United Nations
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GENEVA TIMBER AND FOREST DISCUSSION PAPERS

FORECASTS OF THE ECONOMIC GROWTH IN OECD COUNTRIES AND CENTRAL AND EASTERN EUROPEAN COUNTRIES FOR THE PERIOD 2000-2040

A study prepared for the European Forest Sector Outlook Study (EFSOS)

By NOBE
Independent Centre for Economic Studies

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Timber Section,
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Note

The designations employed and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of the secretariat of the United Nations concerning the legal status of any country, territory, city or area, or of its authorities, or concerning the delimitation of its frontiers or boundaries.

Abstract

The study contains projections of the economic development, over the period of 40 years (from 2000 until 2040), for 22 high-income OECD countries and 22 Central and Eastern European economies. The projections are based on the endogenous growth theory that allows for capturing both phenomena of the knowledge-base growth in the high-income OECD countries, and the real convergence process in the catching-up countries of Central and Eastern Europe. Obviously, any projection made for the period of 40 years is subject to a great uncertainty and forecasting error. Over the period of 40 years deep and unpredictable changes may take place in the direction of the technological progress, political situation and social stability of nations, international flows of production factors, and institutional development. Nevertheless, three scenarios presented in this study show the plausible range of the GDP growth that may be expected, given the best knowledge available today.

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In the interests of economy, Discussion Papers are issued in the original language only, without final languages editing. They are available on request from the secretariat. They are distributed automatically to nominated forestry libraries and information centres in member countries. It is the intention to include this discussion paper on the Timber Committee website at: http//www.unece.org/trade/timber. Those interested in receiving these Discussion Papers on the continuing basis should contact the secretariat.

Another objective of the Discussion Papers is to stimulate dialogue and contacts among specialists. Comments or questions should be sent to the secretariat, who will transmit them to the authors.

Preface by the secretariat

The main objective of the European Forest Sector Outlook Studies (EFSOS) project is to analyse the future possible developments of the forest and forest industry sector in Europe, including CIS, considering challenges and uncertainties of varying policies, market developments and the influence of exogenous factors (e.g. climate change). The outcomes should assist policy and investment decision-making. The main target groups are policy makers, entrepreneurs and the academic community of the forest and forest products sector as well as the public in general.

EFSOS is a part of the FAO global forest sector outlook study activities. It is significantly linked to the other work areas of the Joint ECE Timber Committee and FAO European Forestry Commission Integrated Programme of Work.

The first step into the EFSOS programme is a baseline study report, consisting of historical analysis of driving forces, base line scenarios ("business as usual") on forest resources and forest products markets and alternative policy scenarios.

As for the baseline scenarios ("business as usual") on forest products markets the secretariat focussed the activities on the former (European Timber Trend Studies, ETTS V) approach, using econometric analysis for forecasting production, trade and consumption of main forest products, updating input data and improving the methodology as resources allow. Gross Domestic Production (GDP) is one of the main exogenous variables in the model. GDP forecasts are needed to feed the model and to run the scenarios. While research in other international organisations (e.g. World Bank, OECD) provides with this type of forecasts only for 5-8 years, the current "FORECASTS OF THE ECONOMIC GROWTH IN OECD COUNTRIES AND CENTRAL AND EASTERN EUROPEAN COUNTRIES FOR THE PERIOD 2000-2040" gives an outlook on a longer period over the coming four decades, considering the need of careful assumptions, when dealing with such a long forecast period. The study represents an essential prerequisite for providing a useful baseline scenario on forest products markets.

The secretariat expresses its thanks to NOBE, (91-849 Łódź, Jonschera 4/10 Poland,tel./fax:+48 656 4978 http://www.nobe.pl, and to the study authors, namely Mr. Witold Orlowski and Mrs. Wanda Czyzewska for the essential contribution to the EFSOS programme, as well as to FAO Rome, who funded the study.

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INTRODUCTION

Long-term forecasting and the economic theory

The purpose of the study was to generate possible projections of the economic development of the West, Central and East European economies over the period of 40 years (from 2000 until 2040).
One should start with the following statements:

- *Firstly*, any projection made for the period of 40 years is subject to a great uncertainty and forecasting error. Over the period of 40 years deep and unpredictable changes may take place in the direction of the technological progress, political situation and social stability of nations, international flows of production factors, and institutional development. All these changes may seriously influence the direction of the economic developments.

- *Secondly,* the projections can be only based on the experience from the past. Obviously, that does not mean extrapolation of the past growth trends for various economies. To the contrary, it is highly improbable that a nation that went over the past 40 years through the period of a robust economic growth that allowed for reaching high development levels is likely to continue a very fast growth in the future. However, a careful analysis of the growth patterns observed in the past may allow for finding links between the economic development on the one hand, and the factors - endogenous or exogenous for the economic policy - that had a positive or negative impact on the economic performance. It is a plausible assumption that the same link will be observed in the future.

- *Thirdly,* one must take into account a different character of the economic growth in the high-income OECD countries on the one hand, and Central and East European countries (CEEC) on the other. The high-income OECD countries reached over the past decades very high level of the development. Moreover, they play a role of leaders in the technological development, producers and users of the most modern technology currently available to the humanity. With the current level of saturation with the fixed capital, and with the projected relative scarcity of the available labour, the nations of high-income OECD countries can not base their future development on the increase in the use of production factors (as the capital has falling marginal productivity). The future economic growth of these countries crucially depends on their ability to continue the knowledge-base growth, to enhance the human capital of employees, and to accelerate the technological progress.

- *Fourthly,* in the case of CEEC there exists a deep development gap between this group of countries on the one hand, and the high-income OECD countries on the other. The gap exists both in the productivity and income levels, but also in the technological level of the economy. Therefore, apart from the possibility of reducing the development gap due to the higher marginal productivity of capital, the CEEC may also accelerate their growth through the accelerated absorption of the technology imported from the high-income OECD countries. In the case of the CEEC the growth prospects depend on the fact, to what extent these countries can exploit the chance of the real convergence (ability of a less developed economy to develop faster so that, over time, the initial gap in GDP between the less developed country and the richer countries diminishes).

- *Fifthly,* the economic theory that allows for capturing both phenomena of the knowledge-base growth in high-income OECD countries, and the real convergence process in the CEEC, is the ***endogenous growth theory***. However, the models used for explaining the phenomena, although

rooted in the same theory, should be different to take account of the different character of the growth process in both groups of countries over the next 40 years: the knowledge-intensive development of the technological leaders (OECD), and the catch-up process in the countries that may benefit from the real convergence due to their relative backwardness (CEEC).

In this study we present the methodology, assumptions and projections of the economic development separately for 22 high-income OECD countries, and for 22 CEEC (including Turkey, Cyprus and Malta).

Demographic forecasts

The study uses the demographic projections of the United Nations.
The projection is presented in 3 fertility variants: the medium-, high- and low variant projections. The major differences among the three variants are largely due to the assumed fertility levels; however, some assumptions were also made on future patterns of migration. The high- and low-fertility variants indicate the plausible range of future demographic trends.

According to all the variants, majority of the 44 OECD and CEEC covered by the study will experience a negative population growth in the period 2000-2040. Among the OECD countries, the increase in the population can be expected only in the traditional immigration countries (USA, Canada, Australia), and in several smaller countries, mainly Nordic. In all the major West European countries the population is likely to fall (only in the high fertility variant, negligible increase may appear in several countries of Western Europe). In the case of CEEC, the population is likely to increase only in Turkey, some relatively poor Balkan countries (Albania, Macedonia), and in the small island countries of Cyprus and Malta. In all the other CEEC the population is likely to fall, even more seriously than in the West European countries, albeit in some cases the high-fertility variant allows for the stabilization or even negligible growth (notably in the case of Poland). Huge majority of the countries of both OECD and CEEC will have to face the process of ageing, sometimes quite dramatic.

