

## Demographic Change and Labor Markets

### Introduction

The demographic changes discussed in chapter 1 have potentially important implications for economic growth in Eastern Europe and the former Soviet Union. They could affect the size of the workforce, its productivity, and the financial capital available for investment. This chapter addresses the links between aging and labor supply and the productivity of the labor force; savings and financial markets are the subject of the next chapter.

Demographic trends can have direct implications for labor markets through three primary channels: labor supply, labor productivity, and labor demand (because of shifts in the structure of aggregate demand). This chapter focuses on the first two. The conventional wisdom is that aging societies will face difficult economic and social challenges because of what will inevitably happen in the labor market—that is, output will be reduced because the labor force will shrink as large numbers of workers retire and because older workforces cannot produce at the level of younger ones.

Population aging is seriously affecting other regions, including Japan and Western Europe, but there are reasons to be particularly concerned about the labor market consequences in Eastern Europe

and the former Soviet Union. First, the region already has low levels of labor force participation, with earlier exits from the labor force than other aging regions. In most countries, these low levels have been caused partly by large-scale downsizing associated with restructuring and weak labor markets that offer very limited reemployment prospects. Labor force withdrawals have often been encouraged by early retirement schemes that were intended to make room for younger workers. Second, compared with other graying societies, Eastern European and former Soviet countries have fewer financial resources for mitigating any negative consequences on the labor market of population aging—to the extent that such resources can help.

These are legitimate concerns; however, the story is more complex and may be less demographically determined than conventional wisdom suggests. As chapter 1 showed, not all countries in Eastern Europe and the former Soviet Union are aging—which suggests that migration can play an important role in addressing labor shortages in those countries that are. There is also some scope for increasing labor supply through greater labor force participation. Moreover, negative productivity predictions are not necessarily valid. The evidence is actually somewhat mixed regarding whether workers become less productive as they age.

However, this more positive scenario will only transpire if sound, forward-looking policies are implemented to mitigate the real risks of aging populations. Policy choices affecting migration, labor market regulations and wage-setting practices, retirement and pension rules, and training and education policies will be particularly critical for ensuring increases in labor supply and labor productivity. Efforts to remove discriminatory attitudes toward older workers would also help.

This chapter begins with projections to 2020 of labor forces for Eastern European and former Soviet countries, including alternative scenarios that could increase the labor supply over that in the base case. It then summarizes existing evidence on how workforce age affects labor market outcomes. The following section looks at what is known about how aging affects productivity. The chapter concludes with a discussion of policy options for addressing aging-related concerns in the labor market.

## **Labor Force Projections**

Labor supply is significantly predetermined by demographics, but there is room to maneuver through changes in participation and through migration. This section begins with an analysis of projections

of working-age population to 2020 for the region's countries. The base case projects the working-age population, conventionally defined (age 15 to 64), with current labor force participation rates. Then alternative scenarios modify those rates in various ways to assess how different potential policy levers could increase future labor supply.

### **What the Region's Labor Force Will Look Like in 2020**

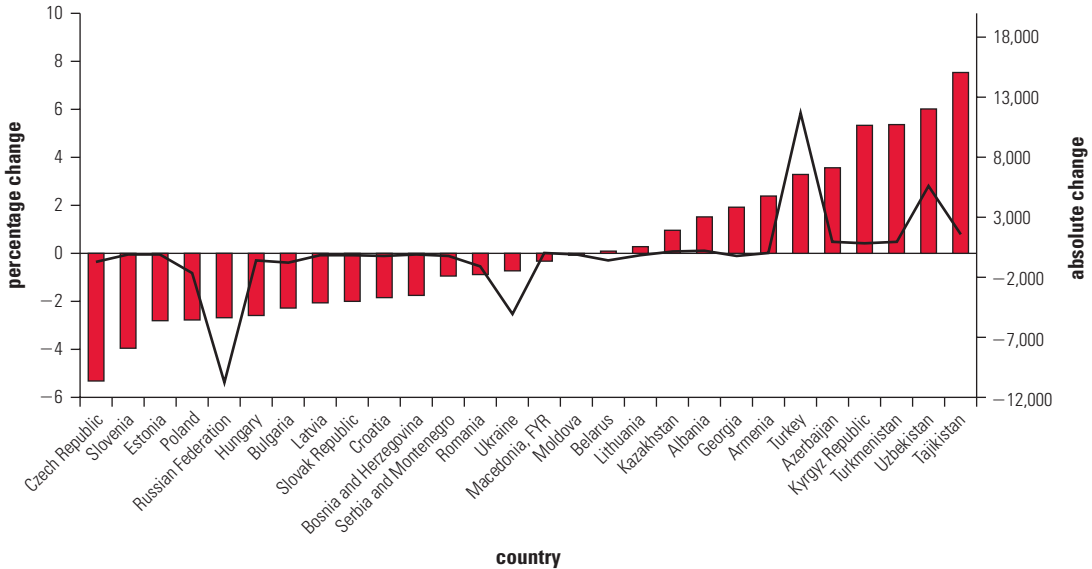
Demographic trends suggest that the region's working-age population will decline over the next 15 years. However, the magnitude of the decline will be modest. According to the United Nations (UN) population projections (2004 revision, medium variant), the region will lose 458,000 working-age people between 2005 and 2020 (United Nations 2005).<sup>1</sup> In relative terms (working-age population as a proportion of population as a whole), this impact is virtually zero, given that the entire population in the region is projected to increase by only 1.2 million through 2020. However, this projection still gives cause for concern, given that labor supply is a key determinant of economic growth. It should be noted that these population projections do not incorporate any major shifts in migration.<sup>2</sup>

As chapter 1 showed, the overall regional demographic profile masks big differences across countries. Trends in the working-age population range from large increases, as in Uzbekistan and Tajikistan, to large losses, in the Russian Federation and Ukraine. The 2005 to 2025 percentage changes in the shares of the working-age population appear in figure 2.1 (for background numbers, see annex 2.C). Obviously, this situation will create incentives for migration within the region, a prospect discussed later.<sup>3</sup>

The trends in the working-age population described in figure 2.1 correspond fairly closely with the country classification introduced in chapter 1 (see table 1.2). In the five "young" countries—the Kyrgyz Republic, Tajikistan, Turkey, Turkmenistan, and Uzbekistan—absolute and relative working-age populations will increase uniformly over the next 15 years. Virtually all the "old" countries will experience declines in both absolute and relative terms. The exception is Georgia, where the working-age population is projected to increase as a share of total population, even though the total population will decline in absolute numbers. Among those countries that are aging, the projections are mixed. Armenia, Bosnia and Herzegovina, the former Yugoslav Republic of Macedonia, and Moldova will have very little change in either their absolute or their relative working-age population. Albania, Azerbaijan, and Kazakhstan will have some growth in their working-age population; however, as was noted in chapter 1, these countries

FIGURE 2.1

### Relative and Absolute Changes in Working-Age Population, 15–64 Years, Eastern European and Former Soviet Countries, 2005–25



Source: World Bank staff estimates based on International Labour Organization Laborsta data.

Note: Bars correspond to percentage point changes in working-age population to total population ratio (left axis) and line corresponds to absolute changes in working-age population (right axis).

are borderline aging countries with features of a younger demographic profile, even though their shares of elderly are above the threshold separating young from old countries.

Although working-age populations are projected to grow in the young countries, increases in the old-age dependency rates will be uniform throughout the region (recall figure 1.19). In most countries, including most young ones, the number of workers retiring each year will increase and eventually exceed the number of new labor market entrants.

However, there is no question that labor supply issues will be an important concern for the old countries—and the magnitude of the challenge will be formidable. When young countries are taken out of the calculations, the potential labor supply in the old countries is projected to shrink by more than 22 million in the next 15 years. The greatest challenges may be faced by old countries where large increases are projected in the old-age dependency rate and a low proportion of the older population currently participates in the labor market. According to those criteria (table 2.1), the largest adjustments will need to be made in Hungary, FYR Macedonia, Poland, and Slovenia followed by Bulgaria, Croatia, Serbia and Montenegro, and Turkey (although the last is a young country).

**TABLE 2.1**  
**Classification of Eastern European and Former Soviet Countries by Old-Age Dependency**  
**Projections and Current Labor Force Participation of Older Workers**

LFP ages 50 to 64 in 2005 <sup>a</sup>	Change in old-age dependency rate 2005–20 <sup>b</sup>		
	Moderate	Large	Very large
High	Armenia, Azerbaijan, Georgia, Kazakhstan, Kyrgyz Republic, Lithuania, <sup>c</sup> Turkmenistan, Uzbekistan	Estonia <sup>c</sup>	Czech Republic <sup>c</sup>
Average	Belarus, Ukraine <sup>c</sup>	Latvia, <sup>c</sup> Romania, <sup>c</sup> Russian Federation	Albania, Bosnia and Herzegovina, <sup>c</sup> Moldova, Slovak Republic
Low	Tajikistan	Bulgaria, <sup>c</sup> Croatia, <sup>c</sup> Serbia and Montenegro, <sup>c</sup> Turkey	Hungary, <sup>c</sup> Macedonia, FYR; Poland; <sup>c</sup> Slovenia <sup>c</sup>

Source: van Ours 2006.

Note: LFP = labor force participation.

a. High:  $\geq 60$  percent; average:  $<60$  percent and  $>50$  percent; and low:  $\leq 50$  percent.

b. Moderate:  $<15$  percent; large:  $\geq 15$  percent and  $<30$  percent; and very large:  $\geq 30$  percent.

c. Old-age dependency rate is equal to or greater than 25 percent.

However, this simple two-way classification tells only part of the story. For example, countries such as Lithuania and Ukraine already have a relatively high old-age dependency rate and so may find it difficult to cope with even a moderate increase in this ratio. In addition, countries that already have high participation rates for older people might be particularly challenged by increases in the high dependency rates they already face (the Czech Republic and Estonia).

Another nuance comes from the fact that some countries will be aging within the working-age population—that is, the population is shifting from younger people (for example, 15 to 39 years) to older people (40 to 64 years). Given that labor force participation tends to decline eventually within the older age group, additional pressures on labor supply can be anticipated in those countries where aging is taking place within the working-age population. As table 2.2 shows, most old countries are projected to see decreases in their 15 to 39 age group and increases in their 40 to 64 age group. In other words, at the same time that a growing share of the population is moving into the elderly category, aging is going on within the working-age population. This scenario is likely to have a further effect on labor supply unless participation rates increase for workers in the later stages of what is conventionally considered “working age.”

Indeed, defining working age as 15 to 64 years old does not easily fit with the experience of Eastern European and former Soviet countries, because of the high rates of early exit from the labor force. These rates are high partly because pension systems in the region have generally allowed for early retirement (discussed in more detail in chapter 4). They are also high because restructuring has typically been a one-way

**TABLE 2.2**  
**Projected Changes in Working-Age Population in Eastern European  
 and Former Soviet Countries, 2005–20**

*thousands*

Absolute change in WAP	Age groups		
	15–64	15–39	40–64
<i>Old countries</i>			
Armenia	27.00	–47.00	73.00
Belarus	–566.08	–651.00	85.00
Bosnia and Herzegovina	–122.00	–225.00	103.00
Bulgaria	–757.00	–680.00	–78.00
Croatia	–205.00	–218.00	13.00
Czech Republic	–733.00	–879.00	147.00
Estonia	–75.00	–75.00	0.30
Georgia	–201.00	–252.00	52.00
Hungary	–575.00	–723.00	148.00
Latvia	–165.00	–160.00	–5.00
Lithuania	–138.80	–188.00	49.00
Macedonia, FYR	8,905.00	–81.00	89.00
Moldova	–111.58	–215.00	104.00
Poland	–1,619.00	–2,247.00	628.00
Romania	–1,098.00	–2,130.00	1,032.00
Russian Federation	–10,752.00	–10,251.00	–501.00
Serbia and Montenegro	–211.00	–384.00	173.00
Slovak Republic	–143.00	–364.00	221.00
Slovenia	–111.00	–154.00	43.00
Ukraine	–5,031.00	–3,988.00	–1,043.00
<i>Young countries</i>			
Albania	239.00	108.00	131.00
Azerbaijan	985.00	160.00	825.00
Kazakhstan	182.00	–462.00	645.00
Kyrgyz Republic	843.00	340.00	503.00
Tajikistan	1,596.00	999.00	597.00
Turkey	11,713.00	2,799.00	8,914.00
Turkmenistan	933.00	365.00	568.00
Uzbekistan	5,630.00	2,516.00	3,114.00

*Source:* World Bank staff calculations based on International Labour Organization Laborsta data.

*Note:* WAP = working-age population.

street out of the labor force for older workers in the region. Using the conventional definition of working-age population, then, understates the future labor supply problem in the region. For example, if the working-age population is defined as those who are 15 to 59 years old, the absolute and relative numbers decrease dramatically compared with projections that use the conventional definition. Instead of a regionwide decrease in the working-age population of 458,000 by 2020, the decline becomes 12.5 million—a drop of 4 percent from the 2005 level. Obviously, labor force participation patterns will be a key factor in determining the ultimate effect of aging.

