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Wiener Institut für
Internationale
Wirtschaftsvergleiche

The Vienna Institute
for International
Economic Studies

Forschungsberichte

wiiw Research Reports | 336

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# Rapid Growth in the CIS: Is It Sustainable?

February 2007

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Garbis Iradian was a guest researcher at wiiw during the preparation of this study. He is now senior economist at the International Monetary Fund (IMF).

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## Acronyms

### Countries

| | | | |
|---|---|---|---|
| ARM | Armenia | CZE | Czech Republic |
| AZE | Azerbaijan | HUN | Hungary |
| BEL | Belarus | POL | Poland |
| GEO | Georgia | SLK | Slovak Republic |
| MDA | Moldova | SLN | Slovenia |
| KGZ | Kyrgyz Republic | ALB | Albania |
| KAZ | Kazakhstan | BGR | Bulgaria |
| RUS | Russia | BIH | Bosnia and Herzegovina |
| TAJ | Tajikistan | HRV | Croatia |
| UKR | Ukraine | MAC | FYR Macedonia |
| UZB | Uzbekistan | ROM | Romania |
| EST | Estonia | TUR | Turkey |
| LVA | Latvia | | |
| LTU | Lithuania | | |

### Regions

| | |
|---|---|
| BAL | Baltic States (Estonia, Latvia, Lithuania) |
| CEE | Central and Eastern Europe (Czech Republic, Poland, Hungary, Slovak Republic, Slovenia) |
| EU | European Union |
| SEE | Southeastern Europe (Albania, Bosnia and Herzegovina, Bulgaria, Croatia, FYR Macedonia, Romania) |
| CIS | Commonwealth of Independent States (Armenia, Azerbaijan, Belarus, Georgia, Moldova, Kyrgyz Republic, Kazakhstan, Russia, Tajikistan, Turkmenistan, Ukraine, Uzbekistan) |
| CIS7 | Armenia, Azerbaijan, Georgia, Kyrgyz Republic, Moldova, Tajikistan, Uzbekistan |
| FSU | Former Soviet Union Republics (CIS plus the three Baltics) |
| MENA | Middle East and North Africa (Egypt, Jordan, Lebanon, Pakistan, Yemen, Algeria, Morocco, Algeria) |
| LA | Latin America (Argentina, Bolivia, Brazil, Chile, Colombia, Mexico, Peru, Honduras, Costa Rica, Nicaragua, Paraguay, Uruguay) |
| SEA | South and East Asia (China, India, Korea, Malaysia, Thailand, Vietnam, Sri Lanka) |

**Other**

| | |
|---|---|
| CEA | Center for Economic Analysis |
| CPI | Consumer price index |
| CS | Cross-section |
| EBRD | European Bank for Reconstruction and Development |
| EU | European Union |
| FDI | Foreign direct investment |
| FE | Fixed effects |
| GCF | Gross capital formation |
| GDP | Gross domestic product |
| GFCF | Gross fixed capital formation |
| GKS | Goskomstat or Rosstat |
| GLS | Generalized least squares |
| GMM | Generalized matrix of moments |
| HIPC | Highly Indebted Poor Countries |
| IFS | International Financial Statistics (IMF) |
| ILO | International Labour Organization |
| IMF | International Monetary Fund |
| IOM | International Organization for Migration |
| IT | Information Technology |
| IV | Instrumental Variables |
| LCU | Local currency units |
| OECD | Organization for Economic Cooperation and Development |
| OLS | Ordinary least squares |
| OPEC | Organization for Petroleum Exporting Countries |
| PPP | Purchasing power parity |
| RE | Random effects |
| REB | Russian economic barometer |
| REER | Real effective exchange rate |
| RER | Real exchange rate |
| SCCIS | Statistical Committee of the CIS |
| SITC | Standard International Trade Classification |
| TFP | Total factor productivity |
| TOT | Terms of trade |
| ULC | Unit labour costs |
| UNCTAD | United Nations Conference for Trade and Development |
| UNECE | United Nations Economic Commission for Europe |
| UNESCO | United Nations Educational, Scientific and Cultural Organization |
| WEO | World Economic Outlook (IMF) |
| WIIW | The Vienna Institute for International Economic Studies |
| WTO | World Trade Organization |
| 2SLS | Two-stage least squares |
| 3SLS | Three-stage least squares |

## *Summary*

*This paper analyses some of the main factors behind the recent rapid growth in the Commonwealth of Independent States (CIS) and the prospects for its continuation. Two approaches are used. The first approach uses growth accounting exercises to estimate the total factor productivity (TFP) growth of all transition economies and compare them with other fast-growing economies. The second approach uses panel regression to estimate the determinants of per capita and TFP growth for 90 countries. Both short-run and long-run coefficients are estimated using fixed effects, random effects, and two stage least squares (2SLS) econometric techniques.*

*The central conclusion of the study is that the rapid growth of the CIS countries over the past six years has been driven primarily by improvement in labour productivity, increases in capacity utilization, recovery of previously lost output, favourable commodity prices, and large increases in remittances. This strong growth may continue over the next few years. Why? First, the still relatively low real GDP base and low average per capita means that there is more catch-up potential. Second, the recent trend of faster capital accumulation is expected to play a more important role in the medium-term growth. Third, education levels are relatively much higher than in other regions. There is a downside risk, however, arising from the high concentration of exports in a few commodities. The undiversified export structure and the terms-of-trade gains may expose the CIS countries to considerable external risks.*

*The challenge, therefore, will be to improve the investment climate in the non-primary sectors. Improving the investment climate will require further progress in implementing structural reform and strengthening institutional development. The undiversified export structure and the terms-of-trade gains may expose the CIS countries to considerable external risks. As time passes, the share of growth derived from improved resource allocation may diminish gradually and long-term rapid growth will be increasingly dependent on physical and human capital accumulation.*



***Keywords:*** *growth, TFP, remittances, institutions*

***JEL classification:*** *F1, O47, F20, N7*

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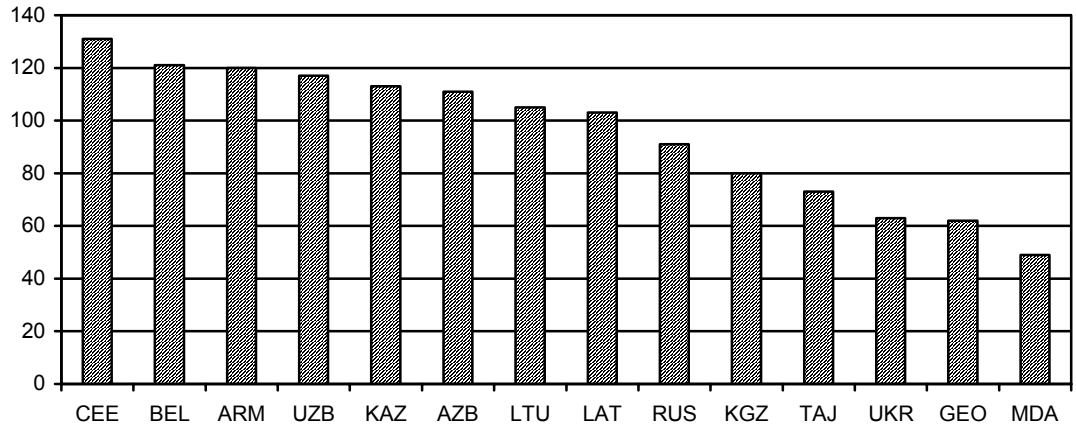
# Rapid growth in the CIS: is it sustainable?

## I. Introduction, purpose and scope of study

This study analyses some of the main factors behind the recent rapid growth in the Commonwealth of Independent States (CIS) and the prospects for its continuation. The CIS region includes Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyz Republic, Moldova, Russia, Tajikistan, Turkmenistan, Ukraine, and Uzbekistan. From 2000 to 2005, real economic growth in the CIS averaged (unweighted) 8% per year, exceeding the growth of most other regions. The contraction in output during the first half of the 1990s, however, was so deep that as of end 2005 real GDP figures for Moldova, Georgia, Ukraine, Tajikistan, Kyrgyz Republic, and Russia were still below their 1990 levels (Figure 1).

Figure 1

**Real GDP index in 2005 (1990 = 100)**




*Note*: CEE is the unweighted average for Czech Republic, Hungary, Poland, Slovak Republic, and Slovenia.
*Sources*: Author's own calculations from national central bank websites and IMF WEO database.

The size of the output decline in the early 1990s varied significantly across countries depending, in part, on the extent of pre-transition linkages with the Soviet Union and regional conflicts. Table 1 shows the differences in the depth and length of the decline, as well as the timing and strength of the subsequent recovery. The extent to which output collapsed in some CIS countries far exceeded expectations, partly due to special factors including regional political conflicts and the absence of support institutions to manage the

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transition to a market economy.[1] By the time output had bottomed out, it had fallen by more than 50% in Armenia, Azerbaijan, Georgia, Moldova, and Tajikistan.[2] The pick up in growth rates since the output troughs has been impressive in most CIS countries. Cumulatively, as of 2005, the recoveries in Belarus, Armenia, Azerbaijan, Kazakhstan, and Russia, in that order, have been ranging from 121% to 91%.

The experience of most fast-growing economies show that to sustain economic growth of at least 6% a year for a long period (15 to 20 years) the investment-to-GDP ratio should exceed 25% (examples include China, South Korea, Malaysia, Thailand, Vietnam, and Botswana). But investment outlays for the CIS, excluding Azerbaijan,[3] averaged about 22% of GDP in 2001–05, and total employment for the region as a whole at end-2005 was about 10% below its 1989 level. Total factor productivity (TFP), including greater capacity utilization, appear to have contributed more to growth than factor inputs.[4] This development raises the question, can the current pace of economic expansion be sustained?

Table 1

**Output performance in the FSU, 1990–2005**

| | Cumulative output decline to lowest level (1990=100) | Year in which output was lowest | Average growth since lowest level | Real GDP in 2005 (1990=100) |
|---|---|---|---|---|
| Georgia | 68 | 1994 | 6.5 | 62 |
| Moldova | 66 | 1999 | 3.5 | 49 |
| Ukraine | 59 | 1998 | 7.3 | 63 |
| Azerbaijan | 58 | 1995 | 14.2 | 111 |
| Armenia | 53 | 1993 | 9.1 | 120 |
| Tajikistan | 51 | 1996 | 7.4 | 73 |
| Kyrgyz Rep. | 49 | 1995 | 4.5 | 80 |
| Latvia | 47 | 1995 | 7.1 | 103 |
| Russia | 42 | 1998 | 6.7 | 91 |
| Kazakhstan | 39 | 1995 | 6.6 | 113 |
| Belarus | 37 | 1995 | 6.8 | 121 |
| Lithuania | 34 | 1994 | 6.1 | 105 |
| Estonia | 30 | 1994 | 6.6 | 137 |
| Uzbekistan | 18 | 1995 | 3.8 | 117 |

*Sources*: IMF (WEO database) incorporating national statistics.

[1] Examples of regional conflicts include the war over Nagorno-Karabakh between Armenia and Azerbaijan (1990-94), secessionist pressures in Georgia and Moldova, and the civil war in Tajikistan from 1991 to 1997.

[2] The rate of the real GDP declines in the early 1990s were likely to be overstated in the official data – due to both the emergence of the private sector, which in the early days of the transition was typically not fully included in the statistical base, and the development of the underground economy.

[3] Investment in Azerbaijan averaged 42% of GDP in 2000–05, with foreign investment in the energy sector accounting for more than half of this investment.

[4] TFP is a measure of elements such as managerial capabilities and organizational competence, research and development, intersectoral transfers of resources, increasing returns to scale, embodied technical progress, and diffusion of technology.

In analysing the growth experience of the CIS countries, two approaches are used. First, growth accounting exercises are undertaken. Second, regression estimations on the determinants of growth in per capita or total factor productivity are carried out. Two periods of macroeconomic performance, 1996–2000 and 2001–05, are distinguished. Both external and internal environments differ significantly in these two periods. The research questions are as follows:

- Why did CIS countries grow faster than other regions? Is the low initial income level, after the sharp fall in output in the 1990s, one of the major factors in explaining the rapid growth in recent years (recovery of lost output)?
- Has the improved growth performance been accompanied by improvements in investment, productivity growth, and basic institutions, suggesting a more durable foundation?
- Why have the non-reformers (Belarus and Uzbekistan) fared better than some of the reformers?
- Have improved economic policies played an important role? Do market reforms and improvement in institutions explain the variance in relative output performance?
- To what extent is the recovery of growth driven by favourable external conditions? Did the recent improvements in the terms of trade and the large inflows of remittances to low-income CIS countries contribute to their strong growth?
- Can Russia continue being a regional growth engine?
- And finally, how can the region turn the rapid growth into dynamic sustained growth?

The central conclusion is that the recent rapid growth has been driven primarily by improvements in the allocation of resources and labour productivity,[5] increases in capacity utilization, recovery of previously lost output, favourable world commodity prices, and large increases in remittances. Most of these factors are unlikely to continue over the long term, although over the next few years growth may remain strong.

The strong economic recovery that began in 2000 in the CIS may continue over the medium-term, albeit at somewhat lower growth rates. Recent trend of faster capital accumulation is expected to play a more important role in the medium-term growth. There is a downside risk, however, arising from the high concentration of exports in a few commodities. One possible way to address this risk would be through export diversification. But the economic diversification and modernization of these economies is a long-term

[5] During the initial years of transition, the disorganization or chaos resulting from the removal of central controls and coordination produced negative TFP growth rates as output fell and a large part of the capital stock lay idle. Subsequently, as the economies achieved macroeconomic stability and introduced structural reforms, the reallocation of resources to more productive activities allowed the economies to generate rapid growth with low rates of investment, so that total factor productivity growth rates increased.

process that is likely to take years to materialize, even under favourable circumstances in a supportive policy environment. More specific findings include the following:

- The growth-accounting exercise suggests that CIS's recent strong growth has been driven largely by growth of productivity.
- Transition countries that experienced larger declines in output during the early 1990s tended to grow at much faster rates.
- Improvements in macroeconomic policies and structural reforms contributed strongly to the recent rapid growth in the CIS region.
- More favourable terms of trade and large increases in remittances have also aided the stronger growth performance. But the undiversified export structure and terms-of-trade gains expose the CIS countries to considerable external risks.
- Russia's influence on CIS economic performance remains significant. New linkages (such as economic migration, remittances, and dependence on Russian energy supply and transit) are emerging.
- Although growth over the medium to long-term could slow from the record high levels observed in recent years, it should nevertheless remain relatively strong barring negative external shocks or policy reversals in the macroeconomic or structural areas.

This study is divided into seven sections. Section I comprises this section. The second section presents an overview of the main macroeconomic developments in the CIS region and reviews the main drivers of growth. Section III attempts to explain why some of the non-reformers performed better than some of the reformed transition economies. Section IV reviews the growth accounting framework, estimates the share of factor inputs, and analyses the estimation results. The contribution of the calculated growth in TFP to output in the CIS region is compared with the Baltics (BAL) Central and Eastern Europe (CEE), major industrial countries, Latin America, and the fast growing economies of Southeast Asia. Section V examines the empirical determinants of growth in output and TFP. After a brief review of the literature, the recent development in workers' remittances to the low income CIS is discussed. Real GDP growth, and the derived rate of TFP growth from Section IV are regressed on a set of macroeconomic variables, structural reforms, and institutions using panel data (that is, across countries and over time) data for a large group of countries over the period 1970–2005. Section VI summarizes the findings and draws conclusions.

In view of the limited availability and quality of data some potential methodological pitfalls with the approaches used in this study should be recognized. A new database has been compiled from a number of sources including the WEO database, the World Bank, the ILO, UNECE, wiiw, and the national authorities as reported in the annual reports of the countries' respective central banks. One caveat should be noted: the data for some of the CIS countries (particularly for Tajikistan, Turkmenistan, and Uzbekistan are generally

incomplete and not always of good quality, hence data from these countries should be interpreted cautiously.

## II. Overview of macroeconomic developments

Macroeconomic performance in the CIS countries has improved significantly in the past five years. Growth has been impressive, inflation has declined, and the fiscal and the external current account deficits have narrowed significantly and in some case moved to surplus. Considerable progress has also been achieved in structural reforms.

### *A. Contribution to GDP growth*

During 2001–05, real GDP growth for the CIS region picked up strongly to an unweighted average of 8% a year, outperforming the average growth in other regions, including the fast growing economies of Southeast Asia. Preliminary indications for the first nine months of 2006 show continued robust growth for all CIS countries. Prudent macroeconomic policy framework, some progress in structural reforms, high commodity prices, and a benign global environment underpinned the strong growth.[6] Also, the rapid growth in the CIS has proceeded from a low base, after the sharp fall in output in the first half of the 1990s.

The rapid growth has been driven by domestic demand (Figure 2). Real private consumption grew by about 9% for the region as a whole, underpinned by large hikes in real wages (Figure 3). In the low-income CIS countries, the substantial increase in remittances is helping support consumption. While the benign global environment and higher commodity prices have encouraged a rapid increase in exports, the sharp increase in consumption has led to an even higher growth in imports. The contribution of net exports to GDP growth, therefore, was negative or close to zero with the exception of Armenia and Kazakhstan.[7]

While real investment grew by double-digit levels in several CIS countries, the ratio of investment to GDP remained relatively low (Figure 4). The investment outlays (excluding Azerbaijan) remained relatively low (23% of GDP) despite the very favourable growth performance, some 6 percentage points below the simple average for Estonia, Latvia and Lithuania (BAL), 3 percentage points below the five CEE economies, and some

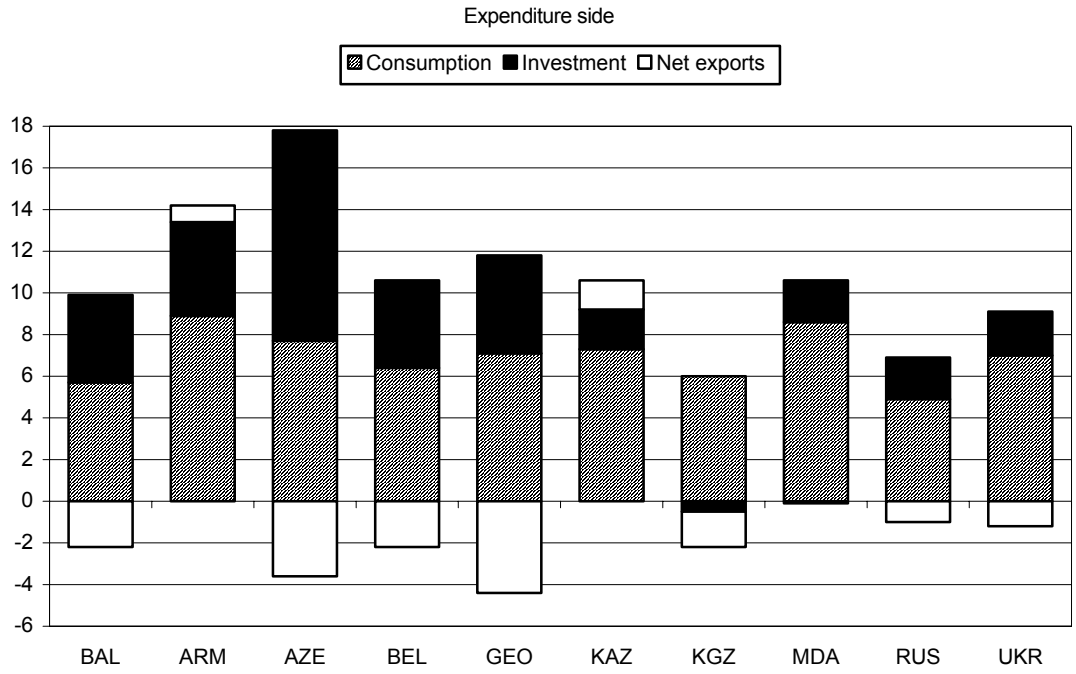
[6] Global growth in recent years has been running at its strongest pace in thirty years.

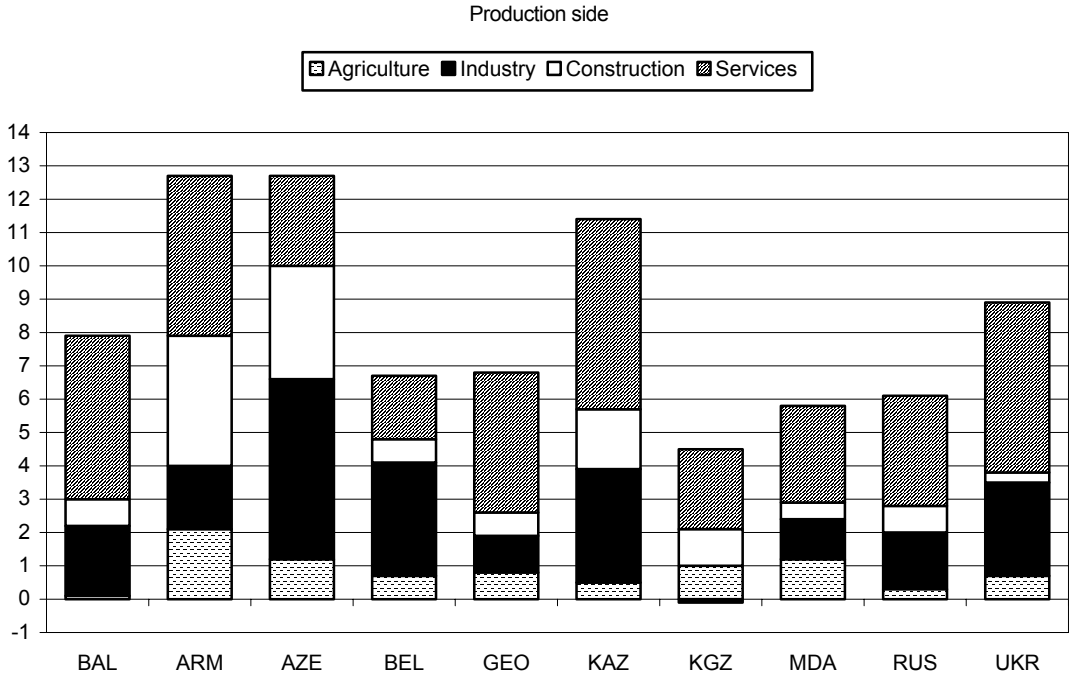
[7] Exports of processed precious stones and metals, representing 65% of total exports in Armenia, accounted for most of the recent growth in exports. Georgia's exports of metals, copper, and steel to Turkey, and wine and beverages to Russia (representing about 60% of total exports), have also surged in recent years. The value of Azerbaijan's exports, 87% of which are crude oil and oil products, more than doubled from 2001 to 2005. In the Kyrgyz Republic, gold accounts for about 40% of the total exports, and in Tajikistan aluminium and cotton fibre account for about 70%.

Figure 2

**Contribution to GDP growth, 2001–2005**

(In percentage points of GDP)



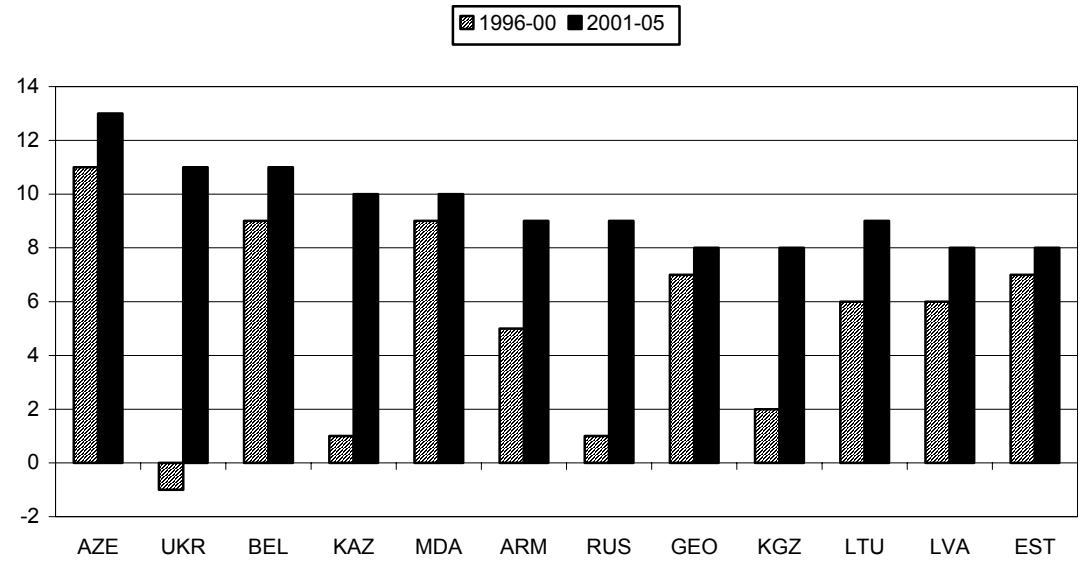

*Sources*: Author's calculations from the WEO and UNECE databases.

10 percentage points below the fast-growing countries in southeast Asia. In particular, the level of investment remained low in sectors other than oil, gas, and metallurgy. FDI inflows outside the commodity sectors remained low. The continued concentration of exports in primary commodities raises questions about the regions' vulnerability to sharp fluctuations in global prices of commodities. This concentration also makes it more difficult to improve employment figures.

Figure 3

**Real private consumption, 1996–2005**

(Average percentage change)



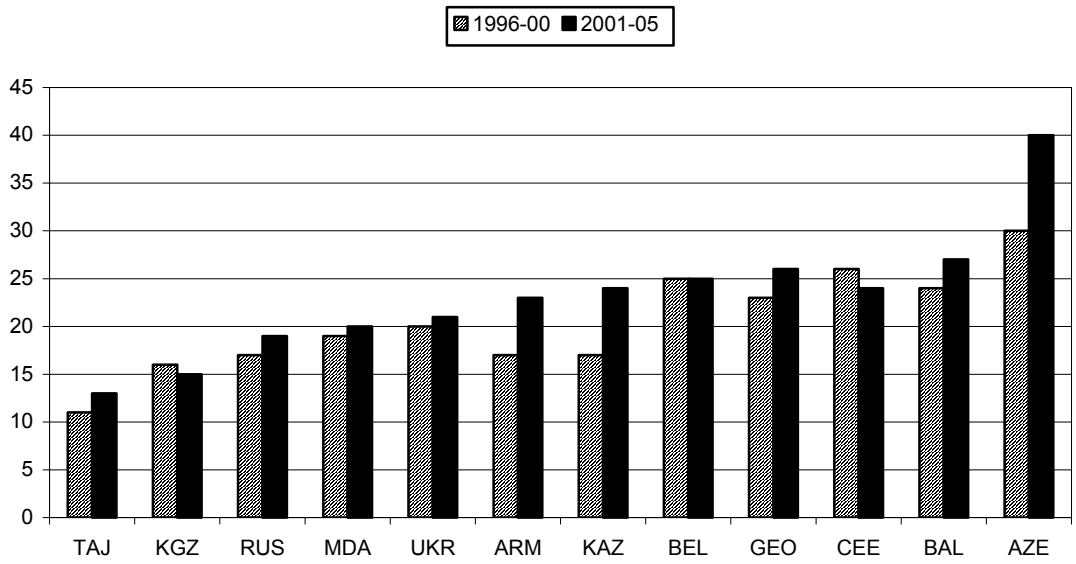

*Sources*: Author's calculations from the WEO and UNECE databases.

Turning to individual countries, Russia experienced seven years (1999–2005) of strong economic growth. In 1999–2000, growth was driven by a strong increase in net exports which resulted partly from the large real exchange rate depreciation. Beyond 2000, the impetus to growth was mainly private consumption fuelled by rising incomes following the sharp rise in international oil prices. The rising domestic demand led to some increase in imports so that the contribution of net exports to growth declined over the past four years. As in other energy exporting countries, the income and wealth effects associated with high oil and gas prices lifted non-energy output. The latter reflected the rebound in real wages from the depressed levels in the wake of the 1998 financial crisis. While real fixed investment grew by an annual average of 9%, the investment-to-GDP ratio remained relatively low, particularly in the non-energy sector. Russia's inefficient state administration is a key impediment to investment – both foreign and domestic. Growth in small and medium-sized enterprises remains relatively limited.

Figure 4

**Investment, 1996–2005**

(In per cent of GDP)




*Sources*: Author's calculations from the WEO and UNECE databases.

The strong growth in Ukraine in 2000–05 is due to positive terms-of-trade shocks, the cumulative effect of structural reforms introduced in 2000-2001, and the strong recovery of domestic demand. An export-led upturn in key manufacturing sectors (particularly in steel and chemicals) which benefited from increased external demand and higher international prices of commodities, contributed to an overall surge in real industrial output.[8] Real GDP growth slowed in 2005 primarily on account of decelerating exports (drop in world steel prices) and political uncertainties that undermined investment, but recovered rapidly in 2006. Foreign direct investment has soared since 2004 to an estimate of USD 10 billion in 2005-06 – more than the cumulative total for all preceding years. But there is still a long way to go before foreign investment levels match central Europe's. The bulk of the recent inflow is accounted for the USD 4.8 billion privatization of Kryvorizhstal, the steel mill, sold in 2005 to Mittal Steel, and a handful of bank deals. Other sectors have been barely touched by foreign capital due to high bureaucratic interference and influence of domestic oligarchs.

FDI-led reconstruction of the energy sector has contributed to the strong economic performance in Azerbaijan and Kazakhstan. The completion of the Baku-Tbilisi-Ceyhan oil pipeline (with a capacity of one million barrels a day) and the extraction from the large

[8] The steel and chemicals sectors accounted for close to half of Ukrainian export earnings. The recent completion of new refining capacity is also bearing fruit: various oil products – which now account for about 15% of total exports – benefited from increased prices. Exports of machinery and equipment (including transport vehicles) increased substantially in recent years on the strength of Russia's surging import demand.

Azeri-Chriag-Guneshi oilfield raised the annual growth rate in 2005-2006 to more than 25% in Azerbaijan. In Kazakhstan also, high oil prices have helped boost economic growth to an average of about 10% a year in 2001–05, while employment – which had declined sharply in the 1990s – has recovered in recent years.

Growth in Armenia, Georgia, Moldova, the Kyrgyz Republic, and Tajikistan was also strong. On the expenditure side, economic growth has been driven by private consumption and small scale private investment. On the production side, construction and services accounted for most of the growth. High levels of remittances from workers living abroad combined with substantial growth in real wages have fuelled private consumption growth. In Georgia, the economy benefited greatly from its role as a transit corridor for oil and natural gas. The construction sector was boosted by the work on the Baku-Tbilisi-Ceyhan oil pipeline and the Shah-Deniz gas pipeline, which have provided employment and generated demand for business services. Average annual growth rate in the Kyrgyz Republic was much lower than the other CIS due to the accident in 2002 at the Kumar gold mine, which accounts for a large share of the country's industrial output and exports, and the political upheaval in 2005 (Tulip Revolution).

Belarus, with limited market reforms, has experienced 10 years of uninterrupted strong growth averaging about 7% a year. Unlike other CIS countries, this rapid growth has occurred from a relatively high initial base – Belarus suffered a smaller drop in output in the early 1990s than most other CIS countries. The rapid growth reflected the continuing strength of the manufacturing industry, and greater efficiency in energy and capacity utilization. In contrast to some other CIS countries, where growth and exports remain concentrated in the extracting sectors (oil, gas, and metals) with limited employment opportunities, the growth structure in Belarus has been much more beneficial for labour.

