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## IDE DISCUSSION PAPER No. 506

### **Innovation in Eastern Europe: A case study of Czech Republic**

Mila Kashcheeva\* and Kaoru Nabeshima\*\*

March 2015

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In this study we evaluate innovative performance of the economies of Central and Eastern Europe (CEE) based on the available statistics of innovation processes. We compare such country-level indicators as educational levels, investments in R&D, FDI, trade and licensing flows, patents and scientific articles, and find that the most developed CEE economies are also the most innovative. At the same time, as supported by the results of the interviews in Czech Republic, one of the top performers in the CEE region, its economy is facing a number of challenges that are similar to other middle-income countries around the world. We suggest addressing these challenges from the prospective of the Middle Income Trap, when a middle-income economy to sustain growth must learn to compete with advanced economies in high-skill innovation. Development of effective innovation policy should be a priority for the CEE countries to escape from the middle income trap.

**Keywords:** innovation policy, middle income trap, Central and Eastern Europe.

**JEL classification:** O31, O10, O20.

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# **Innovation in Eastern Europe: A case study of Czech Republic**

by

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## **Abstract**

In this study we evaluate innovative performance of the economies of Central and Eastern Europe (CEE) based on the available statistics of innovation processes. We compare such country-level indicators as educational levels, investments in R&D, FDI, trade and licensing flows, patents and scientific articles, and find that the most developed CEE economies are also the most innovative. At the same time, as supported by the results of the interviews in Czech Republic, one of the top performers in the CEE region, its economy is facing a number of challenges that are similar to other middle-income countries around the world. We suggest addressing these challenges from the prospective of the Middle Income Trap, when a middle-income economy to sustain growth must learn to compete with advanced economies in high-skill innovation. Development of effective innovation policy should be a priority for the CEE countries to escape from the middle income trap.

## **1. Introduction**

This study evaluates innovative performance of the economies of Central and Eastern Europe (CEE).<sup>1</sup> During the 1990s, after the dissolution of the Soviet Union, most of the CEE states have been experiencing economic decline, and only a few CEE economies were able to sustain a close-to-zero real GDP growth. Colossal challenges associated with establishing of market economies explain slow growth and decline over the early years of transitioning. And during the decade of 2000s the comparative advantages of well-educated and relatively cheap labor force as well as excellent

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<sup>1</sup> The following economies are analyzed in this report: Belarus, Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Moldova, Poland, Romania, Russia, Slovakia, Slovenia, and Ukraine.

geographic position within Europe helped these economies to excel and enjoy positive growth on average. At the same time as the global financial crisis of 2007-08 revealed the CEE economies remain very vulnerable. While having some unique challenges associated with the legacy of the Soviet planned economy, in this paper we argue that most of the current challenges in the CEE economies are similar to other middle-income countries around the world<sup>2</sup> and can be addressed from the prospective of the Middle Income Trap.

Middle Income Trap is commonly understood as a period when a middle-income economy experiences close-to-zero or negative per capita GDP growth for some years or when the years of economic growth alternate with the years of decline, and overall the economy fails to graduate to a more advanced level. Kharas and Kohli (2011) suggest that the underlying reason for the experience of Middle Income Trap is inability of an economy to switch from the resource-driven growth to the productivity-driven growth. When a middle-income economy is no longer able to compete with low-income, low-wage economies, to sustain its growth it must learn to compete with advanced economies in high-skill innovation. However, while often being growth champions at earlier development stages, most middle-income countries around the world when faced with the necessity to innovate to sustain growth, instead fall into the Middle Income Trap. Thus, for these countries, development of innovation capability is an important policy issue to escape from the middle income trap.

When analyzed together CEE economies were often referred to as transition economies (i.e., the countries in transition from centrally planned to market economies according to the UN definition), and although most of them have officially finished their

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<sup>2</sup> For studies looking at the middle income trap, see for instance, Eichengreen, Park and Shin (2012);Felipe (2012);Ohno (2009);Paus (2012);Yusuf and Nabeshima (2009a;2009b).

transition to the market economies<sup>3</sup>, only four CEE economies graduated to the advanced economy status, namely Slovenia (from 2011), Czech Republic (from 2009), Slovakia (from 2009), and Estonia (from 2011) according to the IMF's World Economic Outlook Report (IMF, 2012).

The analysis is based on the available measures of innovation processes for the years of 2000-2013. We opt not to include earlier years primarily due to the fact that in the 1990s the CEE countries have been experiencing major economic and political restructuring following the collapse of the Soviet Union<sup>4</sup> and dissolution of individual socialist states, and earlier data are not always available and reliable. We accompany the analysis of the available statistical data with the results of the interviews we conducted in Czech Republic in May 2014.

The study proceeds as follows. Section 2 compares major economic indicators on innovation among the CEE economies and identifies the innovation leaders in the region. Section 3 summarizes the insights from the interviews we conducted in Czech Republic in April 2014. Section 4 concludes the study.

## **2. Innovation leaders in the CEE region**

In this section we aim to identify the countries that are top innovation performers in the CEE region. We compare such indicators of innovation processes as educational levels, investments in R&D, FDI, trade and licensing flows, patents and scientific articles among the CEE economies. Also, see Appendix B for the CEE

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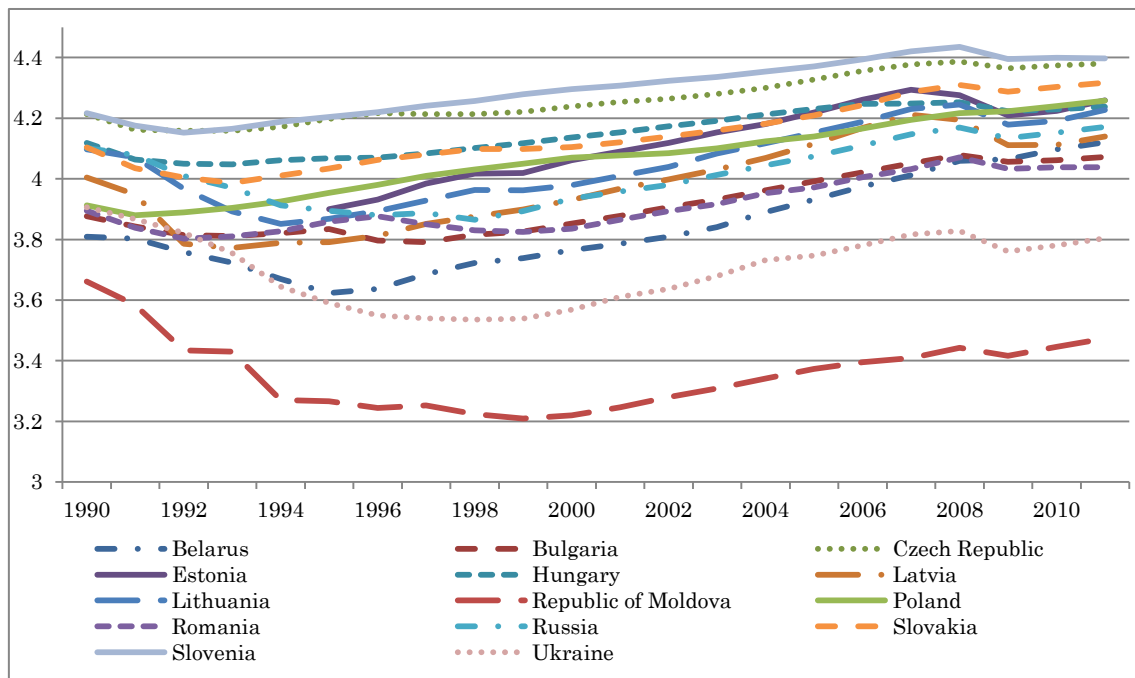
<sup>3</sup> As of February 2013 only Russia, Belarus, Republic of Moldova and Ukraine are still considered as economies in transition by the UN (see <http://unstats.un.org/unsd/methods/m49/m49regin.htm#transition>), the other 10 countries officially finished their transition to market economies when joined the EU (Eight countries joined the EU in 2004 (Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia, Slovenia) and Bulgaria and Romania joined in 2007. Six out of fourteen economies in this study are OECD members (Czech Republic since 1995, Estonia since 2010, Hungary since 1996, Poland since 1996, Slovakia since 2000, and Slovenia since 2010).

<sup>4</sup> Among the fourteen economies, the following economies were part of the Soviet Union: Belarus, Estonia, Latvia, Lithuania, Moldova, Russia, and Ukraine.

countries' profiles based on the basic economic indicators.

Most CEE countries have been experiencing a prolonged decline or close-to-zero growth in real GDP per capita during the 1990s and only started to grow in the beginning of the 2000s. Figure 1 presents the evolution of real GDP per capita for the CEE economies in 1990-2011.<sup>5</sup> Also see Table 1 for the average growth rate in the 1990s and the 2000s, as well as the most recent growth numbers.<sup>6</sup>

**Figure 1. Log of real GDP per capita for the CEE states, 1990-2011.**



Source: Author's calculations based on World Development Indicators.

The CEE region was severely affected by the financial crisis of 2007-08. Estonia, Lithuania, Latvia and Ukraine have been hit especially hard. Latvia had three consecutive recession years in 2008-10 and had the biggest drop in GDP in the world in 2009 (of almost 18% negative growth), but it has been steadily recovering since (see

<sup>5</sup> In this case, we calculate the log of PPP converted GDP per Capita at 2005 constant prices to show log (or proportional) cross-country income difference among CEE economies.

<sup>6</sup> It also appears that Former Soviet Union (FSU) states had more pronounced declines in their GDP per capita in the 1990s compared to other former socialist states.

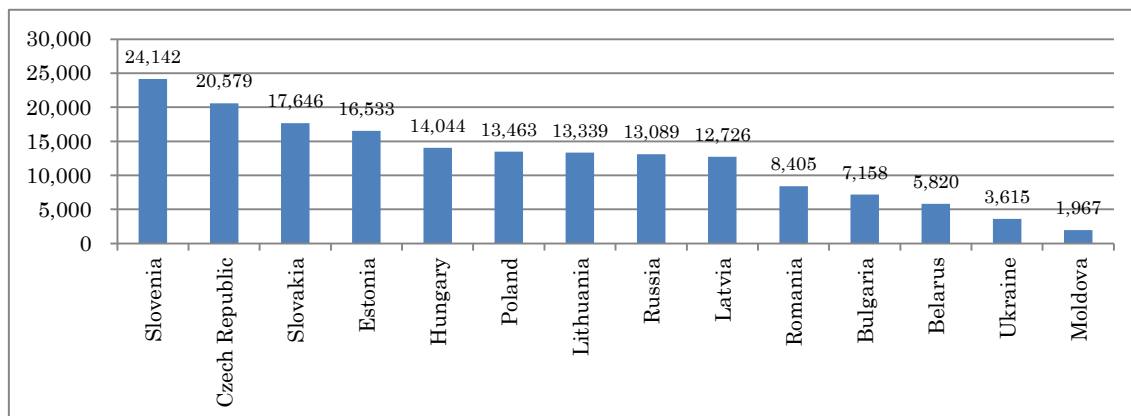
Table 1). There are only six CEE economies that were able to sustain positive GDP growth during two previous decades and four of these economies have recently graduated to advanced economy status according to the IMF's World Economic Outlook Report (IMF 2012), namely Slovenia (from 2011), Czech Republic (from 2009), Slovakia (from 2009), and Estonia (from 2011). Poland and Hungary are the other two economies that experienced positive average GDP growth in the 1990s and 2000s, although they currently remain, together with other economies that are analyzed in this report, classed as developing economies by IMF definitions (see Figure 2 for 2011 GDP per capita in current dollars).

**Table 1. GDP growth (annual %), 1991-2011.**

Country	Average in 1991-2000	Average in 2001-2010	2007	2008	2009	2010	2011
Estonia	6.77 (1996-2000)	3.85	7.49	-4.15	-14.07	3.33	8.28
Republic of Moldova	-9.00	5.21	6.79	5.13	1.63	7.09	6.41
Lithuania	-2.72	4.62	9.84	2.93	-14.74	1.33	5.87
Latvia	-2.00	4.07	9.98	-4.24	-17.95	-0.34	5.47
Belarus	-0.87	7.45	8.65	10.25	0.16	7.70	5.30
Ukraine	-7.67	4.55	7.90	2.30	-14.80	4.20	5.20
Poland	3.86	3.91	3.07	7.76	-5.99	3.90	4.35
Russia	-3.61	4.91	8.54	5.25	-7.82	4.34	4.34
Slovakia	0.42	4.84	10.49	5.75	-4.93	4.18	3.35
Czech Republic	0.64	3.43	5.73	3.10	-4.51	2.49	1.89
Bulgaria	-1.07	4.15	6.40	6.20	-5.50	0.40	1.70
Hungary	0.37	2.02	0.11	0.89	-6.80	1.26	1.69
Slovenia	1.92	2.78	6.87	3.59	-8.01	1.38	-0.17
Romania	-1.51	4.43	6.00	9.43	-8.50	0.95	-0.37

Source: World Development Indicators.

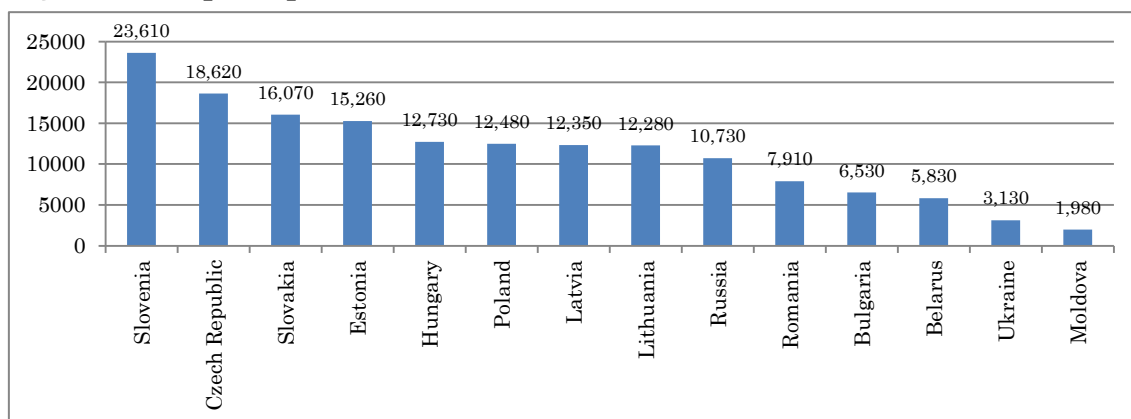
**Figure 2. GDP per capita (current USD), 2011.**



Source: World Development Indicators

World Bank further divides economies by their income groups based on GNI per capita<sup>7</sup>. According to this WB definition, in 2011 Slovenia, Czech Republic, Slovakia, Estonia and Hungary are classified as high income economies, Poland, Latvia, Lithuania, Russia, Romania, Bulgaria and Belarus as upper middle-income economies, while Ukraine and Moldova as lower middle income economies (see Figure 3).