## Labor Force Participation Projections

In an examination of the future labor supply and the role of participation rates, projections from 2005 to 2020 have been carried out for six countries in the region: the Kyrgyz Republic and Turkey (young countries) and Bulgaria, the Czech Republic, Poland, and Russia (old countries). In addition to projections describing what would happen if participation rates do not change (the base case), alternate scenarios were run to see how changes in participation rates would compensate for the aging-related declines in potential labor supply. The selection of countries shows how participation can affect labor supply for the different types of aging experiences in the region. In any event, the results for the old countries are of greatest interest and show that significant increases in labor supply are possible when participation rates rise. However, to fully compensate for aging in the old countries, gains in participation rates will have to be large. Where these rates are already high, increasing participation is a less viable policy option.

The projection exercise included the following base case and scenarios:

- **Base case.** This scenario leaves participation rates by age and gender unchanged at their 2003 levels. These rates are presented in table 2.3.
- **ILO.** This scenario follows projections of the International Labour Organization (ILO), which are essentially an extrapolation of the most recent estimates of participation rates by age-gender groups within countries. The ILO methodology is described annex 2.A.
- **EU25 convergence.** These projections assume that participation rates for all age-gender groups will move toward those of the

**TABLE 2.3**

### Participation Rates by Age Groups in Projection Countries and the European Union, 2003

percent

Age group	EU25	Kyrgyz Republic	Turkey	Russian Federation	Poland	Bulgaria	Czech Republic
15–19	25	32	28	15	9	7	9
20–24	61	67	51	61	57	51	63
25–29	81	79	62	85	84	74	80
30–34	84	83	63	86	87	79	86
35–39	86	83	63	93	89	84	92
40–44	86	85	61	92	87	84	92
45–49	84	85	54	88	82	80	93
50–54	77	77	45	80	65	73	88
55–59	58	65	37	51	41	49	60
60–64	26	41	30	30	20	17	22

Source: World Bank staff calculations based on International Labour Organization Laborsta data.

current average of the 25 members of the European Union (EU), converging by 2020.

- **2 percent across the board.** This scenario projects a gradual increase in labor force participation rates for all age-gender groups, reaching a level two percentage points higher than they were in 2005.<sup>4</sup>
- **Older workers.** This scenario uses projections of gradually increasing participation rates for workers, age 60 to 64, so that the rates are 10 percent higher in 2020 than in 2005.
- **40 to 59 year olds.** This scenario uses projections of gradually increased participation rates for both men and women in this age group, so that the rates are 6 percent higher in 2020 than in 2005.

The first four exercises are reported for all six countries, but the last two are reported only for the four old countries, because increasing participation rates for older workers and those age 40 to 59 are not as relevant for young countries. (Annex 2.B presents the alternative scenarios for each of these countries.)

Table 2.4 summarizes the projection results for two young countries. As would be expected, in these countries, where the working-age population is increasing, the labor force also increases under all scenarios. In the Kyrgyz Republic, the labor force gains are greatest in the 2-percent-across-the-board scenario. However, in Turkey, the labor force grows by far the most under the EU25 convergence scenario, as a result of the huge differences in Turkey's labor force participation

**TABLE 2.4**  
**Labor Force Projections for Two Young Countries under Different Scenarios, 2005 and 2020**

Country	2005 (thousands)	2020 (thousands)	Change (thousands)	2020 projection as percentage of total population in 2020
<i>Kyrgyz Republic</i>				
WAP 15 to 64 years old	3,285	4,128	843	67.7
Base case projection	2,270 (43.1%) <sup>a</sup>	2,901	631	47.6
ILO projection	2,254	2,865	611	47.0
EU25 convergence projection	2,270	2,808	538	46.1
2-percent-across-the-board projection	2,270	2,984	714	49.0
<i>Turkey</i>				
WAP 15 to 64 years old	47,849	59,561	11,712	68.6
Base case projection	24,591 (33.6%) <sup>a</sup>	30,178	5,587	34.8
ILO projection	26,214	31,639	5,425	36.5
EU25 convergence projection	24,591	40,681	16,090	46.9
2-percent-across-the-board projection	24,591	31,369	6,778	36.2

Source: World Bank staff calculations based on ILO Laborsta data.

Note: WAP = working age population.

a. Base case labor force as a percentage of total population in 2005.



rates compared with those of the European Union, specifically for women.

The projections for the old countries are summarized in table 2.5. The projections of the working-age population show the large losses that these countries will experience in potential labor supply. None of the scenarios for increasing participation rates can make up for this demographic shift. With the exception of the EU25 convergence scenario for Poland, all countries are projected to see declines in their

**TABLE 2.5**  
**Labor Force Projections for Four Old Countries under Different Scenarios, 2005 and 2020**

Country	2005 (thousands)	2020 (thousands)	Change (thousands)	2020 projection as percentage of total population in 2020
<i>Czech Republic</i>				
WAP 15 to 64 years old	7,272	6,539	-733	65.8
Base case projection	5,099 (49.8%) <sup>a</sup>	4,716	-383	47.5
ILO projection	5,142	4,806	-336	48.4
EU25 convergence projection	5,099	4,544	-555	45.8
2-percent-across-the-board projection	5,099	4,847	-252	48.8
40 to 59 year olds increase projection	5,099	4,898	-201	49.3
Older workers increase projection	5,099	4,768	-331	48.0
<i>Poland</i>				
WAP 15 to 64 years old	27,252	25,633	-1,619	68.0
Base case projection	17,432 (45.2%) <sup>a</sup>	16,694	-738	44.3
ILO projection	17,227	16,064	-1,163	42.6
EU25 convergence projection	17,432	17,684	252	46.9
2-percent-across-the-board projection	17,432	17,207	-225	45.6
40 to 59 year old increase projection	17,432	17,323	-109	45.9
Older workers increase projection	17,432	16,964	-468	45.0
<i>Bulgaria</i>				
WAP 15 to 64 years old	5,364	4,607	-757	67.2
Base case projection	3,278 (42.4%) <sup>a</sup>	2,894	-384	42.2
ILO projection	3,081	2,599	-482	37.9
EU25 convergence projection	3,278	3,181	-97	46.4
2-percent-across-the-board projection	3,278	2,986	-292	43.5
40 to 59 year old increase projection	3,278	3,018	-260	44.0
Older workers increase projection	3,278	2,957	-321	43.1
<i>Russian Federation</i>				
WAP 15 to 64 years old	101,599	90,847	-10,752	68.3
Base case projection	71,088 (49.6%) <sup>a</sup>	63,759	-7,329	47.9
ILO projection	72,162	64,697	-7,465	48.6
EU25 convergence projection	71,088	62,122	-8,966	46.7
2-percent-across-the-board projection	71,088	65,576	-5,512	49.3
40 to 59 year old increase projection	71,088	65,962	-5,126	49.6
Older workers increase projection	71,088	65,682	-5,406	49.3

Source: World Bank staff calculations based on ILO Laborsta data.

Note: WAP = working age population.

a. Base case labor force as a percentage of total population in 2005.

labor forces between 2005 and 2020 under all scenarios. However, table 2.5 shows that the magnitude of the decline varies tremendously under different scenarios. The extent to which specific scenarios lead to increases in labor supply largely reflects the projected age composition of the population and existing age-gender participation rates. Generally, the alternative scenarios improve the future situation, compared with the base case and ILO scenarios.

One point that comes through clearly in the projections is that increasing the labor force participation of older workers (age 60 to 64) in old countries is generally less effective than some of the other alternatives. Under the older workers scenario, the labor force improves only very slightly relative to the base case in Bulgaria and the Czech Republic. Although this scenario leads to greater gains in Poland and Russia, it is still a less effective strategy than others tested. So, though addressing the issue of early exit in at least some of the region's countries needs to be part of the response, that action alone is far from sufficient.

Increasing labor force participation in the 40 to 59 age group typically results in greater gains than focusing on the older group. In the Czech Republic and Russia, it leads to the largest labor force in 2020 of all scenarios tested. However, the picture remains dark in Russia, where this scenario still projects a labor force decline of more than 5 million over the next 15 years.

Across-the-board increases of 2 percent in labor force participation rates lead to modest gains in the labor force for the old countries. The EU25 convergence scenario leads to results that differ country by country. These results are heavily affected by how far current participation rates are from EU averages. In Bulgaria and Poland, where current participation rates are well below EU25 averages (recall table 2.3), this scenario is the most favorable one tested. In fact, in Poland, the EU25 convergence scenario leads to a labor force that is larger by 250,000 than it is currently. By contrast, participation rates in the Czech Republic and Russia are already higher than EU25 averages for many age groups, so this scenario leads to much lower gains. Obviously, as has been noted earlier, old countries that already have relatively high participation rates have limited scope for using greater activity rates to compensate for declining working-age populations.

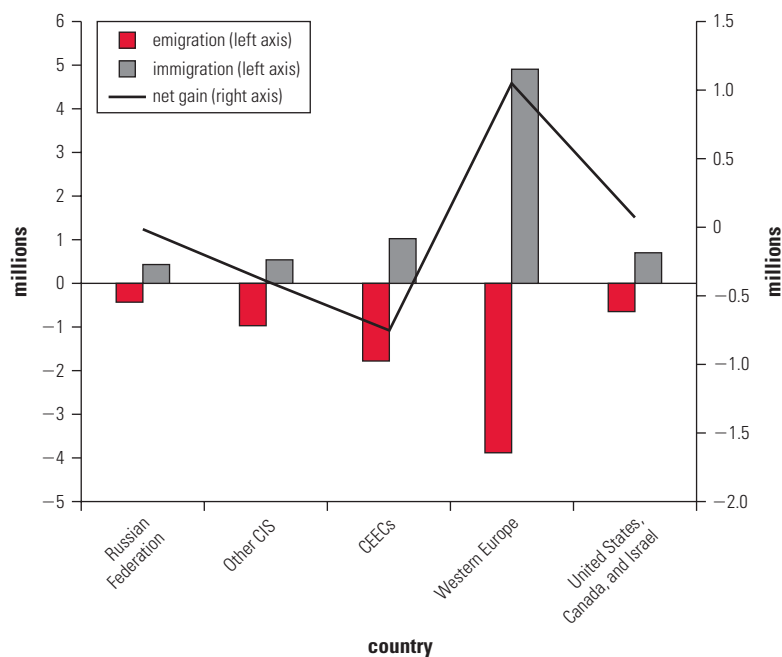
Taken together, the projections show that improving participation rates will make a difference, especially in countries where these rates are relatively low. Broad-based improvements will make more of a difference than relatively large increases in the oldest segment of the working-age population. In the region's old countries, raising rates across the board will be critical, specifically in countries where

participation is not high now. However, in countries that already have relatively high participation rates (at least by European standards), other strategies will be needed to make up for the substantial loss in the working-age population. One response could be to use migration to compensate.

## Migration

Migration is important for countries in the region.<sup>5</sup> Flows are large by international standards, and the region is unique in that it is both a major sender and a major receiver. Very tight controls on migration in the communist era loosened after transition. Migration has been marked by two distinct flows: from countries in Central and Eastern Europe to those in Western Europe, and from poorer countries of the former Soviet Union to richer ones, particularly Kazakhstan and Russia. With some exceptions, young countries that have growing working-age populations already are net senders of migrants, while the reverse is true for most old countries. Figure 2.2 shows recent

**FIGURE 2.2**  
**Immigration and Emigration Flows for Eastern European and Former Soviet Subregions, Western Europe, North America, and Israel, 2000–03**



Source: Mansoor and Quillin 2006.

Note: CEEC = Central and Eastern European Country; CIS = Commonwealth of Independent States.

flows of immigration and emigration for subregions in Eastern Europe and the former Soviet Union, as well as for Western Europe and North America.

Migration patterns tend to reflect both push and pull factors. Prospects of higher wages, the potential for improved standards of living, and better opportunities for professional and personal development are tested determinants of migration, as is geographical proximity. Current and projected differences in human capital returns and quality of life suggest that, within the region, the new EU members are likely to experience continuing inflows of workers—most likely from former Soviet countries but also from countries in Africa and Asia. Given its size and young demographic profile, Turkey remains a potential source of labor for the European Union. With their growing populations, southern former Soviet countries are likely to see continued flows into the shrinking and aging northern former Soviet countries. Certainly, the eventual magnitude of all these flows will also be affected by economic prospects in the potential sending countries. Political factors can also play a role.

Remittances are an important source of external financing for many countries in the region—the largest source for some of the poorest countries. In Moldova, remittances constitute more than 25 percent of gross domestic product (GDP). It is followed by Bosnia and Herzegovina and Albania (both over 20 percent), Tajikistan and Armenia (10 to 15 percent), and the Kyrgyz Republic and Georgia (5 to 10 percent). The main sources are the European Union and the resource-rich countries of Eastern Europe and the former Soviet Union, accounting for 75 percent and 11 percent, respectively, of all remittances. Remittances also represent an important source of foreign exchange in a number of countries and, thus, can improve creditworthiness and access to international capital markets. Remittances have financed more than 70 percent of the deficit in Albania since 1995, 75 percent of the deficit in Moldova in 2002 and 2003, and virtually all the deficits in Tajikistan. In many high-migration countries (for example, Albania, Bosnia and Herzegovina, Moldova, Montenegro, Serbia, and Tajikistan), unrecorded remittances also play an important role.