Strong growth has also been recorded in Turkmenistan and Uzbekistan, also non-reformed economies, underpinned by higher commodity prices. According to official figures real GDP growth in Turkmenistan averaged more than 15% in 2000-2005, but it is likely that these estimate may have a significant upward bias.[9] Uzbekistan's average growth of 5% in 2001-2006 has been driven by favourable world market prices for gold and cotton – Uzbekistan's main exports – and increasing exports of natural gas and cotton. The binding constraint on higher economic growth in Turkmenistan and Uzbekistan (in the non resource sectors) continues to be the extensive state intervention and the relatively closed nature of these two economies, which hold back private sector development.

[9] According to UNECE, this growth rate diverges considerably from the officially reported changes in physical volume of output of the country's key commodities. Also the implicit deflators in the official statistics appear to be inconsistent with the reported growth in the average nominal wage in the economy. The UNECE estimates of the average real GDP growth is about 7%. Prior to 1999, Turkmenistan's growth experience was similar to other CIS countries, but diverged afterwards.

### *B. Progress towards macroeconomic stabilization*

Significant progress has recently been made in the CIS toward establishing conditions more propitious for investment and growth. Cautious macroeconomic policies have led to a decline in the CPI inflation rate (Table 2). By mid-2006, inflation rates had been in the single digits in Armenia, Belarus, Georgia, the Kyrgyz Republic, Kazakhstan, Russia, Tajikistan, Turkmenistan, and Ukraine. The inflation rates in Azerbaijan and Uzbekistan were slightly over 10%.

Monetary policy faced important challenges. Several central banks in the region are also focusing on stabilizing the nominal exchange rate against the U.S. dollar in the face of large current account surpluses and capital inflows. With the scope for sterilization of foreign exchange purchases limited by the underdeveloped domestic debt market, base money growth remained above levels consistent with low, single-digit inflation rates.

Prudent fiscal policy has been one of the most important contributions to sustaining growth in the CIS. The average fiscal deficit narrowed from about 6% of GDP in 1996–2000 to less than 1% in 2001–05. In addition to cutting unproductive expenditures, fiscal responsibility has been facilitated by growing revenues due to strong growth and some improvement in the administration of tax collection. Rising oil and gas prices helped the resource-rich economies of Azerbaijan, Kazakhstan, Russia, and Turkmenistan to strengthen their fiscal positions, moving the fiscal deficits to significant surpluses in recent years, and to increase substantially their foreign exchange reserves.

Foreign exchange flows to the region – whether in the form of export earnings, workers' remittances, or official financing – accelerated, boosting foreign exchange reserves. The external positions of all CIS countries strengthened. The unweighted average external current account deficit narrowed significantly, although there is significant variation across countries. Most countries in the region benefited from the boom in commodity prices. Russia has recorded an average current account surplus of 10% of GDP, and Ukraine a surplus of about 7% of GDP. The large current account deficit in Azerbaijan was mainly due to the extensive pipeline and oil and gas field development projects financed through FDI. In the low-income CIS countries (Armenia, Georgia, the Kyrgyz Republic, Moldova, and Tajikistan) the adverse impact of higher energy prices on the current account was more than offset by increasing remittances and prices of non-oil commodity exports.

The improvement in the fiscal and external current balances combined with the recent appreciation of the exchange rate relative to the U.S. have resulted in significant reductions in countries' external debt burdens easing concerns about medium-term debt sustainability. Debt relief under the Highly Indebted Poor Countries (HIPC) Initiative, which has already benefited Tajikistan, is expected to reduce further the burden of debt in the

Table 2

## Key economic and financial indicators, 1996–2005

| | **Per capita real GDP growth** (%) | | **CPI inflation Rate** (period average, in %) | | **Investment** (as per cent of GDP) | | **Fiscal balance** (as per cent of GDP) | | **Current account balance** (as per cent of GDP) | | **External debt** [1] (as per cent of GDP) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1996–2000 | 2001–2005 | 2000 | 2005 | 1996–2000 | 2001–2005 | 1996–2000 | 2001–2005 | 1996–2000 | 2001–2005 | 2000 | 2005 |
| CIS | 3.2 | 8.0 | 33.5 | 10.1 | 19.8 | 22.2 | -5.1 | -0.8 | -7.4 | -2.1 | 62 | 40 |
| Armenia | 6.6 | 12.1 | -0.8 | 0.6 | 17.0 | 22.1 | -6.6 | -1.9 | -17.9 | -6.3 | 45 | 27 |
| Azerbaijan [2] | 6.2 | 11.5 | 1.8 | 9.7 | 30.6 | 41.8 | -3.1 | 0.1 | -19.9 | -16.9 | 20 | 13 |
| Belarus | 6.7 | 7.9 | 168.6 | 10.3 | 24.7 | 23.6 | -1.1 | -1.0 | -4.2 | -1.7 | 12 | 5 |
| Georgia | 7.2 | 8.1 | 4.0 | 8.3 | 15.7 | 23.1 | -6.0 | -1.5 | -8.2 | -7.8 | 52 | 33 |
| Kazakhstan | 3.9 | 10.2 | 13.3 | 7.6 | 16.5 | 23.3 | -5.3 | 2.3 | -2.4 | -1.5 | 69 | 74 |
| Kyrgyz Republic | 4.2 | 4.0 | 18.7 | 4.8 | 16.5 | 18.3 | -10.5 | -5.0 | -14.7 | -3.4 | 124 | 91 |
| Moldova | -2.1 | 7.3 | 31.3 | 11.9 | 19.1 | 17.0 | -6.8 | 0.3 | -11.7 | -4.3 | 134 | 67 |
| Russia | 2.2 | 6.6 | 20.8 | 12.6 | 17.2 | 18.9 | -5.2 | 3.4 | 6.7 | 10.1 | 62 | 26 |
| Tajikistan | -0.5 | 8.8 | 32.9 | 11.3 | 11.3 | 14.0 | -5.6 | -2.9 | -6.3 | -3.8 | 81 | 31 |
| Ukraine | -1.1 | 8.0 | 28.2 | 13.5 | 19.8 | 19.4 | -2.9 | -1.5 | 0.3 | 6.6 | 38 | 31 |
| Uzbekistan | 2.2 | 4.0 | 49.5 | 21.0 | 29.0 | 22.3 | -3.5 | -1.5 | -2.7 | 5.7 | 49 | 37 |
| Baltics (BAL) | 6.1 | 7.7 | 2.5 | 4.5 | 23.4 | 25.7 | -2.0 | -1.0 | -8.1 | -8.8 | 53 | 73 |
| Estonia | 6.6 | 6.9 | 4.0 | 4.1 | 26.8 | 29.0 | -0.8 | 1.3 | -7.7 | -10.4 | 55 | 89 |
| Latvia | 6.7 | 8.4 | 2.6 | 6.7 | 21.4 | 26.3 | -1.9 | -2.1 | -7.2 | -9.4 | 61 | 85 |
| Lithuania | 5.0 | 7.8 | 1.0 | 2.8 | 21.9 | 21.7 | -3.3 | -2.1 | -9.5 | -6.5 | 43 | 44 |
| Central Europe (CEE) [3] | 3.7 | 3.7 | 8.9 | 2.5 | 26.0 | 23.8 | -3.9 | -4.6 | -4.9 | -4.1 | 48 | 56 |
| Southeast Europe (SEE) [4] | 5.1 | 4.5 | 14.6 | 5.8 | 22.5 | 23.3 | -4.2 | -2.8 | -7.8 | -9.0 | 56 | 52 |

*Note*: Regional figures are unweighted averages.

1) Much of the external debt of the low income CIS and south-east European economies is owned to the IMF and the World Bank and are at concessional terms. Therefore, the present value of external debt-to-GDP ratios for Armenia, Georgia, Moldova, Kyrgyz Republic, and Tajikistan are much lower than the figures reported in this table. – 2) The large external current account deficit for Azerbaijan is due to extensive imports associated with the pipeline and oil and gas fields development financed through FDI. – 3) Includes Czech Republic, Hungary, Poland, Slovak Republic, and Slovenia. – 4) Includes Bulgaria, Croatia, Romania, Albania, Bosnia and Herzegovina, and FRY Macedonia.

*Sources*: Derived from IMF World Economic Outlook and the Vienna Institute for International Economic Studies (wiiw) databases.

Box 1

**Labour market**

The transition from central planning to market economy has involved large losses in employment as unproductive firms have been closed, state enterprises were privatized, and production processes became more efficient. Many pre-transition characteristics of labour markets – high participation rates, the lack of open unemployment, and little wage differentiation – changed completely. Total employment in all the CIS dropped by about 20% from 1990 to 1997 (see Appendix Table A22).

The economic expansion that started in most countries of the region in 1999 has led only to modest employment increases in Russia, Ukraine, and Central Asian countries. As of 2005 and relative to the pre-transition level of 1990, the region as a whole still lost slightly more than 10% of its employment. The jobless recovery in some CIS countries may reflect the poor quality of labour market statistics. Official statistics fail to capture fully the improvement in employment in small and medium size enterprises and in service sectors that are less well monitored than industry. Difficult business environment in some of the CIS countries appear to have limited the ability for small and medium-sized enterprises to play their role of key employment generators. Self employment has increased substantially and is mainly concentrated in farming, wholesale and retail trade, and construction. There has been a large shift in labour between the public and private sectors. Private sector employment has grown rapidly, both in absolute terms and as a share of total employment.

Real wages, after declining sharply in the first half of the 1990s, grew at double digit levels over the past five years and have surpassed the productivity growth in all CIS countries. The registered unemployment rates, according to an ILO definition, are relatively low. But the labour force survey (LFS) data indicate high rates of unemployment rate (varying from 9% in Kazakhstan, Russia, and Ukraine, to 20% in Armenia, Georgia, and Moldova). Migration from CIS-7 countries to resource-rich countries) especially to Russia and Kazakhstan continued despite the strong economic performance of the past 7 years.

Engagement in the informal sector by those officially listed as unemployed or economically inactive is widespread in the CIS countries. According to the ILO sources, the size of the informal sector employment accounts for about one-half of all employment in the CIS as compared to about a quarter of in the CEE. Informal sector jobs are defined as value-adding activities outside the tax net and regulation. These activities may be unregistered and untaxed by their nature (household subsistence economy) or emerge because of purposeful evasion and noncompliance.

In 1995–2005**,** population and labour force growth rates increased in the range of 1% to 2% a year, with the highest in Turkmenistan followed by Uzbekistan, Tajikistan, the Kyrgyz Republic, and Azerbaijan. In contrast, population and labour force rates declined by 1% to 1.5% a year in Armenia, Georgia, Moldova, Russia and Ukraine due to reduced fertility, increasing mortality and emigration. With respect to the quality of the labour force, the secondary school enrolment rate in the CIS is still much higher than most low and middle income developing countries. The human capital stock inherited from the Soviet era was very high.

Kyrgyz Republic and Moldova. At end-2005, the external debt was still high in Moldova (67% of GDP) and the Kyrgyz Republic (91% of GDP). Debt service obligations continue to absorb a large portion of central government expenditures in these two countries, reducing resources available for social expenditures.

The process of monetary deepening accelerated in recent years. Strong growth in domestic demand has been fuelled by rapid expansion in credit to the private sector (a significant share is denominated in foreign currency). Much of this expansion reflected the needed process of remonetization and improvement in financial intermediation. In the Caucasus and Central Asia, the degree of monetization has increased at a fast pace in recent years but still is considered low compared with the Central and Eastern European economies (Box 1).

## III. Variation in output development among the CIS countries

There are a number of factors, such as initial conditions, institutional quality, and duration of Soviet rule, that are attributed to the CIS countries' lower performance in the 1990s, compared to its peers in the CEE and Baltic regions.[10] Much variation also exists among the CIS countries. The output decline was deeper and longer in Russia and Ukraine than in Belarus and Uzbekistan. In this connection, Figure 5 shows the profile of output in individual CIS countries. Maximum annual output decline occurred in the year that transition began (exacerbated in some countries by wars or violent crisis), and by the time stabilization began, cumulative output had fallen by more than 40%, except in Belarus and Uzbekistan.

In most studies that attempted to explain growth performance, the usual set of explanatory variables used were initial conditions, structural reforms, and macroeconomic policy variables (Berg and others, 1999; Fischer and Sahay, 2000; and Havrylyshyn and van Rooden, 2003). It is not entirely clear from these studies why growth resumed much sooner and the decline in output was smaller in Belarus and Uzbekistan (two slow reformers) than in the other CIS countries, particularly Russia and Ukraine. Differences in industrial disproportions and natural resource abundance do not seem to explain the depth of the decline (Russia and Ukraine are rich with natural resources).

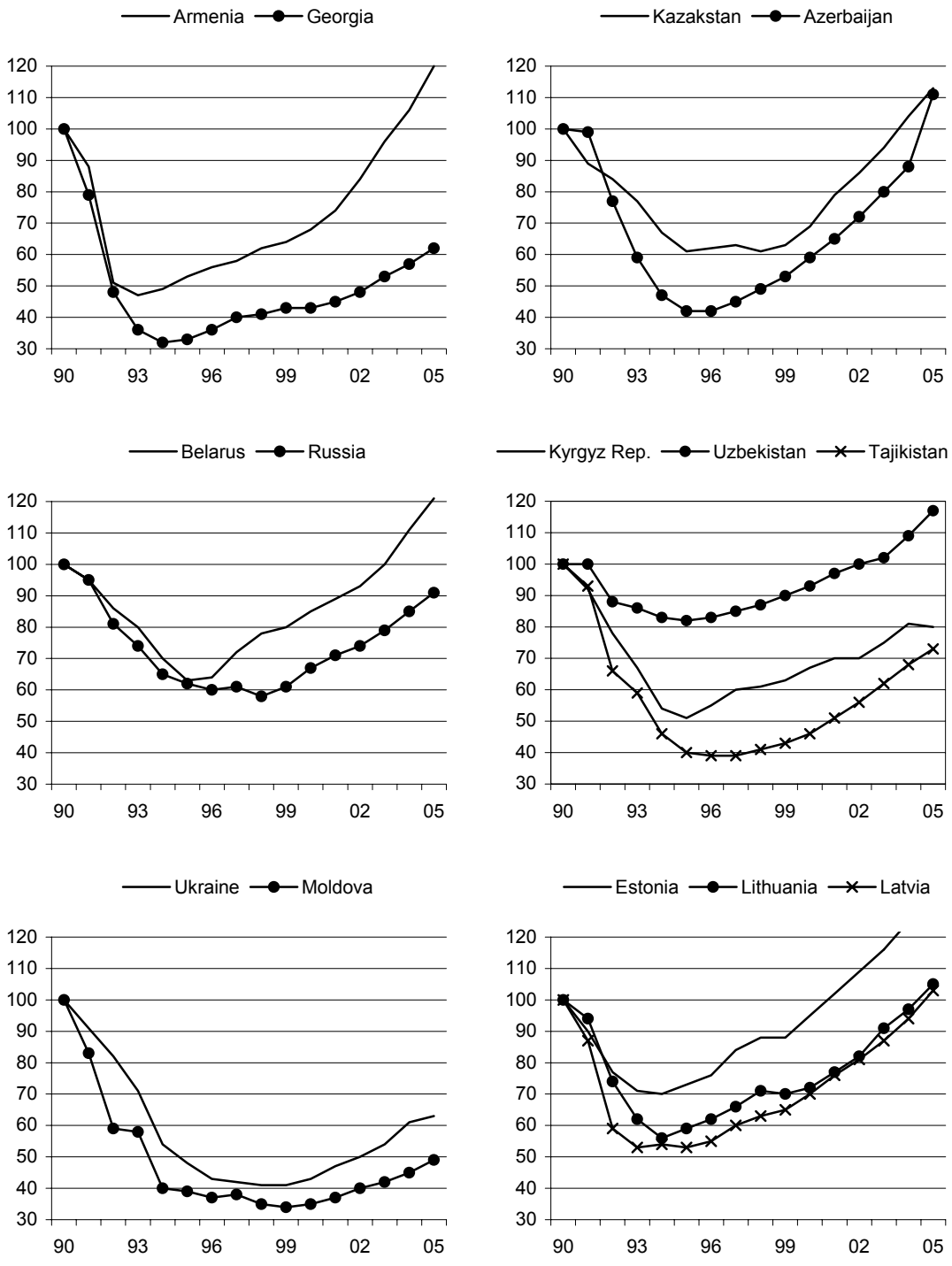
A number of researchers argue that the deep and long decline in output can be explained by institutional performance. Djankov et al. (2003) note that the CEE countries reduced

[10] The initial conditions of the CIS countries include the structure of the economies, magnitude of macroeconomic imbalances and structural distortions. Some of the CIS countries also suffered a severe external shock when the disintegration of the Soviet Union and the collapse of the Council for Mutual Economic Assistance (CMEA) in 1991 wiped out various forms of transfers from the Soviet Union and substantially reduced their terms of trade.

Figure 5

**Output profile in the FSU, 1991–2005**

Real GDP index (1990 = 100)




*Sources*: WEO database incorporating revised figures by authorities on the extent of output decline in the early 1990s.

government control and involvement in the economy less than Russia and this enabled them to be on a more attractive institutional possibility frontier. Popov (2000) argues that countries which were able to create strong democratic governments (as in the CEE or the Baltics), or countries which decided to stay with the old authoritarian order (Belarus, Uzbekistan, China, and Vietnam), were able to resume growth earlier and at a higher rates, while countries which decided to go through a painful constitutional transformation, and ended up with weak governments, such as Russia and Ukraine, experienced deeper and longer output decline.[11]

Sonin (1999) argues that bad-quality government manifests itself in rent-seeking behaviour and is unable or unwilling to protect property rights. Catanheira and Popov (2000) attribute the collapse of the Russian government to the inappropriate sequencing of reforms. They argue that most countries usually develop the rule of law and then introduce democracy. The CEE countries developed the rule of law, an initial condition, before the World War II, and managed to return to it at the beginning of transition. History provides examples of authoritarian governments succeeding in promoting economic development, South Korea in the 1950–80s, Chile in the 1970–80s, and modern China. Yudaeva and others (2004) argue that Russia failed in the 1990s for the following reasons: (1) it developed a weak, illiberal democracy without the rule of law; (2) it did not produce well-trained politicians and economists for the new regime; and (3) the government and the Parliament differed on the speed and costs of reforms. In Central Asia, where authoritarian regimes were successful, the leading group also had full control over the main natural resources (cotton in Uzbekistan, oil and gas in Kazakhstan, Azerbaijan, and Turkmenistan). Yeltsin had none of these. He could not rely on the party apparatus. The coming to power of Putin brought a more effective government, stability and trust, and a clear action plan.[12]

Ukraine has an enviable endowment of natural and human resources but the economy has not been able to use these resources efficiently – at least until the late 1990s. The tension between the east (mostly Russian population) and the west (more nationalistic and anti-Russian) is one of the explanations for the government's failure to unify the country and to introduce an effective democracy and a market reform. Output in Ukraine continued to decline until 1998 when real GDP was about 60% of what it had been in 1990. Following the reforms introduced in 1999–2000, the economy grew at an average annual growth rate of about 8% over the past five years. Nevertheless, by end-2005 it had recovered only two-thirds of its pre-transition real GDP level. Babanin and others (2004) note that the main

[11] China and Vietnam started developing the rule of law in their countries under the ruling communist party. The rapid economic growth of these two countries can be attributed to their special economic structure rather than as a result of the piece-meal and gradual approach to market reforms. Reforms were possible in Chile in the 1970s and 1980s because the authoritarian and repressive nature of the Pinochet regime made it easier to eliminate opposition to reform. After the period of repression (starting late 1980s) a considerable amount of consensus emerged on policy.

[12] Owen and Robinson (2003) demonstrate that in addition to the rise in energy prices, the Russian economy benefited also from the 1998 financial crisis which resulted in a sharp devaluation of the ruble.

reason for the failure of transition in Ukraine is the conspiracy between magnates of the old, energy intensive industry and all branches of the government, in a 'state capture' scheme to plunder the rest of the country by collecting and distributing rents among themselves and protecting and preserving their loss-making, old-fashioned sectors.

In contrast to Russia and Ukraine, the institutional capacity in Belarus and Uzbekistan remained strong in the early years of transition, and this prevented the economy from experiencing the deep and long decline in output observed elsewhere in the CIS.[13] Belarus was among the reformers at the start of the transition, but since 1995 the pace of reforms slowed. Nevertheless, the economy has experienced steady and strong growth since 1996 and by 2005 its real GDP index was the highest among the CIS. Although several reform measures were undertaken (notably the lifting of price controls), the economy remains highly regulated and predominantly under state control.

In 1999-2006, industrial enterprises – which are still owned by the government – have undergone very limited restructuring. The strong growth should not necessarily be associated with the slow pace of economic reform, but rather with the special privileged relationship of Belarus with Russia. Specific contributing factors to the strong performance of the Belarus economy include:

- Preferential relations with Russia, including market access. Although trade with Russia declined modestly over the past several years, in 2005 it accounted for about half of the country's total exports and imports.
- Support from Russia (including the importation of oil and gas at significantly lower prices). Till end 2006, Russia charged Belarus USD 47 per 1000 cubic metres of gas and USD 27 per barrel of oil compared with international market prices in 2006 of about USD 230 and USD 60, respectively. This could amount to direct fiscal support equivalent to at least 15% of GDP.
- Limited market reforms prevented Belarus the 'disorganized' political and economic environment that characterized the transition process in other CIS countries.
- The country's well-educated and disciplined workforce. This has been a key factor underlying the rapid growth.
- Maintained of a strong authoritarian government that moderated disorganization and corruption and used direct interaction methods of the old regime via state-owned enterprises to encourage production.

[13] Belarus, Uzbekistan, and Turkmenistan can best be described as illiberal autocracies and are believed to have strong state institutions. One proxy measure of strong institutions is the share of government revenue or expenditure in GDP. In the CEE and to some extent in the Baltics, the share of state revenues in GDP remained relatively high.

A reduction in transfers from Russia would result in a loss of competitiveness. The main source of the strong growth seems to have been in the unrestructured and subsidized industrial sector, a demand that has been met by increased capacity utilization. This may not be sustainable in the longer run in the absence of reforming the economy.

Uzbekistan avoided the high level of disorganization and disorder that characterized the early years of transition in Kazakhstan and Russia. Rent-seeking opportunities in the resource-extracting industries were much lower in Uzbekistan than in Kazakhstan and Russia. Zettelmeyer (1998) attributed Uzbekistan's success to favourable initial conditions (including low initial industrialization), natural resource abundance (cotton and non-ferrous metals), and self-sufficiency in energy. The revival of the economy came about by combining rigid state control with subsidies that were largely financed from the foreign exchange earnings in exporting cotton, and by developing the energy sector for domestic purposes. The cotton exports and self-sufficiency in energy mitigated the external financing constraints faced by other low-income CIS countries. In contrast, Kazakhstan, a relatively fast reformer in Central Asia, has overtaken Uzbekistan in terms of achieving its pre-transition output. While Uzbekistan's continuing reliance on protectionism, state intervention, and government ownership may have prevented the contraction of output in the early-1990s, the overall low reform has probably had a negative impact on aggregate growth in recent years.

## IV. Growth accounting results

The purpose of this section is to attempt to quantify the factors that have been responsible for the CIS's remarkable performance in recent years. In this way, insight can be gained into answering the question of whether comparable growth rates can be sustained in the future. Growth accounting helps to explain economic growth by decomposing output growth into the contributions of capital, labour, and a residual measure of gains in the efficiency with which capital and labour are used. This residual is an estimate of the changes in total factor productivity (TFP) that reflect, in addition to biases due to methodological assumptions and measurement errors, a wide range of factors affecting the efficiency with which inputs are used.[14] In this section, the estimated TFP growth of the CIS is compared with the CEE, the Baltics, SEE, selected fast-growing economies, and advanced OECD countries.

[14] The residual is defined as the growth in output that occurs with unchanged levels of the factor inputs. The interpretation of this residual depends on the definition of factor inputs employed in the analysis. Labour's productivity is affected, among other things, by educational attainment and work experience. The productivity of capital is affected, among other things, by the age of the equipment, the level of technology embodied within it, and whether the capital good is publicly or privately owned.

### *A. Literature review*

Many studies on the sources of growth highlighted the importance of productivity in explaining cross-country differences in per capita real GDP growth. Detailed growth accounting exercises by Solow (1957) and Denison (1962, 1967) found that the rate of capital accumulation per person accounted for less than one-fourth of GDP growth rates in the U.S. and other industrialized countries. Christenson, Cummings, and Jorgenson (1980) incorporated estimates of changes in the quality of human and physical capital in their detail growth accounting exercise for the major industrial countries in 1947–74 (prior to the productivity slowdown). Dougherry (1991) does the same exercise for the period 1960–90 (which includes the slow productivity period). Elias (1990) conducts a rigorous growth accounting study for seven Latin American countries. Jorgenson (1995) showed that it is important to account for changes in the quality of labour and capital. If the quality of labour inputs due to education, training, and health, is not taken into consideration in accounting for growth, then the TFP growth will be overestimated.

Young (1995) found that the high rates of real GDP growth in Hong Kong, Singapore, South Korea, and Taiwan, were mainly due to high growth rates in factor inputs. His estimated share attributed to capital accumulation may be exaggerated because it does not take into account how much TFP growth induces capital accumulation (Barro and Sala-i-Martin, 1995, p. 352). Nevertheless, Young's results have important implications for the understanding of the East Asian miracle, namely, that these countries may not be able to sustain the high economic growth of the past three decades. This line of reasoning is neo-classical in nature, which implies that in steady state there is no technical progress, and that growth results exclusively from the accumulation of resources. This process eventually could stop as a result of diminishing returns to the factors. Thus more emphasis should be placed on productivity.

Senhadji (1999) conducted an extensive growth accounting exercise for 88 countries (excluding transition economies) covering the period 1960–94. The estimated shares of physical capital by regions were as follows: East Asia 0.42, South Asia 0.28, Middle East 0.62, Latin America 0.64, and industrial countries 0.51. De Broeck and Koen (2000) showed that the output fall at the outset of transition is largely accounted for by declines in TFP rates. They assumed that the share of capital is 0.30.

One question, therefore, is whether some of the conditions that led to the rapid growth in certain periods in other countries are also present in the CIS. The answer ultimately depends on the elements that determine economic growth – the growth of the labour force, the accumulation of capital, and productivity growth, or improvements in the way in which labour and capital are employed to produce goods and services.

### *B. Data and methodology*

The data set for transition economies includes 25 countries (comprising 11 CIS, 3 Baltic, 5 CEE, and 6 SEE countries) and generally covers the period 1991–2005. Data for Bosnia and Herzegovina and Croatia, however, have a shorter span. For comparison purposes the growth accounting for several fast-growing economies is also calculated including Chile, China, Ireland, and South Korea. The data come primarily from the IMF World Economic Outlook (WEO), the International Labour Organization (ILO), and the Vienna Institute for International Economic Studies (wiiw). The data-set on the CIS, in particular, suffers from various serious weaknesses due to underreporting by private enterprises, particularly in the early years of transition, to avoid taxes and regulations. The decline in output during the first half of the 1990s could be overstated because the statistical system was designed to collect information only on publicly owned enterprises. Beyond the mid-1990s, the information on the emerging private sector gradually became available and incorporated in the statistical system.

Measuring capital is fraught with difficulties as none of the CIS countries have official estimates of capital stock. The capital stock in this paper is estimated indirectly from investment. This can be done by using the inventory method, which relies on the process of the accumulation of capital. The value of capital stock in a given year is equal to the value of the capital stock of the previous year, plus the real gross investment during the year, minus the depreciation of the initial capital during the year.

$$K_{(t+1)} = K_t + I_t - \delta * K_t \qquad (1)$$

where $\delta$ is the depreciation rate assumed at 0.07 (or 7%). Estimates of the capital stock are in general considered unreliable due to the lack of information about the initial capital stock and the rate of depreciation of capital. However, given the availability of time series on investment for 16 years from the IMF database, the importance of the assumption about the initial capital stock is reduced. That is, any error in the estimate of the capital stock for the CIS in the early 1990s would be small as compared with the stock of capital in recent years given the assumption of a depreciation rate of 7%. Having said that, a rough guess of the initial capital stock, K(0), is made and then equation (1) is used to calculate $K_t$.[15] The capital stock in 1990 is assumed at 1.7 times the real GDP.[16] Capital obsolescence and economic distortions inherited from central planning contributed to the decline in total factor

[15] IMF estimates of the steady state capital-output ratios for emerging Asian countries are in the range of 2.0 to 3.5. The average for industrial countries during 1970–04 is slightly below 3.0.

[16] The effect of the initial capital stock on the capital stock series decreases rapidly with the sample size of investment figures.

productivity to significantly below zero early in the transition.[17] The output collapse was further associated with substantial reductions in the inputs of capital and labour, as investment spending in particular was cut deeply in the early transition years.

Another concern about the measurement of the capital stock for a transition economy is that during the initial contraction a significant portion of the communist capital stock may not only be temporarily idled, but may actually be permanently scrapped. If so, this would cause the contribution of capital accumulation to be underestimated during the subsequent recovery. In order to address this concern, a one-time adjustment for the permanent scrapping of a significant portion of the capital stock during the communist era is applied; that is, the capital stock for the CIS countries is reduced by the same rate as output between 1990 and 1994, so that the (K/Y) ratio is not allowed to rise during the course of the contraction. For labour input, data from the ILO on the economically active labour force are used. But the measure of the labour force treats all workers as if they were identical over time and across countries. In reality, there are major differences in the quality of labour. A better measure of actual labour input would be hours worked. Such data, however, are not available for most CIS countries. Some previous growth accounting studies, which used period averages of 5 to 10 years, made adjustments to labour quality by including education, age, and gender (Young 1994). Such information is available only for selected years and a limited number of countries. More importantly, the education level, as measured by secondary school attainment, for the 25 transition economies, is relatively high as compared with other developing and emerging economies, and there is little variation across CIS countries and over time. Thus, the correlation between the education level and growth is expected to be weak in this case. In the absence of adequate indicators that reflect changes in the quality of labour over time and across countries, the growth in total factor productivity will by overestimated.

The organizing principle of growth accounting is the Cobb-Douglas aggregate production function:

$$Y = e^{\theta} \acute{K}^{\alpha} \acute{L}^{\beta} \qquad (2)$$

where Y is GDP in real terms, $\theta$ is the rate of productivity growth, $\alpha$ represents the share of capital, $\beta$ represents share of labour, $\acute{K}=u_k K$ is the capacity utilization-adjusted measure of capital stock, and $\acute{L}=u_L L$ is the employment-adjusted measure of labour utilization. Failure to adjust for capacity utilization of capital and labour, and failure to account for improvement in capital and labour quality tend to overestimate the Solow residual

[17] Much of what the former Soviet Union Republics produced during the communist system was of poor quality or dubious value; and compared with general practice in the west, socialist industry often employed several times more inputs (especially energy) to produce the same volume of output. Moreover, in the absence of any incentives to encourage efficiency, much of the "investment" that took place under the old system amounted to little more than waste and theft (Aslund, 2001).