One should note, that the UN demographic projections are based on very conservative assumptions about migrations. Generally speaking, migrations are assumed on the level observed in the past (relatively low, particularly in the case of CEEC). The European Union (EU) membership of several CEEC, with the implied freedom of movement of labour within the enlarged EU, may lead to bigger migration flows, improving the demographic prospects of the West European OECD countries, and deteriorating demographic prospects of the CEEC.

Development scenarios

The projections of the economic growth in 44 CEEC and OECD countries are presented in 3 variants: **low**, **base** and **high scenario**.

For the OECD countries, the **low case** means mainly, that the policies aimed at accelerating the technological progress and enhancing the human capital are relatively weak (basically, there is almost no progress compared to the current situation). Additionally, the countries suffer due to the most unfavourable demographic trends (low UN demographic variant meaning the fall of the population with strong ageing process). Given the very high stock of the capital per employee, and therefore the low marginal productivity of capital, that leads to the very slow increase in the GDP.

The **base case** for the OECD countries means steady improvement in the policies aimed at accelerating knowledge-based growth, and more favourable demographic trends (medium UN demographic variant).

The **high case** for the OECD countries means the aggressive move towards accelerating the technological progress and strengthening human capital by the robust increase of resources devoted to R&D activities and to the education, accompanied by the most optimistic UN high demographic variant.

For the CEEC, the **low case** means very slow progress in the political, social and economic stabilization, lack of policies aimed at enhancing the domestic saving and investment, low level of absorption of the technology, and little investment in the human capital. Such an unfavourable economic and social environment slows down the process of the real convergence. Additionally, the slow real convergence is accompanied by the slow growth of the OECD countries (low case) and unfavourable demographic trends (low UN demographic variant).

The **base case** for the CEEC means steady improvement in the policies aimed at accelerating the real convergence (including relatively fast path of the EU enlargement), efficient absorption of the technology leading to the steady reduction in the technological gap, relatively fast growth in the OECD area (base case), and more favourable demographic trends (medium UN demographic variant).

The **high case** for the CEEC means acceleration of the process of the economic, social and political stabilization of the region, with the relatively rapid expansion of the EU not only to the countries currently engaged in membership negotiations, but also to Turkey and Balkan states. That, accompanied by efficient policies enhancing saving and investment, and improving rapidly the human capital, as well as by the rapid process of technological catching-up, leads to the acceleration of the real convergence. The real convergence, together with the good economic performance of the OECD countries (high case) and relatively good demographic trends (high UN demographic variant) allows for the robust growth of GDP in all the CEEC.
The construction of the three scenarios is presented by table 1.

Tab.1 Three scenarios of the economic development

	Low	***Base***	***High***
Economic scenario for OECD	Low case	Base case	High case
Demographic scenario for OECD	Low UN variant	Medium UN variant	High UN variant
Economic scenario for CEEC	Low case (slow convergence)	Base case (medium convergence)	High case (fast convergence)
Demographic scenario for CEEC	Low UN variant	Medium UN variant	High UN variant

Please note, that one can imagine another combination of the economic and demographic scenarios for both groups of countries than one of three scenarios (consider, as an example, base case in OECD accompanied by low UN demographic variant, and high case for the CEEC convergence accompanied by high UN demographic variant for CEEC). However, we decided to mix in the 'radical' scenarios only the most 'radical' cases and variants. The rationale is that the combination of the "low" cases/variants leads to the slowest growth, while the combination of the "high" cases/variants leads to the most rapid GDP growth in both areas (OECD and CEEC). Therefore, the Low and High scenarios set probable lower and upper band for the growth prospects, while the Base scenario is the most moderate in all the assumptions and results.

METHODOLOGY OF FORECASTING THE ECONOMIC GROWTH FOR THE OECD COUNTRIES

Countries covered by the forecast

The forecast covers 22 high-income OECD countries:

- 15 current members of the EU

- 3 EFTA members (Iceland, Switzerland, Norway)
- 4 non-European OECD members (USA, Canada, Australia, Japan).
-

The forecast covers 4 decades: 2000-10, 2010-20, 2020-30, and 2030-40. The projected variables are: GDP per capita adjusted for PPP (Purchasing Power Parity; e.g. real GDP per capita level adjusted for differences in prices among countries), total GDP adjusted for PPP, and population.

Methodology

The forecast of the economic growth for the 22 high-income OECD countries is based on the endogenous growth theory (for a survey, consult the attached references, in particular the book by Barro and Sala-I-Martin [1995]).

The endogenous growth theory is a leading school of the economic growth theory of the 1990s. Basically, the difference between the exogenous growth theory, created during the years 1950s and 160s, and endogenous growth theory created during the late 1980s and 1990s can be explained in a very simple way.

In the exogenous growth theory, the increase in output is a function of the growing outlays of production factors (capital and labour) employed in the production process, with the given technology. That means, the technological progress is exogenously given and determined by the stream of new inventions. The core of the exogenous growth model is the neo-classical production function:

$$\mathbf{X} = f(\mathbf{K}, \mathbf{L}, \mathbf{a}),$$

where **X** stands for output, **K** for capital, **L** for labour, and **a** is a set of parameters reflecting the technological progress.

Given the properties of the neo-classical production function, the marginal productivity of the production factors is falling with the increase of the use of these factors. That means, the richer the economies become, and the more capital per worker they use in the production, the smaller the effect of the additional capital put into operation, and the slower the economic growth. That leads to the growth rate falling to zero (in per capita terms) with the very high capital per worker. In other words, the exogenous growth models forecasted the general convergence of the development levels: poor countries were expected to grow fast, but after having reached high income levels the countries should expect they growth rates falling to zero. That implies so-called unconditional convergence: earlier or later all the economies should reach the similar level of development, and the path of reaching the level depends mainly on the propensity to save and to invest (saving ratio in the economy).

The endogenous growth theory modified this approach in three important areas. Firstly, the new growth theory assumed that the technological progress is endogenous, i.e. a country can accelerate the progress by right policies (R&D activities, policies aimed at encouraging innovation and entrepreneurship). Secondly, the outlays of the labour used in production may be augmented through the human capital development (education, enhancing activity and entrepreneurship). Thirdly, the process of convergence is conditional, i.e.; depends on the right policies of a country.

The core of the endogenous growth model is the modified production function:

$$\mathbf{X} = f(\mathbf{K}, \mathbf{L}, \mathbf{A}),$$

where **X** stands for output, **K** for capital, **L** for labour, and **A** is the technological progress. The value of **A** may be increased by the appropriate policies.

As a result, the endogenous growth models reject the hypothesis about the growth rate falling to zero (in per capita terms) after having reached very high level of development. Even a very rich economy, employing very high capital per worker, may still grow by accelerating the technological progress and enhancing the human capital. That means the character of the growth process in a developed economy changes towards the knowledge-based growth (OECD [1996a]). In a less developed economy, one may still count on the relatively high growth due to the increase of the use of production factors (mainly due to the growing capital per worker). However, the process of the convergence depends on the use of right economic policies enhancing human capital development, entrepreneurship, creating incentives for the long term saving and investment, and encouraging the technological progress. In particular, the policy should aim at maximising benefits from the technological spillovers (accelerated technological progress due to the economic relations with more developed countries). That leads to the concept of the conditional convergence: convergence can not be given for granted (with inappropriate policies even a poor country may grow slowly, while with appropriate policies a rich country may grow rapidly), and the speed of convergence depends on the economic policy employed by the less developed country.