A projection exercise was carried out that analyzes how migration might fit into the broader labor supply picture. The exercise looked at how much migration would be needed to keep the ratio of labor force to total population constant over time, compensating for the declines in potential labor supply because of demographic trends. This exercise was undertaken for Bulgaria, the Czech Republic, Poland, and Russia through 2020 (table 2.6). The first step was to

**TABLE 2.6**  
**Results of Projection Exercise to Estimate Net Migration Needs**  
**by 2020 in Four Old Countries**

thousands

Estimation	Russian Federation	Poland	Bulgaria	Czech Republic
WAP needed in 2020 to keep LF/ Pop constant	93,706	26,422	4,726	7,030
Number of migrants needed:				
Using ILO projection	2,859	789	119	491
Using increase in LFPR for 40 to 64 age group	2,640	-253	-507	-291

Source: World Bank staff calculations based on ILO Laborsta data.

Note: WAP = working age population; LF/Pop = ratio of labor force to population; LFPR = labor force participation rate.

calculate the working-age population in 2020 that would be necessary to keep the ratio constant over time, leaving participation rates by age and gender unchanged from their 2003 levels. The number of migrants needed is expressed as the difference between this working-age population and the ILO projections for 2020. The results indicate that Russia, Poland, the Czech Republic, and, to a lesser extent, Bulgaria would need significant net in-migration to maintain the current ratios of labor force to population. Nearly 3 million migrants would be needed in Russia.

A similar exercise was carried out using two other projection scenarios—the 40-to-59 age increase and the older worker (age 60 to 64) increase—because they were generally the best scenarios in the earlier projection exercise. Once participation rates are increased by 6 percent for those age 40 to 59 and by 10 percent for those age 60 to 64, Russia turns out to be the only country in need of additional migrants (more than 2.6 million), until 2020. The higher participation rates would be more than sufficient for maintaining ratios of labor force to population in the other countries.

The uneven aging patterns across countries in the region mean that there is scope for intraregional migration to play an important role in helping the region adjust to the predicted demographic trends. The flow of migrants—primarily from younger countries, especially in Central Asia, to Central and Eastern Europe and to older former Soviet countries—could be an important supply of labor in the receiving countries, as well as a key income source for the sending countries.<sup>6</sup> Projections suggest that migration could play an especially necessary role in countries where there is only limited scope for increasing the rates of labor force participation.

## Implications of an Aging Labor Force for Labor Market Outcomes

This section deals with how labor market outcomes change with age. New analysis uses household survey data from four countries, Albania and Turkey (both with large youth population shares), and Bulgaria and Russia (both old).<sup>7</sup> The analysis here focuses on how labor market outcomes change as individuals age, not on what happens as populations age. It is not clear how relationships observed at the individual level will change as national demographic profiles shift to older age categories. That will depend on such factors as the substitutability of older workers for younger ones, societal and employer attitudes about the employability of older workers, and incentives created by social security and labor market rules and institutions.

### Labor Force Participation

Labor force participation patterns for older workers differ significantly across countries. In the Organisation for Economic Co-operation and Development (OECD), workers in some countries continue to participate at very high rates into their 60s. For example, the participation rate for men age 60 to 64 is greater than 60 percent in Iceland, Japan, New Zealand, Switzerland, and Sweden; for women in the same age group, rates are lower but still greater than 50 percent in Iceland, Sweden, and Norway. From 1994 to 2004, participation rates for older people rose in almost all OECD countries, largely because of increases in the labor force activity of women in these age groups.

Labor force participation by older people in countries in the region differs from participation patterns in nontransition OECD countries in various ways (table 2.7). First, in Eastern European and former Soviet countries, participation rates for age 50 to 64 are lower for both men and women. This difference really emerges at age 60 for men and age 55 for women. Second, while women's participation rates in the OECD have increased over the past quarter century, they have declined in Eastern Europe and the former Soviet Union. Third, divergence (as measured by the standard deviation of national participation rates) has increased in the countries of Eastern Europe and the former Soviet Union but not in those of the OECD.

The gap between these two groups of countries in the participation of older workers is partly due to differences in the average age on exit from the labor force. Although entry patterns are very similar, workers in the Eastern European and former Soviet countries for which data are available exit the labor force on average almost

**TABLE 2.7**  
**Means (Standard Deviations) of Participation Rates for People 50 Years and Older, Eastern European and Former Soviet and Non–Eastern European and Former Soviet OECD Countries, 1980 and 2003**

Grouping	Females		Males	
	1980	2003	1980	2003
Eastern European and Former Soviet Countries				
50–54 years	70.3 (14.3)	66.4 (15.0)	89.9 (36.6)	82.8 (6.4)
55–59 years	35.8 (10.3)	38.6 (14.6)	79.4 (7.8)	70.8 (12.7)
60–64 years	20.2 (9.3)	20.2 (12.2)	43.6 (14.5)	38.3 (15.3)
65 years and older	7.8 (5.2)	9.4 (9.1)	19.7 (10.7)	16.8 (12.3)
Non–Eastern European and Former Soviet OECD Countries				
50–54 years	50.6 (18.9)	69.7 (13.3)	90.9 (4.2)	88.6 (3.5)
55–59 years	40.5 (18.0)	54.7 (17.8)	80.6 (9.9)	75.7 (10.8)
60–64 years	24.7 (16.0)	29.4 (18.4)	55.0 (19.2)	47.3 (19.4)
65 years and older	5.6 (4.5)	4.9 (4.3)	16.1 (10.9)	11.2 (8.2)

Source: van Ours 2006, based on ILO Key Indicators of the Labor Market database.

Note: The table includes 28 Eastern European and Former Soviet countries and 23 non–Eastern European and Former Soviet OECD countries.

**TABLE 2.8**  
**Mean Age of Labor Force Entry and Exit in Selected Eastern European and Former Soviet Countries and Non–Eastern European and Former Soviet OECD Countries, 2000**

years

Country	Females			Males		
	Age entry	Age exit	Duration	Age entry	Age exit	Duration
Average Eastern European and Former Soviet <sup>a</sup>	21	55.3	34.4	19.5	56.9	37.4
Average OECD	21.5	60.2	38.7	19.7	60.6	40.9

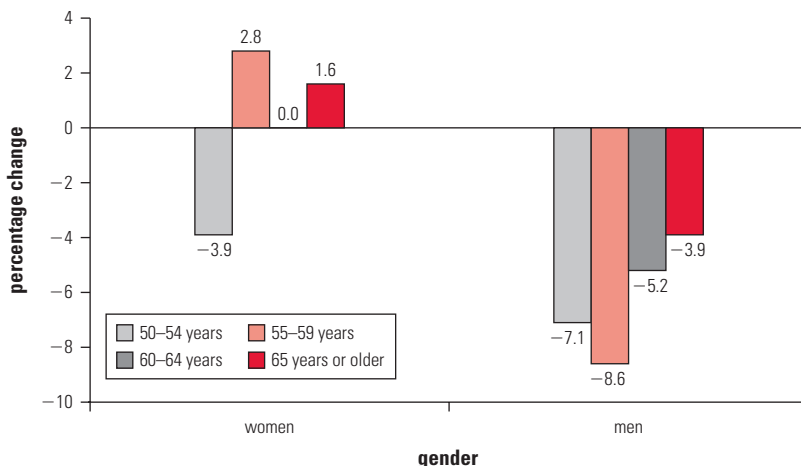
Source: van Ours 2006, based on OECD data.

a. Eastern European and Former Soviet countries are the Czech Republic, Hungary, Poland, the Slovak Republic, and Turkey.

four years earlier in the case of men and five years earlier in the case of women (table 2.8).<sup>8</sup> The result is that the duration of working life tends to be shorter in the region. The early exit patterns are driven in part by the effects of restructuring; laid-off workers often withdraw from the labor force because of a scarcity of reemployment prospects.

Detailed data show that the participation rates of older people vary considerably throughout the region (annex tables 2.D.1 and 2.D.2). For women, differences are evident even in the 50-to-54 age category: participation rates are above 80 percent in seven countries—primarily new EU members but including Belarus and Kazakhstan—but below 50 percent in four countries. Variation increases in older age groups; for women in the 60-to-64 age group, the extremes are 4 percent in the Slovak Republic and 65 percent in Georgia. For men, major

**FIGURE 2.3**  
**Change in Male and Female Labor Force Participation Rates for**  
**Older-Age Categories, Eastern European and Former Soviet Countries,**  
**1980–2003**



Source: van Ours 2006, based on ILO Key Indicators of the Labor Market database.

differences do not emerge until age 55 to 59, with the highest participation rate in Armenia (94 percent) and the lowest in Slovenia (48 percent). In the 60 to 64 age category, in some countries of the region—mainly middle-income ones—men’s participation rates are less than 25 percent, while in others in Central Asia and the Caucasus, those rates are greater than 50 percent.<sup>9</sup>

Across the region, participation rates for older men have fallen while rates for older women have remained more stable. Declines have been particularly steep for men under age 60; at one time, their participation rates were quite high (figure 2.3). Much of the decline has occurred in the posttransition period. The largest decreases have generally, but not always, occurred in countries such as Hungary and Poland, where the restructuring process has progressed the most (see annex table 2.D.3 for country-specific data). Georgia is the only country in the region where participation rates for older males have actually increased since 1980.

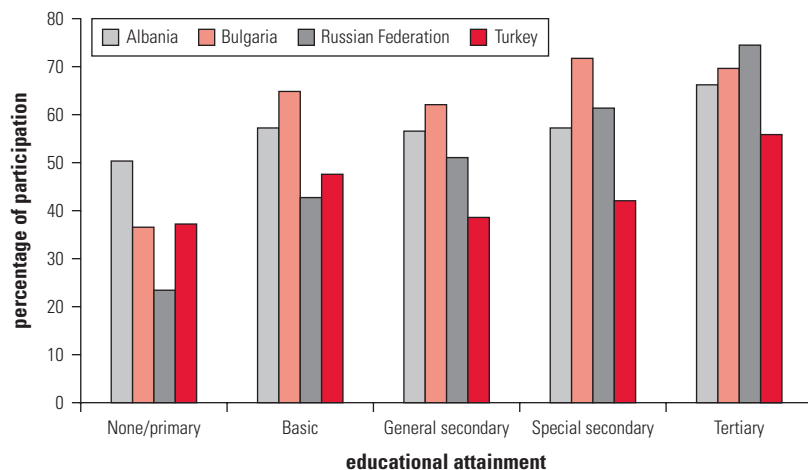
The participation of older people in the labor market varies according to individual characteristics, with education being a particularly important factor. In the four countries for which detailed analysis has been carried out, participation rates for well-educated people in the 50 to 64 age group are much higher than for the poorly educated (figure 2.4). These education-related differentials are particularly striking in Bulgaria and Russia.

In the final analysis, when all individual characteristics are taken into account, age still has a strong pure effect on labor force



FIGURE 2.4

### Participation Rates of Labor Force 50 to 64 Years by Educational Attainment in Selected Eastern European and Former Soviet Countries, Various Years

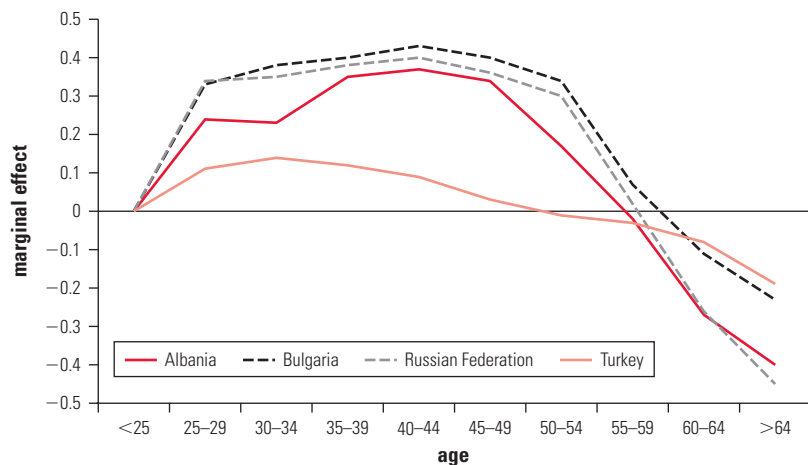


Source: World Bank staff calculations based on household survey data.

Note: See note 7 for the survey year of each country.