($\theta$ = growth in total factor productivity (TFP).[18] Among the CIS, capacity utilization estimates are only available for Russia based on surveys in industry.[19] These surveys suggest series that display a 'U-shaped' pattern of capital utilization, falling until 1996 and rising from 1999 onward. High capacity utilization in recent years may also have been spurred by structural reform. These surveys also show that labour utilization increased from around 70% during 1994–98 to around 85% during 2000–04.[20] In this paper, the results of the capacity utilization for Russia are used as proxy for capital stock and labour utilization in other CIS countries. Output growth is then divided into components attributable to changes in the factors of production. Rewriting equation 2 in growth rates:

$$y = \theta + \alpha\acute{\kappa} + \beta\acute{I} \qquad (3)$$

where y is the per capita growth rate in output, $\theta$ is the growth rate of TFP, $\acute{\kappa}$ is the growth rate of the capacity utilization-augmented capital stock, and $\acute{I}$ is the growth rate of skill-augmented labour. Also, the paper assumes a degree of competition sufficient to ensure that earnings of the factors are proportional to their productivities. The shares of income paid to the factors can then be used to estimate their relative importance in the production process ($\alpha$ is the share of capital and $\beta$ is the share of labour, with constant return to scale $\alpha+\beta=1$). This implies that the growth in total factor productivity ($\theta$) can be calculated as the growth rate of output (y) less the share-weighted growth of factor inputs ($\alpha\acute{\kappa}$ and $\beta\acute{I}$).

Another approach would be to estimate the coefficients of the production function by regressing the growth rate of output on the growth rate of inputs, growth in capital and labour rates (Table 3). The intercept then measures the growth in TFP, and the coefficients on the factor growth rates measure the shares of capital and labour, respectively. The main advantage of this process is that it dispenses with the assumption that factor social marginal products coincide with the observable factor process.

The disadvantage of the regression approach is that the growth of capital and labour cannot usually be regarded as exogenous with respect to variations in TFP – in particular, the factor growth rates would receive credit for correlated variations in unobservable technological change. Also the regression framework has to be extended from its usual form to allow for time and cross-section variations in factor shares and in the TFP growth rate (Barro, 1998). Existing literature on industrial countries shows a range for the capital

[18] An example for improvement in the quality of capital would include a shift from long-life capital (buildings) to short-life capital (machinery and equipment). An example of labour quality would include improvement in the skills and education of the labour force.

[19] See Oomes and Dynnikova (2006). The surveys include Rossat (GKS), the Institute for the Economy in Transition (IET), the Russian Economic Barometer (REB), and the Center for Economic Analysis (CEA).

[20] CIS economies typically had a substantial amount of 'hidden' or 'disguised' unemployment – defined by Eastwell (1997) as employment in very low productivity occupations. Some of this disguised unemployment continued to exist during transition in the form of formally employed workers that had shortened working days.

share of 0.30 to 0.45. For the developing countries the reported capital shares by several studies are well above those of the industrial countries (see Elias, 1990; and Senhadji, 1999). Table 4 shows the estimated TFP growth under two Scenarios. Scenario B uses the same capital share as in Scenario A, but the growth in factor inputs (capital and labour) are adjusted for capacity utilization using the survey results of industry in Russia as a proxy for capacity utilization in other CIS countries.[21] The estimated share of capital is 0.40 using annual data for the period 1996–2005.[22] This is close to the reported share of capital in the literature for industrial countries.

Table 3

**Production function estimates for transition countries**

| Regression | Period | Method of estimation | Intercept TFP growth | Share of capital | Share of labour | R Squared | Obser-vations |
|---|---|---|---|---|---|---|---|
| 1 | 1996–2005 | GLS with | 2.20 | 0.61 | 0.60 | 0.53 | 216 |
| | (Annual data) | Fixed Effects | (2.1) | (3.3) | (6.3) | | |
| 2 | 1996–2005 | GLS with | 1.43 | 0.77 | 0.54 | 0.47 | 216 |
| | (Annual data) | Random Effects | (2.1) | (6.3) | (6.6) | | |
| 3 | 1996–2005 | GLS with | 3.28 | 0.41 | 0.60 | 0.71 | 216 |
| | (Annual data) | CS weights | (6.4) | (3.9) | (7.3) | | |
| 4 | 1991–1995 | GLS with | -1.84 | 0.81 | 0.35 | 0.87 | 120 |
| | (Annual data) | CS weights | (4.4) | (22.6) | (3.9) | | |
| 5 | 1991–2005 | GLS with | 0.24 | 0.88 | 0.48 | 0.83 | 336 |
| | (Annual data) | CS weights | (1.5) | (30.8) | (7.1) | | |
| 6 | 1996–2005 | OLS | 2.42 | 0.41 | 0.70 | 0.85 | 50 |
| | (Period averages) [1)] | | (2.8) | (3.6) | (5.4) | | |
| 7 | 1991–1995 | OLS | -3.3 | 0.82 | 0.35 | 0.81 | 25 |
| | (Period averages) [2)] | | (3.1) | (10.7) | (1.8) | | |

*Notes*: A Hausman test favours the Generalized Least Squares (GLS) estimate of panel data with fixed effects. Values in parentheses are T-statistics.
1) Period averages of 5 years each. Each country represented in two observations. – 2) Period average of 5 years. Each country represented with one observation.

*Source*: Author's own calculations, as explained in text, based on the WEO, wiiw, and ILO databases.

Interestingly, OLS estimates for period averages, of five years each, also indicate a share of capital close to 0.40, but the estimated share of labour is significantly higher (about 0.70). The general fit reported in Table 3 is good with an R-squared value of 0.71 in regression number 3. The growth in per capita output, divided into the contributions of

[21] Based on details of national accounts by income source, labour income can be estimated as the category "average earnings of employees" and capital income as the category "gross profits and gross mixed income." These estimates imply that the share of capital during the period 1995–2004 was about 50% for Russia.

[22] A Hausmann test favours fixed effects rather than the random effects econometric technique.

increases in capital, labour, and total factor productivity under two scenarios, is presented in Table 6 for 11 CIS countries over two sub-periods of 1991–2005. For comparative purposes, the unweighted averages for the Baltics, CEE, and SEE are also presented. Scenario A shows that, without adjusting for capacity utilization, on average 63% of the output growth in the CIS in 2001–05 is explained by the growth in TFP. Scenario B shows that, when adjustment for capacity utilization is made, the contribution of TFP drops to about 50%. This implies that the increase in capacity utilization has been an important factor behind GDP growth since 1996.

TFP growth was sharply negative in the early years of the transition but turned to very significantly positive after the mid-1990s, indicating that part of the initial sharp productivity decline was temporary, with production factors being less than fully utilized. During the sharp contraction of 1991–95, TFP fell dramatically accounting for slightly more than half of the contraction in output. Factor contribution was also negative in the CIS and the Baltics during the first half of the 1990s**,** reflecting the reduction in employment and investment.[23] With the exception of Uzbekistan, total labour employment fell in all the other CIS countries (for Russia an annual average fall of 3%). To test for the robustness of the TFP growth estimates, based on the choice of the depreciation rate of capital and the initial capital output ratio, several scenarios are conducted with depreciation rates ranging from 3% to 10%, and the initial capital output ratios ranging from 1% to 2.5%. The essence of the results does not change much. All scenarios show similar patterns and magnitude of the changes in TFP.

### *C. Sources of CIS growth*

The results in Table 4 show that growth differences across countries and over time were driven mainly by labour productivity. Growth in labour productivity can be decomposed into capital deepening (i.e., increases in physical capital) and growing TFP which in this study includes improvement in labour quality. The results indicate that during 2001–05, the CIS enjoyed faster TFP growth than the CEE and SEE. TFP growth was highest in Armenia, Belarus, Tajikistan, and Ukraine. Growth in Azerbaijan has been driven more by capital investment (primarily in the oil sector) adding to an already high capital stock. Moldova and Ukraine have experienced a delayed economic rebound, more so than the other CIS countries. In particular, TFP in these two countries only started to recover in 2000. During 1996–2005, when the unweighted average annual real GDP grew by 5.6% in the CIS countries, the average annual growth of TFP was 3.2 percentage points (with no adjustment for capacity utilization), whereas the contribution of factor inputs (i.e., the combined contributions of capital growth and labour force growth) was a mere 2.4 percentage points.

[23] The investment collapse had additional negative repercussions, as it accelerated the aging of the capital stock.

Overall the estimated TFP growth for the CIS countries are quite high compared with the results found in the literature on growth accounting for other countries. A natural question is then what were the factors that led to this high TFP growth?

- Increases in TFP could come from reallocating human and physical capital to the more productive processes and reductions in distortions in the economy. For example, lowered tariff barriers and phased out selective interventions that target certain sectors have led to a reallocation of resources to more productive activities.
- Higher TFP growth could also be explained by the scale of some of the CIS economies, which are small and poor economies with very low endowment of technology. Hence, for a given technological innovation, the smaller the initial endowment the higher the growth of TFP. When capital is scarce, its marginal productivity is considerable. Therefore, for similar investment rates, the contribution of capital deepening should be larger in economies with less capital.
- More importantly, increases in capacity utilization could also raise TFP growth. Most CIS countries experienced significant increases in capacity utilization from their low levels reached in the mid-1990s.

Following Nishimizu and Page (1982), an internationally accessible best-practice production function is defined as

$$Y^f(t) = F(Z(t); t) \quad (1)$$

where $Y^f(t)$ is potential output at best practice, and Z(t) is a vector of inputs in natural units at time t. It is assumed that the function F(.) satisfies the usual neoclassical properties and that an appropriate aggregate index of output exists. The best-practice function defines the 'state of the art' in the sense that further increases in output at given levels of inputs cannot be achieved without the introduction of new techniques. Firms can move along the best-practice function, increasing output as the result of accumulation of inputs. The introduction an dissemination of new techniques move the best-practice frontier and is technological progress as defined by Solow (1956). Observed performance in a sample of economies or firms reveals that few are at best practice.[24]

The economies of most developing (including the CIS) lie below the production frontier due to use of inefficient use of best-practice techniques. Observed output Y(t) for a vector of inputs Z(t) can be expressed as

$$Y(t) = Y^f(t)\, e^{u(t)} = F(Z(t); t)e^{u(t)} \quad (2)$$

[24] There is a large literature on technical inefficiency. Pack (1988) summarizes much of this literature as it applies to developing countries.

where u(t) is the level of technical efficiency [$0<e^{u(t)} = Y(t)/Y^{f}(t) <1$] corresponding to observed output Y(t).

The derivative in logarithms of equation (2) with respect to time yields:

$$\dot{Y}(t)/Y(t) = F_z \dot{Z}(t)/Z(t) + F_t + \dot{u}(t) \quad (3)$$

Where $F_z$ and $F_t$ are the output elasticities of F(Z(t);t) with respect to inputs Z(t) and time t, and dotted variables indicate time derivatives.

Output changes in equation 3 are decomposed into three main elements. The first one gives output changes due to input changes, weighted by the elasticity of output with respect to each input. This is the component of growth due to accumulation. The second element is the rate of technological progress of the best-practice frontier, and the last element, $\dot{u}(t)$ can be either positive or negative.[25]

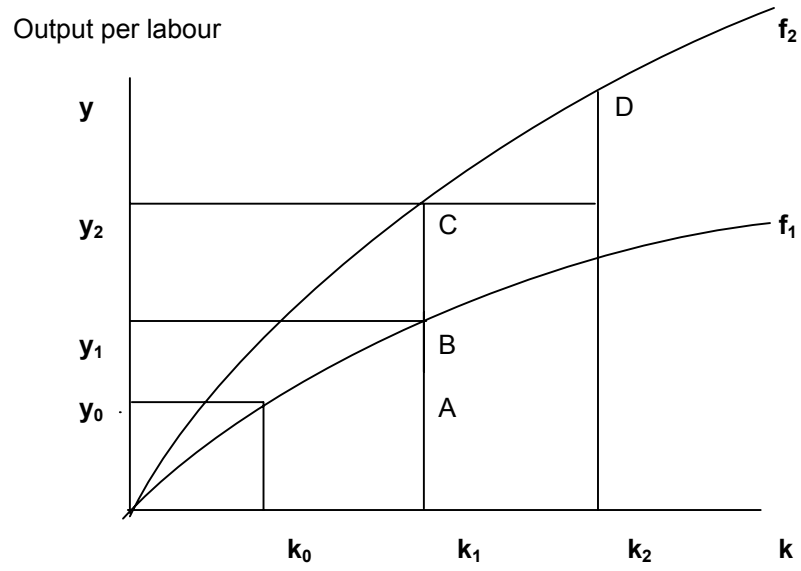
The rate of TFP change can be defined as the variation in output not explained by input changes. Thus for any observation, i:

$$TFPi\,(t) = Ft + \dot{u}\,i\,(t), \quad (4)$$

Is the sum of technological progress, measured at the frontier, and the change in efficiency observed at the individual level.

Figure 6

**Growth of inputs and outputs**




[25] See World Bank (1993), pp. 67-69.

These concepts are represented in Figure 6.[26] In this paper, a constant return to scale is assumed in capital and labour. The international best-practice production function, $f_2$, relates output per labour to capital (including human capita) input per labour. Economies that are technically inefficient operate along functional relationships such as $f_1$ in Figure 6. Catch-up can be achieved by moving from a point such as A to D, combining accumulation with a movement toward best practice.

This interpretation of TFP change is useful in understanding the sources of rapid catch-up in technologically backward economies. Developed economies, which employ international best practice, are listed to rates of TFP change determined by the rate of technological progress $u_i(t) = 0$. Economies that do not employ best practice can have TFP growth rates exceeding the rate of technological progress if technical efficiency change $u_i(t)$ is positive. It is also possible for TFP change to be negative, if technical efficiency change is negative and greater in absolute value than technological progress. A rapid shift from average practice to best practice – positive technical efficiency change – can provide a powerful engine of growth that is recorded as high rates of TFP change as is the case in the CIS in recent years.

The estimated TFP change in Table 4, using the growth accounting framework, consists of both technological progress and technical efficiency change. Here it is assumed that technological change (the movement of best practice) is constant and does not vary across countries.[27] Under this assumption all of the variance in rates of TFP change derives from variance in the rate of technical efficiency change. Figure 7 shows the residual estimate of technical efficiency change by subtracting from the estimated TFP growth the average TFP growth for highly developed economies (which is estimated about 1.5% a year).

It should be noted that the estimate of TFP that is derived in this section should be interpreted with caution, since the methodology used here does not adjust factor inputs for quality changes. The implication is that the incremental effect on growth of embodied technological advancement is not attributed to capital but rather is measured as a higher level of TFP. The same measurement problem can also arise in the case of labour. As education and on-the-job training act to improve the quality of labour, measured TFP will be enhanced. This 'mis-measurement' of TFP may well be significant in the case of the CIS, following the move from central planning to market economies in the past 15 years. It is unclear whether the recent rapid growth driven mostly by improvements in TFP, will be sustained over the medium to long-term. A large part of productivity growth in the CIS

[26] Proponents of endogenous growth theory would not accept the depiction of the production function with diminishing returns to capital.

[27] Industrial sector estimates of TFP change in developed economies generally yield a compact distribution of rates with a mean value close to 1.5% a year, both within and across economies. This may therefore be a good first approximation of the rate of technological change.

Table 4

## Growth accounting results, 1991-2005

| Country | Period | Real GDP growth rate | Investment to GDP ratio | Labour product-ivity growth | Contribution in percentage points of GDP | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Scenario A | | | Scenario B [1] | | |
| | | | | | Capital | Labour | TFP | Capital | Labour | TFP |
| Armenia | 1991–1995 | -10.0 | 17.8 | -8.4 | -4.4 | -1.2 | -4.5 | -5.6 | -1.1 | -3.3 |
| | 1996–2000 | 5.1 | 17.0 | 8.2 | 1.7 | -1.7 | 5.1 | 2.1 | -1.2 | 4.2 |
| | 2001–2005 | 12.1 | 23.0 | 13.2 | 4.1 | -0.6 | 8.6 | 5.2 | -0.4 | 7.3 |
| Azerbaijan | 1991–1995 | -15.6 | 16.0 | -14.6 | -3.3 | -0.7 | -11.5 | -3.7 | -0.6 | -11.3 |
| | 1996–2000 | 7.1 | 30.4 | 6.6 | 2.3 | 0.3 | 4.5 | 2.7 | 0.4 | 4.0 |
| | 2001–2005 | 13.7 | 40.6 | 12.8 | 5.2 | 0.5 | 8.0 | 6.0 | 0.7 | 7.0 |
| Belarus | 1991–1995 | -8.3 | 26.8 | -6.0 | -0.7 | -1.5 | -6.1 | -0.5 | -1.4 | -6.4 |
| | 1996–2000 | 6.4 | 25.0 | 6.2 | 1.9 | 0.1 | 4.4 | 2.7 | 0.2 | 3.5 |
| | 2001–2005 | 7.5 | 24.8 | 8.1 | 2.2 | -0.3 | 5.6 | 2.9 | -0.2 | 4.8 |
| Georgia | 1991–1995 | -19.9 | 8.6 | -13.2 | -8.4 | -5.2 | -6.3 | -9.2 | -4.0 | -6.7 |
| | 1996–2000 | 5.9 | 19.5 | 5.5 | 2.5 | 0.3 | 3.0 | 3.0 | 0.5 | 2.4 |
| | 2001–2005 | 7.3 | 24.3 | 8.5 | 3.4 | -0.6 | 4.6 | 4.3 | -0.4 | 3.4 |
| Kyrgyzstan | 1991–1995 | -12.6 | 15.7 | -11.4 | -4.2 | -0.7 | -7.6 | -4.7 | -0.6 | -7.3 |
| | 1996–2000 | 5.6 | 16.5 | 4.1 | 1.2 | 0.9 | 3.6 | 1.5 | 1.2 | 2.9 |
| | 2001–2005 | 3.8 | 17.9 | 1.9 | 1.7 | 1.1 | 1.0 | 2.1 | 1.3 | 0.4 |
| Moldova | 1991–1995 | -15.7 | 16.8 | -15.7 | -6.0 | -2.6 | -7.1 | -6.7 | -2.4 | -6.6 |
| | 1996–2000 | -2.4 | 18.7 | -2.4 | 0.8 | -1.3 | -2.0 | 1.1 | -0.9 | -2.6 |
| | 2001–2005 | 7.0 | 19.4 | 7.0 | 1.4 | -0.5 | 6.1 | 1.9 | -0.3 | 5.4 |
| Kazakhstan | 1991–1995 | -9.2 | 28.9 | -7.2 | -2.6 | -1.3 | -5.3 | -2.9 | -1.2 | -5.1 |
| | 1996–2000 | 2.5 | 17.0 | 3.6 | 0.7 | -0.6 | 2.5 | 1.5 | -0.4 | 1.4 |
| | 2001–2005 | 10.3 | 25.9 | 6.9 | 3.5 | 1.9 | 4.9 | 4.4 | 2.3 | 3.6 |
| Russia | 1991–1995 | -9.0 | 22.4 | -6.1 | -2.9 | -1.9 | -4.3 | -3.2 | -1.7 | -4.1 |
| | 1996–2000 | 1.6 | 17.2 | 1.5 | 0.7 | 0.1 | 0.8 | 1.5 | 0.2 | -0.1 |
| | 2001–2005 | 6.1 | 20.5 | 5.2 | 1.9 | 0.6 | 3.6 | 2.8 | 0.7 | 2.6 |
| Ukraine | 1991–1995 | -12.2 | 25.3 | -11.0 | -3.5 | -0.8 | -7.9 | -3.9 | -0.7 | -7.6 |
| | 1996–2000 | -1.8 | 19.9 | 0.2 | 0.5 | -1.2 | -1.2 | 1.3 | -1.7 | -1.4 |
| | 2001–2005 | 7.3 | 20.3 | 6.6 | 1.2 | 0.5 | 5.7 | 2.1 | 0.5 | 4.7 |
| CIS-11 | 1991–1995 | -12.1 | 20.0 | -10.4 | -3.9 | -1.4 | -6.8 | -4.3 | -1.5 | -6.3 |
| | 1996–2000 | 3.0 | 19.7 | 3.3 | 1.3 | -0.2 | 2.0 | 1.6 | 0.0 | 1.4 |
| | 2001–2005 | 8.1 | 23.3 | 7.3 | 2.5 | 0.4 | 5.1 | 3.2 | 0.7 | 4.2 |
| Baltics [2] | 1991–1995 | -9.0 | 18.2 | -4.7 | -2.3 | -2.6 | -4.0 | … | … | … |
| | 1996–2000 | 5.1 | 23.5 | 6.4 | 2.1 | -0.7 | 3.7 | … | … | … |
| | 2001–2005 | 7.7 | 27.4 | 6.3 | 3.0 | 0.8 | 3.9 | … | … | … |
| Central Europe [2] | 1991–1995 | -0.7 | 22.7 | 2.5 | 1.2 | -1.9 | 0.1 | … | … | … |
| | 1996–2000 | 3.7 | 26.0 | 3.8 | 1.8 | 0.0 | 1.6 | … | … | … |
| | 2001–2005 | 3.7 | 23.8 | 3.4 | 1.3 | 0.1 | 2.3 | … | … | … |
| Southeast Europe [4] | 1991–1995 | -6.0 | 17.3 | 0.1 | -2.5 | -3.8 | 0.2 | … | … | … |
| | 1996–2000 | 5.4 | 22.5 | 3.4 | 2.8 | 1.2 | 1.3 | … | … | … |
| | 2001–2005 | 4.5 | 23.5 | 4.9 | 2.3 | -0.2 | 2.3 | … | … | … |

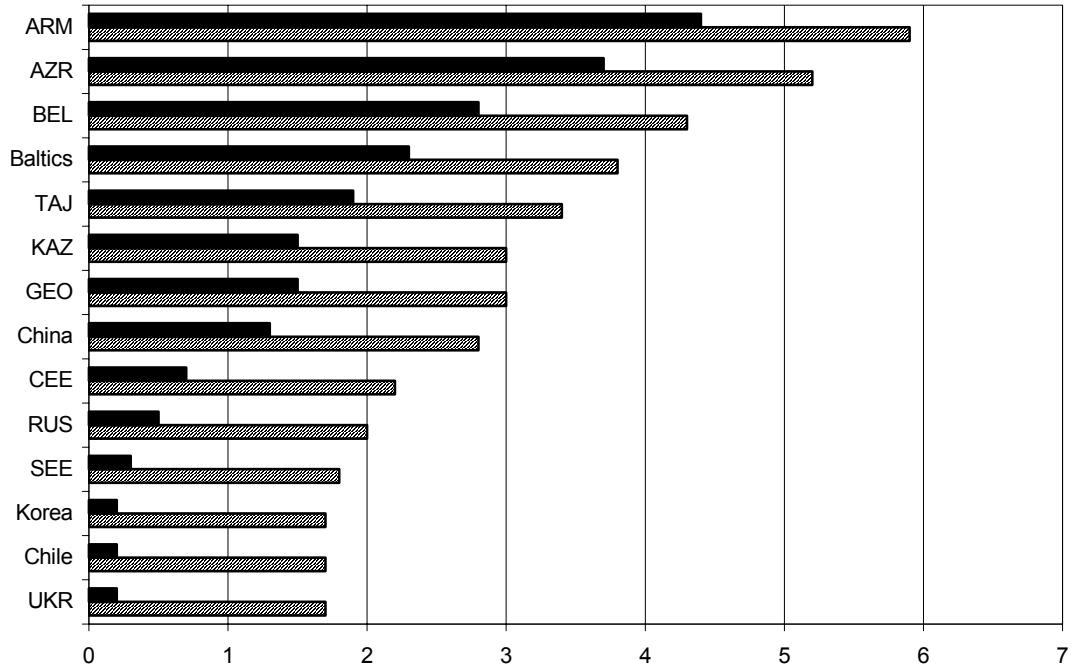
*Notes*: 1) Adjusted for capacity utilization based on the results of surveys of the Russian industry. – 2) Includes Estonia, Latvia, and Lithuania – 3) Includes Czech Republic, Hungary, Poland, Slovak Republic, and Slovenia. – 4) Includes Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Macedonia, and Romania.

*Sources*: Author's own calculations, as explained in text, based on the databases of the IMF, wiiw, and ILO.

Figure 7

**Technical efficiency vs. TFP**

(Change estimates, annual average 1996-2005)

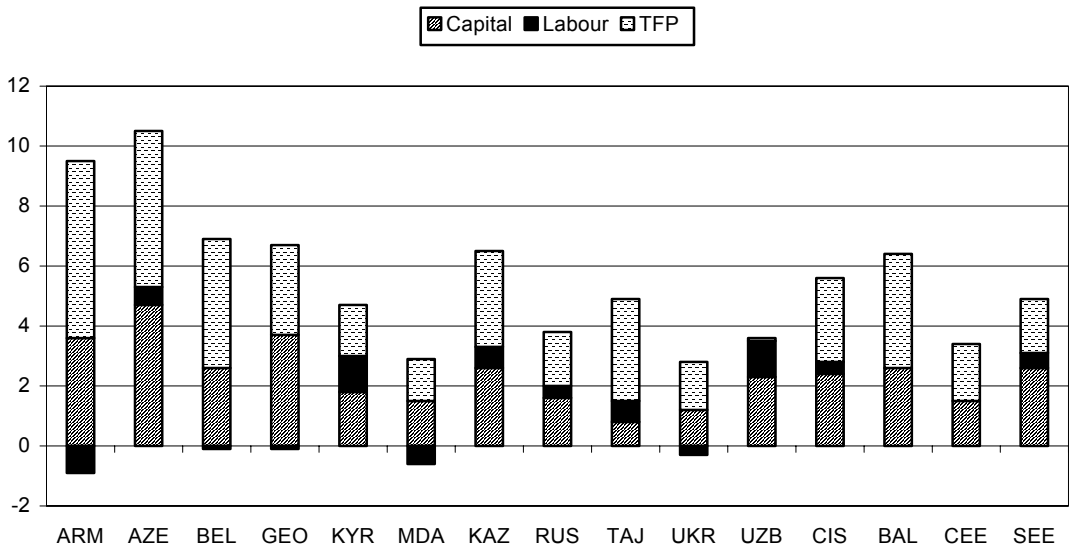



*Source*: Author's own calculations.

Figure 8

**Contribution to growth, 1996–2005**

(In percentage points of GDP)




*Note*: The contributions to growth are adjusted for capacity utilization.

*Sources*: Author's own calculations based on IMF, wiiw, and ILO databases.

reflects improvements in the allocation of resources, the better use of investment, increases in capacity utilization, elimination of inefficiency and higher intensity of work. These aspects of productivity gains are essentially transitory in the sense that they cannot produce growth indefinitely, but they can have a substantial impact over one or two decades.

The current pattern of economic growth in some of the CIS may not be sustainable in the medium and long run. As post-transition reallocation gradually tapers off, the CIS economies must raise their investment further, particularly in the non-commodity sectors, in order to sustain high rates of GDP growth. The downside risk also arises from a high concentration of exports in commodities like gold in the Kyrgyz Republic, aluminium in Tajikistan, gold and cotton fibre in Uzbekistan, and oil and gas in Azerbaijan, Kazakhstan, and Russia (Table 5).

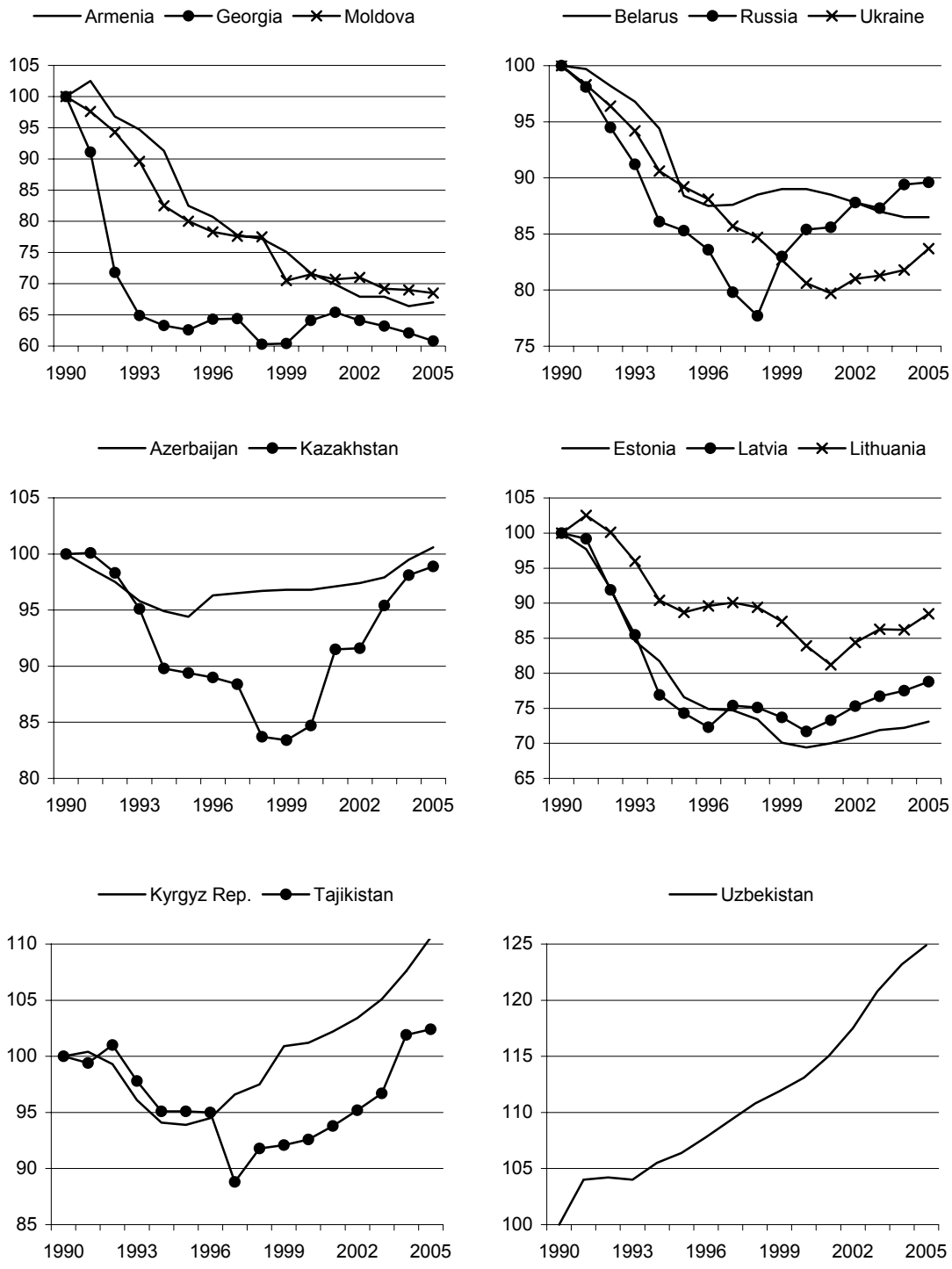
Much of the new investment in the CIS has been in the extractive industries, while relatively little has gone to other sectors of the economy. The commodity price boom may have complicated efforts to diversify production and exports away from primary materials to goods with a higher value-added component. Recent investments – both domestic and foreign financed – have often focused on extraction industries (Azerbaijan, Turkmenistan) or on commodity transport infrastructure (oil and gas pipeline projects in Azerbaijan, Georgia, Kazakhstan). While Armenia, Belarus, Moldova, and Georgia are relatively less dependent on commodities, they are more closely dependent on Russian investment and import demand (machinery and equipment in case of Belarus, agricultural and beverage products in case of Georgia and Moldova, Appendix Table A17).