**Figure 3. GNI per capita (Atlas method, current USD), 2011.**



Source: World Development Indicators.

Since sustainable economic growth among the middle-income and advanced

<sup>7</sup> Economies are divided according to 2011 GNI per capita, calculated using the World Bank Atlas method. The groups are as follows: low income is \$1,025 or less; lower middle income is \$1,026 - \$4,035; upper middle income is \$4,036 - \$12,475; and high income is \$12,476 or more.



economies to the large extent depends on their ability to innovate, then the most developed countries on the above graphs should also be the most successful innovators among the CEE group. The rest of this section evaluates various indicators of innovative performance among the CEE countries to identify the leaders.

### *Human Capital*

An education system that produces both innovative talent and an adequately trained supportive labor force is essential for creation of new knowledge. In 2010 the shares of labor force with tertiary education in the CEE region ranged from 15.7 % for Romania to 35.5 % for Lithuania. In 2008 Russia reported 54% share of labor force with tertiary education, the all-time largest share among the CEE economies. These shares have been growing for most of the CEE economies throughout most of the analyzed period (see Table 2).

**Table 2. Labor force with tertiary education (% of total), 2000-2010**

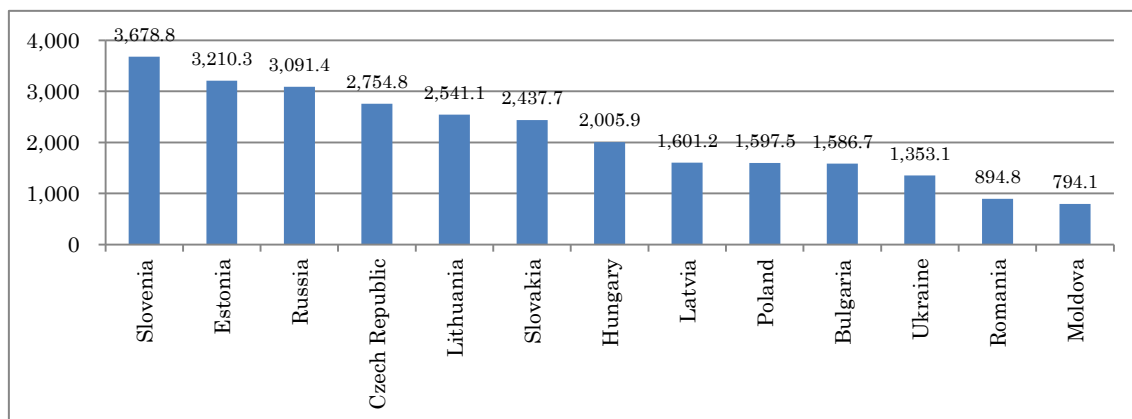
Country	2000	2005	2010
Russia	-	50.40	54 (2008)
Lithuania	42.50	29.10	35.50
Estonia	29.60	34.40	35.30
Latvia	19.30	22.00	27.80
Poland	12.30	18.90	26.30
Bulgaria	20.40	24.10	25.60
Slovenia	16.50	21.00	25.50
Hungary	16.20	20.20	22.70
Slovakia	10.60	14.50	18.30
Czech Republic	11.80	13.70	17.50
Romania	8.60	12.20	15.70
Ukraine	-	45.20	-

Source: World Development Indicators. Note: Information is not available for Belarus and Moldova.

The number of researchers in R&D is a more direct way to measure the talent

involved in innovation processes.<sup>8</sup> Figure 4 shows that Slovenia, Estonia and Russia have the largest share of researchers in R&D.

**Figure 4. Researchers in R&D (per million people), 2009**



Source: World Development Indicators.

### *Research and Development*

Investments in R&D in the CEE economies have been quite low, ranging from 1.86% of GDP for Slovenia to 0.46% of GDP for Latvia in 2009. However, in spite of the financial crisis of 2007 and the following recession only Belarus and Moldova had decreased their R&D investments (% of GDP) for two consecutive years, 2008-09 in the aftermath of financial crisis (see Table 3).

**Table 3. Five-year average R&D expenditure (% of GDP), 2000-2009**

Country	2000-2004	2005-2009	2006	2007	2008	2009
Slovenia	1.41	1.59	1.56	1.45	1.65	1.86
Czech Republic	1.22	1.50	1.55	1.54	1.47	1.53
Estonia	0.73	1.18	1.14	1.11	1.29	1.44
Russia	1.18	1.11	1.07	1.12	1.04	1.25
Hungary	0.90	1.01	1.00	0.97	1.00	1.15
Ukraine	1.04	0.93	0.95	0.85	0.84	0.86
Lithuania	0.67	0.80	0.79	0.81	0.80	0.84
Belarus	0.66	0.74	0.66	0.96	0.74	0.64
Poland	0.58	0.59	0.56	0.57	0.60	0.68

<sup>8</sup> Researchers in R&D are professionals engaged in the conception or creation of new knowledge, products, processes, methods, or systems and in the management of the projects concerned. Postgraduate PhD students engaged in R&D are included.

Latvia	0.41	0.59	0.70	0.59	0.61	0.46
Romania	0.38	0.49	0.45	0.53	0.59	0.48
Moldova	0.34	0.48	0.41	0.55	0.53	0.53
Slovakia	0.59	0.48	0.49	0.46	0.47	0.48
Bulgaria	0.48	0.47	0.46	0.45	0.47	0.53

Source: World Development Indicators.

At the same time the contraction of GDP in most of the CEE economies in the aftermath of financial crisis could be the primary reason for increases in R&D shares shown in the previous table. Only Poland, Hungary, Slovenia and Bulgaria were able to constantly increase its R&D spending despite the crisis, other countries experienced decrease in their real R&D spending for one or two years after 2007. Table 4 compares real R&D expenditure between 2006 and 2010 (measured in constant USD 2005 prices).

**Table 4. Gross Domestic Expenditure on R&D, (GERD in 2005 USD, million), 2006-2010**

Country	2006	2007	2008	2009	2010
Russia	19689	22230	21892	24188	23347
Poland	3107	3384	3790	4301	4871
Czech Republic	3467	3650	3570	3582	3888
Hungary	1788	1751	1803	1955	1967
Romania	993	1222	1499	1113	1100
Slovenia	775	769	911	942	1081
Slovakia	459	480	522	506	692
Bulgaria	370	391	430	457	517
Lithuania	415	467	472	421	408
Estonia	277	285	324	311	361
Latvia	236	220	218	133	175
Ukraine	2678	2598	2637	2273	-
Belarus	607	960	816	708	-
Moldova	36	50	53	49	-

Source: UNESCO (2013)<sup>9</sup>

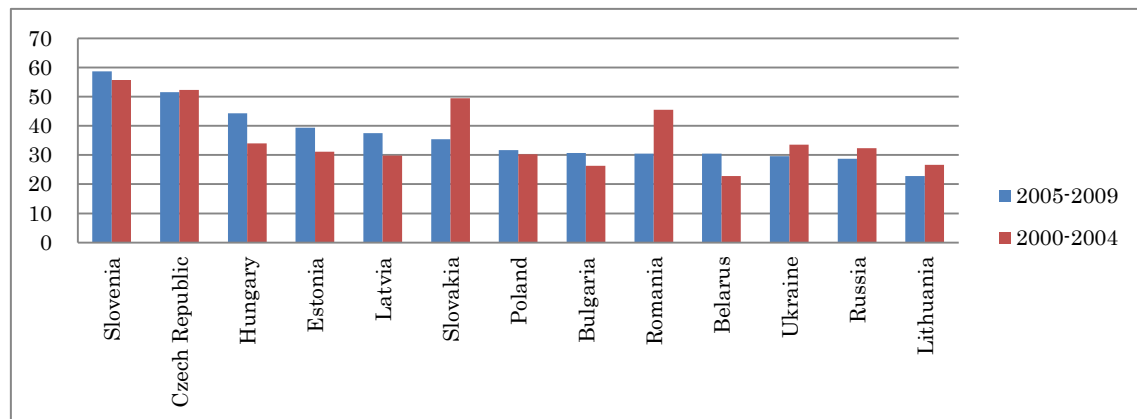
Although Russia has been the leader among the CEE economies based on its annual R&D expenditure since the 1990s, only less than 30% of R&D expenditure in Russia is financed by private investors. Moreover the share of R&D financed by private

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<sup>9</sup> The original data can be found here: <http://stats.uis.unesco.org/unesco/ReportFolders/ReportFolders.aspx>

sector has been declining in Russia during 2000s. Slovenia, Czech Republic and Hungary have the largest shares of R&D expenditure financed by private enterprises (see Figure 5).

**Figure 5. GERD financed by business enterprise (%), 5-year average, 2000-2009**



Source: UNESCO (2013)

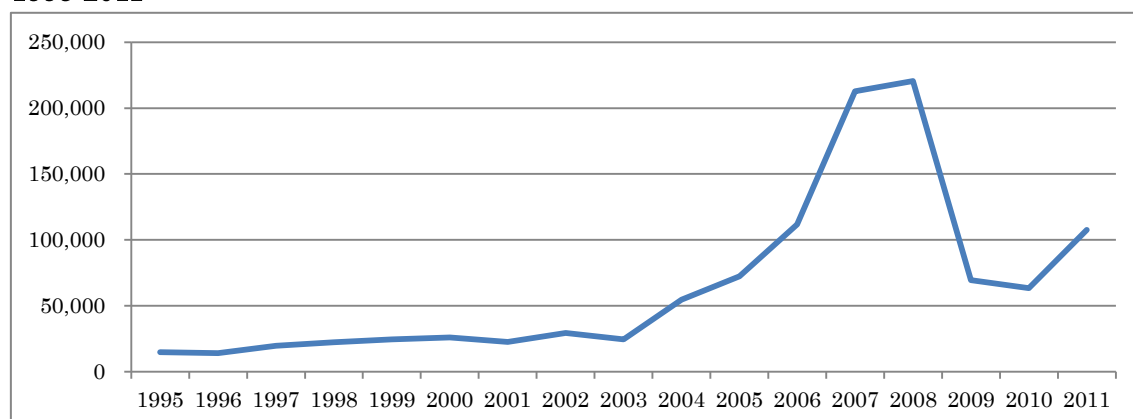
### *Foreign direct investment*

Domestic producers can also improve their productivity by adopting foreign technologies brought by multinational enterprises to their markets.<sup>10</sup> Since the early 1990s, the CEE economies have been opening up to FDI inflows.<sup>11</sup> The inflows of FDI were slowly rising during the 1990s, accelerated significantly in the early 2000s, reached their peak in 2007/2008 and collapsed in the aftermath of the financial crisis. In the last few years FDI inflows started to come back to the region (see Figure 6).

<sup>10</sup> For the roles of FDI in technology transfer, see Nabeshima (2004);Saggi (2006);Smeets (2008).

<sup>11</sup> Poland is the only country in the region that reports FDI statistics before the early 1990s, starting from 1976.

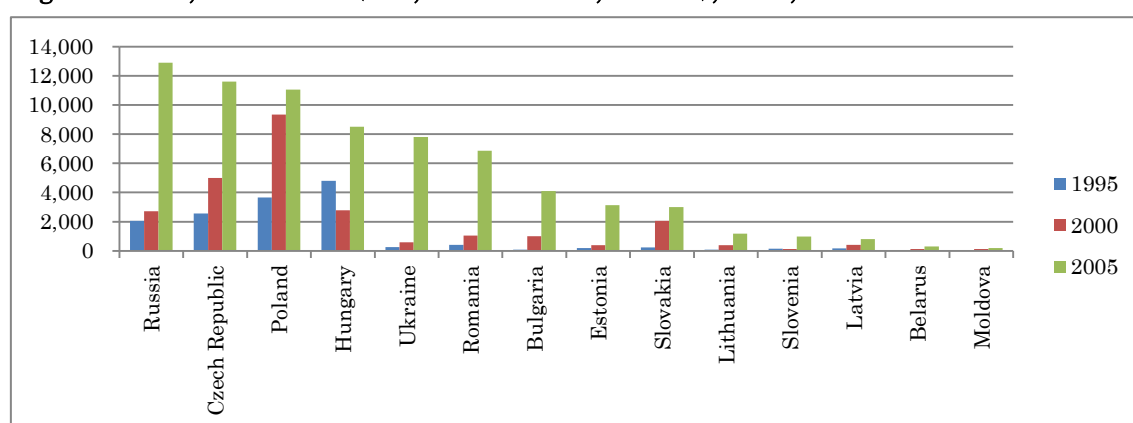
**Figure 6. Total volume of FDI inflows to the CEE economies (current USD, million), 1995-2011**



Source: World Development Indicators.