FIGURE 2.5

### Marginal Effect of Age on Labor Force Participation of Females in Selected Eastern European and Former Soviet Countries, Various Years

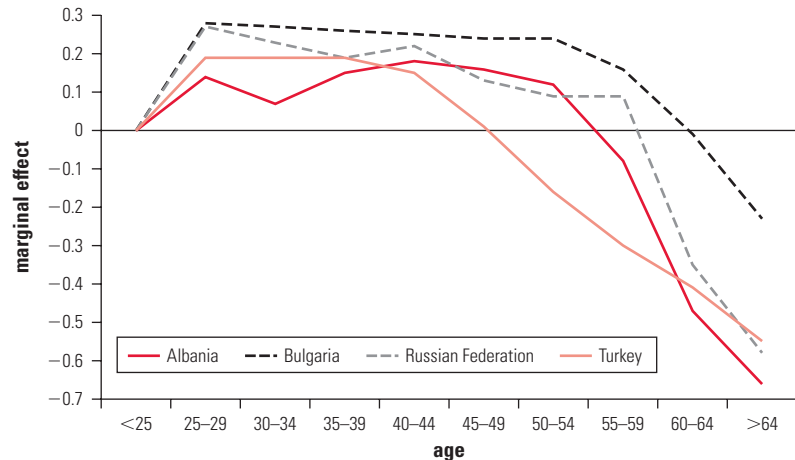


Source: van Ours 2006, based on World Bank staff calculations.

Note: See note 7 for the survey year of each country.

participation. To isolate the specific effects of age, van Ours (2006) estimated probit functions to explain labor force participation relative to a set of potential determinants for the four countries where we have undertaken micro-level analysis.<sup>10</sup> The results are shown in figures 2.5 and 2.6, which describe the marginal effects of age on

**FIGURE 2.6**  
**Marginal Effect of Age on Labor Force Participation of Males in Selected Eastern European and Former Soviet Countries, Various Years**



Source: van Ours 2006, based on World Bank staff calculations.

Note: See note 7 for the survey year of each country.

participation by men and women. For women in Albania, Bulgaria, and Russia, the positive effect of age on participation continues to increase until the mid-40s, when it begins to turn down. In all three countries, the marginal effect of age becomes negative by the mid- to late 50s. Turkey's pattern is quite different: age has far less effect in the years between age 25 and age 50, when it turns negative. For men in all countries, the marginal positive effect of age is never as large as it is in the case of women, but the point at which its effect becomes negative tends to happen a bit later (figure 2.6).

### Employment, Unemployment, and Wages

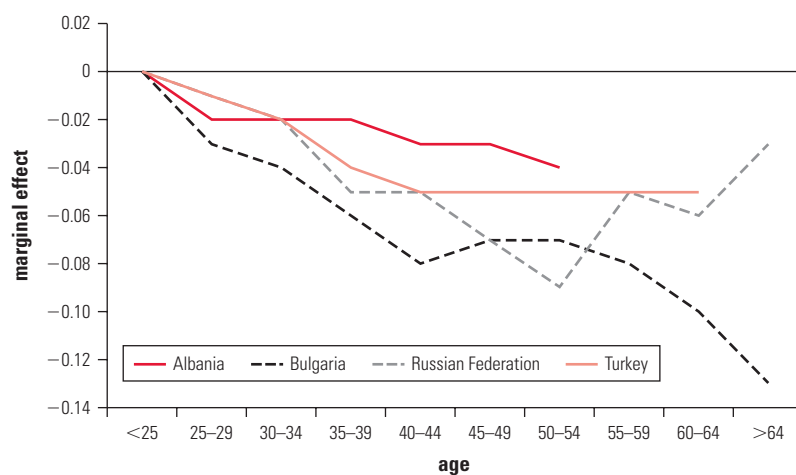
Employment rates by age largely follow the participation rate patterns described earlier. In fact, for older workers, participation and employment rates tend to converge, because older workers often leave the labor force completely if they do not have a job. As a result, unemployment rates are often lower for older workers than for prime-age workers. Because jobless older workers often do not search or stop searching for new jobs, many are not counted in the labor force and thus are not classified as unemployed. Table 2.9 shows recent unemployment rates for women and men in 10 countries in the region, comparing rates for the 25 to 54 and the 55 and over age groups. In all cases (except for women in Lithuania), the rates for the older group are lower than for the younger group. Figures 2.7 and 2.8 isolate the effect of age on unemployment, using the same methodology

**TABLE 2.9**  
**Unemployment Rates by Age in Selected Eastern European and Former Soviet Countries**

Country	Females		Males	
	25–54 years	55 years and over	25–54 years	55 years and over
Bulgaria (2000)	14.7	10.8	14.6	12.6
Czech Republic (2003)	9.3	5.2	5.0	4.0
Estonia (2003)	8.9	5.0	9.7	6.8
Hungary (2000)	5.3	1.6	6.3	3.8
Latvia (2003)	9.8	6.7	10.0	7.8
Lithuania (2003)	10.6	11.6	11.8	10.0
Poland (2003)	18.3	8.1	16.5	9.8
Romania (2003)	5.8	0.9	6.7	2.5
Slovak Republic (2003)	15.7	9.7	14.4	14.2
Turkey (2003)	8.1	0.9	8.9	3.7

Source: van Ours 2006, based on ILO Key Indicators of the Labor Market database.

**FIGURE 2.7**  
**Marginal Effect of Age on Unemployment of Females in Selected Eastern European and Former Soviet Countries, Various Years**



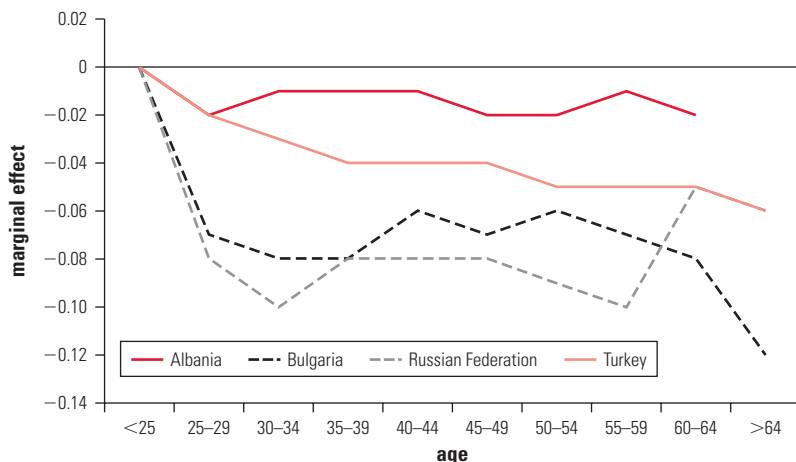
Source: van Ours 2006, based on World Bank staff calculations.

Note: See note 7 for the survey year of each country.

underlying the participation rate charts for the four countries where detailed analysis has been carried out. These profiles show that, when other factors are controlled for, the marginal effect of age is to increasingly reduce unemployment. Russia is a partial exception: although age reduces the probability of unemployment, its effect weakens once workers are older than age 50.

The unemployment that exists among older workers is often long-term unemployment that ends in withdrawal from the labor force. This situation reflects the difficulties that older workers face in finding

**FIGURE 2.8**  
**Marginal Effect of Age on Unemployment of Males in Selected Eastern European and Former Soviet Countries, Various Years**



Source: van Ours 2006, based on World Bank staff calculations.

Note: See note 7 for the survey year of each country.

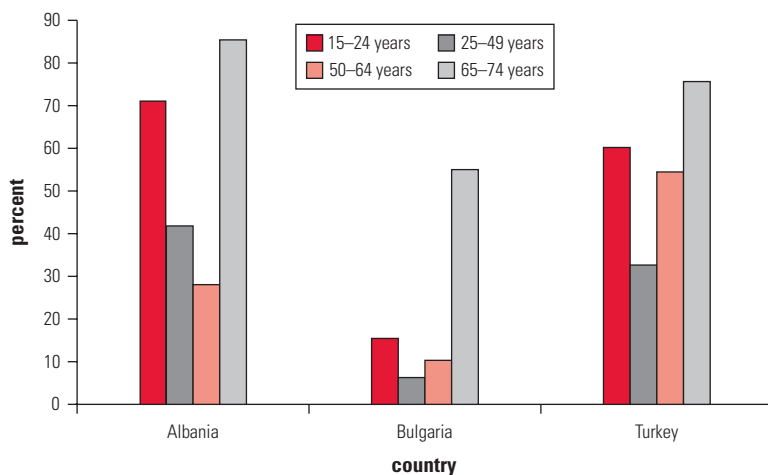
new work after losing a job. Although many firms employ older workers, few hire them. Their experience and skills are often seen as a firm-specific advantage; if they get separated for one reason or another, older workers are often viewed as expensive and inflexible in terms of adjusting to technological and organizational change.<sup>11</sup> Moreover, age-earnings profiles that are backloaded to motivate greater lifetime commitment to the firm can lead older workers to set reservation wages that may be too high given their productivity, especially in new settings.

Many older workers who are employed work in the informal sector (figure 2.9). The incidence of informality changes over the life cycle and can be described by a convex function in most countries. In Albania, Bulgaria, and Turkey, informal employment—defined as wage work without social security coverage—declines as workers move into prime age and then increases dramatically for workers older than 50. This situation reflects two factors: (a) the difficulties that older workers face in getting good jobs, for the reasons discussed earlier, and (b) the possibilities of supplementing (low) pension benefits with income from unregistered employment.

Workers have reduced hours as they get older, and part-time employment becomes more prevalent. Data for the four focus countries included in this section show the consistent pattern of a downward slope in average hours by age, although the turning point differs by gender and by country. Figures 2.10 and 2.11 illustrate the marginal effect of age for women and men, respectively.

FIGURE 2.9

### Informal Share of Wage Employment in Selected Eastern European and Former Soviet Countries, Various Years

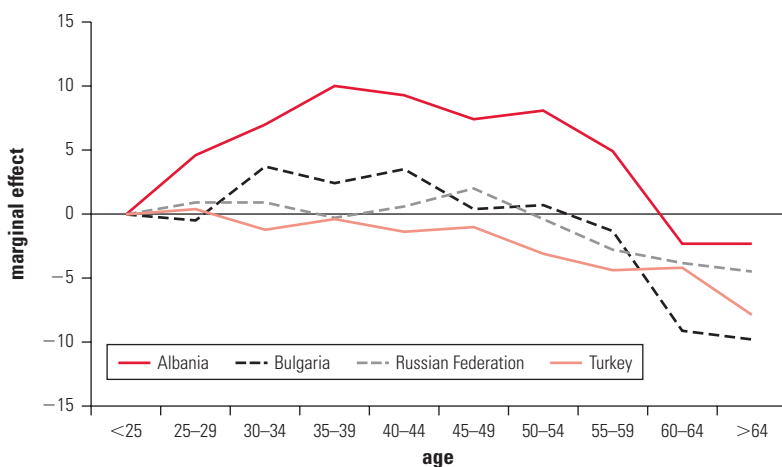


Source: World Bank staff calculations, based on household survey data.

Note: See note 7 for the survey year of each country.

FIGURE 2.10

### Marginal Effect of Age on Weekly Hours of Employment for Females in Selected Eastern European and Former Soviet Countries, Various Years

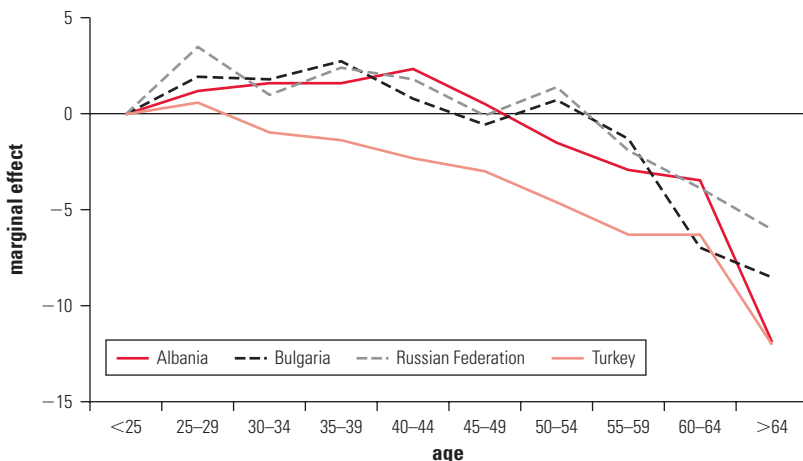


Source: van Ours 2006, based on World Bank staff calculations.

Note: See note 7 for the survey year of each country.

Wages tend to increase with age until the late stages of working life. Figures 2.12 and 2.13 show the marginal effects of age on wages by gender, with other wage determinants controlled for, in the four focus countries. These patterns are consistent with the frequently observed upward-sloping age-earnings profiles. They are attributed

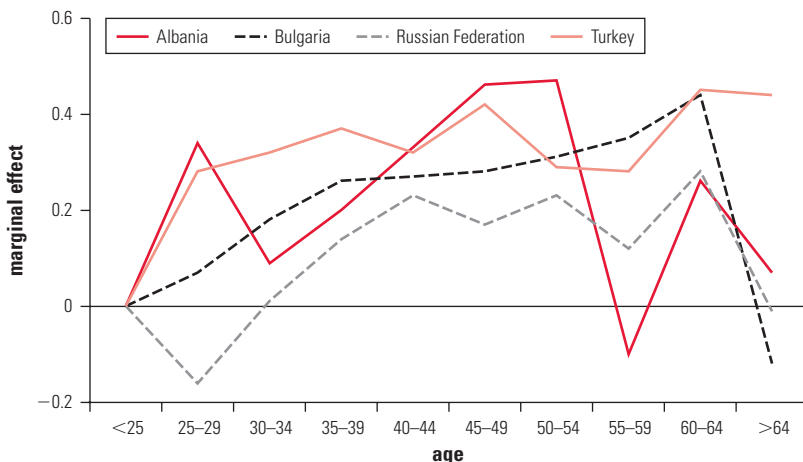
**FIGURE 2.11**  
**Marginal Effect of Age on Weekly Hours of Employment for Males in Selected Eastern European and Former Soviet Countries, Various Years**



Source: van Ours 2006, based on World Bank staff calculations.