The model for OECD countries

The growth model used in this study is rooted in the endogenous growth theory. The average growth rate of GDP is a function of the increase in the use of production factors (labour and capital) on the one hand, and the technological and organisational progress on the other (low case letters indicate average growth rates in a given period; for simplicity let us assume that the growth rates are additive):

$$\mathbf{x} = f(\mathbf{k}, \mathbf{l}) + \mathbf{tfp}$$

where **x** stands for GDP growth, **k** for growth of outlays of capital, **l** for growth of outlays of labour, and **tfp** for the increase in the total factor productivity; $f(\mathbf{k}, \mathbf{l})$ indicates a function that aggregates the growth of outlays of labour and capital into the total growth of outlays of production factors.

As the aggregating function $f(\mathbf{k}, \mathbf{l})$ we used the function derived from the Cobb-Douglas production function with utility maximizing assumption:

$$\mathbf{X} = a\,\mathbf{K}^{\square}\,\mathbf{L}^{(1-\square\square\square}$$

that leads, after a few simple arithmetic calculations, to the formula:

$$f(\mathbf{k}, \mathbf{l}) = \mathbf{k}^{\square}\,\mathbf{l}^{(1-\square\square\square}$$

where $\square$ is the share of the capital in the primary distribution of value added (division between the capital income and the labour income).

The rate of growth of the capital is determined by the investment to GDP ratio in the economy, albeit this relation may be affected by the speed at which the old capital assets are depreciated in the economy (an economy with the fast depreciation gets less increase of the fixed capital from the same investment to GDP ratio than an economy with the slow depreciation):

$$\mathbf{k} = g(\mathbf{I}/\mathbf{X})$$

where **I** stands for investment (gross fixed capital formation).

The rate of growth of labour **l** is determined by the change in population (taken from the UN projections), change in the labour participation, and the change in the unemployment rate in the economy.

Then, and according to the endogenous growth theory, the increase in the total factor productivity over a given period is the function of: (1) the initial level of development (or capital per worker employed in the economy), with the expected negative sign due to the falling marginal productivity of capital; (2) ability of the society to absorb the new technology; (3) policies aimed at enhancing human capital; (4) policies aimed at accelerating technological progress:

$$\mathbf{tfp} = h(\mathbf{X}_0, \mathbf{a_1}, \mathbf{a_2}, \mathbf{a_3}, \ldots)$$

where $\mathbf{X}_0$ stands for the initial development level, and $\mathbf{a_i}$ for various policies (a similar approach, although limited only to the R&D activities, was used by Grilliches [1973]).

Tab.2 Observed historical growth patterns in the OECD countries, 1960-1996

	Fixed capital				Employment (labour)				Total Factor Productivity (TFP)				Output (Gross Value Added)			
	1960s	1970s	1980s	1990s	1960s	1970s	1980s	1990s	1960s	1970s	1980s	1990s	1960s	1970s	1980s	1990s
Australia		4.3	3.4	2.4		1.6	2.0	1.2		0.7	0.4	2.2		3.4	2.9	3.9
Netherlands		3.3	2.0	2.2		0.2	0.6	0.6		1.6	1.0	1.5		3.0	2.2	2.7
Belgium		3.7	2.1	2.3		0.2	0.2	0.4		3.0	1.0	1.1		4.6	2.0	2.3
Denmark		3.2	1.8	1.3		0.7	0.5	-0.3		1.0	1.2	1.7		2.6	2.3	2.1
Norway		3.9	1.9	0.7		1.7	0.5	0.8		2.1	1.4	2.3		4.7	2.5	3.0
Sweden		3.0	2.8	1.9		0.8	0.7	-1.1		0.3	0.5	1.5		2.0	2.0	1.5
Finland	5.1	4.5	3.4	1.5	0.4	0.3	0.4	-2.0	2.2	1.5	1.6	2.7	4.5	3.5	3.2	2.1
USA	3.6	3.4	2.6	2.3	1.9	2.1	1.8	1.1	1.1	0.0	0.6	1.7	3.7	2.6	2.8	3.3
Canada	4.6	4.3	3.7	2.7	2.6	3.1	2.0	0.8	1.7	1.1	0.2	1.2	5.2	4.7	2.9	2.7
Japan		9.8	5.8	3.3		0.7	0.9	0.6		0.4	1.3	-0.5		4.7	4.2	1.2
Germany	5.5	3.8	2.6	2.0	0.2	0.2	0.5	0.1	2.1	1.2	1.0	0.9	4.5	2.8	2.3	1.8
France		4.0	2.7	2.3		0.5	0.2	0.3		1.7	1.1	0.6		3.6	2.4	1.7
Italy		3.5	3.2	2.1		1.0	0.6	-0.3		1.6	0.6	0.8		3.6	2.2	1.4
UK		2.8	2.5	2.5		0.2	0.6	-0.2		0.6	1.2	0.9		1.8	2.6	1.8
Austria		3.9	2.1	1.6		0.9	0.6	0.5		1.5	1.1	1.1		3.6	2.3	2.1
Greece		4.6	2.6	3.2		1.1	1.0	0.7		2.1	0.0	0.8		4.7	1.6	2.5
Portugal		5.7	3.1	3.4		2.8	0.4	0.6		0.8	1.7	0.9		4.7	3.2	2.6
Spain		3.9	2.7	1.9		0.9	1.3	0.9		1.5	1.0	1.1		3.6	2.9	2.4
Total		**4.1**	**2.6**	**2.2**		**1.2**	**1.1**	**0.6**		**1.5**	**0.9**	**1.2**		**3.9**	**2.6**	**2.4**

Source: Calculations based on the World Bank, OECD, and national data.

Please note that the historical data on the TFP growth show big differences among the countries, and among the periods (decades; compare table 2). The average TFP growth was generally slowing down during the 1970s and 1980s, but then accelerated again during the 1990s. One should also note that the TFP growth in the period of 19960s, 1970s and 1980s was generally faster in Europe than in USA and Japan. During the 1990s the TFP growth sharply accelerated in USA, and became negative in Japan.

Regression results

Construction of the above-described model required estimating parameters of two equations: (1) equation linking the rate of growth of the fixed capital to investment to GDP ratio; and (2) equation explaining the growth of he total factor productivity.

In the case of both equations, we used the data from 18 OECD countries for 3 full decades: 1960s, 1970s, and 1980s, and additionally the data for the 1990s (based on the period 1990-96). For the decade of 1960s only 4 observations were available. The data sources used for calculations were: OECD [1996b], OECD [2000], World Bank [2001], and national statistical yearbooks. Altogether, we had 58 observations.

Table 3 shows the results of the OLS regression, with the dependent variable defined as the yearly average growth rate of fixed capital in a given period. Dependent variables were: average investment to GDP ratio during the period, and dummy variables (for various periods, and country-specific).

Tab.3 Growth of fixed capital in OECD countries: regression results

	Coefficients	Standard errors	t Statistics	p-values
Intercept	-0.767	0.56	-1.36	0.18
Investment to GDP ratio	0.152	0.03	5.81	0.00
Dummies for the decades:				
Dummy for 1960s	1.902	0.28	6.71	0.00
Dummy for 1970s	0.982	0.17	5.64	0.00
Country-specific dummies:				
Norway (all decades)	-1.410	0.33	-4.28	0.00
Japan 70s	4.404	0.60	7.36	0.00
Japan 80s	2.124	0.57	3.74	0.00
	Regression statistics			
	R^2	0.877	Standard error	0.523
	Adjusted R^2	0.863	No. of observations	58

Source: Own calculations

Table 4 shows the results of the OLS regression, with the dependent variable defined as the yearly average growth rate of total factor productivity (TFP) in a given period. Dependent variables were: GDP per capita level at the beginning of the period (GDP_{-1}), the share of population over 65 years old (average during the period), gross enrolment rates in tertiary education (average during the period), share of R&D expenditure in GDP (average during the period), a proxy for the country-specific ability to absorb new technology (increase of the number of mobile phone per 1000 of population during the 1990s) and dummy variables (for various periods, and country-specific).