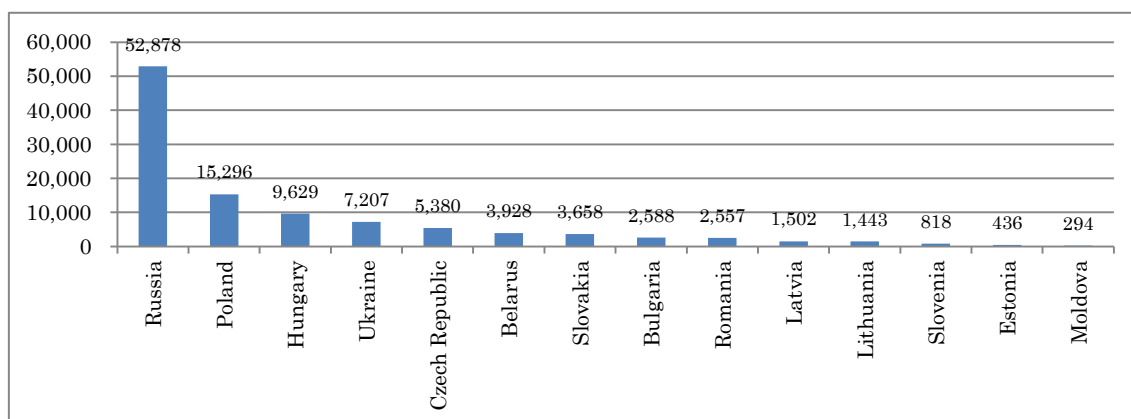
Poland, Czech Republic and Hungary have been the top recipients of FDI based on total volume from the early 1990s until 2003. Since 2003 Russia has been receiving the largest volume of FDI among in the CEE region annually except for the year of 2007 when Hungary received the largest volume of FDI in 2007 (see Figure 7 for the volumes of incoming FDI in 1995, 2000, and 2005 and Figure 2.8 for total FDI inflows for the CEE economies in 2011).

**Figure 7. FDI, net inflows (BoP, current USD, million), 1995, 2000 and 2005**



Source: World Development Indicators.

**Figure 8. FDI, net inflows (BoP, current USD, million), 2011**



Source: World Development Indicators.

Given the technology, know-how and business expertise embedded in FDI, a share of FDI in GDP approximate the extent to which an economy depends on foreign knowledge. While Russia receives the largest volume of FDI, its share of FDI in GDP is one of the smallest among the CEE economies. According to Table 5, which shows 5-year average shares<sup>12</sup> of FDI in GDP during the last 15 available years, Bulgaria, Hungary and Estonia are the most FDI-intensive economies. Also note a significant variation in the 5-year average shares of FDI in GDP for most of the CEE countries.

**Table 5. FDI, net inflows (% of GDP)**

Country	Average in 1997-2001	Average in 2002-2006	Average in 2007-2011	Average in 2002-2011	2011
Bulgaria	5.79	12.85	13.92	13.38	4.84
Hungary	7.24	7.13	17.80	12.46	6.88
Estonia	7.30	11.38	9.22	10.30	1.97
Moldova	5.10	5.23	6.87	6.05	4.20
Romania	3.37	6.08	3.89	4.99	1.42
Ukraine	1.71	4.28	5.25	4.76	4.36
Czech Republic	7.07	5.99	3.16	4.58	2.48
Slovakia	2.72	5.86	3.04	4.45	3.81
Latvia	5.10	4.73	4.13	4.43	5.32
Poland	3.92	3.83	3.76	3.80	2.97
Lithuania	4.63	4.16	3.11	3.64	3.38
Russia	1.17	2.03	3.50	2.76	2.85

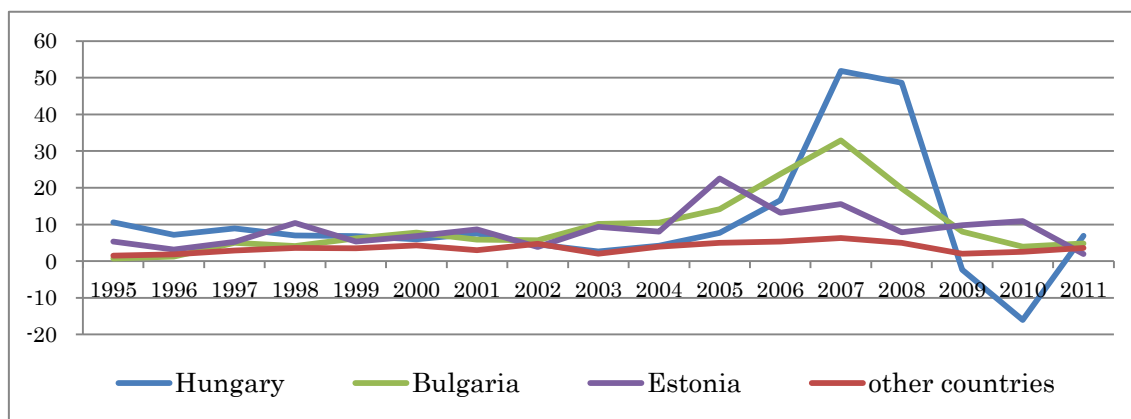
<sup>12</sup> Five-year average shares are calculated to smooth out annual fluctuations in FDI and the shares in GDP are presented to control for an economy size.

Belarus	1.84	1.07	4.24	2.65	7.26
Slovenia	1.25	3.03	1.92	2.48	1.65

Source: World Development Indicators.

The pick of 2007/2008 and the following decline in FDI inflows were especially dramatic for Bulgaria, Hungary and Estonia. The FDI/GDP shares even turned negative for Hungary in 2009 and 2010, for Latvia in 2009, and for Slovenia in 2009 revealing negative FDI inflows during those years.<sup>13</sup> See Figure 9 for the shares of FDI in GDP since 1995 for these top FDI recipients compared to the total FDI to the rest of the CEE economies. Still, if shown on a more appropriate scale the average ratio of FDI to GDP for other CEE economies (excluding the top FDI recipients, Hungary, Bulgaria and Estonia) followed the same trajectory (see Figure 10).

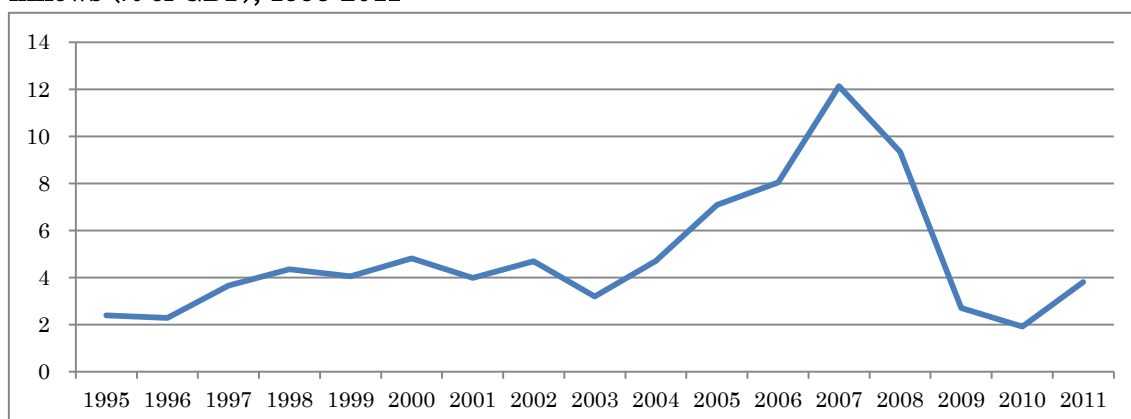
**Figure 9. FDI, net inflows (% of GDP), 1995-2011**



Source: World Development Indicators.

<sup>13</sup> Since FDI is measured on a net basis (i.e., capital transactions' credits less debits between direct investors and their foreign affiliates), the FDI/GDP ratio is negative when FDI is negative due to equity capital, reinvested earnings or intra-company loans transactions being net negative.

**Figure 10. FDI to the CEE economies excluding Hungary, Bulgaria, and Estonia, net inflows (% of GDP), 1995-2011**



Source: World Development Indicators.

Another way that domestic companies can acquire new technologies and improve their productivity is by investing abroad and learning from foreign firms that operate in other markets. Hungary, Estonia and Russia have the largest shares of outward FDI in their GDPs during the last 10 years, with Hungary having exceptionally large share of outward FDI of 10.4% (see Table 6 for the 5-year average shares of outward FDI in GDP during the last 15 years).

**Table 6. Average FDI, net outflows (% of GDP), 1997-2011**

Country	Average in 1997-2001	Average in 2002-2006	Average in 2007-2011	Average in 2002-2011	2011
Hungary	0.80	4.41	16.43	10.42	15.60
Estonia	1.72	3.44	2.97	3.21	-6.77
Russia	0.89	1.93	3.52	2.72	3.62
Slovenia	0.26	1.60	1.40	1.50	0.21
Poland	0.04	0.89	1.26	1.07	1.43
Lithuania	0.09	0.75	0.69	0.72	0.40
Czech Republic	0.14	0.47	0.88	0.68	0.53
Latvia	0.30	0.59	0.43	0.51	0.22
Bulgaria	0.04	0.21	0.60	0.40	0.44
Slovakia	-0.08	0.16	0.42	0.29	0.52
Ukraine	0.03	0.04	0.37	0.20	0.12
Moldova	0.00	0.02	0.23	0.13	0.29
Romania	-0.01	0.10	0.04	0.07	-0.02
Belarus	0.01	-0.28	0.10	-0.09	0.10

Source: World Development Indicators.

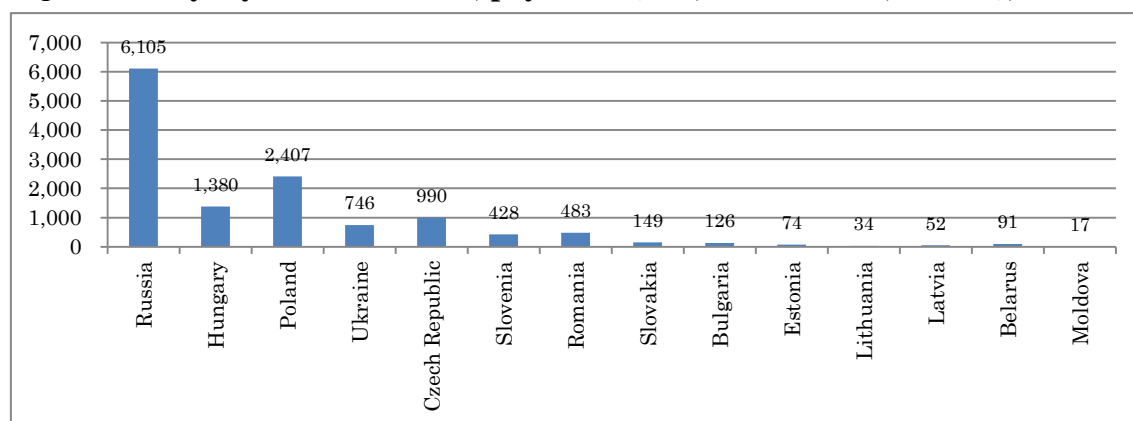


## Licensing

Royalty and licensing fees receipts and payments<sup>14</sup> between residents and nonresident entities is another way to measure the extent of technology flows between foreign MNEs and domestic companies. The economies that were top recipients of FDI in 2011 by the total volume received, - Russia, Poland and Hungary, - also paid and received the largest amounts in royalties and license fees in 2011 (see Figure 11 and Figure 12).

In 2011 Russia paid approximately 12% of the total value of its FDI inflows to foreign producers in royalties and license fees, seven times more than it received in the same year. Poland paid only 6% of the value of its FDI, nine times more than it received. Hungary paid 14%, approximately the same amount as it received.

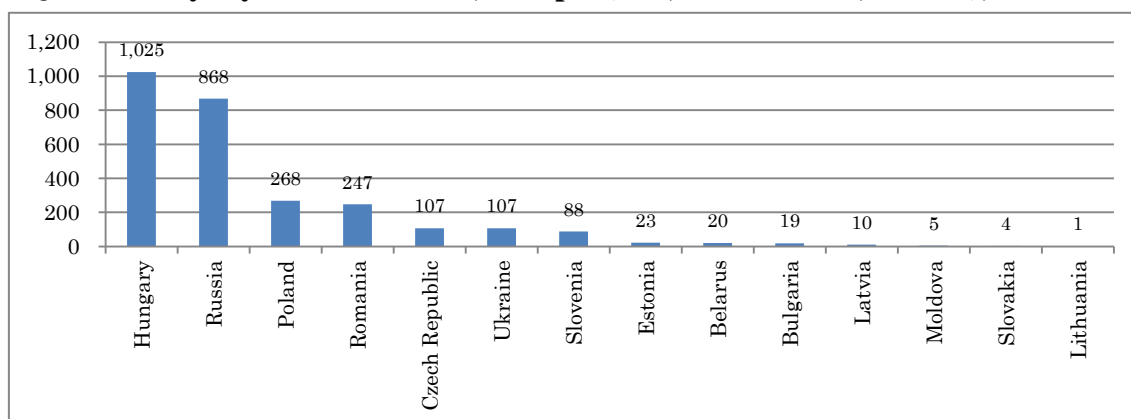
**Figure 11. Royalty and license fees, payments (BoP, current USD, million), 2011**



Source: World Development Indicators.

<sup>14</sup> Royalty and license fees are payments and receipts between residents and nonresidents for the authorized use of intangible, nonproduced, nonfinancial assets and proprietary rights (such as patents, copyrights, trademarks, industrial processes, and franchises) and for the use, through licensing agreements, of produced originals of prototypes (such as films and manuscripts).

**Figure 12. Royalty and license fees, receipts (BoP, current USD, million), 2011**

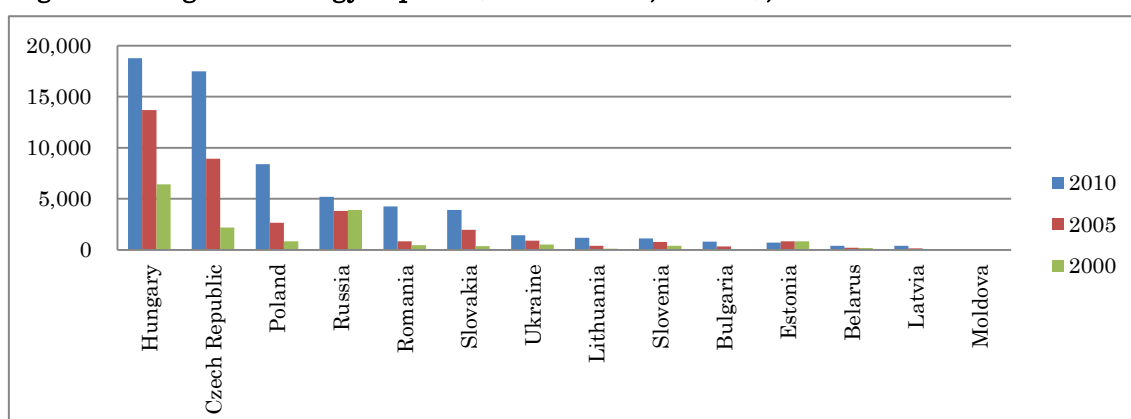


Source: World Development Indicators.