Long-term rapid growth, therefore, will be increasingly dependent on the ability of the Region to diversify, and raise investment in the non-commodity sectors. This would require a deepening and acceleration of the reform process including improvement in the quality of institutions to create a better business environment. The unfavourable demographic trends of fertility rates and continued emigration of the young will make it difficult for Armenia, Belarus, Georgia, Moldova, Russia, and Ukraine to attain and maintain savings rates as high as those recorded by most rapidly growing economies. The demographic situation appears to be more favourable in Azerbaijan, Kazakhstan, the Kyrgyz Republic, Tajikistan and Uzbekistan due to the relatively higher fertility rates (which is synonymous with the rate of population growth).

Figure 9

**Employment in FSU**

(1990 = 100)




*Sources*: ILO, IMF Country Reports, and respective annual reports of Central Banks.

Table 5

## Comparison of growth accounting by countries and regions

(in per cent, annual averages)

| | Share of capital in output | Real GDP growth | Investment as % of GDP | Contribution to growth (percentage points) Capital | Labour | TFP | Share of TFP in output (in %) | Growth in productivity of labour (in %) |
|---|---|---|---|---|---|---|---|---|
| CIS (1996-05) [1] | 40% | 5.6 | 22 | 2.4 | 0.3 | 2.9 | 50 | 5.5 |
| Armenia | 40% | 8.6 | 20 | 3.6 | -0.9 | 5.9 | 69 | 10.9 |
| Azerbaijan | 40% | 10.5 | 36 | 4.7 | 0.6 | 5.2 | 50 | 8.8 |
| Belarus | 40% | 6.9 | 25 | 2.6 | 0.0 | 4.3 | 62 | 7.2 |
| Georgia | 40% | 6.6 | 22 | 3.7 | -0.1 | 3.0 | 45 | 7.0 |
| Kyrgyz Republic | 40% | 4.7 | 17 | 1.8 | 1.2 | 1.7 | 36 | 3.0 |
| Kazakhstan | 40% | 6.4 | 21 | 2.6 | 0.8 | 3.0 | 47 | 5.3 |
| Moldova | 40% | 2.3 | 19 | 1.5 | -0.6 | 1.4 | 61 | 2.3 |
| Russia | 40% | 3.9 | 19 | 1.6 | 0.4 | 2.0 | 50 | 3.4 |
| Tajikistan | 40% | 4.9 | 15 | 0.8 | 0.7 | 3.4 | 69 | 4.3 |
| Ukraine | 40% | 2.8 | 20 | 1.1 | 0.0 | 1.7 | 61 | 6.0 |
| Uzbekistan | 40% | 3.6 | 20 | 2.3 | 1.2 | 0.1 | 3 | 2.0 |
| Baltics (1996-05) [1] | 40% | 6.4 | 25 | 2.6 | 0.0 | 3.8 | 59 | 6.4 |
| Central Europe (1996-05) [1] | 40% | 3.7 | 25 | 1.5 | 0.0 | 2.2 | 46 | 3.6 |
| Southeast Europe (1996-05) [1] | 40% | 4.9 | 23 | 2.6 | 0.5 | 1.8 | 37 | 4.2 |
| Chile [1] | | | | | | | | |
| 1976-90 | 40% | 5.1 | 18 | 2.3 | 2.1 | 0.7 | 14 | 1.6 |
| 1991-05 | 40% | 5.8 | 23 | 2.9 | 1.2 | 1.7 | 29 | 3.6 |
| Ireland [1] | | | | | | | | |
| 1986-95 | 40% | 4.8 | 17 | 1.8 | 1.1 | 1.9 | 40 | 3.0 |
| 1996-05 | 40% | 7.4 | 23 | 3.7 | 2.4 | 1.3 | 18 | 3.2 |
| Korea [1] | | | | | | | | |
| 1976-90 | 40% | 8.2 | 30 | 4.0 | 1.7 | 2.5 | 30 | 5.1 |
| 1991-05 | 40% | 5.6 | 33 | 2.9 | 1.0 | 1.7 | 30 | 3.9 |
| China [1] | | | | | | | | |
| 1991-05 | 40% | 9.7 | 37 | 6.1 | 0.8 | 2.8 | 29 | 8.3 |
| G-7 (1950-60) [2] | 40% | 5.6 | … | 1.4 | 1.5 | 2.7 | 48 | … |
| Canada | 44% | 5.2 | … | 2.4 | 1.1 | 1.7 | 33 | … |
| France | 40% | 4.9 | … | 1.7 | 0.3 | 2.9 | 59 | … |
| Germany | 39% | 8.2 | … | 1.9 | 1.6 | 4.7 | 57 | … |
| Italy | 39% | 6.0 | … | 0.6 | 1.6 | 3.8 | 63 | … |
| Japan | 39% | 8.1 | … | 0.4 | 4.8 | 2.9 | 36 | … |
| UK | 38% | 3.3 | … | 1.6 | 0.2 | 1.5 | 45 | … |
| USA | 40% | 3.7 | … | 1.3 | 1.0 | 1.4 | 38 | … |
| G-7 (1960-95) [3] | 39% | 3.6 | … | 1.6 | 0.3 | 1.3 | 35 | … |
| East Asia (1966-90) [4] | 36% | 8.9 | 32 | 4.0 | 3.3 | 1.7 | 19 | … |

*Notes*: 1) Author's own calculations. – 2) Christenson and others (1980); simple average for Canada, France, Germany, Italy, Japan, UK, and USA. – 3) Dougherry (1991); simple average for Canada, France, Germany, Italy, Japan, UK, and USA. – 4) Young (1995); simple average for Hong Kong, Singapore, Korea, and Taiwan.

## *D. Sources of growth in the fast growing economies*

Table 6 compares the CIS region with other fast growing economies to give a sense of the challenges that the CIS would face in sustaining the recent rapid growth. To minimize concern about methodological differences in comparing growth in the CIS with that of other regions, a uniform capital share of 40% close to the average for the major industrial countries and East Asia is used.

Table 6

**Investment and export concentration of fast-growing economies**

| | Period covered for growth and investment | Real GDP growth rate | Investment as % of GDP | Manufacturing as % of (2004) GDP | Manufacturing as % of (2004) Exports | Export of major commodities in 2004 Category | % of exports |
|---|---|---|---|---|---|---|---|
| Armenia [1)] | 1996–2005 | 8.6 | 21 | 17 | 21 | Precious stones & metals | 65 |
| Azerbaijan | 1996–2005 | 9.8 | 36 | 15 | 9 | Oil | 87 |
| Belarus [2)] | 1996–2005 | 6.9 | 25 | 23 | 24 | Petroleum products, metals, wood & pulp | 60 |
| Georgia | 1996–2005 | 6.6 | 22 | 16 | 36 | Wine & metals | 28 |
| Moldova | 1996–2005 | 2.4 | 19 | 18 | 36 | Wine & metals | 20 |
| Kyrgyzstan | 1996–2005 | 4.5 | 17 | 8 | 24 | Gold | 40 |
| Kazakhstan | 1996–2005 | 6.4 | 21 | 16 | 16 | Oil and gas | 57 |
| Russia | 1996–2005 | 4.1 | 19 | 8 | 21 | Oil and gas | 55 |
| Tajikistan | 1996–2005 | 4.8 | 15 | 7 | 15 | Aluminium & cotton | 69 |
| Ukraine | 1996–2005 | 2.8 | 20 | 18 | 50 | Iron & steel | 40 |
| Uzbekistan | 1996–2005 | 3.5 | 22 | 9 | 15 | Gold, cotton, & gas | 65 |
| Turkmenistan | 1996–2005 | 9.4 | 27 | 2 | 4 | Gas, oil and oil products | 82 |
| China | 1988–2005 | 9.5 | 35 | 39 | 90 | Ores & metals | 2 |
| South Korea | 1988–2005 | 6.1 | 31 | 24 | 92 | ... | ... |
| Malaysia | 1988–2005 | 6.8 | 32 | 31 | 81 | Oil &rubber | 5 |
| Thailand | 1988–2005 | 5.8 | 30 | 35 | 75 | ... | … |
| Vietnam | 1995–2005 | 7.2 | 29 | 21 | 50 | Oil | 21 |
| Botswana | 1988–2005 | 7.2 | 27 | 4 | 10 | Diamond | 80 |
| Mauritius | 1988-2005 | 5.4 | 24 | 18 | 25 | Sugar | 17 |
| Chile | 1988–2005 | 6.0 | 23 | 16 | 14 | Ores & metals | 50 |
| India | 1988–2005 | 6.1 | 23 | 16 | 76 | Ores & metals | 4 |
| Ireland | 1988–2005 | 6.1 | 21 | 32 | 85 | … | … |

*Notes*: 1) Precious and semi precious stones are excluded from manufacturing exports. - 2) Minerals, petroleum products, chemical and petrochemical products are excluded from manufacturing exports.

*Sources*: Derived from IMF Country Reports and UNCTAD database.

Examining differences in the sources of recent fast growth in the CIS, East Asia, and of the rapid growth in Europe during the Golden Age is instructive. Growth-accounting estimations suggest that periods of sustained, rapid growth typically result from high

investment combined with strong TFP. During the 'Golden Age' (post-war period) in Western Europe and Japan, there were strong contributions to growth from TFP gains. The average contribution of TFP to output growth was 2.7 percentage points for the seven major industrial countries – close to the estimated TFP growth for the CIS, and accounting for about half of the growth in output. Catching up, scale effects, and improvements in resource allocation made strong contributions to TFP during 1950–60 (Maddison, 1996).[28] These improvements stemmed from adjusting to trade liberalization, exploiting opportunities for mass production as larger and better integrated markets emerged, and from moving resources out of relatively low-productivity agriculture. As catch-up growth weakened, the magnitude of TFP growth fell markedly after 1973. The same argument may be made for the catching up process of the CIS after the sharp fall in output during the early years of transition.

The obvious point to stand out from Table 5 is that East Asian growth has relied much more heavily on factor inputs, both labour and capital, and less on TFP growth than that of 'Golden Age' Europe and the current CIS rapid growth. Gains in the TFP of the 'four tigers' (Korea, Taiwan, Hong Kong, and Singapore) accounted for only one fourth of the growth in output over the past three decades. According to Young's (1995) estimates, physical capital accumulation boosted growth in the 'four tigers' by 4 percentage points during 1966–90, much more than observed in other regions. TFP contributed only 1.7 percentage points to growth and labour 3.3 percentage points. The average investment to GDP ratio in these four countries was at least 30% during that period, and government policies may have played a key role in sustaining the high growth. The estimates in this paper show that factor inputs in South Korea over the past three decades (1975–2005) accounted for 70% of the growth, the same as in China over the past 15 years (1991–2005).

Other fast growing economies with high investment-to-GDP ratios include Mauritius and Botswana. The rapid and sustained growth achieved by the Mauritius economy from 1983 to 2005 is attributed to the following: successful pursuit of macroeconomic stability, despite the presence of adverse exogenous shocks; successful strategy of trade openness; development of a solid institutional framework that has promoted growth, including respect for the law, political stability, an efficient administration, and favourable regulatory framework. Also a rapid development of a well-developed financial system has contributed to supporting economic diversification and growth. While average annual GDP growth has remained very similar, there has been a substantial change in the factors explaining growth between the 1980s and the 1990s. In the first decade, GDP growth was mainly accounted for by sustained growth in factor inputs, with labour force increasing on average by 5% per year. In the second period, while the growth of labour declined sharply, both physical capital and TFP rose substantially.

[28] The United States of America saw per capita income growth averaging 2.4% a year between 1950 and 1973; over the same period in Germany per capita income grew on average by 5% a year; and in Japan by slightly more than 8%.

For the past 30 years, Botswana has experienced extraordinary growth – about 8% a year on average since the mid-1980s. The mining sector (copper, nickel, and coal, as well as diamonds) accounts for almost half of Botswana's total growth. But mineral wealth alone does not account for Botswana's rapid growth. Botswana has also been praised for its sound institutions and good governance, which are rooted in the strong political leadership that has prevailed since it achieved independence in 1966.

It has often been observed that resource-abundant economies tend to grow less rapidly than resource-scarce economies – a phenomenon referred to as the 'resource curse'. (Box 2). The argument is that natural resource wealth sows the seeds of discord and conflict among domestic stakeholders, such as politicians, developers, and citizens. They are naturally motivated to seek unfair resource rents, quickly depleting natural resources and wasting resource revenue. In an analysis of a data-set for 89 countries, Iimi (2006) found that an abundance of natural resources could guarantee growth. The quality of a country's institutions determines the degree to which natural resources can contribute to economic development. Specifically a strong public voice with accountability, high government effectiveness, and powerful anticorruption policies tend to link natural resources with high economic growth. In this respect, Appendix Table A17 shows that the institutional quality scores for Botswana and Mauritius are the highest among developing countries, and significantly better than those in the CIS.

There are very few countries around the world that were able to sustain rapid growth for more than 15 years with relatively low shares of investment in GDP. These include Chile, Ireland, and India.

- In Chile, factor accumulation was the primary determinant of GDP growth. From 1976 to 1990, GDP growth averaged 5.1%, with factor accumulation accounting for over 80% of total growth (equally divided between capital and labour). From 1991 to 2005, economic growth strengthened further to an annual average of 5.8% reflecting higher investment and improvements in capital and labour efficiency. As a result TFP grew rapidly and contributed some 29% of GDP growth, still significantly below the TFP growth of the CIS. The main policies underpinning the sustained rapid growth included the following: (a) strong fiscal discipline; (b) strengthened financial system; and (3) improved institutional arrangements that created more stable macroeconomic environment.
- Ireland's impressive economic performance over the past two decades was also driven largely by factor inputs. Although productivity growth was strong, what set Ireland apart was the large increase in labour utilization in the past two decades. Although not the only factor, the social partners contributed significantly to the increase in the employment rate since the early 1990s, which averaged about 4% per annum.[29]

[29] Providing an additional boost to economic growth, the inverse dependency ratio increased substantially, reflecting favourable demographic factors. In contrast to other European countries, fertility rates in Ireland were very high in the

Consequently, unemployment declined from double digit levels in the 1980s to 4% in 2005.

– India has also witnessed rapid growth over the past decade averaging about 6% a year, although the investment-to-GDP ratio remained relatively low (22%). Growth has been driven largely by increased labour utilization and efficiency gains. Until the mid-1990s, export growth was in single digits and narrowly based. Since 2000, the volume of exports has grown three times faster than in the latter half of the 1990s. This acceleration has been led by services exports – particularly software and Information Technology (IT).

It is also interesting to compare the growth performance of East Asia with Latin America. While there are many factors which explain the growth divergence, the focus below is on the sources of export growth in the two regions. The reason for this comparison is that the export structure of the CIS countries resembles more that of Latin America, mostly primary commodities. For Latin America as a whole, real per capita economic growth averaged slightly less than 1% as compared with 6.5% in East Asia in 1980–2005. Most of East Asia's growth in intra-industry trade has been in textiles, light manufacturing and high-technology exports, which has been the category of most rapid growth in world trade. In Latin America, except Mexico, export growth was heavily weighted toward natural resource commodities and low- and medium-technology exports. As a result, whereas East Asia's share of global manufactured exports rose sharply, Latin America's share remained flat. Excluding Mexico, Latin America's share of global manufactured exports was only 2%, a rate below that recorded in 1980. In a global economy in which international production systems for commodities such as automobiles, electronics, and garments have become increasingly fragmented across national boundaries and trade in manufactured goods has risen to 80% of total trade, East Asia has benefited far more than Latin America from gains of global trade patterns.[30]

A key driver in the above trade dynamics has been FDI by multinational corporations. Not only has East Asia received more FDI flows than Latin America, but the flows to East Asia have been mostly channelled into manufacturing, which fed exports. In contrast, more than half of the FDI in Latin America was related to mergers and acquisitions in connection with the privatization of state-owned utilities and domestic banks. Much of the rest has been directed to the exploitation of natural resources, particularly mining and oil. This is similar to the current situation in the CIS countries where most of the FDI is related to privatization or directed to the exploitation of natural resources.

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1960s and 1970s. Population growth also supported the increase in output, helped by the reversal of migration flows. The net inflow of migrants to Ireland between 1996 and 2003 was close to 0.2 million (about 5% of the population).

[30] See IMF, 2006, Finance and Development, June, Vol. 43, Number 2.

Box 2

**Country experiences in managing natural resources**

Empirical research suggests that a majority of countries with large natural resource wealth lag behind comparable countries in terms of real GDP growth (Sachs and Warner 2001). This finding holds independently of trends in commodity prices, climatic variables, or other growth impediments. It applies not only to oil-dependent countries like Congo, Nigeria and Venezuela, but also to producers of other minerals, such as Zambia (copper). These countries have become increasingly reliant on natural resources over time as indicated by the steadily growing share of oil, gas, or other commodities in their exports. Many countries, however, have successfully used their natural resources to modernize their economies, improve their peoples' welfare (Botswana and Chile), and over time decreased dependence on natural resources (Malaysia and Australia).

The origins of the 'oil curse' are threefold: (a) the Dutch disease; (b) poor fiscal policies in coping with volatile oil revenues, raising sustainability issues; and (c) negative effects of 'rent-seeking' behaviour – exacerbated by the dominance of extractive industries – on institutions, governance, and political processes. Dutch disease describes the possible deindustrialization in the aftermath of a natural resource discovery. The discovery may trigger a boom that raises the country's real effective exchange rate of the country (either through increase in domestic prices and costs or through an appreciation of the domestic currency on the foreign exchange market), making manufacturing goods (or other tradable goods) less profitable, and leading to the absolute or relative decline of the industries producing them. When the boom ends and revenues from natural resources disappear, these weakened industries are not able to generate alternative fiscal and foreign exchange revenues, leaving no choice but economically and politically difficult adjustments.

In this respect, the current sources of rapid economic growth in the CIS region (rising volumes of natural resource exports and favourable world commodity prices) may come to an end. Russia, Azerbaijan, Kazakhstan, and Turkmenistan depend heavily on the exports of oil and gas; Ukraine on iron and steel, Kyrgyz Republic on gold; Uzbekistan on gold and cotton fibre, and Tajikistan on aluminium and cotton fibre. The CIS economies need to diversify and achieve significant productivity gains in non-commodity sectors. But the diversification of the CIS economies is a long-term process that will likely take several years to materialize even under favourable circumstances and a supportive policy environment. To improve growth prospects in the non-resource sectors, an acceleration of structural reforms is needed. Significant gains in productivity will be required to offset the impact of the recent real exchange rate appreciation on competitiveness of non-resource sectors. Better institutions would also help to attract FDI to the non-commodity sectors.

## V. Determinants of growth

The empirical question posed by the current literature on endogenous growth is whether productivity growth is exogenous or whether its economic determinants can be identified. The systematic relationship between the share of productivity and income is an indication that productivity growth is not driven by exogenous processes.

One approach to analyzing the determinants of productivity growth would be to take the country-specific residuals obtained in the pervious section and undertake cross-country

regressions. The problem with this approach is that if productivity growth is endogenous, the estimates in the previous section will be biased. Therefore, the standard approach that is followed in this section is to study the determinants of per capita and TFP growth rates by regressing them on a set of relevant variables.

### *A. Literature review*

While several recent studies have analysed the causes of output collapse and subsequent recovery in transition countries, it is fair to say that no consensus has yet been reached. Most of the analysis has been based on cross-country and panel regressions that explore the links between growth and a number of policy variables. Fischer and Sahay (2000) and Havrylyshyn and van Rooden (2003) concluded that the initial-phase 'liberalizing' measures have a larger positive impact on long-term growth than measures to improve the institutional environment. Lawson and Wang (2004) have failed to find a strong and positive effect of reforms on growth, especially a positive growth impact, but there is no significant link between growth and privatization, competition policy, or financial sector reform. Fidrmuc (2003) casts doubt on the benefits of reform. His results change when the sample is split into early and later periods of transition. Merlevede (2003) provides strong evidence that backtracking in reform (as indicated by a downgrade in EBRD transition indicators) is bad for growth. Falcetti and others (2005) found a positive and strong link between progress in market-oriented reforms and economic growth.

Some empirical studies have found a positive and significant link between improvement in the terms-of-trade and economic growth (Fisher, 1993 and Mendoza, 1997), while more recent studies found mixed results (Turnovsky and Chattopadhyay, 2003). Mendoza shows that growth would be slower on average in economies in which the terms of trade grow at a slower rate because slow terms-of-trade growth reduces the expected real return on investment and thus reduces the savings rate. Barro (1997) notes that if the quantities of domestically produced goods do not change, then an improvement in the terms of trade raises real gross domestic income, but does not affect real GDP. Movements in real GDP occur only if shifts in the terms of trade bring about a change in domestic employment and output.

Berengaut and Elborgh-Woytek (2006) found that more than 60% of the variance in relative output performance among transition economies can be attributed to just two factors – conflicts and institutions. They obtained unbiased estimates of the impact of institutions on output by using instrumental variables, an approach that allows the researcher to sidestep the possibility that institutions are not exogenous with respect to output.

Negative shocks (the transition process may be considered as a shock to the economies in the CIS region) in theory impose only a temporary restraint on output, but may lead to rapid future growth that offsets the initial decline. First, negative shocks could stimulate political and economic reforms. Corrective policies could prompt an economic recovery above the original trend line if they reduce inefficiencies. Second, following the idea of Schumpeter's (1942) 'creative destruction', a sharp fall in output may cleanse the economy of inefficient firms, leading to higher productivity and economic growth (Caballero and Hammour, 1994). Blanchard (1997) defines the core process of change as comprising two elements: reallocation of resources from old to new activities (via closures and bankruptcies, combined with the establishment of new enterprises), and restructuring within surviving firms (via labour rationalization, product line change, and new investment). These can be thought of as the dynamic movements resulting from the establishment of the new incentives and are reminiscent of the Schumpeterian concept of 'creative destruction' by entrepreneurial activity, only with a much larger impact than what Schumpeter's model envisioned.

In contrast, Cerra and Saxena (2005) found that recessions or large contractions in output due to crisis, wars, or other reasons, are in general not followed by high-growth recovery phases. They conclude that when output drops, it tends to remain well below its previous trend. The data used by Cerra and Saxena consisted of annual observations spanning 192 countries from 1960 to 2001, but for transition countries only the 1990–2001 period was included and thus did not capture the strong growth recorded in recent years. Johnson, Ostry, and Subramanian (2006) emphasize the role of manufactured exports and a competitive exchange rate in longer episodes of sustained growth.

This section differs from most previous empirical studies on the determinants of economic growth in the following aspects. First, it uses a larger cross-country (90 countries) sample over a longer time period (1986–2005). Second, it focuses on transition economies. Third, it investigates both short-run and long-run impacts of the explanatory variables on growth. Fourth, it uses a new set of explanatory variables that are believed to have contributed to the recent rapid growth including output recovery index, workers' remittances, terms of trade, and institutional quality. Finally, it does not simply assume, but actively tests for, endogeneity of market reforms, institutional quality, and economic growth so that appropriate econometric methods can be chosen.

### *B. The role of remittances and Russia as the engine of growth*

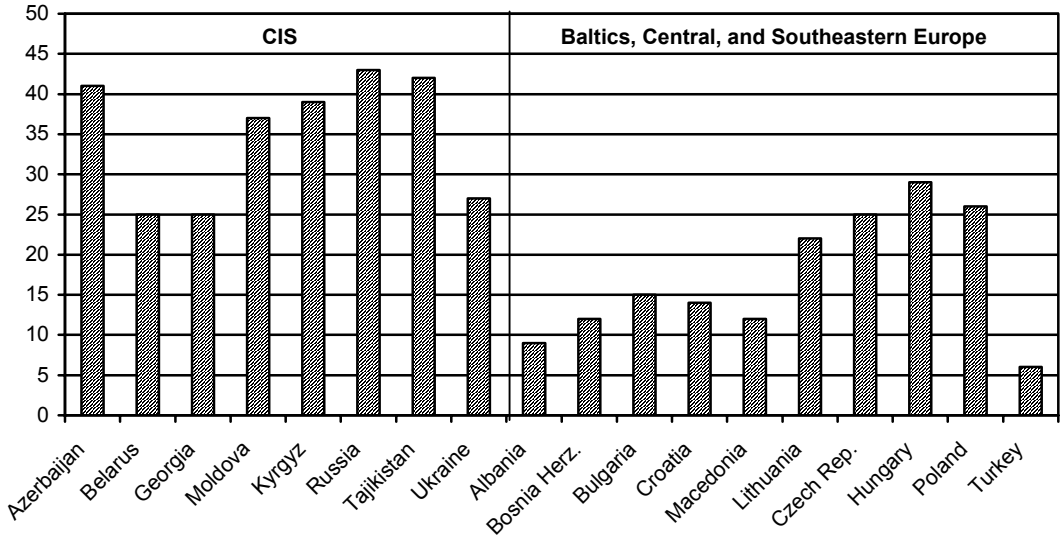
Workers' remittances have become an increasingly important channel for meeting external financing needs and may be behind the recent strong economic growth in the low-income

CIS.[31] Large-scale labour emigration from these economies in the 1990s and the associated substantial increase in workers' remittance flows, largely from Russia, in recent years, have increasingly shaped the economic and social landscape of the countries in the region. Armenia, the Kyrgyz Republic, Tajikistan, Georgia, and Moldova have lost from 18% to 25% of their labour force, in that order, due to emigration to Russia and OECD countries. The migration rates seem to be particularly striking for the highly skilled workers (Figure 10). Central and southeast European workers have tended to migrate to Western Europe while workers of low income CIS countries tend to go to Russia.

Figure 10

**Highly skilled expatriates in the OECD, 2002**

(in percentage, by country of birth)




*Source*: OECD, 2004, Trends in International Migration, pp. 148-149.

The strong performance of the Russian economy and improvement in employment prospects since the late 1990s, made it attractive to foreign migrant workers, particularly from the low income CIS countries. Monthly dollar wages in Russia more than tripled from 2000 to 2005 (Box 3). Russia has benefited from migration as a means of compensating for its loss of approximately one million people a year. The majority of migrant workers are employed in construction, trade-related services, and agriculture. Increases in labour productivity cannot make up for the loss of hundreds of thousands of workers each year. According to official estimates, the size of international migration to Russia between 1992 and 2003 is over 6 million. In 2005 alone, the Russian Federal Migration Service issued

[31] Wage income earned abroad has become a sizeable component in the balance of payments of several CIS and south-east European economies. Income earned abroad by short-term workers (residents for less than a year) appear in the balance of payments as workers' compensation under the income account while income earned abroad by migrants (foreign residence for over a year) appear as workers' remittances under the current account private transfers.

Box 3

**CIS competitiveness**

There are several indicators to measure the external prices competitiveness of a country. The most widely used indicator of competitiveness is the estimate of unit labour costs (ULC). But the statistical base in the low income CIS countries is inadequate for such an analysis, mainly on account of poor labour force statistics. The table below shows four indicators of competitiveness. First, the CPI based real effective exchange rate (REER) does not seem to suggest that the exchange rate is misaligned. The indices are still at levels significantly more depreciated than prior to the Russian crisis (except Russia). Furthermore, there seems to be some space for real appreciation in the years to come, in line with the Balassa-Samuelson effect expected from the productivity increases taking place in a reforming transition economy. The modest appreciation of the currencies in the region reflects: (i) an upward adjustment in initially misaligned exchange rates to a more appreciated equilibrium rate; (ii) large productivity gains related to market-based reforms; and (iii) large foreign capital inflows, including workers' remittances and exports earnings. Second, the growth in productivity of labour in the CIS was much higher than in other regions and has so far been sufficient to offset the negative effect of wage and exchange-rate increases on competitiveness. Third, while average monthly wages in the low-income CIS almost tripled in dollar terms from 2000 to 2005, they are still low compared to the Baltics, CEE, and China.

Fourth, the results of the World Bank Doing Business surveys in 2005 indicate the time involved in starting a new business has been reduced significantly in recent years to only 21 days in the Kyrgyz Republic, 25 days in Armenia and Georgia, and 30 days in Moldova. The unweighted average for the Baltic (Estonia, Latvia, and Lithuania) is 26 days. But it takes 40 days in the Czech Republic and 52 days in Hungary to complete the process which takes only 2 days in Australia and 5 days in Denmark. The length of time involved in stating a business, and the circumstances of the procedures, are among the factors that influence where enterprises will locate a new business.

**Selected competitiveness indicators**

| | Real effective exchange rate (1997=100) | | Productivity of labour Annual % change | | Average wage per month (In US dollars) | | Business climate Days needed | |
|---|---|---|---|---|---|---|---|---|
| | 2002 | 2005 | 1996-00 | 2001-05 | 2000 | 2005 | for a licence | to start business |
| Armenia | 104 | 108 | 8.1 | 13.6 | 42 | 114 | 176 | 25 |
| Azerbaijan | 82 | 72 | 6.3 | 11.2 | 50 | 125 | 212 | 123 |
| Belarus | 57 | 68 | 6.2 | 8.1 | 67 | 218 | 354 | 79 |
| Georgia | 92 | 94 | 5.5 | 8.5 | 37 | 113 | 282 | 25 |
| Kazakhstan | 84 | 88 | 3.6 | 6.9 | 101 | 254 | 258 | 25 |
| Kyrgyz Republic | 82 | 80 | 4.1 | 1.9 | 26 | 63 | 152 | 21 |
| Moldova | 95 | 101 | -2.4 | 7.0 | 33 | 105 | 122 | 30 |
| Russia | 92 | 113 | 1.5 | 5.2 | 79 | 302 | 528 | 36 |
| Tajikistan | 90 | 80 | 1.0 | 7.6 | 8 | 29 | … | … |
| Ukraine | 85 | 77 | 7.3 | 4.6 | 42 | 156 | 265 | 34 |
| Uzbekistan | 54 | 43 | 1.3 | 2.6 | 42 | 81 | … | … |
| Baltics | 82 | 85 | 6.4 | 6.3 | 259 | 510 | 142 | 26 |
| CEE | 122 | 137 | 3.8 | 3.4 | 357 | 778 | 260 | 41 |
| China | 102 | 93 | 7.0 | 7.8 | 94 | 185 | 363 | 48 |

*Sources*: Derived from IMF, UNECE, and World Bank databases.

650,000 work permits to foreigners. There are an additional 4 to 5 million illegal labour migrants in Russia, of which 2 million are from Central Asia.[32] The item 'net compensation of employees' in the Russian balance of payments accounts increased from USD 220 million in 1995 to USD 550 million in 1997, then decreased to USD 204 million in 1999 (due to the 1998 Russian crisis), and since then has been growing at a fast pace to about USD 4.5 billion in 2006 (Figure 11). The current transfers (debit) which include workers' remittances, have also increased from USD 0.6 billion in 1999 to USD 6.5 billion in 2006. According to the Russian balance of payments account about 90% of these payments (compensation to employees and private transfers) were made to CIS countries.