Tab.4 TFP growth in OECD countries: regression results

	Coefficients	Standard errors	t Statistics	p-values
Intercept	1.991	0.85	2.34	0.02
GDP_{-1} (GDP p.c. at the beginning of the period)	-0.045	0.04	-1.24	0.22
Share of population over 65 years old	-0.069	0.04	-1.69	0.10
Gross enrolment, tertiary education	0.006	0.01	0.67	0.51
R&D as % of GDP	0.161	0.10	1.59	0.10
Technology absorption (mobile phones/population)	0.001	0.00	2.47	0.02
Dummies for the decades:				
Dummy for 1960s	0.026	0.45	0.06	0.95
Dummy for 1970s	-0.419	0.30	-1.38	0.18
Dummy for 1980s	-0.462	0.25	-1.88	0.07
Country-specific dummies:				
Norway (all decades)	0.675	0.30	2.23	0.03
USA 70s	-1.185	0.51	-2.33	0.02
Belgium 70s	2.199	0.49	4.47	0.00
Japan 70s	-1.258	0.53	-2.37	0.02
Greece 70s	1.110	0.49	2.25	0.03
Greece 80s	-0.832	0.50	-1.66	0.10
Japan 90s	-1.765	0.54	-3.27	0.00
	Regression statistics			
	R^2	0.682	Standard error	0.461
	Adjusted R^2	0.558	No.of observations	58

Source: Own calculations

All the coefficients have expected signs (negative impact of the initial development level and the ageing process limiting countries' ability to absorb the new technology; positive impact of the spending on R&D and education, and of country-specific technology absorption abilities). The country-specific dummies indicate that a given country had a slower/faster TFP growth in a given period that one should expect. The intercept modified with the dummy variables for the decades may be seen as a proxy for the exogenous technological progress (i.e. the world trend in technology, independently of the policies of a country). The regression results imply the following values of this parameter: 2.01 during the 1960s, 1.57 during the 1970s, 1.53 during the 1980s, and 1.99 during the 1990s.

Please note, however, that in many cases the t statistics indicate relatively small statistical significance of the impact of independent variables (notably in the case of the education). The reason for this is relatively high correlation between variables that, according to the economic theory, should be included in the equation. In particular, all the indicators of the level of education are highly correlated with the initial GDP per capita level (compare table 5). It is also worth noticing, that an attempt to avoid including independent variables with high correlation (that leads to co-linearity problems) was one of the main tasks while searching for appropriate indicators. For example, the proliferation of mobile phones was used as a proxy for the country-specific ability to absorb new technology instead of the proliferation of the internet mainly because of the higher correlation of the latter with the initial GDP.

Tab.5 Correlation between variables used in the model

	TFP growth	*GDP$_{-1}$*	*Popul. over 65*	*Tertiary educ.*	*R&D*	*Technol. absorb.*	*1960s*	*1970s*	*1980s*
TFP growth over the period	1.000								
GDP_{-1} (GDP at the beginning of the period)	-0.153	1.000							
Share of population over 65 years old	-0.025	**0.428**	1.000						
Gross enrolment, tertiary education	-0.014	**0.790**	0.163	1.000					
R&D as % of GDP	-0.110	**0.635**	0.316	0.406	1.000				
Technology absorption (mobile phones/pop)	0.193	-0.033	0.299	-0.225	-0.013	1.000			
Dummy for 1960s	0.248	-0.351	-0.399	-0.201	-0.085	-0.124	1.000		
Dummy for 1970s	0.061	**-0.501**	-0.304	-0.397	-0.256	0.023	-0.183	1.000	
Dummy for 1980s	-0.256	0.067	0.034	-0.178	-0.001	0.023	-0.183	-0.450	1.000

Source: Own calculations

Although the regression results are not ideal from the statistical point of view, in our view the model has got enough forecasting power to be used for computation of the expected growth rates of TSP, and GDP, for the period of the next 40 years.

METHODOLOGY OF FORECASTING THE ECONOMIC GROWTH FOR THE CENTRAL AND EASTERN EUROPEAN COUNTRIES

Countries covered by the forecast

The forecast covers 22 Central and Eastern European countries (CEEC):

- 10 CEEC currently negotiating the EU membership (Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, Slovenia)
- 3 Mediterranean countries – candidates for the EU (Turkey, Cyprus, Malta)
- 5 Balkan countries that do not have the EC candidate status (Albania, Bosnia and Hercegovina, Croatia, FYR Macedonia, Yugoslavia)
- 4 European FSU countries (Belarus, Moldova, Russian Federation, Ukraine).
-

The forecast covers 4 decades: 2000-10, 2010-20, 2020-30, and 2030-40. The projected variables are: GDP per capita adjusted for PPP (Purchasing Power Parity; e.g. real GDP per capita level adjusted for differences in prices among countries), total GDP adjusted for PPP, and population.

Methodology

The forecast of the economic growth for the 22 CEEC is based on the endogenous growth theory (compare methodological chapter of the previous part of the study – forecast for OECD countries).
In the case of CEEC, taking into account the existing gap in the development level and technological level compared to the EU-15, we decided to use the "real convergence" approach. In other words, the

answer to the question: "how fast the GDP growth can be?", we replace by the answer to the question: "how fast the CEEC will be closing the development gap vis-à-vis EU-15?".

Real convergence, means an ability of a less developed economy to develop faster so that, over time, the initial gap in GDP between the less developed country and the richer countries diminishes. This principle has been observed and then empirically proven many times in history, i.e. 50 states of the United States, Japanese prefectures, and regions within the EU. In all these cases the speed of convergence was at about 2% level. This means that over a longer period of time, the growth rate in poor regions is higher than the growth rate in rich regions, and the gap in economic development decreases by an average of 2% annually. Such a parameter is called in economics "the beta-convergence parameter". From the point of view of the neo-classical economy, this can be easily explained by the following mechanism: in poor regions labour is cheap and capital relatively expensive because it is scarce (poor regions have low income, and therefore, small savings). If the capital is expensive, the marginal return resulting from its use - equal to its price - is high. That means that capital investments in a poor region bring higher returns, than in a rich region, where the capital is relatively cheap and abundant. This constitutes an incentive to move the capital from rich regions to poor regions, which in turn, leads to higher growth rates in poor regions.

In fact, high growth rates in poor regions do not require imports of capital. In the traditional models of economic growth, the neo-classical production function representing the process of transforming production factors (labour and capital) into goods and services exhibits the property of diminishing marginal productivity of production factors as their amount increases. This means that in the economy that does not have much capital, each saved and invested unit of capital gives higher production growth than in a developed economy. Therefore, there is no need to borrow capital from abroad; given the same savings rate, a less developed economy will be growing faster than a well developed economy.
However, the endogenous growth theory adds additional dimension to the analysis. As the technological progress is assumed to be endogenous, the speed of convergence becomes a function of such factors as policies supporting the human capital development, economic and political stability, good legal framework for the economic activity, policies supporting the accelerated absorption of the technology, and the saving and investment ratio. Therefore, the theory predicts the process of the conditional real convergence with the speed dependent on the broadly understood economic policies.

The available forecasts of the speed of convergence of CEEC (Barro [1994], Barbone and Zalduendo [1997], Sachs and Warner [1996], NOBE [2000]), tell generally about a period of 30-40 years necessary for the most developed CEEC (Czech Republic, Hungary, Poland, Slovenia, Slovakia) to reach the level of 70-80% of the EU-15 GDP per capita that implies an average growth rate of ca.5%. However, the results vary depending on the methodology, as well as on the assumptions made under various scenarios.