### *High-technology exports*

High-technology exports<sup>15</sup> have been growing from most of the CEE economies. Hungary, Czech Republic and Poland have the largest volume of high-technology exports in 2010. While Russia is the fourth largest exporter of high technologies in the region, since 2000 there is very little growth in its high-technology exports (see Figure 13 for the volumes of high-technology exports in 2000, 2005 and 2010).

**Figure 13. High-technology exports (current USD, million), 2000-2010**

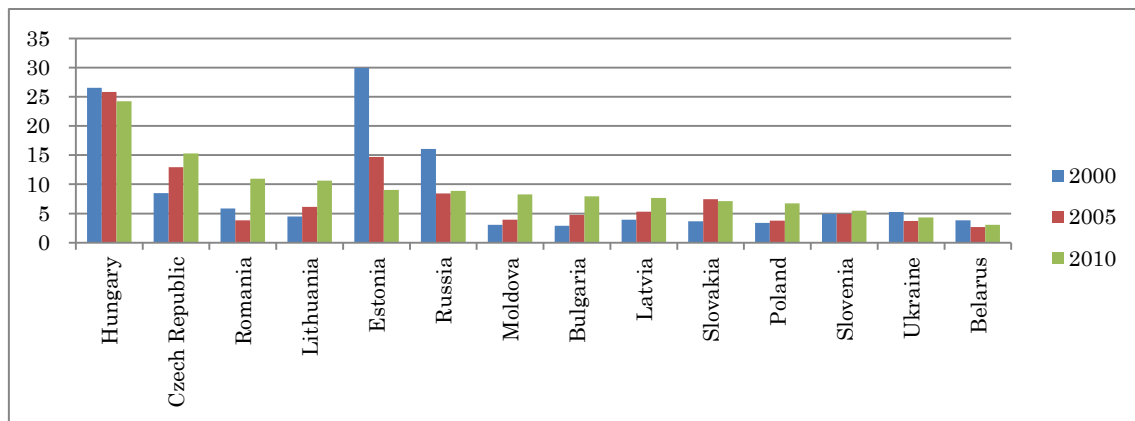


Source: World Development Indicators.

<sup>15</sup> High-technology exports are products with high R&D intensity, such as in aerospace, computers, pharmaceuticals, scientific instruments, and electrical machinery. Data are in current U.S. dollars.

Hungary and Czech Republic not only export the largest volumes of high-technology exports among the CEE states, but their shares of high-tech exports in total manufacturing exports are also the largest among the CEE economies (24% and 14% respectively). Lithuania while having relatively low volume of high-tech exports has the third largest share (10.1%) of high-tech exports in its total manufacturing exports (see Figure 14 for the percentage of high-technology exports in all manufacturing exports for the CEE economies).

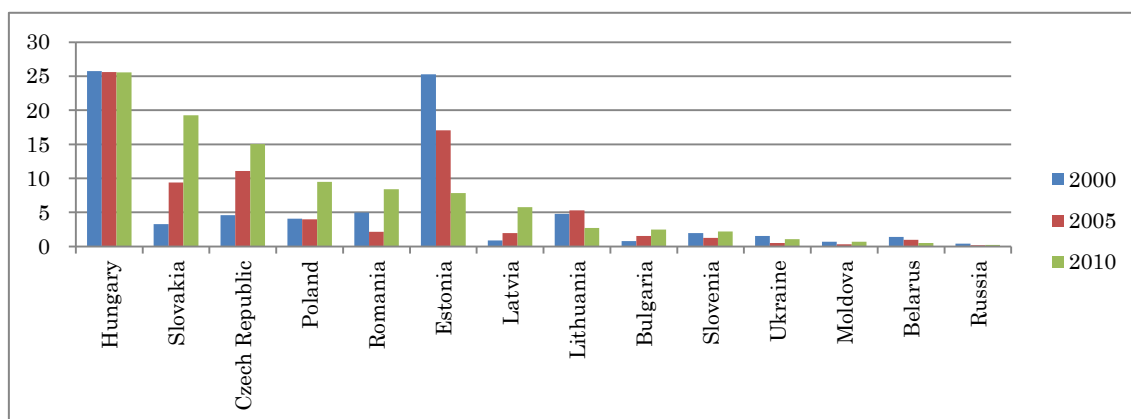
**Figure 14. High-technology exports (% of manufactured exports), 2000-2010**



Source: World Development Indicators.

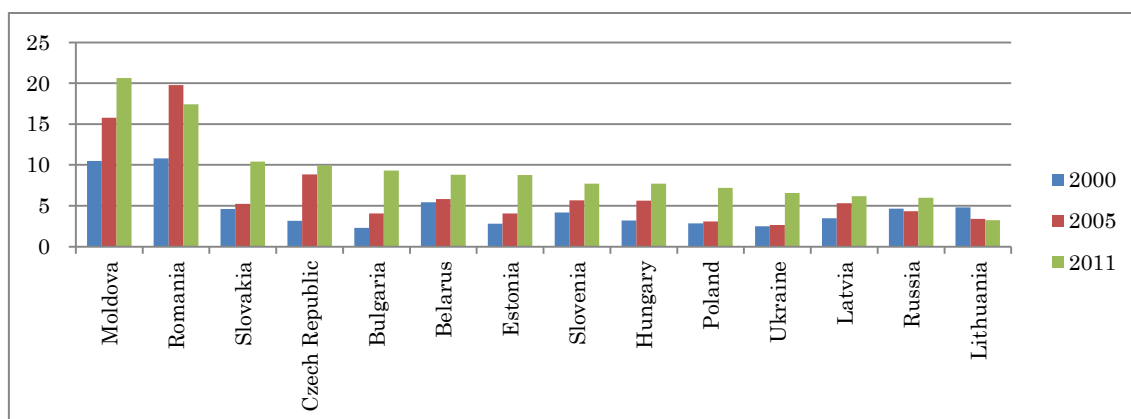
Another indicator of the extent to which countries shifted to higher-technology activities is the percentage of exports accounted by ICT goods and services. Among the CEE economies Hungary, Slovakia and Czech Republic have the largest shares of ICT goods in total goods exports in 2010. Moldova, Romania and Slovakia have the largest shares of ICT service exports in total service exports in 2011 (see Figure 15 and Figure 16).

**Figure 15. ICT goods exports (% of total goods exports), 2000-2011.**



Source: World Development Indicators.

**Figure 16. ICT service exports (% of service exports, BoP), 2000-2011.**

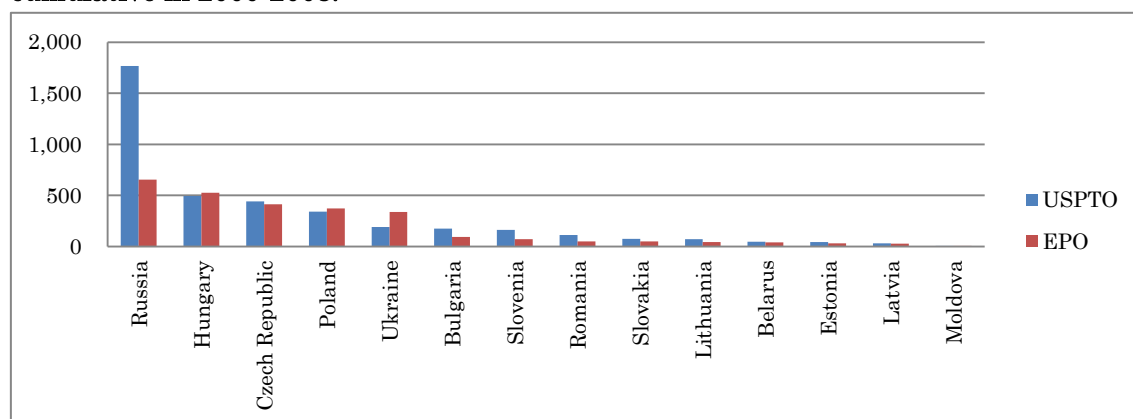


Source: World Development Indicators.

### *Patent counts*

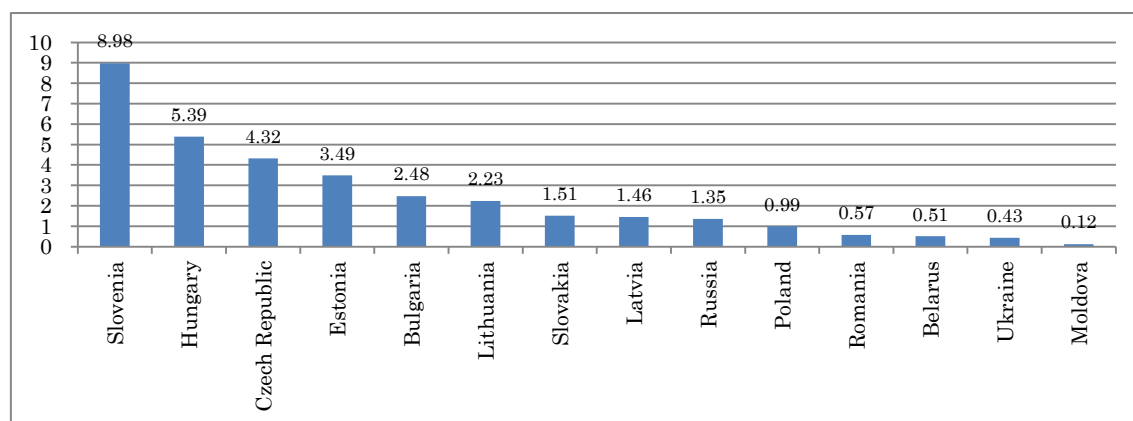
One of the most common measures of an economy's ability to innovate is the number of patents produced by its residents. Russia has the largest number of USPTO and EPO patents among the CEE economies followed by Hungary and Czech Republic. For the other CEE economies the total number of patents is small (see Figure 17). However, if per capita number of patents is calculated, Slovenia, Hungary and Czech Republic have the largest number of patents per capita (see Figure 18).

**Figure 17. Total patents (Patent grants at the USPTO and EPO, priority date), cumulative in 2000-2008.**



Source: OECD.

**Figure 18. Average number of USPTO patents per 1 million people, 2000-2008.**



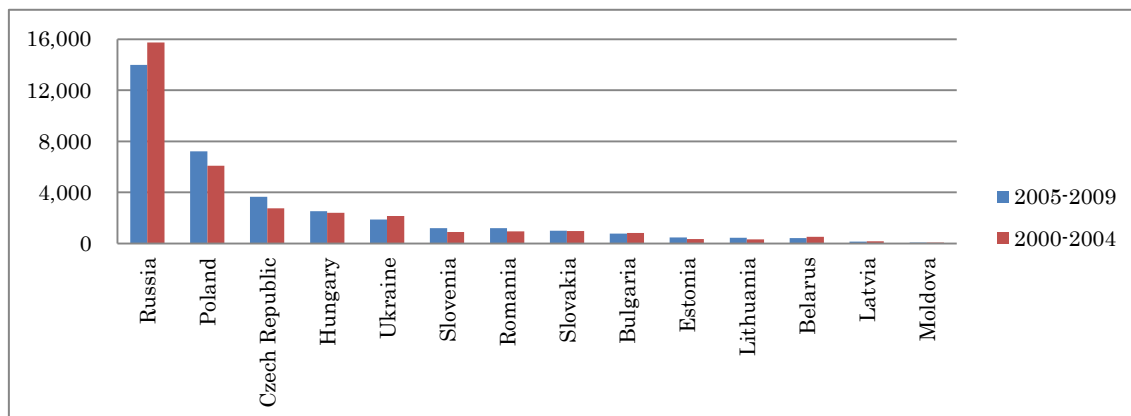
Source: OECD.

### *Scientific and technical journal articles*

**The number of scientific and technical journal articles is another way to measure innovative output of a country. As**

Figure 19 shows, Russia, Poland, and Czech Republic have the largest number of scientific and technical journal articles published annually between 2000 and 2009. While Poland and Czech Republic experience an upward trend in the number of research articles published annually, for Russia per annum number of published articles has been decreasing during 2000s.

**Figure 19. Scientific and technical journal articles, 2000-2009.**



Source: World Development Indicators.

### *Composite indexes of innovative environment*

Here we compare available composite indexes of overall innovation environment in the CEE economies. In particular, we compared the ranks of the CEE economies based on the Global Innovation Index (GII)<sup>16</sup> (Dutta 2012), Ginarte and Park index of patent protection (Park 2008), index of economic freedom from Heritage Foundation, Polity IV political institutions' index, and Ease of Doing Business from World Development Indicators.

Estonia, Slovenia and Czech Republic had the highest GII ranks in 2012, i.e. their environment appeared to be the most conducive to innovation (see Table 7). Slovenia ranks in top ten countries in the world on such indicators as Madrid resident trademark registration (as a share of bn PPP\$ GDP), tertiary enrollment (% gross), school life expectancy (years) among others. Estonia ranks high in press freedom, Wikipedia monthly edits, and firms offering formal training (% firms) among others.

<sup>16</sup> The index includes 141 countries based on 84 indicators related to innovation processes, from such traditional indicators of innovation activity as the number of patents produced and the number of researchers in population, to very innovative indicators such as the number of video uploads on YouTube and the number of national feature films produced. All indicators are divided into innovation inputs and innovation outputs, the innovation efficiency index (the ratio of the Output Sub-Index over the Input Sub-Index) is calculated.

Czech Republic ranks high in computer software spending (% of GDP), ISO environmental and quality certification (Dutta 2012).<sup>17</sup>

**Table 7. Global Innovation Index ranks for the CEE economies, 2012.**

Country	Innovation Inputs Rank	Innovation Output Rank	Innovation Efficiency Rank	GII Rank in 2012
Estonia	24	8	8	19
Slovenia	32	22	20	26
Czech Republic	31	23	22	27
Latvia	36	27	33	30
Hungary	37	29	41	31
Lithuania	38	37	62	38
Slovakia	40	43	65	40
Bulgaria	47	42	49	43
Poland	41	50	80	44
Moldova	79	30	3	50
Russia	60	49	43	51
Romania	51	57	77	52
Ukraine	78	47	14	63
Belarus	80	75	66	78

Source: Dutta (2012)

Bulgaria, Hungary and Czech Republic offer the strong patent protection among the CEE economies in 2005 based on the Ginarte and Park index<sup>18</sup>, while Russia and Ukraine have the lowest GP scores in the CEE region (see Table 8).