Note: See note 7 for the survey year of each country.

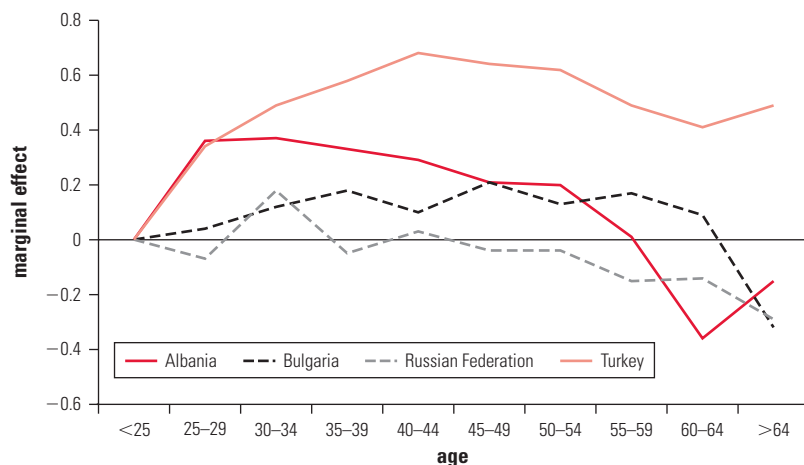
**FIGURE 2.12**  
**Marginal Effect of Age on Wages for Females in Selected Eastern European and Former Soviet Countries, Various Years**



Source: van Ours 2006, based on World Bank staff calculations.

Note: See note 7 for the survey year of each country.

primarily to the long-term relationships between workers and firms noted earlier, in which workers are initially underpaid (below the value of their marginal productivity) but are eventually overpaid. It also reflects selective attrition from the labor force, as less productive workers exit earlier.

**FIGURE 2.13****Marginal Effect of Age on Wages for Males in Selected Eastern European and Former Soviet Countries, Various Years**

Source: van Ours 2006, based on World Bank staff calculations.

Note: See note 7 for the survey year of each country.

## Aging and Labor Productivity

The conventional view of the age-productivity profile is that it follows an inverted U shape, rising as workers enter prime age and then declining as they approach retirement. However, while the research might often point in that direction, studies have raised questions about this relationship. The evidence seems to be occupationally specific, and the ongoing shift to services might be weakening any systematic relationship between age and individual productivity. Furthermore, the few studies on the aggregate productivity effects of societal aging do not find strong effects. It is also important to recognize that past trends do not necessarily have predictive power for the future. As the labor supply ages, we can expect that firms and workers will adapt to the new reality. Firms will have little choice but to find effective ways to employ older workers and to invest in them, and as demand for their services increases, older people will have incentives to supply their labor and to invest in their human capital because returns will be higher. However, these sorts of adjustments will be more likely to occur if they are enabled by appropriate labor market and education policies. Finally, in the Eastern European and former Soviet countries, there may be some reason to expect that improvements in individual productivity will occur because of more relevant and better education after the transition.

## How Productivity Changes as Workers Age

The concave relationship between age and individual productivity is not as indisputable as some studies claim. A number of gerontological and psychological studies present direct measures of job performance and conclude that there is no significant overall difference in the job performance of older and younger workers (OECD 1998). Most studies have found that variations within an age group far exceed the average differences between age groups. In fact, it is difficult to generalize about the relationship between aging and productivity, because skill requirements and individual capacities are so diverse (boxes 2.1 and 2.2). The exact relationship depends very much on the nature of the work—the education level, the complexity of the work, and physical demands. Productivity declines at older ages seem to be particularly strong for work tasks where problem solving, learning, and speed are needed, but in jobs where experience and verbal abilities are important, older individuals maintain a relatively high productivity level.

Ongoing economic changes raise additional considerations. Technological and organizational innovation and the economic shift from manufacturing to services are causing job requirements to change. As a result, the weight of the different factors determining individual productivity—physical abilities, mental abilities, education, and job experience—are changing as well. How these changes will affect the relative productivity of different age groups is uncertain. On the one hand, older workers might be better off because physical abilities are becoming less important. On the other hand, continuously changing types of work can mean that being able to absorb new information is becoming increasingly important relative to having long experience.

Innovative management practices, tailored to maximize the contributions of a diverse workforce, will be important in determining the future productivity of older employees. A critical element will be how well training practices are adapted to help older workers realize their potential. Even if aging typically does not reduce the ability of workers to perform familiar job tasks, a declining ability to adapt to changing skill requirements will tend to lower their productive contribution over time. A number of studies suggest that training for older workers may need to take place at a slower pace, be more closely tied to the work context, and involve self-directed learning rather than formal classroom training (OECD 2006).

The limited evidence available suggests that older workers who have adequate educational attainment and a history of participation in on-the-job training are good training prospects. Targeted training



**BOX 2.1****How Does Productivity Change with Age for Different Tasks?**

Direct measures of individual productivity are scarce; however, researchers have found productivity relatively easy to establish in sports and in some specific occupations (typists, economists, painters). Some examples are given below:

- Analyses of the relationship between age and productivity for typists (age 19 to 72) find that older typists were not slower in overall speed of typing. Older typists had a lower direct speed of typing but used more efficient work strategies (Salthouse 1984).
- The productivity of economists—as measured by publications in leading journals—seems to decline with age. Nevertheless, it is not possible to distinguish between natural declines in capacity or reduced incentives to produce (Oster and Hamermesh 1998).
- The relationship between the age of modern painters and the value of their paintings has also been investigated. Painters born between 1900 and 1920 had their peak around age 50, whereas those born between 1921 and 1940 peaked around age 30. The shift in the age-productivity profile, sharply reducing the value of experience, was due to a sudden increase in the demand for contemporary American art during the 1950s (Galenson and Weinberg 2000).
- In sports, although physical deterioration rates increase at higher ages, productivity losses are small for a wide age range. Studies of U.S. data on male running records by age find that the physical deterioration rate is rather low. For example, between age 35 and age 55, the time needed to run the half-marathon increases annually by 0.8 percent, whereas between age 55 and age 65, the annual increase is 1.1 percent. Data on swimming and chess results have been studied to measure aging effects on physical activities and on cognitive activities, respectively. In the 40 to 70 age range annual deterioration rates for sprints—100-, 200-, and 400-meter track—are 0.6 percent and for longer distances, the rates are 0.8 percent. Deterioration rates for men's 100-meter swim are 0.5 percent, and for chess—in terms of rating by the World Chess Federation—the annual deterioration rate is only 0.2 percent (Fair 1994, 2004).

As these differences in the findings of occupation-specific studies suggest, it is difficult to establish unequivocal and generalizable conclusions.

programs seem effective in softening or halting any age-related decline in the ability to learn new skills. Research has demonstrated that such programs can stabilize or even reverse age-specific declines in inductive reasoning and spatial orientation. Furthermore, exercising speed, reasoning, and memory abilities can enhance the functional level of those who undergo training relative to those who do not. As the labor supply ages, firms and workers will need to adapt to the new reality. Until now, all evidence has indicated that access to training decreases

**BOX 2.2****What Do Wage Trends Tell Us about How Productivity Changes with Age?**

To the extent that earnings reflect productivity, age-earnings profiles can provide some insights into age-productivity effects. Unfortunately, this area is difficult to investigate empirically because of the lack of precise measures of individual productivity as well as wage determinants that are unrelated to productivity.

Empirical research shows mixed results regarding the relationship between earnings, productivity, and aging. Some studies find that, for prime-age workers and older workers, productivity and earnings rise at the same rate over the life cycle. This evidence is consistent with economic models in which wages rise in accordance with productivity. However, other studies using matched worker-firm data find opposite results—that is, that older workers are relatively overpaid. Although the age profile of wages has a concave pattern, the age profile of productivity stops rising (and even decreases) after some experience level. A third line of evidence suggests that, even if there is such divergence, the effects are small, and aging of the labor force will not lead to a dramatic increase in unit labor costs.

Ultimately, using age-earnings profiles to assess the effects of aging on productivity is of limited use because many factors other than productivity come into play in determining how firms pay workers over their working lives. In the common lifetime pattern, firms pay younger workers below their productivity and then pay them above their productivity at older ages. They do so both to protect against initial uncertainty about worker quality and to strengthen lifetime work effort. Furthermore, this profile can encourage loyalty because younger workers know that their lifetime compensation from the firm is backloaded.

substantially through one's working life. In the future, firms will have no choice but to expand their training programs to invest more in older employees and to reorient the programs to meet the needs of those workers.

It needs to be acknowledged that employers do seem to have strong opinions about the productivity of older workers even if the objective relationship is not so clear. Remery and others (2003) find that the higher the share of older workers in the firm, the less favorably employers actually consider older workers. About 40 percent of the employers surveyed indicated that they do not consider recruiting older workers, even when facing staff shortages. However, any such negative views held by employers in aging countries in the region will have to be moderated because of the demographic reality.

Several studies have looked at how individual productivity changes with age; very few have investigated the effects of societal aging on aggregate labor productivity. This may be an important question because any conclusions about individual effects cannot be automatically presumed to apply collectively. In fact, even if older workers do have lower productivity, the aggregate productivity impact will also be affected by what happens to proportions of young and prime-age workers. In many aging countries, the share of prime-age (most productive) workers will remain relatively constant, and changes will occur in the shares of young and old workers, with little impact on overall productivity. Indeed, the limited research on this issue concludes that the impact of changing age distributions on productivity is not very significant (Blanchet 1993; Börsch-Supan 2003; Klevmarken 1993).

An important factor in determining the aggregate productivity effects of an aging population will be the substitutability of workers of different ages. Until now, especially in Eastern Europe and the former Soviet Union, this debate has largely centered on the idea that the old should make room for the young. An important new question, then, is whether older workers induced to retire later are good substitutes for younger workers. There are reasons to be concerned about this substitutability. One is structural: older workers have been concentrated in industrial occupations and in big firms, whereas new jobs tend to be concentrated in service sector occupations and smaller firms. However, it is difficult to draw firm conclusions because not much is known about labor substitutability across age groups.<sup>12</sup>

### **Human Capital Accumulation after the Transition: Does It Matter for Productivity?**

One issue unique to the region is whether any productivity concerns raised by aging might be mitigated because of potential productivity gains embodied in younger workers who accumulated their human capital after the transition. Workers who received their education and early labor force experience in a planned economy will largely have moved out of the labor force by 2020. Labor forces throughout the region then will be composed only of workers who accumulated their human capital after the transition. This situation raises the question of whether this shift will provide a productivity boost in itself, because of the possibly lower returns to pretransition human capital in a market economy.

There is evidence of increasing returns to education in transition countries. Under central planning, returns to schooling were traditionally low, and differences in educational attainment had limited impact on individual variations in earnings. Labor market liberalization, decentralized wage setting, and the transition to a market economy in general should thus lead to an increase in wage differentials. The empirical literature on returns to schooling in transition countries has focused mostly on Bulgaria, the Czech Republic, Hungary, Poland, and Russia (Flabbi, Paternostro, and Tiongson 2007; Kertesi and Kollo 2001; Yemtsov, Cnoblach, and Mete 2006). Indeed, both country-specific and cross-country studies find that returns to education have increased, albeit slightly, since the transition.

In transition countries, an additional question is whether the timing of human capital accumulation matters. To answer this question, we looked at different cohorts to compare the returns to socialist and posttransition skills and experience. We compared two cohorts: those individuals born between 1955 and 1965, who would have completed their education or started working before the transition, and those born between 1975–1980, who would have either completed their studies or entered the labor market after the transition. The hypothesis that we tested is that skills and experience acquired under the planned-economy system (by the older cohort) are less appropriate and less well rewarded in the new market environment than human capital acquired during and after the transition (by the young cohort). To test this hypothesis, we calculated returns to education and experience for different cohorts in Belarus, Bulgaria, Georgia, Hungary, Moldova, Poland, Romania, and Russia (box 2.3 describes the methodology).

Estimation results show that rates of return to education are higher for the younger cohort in five of the countries and lower in three. In most cases, differences are relatively small (figure 2.14). However, certain methodological challenges arise in properly testing these cohort effects. Overall, they likely lead to an underestimation of the true returns to education for young workers and, accordingly, of the premium for posttransition human capital accumulation. Most obviously, not enough time has passed since the transition to fully capture returns for the posttransition group beyond their first years in the labor market. Young people often start their careers in low-wage sectors; many presumably move into higher-wage sectors as they accumulate experience. We have already seen that informal employment—defined as wage workers who lack social security coverage—declines in Albania, Bulgaria, and Turkey as workers move into prime age.<sup>13</sup> Institutional factors also affect the determination of wages by seniority and could confound the analysis.