The model for CEEC

The growth model used in this study is based on the real convergence concept. The core of the model is the equation forecasting the beta-convergence parameter, i.e. the speed at which the development gap is reduced in a given period.

Beta-convergence parameter (β) is defined as:

$$\beta = [(1-\mathbf{gdp}_{i,1}/\mathbf{gdp}_{eu,1}) / (1-\mathbf{gdp}_{i,0}/\mathbf{gdp}_{eu,0})]^{(1/n)} - 1$$

where $\mathbf{gdp}_{i,0}$ stands for GDP per capita at purchasing power parity (PPP) in the country i at the beginning of the period, $\mathbf{gdp}_{eu,0}$ is GDP p.c. at PPP in EU-15 at the beginning of the period, $\mathbf{gdp}_{i,1}$ is

GDP p.c. at PPP in the country i at the end of the period, $\mathbf{gdp_{eu,1}}$ is GDP p.c. at PPP in EU-15 at the end of the period, n is the number of years.

In other words, the beta-convergence parameter shows by what percent, on the average, the development gap between a given CEEC and the EU-15 is reduced annually in the given period. It was confirmed in several studies that the beta-convergence parameter observed among the regions in Western Europe, USA and Japan, was at the level of 2% (the gap was reduced by 2% a year, Barro and Sala-I-Martin [1995]).

According to the endogenous growth theory, the speed of convergence in a given period (the beta-convergence parameter) is the function of: (1) political stability; (2) policies aimed at accelerating the absorption of technology (closing the technological gap due to technology spillovers); (3) economic stability; (4) saving and investment rates; (5) policies aimed at enhancing human capital:

$$\beta = f(\mathbf{a_1}, \mathbf{a_2}, \mathbf{a_3}, \ldots)$$

where $\mathbf{a_i}$ stands for various policies.

The beta-convergence parameter is then used for calculating the GDP p.c. level in the country i at the end of the period in the relation to EU-15:

$$\mathbf{gdp_{i,1}}/\mathbf{gdp_{eu,1}} = 1 - (1-\mathbf{gdp_{i,0}}/\mathbf{gdp_{eu,0}})(1+\beta)^n$$

The growth rate of GDP per capita in the country i can be obtained as:

$$\mathbf{gdp_{i,1}}/\mathbf{gdp_{i,1}} -1 = [\ (\mathbf{gdp_{i,1}}/\mathbf{gdp_{eu,1}}) / (\mathbf{gdp_{i,0}}/\mathbf{gdp_{eu,0}})\ ]\ [\mathbf{gdp_{eu,1}}/\mathbf{gdp_{eu,0}}] - 1$$

Please note, that the expression $\mathbf{gdp_{eu,1}}/\mathbf{gdp_{eu,0}}$ means the GDP per capita growth index in the area of EU-15, and should be taken from the projection of the growth of the OECD countries.
The total GDP growth can be obtained by adding the growth rate of population to the growth rate of GDP per capita.

Regression results

Construction of the above-described model required estimating parameters of the equation explaining the beta-convergence parameter.

In the case of this equation, we used the data from 26 developing economies of Europe, the Americas, Africa and Asia for 4 decades: 1960s, 1970s, 1980s, and 1990s (based on the period 1990-99), and for 19 transition economies of Europe and Central Asia for the period 1995-99. The data sources used for calculations were: World Bank [2001]; IMF [2000]. The political stability index was constructed by NOBE. Altogether, we had 112 observations (full data were not available for every developing country for all the periods). Moreover, please note that some countries counted as developing ones in some periods, might have graduated into developed ones later and, therefore, no longer included in the sample.

The political stability index was constructed by NOBE according to the scale presented in table 6, with 0 value meaning the total lack of stability, and 6 meaning the highest possible level of stability.

Tab.6 Political stability indicator: definitions

Value of the	Characteristics of the situation

index	
0	*long-lasting war, revolution, total collapse of the state*
1	*coup d'etat, serious civil unrest, unstable dictatorship*
2	*stable dictatorship*
3	*unstable democracy*
4	*stable democracy*
5	*enhanced stability (stable democracy and advanced EU negotiations, or membership of major Western organisations – NATO, OECD, EFTA)*
6	*full political stability, EU membership*

Table 7 shows the results of the OLS regression, with the dependent variable defined as the beta-convergence parameter, i.e. yearly average reduction of development gap vis-à-vis the EU-15 countries (measured by GDP per capita at PPP) in a given period. The negative value of the beta-convergence parameter means that the development gap was falling during the period.

Dependent variables were: (1) the index of the political stability, (2) the speed of elimination of the technological gap (defined as the change, in points, of the number of telephone mainlines per thousand of population related to the OECD average), (3) the economic instability index (measured by the yearly average CPI inflation), (4) the ratio of gross domestic saving to GDP (average in the period), (5) the share of public spending on education in GDP, and dummy variables (country-specific).

Tab.7 Speed of convergence in CEEC: regression results

	Coefficients	Standard errors	t Statistics	p-values
Intercept	1.334	0.38	3.50	0.00
Political stability	-0.173	0.08	-2.08	0.04
Elimination of technology gap (change in tel.lines related to OECD))	-0.057	0.01	-6.24	0.00
Economic instability (CPI)	0.010	0.00	6.45	0.00
Gross domestic savings as % of GDP	-0.030	0.01	-2.70	0.01
Public spending on education % GDP	-0.133	0.06	-2.05	0.04
Spain 60s	-2.703	0.65	-4.14	0.00
Japan 60s	-6.858	0.97	-7.03	0.00
Uruguay 60s	4.212	0.92	4.58	0.00
Hong-Kong 80s	-5.671	0.93	-6.08	0.00
Czech R.95s	4.012	0.93	4.33	0.00
Greece 80s	3.027	0.93	3.25	0.00
Hong-Kong 70s	-2.709	0.93	-2.91	0.00
Israel 80s	1.667	0.94	1.76	0.08
	Regression statistics			
	R^2	0.816	Standard error	0.907
	Adjusted R^2	0.792	No. of observations	112

Source: Own calculations

All the coefficients have expected signs (high political stability, high speed of elimination of the technological gap, high domestic saving and high spending on education accelerate the fall of the development gap, while high economic instability increases the gap). The country-specific dummies indicate that a given country had a slower/faster speed of convergence in a given period that one should expect.
As table 8 indicates, there is no co-linearity problem.

Tab.8 Correlation between variables used in the model

	Beta convergence	*Political stability*	*Elimination of T-gap*	*Economic instability (CPI)*	*Gross domestic savings*	*Public spending on education*
Beta convergence	1.000					
Political stability	**-0.417**	1.000				
Elimination of technology gap (change in tel.lines related to OECD)	**-0.580**	**0.417**	1.000			
Economic instability (CPI)	**0.433**	-0.215	-0.207	1.000		
Gross domestic savings as % of GDP	-0.384	0.215	0.248	-0.083	1.000	
Public spending on education % GDP	-0.048	0.276	-0.015	-0.027	-0.190	1.000

Source: Own calculations

The equation explaining the beta-convergence parameter has got good statistical properties. In our view, it can be used for the long-term forecasting of the development patterns of CEEC.

PROJECTIONS OF THE ECONOMIC GROWTH FOR THE OECD COUNTRIES, 2000-2040

Overview of the scenarios

The projection is made in 3 variants: low, base, and high case. The general definition of the scenarios can be found in the introduction. Let us remind that:

- **Low case:** policies aimed at accelerating the technological progress and enhancing the human capital are relatively weak (there is almost no progress compared to the current situation). Additionally, the countries suffer due to the most unfavourable demographic trends (low UN demographic variant meaning the fall of the population with strong ageing process).

- **Base case:** steady improvement in the policies aimed at accelerating knowledge-based growth, and more favourable demographic trends (medium UN demographic variant).