**Table 8. GP index of patent protection, 1995-2005.**

Country	1995	2000	2005
Bulgaria	3.23	4.42	4.54
Hungary	4.04	4.04	4.50
Czech Republic	2.96	3.21	4.33
Slovakia	2.96	2.76	4.21
Poland	3.46	3.92	4.21
Romania	3.52	3.72	4.17
Lithuania	2.69	3.48	4.00

<sup>17</sup> More information can be found at: <http://www.globalinnovationindex.org/gii/>

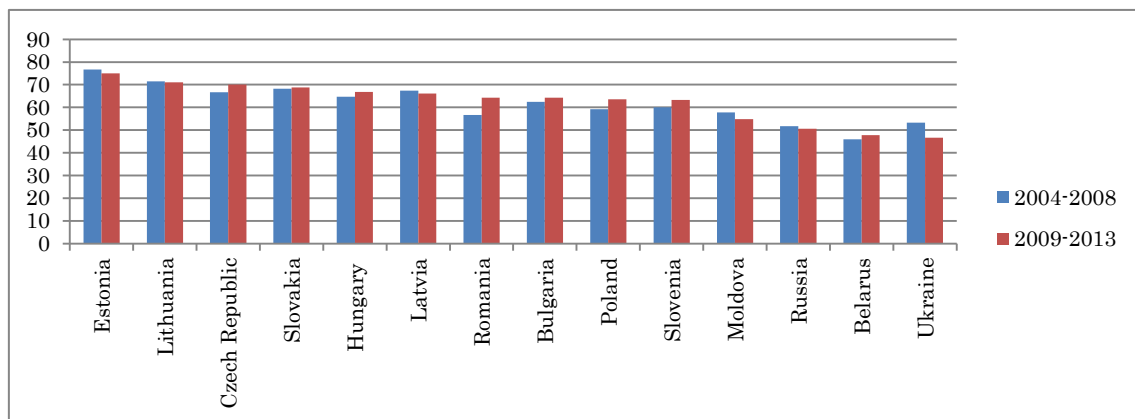
<sup>18</sup> Ginarte and Park index (GP index) of patent rights is since 1995 and until 2005 for the CEE economies. It relates to patent rights only and not to overall IPR and ranges from zero to five, where higher values indicate stronger levels of protection. The index is the unweighted sum of five separate components: coverage (inventions that are patentable); membership in international treaties; duration of protection; enforcement mechanisms; and restrictions (for example, compulsory licensing in the event that that a patented invention is not sufficiently exploited) .

Russia	3.48	3.68	3.68
Ukraine	3.68	3.68	3.68

Source: Park (2008). Note: Information is not available for Belarus, Moldova, Latvia, Estonia and Slovenia.

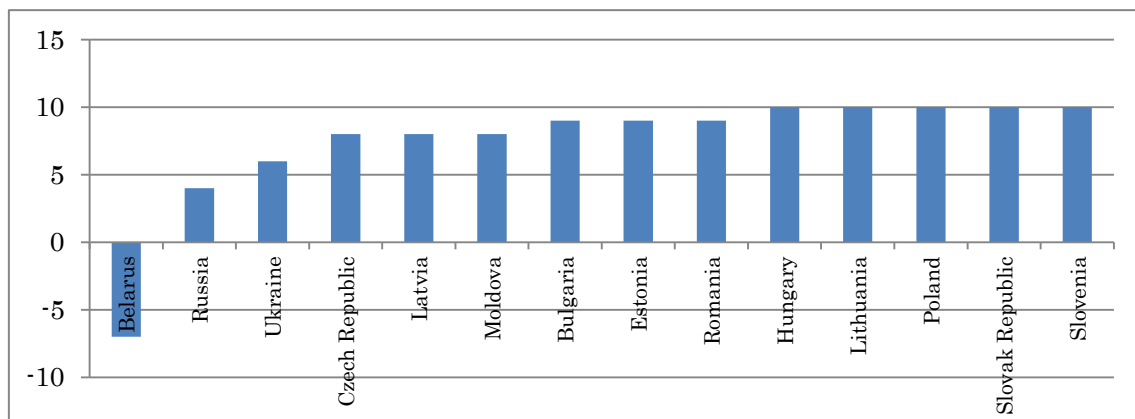
Belarus, Russia and Ukraine score the lowest among the CEE economies on both economic and political institutions (see Figure 20 and Figure 21).

**Figure 20. Index of Economic Freedom, 5-year average, 2004-2013.**



Source: Heritage Foundation.

**Figure 21. Political Institutions, 2012.**



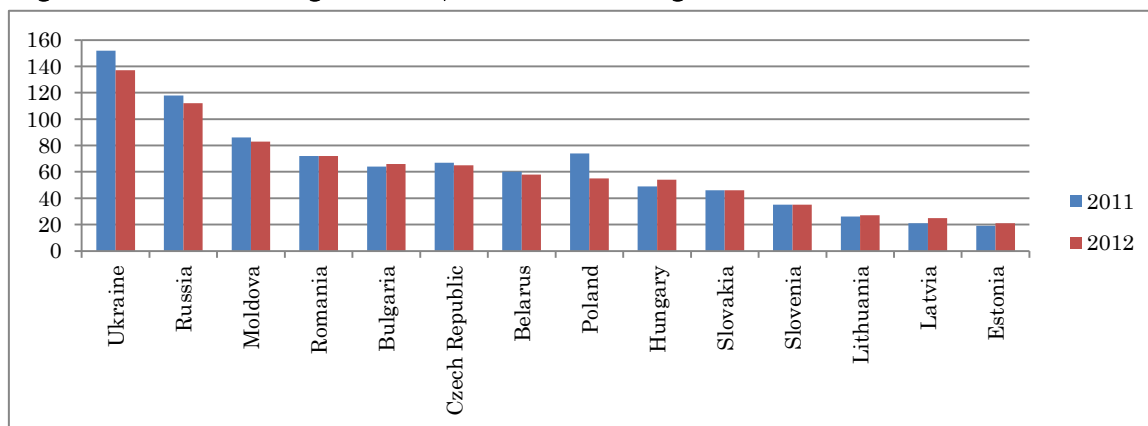
Source: Polity IV.

Ukraine, Russia and Moldova have the least friendly environment for doing business among the CEE economies (see Figure 22).<sup>19</sup>

<sup>19</sup> The Ease of doing business index ranks economies from 1 to 185, with first place being the best. A high ranking (a low numerical rank) means that the regulatory environment is conducive to business operation. The index averages



**Figure 22. Ease of doing business, 2011-2012 average**



Source: World Development Indicators.

### 3. Innovation scene in Czech Republic

This section offers our insights resulted from the research trip to Czech Republic in May 2014. We visited Prague and Olomouc regions of Czech Republic and during the unstructured interviews discussed the functioning of the Czech innovation system, its bottlenecks and positive developments with the representatives of government technology and innovation supporting agencies, with foreign and local innovative firms from different industries, as well as with the representatives of Czech Universities and research centers.<sup>20</sup>

The following remarks about the innovation system in Czech Republic were repeatedly made during our interviews:

- The quality of students (entering universities as well as graduating) is relatively good, but it seems to be deteriorating for a number of years. This may be partly due to the overall decrease in the students' interest to study technical fields. But a relatively low pay for the teachers was also named as

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the country's percentile rankings on 10 topics covered in the World Bank's Doing Business. The ranking on each topic is the simple average of the percentile rankings on its component indicators.

<sup>20</sup> See Appendix A for the full list of interviewees in Czech Republic.

the factor affecting the quality of education. This translates into difficulties in finding local technical talents that are required by Czech as well as foreign-invested firms, while hiring foreign talents is also difficult partly due to the red tape, but also because talents are attracted to the better paid jobs in other European markets;

- There is a lack of mediators between universities and the private sector, and the existing links are not functioning properly. There is no good match between the types of research produced by universities and those required by industry, and the quality of the research is often inadequate by the industry standards. Also, there is a general mismatch of incentives where universities focus on teaching, not research, and prefer longer research projects resulting in publications, while industry appreciates quick results and is not keen on revealing their intellectual property. There seems to be a better formed incentive from the private sector to engage with the universities, than the other way around. It translates into contributing courses being taught at the universities by some private firms as well as research internships offered by other firms. Yet others donate some special equipment to the universities, so that the students have a first-hand experience of their machines;
- The evaluation system of the EU-funded research centers is not functioning properly and needs improvement. It is currently hard to make sure that all the EU rules are being fulfilled. Most of the attracted resources have been spent on creating new facilities and research laboratories that have to be sustained by the Czech government starting from 2017. The available

resources internally are not sufficient to support all the newly established research centers, and Czech government will have to prioritize. It is hard to effectively evaluate the performance of these research institutes as they quickly adapt to the new changing requirements, and the problem is not unique to Czech Republic. Czech government will follow the new guidelines of Technopolis 2015 and will include the new pillars in the evaluation system that are based on the commercialization efforts, capitalization of research results, licensing, international collaboration. At the same time, since the country is small, everybody knows which research centers are truly good.

- No clearly defined priority technology fields. The specified areas are too broad;
- No strong venture capital in Czech Republic. No local experienced investors and foreign investors are attracted to more active markets.

Czech Republic is a small open economy. Given its relatively small local market, Czech companies have to orient outward to reach larger markets. Historically life sciences (chemistry, bio-chemistry, and medical fields) are the area of comparative advantage in Czech Republic and Czech companies in these fields effectively joined global supply chains, specializing on high-value added activities such as R&D. Also a number of global leaders have emerged from the successful local companies and overall, Czech economy is well integrated into the European market.

Czech Republic is the recipient of the EU structural funds aimed at innovation support. Currently small companies receive tax reductions based on their R&D involvement, but eventually this support will have to end due to the limited resources

available to the government. In particular, starting from 2017 Czech government will have to support EU-funded research institutes.

Companies that were looking for cheaper labor are leaving Czech market, and it is especially important to attract more companies that will perform R&D in the local market and create sustainable links with local firms. Here, it is important to educate motivated tech professionals plus attract foreign talents, make it easier for foreign talents to come to Czech Republic. This also includes foreign professors. To make the competitiveness of Czech Republic more apparent.

#### **4. Conclusion**

In this discussion paper we compare innovation performance of the CEE economies based on the available statistics. We compare such country-level indicators as educational levels, investments in R&D, FDI, trade and licensing flows, patents and scientific articles among the CEE economies.

An effective innovation policy should employ the existent strengths of a national innovation system and be able to compensate for its weaknesses. A major change of a government's growth strategy is required at that stage as the policies that helped during low-income stage, are likely to prevent further development after an economy reaches middle income.

Whether the CEE economies will be able to grow out of middle income and sustain their growth as newly advanced economies depends on many economic and political factors. However, without continuous improvements in productivity, the process that is attained through innovation, no middle-income country can continue its development.

## **Appendix A. The list of interviewees in Czech Republic.**

Technology Agency of Czech Republic  
CERTICON  
CzechInvest  
Rockwell Automation  
Czech Technical University in Prague  
CEITEK  
FEI  
ICRC  
Olomouc Regional Development Office  
Olomouc Science and Technology park  
Olomouc Regional Center of Advanced Technology and Science  
CONTEPRO  
Czech Statistical Office  
Honeywell  
R&D support department of Czech Invest  
Apigenix  
Zentiva  
LINET  
Czech Technical University (CTU) – CVUT Media Lab  
CredoVentures  
Research Center of Manufacturing Technology of CTU

## Appendix B. Main economic indicators, 1995-2011.

Table B.1. Belarus

Belarus	1995	2000	2005	2006	2007	2008	2009	2010	2011
Population (million)	10.19	10.01	9.78	9.73	9.70	9.60	9.51	9.49	9.47
Unemployment, total (% of total labour force)	-	-	-	-	-	-	-	-	-
Inflation, consumer prices (annual %)	709.35	168.62	10.34	7.03	8.42	14.84	12.95	7.74	53.23
Poverty headcount ratio at 1.25 USD a day (PPP) (% of population)	0.36	0.33	0.18	0.10	0.13	0.10	-	-	-
Macroeconomic indicators									
GDP (current USD, million)	13972.64	12736.86	30210.09	36961.92	45275.71	60763.48	49209.52	55211.85	55132.08
GDP (constant 2000 USD, million)	9378.83	12736.86	18293.98	20123.01	21863.11	24103.69	24143.11	26002.13	27380.24
GDP per capita (current USD)	1370.67	1273.05	3090.36	3797.78	4666.64	6328.21	5176.14	5817.90	5819.92
GDP per capita (constant 2000 USD)	920.03	1273.05	1871.39	2067.61	2253.46	2510.28	2539.51	2739.95	2890.35
Gross savings (% of GDP)	20.54	23.06	29.75	28.24	27.29	28.90	24.32	26.13	26.34
Industrial structure (value added)									
Agriculture, value added (% of GDP)	17.46	14.15	9.77	9.75	9.34	9.78	9.43	9.12	9.92
Industry, value added (% of GDP)	36.97	39.17	41.76	42.38	42.17	44.26	42.28	42.91	44.41
Services, etc., value added (% of GDP)	45.57	46.68	48.47	47.86	48.48	45.96	48.29	46.88	45.67
Employment structure (% of total employment)									
Agriculture	-	-	-	-	-	-	-	-	-
Industry	-	-	-	-	-	-	-	-	-
Services	-	-	-	-	-	-	-	-	-
Employment to population ratio 15+, total (%)	55.10	52.40	50.90	50.60	50.30	50.10	49.50	50.10	-
Trade structure									
Exports of goods and services (current USD million)	6939.56	8815.28	18064.97	22199.81	27592.40	37027.90	24865.45	29966.73	48456.64
Exports of goods and services (% of GDP)	49.67	69.21	59.80	60.06	60.94	60.94	50.53	54.28	87.89
Imports of goods and services (current USD million)	7552.70	9221.27	17850.10	23742.04	30430.18	41721.25	30401.93	37481.60	49617.55
Imports of goods and services (% of GDP)	54.05	72.40	59.09	64.23	67.21	68.66	61.78	67.89	90.00
Human resources									
Labor force, total	4980642.66	4739475.57	4650237.97	4623700.79	4596296.34	4522058.06	4454425.22	4476949.85	-
School enrolment, secondary (% net)	-	-	88.61	87.90	87.35	92.80	92.41	92.71	92.73
Labour force with tertiary education (% of total)	-	-	-	-	-	-	-	-	-
Public spending on education, total (% of GDP)	5.46	6.20	5.87	6.08	5.15	-	4.52	5.41	5.25

Source: World Development Indicators.