Table 7 shows that remittances as a share of GDP have been increasing in recent years in Armenia, Azerbaijan, Georgia, Moldova, the Kyrgyz Republic, and Tajikistan. The actual figures for remittances could be higher if unrecorded remittances (outside the banking system) were included.[33] As a source of foreign exchange, remittances in 2005 amounted to 60% of exports of goods and services and about four times the amount of FDI in Moldova[34] and 42% of goods and services and more than twice the amount of FDI in Armenia.[35]

The recent increase in remittance inflows reflects the improvement in quality and coverage of remittance data and the strong performance of the Russian economy in recent years, which enhanced the working conditions and salaries of expatriates from the low-income CIS countries. Nevertheless, recorded remittances are significantly less than the actual flows. High transactions costs and noncompetitive structures among formal money transfer operators like Western Union make the use of informal channels quite common in the CIS. Though it is difficult to quantify injection of resources from various informal activities, official estimates indicate that net remittances as share of GDP exceeded 12% in several CIS countries (Table 7). Such large inflows have generated a domestic boom in non-tradable activities – principally construction and services.

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[32] Russia is facing a demographic and economic challenge with its decreasing economically active population. According to census data, until 2002 most of the decline in the Russian population (6%) since the early 1990s was partly compensated by a net increase in immigration largely from the low-income CIS countries.

[33] According to the Central Bank of Armenia, total private transfers (mainly remittances from Russia), including those not captured by the balance of payments, are likely to have exceeded USD 1 billion in 2005 (equivalent to about 25% of GDP).

[34] For a detailed analysis of the significance of workers' remittances in Moldova see IMF Report No. 05/54, Republic of Moldova: Selected Issues, Washington D.C. February 2005.

[35] Based on IMF country reports and Central Bank Annual Reports of the respective countries.

Table 7

**Workers' remittances, 2000-2005**

(percentage of GDP)

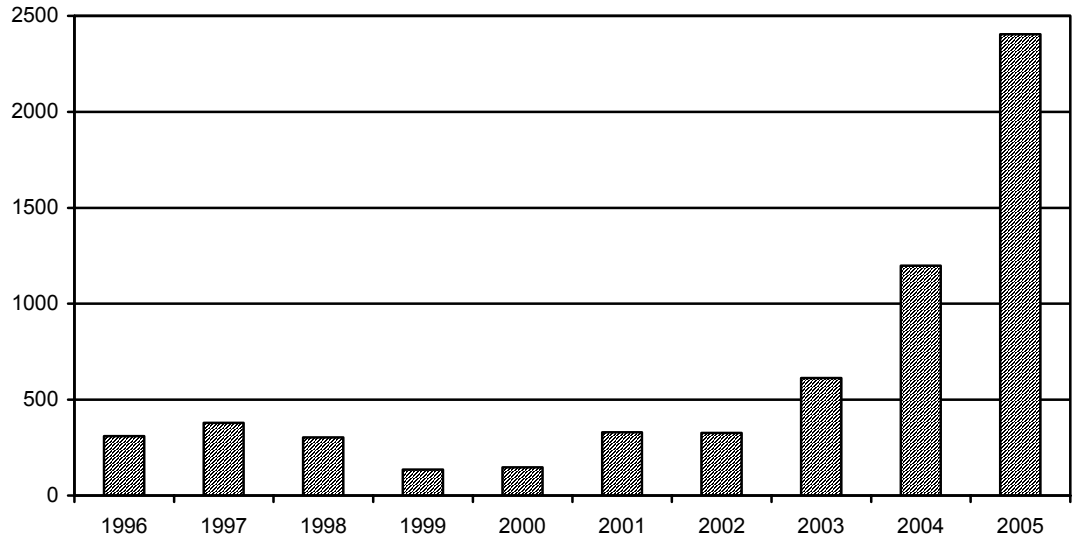
| | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 |
|---|---|---|---|---|---|---|
| Moldova | 12.6 | 13.7 | 17.4 | 22.4 | 25.6 | 31.2 |
| Tajikistan | 5.0 | 9.2 | 16.3 | 18.4 | 16.8 | 23.2 |
| Armenia | 8.1 | 8.6 | 9.4 | 10.3 | 12.7 | 13.0 |
| Georgia | 9.0 | 5.6 | 7.0 | 6.2 | 7.0 | 8.0 |
| Kyrgyzstan | 3.7 | 1.8 | 4.2 | 5.6 | 6.7 | 8.0 |
| Uzbekistan | ... | ... | ... | 3.4 | 3.6 | 5.0 |
| Azerbaijan | 1.1 | 1.8 | 2.9 | 2.4 | 2.7 | 4.2 |
| Bosnia-Herzegovina | 25.2 | 21.4 | 18.7 | 16.9 | 18.0 | 17.4 |
| Macedonia | 18.1 | 19.6 | 11.8 | 15.0 | 15.5 | 17.0 |
| Serbia and Montenegro | 13.2 | 14.7 | 13.5 | 12.9 | 14.4 | 14.6 |
| Albania | 16.2 | 17.0 | 16.3 | 15.6 | 15.0 | 14.5 |
| Croatia | 5.8 | 6.1 | 6.2 | 6.1 | 6.1 | 5.9 |
| Bulgaria | 2.7 | 3.6 | 3.7 | 3.8 | 4.6 | 4.8 |

*Sources*: IMF Country Reports, Balance of Payments Yearbooks, and annual reports of central banks.

Figure 11

**Russia: net compensation of employees with CIS**

(debit, millions of US dollars)




*Source*: https://www.cbr.ru/eng/statistics/ (web site of the Central Bank of Russia). Balance of payments of the Russian Federation (detailed components).

Cross-country comparisons of remittances are hampered by differing definitions, coverage, and classifications. Likewise, intertemporal comparability of remittances data is impeded by changes in classification and shifts between formal and informal channels. Some countries do not classify remittances separately from other current transfers in the IMF Balance of Payments (BOP) database. In such cases the standard definition (sum of workers' remittances, compensation of employees, and migrant transfers) in the BOP understates the true flows. To estimate flows more accurately and to obtain the most recent revised data for a larger number of countries, the series on remittances rely on the information provided by IMF country reports and the respective Central Banks' annual reports. Some countries (including the low income CIS) have only started in recent years to systematically produce and report remittances statistics.

Remittances are less volatile than aid flows and export earnings. As with any form of external flows, remittances carry the risk of Dutch disease effects for the receiving country (Amuedo-Dorantes and Pozo, 2004; Bourder and Flack, 2006 – supporting policymakers should be prepared to respond to.[36] Other studies have found no evidence that remittances hurt export competitiveness (Rajan and Subramanian, 2005).

Empirical evidence of the impact of remittances on growth is inconclusive. The most immediate channel through which remittances impact real GDP growth is the multiplier effect of increased spending by recipient households. The impact depends on how the remittances are spent in the economy (whether consumed or invested). Most empirical studies have found that remittances are less volatile then other sources of foreign exchange earning, and remittances from family members actually increase when domestic households experience a negative shock (Chami, Fullenkamp, Jahjah, 2005). Mishra (2005), using data for Caribbean countries, shows that remittances have statistically and economically significant impact on private investment. This result is striking, given the common perception that remittances are used largely for consumption purposes. It is, however, consistent with the micro-level studies, which show that remittances have a strong impact on investment in real estate, small enterprises, and agriculture. Giuliano and Ruiz-Arranz (2005) showed that remittances can help alleviate a lack of credit and can compensate for an underdeveloped financial sector. In this connection, the results of the 2005 survey of over 600 micro and small businesses conducted by the EBRD showed that workers' remittances have been a major source of investment financing in the low-income CIS countries. A significant portion of the remittances received were used to finance existing small business investment and the start-up of new ones. Remittances also have the potential to bring a larger share of the population into contact with the formal financial system, expanding the availability of credit and saving products.

[36] See Gupta, Powell, and Yang (2006).

Workers' remittances have helped lift a large segment of the populations in Armenia, Moldova, Kyrgyz Republic, and Tajikistan out of poverty in recent years, yet they may have a deleterious impact on national economic growth in the medium to long-term. Brain drain – the loss of skilled and highly trained people emigrating to other countries – may not be fully mitigated by the financial flows from workers' remittances and the diffusion of new ideas and technologies, either when they return home or simply by facilitating the exchange of information. Moreover, workers' remittances may reduce labour market participation rates as receiving households opt to live off of migrants' transfers rather than by working.

Brain drain – the loss of skilled and highly trained people emigrating to industrial countries – may be mitigated by the financial flows from workers' remittances and the diffusion of new ideas and technologies, either when they return home or simply by facilitating the exchange of information.

Trade is another channel through which the strong recovery in the Russian economy has contributed to the rapid growth in other CIS countries. Experience from around the world shows that large economies can be the engine of growth for their smaller trading partners. For example, given its size, the United States economy continues to be the main engine of growth worldwide. During a boom, the trading partners of large economy benefit significantly from the strong growth of domestic demand in the latter. Russia's economy is about double the size of the combined other CIS countries, and about the same as the aggregate of the CEE and the Baltics. Apart from trade, Russia continues to have strong ties (including through investment and supply of energy at significantly lower prices than internationally) with most of the CIS countries.

Russia's influence on CIS economic performance continues to be significant despite the diversification of trading partners. New linkages (such as economic migration and remittances and political gains through CIS dependence on Russia's energy supply and transit system) are emerging. As indicated above there has been large inflow of remittances from workers in Russia to low-income CIS countries. Several CIS countries still rely heavily on the Russian market including Belarus, Moldova, Georgia, the Kyrgyz Republic, and Ukraine (Appendix Table A18). The strong recovery in Russia's domestic demand in 2000–05 has also been reflected in substantial growth in intra-CIS trade.[37] The surge in exports to Russia, partly driven by the real depreciation of the other CIS currencies against the rouble, has been an important factor for the acceleration of growth in these countries. Russia's influence in the region is also manifested through Gazprom's

[37] Shiells, Pani and Jafarov (IMF WP, 2005) found that Russian growth was a significant determinant of regional economic growth prior to the Russian crisis, but the link has weakened following the Russian crisis.

monopoly in setting the price of gas that is delivered to (Armenia, Belarus, Georgia, and Ukraine) or imported from Turkmenistan and then re-exported to Ukraine.[38]

The current situation is favourable to the CIS but could be reversed if the Russian economy slows significantly in the coming years. The heavy reliance on oil and gas exports is a mixed blessing for the Russian economy. In times of high energy prices, as in the past five years, it has provided a welcome boost to the economy. Yet, a significant drop in energy prices could also adversely impact the economy. Moreover, even long booms carry risks due to the dangers of 'Dutch' disease.

### *C. Structural reforms and institutional quality*

Structural reforms and good institutions enhance growth by improving the efficiency of resource allocation and expanding the productive capacity of the economy. To measure the extent of structural reforms and institutions, this section uses the information made available by the EBRD and the World Bank, respectively.[39] The latest EBRD transition indicators show that among the CIS, structural reforms are more advanced in Armenia and Georgia, but these two countries are still far behind the CEE and the Baltics. Among the five Central Asian countries, the fastest reformers are the Kyrgyz Republic and Kazakhstan. Tajikistan made some progress in recent years after it initially lagged behind due to its civil war until 1998.

In general, reform in the CIS is most advanced in the privatization of small-scale enterprises, the liberalization of foreign trade and exchange and the elimination of price controls. Structural reforms are least advanced in the regulation and supervision of the banking and financial sector, the development and enforcement of competition policy, and the reform of governance in both the private and the public sectors. Only half of the 12 CIS countries achieved an average transition indicator score of 3.0 or more as compared with an average of 3.7 for the Baltics and CEE. Progress in structural reforms has been slow in Belarus and Uzbekistan. Most of the progress attained in these two countries is related to

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[38] Gas prices to Armenia have been frozen (at less than half the international prices) until January 1, 2009, in return Armenia would transfer control of the electricity power generating units to Russia. Starting first of January 2007, Gasprom has more than doubled prices of gas that Belarus pay (an increase from USD 47 to 100 per thousand cubic metres and part of the bill will be paid by surrendering shares in its gas-distribution system through which Russian gas transits to western Europe. Georgia, whose Western-leaning leadership has accused Russia of using its energy might to apply political pressure, agreed to pay USD 235 per thousand cubic metres (tcm) for its gas imports under threat of a gas freeze at the beginning of 2007. Turkmenistan's gas export prices to Russia increased from USD 44 per tcm in 2004 (with half paid in kind) to USD 65 per tcm at the start of 2006 (all cash), and to USD 100 per tcm from October 2006 to end 2009. This is still well below the price Russia receives for its gas exported to western Europe (USD 230 per tcm) and slightly more than the gas prices charged to Ukraine. Ukraine's Russian-leaning new prime minister (Viktor Yanukovych) was able to negotiate a favourable price of gas of USD 130 per tcm (almost half the international prices) starting in 2007.

[39] The EBRD reform index omits several important elements of economic governance. These include market-supporting institutions, such as a fair and uncorrupted judicial system and regulatory bodies that ensure a level playing field for business. In this regard, the EBRD and the World Bank have conducted periodic surveys of enterprises in the past five years to construct measures of good business environment and governance.

price and trade liberalization. Turkmenistan virtually did not reform its economy with the exception of some small-scale privatization and price liberalization.

Market reforms in the CIS have been delayed due to the lack of unequivocal political and popular support for reform, and the absence of external anchor for the reform process, such as the realistic expectation of EU membership. And unlike the Baltics and the CEE, the CIS are relatively far from the large west European markets. Despite these disadvantages, reforms in the CIS have nevertheless advanced, although at a slower pace and with significant differences across countries. Armenia, Azerbaijan, Georgia, Tajikistan, and Ukraine have made further progress in recent years, while Kazakhstan and Russia have taken some steps backward.

The business climate has improved in recent years. As Table 8 shows, the time involved in starting a new business has been reduced to only 21 days in the Kyrgyz Republic, 25 days in Armenia and Georgia, and 30 days in Moldova. The unweighted average for the Baltic region (Estonia, Latvia, and Lithuania) is 26 days. But it takes 40 days in the Czech Republic and 52 days in Hungary to complete the process which takes only 2 days in Australia and 5 days in

Denmark. But no significant progress has been made in reducing corruption. Priorities include strengthening property rights, fortifying the judiciary and allowing the speedy enforcement of contractual obligations, and providing greater transparency and stability in rules and regulations governing private investment.

The institutional quality columns for different years in Table 8 measure the quality of institutions based on the work of Kaufmann and others (from 1996 to 2005) at the World Bank. In this study the institutional quality measure is constructed by calculating the simple average of six indicators:[40]

- *Voice and accountability* – focuses on the quality of the political process and civil and private liberties;
- *Political instability and violence* – measures the threat and realization of destabilizing the government or regime by any unlawful means;
- *Government effectiveness* – measures the quality of inputs, mostly of the bureaucracy, and the process by which policy is being formed, including independence of political interference;
- *Regulatory burden* – looks at the quality of the policies and the degree to which they interfere negatively with the operation of the market economy;

[40] These six measures are based on an unobserved components model that aggregates over 300 indicators, ranging from ratings by country experts to survey results. Given the subjective nature of the underlying polls and surveys, it is possible that the respondents' answers to questions on institutions are influenced by their perception of policies. Nevertheless, this is the best set of institutional measures.

- *Rule of law* – estimates respect for the law and the quality of the judiciary and enforcement arms; and
- *Control of corruption* – measures the inclination of people and officials to offer and accept bribes.

Each of these indicators is distributed normally, with a mean of zero and a standard deviation of one. This implies that virtually all scores lie between -2.5 and 2.5, with higher scores corresponding to 'better' outcomes. Since these six measures are strongly correlated, distinguishing the separate impact of any single concept is problematic. Institutional quality in Table 8 is defined as the simple average of the above six indicators.

The scores for institutional quality in the CIS are still among the lowest in the world, and worse than some of the sub-Saharan African economies.[41] Weak state capacity, particularly in the low income CIS countries, appears to be an important constraint on institutional reforms. Unlike the CEE and the Baltics, very little progress has been made in recent years in building adequate, comparable institutions. In Kazakhstan, the Kyrgyz Republic, Moldova, and Ukraine the quality of institutions as measured by the World Bank, was worse in 2004 than in1996, in areas such as voice and accountability, rule of law, and corruption. Policy makers have failed to take advantage of the favourable economic circumstances in recent years to accelerate the pace of systemic change. That said, the record of structural reforms and institutional quality suggest that most CIS economies have not yet reached a critical mass of structural transformation and improvement in business environment to sustain rapid growth. A huge structural transformation is still needed (Owen and others 2003, p. 60).

### *D. Model specification and estimation*

Both the short-run and long-run coefficients of the determinants of per capita growth and total factor productivity are estimated. For the short-run estimates, the dataset is annual covering the period from 1991–2005 for transition countries and 1986–2004 for other countries. Three different econometric techniques are used to estimate the short-run coefficients: fixed effects, random effects, and two stage least squares (2SLS). The dataset used in the long-run estimates includes 5 to 10-year period averages, each country being represented with one or two observations. The simplest strategy would be to estimate the long-run coefficients using ordinary least squares (OLS). Since some of the explanatory variables are endogenous, the model is also estimated by two stage least squares (2SLS) using s set of instruments that are correlated with the endogenous regressors and orthogonal to the disturbances.

[41] Institutions play a major role in promoting economic development (Rodrik, 2000; Acemoglu et al., 2001) partly because they reduce uncertainty and lower the cost of transactions and production.

Table 8

## Structural reforms, business environment and institutions (1995–2005)

| | EBRD Structural Reform Index [1] | | | Business environment Days needed (2005) | | Institutional quality [2] | | |
|---|---|---|---|---|---|---|---|---|
| | 1995 | 2000 | 2005 | for a licence | to start business | 1996 | 2000 | 2004 |
| **CIS** | 2.3 | 2.6 | 2.9 | 261 | 44 | -0.58 | -0.72 | -0.76 |
| Armenia | 2.1 | 2.7 | 3.3 | 176 | 25 | -0.39 | -0.54 | -0.43 |
| Azerbaijan | 1.6 | 2.3 | 2.8 | 212 | 123 | -0.93 | -0.82 | -0.96 |
| Belarus | 1.9 | 1.5 | 1.8 | 354 | 79 | -0.87 | -1.13 | -1.12 |
| Georgia | 2.0 | 3.0 | 3.2 | 282 | 25 | -0.72 | -0.63 | -0.80 |
| Kazakhstan | 2.4 | 2.8 | 3.0 | 258 | 25 | -0.62 | -0.59 | -0.82 |
| Kyrgyz Republic | 2.9 | 3.0 | 3.1 | 152 | 21 | -0.30 | -0.60 | -0.80 |
| Moldova | 2.2 | 2.9 | 2.9 | 122 | 30 | -0.19 | -0.61 | -0.64 |
| Russia | 2.8 | 2.7 | 3.0 | 528 | 36 | -0.63 | -0.80 | -0.63 |
| Tajikistan | 1.7 | 2.2 | 2.5 | … | … | … | … | … |
| Turkmenistan | 1.2 | 1.4 | 1.5 | … | … | … | … | … |
| Ukraine | 2.2 | 2.6 | 3.0 | 265 | 34 | -0.54 | -0.75 | -0.63 |
| Uzbekistan | 2.1 | 2.0 | 2.2 | … | … | … | … | … |
| **Baltic States** | 3.2 | 3.4 | 3.7 | 142 | 26 | 0.40 | 0.63 | 0.85 |
| Estonia | 3.4 | 3.7 | 3.8 | 116 | 35 | 0.67 | 0.93 | 1.06 |
| Latvia | 3.0 | 3.3 | 3.6 | 160 | 18 | 0.25 | 0.47 | 0.71 |
| Lithuania | 3.2 | 3.3 | 3.8 | 151 | 26 | 0.27 | 0.50 | 0.77 |
| **Central Europe** | 3.4 | 3.6 | 3.7 | 252 | 47 | 0.67 | 0.71 | 0.78 |
| Czech Republic | 3.5 | 3.6 | 3.9 | 245 | 40 | 0.89 | 0.68 | 0.74 |
| Poland | 3.4 | 3.6 | 3.7 | 322 | 31 | 0.60 | 0.62 | 0.54 |
| Hungary | 3.6 | 3.9 | 3.9 | 213 | 52 | 0.72 | 0.88 | 0.90 |
| Slovak Republic | 3.3 | 3.4 | 3.7 | 272 | 52 | 0.34 | 0.49 | 0.74 |
| Slovenia | 3.1 | 3.4 | 3.4 | 207 | 61 | 0.79 | 0.89 | 0.99 |
| **Southeast Europe** | 2.4 | 3.0 | 3.2 | 272 | 42 | -0.13 | -0.17 | -0.12 |
| Albania | 2.6 | 2.8 | 3.0 | 390 | 47 | -0.10 | -0.49 | -0.48 |
| Bosnia & Herzegovina | 1.2 | 2.1 | 2.6 | 187 | 54 | … | -0.56 | -0.58 |
| Bulgaria | 2.6 | 3.4 | 3.5 | 212 | 32 | -0.15 | 0.12 | 0.21 |
| Croatia | 2.9 | 3.3 | 3.5 | 278 | 49 | -0.25 | 0.26 | 0.24 |
| Romania | 2.5 | 3.2 | 3.4 | 291 | 28 | -0.15 | -0.15 | -0.01 |

*Note*: Regional figures are unweighted averages.

1) Simple average of eight EBRD transition reform indicators (price liberalization, competition policy, banking reform, trade and foreign exchange system, large-scale privatization, small-scale privatization, governance and enterprise reforms, and infrastructure). The transition indicators range from 1 to 4, with 1 representing little or no change from a rigid centrally planned economy and 4 representing the standards of an industrialized market economy. - 2) Simple average of six institutional concepts: voice and accountability, political stability and absence of violence, government effectiveness, regulatory burden, rule of law, and control of corruption. Each of these indicators is distributed normally, with a mean of zero and a standard deviation of one. The scores lie between -2.5 and 2.5, with higher scores corresponding to better outcome.

*Sources*: Own calculations based on EBRD Transition reports, various years; World Bank, 2005, Doing Business; Kaufmann and others, 2005, Governance Indicators for 1996-2004, World Bank Policy Research Paper Series, number 3030.

The full sample includes 90 countries, of which 25 are classified as transition countries.[42] These countries represent all geographic regions. Summary statistics for the key variables used in the analysis are presented in Table 9. It should be noted that the scores for the quality of institutions is the lowest in the CIS as compared with other regions or group of countries. But the level of education in the CIS is much higher than other developing and emerging economies and is close to the CEE and the advanced OECD group of countries.

The model postulates that the per capita growth rate, in a given country (i) and period (t), is explained by the following factors:

$$g_{it} = \lambda_1 Z_{it} + \lambda_2 X_{it} + \mu_i + v_t + \varepsilon_{it} \quad (4)$$

where the dependent variable is either $g_{it}$ (the average growth rate of per capita GDP) or $\theta_{it,}$ the growth in total factor productivity, $\mu_i$ is a country specific unobservable effect, $v_t$ is a time specific factor; $\varepsilon_{it}$ is the disturbance term, Z is the vector of 'core explanatory variables' that are believed to have contributed to the recent rapid growth. Such variables include:

- The impact of convergence is measured by the initial per capita income. That is, the potential for growth depends on the initial level of per capita income. The coefficient for this variable is expected to be negative, implying that poor countries tend to grow faster than richer countries as each country converges toward its steady state. To reduce the problem of multicollinearity of per capita income with other variables used in the regression (namely the real GDP index, EBRD reform index, and the inflation rate) as detected in the cross-correlation matrix (Table 10), I entered the two years lag of the level of per capita GDP into the growth and TFP equations.
- The catch-up process or the recovery of output after its sharp fall in the 1990s is investigated. For the sample that includes only transition economies, the real GDP index (1990=100) of the previous year is used to test whether the amplitude of the recent recovery is influenced by the magnitude of the fall in output before recovery is resumed. When the full sample is used to estimate the long-run coefficients, an index with the following values is used: 0 if the country is not a transition economy; and the following values for transition countries:

[42] Advanced OECD: Australia, Austria, Canada, Denmark, Finland, France, Germany, Ireland, Italy, Japan, Netherlands, Norway, Spain, Sweden, the UK, and the U.S. Sub-Sahara: Botswana, Burkina Faso, Cameroon, Ghana, Ivory Coast, Kenya, Malawi, Mali, Mauritius, Niger, Nigeria, Senegal, South Africa, Nigeria, and Tanzania. Latin America: Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay, and Venezuela. MENA: Algeria, Egypt, Jordan, Lebanon, Marocco, Pakistan, Tunisia, and Yemen. Southeast Asia: China, Hong Kong, India, Korea, Malaysia, the Philippines, Singapore, Sri-Lanka, Thailand, Vietnam. CIS: Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, the Kyrgyz Republic, Moldova, Russia, Tajikistan, Ukraine, and Uzbekistan. CEE and Baltic: Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovak Republic, and Slovenia. SEE: Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Macedonia, Romania, and Serbia.

- 0.25 if real GDP in 1996 was between 80% and 95% of its value in 1990;
- 0.50 if real GDP in 1996 was between 65% and 79% of its value in 1990;
- 0.75 if real GDP in 1996 was between 50% and 64% of its value in 1990;
- is real GDP in 1996 was less than 50% of its value in 1990.

  Usually sharp contractions in output due to crisis, wars, etc., may be followed by strong future growth that offset the initial decline. This combined with corrective policies and structural reforms could spur strong economic recovery above the original trend line if the governments reduce inefficiencies.

– EBRD reform index is the unweighted average of eight structural reform indicators: price liberalization, small-scale privatization, large-scale privatization, competition policy, trade liberalization, financial sector reform, governance and enterprise reforms, and infrastructure reform. The EBRD indicators range from 1 to 4.3, where 4.3 indicates that the country's structural characteristics are comparable to those prevailing on average in market economies, and 1 represents conditions before reform in a centrally planned economy with dominant state ownership of the means of production.[43]

– Most empirical studies show that institutions are one of the most important determinants of long-run growth. However, improving basic institutions can take a long time. To investigate the impact of institutional quality on growth, when using the full sample of countries, the indices provided by the World Bank's cross-country governance dataset are used, as developed and presented in Kaufman and others (2005). In this respect, a simple average of six measures of institutional development is constructed: voice and accountability, political instability, government effectiveness, regulatory burden, rule of law, and control of corruption.44 Each of these indicators is distributed normally, with a mean of zero and a standard deviation of one. This implies that virtually all scores lie between -2.5 and 2.5, with higher scores corresponding to 'better' outcomes. Data on these variables are available only for 1996, 1998, 2000, 2002, and 2004. For this reason this variable is included only in the long-run regressions using period averages for 1996–2005 and for 90 countries. The term 'institutions' covers the practices, rules and organizations that guide and govern economic activities. The institutional infrastructure of a market economy includes the way that markets operate, the ease of entry into the market by new firms (the avoidance of bureaucratic obstacles and restrictive procedures) and for the exit of established firms (including bankruptcy procedures), property law and contracts and their judicial enforcement, taxation, the effective regulation of financial and infrastructure services, and environmental protection.

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[43] The reform indices are not perfect and their assessment is sometimes influenced by the observed macroeconomic performance, which raises the problem of possible endogeneity.

[44] Corruption includes bribery and direct involvement in business by many civil servants. It includes contradictory laws that give state bureaucrats the possibility to extract rent from businesses and thus hinder improvements in legislation that would reduce their rents.

- The impact of net remittances from migration as share of GDP is also examined.
- The terms of trade index (2000=100) is included to account for possible exogenous shocks in international commodity prices that may have an impact on per capita growth. This index is derived from export prices relative to import prices. This variable may also be included in the list of instrumental variables (IVs) because its movement depends primarily on world conditions and therefore, is largely exogenous with respect to per capita growth for an individual country. Although Armenia, Georgia, and the Baltics have faced less favourable terms of trade than the other former Soviet Union republics, their average economic growth was higher. This may suggest that factors other than the terms of trade have more than offset the adverse impact from the terms of trade deterioration on growth in these countries.

The group of variables X comprises macroeconomic policy and structural variables that are frequently included as the determinants of growth in cross-country studies (Sala-i-Martin, 1997):

- Share of FDI in total investment. Unlike previous studies, this paper uses the share of FDI in total investment instead of the ratio of FDI inflow to GDP. FDI can provide the CIS with much of the needed technological and managerial expertise. A country may gain the benefits from FDI without increasing it net external debt. Two recent fast growing economies highlight this distinction. During 1991–2000, Ireland and China received large FDI inflows that are generally credited with playing an important role in their growth performance, yet during this period both countries had external current account surpluses every year. But the impact of FDI on growth remains more contentious in empirical studies than in theoretical studies. While some studies find a positive strong link between FDI and growth, others detect a negative weak relationship. The controversy may partly be due to data inaccuracy and insufficiency in either cross-country or time series.
- Share or total investment in GDP. There is little disagreement in the general growth literature that investment is a major engine of growth in the medium to long term. In the short run, however, and especially in the CIS economies with a history of excessive capital accumulation and inefficient use (see Easterly and Fisher, 1995), the role of investment in the initial recovery phase (perhaps until 2000) may be relatively less important. In this regard, Havrylyshyn and others (1999) found little evidence that recovery in output depended on investment. Instead, the initial output expansion of the CIS came primarily from a variety of efficiency improvements (including recovery of underutilized capacity; elimination of the egregious waste of labour, capital, and materials; and efficiency gains from a more appropriate combination of capital and labour.

- The impact of macroeconomic stabilization as measured by overall fiscal balance as a ratio of GDP, and the logarithm of the inflation rate, is also considered. Inflation is a policy result, while the fiscal balance refers more to the policy itself. Berg and others (1999) show that the fiscal balance is more difficult to reject than inflation in modelling transition economies' output paths. In addition to their effects on inflation, large fiscal deficits are likely to have adverse effects on growth through unsustainable balance of payments positions. Large fiscal deficits may also lead governments to use financial repression, including restrictions on international capital flows. While fiscal consolidation that reduces reliance on domestic financing enhances growth, the composition of fiscal spending affects growth (Gupta, Clements, and Inchauste, 2004). A higher share of spending on education and health benefits growth. However, this positive effect is reduced if governance is poor or macroeconomic policies are unsound.
- Government size in the economy is measured by the ratio of government consumption to GDP. Higher government consumption is believed to reduce growth prospects. This effect is normally associated with the crowding out of private sector investment, higher rent-seeking behaviour, and distorted market incentives including higher taxation. In contrast, efficient government investment can promote economic growth through improvement in infrastructure and creating the right environment for private investment.
- Degree of international openness is measured by the ratio of exports plus imports to GDP. This measure is highly sensitive to the movement in international prices of commodities such as oil and gas in the case of Azerbaijan, Kazakhstan, and Russia. The use of the trade ratio as an instrument variable may be appropriate if it is exogenous to economic growth.
- Financial intermediary development as measured by the ratio of credit to private sector to GDP. This variable is highly correlated with per capita income as show in the correlation matrix in Table 10. An adequate level of financial intermediation stimulates growth by facilitating and improving resource mobilization that leads to better total factor productivity. The deepening of financial development generally raises the investment rate by lowering the cost of matching savings of households with the investment needs of the private sector.
- Education as measured by the secondary school enrolment rate. Due to data limitations, measures of institutional quality and education are entered only in the long-run regressions. Consistent data on education are available only for limited number of years and are more than 5 years apart.