- **High case:** the aggressive move towards accelerating the technological progress and strengthening human capital by the robust increase of resources devoted to R&D activities and to the education, accompanied by the most optimistic UN high demographic variant.

The detailed assumptions and results of the scenarios are presented below.

General results of the projections

The projections point out to continuation of the economic growth in the OECD countries, albeit the rate of growth of GDP falls over time.

The most important features of the expected growth in the EU-15 and EFTA area are:

- General fall of population in the low and base case, and the stabilisation in the high case.
- Accompanying process of the ageing of population.
- GDP growth in the range from 1.5 to 2.5% (annual average for the period 2000-40).
- Possibility of the use of the mechanisms of the knowledge-based economy for keeping the GDP growth (acceleration of the growth rate possible under the condition of the more aggressive use of the policies aimed at accelerating technological progress and maximal development of the human capital).

Tab.9 Average yearly growth in OECD countries 2000-2040, scenario projections

	Low			Base			High		
	GDP p.c.	Population	GDP	GDP p.c.	Population	GDP	GDP p.c.	Population	GDP
Austria	1.7	-0.4	1.3	2.2	-0.2	2.0	2.7	0.0	2.7
Belgium	1.4	-0.4	1.0	1.8	-0.2	1.6	2.3	0.0	2.3
Denmark	1.6	-0.4	1.1	2.0	-0.1	1.8	2.5	0.1	2.6
Finland	1.9	-0.2	1.6	2.3	-0.1	2.3	2.8	0.2	3.0
France	1.5	-0.2	1.4	2.0	0.1	2.0	2.4	0.3	2.7
Germany	1.4	-0.4	1.0	1.8	-0.2	1.7	2.3	0.0	2.4
Greece	1.9	-0.5	1.4	2.4	-0.4	2.0	2.9	-0.2	2.7
Ireland	1.6	0.3	1.9	2.1	0.5	2.6	2.5	0.8	3.3
Italy	0.9	-0.7	0.2	2.1	-0.6	1.5	2.6	-0.4	2.2
Luxembourg	0.8	-0.2	0.6	1.2	0.1	1.3	1.6	0.3	2.0
Netherlands	1.6	-0.3	1.3	2.0	-0.1	1.9	2.5	0.1	2.6
Portugal	2.2	-0.4	1.7	2.7	-0.3	2.4	3.2	0.0	3.2
Spain	1.9	-0.6	1.3	2.3	-0.4	1.9	2.8	-0.2	2.6
Sweden	1.6	-0.2	1.4	2.0	0.0	2.0	2.6	0.3	2.9
UK	1.6	-0.3	1.3	2.1	0.0	2.0	2.5	0.2	2.8
Iceland	1.6	0.2	1.8	2.0	0.5	2.5	2.5	0.7	3.3
Norway	1.2	-0.1	1.1	1.6	0.2	1.8	2.1	0.4	2.6
Switzerland	1.3	-0.3	1.0	1.7	-0.1	1.6	2.2	0.2	2.4
Australia	1.6	0.2	1.9	2.0	0.7	2.7	2.5	0.9	3.4
Canada	1.2	0.2	1.4	1.6	0.7	2.2	2.0	0.8	2.8
Japan	1.6	-0.5	1.1	2.1	-0.2	1.9	2.6	-0.1	2.5
USA	1.1	0.2	1.4	1.5	0.5	2.0	1.9	0.8	2.7
TOTAL	**1.4**	**-0.2**	**1.2**	**1.8**	**0.1**	**2.0**	**2.3**	**0.4**	**2.7**
EU-15	**1.5**	**-0.4**	**1.1**	**2.0**	**-0.2**	**1.9**	**2.5**	**0.0**	**2.6**

Source: model calculations, United Nations

Tab.10 GDP and population in OECD countries 2000-40, scenario projections (in constant 1999 US$)

	Data/estimate 2000			Low			Base			High		
	GDP p.c. in US$ (000)	Population (mn)	GDP in US$ bn	GDP p.c. in US$ (000)	Population (mn)	GDP in US$ bn	GDP p.c. in US$ (000)	Population (mn)	GDP in US$ bn	GDP p.c. in US$ (000)	Population (mn)	GDP in US$ bn
Austria	25.8	8.1	209	51.6	6.9	356	61.6	7.5	463	74.8	8.2	613
Belgium	26.3	10.2	269	45.7	8.7	399	53.9	9.4	509	64.4	10.3	662
Denmark	26.4	5.3	141	49.0	4.5	220	58.4	5.0	293	70.5	5.5	386
Finland	23.8	5.2	123	50.0	4.7	234	60.0	5.0	302	72.5	5.5	399
France	23.6	58.6	1 382	43.4	54.8	2 378	51.4	60.5	3 111	61.8	65.5	4 043
Germany	24.0	82.1	1 968	42.0	70.3	2 951	49.8	76.4	3 802	59.9	83.7	5 010
Greece	16.0	10.5	169	34.5	8.5	293	41.6	8.9	368	50.9	9.8	498
Ireland	27.5	3.8	103	52.4	4.2	220	62.2	4.6	289	74.9	5.1	383
Italy	22.7	57.6	1 310	33.2	42.9	1 422	51.6	45.9	2 369	63.2	49.9	3 153
Luxembourg	43.6	0.4	19	59.6	0.4	24	70.1	0.4	31	83.4	0.5	41
Netherlands	24.9	15.8	394	47.0	14.2	667	56.0	15.0	840	67.8	16.5	1 116
Portugal	16.6	10.0	166	39.6	8.4	331	47.8	8.8	421	58.6	10.1	589
Spain	18.7	39.4	737	39.2	31.5	1 233	46.9	33.0	1 549	56.8	37.0	2 099
Sweden	23.4	8.9	208	43.7	8.3	361	52.6	8.8	462	64.2	10.1	647
UK	22.6	59.5	1 347	42.9	53.1	2 274	51.1	59.0	3 012	61.7	65.4	4 039
Iceland	28.4	0.3	8	53.3	0.3	16	63.5	0.3	21	77.1	0.4	29
Norway	29.0	4.5	129	46.5	4.3	202	55.7	4.8	268	67.4	5.3	355
Switzerland	28.0	7.1	200	46.4	6.4	295	55.3	6.9	384	67.1	7.6	509
Australia	25.4	19.0	482	48.8	20.6	1 007	56.2	25.0	1 404	67.5	26.8	1 807
Canada	27.2	30.5	829	44.4	33.0	1 464	50.3	39.9	2 009	59.9	42.3	2 532
Japan	25.1	126.6	3 183	48.4	102.2	4 943	56.9	116.8	6 641	70.5	119.8	8 452
USA	33.3	278.2	9 267	52.3	303.4	15 866	60.3	342.5	20 660	70.2	389.5	27 329
TOTAL	**26.9**	**841.6**	**22 645**	**46.9**	**791.5**	**37 159**	**55.6**	**884.6**	**49 211**	**66.4**	**974.4**	**64 688**
EU-15	**22.8**	**375.5**	**8 546**	**41.6**	**321.2**	**13 364**	**51.2**	**348.4**	**17 824**	**61.8**	**382.8**	**23 676**