Table B.2. Bulgaria

Bulgaria	1995	2000	2005	2006	2007	2008	2009	2010	2011
Population (million)	8.41	8.17	7.74	7.70	7.66	7.62	7.59	7.53	7.48
Unemployment, total (% of total labour force)	15.70	16.20	10.10	9.00	6.90	5.60	6.80	10.20	-
Inflation, consumer prices (annual %)	62.05	10.32	5.04	7.26	8.40	12.35	2.75	2.44	4.22
Poverty headcount ratio at 1.25 USD a day (PPP) (% of population)	2.02	-	-	-	0.00	-	-	-	-
Macroeconomic indicators									
GDP (current USD, million)	13069.09	12903.55	28895.08	33209.19	42113.66	51824.87	48568.71	47727.33	53514.38
GDP (constant 2000 USD, million)	12760.84	12903.55	16860.95	17956.91	19106.15	20290.73	19174.74	19251.44	19578.72
GDP per capita (current USD)	1554.72	1579.35	3733.26	4313.43	5498.04	6798.13	6403.15	6334.68	7158.16
GDP per capita (constant 2000 USD)	1518.05	1579.35	2178.45	2332.36	2494.35	2661.64	2527.94	2555.18	2618.88
Gross savings (% of GDP)	15.42	12.39	16.26	14.53	9.03	14.63	19.83	21.98	23.64
Industrial structure (value added)									
Agriculture, value added (% of GDP)	14.70	12.63	8.45	7.17	5.58	7.16	4.84	4.90	5.61
Industry, value added (% of GDP)	28.37	26.29	29.21	30.81	32.42	31.15	31.34	29.45	31.14
Services, etc., value added (% of GDP)	56.94	61.08	62.34	62.02	62.00	61.69	63.82	65.65	63.25
Employment structure (% of total employment)									
Agriculture	23.90	13.10	8.90	8.10	7.50	7.50	7.10	6.80	-
Industry	33.50	32.70	34.20	34.50	35.50	36.40	35.20	33.30	-
Services	42.60	53.60	56.60	57.20	56.90	56.10	57.60	59.90	-
Employment to population ratio 15+, total (%)	46.70	43.90	45.40	47.90	50.40	52.50	51.10	48.50	-
Trade structure									
Exports of goods and services (current USD million)	6785.61	6511.44	11713.19	20327.12	25043.55	30171.09	23073.83	27400.44	35593.92
Exports of goods and services (% of GDP)	51.92	50.46	40.54	61.21	59.47	58.22	47.51	57.41	66.51
Imports of goods and services (current USD million)	6522.28	7200.14	16073.49	26167.55	33347.03	40802.78	27363.99	28304.58	35231.83
Imports of goods and services (% of GDP)	49.91	55.80	55.63	78.80	79.18	78.73	56.34	59.30	65.84
Human resources									
Labor force, total	3823716.66	3608802.37	3371938.13	3500175.41	3584315.83	3665431.89	3597908.27	3510499.88	-
School enrolment, secondary (% net)	-	86.66	85.96	85.25	84.93	83.95	82.76	82.68	-
Labour force with tertiary education (% of total)	18.80	20.40	24.10	24.20	24.30	24.60	25.30	25.60	-
Public spending on education, total (% of GDP)	3.45	-	4.25	4.04	3.88	4.44	4.58	-	-

Source: World Development Indicators.

Table B.3. Czech Republic

Czech Republic	1995	2000	2005	2006	2007	2008	2009	2010	2011
Population (million)	10.33	10.27	10.24	10.27	10.33	10.42	10.49	10.52	10.55
Unemployment, total (% of total labour force)	4.00	8.80	7.90	7.10	5.30	4.40	6.70	7.30	-
Inflation, consumer prices (annual %)	9.17	3.90	1.85	2.53	2.93	6.35	1.04	1.41	1.94
Poverty headcount ratio at 1.25 USD a day (PPP) (% of population)	-	-	-	-	-	-	-	-	-
Macroeconomic indicators									
GDP (current USD, million)	57787.49	58807.37	130052.59	148345.13	180511.09	225448.74	197218.26	198929.32	217026.55
GDP (constant 2000 USD, million)	53685.21	58807.37	71857.46	76902.15	81312.44	83832.24	80053.80	82049.22	83597.49
GDP per capita (current USD)	5595.63	5724.84	12705.62	14445.73	17467.42	21627.16	18805.66	18910.01	20579.04
GDP per capita (constant 2000 USD)	5198.40	5724.84	7020.19	7488.67	7868.32	8041.97	7633.49	7799.51	7926.94
Gross savings (% of GDP)	29.54	26.70	25.38	25.24	25.10	26.51	21.14	20.79	-
Industrial structure (value added)									
Agriculture, value added (% of GDP)	4.76	3.74	2.88	2.49	2.37	2.43	2.18	2.31	-
Industry, value added (% of GDP)	36.46	36.57	36.08	36.58	36.98	35.89	36.23	36.19	-
Services, etc., value added (% of GDP)	58.78	59.70	61.03	60.94	60.66	61.68	61.59	61.50	-
Employment structure (% of total employment)									
Agriculture	6.60	5.10	4.00	3.80	3.60	3.20	3.10	3.10	-
Industry	41.80	39.50	39.50	40.00	40.20	40.50	38.60	38.00	-
Services	51.50	55.40	56.50	56.30	56.20	56.30	58.30	58.90	-
Employment to population ratio 15+, total (%)	59.00	55.10	54.70	55.10	55.80	56.10	54.90	54.20	-
Trade structure									
Exports of goods and services (current USD million)	27785.27	35833.71	83798.41	99353.54	123137.01	145297.01	116264.95	132203.14	157446.89
Exports of goods and services (% of GDP)	48.08	60.93	64.43	66.97	68.22	64.45	58.95	66.46	72.55
Imports of goods and services (current USD million)	29878.98	37092.41	80245.41	94884.96	118334.65	139909.78	108311.12	125943.46	148718.08
Imports of goods and services (% of GDP)	51.70	63.07	61.70	63.96	65.56	62.06	54.92	63.31	68.53
Human resources									
Labor force, total	5141186.21	5170237.04	5171779.20	5197195.36	5219470.16	5242194.44	5299941.18	5291485.91	-
School enrolment, secondary (% net)	86.22	-	-	-	-	-	-	-	-
Labour force with tertiary education (% of total)	10.50	11.80	13.70	14.10	14.40	15.30	16.30	17.50	-
Public spending on education, total (% of GDP)	4.92	3.83	4.08	4.42	4.05	3.92	4.38	-	-

Source: World Development Indicators.



Table B.4. Estonia

Estonia	1995	2000	2005	2006	2007	2008	2009	2010	2011
Population (million)	1.44	1.37	1.35	1.34	1.34	1.34	1.34	1.34	1.34
Unemployment, total (% of total labour force)	9.70	13.10	7.90	5.90	4.70	5.50	13.80	16.90	-
Inflation, consumer prices (annual %)	28.78	4.03	4.09	4.43	6.60	10.37	-0.08	2.98	4.98
Poverty headcount ratio at 1.25 USD a day (PPP) (% of population)	0.25	0.64	-	-	-	-	-	-	-
Macroeconomic indicators									
GDP (current USD, million)	3776.93	5675.17	13905.51	16798.53	21993.65	23781.59	19117.64	18845.66	22154.72
GDP (constant 2000 USD, million)	4104.91	5675.17	8017.92	8827.55	9488.89	9095.01	7815.13	8075.43	8744.23
GDP per capita (current USD)	2629.02	4143.93	10330.24	12503.12	16392.72	17738.52	14264.01	14062.23	16533.37
GDP per capita (constant 2000 USD)	2857.31	4143.93	5956.42	6570.33	7072.44	6783.90	5831.01	6025.71	6525.54
Gross savings (% of GDP)	24.02	23.02	23.92	23.60	23.39	21.62	22.39	23.09	25.07
Industrial structure (value added)									
Agriculture, value added (% of GDP)	5.82	4.82	3.53	3.15	3.12	2.74	2.60	3.54	-
Industry, value added (% of GDP)	32.93	27.53	28.60	29.74	29.65	28.91	26.60	28.86	-
Services, etc., value added (% of GDP)	61.25	67.65	67.88	67.10	67.23	68.35	70.80	67.60	-
Employment structure (% of total employment)									
Agriculture	10.20	7.10	5.20	4.80	4.60	3.90	4.00	4.20	-
Industry	34.20	33.30	33.80	33.30	35.00	35.10	31.30	30.10	-
Services	55.60	59.60	61.10	61.90	60.40	60.50	64.10	65.10	-
Employment to population ratio 15+, total (%)	55.60	50.80	54.20	57.00	58.00	58.40	53.10	51.10	-
Trade structure									
Exports of goods and services (current USD million)	2571.08	4800.88	10807.12	12212.56	14751.63	16896.33	12436.84	14968.95	20273.61
Exports of goods and services (% of GDP)	68.07	84.59	77.72	72.70	67.07	71.05	65.05	79.43	91.51
Imports of goods and services (current USD million)	2857.05	5005.54	11710.89	13933.55	16781.63	17856.96	11337.61	13701.05	19400.00
Imports of goods and services (% of GDP)	75.64	88.20	84.22	82.95	76.30	75.09	59.30	72.70	87.57
Human resources									
Labor force, total	701079.52	656338.45	671476.94	692481.97	695395.63	703390.60	700741.40	697880.50	-
School enrolment, secondary (% net)	-	85.04	90.03	91.10	91.37	91.71	92.03	92.03	-
Labour force with tertiary education (% of total)	17.40	29.60	34.40	34.20	33.70	33.80	35.60	35.30	-
Public spending on education, total (% of GDP)	6.10	5.35	4.88		4.72	5.59	6.09	-	-

Source: World Development Indicators.

Table B.5. Hungary

Hungary	1995	2000	2005	2006	2007	2008	2009	2010	2011
Population (million)	10.33	10.21	10.09	10.07	10.06	10.04	10.02	10.00	9.97
Unemployment, total (% of total labour force)	10.20	6.40	7.20	7.50	7.40	7.80	10.00	11.20	-
Inflation, consumer prices (annual %)	28.30	9.78	3.55	3.88	7.94	6.07	4.21	4.88	3.96
Poverty headcount ratio at 1.25 USD a day (PPP) (% of population)	-	0.39	-	-	0.35	-	-	-	-
Macroeconomic indicators									
GDP (current USD, million)	45561.41	46385.59	110321.71	112533.15	136102.02	154233.54	126631.68	128631.63	140029.34
GDP (constant 2000 USD, million)	40117.04	46385.59	56884.94	59101.84	59169.63	59698.69	55640.00	56340.04	57293.18
GDP per capita (current USD)	4411.03	4542.72	10936.95	11173.57	13534.71	15364.68	12634.55	12863.13	14043.66
GDP per capita (constant 2000 USD)	3883.94	4542.72	5639.39	5868.30	5884.14	5947.16	5551.43	5633.99	5745.98
Gross savings (% of GDP)	19.28	19.46	16.70	17.49	15.84	17.04	18.81	20.37	20.64
Industrial structure (value added)									
Agriculture, value added (% of GDP)	8.04	5.54	4.18	4.01	4.02	4.28	3.37	3.53	-
Industry, value added (% of GDP)	29.43	32.42	30.01	30.17	30.19	29.54	29.97	31.03	-
Services, etc., value added (% of GDP)	62.53	62.05	65.81	65.82	65.78	66.17	66.65	65.44	-
Employment structure (% of total employment)									
Agriculture	8.00	6.50	5.00	4.90	4.70	4.30	4.60	4.50	-
Industry	32.60	33.70	32.40	32.30	32.60	32.30	31.20	30.70	-
Services	59.40	59.70	62.60	62.80	62.70	63.30	64.20	64.90	-
Employment to population ratio 15+, total (%)	44.40	46.00	46.50	46.70	46.60	46.10	45.00	45.00	-
Trade structure									
Exports of goods and services (current USD million)	20599.61	34605.68	72753.98	87487.97	110657.15	125946.87	98254.39	111324.32	129199.24
Exports of goods and services (% of GDP)	45.21	74.60	65.95	77.74	81.30	81.66	77.59	86.55	92.27
Imports of goods and services (current USD million)	20462.60	36205.81	75078.38	88517.59	109443.82	125246.30	92102.54	102961.59	118897.34
Imports of goods and services (% of GDP)	44.91	78.05	68.05	78.66	80.41	81.21	72.73	80.04	84.91
Human resources									
Labor force, total	4175454.09	4179520.59	4268805.92	4307375.01	4293969.04	4269734.97	4269883.58	4315633.71	-
School enrolment, secondary (% net)	-	84.15	90.33	90.53	90.57	90.74	91.09	-	-
Labour force with tertiary education (% of total)	-	16.20	20.20	20.40	20.60	21.90	22.50	22.70	-
Public spending on education, total (% of GDP)	4.94	4.96	5.46	5.44	5.29	5.10	5.12	-	-

Source: World Development Indicators.