**BOX 2.3****Computing Returns to Education**

The analysis focuses on Belarus, Bulgaria, Georgia, Hungary, Moldova, Poland, Romania, and Russia, and the data are drawn from household budget surveys (or variations on them, such as integrated surveys or living standards measurement surveys). These surveys provide nationally representative coverage of the populations and collect comprehensive information on earnings, activities, and demographic characteristics of household members.

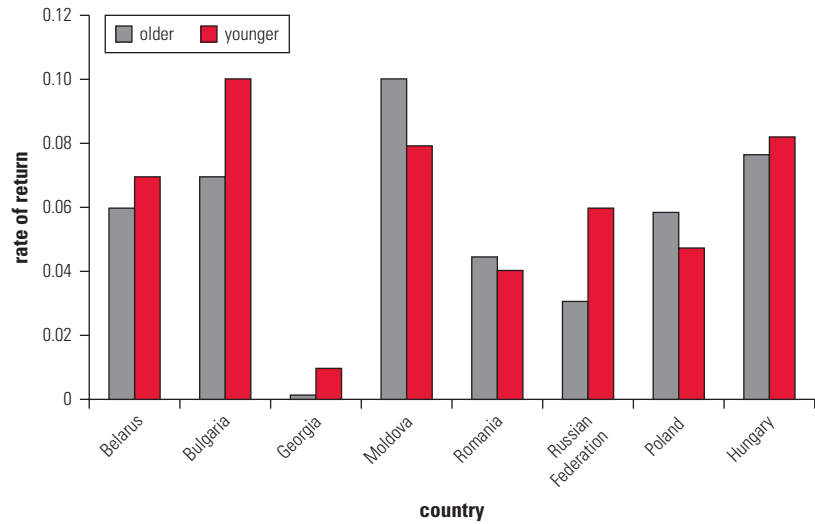
Urban workers were divided into two cohorts. One cohort was composed of individuals born between 1955 and 1965, who therefore attained their entire education before 1990. The other cohort comprised individuals born between 1975 and 1980, who, having obtained some of their education before the transition, acquired most of their work experience under the current system.

The dependent variable was hourly wage. Independent variables were education, experience and its square, gender, marital status, ethnicity, a public sector dummy, years of education, a private sector dummy, month of the interview, and region dummies. Specifically, education levels were constructed using information available on the highest completed level of education. Individuals were split into the following categories: (a) no education/basic (those with no education or less than basic and those with 8 or 9 years completed or incomplete secondary); (b) secondary general (those with complete general secondary or incomplete higher education); and (c) secondary vocational and higher education (graduates of colleges, universities, or higher schooling). In the regressions, no education/basic was the omitted category.

A Mincerian semi-log wage equation was used for estimating returns to education. Sample selection bias was corrected by modeling the decision to work using information on spouses' labor market outcomes and household demographic information (the presence of children and elderly people).

Contrary to what has been found in most countries in the world, returns to experience in these countries turn out to be not significantly different from zero. In fact, all countries studied here have zero or very small returns to experience for older workers. Given that experience gained in the pretransition period might be obsolete under the new economic systems in the region, this result is not surprising. As this older cohort, which accumulated human capital before the transition, moves out of the labor force by the end of 2020, a boost in productivity may occur.<sup>14</sup> Moreover, higher educational attainment should also help maintain productivity as workforces age.

**FIGURE 2.14**  
**Returns to Years of Education for Older and Younger Cohorts in Selected Countries**



Source: World Bank staff calculations, based on household survey data.

## Policy Implications

The conventional wisdom is that aging societies will face difficult challenges because labor supplies will shrink and labor productivity will fall. In the Eastern European and former Soviet countries, these concerns are heightened because the region already has low levels of labor force participation and because aging countries in the region have fewer financial resources than other graying societies for mitigating any negative consequences. However, the story is actually more complex and less demographically deterministic than suggested by the conventional wisdom. Current rates of labor force participation are low by international standards throughout much of the region, in part because of early retirement but also because of relatively low participation rates for other age groups. Thus, there is scope for increasing the labor supply by bringing participation rates up. Moreover, not all countries in the region are aging and there is scope for increasing labor supply in older countries through intraregional migration. Although concerns do exist about falling productivity with aging, the evidence is far from conclusive.

There are valid reasons to conclude that demographic trends in the region do not inevitably imply serious problems for the labor market. Yet an unfavorable scenario may come true if policy makers

do not manage the situation over the next couple of decades. If they do not respond appropriately, countries that are aging face the risks that their labor supply will shrink and that labor productivity may not grow as quickly as needed to increase living standards. Many reforms that address the labor supply and productivity concerns associated with aging are simply fundamentally sound policies that are important not only for confronting the aging issue but also for supporting efficient and equitable labor markets.

Key policy areas are migration, pension policy, labor market regulation, and training and education. All are relevant throughout the aging countries of the region and, in some cases, the reforms needed are universal. In other cases, however, the specific priorities differ by subregion (table 2.10). Some specifics of the reforms needed in pension policy and lifelong learning are spelled out in later chapters.<sup>15</sup>

The uneven aging patterns across countries mean that intraregional migration can play an important role in boosting labor supply in older countries. The flow of migrants—primarily from Central Asia to Central and Eastern Europe and to middle-income former

**TABLE 2.10**  
**Labor Market Reform Agenda for Aging Countries by Country Grouping**

Country grouping	Reform priorities for the labor market
EU countries	<ul style="list-style-type: none"> <li>• Recognize credentials and social security portability to encourage migration.</li> <li>• Liberalize employment protection rules to encourage flexible employment.</li> <li>• Encourage wage adaptability through reduced or differentiated minimum wages.</li> <li>• Increase labor supply in low-wage regions by adjusting benefit levels.</li> <li>• Consider harmonizing unemployment and pension benefit rules to encourage participation of older workers.</li> <li>• Develop incentives for training older workers.</li> </ul>
Southeastern Europe	<ul style="list-style-type: none"> <li>• Recognize credentials and social security portability to encourage migration.</li> <li>• Reduce labor taxes, especially on low-wage labor.</li> <li>• Encourage wage bargaining structures that increase wage flexibility.</li> <li>• Complete restructuring of SOEs, with reemployment support for laid-off workers.</li> <li>• Eliminate links between unemployment and access to social/health benefits.</li> <li>• Develop incentives for training older workers.</li> </ul>
Middle-income CIS	<ul style="list-style-type: none"> <li>• Recognize credentials and social security portability to encourage migration.</li> <li>• Increase scope for flexible employment.</li> <li>• Encourage wage bargaining structures that increase wage flexibility.</li> <li>• Eliminate links between unemployment and access to social/health benefits.</li> <li>• Complete restructuring of SOEs, with reemployment support for laid-off workers.</li> </ul>
Low-income CIS	<ul style="list-style-type: none"> <li>• Deregulate labor market and improve enforcement of basic standards.</li> <li>• Eliminate links between unemployment and access to social/health benefits.</li> </ul>

Source: World Bank staff compilation.

Note: CIS = Commonwealth of Independent States; SOE = state-owned enterprises.

Soviet countries—could be an important source of income for the sending countries while meeting the labor needs of the receiving ones. An effective framework for regulating both temporary and permanent migration will make this process more efficient and equitable.

The other channel for increasing labor supply is through greater labor force participation. The most obvious goal here is to increase participation rates for older people, primarily by delaying their exit from the labor force. Social security rules are critical here (see chapter 4). Also, as the region's huge restructuring endeavor nears completion, a major reason for early exit from the labor force will diminish in importance. Older workers who lose their jobs because of privatization and other forms of restructuring often withdraw from the labor force because they lack reemployment prospects. In many cases, this withdrawal has been encouraged through extended unemployment benefits and early-retirement pensions. In the future, governments will need to remove such incentives for early exit and use income incentives as well as effective employment programs to encourage these workers to seek reemployment.

Although increasing the participation of older workers is an obvious response to the aging of the region, the projections carried out in this chapter show that, in many countries, greater labor supply gains can be realized by achieving modest participation increases across the adult population. One instrument for doing so is reform of labor market regulations. Cross-country analysis by the World Bank, the OECD, and others has consistently shown that more flexible employment protection rules are associated with higher participation rates. By reducing the costs of hiring (and firing) and encouraging flexible contracting, these rules can draw more workers into the labor market. These types of reforms have a particularly positive effect on the participation of such groups as women, older people, and younger people, who, in most countries, often face barriers to participating in the labor market.

Policy makers can also address the productivity concerns associated with aging labor forces. The key instrument in this regard is a training and education framework that supports lifelong learning. Such a framework involves many elements. For example, a diversity of training suppliers, including some from the private sector, must be encouraged. Standards and information are needed so that workers can make informed decisions about what investments to make. Financing instruments, such as income-contingent loans, need to be made available so that funding is not a binding constraint. Clearly, a well-functioning labor market that rewards human capital and does



not discriminate against certain types of workers is necessary for ensuring adequate returns to investments in lifelong learning.

## Annex 2.A: ILO Labor Force Projection Methodologies

Estimates and projections of the total population and its components by gender and age group are produced by the United Nations population Division and those of the economically active population by the International Labour Organization (ILO).

The parametric form for the basic model is linear but fitted to the logic of the proportion participating, scaled to fit between the values  $y_{\min}$  and  $y_{\max}$  chosen for each age-gender group by the program. Typically, one value will be historical and one will represent the extreme long-term assumption. This implies that the participation rate at time  $t$  is then given by

$$y_t = y_{\min} + \frac{y_{\max} - y_{\min}}{1 + e^{a+bt}}$$

where the parameters  $a$  and  $b$  are based on fitting the model to the most recent estimates for an age-gender group within a country and the projections come from extrapolating  $t$  beyond the end of the estimates. Transparent adjustments (in the sense that they are easily recorded) can then be made to the default values for  $y_{\min}$  and  $y_{\max}$  to ensure a plausible profile across age groups and sensible relationships between participation rates for men and women.

The program uses information from the most recent 10 windows of estimates to choose default values for  $y_{\min}$  and  $y_{\max}$ , with the flexibility for the user to make informed changes to those defaults. The basic premise is that if the rates for men and women are converging for a particular age group, this trend will continue. The alternative is either nonconvergence, based on a constant difference between rates, or divergence, based on the rate of divergence from the most recent estimates.

For each age-gender group, the program fits a linear regression to detect whether the most recent estimates are increasing or decreasing. If the rates are decreasing, the program takes a maximum value from the historical estimates. If the rates are increasing, the program takes a minimum value from the historical estimates.

For each age group, a model is fitted to the difference in participation rates between men and women. This model can detect whether

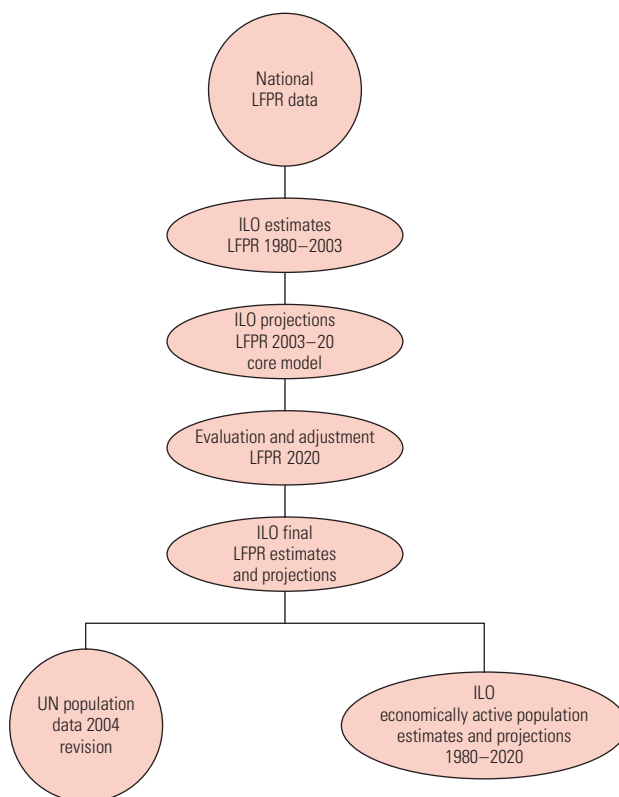
- The rates are diverging.
- The rates are crossing just before the projection window.

- The rates will converge quickly during the projection interval (that is, predict the difference goes to zero within 10 years of the last estimate).
- The rates will converge slowly during the projection interval.
- The rates are a constant distance apart (that is, the slope parameter is not significant).

After one of the five scenarios has been selected for the rates for men and women within each age group, it is then necessary to select appropriate future values for either  $y_{\min}$  or  $y_{\max}$  (Vittorelli and others 2006).

The reference period for the estimates is 1980 to 2003; for the projections, it is 2003 to 2020 (figure 2.A.1). The basic data are single-year rates of labor force participation by gender and 11 age groups in

**FIGURE 2.A.1**  
**ILO Estimates and Projections of the Economically Active Population, 1980–2020**



Source: Vittorelli and others 2006.