Box 4

**Depth of the financial system**

There are substantial differences in the depth of CIS financial sectors. Financial intermediation has increased in Kazakhstan, Russia, and Ukraine but has remained low in other CIS countries. Under the recent favourable macroeconomic conditions, bank lending and deposits grew faster than the inflation rate in most CIS countries, the proportion of bad debt in bank credit portfolios decreased, and the share of foreign currencies in total deposits is gradually declining, albeit from very high levels. Economic studies have shown that countries with 'developed' financial systems tend to have stronger economic growth. Banks played a limited role in financing investment in low-income CIS countries. In 2005, for example, the structure of financing of fixed capital investment in Moldova was as follows: 69% self-financing, 19% local budget, 5% state budget, and only 3% bank loans (National Bank of Moldova, Annual Report 2005). A significant source of self financing in Armenia, the Kyrgyz Republic, Moldova, and Tajikistan is in the form of workers' remittances.

**Financial intermediation and efficiency**

| | Financial intermediation | | | | Efficiency | |
|---|---|---|---|---|---|---|
| | Broad money M2 or M3 | | Credit to private sector | | Interest rate spreads [1] | |
| | 2000 | 2005 | 2000 | 2005 | 2000 | 2005 |
| Armenia | 13 | 16 | 8 | 9 | 12 | 11 |
| Azerbaijan | 13 | 15 | 5 | 9 | 7 | 7 |
| Georgia | 10 | 17 | 7 | 15 | 18 | 14 |
| Kyrgyz Rep. | 11 | 22 | 4 | 8 | 34 | 21 |
| Tajikistan | 9 | 8 | 8 | 7 | 23 | 11 |
| Uzbekistan | 12 | 13 | 12 | 13 | 9 | … |
| Moldova | 16 | 30 | 13 | 21 | 9 | 6 |
| Kazakhstan | 15 | 30 | 12 | 38 | 3 | 4 |
| Russia | 16 | 31 | 16 | 26 | 13 | 7 |
| Ukraine | 19 | 43 | 12 | 34 | 28 | 8 |
| Baltics [2] | 29 | 48 | 18 | 54 | 6 | 3 |
| CEE [3] | 51 | 55 | 36 | 39 | 5 | 5 |

*Notes:* 1) Lending minus deposit rates (per cent per annum). - 2) Estonia, Latvia, and Lithuania. - 3) Poland, Czech Republic, Hungary, Slovak Republic,

*Source*: Derived from the IMF International Financial Statistics, June 2006.

The limited role of the financial system in the growth process in these countries is mainly the result of the lack of transparency in banks and borrowers, inadequate competition, poor enforcement of creditor rights, and the absence of an efficient and impartial judicial system. It is also due to the continued lack of confidence in banks (although improving in recent years); high real lending rates reflecting mainly risk premium; a narrow range of saving instruments provided by banks; and the absence of attractive savings instruments provided by nonbank financial institutions. The prevalent large spreads on domestic interest rates indicate high levels of risk and widespread inefficiencies in the banking sectors. The continued high interest rate spreads reflect difficulties in liquidating collateral and lack of adequate competition among banks. Difficulties in accessing credit from banks is often quoted as a constraint on the development of small and medium enterprises (SME), which could play a significant role in the development of activities outside the commodities sector.

Table 9

**Selected summary statistics (mean values) [1)]**

| Variable | Full samples | OECD | Sub-Saharan Africa | LA America | NENA | SEA | CIS | CEE & BAL | SEE |
|---|---|---|---|---|---|---|---|---|---|
| Real GDP per capita | 3.2 | 2.5 | 1.4 | 1.2 | 1.9 | 4.5 | 5.6 | 4.9 | 3.9 |
| Institutional quality [2)] | 0.12 | 1.52 | -0.32 | -0.16 | -0.03 | 0.25 | -0.82 | 0.76 | -0.21 |
| FDI share in investment [3)] | 14 | 15 | 10 | 12 | 5 | 10 | 25 | 20 | 17 |
| Investment as % of GDP | 22 | 23 | 18 | 20 | 21 | 29 | 21 | 25 | 21 |
| Terms of trade index | 104 | 108 | 106 | 104 | 98 | 107 | 98 | 100 | 108 |
| Remittances % of GDP | 3.4 | 0.8 | 1.7 | 1.5 | 6.5 | 2.0 | 4.8 | 0.9 | 8.6 |
| Gov't consumption % of GDP | 16 | 22 | 14 | 12 | 16 | 11 | 15 | 19 | 16 |
| Secondary Education | 65 | 92 | 25 | 47 | 51 | 70 | 80 | 84 | 73 |

*Notes*: 1) For the list of countries in each group see footnote 36 in the text. - 2) Institutional quality is the simple average of six indices reported in Kaufmann and others (2005).
*The underlying measures are defined as follows*:
(a) voice and accountability–extent to which citizens can choose their government, political rights, and civil liberties; - (b) political stability and absence of violence--likelihood that the government will be overthrown by unconstitutional or violent means; - (c) government effectiveness–quality of public service delivery and competence of the civil service; - (d) regulatory burden–the relative absence of government controls on goods markets, banking system, an international trade; - (e) rule of law–the protection of persons and property against violence or theft, independent and effective judges, contract enforcement; - (f) control of corruption–the method used to calculate each sub-index gives it approximately a unit normal distribution, with an increase always meaning a better quality of institutions.

3) The relatively high share of FDI in total investment in the CIS is due to its concentration in the commodity sectors (Azerbaijan 64%, Kazakhstan 42%, and Tajikistan 48%).

*Sources*: Author's calculations from the IMF, World Bank, WIIW, and UNECE databases.

### *E. Robustness and estimation results*

The robustness of the results is checked by applying different estimation techniques and by dropping groups of countries from the full sample. Also, both the short-run and long-run coefficients are estimated. Unlike a cross-country regression using long-period average data, a panel regression provides additional information since it captures both time-series and cross-sectional information. Furthermore, with a fixed-effects panel approach, it is possible to control for other explanatory variables and changes in them over time.

To deal with the simultaneity problem, the instrumental variables approach is adopted. The coefficient estimates for investment, real GDP index (1990=100) or transition recovery index, the average EBRD measure of reforms or institutional quality may be biased since these variables are not entirely exogenous in the per capita and TFP growth equations. If the causality runs mainly from these variables to growth then the problem may be benign, but if it runs from growth to these variables then the problem is more severe. To control for the causality problem to a certain extent, the model has also been estimated using the 2SLS (two-stage least squares) with the following variables as instruments: (1) a time trend; (2) lagged values of some explanatory variables; (3) distance to a large market (in

the case of transition, African and Middle Eastern economies' distance to Brussels; in the case of Latin American economies, their distance to New York; and in the case of Southeast Asian economies, distance to Tokyo; (4) years of Soviet rule for transition economies;[45] (5) an index measure of ethnic and linguistic fractionalization as measured by Alesina and others (2003);0[46] and (6) the Heritage Foundation Index of Economic Freedom. Using more appropriate instruments would yield more efficient IV estimates.

Another estimation problem faced in this study is the decision of which explanatory variables to include and exclude from the growth equation. Variables could be significantly correlated with growth depending on which other variables are held constant. This is because economic theories are still not precise enough to decide on the determinants of growth. The high cross-correlation among some of the explanatory variables is also a problem (Table 10). For example, combining various set of variables one finds that $x_1$ is significant when the regression includes $x_2$ and $x_3$, but becomes insignificant when $x_4$ is included or $x_2$ excluded.

Table 11 presents the short-run and Table 12 the long-run estimated coefficients with per capita GDP growth as the dependent variable. Table 13 presents the results with TFP growth as the dependent variable. If estimations without country fixed effects are to be done, then the appropriate horizon is long. The fixed-effects estimator allows the constant term to differ across cross-section units and captures the time-series dimension of reform and the real GDP index, after controlling for other growth determinants. Short-run regressions suffer from the problem of extra 'noise' induced by cyclical demand-related, factors (Kraay, 2004). Based on Monte Carlo simulations, Hauk and Wacziarg (2004) argue that taking account of all the advantages and limitations of the different estimation procedures, the pure cross-section OLS estimator that averages data over long-periods might be the least inefficient.

All estimated coefficients show the expected signs. Interestingly using different econometric estimation techniques did not alter the results significantly and the overall fit of the regressions is quite good. The estimated coefficients of the real GDP index and reform index remain statistically significant and close to the pervious estimates. The explanatory power is quite high for this type of data set and ranges from about 0.55 to 0.85. Most estimated coefficients have the expected right signs but their significance differs depending on the variables included and on the econometric estimation techniques. The long-run

[45] See Julian and others (2005) p. 14. Duration of Soviet rule in transition economies: for CIS except Moldova), 64 years; Moldova, 50 years; Baltic countries, 49 years; CEE and SEE, 43 years.

[46] Easterly and Levine (1997) have shown that per capita GDP growth is inversely related to ethno-linguistic fractionalization in a large sample of countries. In particular, they argued that much of Africa's growth failure is due to ethnic conflict, partly as a result of absurd borders left by former colonizers. Mauro (1995) has discussed the impact of ethnic fragmentation on government activities and quality of institutions. Alesina and others (2003) conclude that ethnic and linguistic fractionalization variables, more so than religious ones, are likely to be important determinants of economic success, both in terms of output and quality of institutions.

estimated coefficients are also robust with the exception of the terms-of-trade index and workers remittances.

Catching-up or recovery of lost output has contributed to the fast growth. In addition to macroeconomic stabilization, reforms, and increased investment, rapid growth in Armenia, Azerbaijan, Georgia, and Tajikistan has proceeded from a very low base, caused in large part by civil conflict in those countries in the early 1990s. The coefficient estimates for the real GDP index (1990=100) are negative, as expected, and highly significant (Table 11). The magnitude of the estimated coefficient implies that given an average real GDP index of about 50 for the CIS as compared with say 100 in Central European economies in 1996, the difference in TFP growth is expected to be about 3 percentage points assuming other things are equal.

Short-term economic growth in the low income CIS countries appears to have benefited from rising remittances through their impact on consumption and investment in housing. Table 10 shows a significant positive impact of remittances on growth in the short-run. Remittances have partly compensated for the underdeveloped financial sector in the CIS-7 and other developing countries. For each 1% increase in the ratio of remittances to GDP the per capita income increases by 0.25%. But in the long-run regression equations the coefficients for remittances are insignificant. Over the long run, remittances can reduce labour market participation rates as receiving households opt to live off of migrants' transfers rather than work. In general, the positive impact of remittances on growth will be greater if they are invested or saved in the formal banking system.

Terms of trade improvement are significantly correlated with shorter lived up breaks and down breaks in economic growth but not strongly correlated with sustained growth episodes.[47] The estimated coefficients for terms-of-trade are positive and significant in the short run. Within the CIS-12, the seven net fuel importers have had less favourable terms of trade than the five net fuel exporters – Azerbaijan, Kazakhstan, Russia, Turkmenistan, and Uzbekistan. Beyond terms of trade shocks, there have been significant spillovers from economic growth in the region as a whole. Georgia, Moldova, and Tajikistan did not experience more favourable terms-of-trade growth. The rapid growth in these countries was due to the recovery of lost output, macroeconomic stabilization, market reforms, and large foreign inflows (particularly remittances).

There is a strong link between progress in market reforms and institutional quality on one hand and growth in per capita real GDP or TFP on the other hand. Unlike several other studies (Fidrmuc, 2003; Lawson, 2004) but consistent with the finding of Falcetti (2005), the estimated coefficients for the EBRD reform index in this study are always positive and

[47] Hausmann, Pritchett and Rodrik (2004) also found similar results.

Table 10

## Cross correlation between variables [1)]

| | TFP | Per capita growth | Log of per capita income | Real GDP recovery index (1990=100) | EBRD reform index | Workers remitt-ances (% of GDP) | Terms of trade 2000=100 | Capital growth | Investment to GDP ratio | FDI share in investment | Log of inflation Rate | Fiscal balance to GDP ratio | Gov't consum-tion to GDP Ratio | Credit to private sector to GDP Ratio | Exports +Imports to GDP Ratio | Institute-ional Quality |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TFP | 1.00 | | | | | | | | | | | | | | | |
| Per capital growth | 0.86 | 1.00 | | | | | | | | | | | | | | |
| Initial income per capita | 0.23 | 0.14 | 1.00 | | | | | | | | | | | | | |
| Real GDP recovery index | 0.21 | 0.24 | 0.62 | 1.00 | | | | | | | | | | | | |
| EBRD reform index | 0.46 | 0.38 | 0.60 | 0.41 | 1.00 | | | | | | | | | | | |
| Workers remittances | 0.13 | 0.26 | -0.31 | 0.01 | -0.13 | 1.00 | | | | | | | | | | |
| Terms of trade | 0.26 | 0.25 | 0.07 | 0.19 | 0.17 | 0.02 | 1.00 | | | | | | | | | |
| Capital growth | 0.64 | 0.78 | 0.18 | 0.29 | 0.34 | 0.24 | 0.18 | 1.00 | | | | | | | | |
| Investment to GDP ratio | 0.03 | 0.14 | 0.25 | 0.35 | 0.15 | -0.15 | -0.03 | 0.35 | 1.00 | | | | | | | |
| FDI share investment | 0.36 | 0.34 | 0.03 | -0.02 | 0.42 | 0.20 | -0.04 | 0.28 | -0.08 | 1.00 | | | | | | |
| Inflation rate | -0.58 | -0.64 | -0.32 | -0.38 | -0.62 | -0.20 | -0.17 | -0.59 | -0.19 | -0.42 | 1.00 | | | | | |
| Fiscal balance | 0.45 | 0.47 | 0.29 | 0.19 | 0.29 | -0.08 | 0.21 | 0.48 | 0.20 | 0.20 | -0.41 | 1.00 | | | | |
| Gov't consumption to GDP | -0.11 | -0.16 | 0.28 | 0.12 | 0.03 | -0.17 | -0.03 | -0.04 | 0.18 | -0.33 | -0.01 | 0.03 | 1.00 | | | |
| Credit to private to GDP | 0.15 | 0.09 | 0.66 | 0.50 | 0.42 | -0.11 | 0.11 | 0.13 | 0.26 | -0.09 | -0.27 | 0.24 | 0.41 | 1.00 | | |
| Exports + imports to GDP | -0.02 | -0.04 | 0.23 | -0.06 | 0.11 | -0.12 | -0.03 | -0.08 | 0.17 | 0.06 | 0.02 | 0.08 | 0.18 | 0.25 | 1.00 | |
| Institutional quality | 0.34 | 0.28 | 0.45 | 0.09 | 0.61 | 0.15 | 0.09 | 0.17 | 0.28 | 0.24 | -0.10 | -0.31 | 0.19 | 0.22 | 0.27 | 1.00 |

*Note:* 1) Annual data for 25 transition economies covering the period 1992–2005.

*Source*: Author's own calculation.

highly significant. The strong positive impact of improvement in institutions on growth is consistent with those reported in Rodrik, Subramanian, and Trebbi (2004).[48] The value of the estimated coefficient for institutional quality and its significance increases when some of the macroeconomic policy and structural variables are excluded from the right hand side of the regression equation. This may reflect the impact of institutions on policy sustainability variables and indicate that institutions play a dominant role in explaining cross-country differences in growth. More efficient institutions allow an economy to produce the same output with fewer inputs; bad institutions lower incentives to invest, to work and to save. It is important that credible property rights are established and contracts are enforced so as to underpin high levels of investment and innovation and that opportunism and rent-seeking are contained. This was fundamental to the fast growth in South East Asia's economies, Chile, and Botswana.

As to the other explanatory variables, and consistent with much of the cross-country literature, the regression results in this paper show evidence of conditional convergence. Specifically, poorer CIS countries tend to grow faster than the relatively richer countries in Central and Eastern Europe. This finding is consistent with the neoclassical growth model. It should be noted that initial per capita income might also be a good proxy for the gap in TFP between countries. Unlike previous studies on transition economies, the results in Tables 11 and 12 also suggest that investment is one of the most important variables contributing to the recent rapid growth.

Sound macroeconomic policies (smaller deficits, lower inflation rates, lower government consumption) are associated with higher growth in per capita and TFP. In particular, there is strong link between improvement in the overall fiscal balance (smaller deficits or even small surpluses) and gains in TFP. Higher government consumption as share of GDP reduces growth prospects. This effect is associated with the crowding out of private sector investment, and distorted market incentives including higher taxation. The positive sign and significant coefficient for the log of private sector credit to GDP ratio emphasizes the importance of a healthy financial system that can extend credit to private enterprises at affordable costs. It is also an indication that private investment is a major determinant of TFP growth since private investment and credit to the private sector are positively linked.

The estimated coefficient for the secondary school enrolment rate is positive and highly significant. But the openness to trade (as measured by the sum of exports and imports to GDP ratio) that usually plays an important role in econometric studies of long-term growth, was not found to show a significant statistical association with growth in this study.

[48] Rodrik, Subramanian, and Trebbi (2004) indicate that the quality of institutions 'trumps' everything else. Once institutions are controlled for, conventional measures of geography have a weak direct effects on incomes, and trade is insignificant in explaining growth.

Table 11

## Growth regression results: short-run coefficients

(Dependent variable is per capita real GDP growth rate)

| | Transition' economies | | | | Full sample [1] | |
|---|---|---|---|---|---|---|
| | Fixed effects [2] | Random effects [3] | Random effects [3] | 2SLS | Fixed effects | Random effects [3] |
| Log of per capita GDP level | -0.762 | -1.34 | | | -1.58 | -0.29 |
| (lagged 2 years) | (2.9)** | (1.9)* | | | (5.9)** | (1.3) |
| Recovery index [4] | -0.04 | -0.07 | -0.14 | -0.11 | | |
| (lagged 1 year, 1990=100) | (3.1)** | (3.6)** | (7.8)** | (3.9)** | | |
| EBRD reform index (lagged 1 year) | 2.34 | 2.63 | 4.23 | 2.75 | | |
| (Average of 8 indicators) | (5.1)** | (4.0)** | (9.3)** | (4.5)** | | |
| Investment | 0.14 | 0.21 | 0.27 | 0.24 | 0.22 | 0.24 |
| (as % of GDP) | (4.3)** | (3.5)** | (5.5)** | (5.1)** | (8.7)** | (9.0)** |
| FDI share in investment | 0.02 | 0.01 | | | 0.03 | 0.05 |
| | (2.1)* | (0.6) | | | (3.2)** | (4.3)** |
| Terms of trade index | 0.07 | 0.06 | 0.09 | 0.04 | 0.02 | 0.03 |
| (2000=100) | (4.7)** | (3.5)** | (4.1)** | (1.5) | (2.9)* | (3.5)** |
| Workers remittances | 0.18 | 0.24 | 0.41 | 0.16 | 0.28 | 0.22 |
| (as % of GDP) | (2.9)* | (3.8)** | (5.8)** | (2.5)* | (7.9)** | (6.1)** |
| Fiscal balance | 0.48 | 0.34 | 0.44 | 0.28 | | |
| (in % of GDP) | (8.5)** | (5.4)** | (6.1)** | (3.9)** | | |
| Log of inflation rate | -1.22 | -1.61 | | | -1.19 | -1.12 |
| | (6.6)** | (6.5)** | | | (11.1)** | (10.9)** |
| Government consumption | -0.12 | | | | -0.19 | -0.16 |
| (as % of GDP) | (2.8)* | | | | (4.3)** | (3.3)** |
| Openness to trade | 0.01 | | | | 0,03 | 0,02 |
| (Exports+Imports as % of GDP) | (1.5) | | | | (3.1)** | (2.6)* |
| Conflict [5] | -5.82 | | | | | |
| | (5.4)** | | | | | |
| Observations | 338 | 338 | 349 | 349 | 1018 | 1018 |
| Period | 1992-05 | 1992-05 | 1992-05 | 1992-2005 | 1976-05 | 1976-05 |
| R-squared (weighted) | 0.67 | 0.59 | 0.51 | 0.59 | 0.55 | 0.48 |

*Notes*: Values in parentheses are t-statistics. The symbols ** and * beside the t-values denote statistical significance at the 1 per cent and 5 per cent level, respectively. – 1) The full sample includes 90 countries covering the period from 1986 to 2005. – 2) Linear estimator after one-step weighting matrix. – 3) Swamy and Arora estimator of component variances. – 4) For transition countries a proxy measure of real GDP index in the previous year with 1990=100. – 5) The following indices are used to quantify conflicts: 1 for war in Armenia and Azerbaijan (1991–1994), 1 for Croatia (1991–1995); 0.5 for violent crisis in Georgia (1989–1999), Moldova (1991–1992), and Tajikistan (1990–1998); and 0 for other transition countries.

*Source*: Author's calculations.

Table 12

## Growth regression results: long-run coefficients [1)]

(Dependent variable is per capita real GDP growth rate)

| | OLS | | | 2SLS [2)] | | |
|---|---|---|---|---|---|---|
| Log of initial GDP per capita | -1.21 | -1.09 | -0.86 | -1.15 | -1.25 | -0.97 |
| | (3.2)** | (2.9)** | (1.4) | (3.0)** | (3.2)** | (2.7)** |
| Institutions [3)] | 3.01 | 2.92 | 3.89 | 3.38 | 3.15 | 4.26 |
| | (2.3)* | (2.2)* | (2.9)** | (2.8)** | (2.7)** | (3.4)** |
| (Institutions)(Initial income) [4)] | -0.77 | -0.51 | -0.89 | -0.87 | -0.69 | -0.93 |
| | (2.1)* | (1.7)* | (2.6)** | (2.3)* | (1.9)* | (2.7)** |
| Terms of trade index | 0.03 | 0.04 | 0.06 | 0.04 | 0.04 | 0.05 |
| (2000=100) | (1.3) | (1.5) | (1.7) | (1.2) | (1.4) | (1.5) |
| Workers remittances | 0.05 | 0.06 | 0.09 | 0.05 | 0.06 | 0.08 |
| (as % of GDP) | (1.2) | (1.4) | (1.8)* | (1.2) | (1.4) | (1.7)* |
| Recovery index for Transition [5)] | 2.71 | 2.51 | 3.56 | 2.68 | 2.55 | 3.81 |
| | (4.1)** | (3.7)** | (4.8)** | (4.0)** | (3.7)** | (4.9)** |
| FDI share in investment | 0.03 | 0.03 | 0.05 | 0.05 | 0.04 | 0.06 |
| | (2.3)* | (2.1)* | (2.5)* | (2.5)* | (2.4)* | (2.7)** |
| Investment | 0.21 | 0.19 | | 0.18 | 0.18 | |
| (as % of GDP) | (6.4)** | (5.9)** | | (5.8)** | (5.8)** | |
| Secondary education | 0.05 | 0.04 | | 0.05 | 0.04 | |
| | (3.1)** | (2.9)** | | (3.1)** | (2.9)** | |
| Fiscal balance | 0.37 | | | 0.35 | | |
| (as % of GDP) | (4.5)** | | | (4.2)** | | |
| Government consumption | -0.01 | | | -0.04 | | |
| (as % of GDP) | (0.3) | | | (0.8) | | |
| Observations | 130 | 130 | 130 | 130 | 130 | 130 |
| R-squared | 0.65 | 0.59 | 0.34 | 0.68 | 0.62 | 0.38 |

*Notes*: 1) The dataset set include 70 countries (of which 25 are transition countries) with 10–year period averages, each country represented by one or two observations for the periods 1986–1995 and 1996–2005. - 2) Two-stage least squares with three IVs: distance to a large market, years of Soviet rule, and index for ethno linguistic diversity . - 3) Institutional quality is the simple average of six indices reported in Kaufmann and others (2005).

*The underlying measures are defined as follows:*

(a) voice and accountability–extent to which citizens can choose their government, political rights, and civil liberties; - (b) political stability and absence of violence–the likelihood that the government will be overthrown by unconstitutional or violent means; (c) government effectiveness–quality of public service delivery and competence of the civil service; (d) regulatory burden–the relative absence of government controls on goods markets, banking system, an international trade; (e) rule of law–the protection of persons and property against violence or theft, independent and effective judges, and contract enforcement; and (f) control of corruption–the method used to calculate each sub index gives it approximately a unit normal distribution, with an increase always meaning a better quality of institutions.

4) Captures the interaction between initial GDP per capita and institutions. – 5) To capture the phenomenon of recovery or catching-up, I have constructed an index with the following values: for non transition countries a value of 0; for a transition country with a real GDP level at the start of the period (in 1996) of 0.25 if real GDP was between 80 and 95 per cent of its level in 1990; 0.50 if real GDP was between 65 and 79 per cent of its value in 1990; 0.75 if real GDP was between 49 and 64 per cent of its value in 1990; and 1 if real GDP was less than 49 per cent of its value in 1990.

*Source*: Author's calculations. Note: values in parenthesis are t-statistics and the symbols ** and * denote statistical significance at 1% level and 5% level, respectively.

Table 13

**Some determinants of total factor productivity growth**

| | Transition countries | | | | Full sample | |
|---|---|---|---|---|---|---|
| | Short-run coefficients | | | Long-run | Long-run [2] | |
| | Fixed effects [1] | | 2SLS | OLS | OLS | 2SLS [3] |
| Log of initial GDP per capita | -2.85 | | | | -3.56 | -3.29 |
| | (2.4)* | | | | (4.1)** | (3.4)** |
| Recovery index for transition | -0.10 | -0.11 | -0.09 | -0.03 | | |
| | (4.5)** | (8.9)** | (6.3)** | (3.7)** | | |
| Institutions [4] | | | | 2.48 | 2,41 | 2,65 |
| | | | | (3.2)** | (3.1)** | (3.4)** |
| (Institutions)(Initial GDP per capita) [5] | | | | -0.46 | -0.43 | -0.37 |
| | | | | (2,4)* | (2,3)* | (2,2)* |
| EBRD reform index | 6.62 | 5.65 | 6.31 | 2.17 | | |
| (Average of 6 indicators) | (6.2)** | (10.7) | (5.0)** | (4.1)** | | |
| Fiscal balance | 0.39 | 0.34 | 0.35 | 0.33 | 0.39 | 0.41 |
| (in % of GDP) | (5.6)** | (6.8)** | (2.6)** | (3.2)** | (4.2)** | (5.1)** |
| Terms of trade index | 0.05 | 0.05 | 0.06 | 0.02 | 0.04 | 0.03 |
| (2000=100) | (2.1)* | (2.1)* | (2.3)* | (1.2) | (1.3) | (1.0) |
| Workers remittances | 0.12 | 0.17 | 0.25 | 0.05 | 0.08 | 0.11 |
| (as % of GDP) | (1.6) | (2.3)* | (3.7)** | (1.3) | (1.4) | (1.8)* |
| Openness to trade | 0.03 | | | | 0.08 | 0.11 |
| (Exports+Imports) as % of GDP | (2.1)* | | | | (3.1)** | (3.4)** |
| FDI share in investment | 0.34 | | | | 0.38 | 0.39 |
| | (1.4) | | | | (2.3)* | (2.4)* |
| Observations | 324 | 344 | 284 | 40 | 130 | 130 |
| R-squared | 0.62 | 0.65 | 0.52 | 0.67 | 0.52 | 0.56 |

*Notes*: A Hausman test favors fixed effects (FE) Generalized Least Squares (GLS) pooled estimate with cross-section weights. Values in parenthesis are t-statistics. The symbols ** and * beside the t-values denote statistical significance at 1% and 5% level, respectively. – 1) Generalized Least Squares (GLS) with fixed effects (FE) and cross section weights allows for heteroscedasticity in the relevant dimension. – 2) The dataset set include 70 countries (of which 25 are transition countries) with 10 year period averages, each country represented by one or two observations for the periods 1986–1995 and 1996–2005. – 3) Two-stage least-squares with three IVs: distance to a large market, years of Soviet rule, and index for ethno linguistic diversity . – 4) Institutions is the simple average of six indices reported in Kaufmann and others (2005), see footnote 3 in Table 11. – 5) Captures the interaction between initial GDP per capita and institutions.

*Source*: Author's calculations.

Openness to trade is difficult to measure. The ratio of exports to GDP may not be a good measure of openness since it is very sensitive to the movements in world prices of primary commodities. Most of the CIS countries rely heavily on the exports of a few commodities (including oil, gas, gold, metals, and cotton.

## VI. Conclusions and policy challenges

How can the region turn the recent rapid growth into dynamic sustained growth? The analysis in this paper suggests that much will continue to depend on CIS's commitment and ability to preserve a stable macroeconomic environment and make further progress in market reforms and institutional building to improve the investment climate in the non-primary sectors.

The growth accounting exercise suggests that, unlike the other fast growing economies in South East Asia, the rapid growth in the CIS has been driven largely by growth in TFP rather than factor accumulation. Investment outlays, despite some improvement in recent years, remained relatively low. Employment dropped substantially in the 1990s, generating negative labour contributions to growth until 1998. The employment level has been increasing in recent years in Russia, Ukraine, and countries in Central Asia, but continued its decline in Armenia, Georgia, and Moldova despite the robust growth.

Using a panel data regression this study also found that the rapid growth in TFP is explained by the extent of how much transition economies have contracted in terms of real GDP in the early 1990s, and the degree of progress made in market reforms and institutional building. The results are robust to instrumental variable estimation and other robustness tests. Specific findings include the following:

- Of the 8% arithematic average annual increase in real GDP that occurred between 2001 and 2005, about 5 percentage points are estimated to have been attributable to TFP growth.
- The relatively large contribution of TFP growth was due to increase in capacity utilization from its very low levels in the mid-1990s, improvement in macroeconomic policies and structural reforms.
- Transition countries that experienced larger falls in output during the early 1990s tended to grow at much faster rates.
- More favourable terms of trade and large increases in remittances have also aided the stronger growth performance.
- Russia's influence on CIS economic performance remains significant. New linkages (such as economic migration, remittances, and dependence on Russian energy supply and transit) are emerging.
- Technology transfer is a critical component of productivity growth in periods of catching-up with more advanced economies. FDI often facilitate this process.

The strong economic recovery in the CIS that began in 2000, however, may continue over the next few years. Why? First, the still relatively low real GDP base and low average per capita means that there is more catch-up potential. Second, recent trend of faster capital

accumulation is expected to play a more important role in the medium-term growth. Third, education levels are relatively much higher than other regions. There is a downside risk, however, arising from the high concentration of exports in a few commodities. The undiversified export structure and the terms-of-trade gains may expose the CIS countries to considerable external risks.

As time passes, the share of growth derived from improved resource allocation may diminish gradually and long-term rapid growth will be increasingly dependent on physical and human capital accumulation. While higher domestic savings would strengthen the foundations for sustained economic expansion, the unfavourable demographic trends (continued emigration, aging of the population, low labour force participation, and declining population) in Armenia, Belarus, Georgia, Moldova, Russia and Ukraine may make it difficult to attain and maintain saving rates as high as those recorded by the most rapidly growing economies. Therefore, productivity increases should continue to play a key role in the long-run growth performance.