Table B.6. Latvia

Latvia	1995	2000	2005	2006	2007	2008	2009	2010	2011
Population (million)	2.49	2.37	2.30	2.29	2.28	2.27	2.25	2.24	2.22
Unemployment, total (% of total labour force)	-	14.20	8.90	6.80	6.00	7.40	17.10	18.70	-
Inflation, consumer prices (annual %)	24.98	2.65	6.74	6.53	10.11	15.40	3.53	-1.09	4.38
Poverty headcount ratio at 1.25 USD a day (PPP) (% of population)	0.00	-	-	-	0.21	0.14	-	-	-
Macroeconomic indicators									
GDP (current USD, million)	5235.72	7833.07	16041.84	19935.05	28765.69	33669.37	25875.78	24009.68	28252.50
GDP (constant 2000 USD, million)	5945.59	7833.07	11610.37	13030.69	14330.84	13722.71	11258.79	11220.12	11833.86
GDP per capita (current USD)	2106.88	3300.93	6973.16	8713.07	12638.15	14857.89	11475.69	10723.36	12726.35
GDP per capita (constant 2000 USD)	2392.54	3300.93	5046.86	5695.36	6296.23	6055.66	4993.18	5011.20	5330.57
Gross savings (% of GDP)	13.90	18.93	22.46	17.68	18.47	18.83	29.85	26.56	26.08
Industrial structure (value added)									
Agriculture, value added (% of GDP)	9.08	4.60	3.97	3.51	3.58	3.05	3.30	4.14	-
Industry, value added (% of GDP)	30.35	23.57	21.58	21.91	23.25	23.04	20.65	21.81	-
Services, etc., value added (% of GDP)	60.57	71.83	74.46	74.59	73.17	73.91	76.06	74.05	-
Employment structure (% of total employment)									
Agriculture	-	14.50	12.10	11.10	9.90	7.90	8.70	8.80	-
Industry	-	26.30	25.80	27.50	28.40	29.10	25.00	24.00	-
Services	-	59.10	61.80	61.30	61.50	63.00	66.30	66.90	-
Employment to population ratio 15+, total (%)	53.30	47.90	52.60	55.30	57.20	57.80	50.80	48.70	-
Trade structure									
Exports of goods and services (current USD million)	2234.23	3261.83	7675.88	8947.72	12181.12	14415.86	11356.22	12919.97	16758.17
Exports of goods and services (% of GDP)	42.67	41.64	47.85	44.88	42.35	42.82	43.89	53.81	59.32
Imports of goods and services (current USD million)	2349.49	3812.70	9983.41	13226.80	17944.16	19011.27	11739.07	13261.95	17848.69
Imports of goods and services (% of GDP)	44.87	48.67	62.23	66.35	62.38	56.46	45.37	55.24	63.18
Human resources									
Labor force, total	1204106.16	1089376.76	1135967.83	1167943.40	1194305.79	1219675.61	1192086.19	1155438.96	-
School enrolment, secondary (% net)	80.44	-	-	-	-	86.69	84.83	83.69	-
Labour force with tertiary education (% of total)	-	19.30	22.00	22.60	23.50	26.00	26.60	27.80	-
Public spending on education, total (% of GDP)	6.08	5.36	-	5.07	5.00	5.71	5.64	-	-

Source: World Development Indicators.

Table B.7. Lithuania

Lithuania	1995	2000	2005	2006	2007	2008	2009	2010	2011
Population (million)	3.63	3.50	3.41	3.39	3.38	3.36	3.34	3.29	3.20
Unemployment, total (% of total labour force)	17.10	15.90	8.30	5.60	4.30	5.80	13.70	17.80	-
Inflation, consumer prices (annual %)	39.66	0.99	2.66	3.75	5.74	10.93	4.45	1.32	4.12
Poverty headcount ratio at 1.25 USD a day (PPP) (% of population)	-	0.30	-	-	-	0.16	-	-	-
Macroeconomic indicators									
GDP (current USD, million)	7904.90	11434.20	25962.25	30088.51	39103.97	47252.93	36846.18	36306.38	42725.40
GDP (constant 2000 USD, million)	9201.16	11434.20	16639.63	17944.98	19710.73	20287.75	17296.99	17527.07	18555.91
GDP per capita (current USD)	2178.20	3267.35	7603.97	8864.99	11584.24	14071.27	11033.59	11046.05	13339.18
GDP per capita (constant 2000 USD)	2535.38	3267.35	4873.50	5287.14	5839.15	6041.41	5179.58	5332.53	5793.29
Gross savings (% of GDP)	11.95	13.04	18.29	17.05	17.30	14.51	16.23	19.77	17.51
Industrial structure (value added)									
Agriculture, value added (% of GDP)	10.93	6.35	4.82	4.30	3.94	3.72	3.36	3.51	-
Industry, value added (% of GDP)	31.47	29.78	32.86	32.86	32.60	31.59	26.95	28.16	-
Services, etc., value added (% of GDP)	57.60	63.87	62.33	62.84	63.46	64.70	69.69	68.34	-
Employment structure (% of total employment)									
Agriculture	-	18.70	14.00	12.40	10.40	7.90	9.20	9.00	-
Industry	-	26.80	29.10	29.70	30.70	30.40	26.80	24.40	-
Services	-	54.50	56.90	57.90	59.00	61.20	63.60	66.20	-
Employment to population ratio 15+, total (%)	52.30	50.60	51.90	52.80	53.90	53.40	49.90	47.90	-
Trade structure									
Exports of goods and services (current USD million)	3747.84	5116.48	14936.64	17777.42	21152.01	28293.82	20128.91	24897.75	33231.23
Exports of goods and services (% of GDP)	47.41	44.75	57.53	59.08	54.09	59.88	54.63	68.58	77.78
Imports of goods and services (current USD million)	4582.62	5834.03	16783.50	20839.67	26369.68	33875.77	20653.19	25273.05	33868.04
Imports of goods and services (% of GDP)	57.97	51.02	64.65	69.26	67.43	71.69	56.05	69.61	79.27
Human resources									
Labor force, total	1790782.02	1683282.70	1605582.62	1589245.85	1600694.31	1613860.40	1638980.76	1628492.20	-
School enrolment, secondary (% net)	83.15	91.90	94.88	93.17	91.83	91.03	91.00	91.11	-
Labour force with tertiary education (% of total)	-	42.50	29.10	30.00	32.10	33.70	33.60	35.50	-
Public spending on education, total (% of GDP)	4.74	-	4.90	4.84	4.67	4.90	5.67	-	-

Source: World Development Indicators.

Table B.8. Moldova

Moldova	1995	2000	2005	2006	2007	2008	2009	2010	2011
Population (million)	3.68	3.64	3.60	3.59	3.58	3.57	3.57	3.56	3.56
Unemployment, total (% of total labour force)	-	8.50	7.30	7.40	5.10	4.00	6.40	-	-
Inflation, consumer prices (annual %)	29.86	31.30	11.96	12.78	12.37	12.77	-0.05	7.40	7.61
Poverty headcount ratio at 1.25 USD a day (PPP) (% of population)	-	-	12.49	2.01	0.92	1.05	0.44	0.39	-
Macroeconomic indicators									
GDP (current USD, million)	1753.00	1288.42	2988.17	3408.45	4402.50	6054.81	5439.42	5811.62	7000.33
GDP (constant 2000 USD, million)	1450.58	1288.42	1813.88	1900.67	1958.98	2111.09	1984.64	2125.43	2261.77
GDP per capita (current USD)	476.99	354.00	831.16	950.62	1230.81	1695.97	1525.53	1631.53	1966.94
GDP per capita (constant 2000 USD)	394.70	354.00	504.53	530.09	547.67	591.32	556.61	596.69	635.51
Gross savings (% of GDP)	17.78	16.33	21.57	21.75	25.87	23.40	14.53	15.62	13.05
Industrial structure (value added)									
Agriculture, value added (% of GDP)	33.02	29.03	19.53	17.38	12.01	10.71	96.36	96.58	96.58
Industry, value added (% of GDP)	32.15	21.72	16.34	15.60	14.78	14.31	100.00	99.91	93.65
Services, etc., value added (% of GDP)	34.83	49.25	64.13	67.03	73.21	74.98	-96.36	-96.49	-90.23
Employment structure (% of total employment)									
Agriculture	-	50.90	40.60	33.60	32.80	31.10	-	-	-
Industry	-	13.90	16.00	18.20	18.70	19.70	-	-	-
Services	-	35.20	43.30	48.20	48.50	49.30	-	-	-
Employment to population ratio 15+, total (%)	57.30	54.20	45.20	43.70	43.40	42.40	39.90	38.00	-
Trade structure									
Exports of goods and services (current USD million)	865.03	641.35	1528.28	1542.53	2089.09	2471.51	2005.63	2279.62	3151.38
Exports of goods and services (% of GDP)	49.35	49.78	51.14	45.26	47.45	40.82	36.87	39.23	45.02
Imports of goods and services (current USD million)	1016.00	971.88	2739.31	3132.29	4276.62	5667.51	3997.50	4564.75	6036.01
Imports of goods and services (% of GDP)	57.96	75.43	91.67	91.90	97.14	93.60	73.49	78.55	86.22
Human resources									
Labor force, total	1726337.26	1646377.75	1421599.75	1383677.04	1346046.42	1306366.86	1262365.73	1216972.79	
School enrolment, secondary (% net)	-	78.24	81.79	81.35	80.55	83.50	79.56	78.62	77.75
Labour force with tertiary education (% of total)	-	-	-	-	-	-	-	-	-
Public spending on education, total (% of GDP)	-	33.20	38.85	38.94	40.19	37.97	-	-	-

Source: World Development Indicators.

Table B.9. Poland

Poland	1995	2000	2005	2006	2007	2008	2009	2010	2011
Population (million)	38.59	38.45	38.17	38.14	38.12	38.13	38.15	38.18	38.22
Unemployment, total (% of total labour force)	13.30	16.10	17.70	13.80	9.60	7.10	8.20	9.60	-
Inflation, consumer prices (annual %)	28.07	10.06	2.11	1.11	2.39	4.35	3.83	2.71	4.22
Poverty headcount ratio at 1.25 USD a day (PPP) (% of population)	-	0.14	0.10	0.05	0.07	0.07	0.05	-	-
Macroeconomic indicators									
GDP (current USD, million)	139061.77	171276.12	303912.25	341669.94	425321.50	529400.63	430878.34	469781.79	514496.46
GDP (constant 2000 USD, million)	131592.84	171276.12	199364.06	211779.43	226149.25	237742.90	241612.59	251030.84	261950.14
GDP per capita (current USD)	3603.10	4454.08	7963.02	8958.01	11157.27	13885.64	11293.85	12303.21	13462.85
GDP per capita (constant 2000 USD)	3409.58	4454.08	5223.68	5552.50	5932.47	6235.76	6332.96	6574.30	6854.46
Gross savings (% of GDP)	20.12	18.82	16.92	17.36	18.73	18.22	17.14	16.93	-
Industrial structure (value added)									
Agriculture, value added (% of GDP)	8.01	4.96	4.53	4.29	4.33	3.73	3.65	3.54	-
Industry, value added (% of GDP)	35.17	31.71	30.71	31.11	31.64	31.54	31.74	31.63	-
Services, etc., value added (% of GDP)	56.83	63.33	64.76	64.60	64.04	64.73	64.61	64.83	-
Employment structure (% of total employment)									
Agriculture	22.60	18.80	17.40	15.80	14.70	14.00	13.30	12.80	-
Industry	32.00	30.80	29.20	30.00	30.70	31.90	31.10	30.20	-
Services	45.30	50.40	53.40	54.20	54.50	54.10	55.60	56.90	-
Employment to population ratio 15+, total (%)	50.70	47.00	45.00	46.60	48.70	50.60	50.70	50.50	-
Trade structure									
Exports of goods and services (current USD million)	32261.71	46457.60	112706.00	137881.06	173349.48	211226.55	169955.45	198463.35	-
Exports of goods and services (% of GDP)	23.20	27.12	37.09	40.36	40.76	39.90	39.44	42.25	-
Imports of goods and services (current USD million)	29268.28	57456.97	114958.52	144053.83	185573.07	232243.48	169632.06	204134.33	-
Imports of goods and services (% of GDP)	21.05	33.55	37.83	42.16	43.63	43.87	39.37	43.45	-
Human resources									
Labor force, total	17423418.96	17361503.33	17439828.57	17332742.62	17343749.69	17611622.58	17907013.79	18188774.95	-
School enrolment, secondary (% net)	-	90.64	93.02	93.09	92.54	91.81	91.02	-	-
Labour force with tertiary education (% of total)	13.80	12.30	18.90	20.40	21.50	22.60	24.50	26.30	-
Public spending on education, total (% of GDP)	4.43	5.01	5.47	5.25	4.91	5.08	5.09	-	-

Source: World Development Indicators.

Table B.10. Romania

Romania	1995	2000	2005	2006	2007	2008	2009	2010	2011
Population (million)	22.68	22.44	21.63	21.59	21.55	21.51	21.48	21.44	21.39
Unemployment, total (% of total labour force)	8.00	7.00	7.20	7.30	6.40	5.80	6.90	7.30	-
Inflation, consumer prices (annual %)	32.24	45.67	8.99	6.58	4.84	7.85	5.59	6.09	5.79
Poverty headcount ratio at 1.25 USD a day (PPP) (% of population)	-	17.24	5.59	4.92	3.56	1.96	1.67	-	-
Macroeconomic indicators									
GDP (current USD, million)	35477.06	37052.64	98913.39	122641.51	169282.49	200071.06	161110.32	161628.75	179793.51
GDP (constant 2000 USD, million)	39502.66	37052.64	48898.33	52761.30	55926.98	61198.55	55996.67	56527.46	56320.36
GDP per capita (current USD)	1563.95	1650.97	4572.05	5681.09	7856.48	9299.74	7500.34	7539.36	8405.49
GDP per capita (constant 2000 USD)	1741.41	1650.97	2260.22	2444.05	2595.60	2844.64	2606.87	2636.79	2633.02
Gross savings (% of GDP)	19.04	15.85	15.84	17.35	20.69	22.65	29.00	26.42	27.87
Industrial structure (value added)									
Agriculture, value added (% of GDP)	21.43	12.51	10.14	10.51	8.78	7.14	7.16	7.14	6.97
Industry, value added (% of GDP)	42.74	36.38	34.97	37.42	35.30	25.23	25.96	26.20	25.44
Services, etc., value added (% of GDP)	35.83	51.11	54.89	52.07	55.92	67.63	66.88	66.66	67.59
Employment structure (% of total employment)									
Agriculture	40.30	42.80	32.10	30.50	29.50	28.70	29.10	30.10	-
Industry	31.00	26.20	30.30	30.60	31.40	31.60	30.00	28.70	-
Services	28.70	31.00	37.50	38.80	39.10	39.70	40.90	41.20	-
Employment to population ratio 15+, total (%)	57.80	60.10	51.10	51.90	52.40	52.60	51.90	51.90	-
Trade structure									
Exports of goods and services (current USD million)	9797.52	12113.00	32565.02	36246.54	52010.58	61989.95	53687.43	37961.05	40152.14
Exports of goods and services (% of GDP)	27.62	32.69	32.92	29.55	30.72	30.98	33.32	23.49	22.33
Imports of goods and services (current USD million)	11782.91	14043.00	42812.32	47380.89	72541.07	87575.42	64838.15	48096.41	52245.72
Imports of goods and services (% of GDP)	33.21	37.90	43.28	38.63	42.85	43.77	40.24	29.76	29.06
Human resources									
Labor force, total	11328586.05	11828996.15	10040585.55	10233493.53	10230167.92	10182018.71	10147324.87	10181444.75	-
School enrolment, secondary (% net)	-	78.57	80.57	81.14	81.72	82.40	83.08	-	-
Labour force with tertiary education (% of total)	13.00	8.60	12.20	13.00	13.30	14.30	15.00	15.70	-
Public spending on education, total (% of GDP)	-	2.89	3.48	-	4.28	-	4.32	-	-

Source: World Development Indicators.