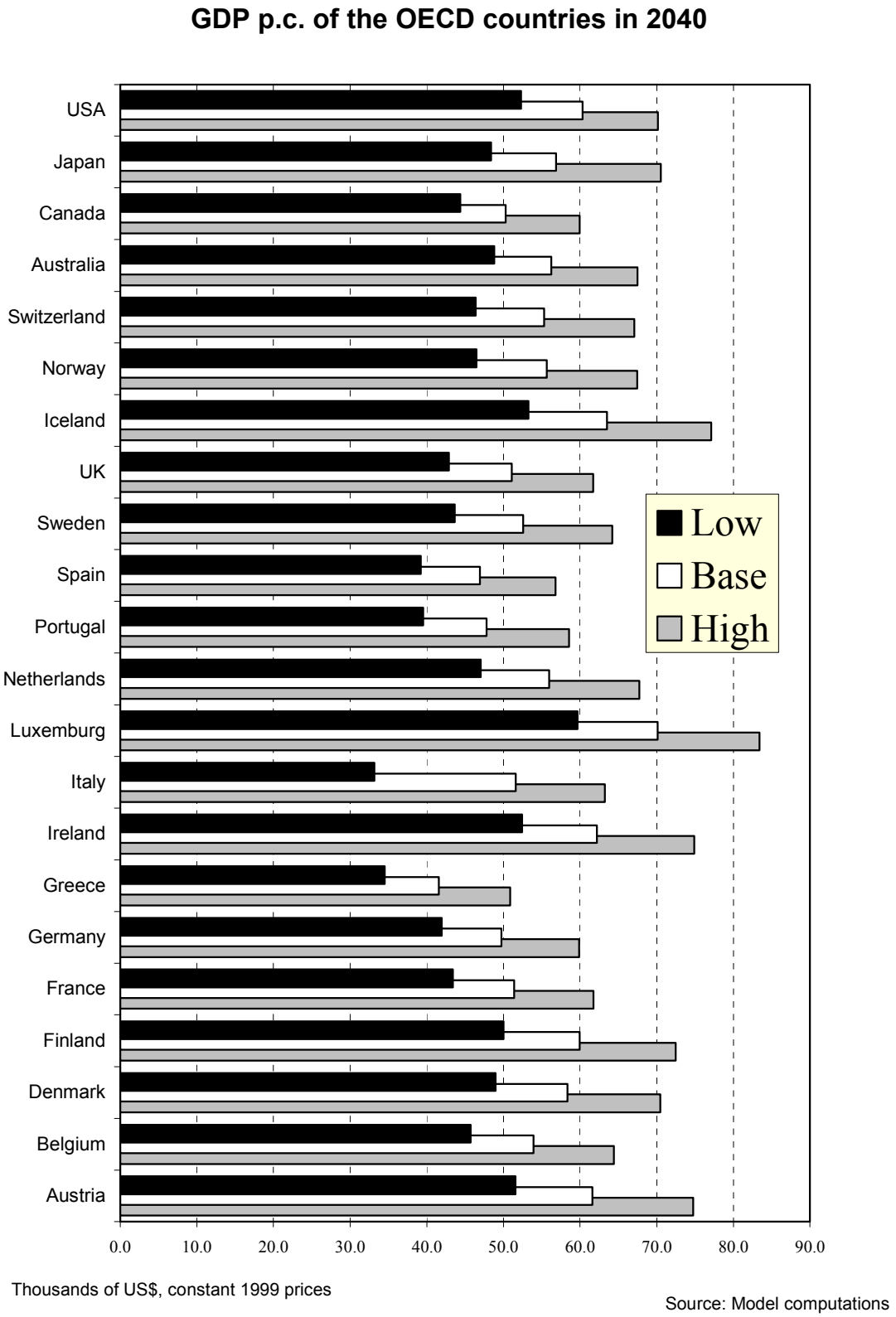
Source: model calculations, United Nations

As data in table 10 indicate, the real convergence process will continue. For example, in the base case, the coefficient of variability of the GDP per capita among the 22 countries falls from 22% in the year 2000 to 12% in 2040 (in the low case to 14%, in the high case to 11%). The ratio of the GDP per capita

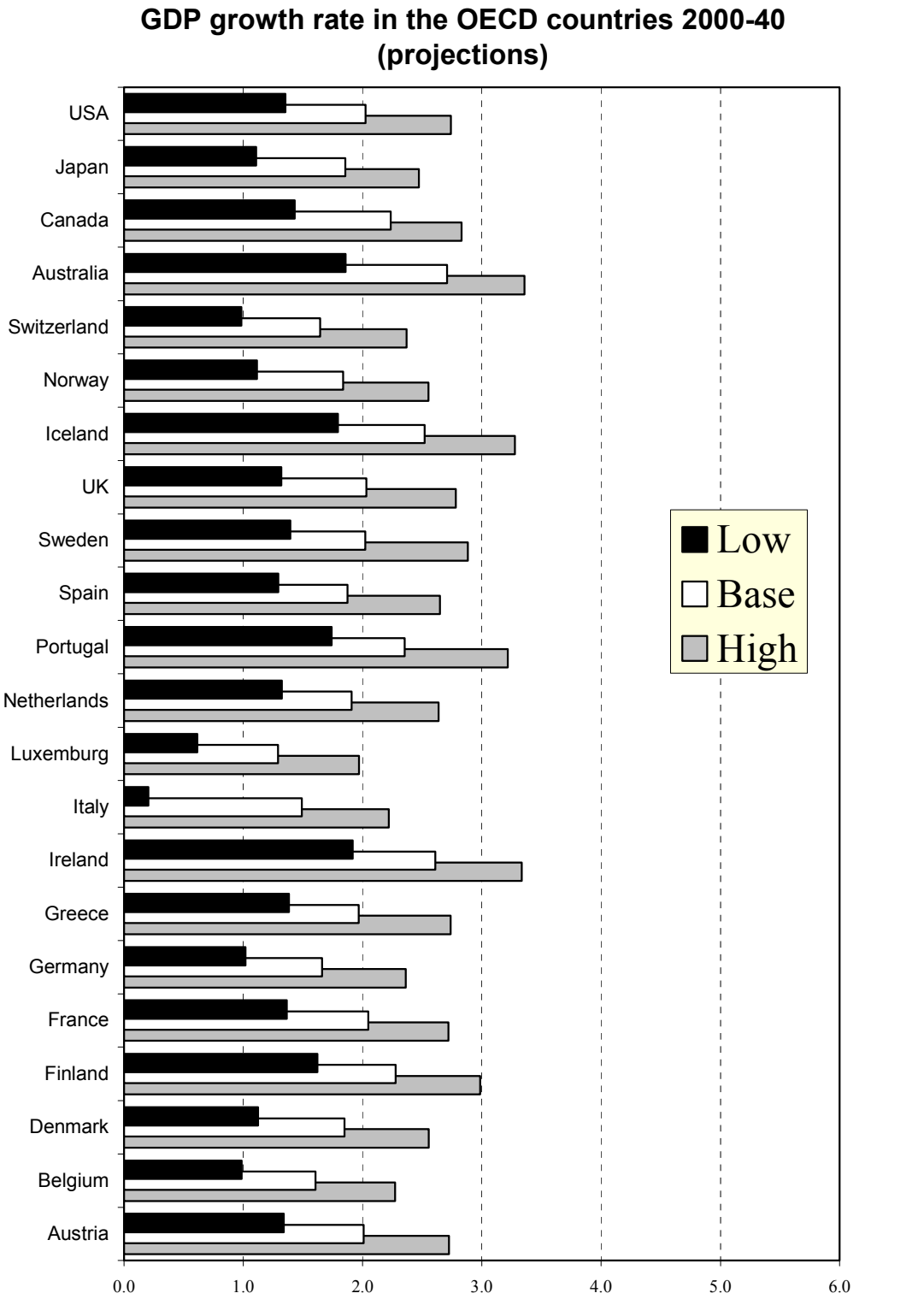
in the most developed and least developed of the 22 OECD countries falls in the projection from 2.7 in the year 2000 to 1.7 in 2040 (in the low case to 1.8, in the high case to 1.6).

Therefore, the acceleration of the growth leads to the faster trend towards the real convergence of the development levels among the high-income OECD countries.