The CIS economies also need to diversify and achieve significant productivity gains in non-commodity sectors. Diversification is a long-term process that is likely to take several years to materialize even under favourable circumstances and a supportive policy environment. Significant gains in productivity will be required to offset the impact of the recent real exchange rate appreciation on the non-resource sectors' competitiveness. Better institutions would also help to attract FDI to the non-commodity sectors.

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# Appendix

Table A14

## Contribution to growth in real GDP: expenditure side

(Annual averages, in percentage points)

| | Real GDP growth | | Private consumption | | Government consumption | | Gross capital formation | | Net exports of goods and services | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1996-00 | 2001-05 | 1996-00 | 2001-05 | 1996-00 | 2001-05 | 1996-00 | 2001-05 | 1996-00 | 2001-05 |
| Armenia | 5.1 | 12.5 | 5.2 | 7.7 | -0.1 | 1.2 | 0.7 | 4.5 | 0.1 | 0.1 |
| Azerbaijan | 7.1 | 13.7 | 9.0 | 6.2 | 0.1 | 1.5 | 10.8 | 10.1 | -2.8 | -3.6 |
| Belarus | 6.4 | 7.5 | 5.5 | 6.3 | 1.1 | 0.1 | 1.3 | 4.2 | 0.0 | -2.2 |
| Estonia | 5.6 | 7.6 | 3.8 | 4.3 | 0.1 | 1.1 | 2.4 | 3.7 | -0.4 | -1.7 |
| Georgia | 5.9 | 7.3 | 7.2 | 5.9 | -0.5 | 1.2 | -0.1 | 4.7 | -0.7 | -4.4 |
| Kazakhstan | 2.6 | 10.3 | -0.1 | 6.4 | -0.5 | 0.9 | -0.6 | 1.9 | 1.2 | 1.4 |
| Kyrgyz Republic | 5.6 | 3.7 | 1.2 | 5.9 | 0.6 | 0.1 | 0.6 | -0.5 | 3.2 | -1.7 |
| Latvia | 5.7 | 8.1 | 3.5 | 5.1 | 0.2 | 0.4 | 3.1 | 5.1 | -1.1 | -2.7 |
| Lithuania | 4.2 | 7.6 | 3.3 | 5.4 | 0.5 | 0.7 | 1.7 | 3.8 | -1.3 | -2.3 |
| Moldova | -2.4 | 7.0 | 6.0 | 8.3 | -0.4 | 0.3 | -0.4 | 2.0 | -5.5 | -3.5 |
| Russian Federation | 1.8 | 6.1 | 0.1 | 4.6 | 0.2 | 0.3 | -0.9 | 2.0 | 1.6 | -1.0 |
| Ukraine | -1.8 | 7.7 | -1.1 | 6.4 | -0.8 | 0.6 | -1.2 | 2.1 | 1.2 | -1.2 |

*Note*: The difference between real GDP by production and by final use is a statistical discrepancy (may reflect unrecorded trade).

*Sources*: Compiled from national and international (IMF and UNECE) official statistics.

Table A15

## Contribution to growth: production side

(Annual averages, in percentage points)

| | Gross value added | | Agriculture and forestry | | Industry and mining | | Construction | | Services and others | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1996-00 | 2001-05 | 1996-00 | 2001-05 | 1996-00 | 2001-05 | 1996-00 | 2001-05 | 1996-00 | 2001-05 |
| Armenia | 3.8 | 12.7 | 0.5 | 2.1 | 0.6 | 1.9 | 1.2 | 3.9 | 1.5 | 4.8 |
| Azerbaijan | 6.9 | 12.7 | 0.8 | 1.2 | 0.4 | 5.4 | 1.5 | 3.4 | 4.2 | 2.7 |
| Belarus | 6.2 | 6.7 | -0.2 | 0.7 | 2.8 | 3.4 | 0.3 | 0.7 | 3.3 | 1.9 |
| Estonia | 5.6 | 7.5 | 0.0 | -0.1 | 1.0 | 2.3 | 0.5 | 0.7 | 4.1 | 4.6 |
| Georgia | 3.3 | 6.8 | -0.4 | 0.8 | 0.3 | 1.1 | 0.4 | 0.7 | 3.0 | 4.2 |
| Kazakhstan | 2.3 | 11.4 | -0.2 | 0.5 | 1.3 | 3.4 | 0.3 | 1.8 | 0.9 | 5.7 |
| Kyrgyz Republic | 5.5 | 4.4 | 2.8 | 1.0 | 1.8 | -0.1 | -0.5 | 1.1 | 1.4 | 2.4 |
| Latvia | 6.0 | 8.2 | 0.1 | 0.1 | 0.8 | 1.3 | 0.5 | 0.8 | 4.6 | 6.0 |
| Lithuania | 4.2 | 7.7 | 0.1 | 0.2 | 1.0 | 2.6 | -0.1 | 0.8 | 3.2 | 4.1 |
| Moldova | -1.7 | 5.8 | -0.6 | 1.2 | -1.0 | 1.2 | -0.5 | 0.5 | 0.4 | 2.9 |
| Russian Federation | 1.7 | 6.1 | 0.0 | 0.3 | 1.0 | 1.7 | -0.2 | 0.8 | 0.9 | 3.3 |
| Ukraine | -2.2 | 8.9 | -0.5 | 0.7 | 0.3 | 2.8 | -0.7 | 0.3 | -1.3 | 5.1 |

*Sources*: Compiled from national and international (IMF and UNECE) official statistics.

Table A16

## Gross value added by sectors, 2000 = 100, at prices of 2000

| | | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Armenia | Agriculture | 87.2 | 90.6 | 92.4 | 88.3 | 99.6 | 101.1 | 100.0 | 111.7 | 115.9 | 120.7 | 138.2 | 155.0 |
| | Industry, including energy | 86.6 | 88.9 | 89.9 | 91.0 | 89.0 | 93.8 | 100.0 | 103.9 | 118.3 | 136.7 | 139.6 | 149.9 |
| | Construction | 53.1 | 50.0 | 62.6 | 65.1 | 72.0 | 77.6 | 100.0 | 104.8 | 148.4 | 215.9 | 244.8 | 330.7 |
| | Services activities | 68.4 | 81.9 | 84.7 | 89.2 | 92.5 | 97.2 | 100.0 | 111.0 | 128.3 | 141.7 | 159.2 | 176.3 |
| Azerbaijan | Agriculture | 85.5 | 79.4 | 81.6 | 75.5 | 80.5 | 88.8 | 100.0 | 111.1 | 118.2 | 124.8 | 131.0 | 140.0 |
| | Industry, including energy | 120.0 | 94.5 | 88.3 | 88.6 | 90.3 | 93.5 | 100.0 | 107.5 | 112.8 | 119.8 | 125.0 | 196.1 |
| | Construction | 16.1 | 17.5 | 36.9 | 61.2 | 93.1 | 97.5 | 100.0 | 105.9 | 192.4 | 284.3 | 389.2 | 397.0 |
| | Services activities | 90.7 | 78.9 | 75.1 | 80.2 | 84.7 | 91.4 | 100.0 | 107.8 | 114.2 | 124.4 | 135.7 | 145.1 |
| Belarus | Agriculture | 107.0 | 104.4 | 105.9 | 100.0 | 99.1 | 91.6 | 100.0 | 102.0 | 103.3 | 109.0 | 123.0 | 126.0 |
| | Industry, including energy | 69.2 | 62.1 | 65.0 | 76.5 | 84.6 | 92.0 | 100.0 | 107.2 | 113.7 | 125.0 | 148.7 | 164.2 |
| | Construction | 122.8 | 82.0 | 75.8 | 92.0 | 104.7 | 102.1 | 100.0 | 94.8 | 105.0 | 117.3 | 135.1 | .. |
| | Services activities | 79.9 | 74.4 | 76.6 | 84.0 | 90.8 | 95.0 | 100.0 | 106.3 | 109.0 | 112.9 | 118.8 | .. |
| Estonia | Agriculture | 97.0 | 99.1 | 99.0 | 104.8 | 105.0 | 101.5 | 100.0 | 94.1 | 93.7 | 90.7 | 92.2 | 90.1 |
| | Industry, including energy | 75.1 | 79.6 | 81.0 | 89.5 | 91.2 | 87.8 | 100.0 | 108.6 | 122.5 | 135.1 | 146.7 | 162.9 |
| | Construction | 57.3 | 65.8 | 70.2 | 80.6 | 95.3 | 87.9 | 100.0 | 104.5 | 125.9 | 133.9 | 147.9 | 168.0 |
| | Services activities | 71.9 | 74.3 | 78.1 | 87.2 | 91.5 | 94.0 | 100.0 | 106.8 | 111.7 | 118.3 | 126.8 | 139.7 |
| Georgia | Agriculture | .. | .. | 109.6 | 113.8 | 106.3 | 113.6 | 100.0 | 108.2 | 106.7 | 117.6 | 109.2 | 122.3 |
| | Industry, including energy | .. | .. | 92.5 | 95.6 | 93.7 | 96.7 | 100.0 | 97.1 | 105.4 | 113.6 | 122.5 | 136.5 |
| | Construction | .. | .. | 59.8 | 90.5 | 122.4 | 96.1 | 100.0 | 110.3 | 157.9 | 231.4 | 245.2 | 299.9 |
| | Services activities | .. | .. | 74.2 | 81.0 | 91.4 | 93.1 | 100.0 | 105.7 | 110.4 | 123.0 | 134.6 | 143.3 |
| Kazakhstan | Agriculture | 148.2 | 112.1 | 106.5 | 105.5 | 85.1 | 103.3 | 100.0 | 117.1 | 120.8 | 123.5 | 123.0 | 131.0 |
| | Industry, including energy | 91.4 | 83.6 | 83.8 | 87.3 | 84.3 | 86.6 | 100.0 | 113.5 | 125.3 | 136.7 | 151.1 | 158.1 |
| | Construction | 126.8 | 78.6 | 61.5 | 66.4 | 81.2 | 87.7 | 100.0 | 127.4 | 152.2 | 167.2 | 191.2 | .. |
| | Services activities | 88.5 | 88.8 | 91.9 | 92.3 | 92.6 | 92.3 | 100.0 | 112.3 | 123.2 | 136.8 | 151.6 | .. |

Table A16 continued

Table A16 (continued)

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kyrgyzstan | Agriculture | 69.0 | 67.6 | 77.8 | 87.4 | 89.9 | 97.3 | 100.0 | 107.3 | 110.6 | 114.1 | 118.8 | 113.8 |
| | Industry, including energy | 98.1 | 73.9 | 76.7 | 107.2 | 112.8 | 108.0 | 100.0 | 104.6 | 93.4 | 107.9 | 110.8 | 96.8 |
| | Construction | 88.5 | 143.9 | 143.8 | 119.4 | 86.3 | 84.6 | 100.0 | 104.0 | 105.5 | 103.1 | 108.7 | 111.0 |
| | Services activities | 83.8 | 79.9 | 79.2 | 79.4 | 82.5 | 85.1 | 100.0 | 103.8 | 108.2 | 116.2 | 129.8 | 135.6 |
| Latvia | Agriculture | 83.6 | 93.3 | 86.7 | 92.6 | 89.5 | 86.5 | 100.0 | 106.3 | 111.0 | 108.4 | 113.1 | 117.3 |
| | Industry, including energy | 80.8 | 82.1 | 84.1 | 94.6 | 97.9 | 92.3 | 100.0 | 109.7 | 118.6 | 125.7 | 134.9 | 142.8 |
| | Construction | 69.9 | 63.2 | 66.6 | 72.1 | 84.3 | 91.1 | 100.0 | 106.1 | 117.6 | 133.7 | 151.1 | 174.4 |
| | Services activities | 75.1 | 73.1 | 76.6 | 82.4 | 86.5 | 92.0 | 100.0 | 108.4 | 114.8 | 123.3 | 133.9 | 149.0 |
| Lithuania | Agriculture | 88.3 | 96.5 | 107.4 | 115.4 | 109.6 | 93.9 | 100.0 | 95.1 | 102.9 | 110.8 | 110.0 | 111.4 |
| | Industry, including energy | 78.7 | 81.4 | 85.4 | 89.0 | 99.5 | 94.9 | 100.0 | 114.2 | 119.5 | 138.6 | 153.0 | 163.4 |
| | Construction | 109.6 | 108.2 | 111.1 | 119.3 | 139.4 | 122.3 | 100.0 | 107.5 | 121.2 | 149.0 | 156.7 | 173.7 |
| | Services activities | 76.2 | 77.6 | 80.2 | 86.4 | 91.9 | 94.7 | 100.0 | 104.8 | 112.0 | 120.2 | 128.2 | 138.5 |
| Moldova | Agriculture | 115.4 | 110.6 | 96.9 | 108.6 | 101.9 | 97.7 | 100.0 | 107.4 | 112.8 | 100.5 | 121.0 | 123.1 |
| | Industry, including energy | 140.6 | 129.1 | 124.9 | 111.4 | 94.2 | 90.2 | 100.0 | 107.0 | 106.8 | 123.8 | 132.9 | 138.3 |
| | Construction | 231.9 | 179.2 | 192.7 | 162.1 | 138.0 | 143.6 | 100.0 | 124.5 | 131.5 | 153.6 | 195.6 | 197.6 |
| | Services activities | 106.5 | 94.3 | 100.3 | 99.8 | 101.7 | 109.2 | 100.0 | 103.6 | 113.6 | 121.0 | 124.2 | 130.8 |
| Russia | Agriculture | 106.8 | 97.2 | 92.2 | 93.7 | 76.7 | 89.1 | 100.0 | 111.1 | 114.3 | 120.5 | 123.9 | 125.6 |
| | Industry, including energy | 89.0 | 86.0 | 83.8 | 85.7 | 81.6 | 90.0 | 100.0 | 104.9 | 109.1 | 118.6 | 125.7 | 129.9 |
| | Construction | 119.8 | 109.0 | 90.7 | 85.8 | 80.4 | 85.2 | 100.0 | 109.9 | 113.0 | 127.6 | 140.5 | 154.1 |
| | Services activities | 97.9 | 95.3 | 95.0 | 95.4 | 93.8 | 94.2 | 100.0 | 103.3 | 108.5 | 116.1 | 124.7 | 135.1 |
| Tajikistan | Agriculture | .. | .. | .. | .. | .. | .. | 100.0 | 108.0 | 123.4 | 136.2 | 157.0 | .. |
| | Industry, including energy | .. | .. | .. | .. | .. | .. | 100.0 | 111.7 | 124.2 | 135.9 | 124.3 | 134.9 |
| | Construction | .. | .. | .. | .. | .. | .. | 100.0 | 176.6 | 142.9 | 226.9 | 388.6 | .. |
| | Services activities | .. | .. | .. | .. | .. | .. | 100.0 | 103.9 | 114.5 | 125.5 | 149.0 | .. |
| Ukraine | Agriculture | 122.5 | 117.1 | 105.5 | 104.5 | 92.8 | 89.2 | 100.0 | 110.0 | 112.1 | 99.8 | 119.4 | .. |
| | Industry, including energy | 108.7 | 96.6 | 92.7 | 89.9 | 89.9 | 95.3 | 100.0 | 111.3 | 118.9 | 134.4 | 145.3 | 148.6 |
| | Construction | 283.8 | 193.3 | 127.2 | 114.4 | 113.9 | 106.5 | 100.0 | 107.8 | 105.0 | 134.6 | 163.2 | 152.2 |
| | Services activities | 129.3 | 116.1 | 104.6 | 99.2 | 98.5 | 96.4 | 100.0 | 117.2 | 125.6 | 143.5 | 164.0 | 165.3 |

*Sources*: Compiled from IMF Country Reports and UNECE Statistical Division Database.

Table A17

## Composition of exports according to SITC, 2001–2005

(in per cent of total exports)

| | Food, beverages, and tobacco | Agricultural raw materials | Fuels | Ores and metals | Chemical products | Machinery and transport equipments | Other manufactured goods | Unallocated |
|---|---|---|---|---|---|---|---|---|
| Armenia | 15 | 2 | 3 | 18 | 2 | 4 | 54 | 2 |
| Belarus | 7 | 4 | 23 | 1 | 12 | 23 | 29 | 1 |
| Georgia | 30 | 2 | 5 | 24 | 7 | 18 | 10 | 4 |
| Moldova | 53 | 5 | 1 | 2 | 1 | 6 | 28 | 4 |
| Kyrgyz Rep. | 15 | 15 | 13 | 34 | 2 | 8 | 12 | 1 |
| Tajikistan | 4 | 4 | 7 | 60 | 1 | 1 | 20 | 3 |
| Azerbaijan | 4 | 1 | 84 | 2 | 3 | 3 | 2 | 1 |
| Kazakhstan | 5 | 1 | 60 | 16 | 2 | 2 | 13 | 1 |
| Russia | 2 | 4 | 54 | 9 | 5 | 7 | 14 | 5 |
| Ukraine | 12 | 2 | 9 | 41 | 9 | 14 | 10 | 3 |
| Estonia | 9 | 8 | 4 | 3 | 6 | 32 | 37 | 1 |
| Latvia | 9 | 25 | 1 | 5 | 6 | 9 | 44 | 1 |
| Lithuania | 11 | 4 | 22 | 2 | 7 | 24 | 29 | 1 |
| Czech Rep. | 3 | 2 | 3 | 2 | 6 | 50 | 34 | 0 |
| Hungary | 7 | 1 | 1 | 2 | 6 | 59 | 22 | 2 |
| Chile | 27 | 10 | 1 | 44 | 6 | 2 | 7 | 3 |
| Ireland | 14 | 0 | 0 | 1 | 42 | 28 | 13 | 2 |
| China | 3 | 1 | 2 | 2 | 5 | 44 | 43 | 0 |
| Korea Rep. | 1 | 1 | 4 | 1 | 9 | 61 | 21 | 2 |

Source: UNCTAD database.

Table A18

## Direction of trade

| | Exports as per cent of total | | | | | Imports as per cent of total | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1995 | 2000 | 2002 | 2003 | 2005 | 1995 | 2000 | 2002 | 2003 | 2005 |
| **Azerbaijan** | | | | | | | | | | |
| CIS countries | 44.7 | 13.5 | 11.2 | 12.9 | 20.8 | 34.2 | 32.0 | 39.1 | 32.4 | 34.4 |
| other countries | 55.3 | 86.5 | 88.8 | 87.1 | 79.2 | 65.8 | 68.0 | 60.9 | 67.6 | 65.6 |
| **Armenia** | | | | | | | | | | |
| CIS countries | 62.6 | 24.4 | 19.1 | 18.8 | 18.9 | 49.6 | 19.6 | 30.6 | 22.0 | 28.9 |
| other countries | 37.4 | 75.6 | 80.9 | 81.2 | 81.1 | 50.4 | 80.4 | 69.4 | 78.0 | 71.1 |
| **Belarus** | | | | | | | | | | |
| CIS countries | 63.0 | 60.0 | 54.7 | 54.6 | 44.2 | 66.1 | 70.2 | 69.2 | 69.6 | 66.6 |
| other countries | 37.0 | 40.0 | 45.3 | 45.4 | 55.8 | 33.9 | 29.8 | 30.8 | 30.4 | 33.4 |
| **Georgia** | | | | | | | | | | |
| CIS countries | 62.4 | 40.1 | 48.7 | 49.9 | 47.1 | 40.1 | 34.9 | 39.7 | 32.0 | 40.1 |
| other countries | 37.6 | 59.9 | 51.3 | 50.1 | 52.9 | 59.9 | 65.1 | 60.3 | 68.0 | 59.9 |
| **Kazakhstan** | | | | | | | | | | |
| CIS countries | 54.9 | 26.5 | 22.7 | 23.1 | 14.6 | 69.7 | 54.2 | 46.2 | 46.8 | 46.9 |
| other countries | 45.1 | 73.5 | 77.3 | 76.9 | 85.4 | 30.3 | 45.8 | 53.8 | 53.2 | 53.1 |
| **Kyrgyzstan** | | | | | | | | | | |
| CIS countries | 65.8 | 41.1 | 34.7 | 34.6 | 45.1 | 67.7 | 53.9 | 55.0 | 57.3 | 61.9 |
| other countries | 34.2 | 58.9 | 65.3 | 65.4 | 54.9 | 32.3 | 46.1 | 45.0 | 42.7 | 38.1 |
| **Moldova** | | | | | | | | | | |
| CIS countries | 62.6 | 58.6 | 54.4 | 53.6 | 50.5 | 67.7 | 33.5 | 39.4 | 42.3 | 39.6 |
| other countries | 37.4 | 41.4 | 45.6 | 46.4 | 49.5 | 32.3 | 66.5 | 60.6 | 57.7 | 60.4 |
| **Russia** | | | | | | | | | | |
| CIS countries | 18.6 | 13.4 | 14.7 | 15.4 | 13.5 | 29.2 | 34.3 | 22.0 | 22.9 | 19.2 |
| other countries | 81.4 | 86.6 | 85.3 | 84.6 | 86.5 | 70.8 | 65.7 | 78.0 | 77.1 | 80.8 |
| **Tajikistan** | | | | | | | | | | |
| CIS countries | 33.6 | 47.7 | 25.5 | 17.4 | 19.6 | 59.0 | 82.9 | 76.0 | 68.0 | 65.0 |
| other countries | 66.4 | 52.3 | 74.5 | 82.6 | 80.4 | 41.0 | 17.1 | 24.0 | 32.0 | 35.0 |
| **Turkmenistan** | | | | | | | | | | |
| CIS countries | 49.4 | 52.4 | 52.1 | 45.8 | 45.8 [1)] | 54.6 | 38.0 | 35.6 | 48.9 | 48.9 |
| other countries | 50.6 | 47.6 | 47.9 | 54.2 | 54.2 [1)] | 45.4 | 62.0 | 64.4 | 51.1 | 51.1 |
| **Uzbekistan** | | | | | | | | | | |
| CIS countries | 39.3 | 24.7 | - | - | | 40.7 | 27.8 | - | - | |
| other countries | 60.7 | 75.3 | - | - | | 59.3 | 72.2 | - | - | |
| **Ukraine** | | | | | | | | | | |
| CIS countries | 53.0 | 30.9 | 24.4 | 26.2 | 31.3 | 64.6 | 57.6 | 52.8 | 50.0 | 47.1 |
| other countries | 47.0 | 69.1 | 75.6 | 73.8 | 68.7 | 35.4 | 42.4 | 47.2 | 50.0 | 52.9 |

*Note*: 1) Figures for 2003.

*Source*: CIS Statistical Yearbook, 2006.

Table A19

## Real GDP growth, 1990-2005

| | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Albania | -9.6 | -27.5 | -7.2 | 9.6 | 9.4 | 8.9 | 9.1 | -10.2 | 12.7 | 10.1 | 7.3 | 7.2 | 3.4 | 6.0 | 6.0 | 5.5 |
| Armenia | -6.0 | -11.7 | -41.8 | -8.8 | 5.3 | 6.9 | 5.9 | 3.3 | 7.3 | 3.3 | 5.9 | 9.6 | 12.9 | 13.9 | 10.1 | 13.9 |
| Azerbaijan | -4.4 | -0.7 | -22.6 | -23.1 | -19.7 | -11.8 | 1.3 | 5.8 | 10.0 | 7.4 | 11.1 | 9.9 | 10.6 | 11.2 | 10.2 | 26.4 |
| Belarus | 2.2 | -1.2 | -9.6 | -7.6 | -11.7 | -11.3 | 2.8 | 11.4 | 8.4 | 3.4 | 5.8 | 4.7 | 5.0 | 7.0 | 11.4 | 9.2 |
| Bosnia and Herzegovina | -10.0 | -12.0 | -30.0 | -40.0 | -35.0 | 15.0 | 34.0 | 45.0 | 15.6 | 10.0 | 5.5 | 4.5 | 5.5 | 3.0 | 6.0 | 5.5 |
| Bulgaria | -9.1 | -8.4 | -7.3 | -1.5 | 1.8 | 2.9 | -9.4 | -5.6 | 3.9 | 2.3 | 5.4 | 4.1 | 4.9 | 4.5 | 5.6 | 5.5 |
| Croatia | **-7.1** | -17.0 | -11.7 | -8.0 | 5.9 | 6.8 | 5.9 | 6.8 | 2.5 | -0.9 | 2.9 | 4.4 | 5.2 | 4.3 | 3.8 | 3.9 |
| Czech Republic | -1.3 | -11.6 | -0.5 | 0.1 | 2.2 | 5.9 | 4.2 | -0.7 | -1.2 | 1.2 | 3.9 | 2.6 | 1.5 | 3.2 | 4.7 | 5.0 |
| Estonia | 2.4 | -7.9 | -21.6 | -8.2 | 0.9 | 4.5 | 4.5 | 11.1 | 4.4 | 0.3 | 7.9 | 6.5 | 7.2 | 6.7 | 7.8 | 9.8 |
| Georgia | -12.4 | -20.6 | -44.9 | -25.4 | -11.4 | 2.6 | 11.2 | 10.5 | 3.1 | 2.9 | 1.8 | 4.8 | 5.5 | 11.1 | 6.0 | 9.3 |
| Hungary | -3.5 | -11.9 | -3.1 | -0.6 | 2.9 | 1.5 | 1.3 | 4.6 | 4.9 | 4.2 | 5.2 | 3.8 | 3.5 | 2.9 | 4.6 | 4.2 |
| Kazakhstan | 2.1 | -11.0 | -5.0 | -9.0 | -13.0 | -8.0 | 0.5 | 1.6 | -1.9 | 2.7 | 9.8 | 13.5 | 9.8 | 9.3 | 9.6 | 9.4 |
| Kyrgyz Republic | 5.7 | -7.9 | -13.9 | -15.5 | -20.1 | -5.4 | 7.1 | 9.9 | 2.1 | 3.7 | 5.4 | 5.3 | 0.1 | 7.0 | 7.0 | -0.6 |
| Latvia | 5.4 | -12.6 | -30.0 | -11.4 | 2.2 | -0.9 | 3.8 | 8.3 | 4.7 | 3.3 | 6.9 | 8.0 | 6.4 | 7.5 | 8.5 | 10.2 |
| Lithuania | 2.1 | -5.7 | -21.3 | -16.2 | -9.8 | 3.3 | 4.7 | 7.3 | 7.3 | -1.8 | 4.0 | 6.5 | 6.8 | 9.7 | 7.0 | 7.3 |
| Macedonia | -9.9 | -6.8 | -7.0 | -9.1 | -1.8 | -1.2 | 1.2 | 1.4 | 3.4 | 4.3 | 4.5 | -4.5 | 0.9 | 2.8 | 4.1 | 3.6 |
| Moldova | -2.4 | -16.0 | -29.1 | -1.2 | -30.9 | -1.4 | -5.9 | 1.6 | -6.5 | -3.4 | 2.1 | 6.1 | 7.8 | 6.6 | 7.4 | 7.1 |
| Poland | -11.6 | -7.0 | 2.6 | 3.8 | 5.2 | 7.0 | 6.0 | 6.8 | 4.8 | 4.1 | 4.0 | 1.0 | 1.4 | 3.8 | 5.3 | 3.4 |
| Romania | -5.6 | -12.9 | -8.8 | 1.5 | 4.0 | 7.2 | 4.0 | -6.1 | -4.8 | -1.2 | 2.1 | 5.7 | 5.1 | 5.2 | 8.3 | 4.0 |
| Russia | 1.4 | -5.1 | -14.5 | -8.7 | -12.7 | -4.1 | -3.6 | 1.4 | -5.3 | 6.3 | 9.0 | 5.1 | 4.7 | 7.3 | 7.2 | 6.4 |
| Slovak Republic | -2.7 | -14.6 | -6.7 | -3.7 | 6.2 | 5.9 | 6.2 | 4.6 | 4.2 | 1.5 | 2.0 | 3.8 | 4.6 | 4.5 | 5.5 | 5.6 |
| Slovenia | -4.7 | -8.9 | -5.5 | 2.8 | 5.3 | 4.1 | 3.5 | 4.6 | 3.8 | 5.2 | 3.9 | 2.7 | 3.3 | 2.5 | 4.2 | 3.8 |
| Tajikistan | -1.6 | -7.1 | -29.0 | -16.4 | -21.3 | -12.4 | -16.7 | 1.7 | 5.3 | 3.7 | 8.3 | 10.2 | 9.1 | 10.2 | 10.6 | 6.7 |
| Turkmenistan | … | -5.0 | -5.0 | -10.0 | -17.0 | -7.2 | -6.7 | -11.3 | 6.7 | 16.5 | 18.6 | 20.4 | 15.8 | 17.1 | 14.7 | 9.6 |
| Ukraine | 3.4 | -6.6 | -8.9 | -10.2 | -22.9 | -12.2 | -10.0 | -3.0 | -1.9 | -0.2 | 5.9 | 9.2 | 5.2 | 7.6 | 12.1 | 2.6 |
| Uzbekistan | 1.6 | -0.5 | -11.1 | -2.3 | -4.2 | -0.9 | 1.6 | 2.5 | 2.1 | 3.4 | 3.3 | 4.1 | 3.1 | 1.5 | 7.4 | 7.0 |

*Sources*: World Economic Outlook (WEO) and incorporating national revisions for the early 1990s.