Note: LFPR = Labor Force Participation Rate; UN = United Nations.

five-year intervals, the last group being 65 years and older. The data are available at the ILO main Web site on labor statistics: <http://laborsta.ilo.org>.

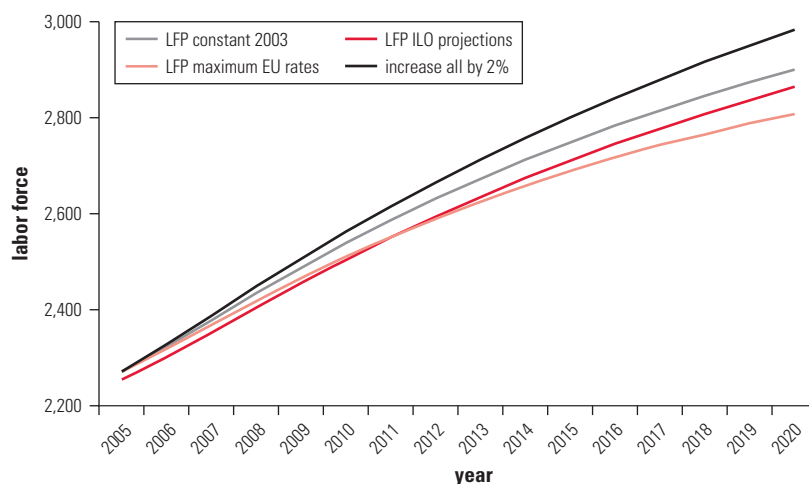
The fifth edition of the EAPEP (Economically Active Population Estimates and Projections) database is the result of a joint collaboration between the ILO Bureau of Statistics and the ILO Employment Trends Unit. All data on labor force participation in the EAPEP input file were selected from the fourth edition of the ILO Key Indicators of the Labor Market database.

## Annex 2.B: Labor Force Participation Projections, 2005–20

This annex presents alternative scenarios for each of the six countries studied. These alternatives are the base case, International Labour Organization, EU25 convergence, 2 percent across the board, older workers, and 40-to-59-year-olds scenarios. In the case of the young countries—the Kyrgyz Republic (figure 2.B.1) and Turkey (figure 2.B.2)—only the first four scenarios are shown. For the older countries—Bulgaria (figure 2.B.3), the Czech Republic (figure 2.B.4), Poland (figure 2.B.5), and the Russian Federation (figure 2.B.6)—all six scenarios are shown.

FIGURE 2.B.1

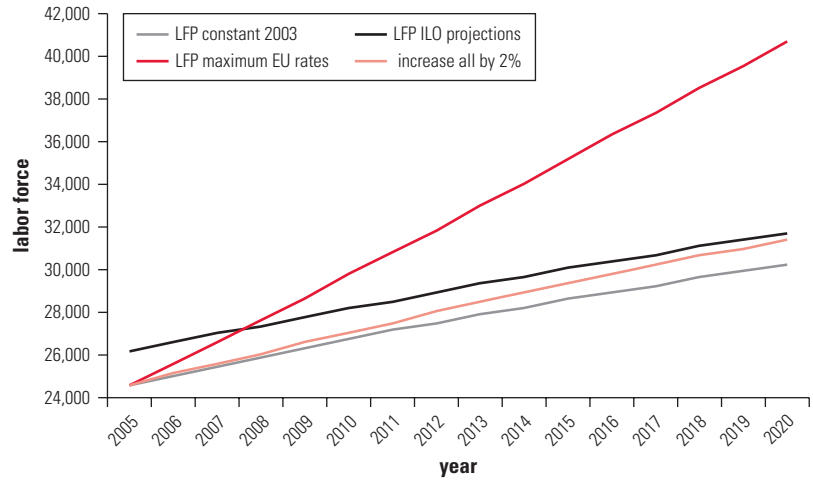
### Labor Force Participation Projections under Different Scenarios, Kyrgyz Republic, 2005–20



Source: World Bank staff calculations based on ILO Laborsta data.

Note: LFP = labor force participation; ILO = International Labour Organization; EU = European Union.

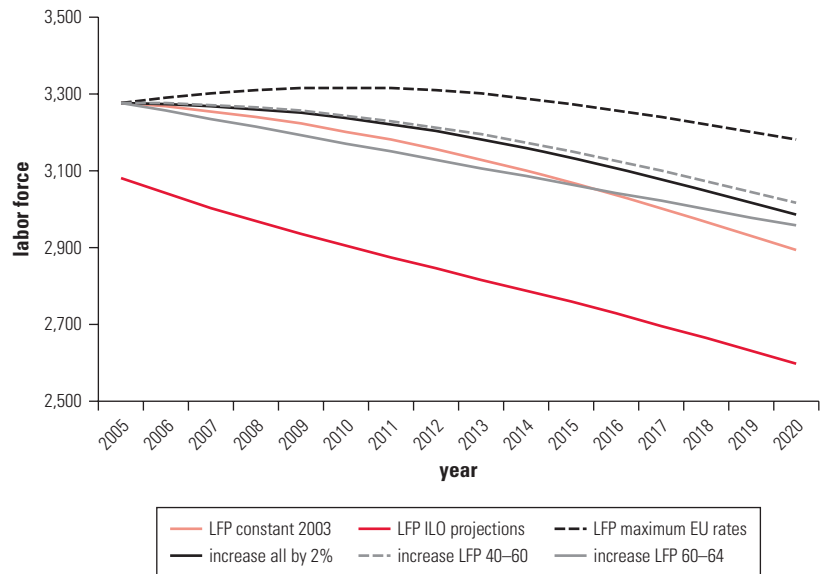
**FIGURE 2.B.2**  
**Labor Force Participation Projections under Different Scenarios, Turkey, 2005–20**



Source: World Bank staff calculations based on ILO Laborsta data.

Note: LFP = labor force participation; ILO = International Labour Organization; EU = European Union.

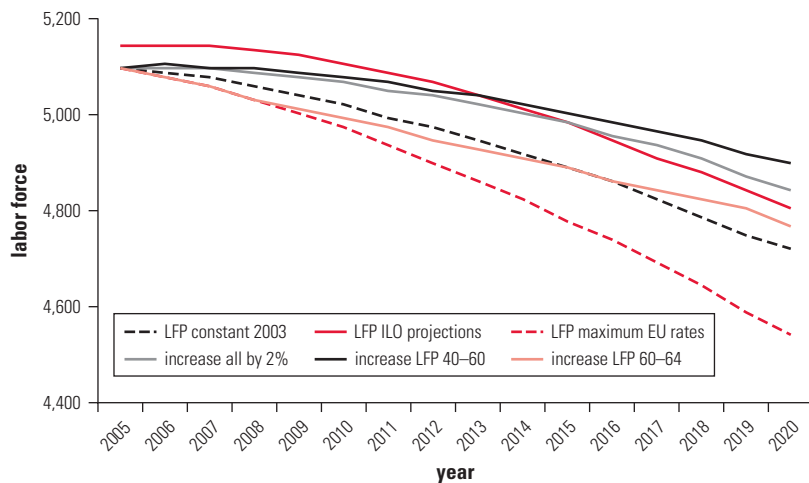
**FIGURE 2.B.3**  
**Labor Force Participation Projections under Different Scenarios, Bulgaria, 2005–20**



Source: World Bank staff calculations based on ILO Laborsta data.

Note: LFP = labor force participation; ILO = International Labour Organization; EU = European Union.

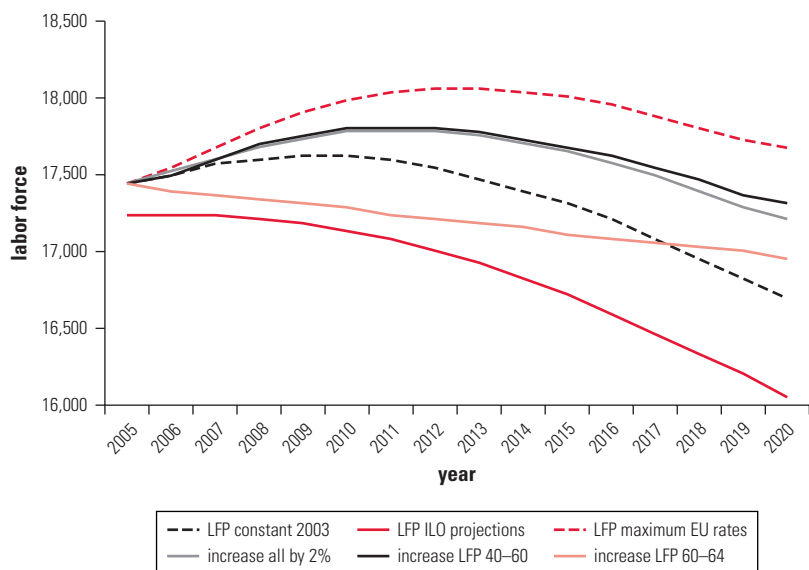
**FIGURE 2.B.4**  
**Labor Force Participation Projections under Different Scenarios, Czech Republic, 2005–20**



Source: World Bank staff calculations based on Laborsta data.

Note: LFP = labor force participation; ILO = International Labour Organization; EU = European Union.

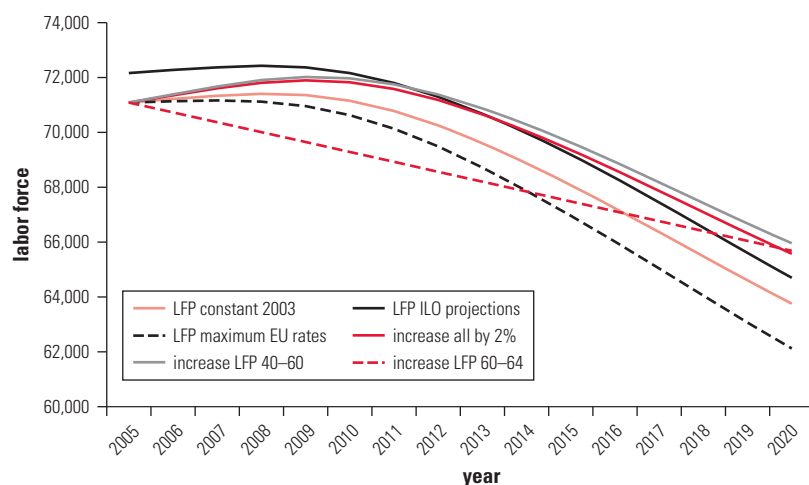
**FIGURE 2.B.5**  
**Labor Force Participation Projections under Different Scenarios, Poland, 2005–20**



Source: World Bank staff calculations based on ILO Laborsta data.

Note: LFP = labor force participation; ILO = International Labour Organization; EU = European Union.

**FIGURE 2.B.6**  
**Labor Force Participation Projections under Different Scenarios,**  
**Russian, Federation, 2005–20**



Source: World Bank staff calculations based on ILO Laborsta data.

Note: LFP = labor force participation; ILO = International Labour Organization; EU = European Union.

## Annex 2.C: Changes in Working-Age Population

This annex presents background data (table 2.C) used in projecting the changes in working-age populations in the Eastern European and former Soviet Countries from 2005 to 2025.

**TABLE 2.C**  
**Changes in Working-Age Population, 15 to 64 Years, in Eastern Europe**  
**and the Former Soviet Union, 2005–20**

Country	Relative change (2020 working-age population to total population as a ratio of the 2005 working-age population to total population)	Absolute change (change in number of working-age individuals)
<i>Old countries</i>		
Czech Republic	0.93	-732.8
Slovenia	0.94	-110.9
Estonia	0.96	-75.0
Poland	0.96	-1,619.0
Russian Federation	0.96	-10,751.8
Hungary	0.96	-575.0
Bulgaria	0.97	-757.5
Latvia	0.97	-165.4
Slovak Republic	0.97	-143.2
Croatia	0.97	-204.5

(continued)

**TABLE 2.C**  
**(continued)**

Country	Relative change (2020 working-age population to total population as a ratio of the 2005 working-age population to total population)	Absolute change (change in number of working-age individuals)
Bosnia and Herzegovina	0.97	-122.3
Serbia and Montenegro	0.99	-210.8
Romania	0.99	-1,098.1
Ukraine	0.99	-5,030.8
Macedonia, FYR	1.00	8.9
Moldova	1.00	-111.6
Belarus	1.00	-566.1
Lithuania	1.00	-138.8
Kazakhstan	1.01	182.4
Albania	1.02	239.2
Georgia	1.03	-200.6
Armenia	1.04	26.5
Azerbaijan	1.05	984.8
<i>Young countries</i>		
Turkey	1.05	11,712.9
Turkmenistan	1.08	932.8
Kyrgyz Republic	1.09	843.2
Uzbekistan	1.10	5,629.8
Tajikistan	1.13	1,595.8

Source: World Bank staff estimates, based on United Nations 2005.