Table B.11. Russia

Russia	1995	2000	2005	2006	2007	2008	2009	2010	2011
Population (million)	148.14	146.30	143.15	142.50	142.10	141.95	141.91	141.92	141.93
Unemployment, total (% of total labour force)	9.40	10.60	7.20	7.20	6.10	6.30	8.40	7.50	-
Inflation, consumer prices (annual %)	197.47	20.78	12.68	9.68	9.01	14.11	11.65	6.86	8.44
Poverty headcount ratio at 1.25 USD a day (PPP) (% of population)	-	-	1.49	1.22	0.29	0.08	0.05	-	-
Macroeconomic indicators									
GDP (current USD, million)	395528.49	259708.50	764000.90	989930.54	1299705.76	1660846.39	1222648.13	1487515.61	1857769.68
GDP (constant 2000 USD, million)	239710.40	259708.50	349710.15	378223.53	410505.21	432048.33	398258.33	415542.47	433557.51
GDP per capita (current USD)	2669.95	1775.14	5337.07	6946.88	9146.42	11700.22	8615.66	10481.37	13089.34
GDP per capita (constant 2000 USD)	1618.12	1775.14	2442.96	2654.20	2888.85	3043.67	2806.41	2928.01	3054.73
Gross savings (% of GDP)	28.02	36.15	31.14	30.75	30.15	32.48	22.90	27.54	30.35
Industrial structure (value added)									
Agriculture, value added (% of GDP)	7.16	6.43	4.97	4.52	4.41	4.40	4.69	4.00	4.25
Industry, value added (% of GDP)	36.96	37.95	38.08	37.23	36.44	36.12	33.64	35.43	37.00
Services, etc., value added (% of GDP)	55.88	55.62	56.96	58.25	59.15	59.48	61.67	60.57	58.75
Employment structure (% of total employment)									
Agriculture	15.70	14.50	10.20	10.00	9.00	8.60	9.70	-	-
Industry	34.00	28.40	29.80	29.30	29.20	28.90	27.90	-	-
Services	50.00	57.10	60.00	60.70	61.80	62.40	62.30	-	-
Employment to population ratio 15+, total (%)	55.10	54.80	56.10	56.80	58.30	58.70	57.40	58.00	-
Trade structure									
Exports of goods and services (current USD million)	115848.18	114429.43	268951.74	333908.28	392044.03	520003.70	341584.67	445512.96	576863.49
Exports of goods and services (% of GDP)	29.29	44.06	35.20	33.73	30.16	31.31	27.94	29.95	31.05
Imports of goods and services (current USD million)	102419.31	62417.35	164337.99	207914.38	279983.43	366597.06	250605.70	322366.55	414054.82
Imports of goods and services (% of GDP)	25.89	24.03	21.51	21.00	21.54	22.07	20.50	21.67	22.29
Human resources									
Labor force, total	70843961.66	73252488.36	73431167.92	74171828.00	75265948.43	75887405.41	75757632.39	75601032.32	-
School enrolment, secondary (% net)	-	-	-	-	-	-	-	-	-
Labour force with tertiary education (% of total)	47.61	48.59	49.22	49.41	49.26	48.90	49.10	48.87	-
Public spending on education, total (% of GDP)	-	2.94	3.77	3.87		4.10	-	-	-

Source: World Development Indicators.



Table B.12. Slovakia

Slovakia	1995	2000	2005	2006	2007	2008	2009	2010	2011
Population (million)	5.36	5.39	5.39	5.39	5.40	5.41	5.42	5.43	5.44
Unemployment, total (% of total labour force)	13.10	18.80	16.20	13.30	11.00	9.60	12.10	14.40	-
Inflation, consumer prices (annual %)	9.89	12.04	2.71	4.48	2.76	4.60	1.62	0.96	3.92
Poverty headcount ratio at 1.25 USD a day (PPP) (% of population)	-	-	0.21	0.07	0.10	0.10	0.06	-	-
Macroeconomic indicators									
GDP (current USD, million)	25253.60	28724.04	61328.47	69002.10	84108.56	97908.89	87239.75	87077.44	95994.15
GDP (constant 2000 USD, million)	24300.88	28724.04	36495.49	39541.19	43690.61	46203.03	43924.49	45761.81	47294.46
GDP per capita (current USD)	4709.74	5330.40	11384.53	12798.53	15583.40	18109.06	16100.08	16036.07	17645.98
GDP per capita (constant 2000 USD)	4532.06	5330.40	6774.73	7334.11	8094.87	8545.63	8106.26	8427.44	8693.84
Gross savings (% of GDP)	27.36	23.27	21.41	20.81	23.07	17.42	12.47	15.57	16.49
Industrial structure (value added)									
Agriculture, value added (% of GDP)	5.91	4.47	3.65	3.59	4.06	4.21	3.95	3.86	-
Industry, value added (% of GDP)	37.77	36.18	36.47	39.03	38.47	38.71	35.25	34.94	-
Services, etc., value added (% of GDP)	56.33	59.34	59.88	57.39	57.46	57.08	60.81	61.20	-
Employment structure (% of total employment)									
Agriculture	9.20	6.70	4.70	4.40	4.20	4.00	3.60	3.20	-
Industry	38.90	37.30	38.80	38.80	39.40	40.10	37.90	37.10	-
Services	51.90	56.10	56.30	56.80	56.40	55.90	58.40	59.60	-
Employment to population ratio 15+, total (%)	48.90	48.90	49.90	51.30	52.30	53.80	51.90	50.60	-
Trade structure									
Exports of goods and services (current USD million)	14586.75	20235.66	46764.13	58299.66	73053.34	81724.62	61833.16	70748.19	85487.91
Exports of goods and services (% of GDP)	57.76	70.45	76.25	84.49	86.86	83.47	70.88	81.25	89.06
Imports of goods and services (current USD million)	14027.90	20975.77	49625.08	61083.38	73982.16	84057.52	62560.24	71884.78	82985.82
Imports of goods and services (% of GDP)	55.55	73.03	80.92	88.52	87.96	85.85	71.71	82.55	86.45
Human resources									
Labor force, total	2477432.09	2591041.57	2661311.27	2657650.62	2662122.19	2707235.32	2705653.79	2723790.16	-
School enrolment, secondary (% net)	-	-	-	-	-	-	-	-	-
Labour force with tertiary education (% of total)	41.40	10.60	14.50	15.10	15.10	15.70	16.60	18.30	-
Public spending on education, total (% of GDP)	4.40	3.92	3.85	3.80	3.62	3.61	4.09	-	-

Source: World Development Indicators.

Table B.13. Slovenia

Slovenia	1995	2000	2005	2006	2007	2008	2009	2010	2011
Population (million)	1.99	1.99	2.00	2.01	2.02	2.02	2.04	2.05	2.05
Unemployment, total (% of total labour force)	7.20	7.20	6.50	6.00	4.80	4.40	5.90	7.20	-
Inflation, consumer prices (annual %)	13.46	8.88	2.48	2.46	3.61	5.65	0.86	1.84	1.81
Poverty headcount ratio at 1.25 USD a day (PPP) (% of population)	-	-	-	-	-	-	-	-	-
Macroeconomic indicators									
GDP (current USD, million)	20940.86	19979.47	35717.73	38945.15	47306.80	54606.02	49056.15	46908.33	49539.27
GDP (constant 2000 USD, million)	16155.99	19979.47	23866.57	25262.67	26998.27	27967.31	25727.73	26082.65	26037.11
GDP per capita (current USD)	10523.72	10045.36	17854.64	19405.93	23441.00	27015.08	24051.04	22897.94	24141.94
GDP per capita (constant 2000 USD)	8119.11	10045.36	11930.46	12588.11	13377.92	13836.19	12613.68	12732.05	12688.65
Gross savings (% of GDP)	23.07	24.60	25.57	26.67	27.42	25.09	21.50	22.02	21.41
Industrial structure (value added)									
Agriculture, value added (% of GDP)	4.39	3.30	2.71	2.39	2.51	2.52	2.46	2.46	-
Industry, value added (% of GDP)	34.85	35.63	34.11	34.39	34.60	33.86	31.17	31.60	-
Services, etc., value added (% of GDP)	60.75	61.07	63.18	63.23	62.90	63.63	66.37	65.94	-
Employment structure (% of total employment)									
Agriculture	10.40	9.50	8.80	9.60	10.20	8.60	9.10	8.80	-
Industry	43.10	37.40	37.20	35.00	34.20	35.00	33.00	32.50	-
Services	46.40	52.30	53.30	55.20	54.70	55.90	57.40	58.30	-
Employment to population ratio 15+, total (%)	54.80	53.40	55.40	55.70	56.80	56.70	55.80	54.70	-
Trade structure									
Exports of goods and services (current USD million)	10385.18	10728.77	22208.56	25914.29	32905.34	36663.79	28643.63	30689.63	35815.26
Exports of goods and services (% of GDP)	49.59	53.70	62.18	66.54	69.56	67.14	58.39	65.42	72.30
Imports of goods and services (current USD million)	10791.01	11422.09	22354.35	26115.77	33720.07	38422.38	27939.15	30424.77	35297.61
Imports of goods and services (% of GDP)	51.53	57.17	62.59	67.06	71.28	70.36	56.95	64.86	71.25
Human resources									
Labor force, total	960509.25	961757.86	1015936.46	1022871.40	1036757.22	1031997.66	1039719.45	1040542.68	-
School enrolment, secondary (% net)	-	91.22	90.76	90.13	91.60	91.47	91.85	92.46	-
Labour force with tertiary education (% of total)	14.70	16.50	21.00	22.60	23.20	23.70	24.60	25.50	-
Public spending on education, total (% of GDP)	5.00	-	5.68	5.67	5.19	5.20	5.70	-	-

Source: World Development Indicators.

Table B.14. Ukraine

Ukraine	1995	2000	2005	2006	2007	2008	2009	2010	2011
Population (million)	51.51	49.18	47.11	46.79	46.51	46.26	46.05	45.87	45.71
Unemployment, total (% of total labour force)	5.60	11.60	7.20	6.80	6.40	6.40	8.80	-	-
Inflation, consumer prices (annual %)	376.75	28.20	13.57	9.06	12.84	25.23	15.89	9.38	7.96
Poverty headcount ratio at 1.25 USD a day (PPP) (% of population)	1.96	-	0.10	0.14	0.06	0.04	0.06	-	-
Macroeconomic indicators									
GDP (current USD, million)	48213.87	31261.53	86142.02	107753.07	142719.01	179992.41	117227.77	136418.62	165245.01
GDP (constant 2000 USD, million)	34538.26	31261.53	45231.60	48533.51	52367.65	53572.11	45643.44	47560.46	50033.61
GDP per capita (current USD)	935.97	635.71	1828.72	2303.02	3068.61	3891.04	2545.48	2973.98	3615.38
GDP per capita (constant 2000 USD)	670.49	635.71	960.23	1037.31	1125.96	1158.11	991.10	1036.84	1094.68
Gross savings (% of GDP)	22.97	24.36	25.58	23.26	22.13	20.83	15.57	17.45	16.00
Industrial structure (value added)									
Agriculture, value added (% of GDP)	15.40	17.08	10.40	8.68	7.46	7.90	8.26	8.27	9.58
Industry, value added (% of GDP)	42.68	36.32	32.35	36.12	36.73	33.62	29.62	31.34	31.70
Services, etc., value added (% of GDP)	41.92	46.60	57.26	55.20	55.81	58.48	62.13	60.39	58.72
Employment structure (% of total employment)									
Agriculture	22.50	23.40	19.40	17.60	16.70	15.80	-	-	-
Industry	28.00	20.80	24.20	24.20	23.90	23.40	-	-	-
Services	14.00	13.30	56.40	58.20	59.40	60.70	-	-	-
Employment to population ratio 15+, total (%)	57.00	51.00	53.60	54.00	54.50	54.80	53.60	54.10	-
Trade structure									
Exports of goods and services (current USD million)	22695.83	19521.22	44344.45	50239.01	64000.99	84458.35	54364.41	69227.57	88854.40
Exports of goods and services (% of GDP)	47.07	62.44	51.48	46.62	44.84	46.92	46.38	50.75	53.77
Imports of goods and services (current USD million)	24182.36	17948.31	43623.04	53306.93	71877.03	98835.81	56327.65	73071.87	97774.94
Imports of goods and services (% of GDP)	50.16	57.41	50.64	49.47	50.36	54.91	48.05	53.56	59.17
Human resources									
Labor force, total	24816729.93	23408479.70	23190519.44	23235870.80	23226648.22	23240736.06	23214637.09	23221175.92	-
School enrolment, secondary (% net)	-	90.69	82.03	83.80	84.66	85.19	85.16	85.99	84.64
Labour force with tertiary education (% of total)	-	-	45.20	-	-	-	-	-	-
Public spending on education, total (% of GDP)	-	4.17	6.06	6.21	5.28	-	-	-	-

Source: World Development Indicators.

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