Table A20

## Real GDP index (1990 = 100)

| | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Albania | 100 | 73 | 67 | 74 | 81 | 88 | 96 | 86 | 97 | 107 | 115 | 123 | 127 | 135 | 143 | 151 |
| Armenia | 100 | 88 | 51 | 47 | 49 | 53 | 56 | 58 | 62 | 64 | 68 | 74 | 84 | 95 | 106 | 120 |
| Azerbaijan | 100 | 99 | 77 | 59 | 47 | 42 | 42 | 45 | 48 | 53 | 56 | 60 | 65 | 72 | 79 | 98 |
| Belarus | 100 | 99 | 89 | 83 | 73 | 65 | 66 | 74 | 80 | 83 | 88 | 92 | 97 | 103 | 115 | 126 |
| Bosnia and Herzegovina | 100 | 88 | 62 | 37 | 24 | 28 | 37 | 54 | 62 | 68 | 72 | 75 | 79 | 82 | 87 | 91 |
| Bulgaria | 100 | 92 | 85 | 84 | 85 | 88 | 79 | 75 | 78 | 80 | 84 | 87 | 92 | 96 | 101 | 107 |
| Croatia | 100 | 83 | 73 | 67 | 71 | 76 | 81 | 86 | 88 | 88 | 90 | 94 | 99 | 103 | 107 | 112 |
| Czech Republic | 100 | 88 | 88 | 88 | 90 | 95 | 99 | 99 | 97 | 99 | 102 | 105 | 107 | 110 | 115 | 122 |
| Estonia | 100 | 90 | 77 | 71 | 70 | 73 | 76 | 84 | 88 | 88 | 95 | 103 | 111 | 119 | 128 | 142 |
| Georgia | 100 | 79 | 44 | 33 | 29 | 30 | 33 | 36 | 38 | 39 | 39 | 41 | 43 | 48 | 51 | 56 |
| Hungary | 100 | 88 | 85 | 85 | 87 | 89 | 90 | 94 | 99 | 103 | 108 | 112 | 116 | 119 | 125 | 130 |
| Kazakhstan | 100 | 89 | 85 | 77 | 67 | 62 | 62 | 63 | 62 | 63 | 70 | 79 | 87 | 95 | 104 | 114 |
| Kyrgyz Republic | 100 | 92 | 79 | 67 | 54 | 51 | 54 | 60 | 61 | 63 | 67 | 70 | 70 | 75 | 80 | 80 |
| Latvia | 100 | 87 | 59 | 53 | 54 | 53 | 55 | 60 | 63 | 65 | 70 | 76 | 81 | 87 | 94 | 104 |
| Lithuania | 100 | 94 | 74 | 62 | 56 | 59 | 62 | 67 | 72 | 71 | 74 | 79 | 85 | 93 | 100 | 108 |
| Macedonia | 100 | 93 | 87 | 79 | 77 | 76 | 77 | 78 | 81 | 85 | 88 | 84 | 85 | 88 | 91 | 95 |
| Moldova | 100 | 84 | 60 | 59 | 41 | 40 | 38 | 38 | 36 | 35 | 35 | 38 | 40 | 43 | 46 | 50 |
| Poland | 100 | 93 | 95 | 99 | 104 | 111 | 118 | 126 | 132 | 138 | 143 | 145 | 147 | 152 | 160 | 166 |
| Romania | 100 | 87 | 79 | 81 | 84 | 90 | 93 | 88 | 84 | 83 | 84 | 89 | 94 | 99 | 107 | 111 |
| Russia | 100 | 95 | 81 | 74 | 65 | 62 | 60 | 61 | 57 | 61 | 67 | 70 | 73 | 79 | 84 | 90 |
| Slovak Republic | 100 | 85 | 80 | 77 | 81 | 86 | 92 | 96 | 100 | 101 | 103 | 107 | 112 | 117 | 124 | 131 |
| Slovenia | 100 | 91 | 86 | 89 | 93 | 97 | 100 | 105 | 109 | 115 | 119 | 122 | 126 | 130 | 135 | 140 |
| Tajikistan | 100 | 93 | 66 | 55 | 43 | 38 | 32 | 32 | 34 | 35 | 38 | 42 | 46 | 50 | 56 | 60 |
| Turkmenistan | 100 | 95 | 90 | 81 | 67 | 63 | 58 | 52 | 55 | 64 | 76 | 92 | 106 | 125 | 143 | 157 |
| Ukraine | 100 | 93 | 85 | 76 | 59 | 52 | 47 | 45 | 44 | 44 | 47 | 51 | 54 | 58 | 65 | 67 |
| Uzbekistan | 100 | 100 | 88 | 86 | 83 | 82 | 83 | 85 | 89 | 93 | 96 | 101 | 105 | 109 | 117 | 126 |

*Sources*: IMF, World Economic Outlook and incorporating national revisions for the early 1990s.

Table A21

## Investment to GDP ratio

| | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Albania | 11.0 | 9.0 | 7.2 | 18.2 | 24.7 | 24.9 | 21.0 | 16.8 | 18.3 | 20.0 | 24.7 | 27.0 | 26.2 | 25.0 | 23.7 | 24.0 |
| Armenia | 30.0 | 25.0 | 17.0 | 13.0 | 18.0 | 16.2 | 17.9 | 16.2 | 16.2 | 16.4 | 18.4 | 19.8 | 21.7 | 24.7 | 23.9 | 24.7 |
| Azerbaijan | 10.0 | 9.0 | 11.0 | 18.0 | 26.3 | 15.6 | 29.5 | 32.4 | 38.7 | 28.5 | 23.1 | 22.9 | 34.1 | 50.8 | 45.0 | 50.0 |
| Belarus | 32.0 | 31.0 | 28.0 | 26.0 | 24.0 | 25.0 | 22.2 | 25.2 | 25.9 | 26.3 | 25.2 | 22.7 | 22.0 | 25.4 | 26.8 | 27.0 |
| Bosnia and Herzegovina | 24.0 | 21.0 | 17.0 | 14.0 | 11.0 | 12.3 | 34.6 | 35.6 | 31.2 | 21.0 | 21.2 | 18.9 | 20.4 | 19.9 | 20.3 | 21.0 |
| Bulgaria | 17.0 | 12.1 | 25.6 | 22.7 | 24.3 | 23.5 | 25.3 | 29.0 | 29.8 | 23.5 | 26.7 | 28.2 | 32.7 | 31.1 | 32.0 | 31.0 |
| Croatia | 13.7 | 10.5 | 13.4 | 15.5 | 14.0 | 15.7 | 20.5 | 24.2 | 23.3 | 23.3 | 21.8 | 22.3 | 24.6 | 27.5 | 26.2 | 26.2 |
| Czech Republic | 25.3 | 24.1 | 27.8 | 28.0 | 28.7 | 31.6 | 31.4 | 29.9 | 28.3 | 27.0 | 27.7 | 27.6 | 26.6 | 26.6 | 27.2 | 27.5 |
| Estonia | 17.0 | 15.0 | 25.6 | 22.7 | 24.3 | 23.5 | 25.3 | 29.0 | 29.8 | 23.5 | 26.7 | 28.2 | 32.7 | 31.1 | 32.5 | 33.0 |
| Georgia | 17.0 | 14.0 | 10.0 | 6.0 | 6.0 | 7.0 | 18.7 | 18.6 | 19.4 | 19.2 | 21.6 | 21.9 | 22.0 | 24.4 | 26.6 | 26.4 |
| Hungary | 19.3 | 20.9 | 19.9 | 18.9 | 20.1 | 20.0 | 21.4 | 22.2 | 23.6 | 23.9 | 23.5 | 23.5 | 23.4 | 22.3 | 22.5 | 22.5 |
| Kazakhstan | 32.0 | 31.7 | 38.2 | 25.1 | 26.8 | 22.5 | 16.9 | 16.3 | 16.6 | 17.2 | 17.9 | 29.3 | 26.7 | 25.6 | 23.8 | 24.0 |
| Kyrgyz Republic | 23.1 | 17.5 | 14.6 | 13.3 | 12.4 | 20.7 | 22.6 | 12.6 | 13.2 | 16.0 | 18.3 | 17.0 | 18.3 | 19.0 | 18.0 | 17.0 |
| Latvia | 20.0 | 16.0 | 17.1 | 10.7 | 14.8 | 14.3 | 15.2 | 19.5 | 24.1 | 23.1 | 23.5 | 26.7 | 26.8 | 28.8 | 30.0 | 29.0 |
| Lithuania | 22.0 | 21.0 | 13.6 | 16.5 | 15.9 | 22.4 | 20.7 | 24.6 | 25.6 | 22.5 | 19.6 | 20.5 | 21.7 | 22.4 | 23.2 | 24.0 |
| Macedonia | 18.3 | 18.9 | 19.5 | 18.6 | 15.3 | 16.5 | 17.4 | 17.3 | 17.4 | 16.6 | 16.2 | 14.8 | 16.6 | 17.0 | 17.8 | 18.5 |
| Moldova | 18.9 | 17.0 | 16.2 | 15.5 | 19.3 | 16.0 | 19.7 | 19.9 | 20.0 | 18.4 | 15.4 | 16.7 | 16.3 | 18.6 | 21.2 | 24.4 |
| Poland | 21.0 | 19.5 | 16.8 | 15.9 | 18.0 | 17.4 | 19.4 | 22.0 | 23.6 | 24.0 | 23.5 | 20.7 | 19.0 | 18.4 | 18.0 | 17.5 |
| Romania | 19.8 | 14.4 | 19.2 | 17.9 | 20.3 | 21.4 | 23.0 | 20.6 | 17.7 | 16.1 | 19.5 | 22.6 | 21.7 | 21.8 | 22.3 | 22.7 |
| Russia | 27.0 | 25.0 | 23.0 | 21.0 | 21.8 | 21.1 | 20.0 | 18.3 | 16.2 | 14.4 | 16.9 | 18.9 | 20.1 | 20.5 | 21.1 | 22.0 |
| Slovak Republic | 18.8 | 20.6 | 18.4 | 18.8 | 19.7 | 20.6 | 21.7 | 22.8 | 23.8 | 26.3 | 25.1 | 24.5 | 23.3 | 23.9 | 24.7 | 24.5 |
| Slovenia | 31.3 | 28.3 | 32.9 | 30.0 | 26.6 | 25.0 | 32.2 | 34.2 | 36.1 | 29.6 | 25.9 | 28.8 | 27.6 | 25.7 | 24.7 | 25.0 |
| Tajikistan | 21.7 | 19.0 | 18.0 | 17.0 | 16.0 | 14.0 | 13.0 | 13.5 | 14.0 | 14.0 | 15.0 | 16.0 | 16.5 | 16.0 | 16.5 | 17.0 |
| Ukraine | 27.0 | 27.5 | 27.4 | 24.5 | 23.7 | 23.4 | 20.9 | 20.0 | 19.6 | 19.4 | 19.4 | 21.8 | 20.2 | 20.3 | 21.3 | 18.0 |
| Uzbekistan | 30.7 | 25.1 | 26.5 | 25.1 | 26.2 | 24.2 | 23.0 | 18.9 | 17.0 | 23.0 | 24.0 | 27.9 | 21.9 | 21.7 | 23.0 | 22.0 |

*Sources*: IMF, World Economic Outlook.

Table A22

## Employment in the FSU (1990–2005)

**In thousands**

| Year | ARM | AZE | BEL | EST | GEO | KAZ | KGZ | LVA | LTU | MDA | RUS | TAJ | UKR | UZB | CIS [1)] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1990 | 1,630 | 3,827 | 4,990 | 826 | 2,870 | 7,325 | 1,748 | 1,313 | 1,666 | 2,120 | 75,235 | 1,950 | 26,380 | 7,941 | 139,821 |
| 1991 | 1,671 | 3,778 | 4,974 | 807 | 2,616 | 7,332 | 1,754 | 1,302 | 1,707 | 2,070 | 73,800 | 1,938 | 25,931 | 8,255 | 137,935 |
| 1992 | 1,578 | 3,733 | 4,900 | 761 | 2,062 | 7,200 | 1,736 | 1,206 | 1,668 | 2,000 | 71,068 | 1,970 | 25,430 | 8,271 | 133,584 |
| 1993 | 1,543 | 3,667 | 4,828 | 699 | 1,864 | 6,963 | 1,681 | 1,123 | 1,599 | 1,900 | 68,642 | 1,908 | 24,850 | 8,259 | 129,526 |
| 1994 | 1,488 | 3,631 | 4,710 | 675 | 1,818 | 6,581 | 1,645 | 1,010 | 1,506 | 1,750 | 64,785 | 1,854 | 23,900 | 8,379 | 123,732 |
| 1995 | 1,345 | 3,613 | 4,410 | 633 | 1,797 | 6,550 | 1,642 | 975 | 1,478 | 1,696 | 64,149 | 1,855 | 23,726 | 8,449 | 122,318 |
| 1996 | 1,315 | 3,687 | 4,365 | 619 | 1,844 | 6,519 | 1,652 | 949 | 1,492 | 1,660 | 62,928 | 1,852 | 23,232 | 8,561 | 120,675 |
| 1997 | 1,268 | 3,694 | 4,370 | 617 | 1,848 | 6,472 | 1,689 | 990 | 1,501 | 1,646 | 60,021 | 1,731 | 22,598 | 8,680 | 117,126 |
| 1998 | 1,258 | 3,702 | 4,417 | 607 | 1,731 | 6,128 | 1,705 | 986 | 1,489 | 1,642 | 58,437 | 1,791 | 22,349 | 8,800 | 115,042 |
| 1999 | 1,224 | 3,703 | 4,442 | 579 | 1,733 | 6,105 | 1,764 | 968 | 1,456 | 1,495 | 62,475 | 1,796 | 21,824 | 8,885 | 118,450 |
| 2000 | 1,169 | 3,705 | 4,441 | 573 | 1,839 | 6,201 | 1,768 | 941 | 1,398 | 1,515 | 64,255 | 1,805 | 21,269 | 8,983 | 119,863 |
| 2001 | 1,140 | 3,715 | 4,417 | 578 | 1,878 | 6,699 | 1,787 | 962 | 1,352 | 1,499 | 64,400 | 1,829 | 21,016 | 9,136 | 120,408 |
| 2002 | 1,106 | 3,727 | 4,381 | 586 | 1,839 | 6,709 | 1,807 | 989 | 1,406 | 1,505 | 66,071 | 1,857 | 21,379 | 9,331 | 122,694 |
| 2003 | 1,108 | 3,747 | 4,339 | 594 | 1,815 | 6,985 | 1,837 | 1,007 | 1,438 | 1,468 | 65,700 | 1,885 | 21,449 | 9,589 | 122,961 |
| 2004 | 1,082 | 3,809 | 4,316 | 596 | 1,783 | 7,182 | 1,880 | 1,018 | 1,436 | 1,463 | 67,275 | 1,988 | 21,591 | 9,781 | 125,199 |
| 2005 | 1,093 | 3,851 | 4,315 | 604 | 1,745 | 7,244 | 1,934 | 1,034 | 1,474 | 1,452 | 67,376 | 1,997 | 22,072 | 9,920 | 126,111 |

**Index (1990=00)**

| Year | ARM | AZE | BEL | EST | GEO | KAZ | KGZ | LVA | LTU | MDA | RUS | TAJ | UKR | UZB | CIS [1)] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 | 100.0 | 100.0 | 100.0 |
| 1991 | 102.5 | 98.7 | 99.7 | 97.7 | 91.1 | 100.1 | 100.4 | 99.2 | 102.5 | 97.6 | 98.1 | 99.4 | 98.3 | 104.0 | 98.7 |
| 1992 | 96.8 | 97.5 | 98.2 | 92.1 | 71.8 | 98.3 | 99.3 | 91.9 | 100.1 | 94.3 | 94.5 | 101.0 | 96.4 | 104.2 | 95.5 |
| 1993 | 94.7 | 95.8 | 96.8 | 84.6 | 64.9 | 95.1 | 96.1 | 85.5 | 96.0 | 89.6 | 91.2 | 97.8 | 94.2 | 104.0 | 92.6 |
| 1994 | 91.3 | 94.9 | 94.4 | 81.7 | 63.3 | 89.8 | 94.1 | 76.9 | 90.4 | 82.5 | 86.1 | 95.1 | 90.6 | 105.5 | 88.5 |
| 1995 | 82.5 | 94.4 | 88.4 | 76.6 | 62.6 | 89.4 | 93.9 | 74.3 | 88.7 | 80.0 | 85.3 | 95.1 | 89.9 | 106.4 | 87.5 |
| 1996 | 80.7 | 96.3 | 87.5 | 74.9 | 64.3 | 89.0 | 94.5 | 72.3 | 89.6 | 78.3 | 83.6 | 95.0 | 88.1 | 107.8 | 86.3 |
| 1997 | 77.8 | 96.5 | 87.6 | 74.7 | 64.4 | 88.4 | 96.6 | 75.4 | 90.1 | 77.6 | 79.8 | 88.8 | 85.7 | 109.3 | 83.8 |
| 1998 | 77.2 | 96.7 | 88.5 | 73.4 | 60.3 | 83.7 | 97.5 | 75.1 | 89.4 | 77.5 | 77.7 | 91.8 | 84.7 | 110.8 | 82.3 |
| 1999 | 75.1 | 96.8 | 89.0 | 70.1 | 60.4 | 83.4 | 100.9 | 73.7 | 87.4 | 70.5 | 83.0 | 92.1 | 82.7 | 111.9 | 84.7 |
| 2000 | 71.7 | 96.8 | 89.0 | 69.4 | 64.1 | 84.7 | 101.2 | 71.7 | 83.9 | 71.5 | 85.4 | 92.6 | 80.6 | 113.1 | 85.7 |
| 2001 | 69.9 | 97.1 | 88.5 | 70.0 | 65.4 | 91.5 | 102.2 | 73.3 | 81.2 | 70.7 | 85.6 | 93.8 | 79.7 | 115.0 | 86.1 |
| 2002 | 67.9 | 97.4 | 87.8 | 70.9 | 64.1 | 91.6 | 103.4 | 75.3 | 84.4 | 71.0 | 87.8 | 95.2 | 81.0 | 117.5 | 87.8 |
| 2003 | 67.9 | 97.9 | 87.0 | 71.9 | 63.2 | 95.4 | 105.1 | 76.7 | 86.3 | 69.2 | 87.3 | 96.7 | 81.3 | 120.8 | 87.9 |
| 2004 | 66.4 | 99.5 | 86.5 | 72.2 | 62.1 | 98.1 | 107.6 | 77.5 | 86.2 | 69.0 | 89.4 | 101.9 | 81.8 | 123.2 | 89.5 |
| 2005 | 67.0 | 100.6 | 86.5 | 73.1 | 60.8 | 98.9 | 110.6 | 78.8 | 88.5 | 68.5 | 89.6 | 102.4 | 83.7 | 124.9 | 90.2 |

*Note:* 1) Excluding Turkmenistan due to lack of data.

*Sources*: International Labour Organization, IMF Country Reports, and respective annual reports of Central Banks.

Table A23

## Terms of trade (2000 = 100)

| | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 1996-2000 average | 2001-2005 average |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Armenia | 92 | 77 | 73 | 46 | 175 | 158 | 214 | 176 | 133 | 129 | 100 | 94 | 111 | 120 | 122 | 123 | 150 | 114 |
| Azerbaijan, Rep. of | 61 | 57 | 43 | 42 | 41 | 34 | 38 | 54 | 53 | 69 | 100 | 90 | 95 | 111 | 132 | 142 | 63 | 114 |
| Belarus | 129 | 130 | 130 | 115 | 96 | 101 | 99 | 98 | 97 | 98 | 100 | 98 | 101 | 102 | 100 | 117 | 98 | 104 |
| Georgia | 92 | 91 | 97 | 97 | 88 | 84 | 78 | 77 | 92 | 93 | 100 | 108 | 100 | 108 | 112 | 107 | 88 | 107 |
| Moldova | 106 | 106 | 112 | 120 | 118 | 129 | 110 | 105 | 91 | 89 | 100 | 99 | 97 | 100 | 101 | 86 | 99 | 97 |
| Kazakhstan | 58 | 59 | 59 | 59 | 59 | 72 | 75 | 77 | 68 | 76 | 100 | 93 | 93 | 94 | 106 | 124 | 79 | 102 |
| Kyrgyz Republic | 98 | 96 | 104 | 96 | 91 | 74 | 86 | 94 | 74 | 86 | 100 | 108 | 97 | 98 | 95 | 76 | 88 | 95 |
| Russia | 99 | 91 | 68 | 65 | 74 | 78 | 83 | 85 | 75 | 78 | 100 | 99 | 96 | 99 | 109 | 133 | 84 | 107 |
| Tajikistan | 88 | 97 | 3 | 66 | 95 | 113 | 100 | 104 | 100 | 96 | 100 | 98 | 89 | 96 | 101 | 91 | 100 | 95 |
| Ukraine | 132 | 132 | 132 | 134 | 118 | 106 | 106 | 102 | 101 | 110 | 100 | 100 | 104 | 115 | 120 | 128 | 104 | 113 |
| Uzbekistan | 97 | 97 | 97 | 97 | 96 | 97 | 97 | 97 | 89 | 84 | 100 | 92 | 103 | 141 | 142 | 139 | 93 | 123 |
| | | | | | | | | | | | | | | | | | | |
| Albania | 154 | 70 | 35 | 67 | 78 | 97 | 87 | 92 | 94 | 101 | 100 | 98 | 97 | 98 | 102 | 101 | 95 | 99 |
| Bosnia & Herzegovina | … | … | … | … | … | … | … | … | 104 | 101 | 100 | 114 | 106 | 101 | 98 | 86 | … | 101 |
| Bulgaria | 88 | 74 | 87 | 100 | 116 | 119 | 114 | 102 | 106 | 103 | 100 | 101 | 102 | 103 | 105 | 104 | 105 | 103 |
| Croatia | 127 | 119 | 99 | 113 | 108 | 97 | 100 | 102 | 104 | 103 | 100 | 101 | 104 | 99 | 99 | 98 | 102 | 100 |
| Macedonia, FYR | 93 | 103 | 89 | 100 | 107 | 105 | 102 | 102 | 102 | 102 | 100 | 100 | 98 | 101 | 95 | 102 | 101 | 99 |
| Romania | 86 | 86 | 92 | 92 | 90 | 93 | 95 | 102 | 96 | 95 | 100 | 99 | 100 | 99 | 98 | 96 | 98 | 99 |
| | | | | | | | | | | | | | | | | | | |
| Czech Republic | 92 | 76 | 87 | 92 | 98 | 99 | 98 | 99 | 104 | 103 | 100 | 102 | 105 | 104 | 103 | 104 | 101 | 103 |
| Estonia | 94 | 94 | 90 | 91 | 92 | 95 | 95 | 97 | 99 | 99 | 100 | 102 | 100 | 104 | 103 | 102 | 98 | 102 |
| Hungary | 97 | 104 | 100 | 94 | 91 | 101 | 101 | 102 | 103 | 102 | 100 | 101 | 101 | 101 | 100 | 102 | 102 | 101 |
| Latvia | 93 | 91 | 87 | 97 | 90 | 105 | 103 | 98 | 100 | 102 | 100 | 100 | 98 | 101 | 103 | 103 | 100 | 101 |
| Lithuania | 112 | 113 | 112 | 82 | 82 | 68 | 88 | 90 | 89 | 93 | 100 | 103 | 109 | 107 | 115 | 118 | 92 | 111 |
| Poland | 88 | 113 | 105 | 99 | 95 | 98 | 101 | 101 | 105 | 100 | 100 | 106 | 104 | 101 | 104 | 106 | 102 | 104 |
| Slovenia | 85 | 102 | 94 | 96 | 97 | 99 | 100 | 101 | 102 | 103 | 100 | 102 | 104 | 104 | 104 | 108 | 101 | 104 |

*Sources*: IMF, World Economic Outlook (WEO).

Table A24

## Institutional quality indicators

| | Voice & accountability | | | Political stability | | | Gov't effectiveness | | | Regulatory quality | | | Rule of law | | | Control of corruption | | | Institutional quality[1)] | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2004 | 2000 | 1996 | 2004 | 2000 | 1996 | 2004 | 2000 | 1996 | 2004 | 2000 | 1996 | 2004 | 2000 | 1996 | 2004 | 2000 | 1996 | 2004 | 2000 | 1996 |
| CIS | -1.04 | -0.74 | -0.84 | -0.82 | -0.46 | -0.29 | -0.78 | -0.90 | -0.79 | -0.90 | -1.15 | -0.94 | -0.98 | -0.85 | -0.83 | -0.96 | -0.84 | -0.91 | -0.91 | -0.84 | -0.77 |
| Armenia | -0.66 | -0.30 | -0.57 | -0.51 | -0.60 | 0.41 | -0.34 | -0.88 | -0.32 | 0.05 | -0.39 | -0.74 | -0.58 | -0.52 | -0.46 | -0.53 | -0.74 | -0.65 | -0.43 | -0.54 | -0.39 |
| Azerbaijan | -0.97 | -0.81 | -1.08 | -1.52 | -0.63 | -0.40 | -0.81 | -0.96 | -1.05 | -0.57 | -0.51 | -1.21 | -0.85 | -0.99 | -0.86 | -1.04 | -1.06 | -0.97 | -0.96 | -0.82 | -0.93 |
| Belarus | -1.54 | -1.21 | -1.03 | -0.24 | -0.07 | 0.03 | -0.93 | -0.92 | -1.20 | -1.78 | -2.70 | -1.08 | -1.31 | -0.99 | -1.01 | -0.91 | -0.05 | -0.92 | -1.12 | -1.13 | -0.87 |
| Georgia | -0.34 | -0.21 | -0.52 | -1.26 | -0.79 | -0.72 | -0.80 | -0.72 | -0.35 | -0.64 | -0.56 | -0.84 | -0.87 | -0.57 | -0.84 | -0.91 | -0.71 | -1.05 | -0.80 | -0.63 | -0.72 |
| Kazakhstan | -1.21 | -0.91 | -1.00 | -0.11 | 0.26 | -0.05 | -0.63 | -0.54 | -0.83 | -0.89 | -0.47 | -0.27 | -0.98 | -0.77 | -0.73 | -1.10 | -0.85 | -0.85 | -0.82 | -0.59 | -0.62 |
| Kyrgyz Republic | -1.06 | -0.68 | -0.48 | -0.91 | -0.09 | 0.76 | -0.83 | -0.63 | -0.43 | -0.06 | -0.36 | -0.16 | -1.04 | -0.90 | -0.69 | -0.92 | -0.85 | -0.79 | -0.80 | -0.60 | -0.30 |
| Moldova | -0.47 | -0.01 | -0.21 | -0.62 | -0.09 | -0.14 | -0.73 | -1.04 | -0.48 | -0.49 | -1.11 | 0.07 | -0.65 | -0.55 | -0.20 | -0.86 | -0.84 | -0.21 | -0.64 | -0.61 | -0.19 |
| Russia | -0.81 | -0.44 | -0.36 | -0.85 | -0.60 | -0.93 | -0.21 | -0.62 | -0.50 | -0.51 | -1.58 | -0.41 | -0.70 | -0.87 | -0.84 | -0.72 | -1.02 | -0.74 | -0.63 | -0.80 | -0.63 |
| Tajikistan | -1.12 | -0.93 | -1.42 | -1.19 | -1.43 | -2.67 | -1.05 | -1.39 | -1.47 | -1.16 | -1.33 | -1.88 | -1.18 | -1.28 | -1.41 | -1.11 | -1.05 | -1.64 | -1.13 | -1.24 | -1.75 |
| Turkmenistan | -1.90 | -1.59 | -1.69 | -0.92 | 0.10 | 0.36 | -1.37 | -1.38 | -1.36 | -2.22 | -2.18 | -2.68 | -1.43 | -1.13 | -1.20 | -1.34 | -1.12 | -1.43 | -1.53 | -1.25 | -1.33 |
| Ukraine | -0.62 | -0.39 | -0.39 | -0.27 | -0.48 | -0.22 | -0.67 | -0.78 | -0.61 | -0.48 | -1.22 | -0.59 | -0.83 | -0.72 | -0.67 | -0.89 | -0.96 | -0.74 | -0.63 | -0.75 | -0.54 |
| Uzbekistan | -1.75 | -1.39 | -1.39 | -1.37 | -1.04 | 0.07 | -1.04 | -0.96 | -0.89 | -2.10 | -1.40 | -1.44 | -1.30 | -0.95 | -1.02 | -1.21 | -0.80 | -0.99 | -1.46 | -1.16 | -0.94 |
| SEE | 0.21 | 0.15 | -0.32 | -0.36 | -0.16 | 0.17 | -0.16 | -0.40 | -0.28 | -0.03 | -0.07 | -0.45 | -0.34 | -0.35 | -0.33 | -0.33 | -0.35 | -0.46 | -0.17 | -0.20 | -0.25 |
| CEE and Baltics | 1.07 | 0.97 | 0.82 | 0.80 | 0.78 | 0.81 | 0.72 | 0.59 | 0.45 | 1.08 | 0.73 | 0.67 | 0.68 | 0.55 | 0.35 | 0.48 | 0.52 | 0.31 | 0.81 | 0.68 | 0.57 |
| OECD | 1.31 | 1.34 | 1.47 | 0.97 | 1.24 | 1.08 | 1.64 | 1.63 | 1.78 | 1.42 | 1.33 | 1.38 | 1.56 | 1.73 | 1.69 | 1.73 | 1.85 | 1.65 | 1.44 | 1.50 | 1.51 |
| sub-Sahara | -0.56 | -0.53 | -0.55 | -0.72 | -0.56 | -0.47 | -0.70 | -0.58 | -0.69 | -0.61 | -0.31 | -0.55 | -0.77 | -0.62 | -0.68 | -0.66 | -0.59 | -0.55 | -0.67 | -0.54 | -0.57 |
| Latin America | 0.15 | 0.17 | 0.04 | -0.39 | -0.09 | -0.24 | -0.38 | -0.25 | -0.29 | -0.08 | 0.41 | 0.41 | -0.47 | -0.38 | -0.27 | -0.36 | -0.33 | -0.38 | -0.26 | -0.08 | -0.12 |
| SEA | -0.19 | -0.12 | -0.25 | -0.63 | -0.56 | -0.57 | -0.35 | -0.24 | -0.06 | -0.30 | -0.03 | -0.03 | -0.43 | -0.27 | -0.12 | -0.57 | -0.45 | -0.38 | -0.41 | -0.30 | -0.24 |
| MENA | -0.99 | -0.84 | -0.77 | -0.33 | 0.00 | -0.40 | 0.02 | 0.04 | -0.04 | -0.39 | -0.07 | -0.14 | 0.00 | 0.21 | 0.07 | -0.05 | -0.02 | -0.16 | -0.29 | -0.12 | -0.24 |
| Fast growing countries | | | | | | | | | | | | | | | | | | | | | |
| Botswana | 0.73 | 0.78 | 0.74 | 0.70 | 0.90 | 0.87 | 0.83 | 0.98 | 0.33 | 0.96 | 0.79 | 0.69 | 0.73 | 0.67 | 0.80 | 0.86 | 1.02 | 0.40 | 0.80 | 0.83 | 0.64 |
| Mauritius | 0.94 | 1.21 | 0.87 | 0.91 | 1.16 | 1.18 | 0.60 | 0.79 | 0.70 | 0.33 | 0.74 | 0.17 | 0.84 | 0.86 | 0.71 | 0.33 | 0.59 | 0.48 | 0.66 | 0.85 | 0.69 |
| Chile | 1.09 | 0.56 | 0.93 | 0.89 | 0.85 | 0.75 | 1.27 | 1.34 | 1.20 | 1.62 | 1.38 | 1.52 | 1.16 | 1.31 | 1.26 | 1.44 | 1.56 | 1.28 | 1.25 | 1.15 | 1.16 |
| Korea | 0.73 | 0.76 | 0.71 | 0.45 | 0.49 | 0.16 | 0.95 | 0.63 | 0.64 | 0.69 | 0.47 | 0.69 | 0.67 | 0.64 | 0.81 | 0.17 | 0.37 | 0.54 | 0.61 | 0.53 | 0.59 |
| China | -1.54 | -1.37 | -1.29 | -0.07 | 0.13 | 0.12 | 0.11 | 0.22 | 0.18 | -0.45 | -0.21 | -0.06 | -0.47 | -0.33 | -0.45 | -0.51 | -0.34 | -0.01 | -0.49 | -0.34 | -0.25 |
| Vietnam | -1.54 | -1.53 | -1.31 | 0.16 | 0.40 | 0.40 | -0.31 | -0.30 | -0.10 | -0.57 | -0.65 | -0.56 | -0.59 | -0.74 | -0.50 | -0.74 | -0.71 | -0.64 | -0.60 | -0.59 | -0.45 |

*Note*: 1) Simple average for the six indicators.

*Source*: Kaufmann, D., Aart Kraay, and Massimo Mastruzzi, 2005, 'Governance Matters IV: Governance Indicators for 1996-2004', World Bank Policy Research Paper Series, No. 3030.

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