## Annex 2.D: Participation Rates in Countries of the Region

This annex presents participation rates between 1980 and 2003 for workers age 50 and older in the countries of Eastern Europe and the former Soviet Union. Data for women are shown in table 2.D.1. Data for men are shown in table 2.D.2. Table 2.D.3 shows the change in participation rates.

**TABLE 2.D.1**  
**Participation Rates for Females 50 Years and Older, 1980 and 2003**

percent

Country	1980				2003			
	50–54 years	55–59 years	60–64 years	65 years or older	50–54 years	55–59 years	60–64 years	65 years or older
Albania	67.5	30.0	19.7	7.5	58.1	29.1	21.9	7.6
Armenia	76.9	41.0	17.0	4.1	64.7	44.3	22.5	11.1
Azerbaijan	69.8	36.6	18.8	7.5	67.5	37.9	21.5	9.5
Belarus	85.9	30.1	11.3	4.5	82.4	26.4	9.2	1.3
Bosnia and Herzegovina	69.9	33.8	18.0	7.3	70.4	35.3	17.4	6.4

(continued)

**TABLE 2.D.1**  
**(continued)**

Country	1980				2003			
	50–54 years	55–59 years	60–64 years	65 years or older	50–54 years	55–59 years	60–64 years	65 years or older
Bulgaria	75.4	31.5	14.1	3.9	72.0	38.5	7.6	2.0
Croatia	38.4	24.9	19.5	10.8	51.4	20.4	8.1	3.5
Czech Republic	83.4	42.9	23.7	7.2	84.9	42.1	13.7	2.3
Estonia	85.9	55.0	40.9	9.3	82.3	65.1	37.0	13.6
Georgia	80.7	48.4	25.2	7.6	73.9	72.2	65.4	42.1
Hungary	67.4	18.8	8.7	3.2	68.1	36.1	7.5	2.0
Kazakhstan	73.7	25.2	8.1	1.9	82.9	61.3	27.3	9.3
Kyrgyz Republic	72.1	25.8	9.2	2.4	68.3	50.1	27.9	12.2
Latvia	88.7	48.2	32.5	12.1	80.4	59.9	26.9	8.9
Lithuania	86.2	43.4	26.4	7.8	85.4	65.3	20.6	3.3
Macedonia, FYR	36.1	28.8	22.8	12.2	49.3	30.1	10.7	3.7
Poland	72.6	56.0	35.0	17.5	59.0	31.1	14.6	4.5
Moldova	78.3	22.5	11.7	4.2	70.0	23.7	13.3	5.2
Romania	65.4	55.0	10.7	4.7	57.7	38.1	29.4	25.0
Russian Federation	81.4	32.0	20.1	3.4	76.9	41.1	24.4	8.1
Serbia and Montenegro	41.3	34.6	28.8	18.6	35.6	36.0	32.7	28.8
Slovak Republic	70.4	35.7	16.3	4.5	80.0	20.0	4.0	0.8
Slovenia	57.1	28.1	19.9	9.8	59.2	19.6	10.3	4.9
Tajikistan	70.1	27.1	10.4	3.3	47.7	23.1	11.8	3.9
Turkey	49.5	47.0	43.7	23.8	23.7	23.1	19.4	10.4
Turkmenistan	71.0	36.2	18.6	7.0	70.3	35.4	17.6	6.6
Ukraine	84.0	28.7	16.2	4.1	73.0	36.0	19.0	13.2
Uzbekistan	69.5	34.5	18.3	7.5	63.4	39.8	24.9	12.1
Total	70.3	35.8	20.2	7.8	66.4	38.6	20.2	9.4

Source: van Ours 2006 based on ILO Key Indicators of the Labor Market database.

**TABLE 2.D.2**  
**Participation Rates for Males 50 Years and Older, 1980 and 2003**

percent

Country	1980				2003			
	50–54 years	55–59 years	60–64 years	65 years or older	50–54 years	55–59 years	60–64 years	65 years or older
Albania	95.6	83.7	83.2	43.4	88.4	77.1	47.4	26.3
Armenia	92.1	83.9	49.3	17.2	83.0	93.9	66.7	27.6
Azerbaijan	90.4	79.4	39.4	17.4	87.2	77.9	42.3	18.8
Belarus	92.0	83.3	31.9	9.1	85.4	70.3	23.4	4.4
Bosnia and Herzegovina	90.1	84.2	44.1	18.4	87.0	74.2	35.7	13.6
Bulgaria	91.2	84.3	44.3	18.8	75.0	60.9	27.2	6.0
Croatia	82.6	63.4	49.0	36.7	80.4	53.5	20.8	6.5
Czech Republic	93.0	84.4	45.8	18.8	90.1	80.0	31.2	6.6
Estonia	90.4	82.1	56.4	16.8	83.3	75.2	54.1	21.0
Georgia	90.9	82.7	50.8	20.0	91.2	89.4	82.4	58.9
Hungary	86.2	72.2	13.2	3.9	72.6	57.0	17.2	3.8
Kazakhstan	91.2	78.6	25.2	9.6	90.8	83.6	52.1	15.7

(continued)



**TABLE 2.D.2**  
**(continued)**

Country	1980				2003			
	50–54 years	55–59 years	60–64 years	65 years or older	50–54 years	55–59 years	60–64 years	65 years or older
Kyrgyz Republic	90.6	80.9	27.2	7.2	86.5	80.9	55.2	25.5
Latvia	92.6	86.6	53.5	22.3	83.8	71.7	42.2	16.4
Lithuania	93.9	88.6	48.3	19.7	85.3	79.0	44.9	8.3
Macedonia, FYR	88.8	73.9	59.8	39.5	80.8	67.0	35.4	7.2
Moldova	93.3	87.5	31.0	12.2	88.8	86.7	36.3	13.0
Poland	87.3	82.0	58.0	30.0	71.0	52.4	27.0	9.0
Romania	86.7	71.2	22.4	5.5	75.5	54.4	34.9	31.5
Russian Federation	90.6	78.0	38.9	15.1	84.6	64.0	37.9	14.5
Serbia and Montenegro	82.5	60.1	38.9	28.9	77.1	54.0	42.6	36.8
Slovak Republic	92.4	84.3	47.3	20.0	88.9	77.5	12.5	2.0
Slovenia	81.4	59.2	31.4	19.3	80.5	48.1	18.0	9.7
Tajikistan	95.2	88.2	36.2	9.7	83.5	78.9	29.1	7.5
Turkey	86.0	78.8	69.1	44.3	65.5	50.8	42.6	25.3
Turkmenistan	90.3	78.7	38.4	16.5	87.0	74.4	36.0	13.8
Ukraine	88.9	78.9	43.3	14.0	79.2	67.3	29.9	18.3
Uzbekistan	90.2	83.5	43.5	18.5	85.7	81.2	48.3	23.5
Total	89.9	79.4	43.6	19.7	82.8	70.8	38.3	16.8

Source: van Ours 2006 based on ILO Key Indicators of the Labor Market database.

**TABLE 2.D.3**  
**Changes in Participation Rates for Population 50 Years and Older, 1980 and 2003**

percent

Country	1980				2003			
	50–54 years	55–59 years	60–64 years	65 years or older	50–54 years	55–59 years	60–64 years	65 years or older
Albania	-9.4	-0.9	2.2	0.1	-7.2	-6.6	-35.0	-17.1
Armenia	-12.2	3.3	5.5	7.0	-9.1	10.0	17.4	10.4
Azerbaijan	-2.3	1.3	2.7	2.0	-3.2	-1.5	2.9	1.4
Belarus	-3.5	-3.7	-2.1	-3.2	-6.6	-13.0	-8.5	-4.7
Bosnia and Herzegovina	0.5	1.5	-0.6	-0.9	-3.1	-10.0	-8.4	-4.8
Bulgaria	-3.4	7.0	-6.5	-1.9	-16.2	-23.4	-17.1	-12.8
Croatia	13.0	-4.5	-11.4	-7.3	-2.2	-9.9	-28.2	-30.2
Czech Republic	1.5	-0.8	-10.0	-4.9	-2.9	-4.4	-14.6	-12.2
Estonia	-3.6	10.1	-3.9	4.3	-7.1	-6.9	-2.3	4.2
Georgia	-6.8	23.8	40.2	34.5	0.3	6.7	31.6	38.9
Hungary	0.7	17.3	-1.2	-1.2	-13.6	-15.2	4.0	-0.1
Kazakhstan	9.2	36.1	19.2	7.4	-0.4	5.0	26.9	6.1
Kyrgyz Republic	-3.8	24.3	18.7	9.8	-4.1	0.0	28.0	18.3
Latvia	-8.3	11.7	-5.6	-3.2	-8.8	-14.9	-11.3	-5.9
Lithuania	-0.8	21.9	-5.8	-4.5	-8.6	-9.6	-3.4	-11.4
Macedonia, FYR	13.2	1.3	-12.1	-8.5	-8.0	-6.9	-24.4	-32.3
Moldova	-8.3	1.2	1.6	1.0	-4.5	-0.8	5.3	0.8

(continued)

**TABLE 2.D.3**  
**(continued)**

Country	1980				2003			
	50–54 years	55–59 years	60–64 years	65 years or older	50–54 years	55–59 years	60–64 years	65 years or older
Poland	–13.6	–24.9	–20.4	–13.0	–16.3	–29.6	–31.0	–21.0
Romania	–7.7	–16.9	18.7	20.3	–11.2	–16.8	12.5	26.0
Russian Federation	–4.5	9.1	4.3	4.7	–6.0	–14.0	–1.0	–0.6
Serbia and Montenegro	–5.7	1.4	3.9	10.2	–5.4	–6.1	3.7	7.9
Slovak Republic	9.6	–15.7	–12.3	–3.7	–3.5	–6.8	–34.8	–18.0
Slovenia	2.1	–8.5	–9.6	–4.9	–0.9	–11.1	–13.4	–9.6
Tajikistan	–22.4	–4.0	1.4	0.6	–11.7	–9.3	–7.1	–2.2
Turkey	–25.8	–23.9	–24.3	–13.4	–20.5	–28.0	–26.5	–19.0
Turkmenistan	–0.7	–0.8	–1.0	–0.4	–3.3	–4.3	–2.4	–2.7
Ukraine	–11.0	7.3	2.8	9.1	–9.7	–11.6	–13.4	4.3
Uzbekistan	–6.1	5.3	6.6	4.6	–4.5	–2.3	4.8	5.0

Source: van Ours 2006 based on ILO Key Indicators of the Labor Market database.

## Notes

1. In this chapter, the projection period goes only to 2020, five years shorter than the period used in chapter 1, because the chapter relies on International Labour Organization labor force projections that do not go beyond 2020.
2. UN population projections set the future path of international migration on the basis of past international migration estimates and an assessment of the policy stance of countries with regard to future international migration flows.
3. For a discussion of how governments can accommodate immigration flows to mutual advantage, refer to Holzmann (2005).
4. A larger increase for all age-gender groups would have been unrealistic for some countries that already enjoy very high rates of labor force participation, such as Russia and the Czech Republic.
5. For an extensive review of migration and remittances in Eastern Europe and the former Soviet Union, see Mansoor and Quillen (2006).
6. There is only scant evidence in the region about the skill composition of migrants. For instance, data from Albania show signs of brain drain: the more educated have been most likely to leave, with few poorly educated people migrating. Among those migrating permanently between 1990 and 2002, 47 percent had secondary schooling or more, compared with 31 percent among nonmigrants. In contrast, only 2 percent of permanent migrants had not completed primary schooling, compared with 25 percent of nonmigrants.
7. Albania LSMS (Living Standards Measurement Survey) 2004; Turkey HBS (Household Budget Survey) 2003; Bulgaria MTHS (Multitopic Household Survey) 2003; Russia RLMS (Russian Living Measurement Survey) 2002.

8. The five countries included in these calculations are the Czech Republic, Hungary, Poland, the Slovak Republic, and Turkey. Note that, compared with the means in the region, these countries for the most part have below-average participation rates for older men but above-average rates for older women.
9. These data are shown in annex 2.D.
10. The following explanatory variables are included: number of children, marital status, years of education and years of education squared, number of adults in the family, urban-rural location, and dummy variables for five-year age groups. For more details, see van Ours (2006).
11. The literature on this topic is summarized in van Ours (2006).
12. Prskawetz, Fent, and Guest (2005) studied the sensitivity of the evolution of labor productivity with respect to projected labor force participation rates, age-productivity profiles, and the degree of substitutability of workers at different ages. If substitutability is imperfect, there is an optimal age mix in the workforce. Average productivity per worker is influenced by demographic changes, which may bring the actual mix closer to or further from the optimum. To investigate the sensitivity of the evolution of labor productivity, Prskawetz, Fent, and Guest used a general equilibrium model, with imperfect substitution between different age groups. They also found that changes in age-specific productivity profiles have only a small impact on projected labor productivity.
13. There might be an alternative interpretation for this finding: young workers are more productive in the conditions of uncertainty generated by the transition.
14. The only cases of significant positive experience coefficients are older cohorts in Poland and Romania. However, the coefficients for those countries are only 2 percent and 3 percent, respectively.
15. Some of the suggested labor market reforms are drawn from a recent regional study on labor markets (Rutkowski and others 2005).