The same phenomenon may be observed with the Graph 1. In every scenario, Luxembourg remains the richest, and Greece the poorest country. Graph 2 shows the comparison of the projected growth rates of GDP, and Graph 3 the UN projections of the population change.

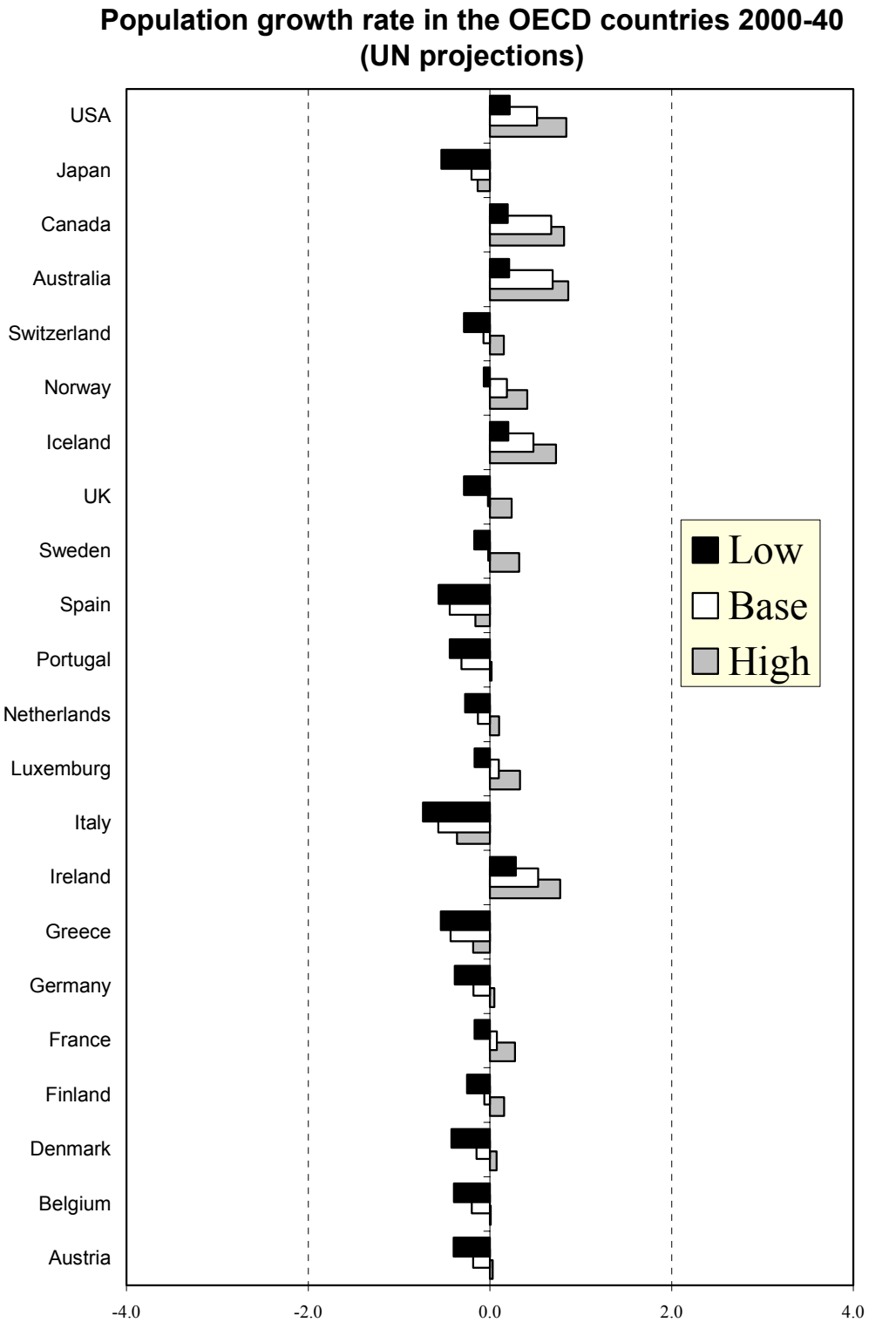

GDP p.c. of the OECD countries in 2040
USA
Japan
Canada
Australia
Switzerland
Norway
Iceland
UK
Sweden
Spain
Portugal
Netherlands
Luxemburg
Italy
Ireland
Greece
Germany
France
Finland
Denmark
Belgium
Austria
Low
Base
High
0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
Thousands of US$, constant 1999 prices
Source: Model computations

Graph 1



Source: Model computations

Graph 2


Population growth rate in the OECD countries 2000-40
(UN projections)
USA
Japan
Canada
Australia
Switzerland
Norway
Iceland
UK
Sweden
Spain
Portugal
Netherlands
Luxemburg
Italy
Ireland
Greece
Germany
France
Finland
Denmark
Belgium
Austria
Low
Base
High
-4.0
-2.0
0.0
2.0
4.0
Source: United Nations

Graph 3

Tab.11 Average yearly growth of production factors and output in OECD countries 2000-2040, scenario projections

	Low				Base				High			
	Capital	Labour	TFP	GDP	Capital	Labour	TFP	GDP	Capital	Labour	TFP	GDP
Austria	2.5	-0.2	0.5	1.3	2.6	0.0	1.0	2.0	2.7	0.3	1.5	2.7
Belgium	2.0	-0.1	0.3	1.0	2.1	0.1	0.7	1.6	2.3	0.3	1.2	2.3
Denmark	1.8	-0.2	0.5	1.1	2.0	0.1	1.0	1.8	2.1	0.3	1.5	2.6
Finland	1.8	0.1	0.9	1.6	1.9	0.3	1.4	2.3	2.0	0.5	1.9	3.0
France	1.7	0.1	0.6	1.4	1.9	0.4	1.0	2.0	2.0	0.6	1.5	2.7
Germany	2.0	-0.1	0.3	1.0	2.1	0.1	0.7	1.7	2.2	0.4	1.2	2.4
Greece	2.2	-0.3	0.6	1.4	2.4	-0.1	1.1	2.0	2.5	0.2	1.6	2.7
Ireland	2.3	0.5	0.7	1.9	2.5	0.8	1.1	2.6	2.6	1.1	1.6	3.3
Italy	1.7	-0.4	-0.2	0.2	1.8	-0.2	0.9	1.5	1.9	0.0	1.4	2.2
Luxembourg	1.8	0.0	-0.1	0.6	1.9	0.3	0.4	1.3	2.0	0.5	0.8	2.0
Netherlands	2.2	-0.1	0.5	1.3	2.3	0.1	0.9	1.9	2.4	0.3	1.5	2.6
Portugal	2.5	-0.2	0.9	1.7	2.6	-0.1	1.4	2.4	2.8	0.3	1.9	3.2
Spain	2.4	-0.2	0.4	1.3	2.5	0.0	0.9	1.9	2.7	0.3	1.4	2.6
Sweden	1.4	0.0	0.8	1.4	1.5	0.2	1.3	2.0	1.6	0.6	1.9	2.9
UK	1.6	-0.1	0.7	1.3	1.7	0.2	1.2	2.0	1.8	0.5	1.8	2.8
Iceland	1.9	0.4	0.8	1.8	2.0	0.7	1.3	2.5	2.1	0.9	1.9	3.3
Norway	0.8	0.1	0.7	1.1	0.9	0.4	1.2	1.8	1.0	0.6	1.8	2.6
Switzerland	1.9	-0.1	0.3	1.0	2.0	0.1	0.8	1.6	2.1	0.4	1.3	2.4
Australia	2.4	0.5	0.6	1.9	2.5	1.0	1.1	2.7	2.6	1.2	1.6	3.4
Canada	1.9	0.4	0.4	1.4	2.0	1.0	0.9	2.2	2.1	1.1	1.3	2.8
Japan	2.7	-0.4	0.3	1.1	2.8	0.0	0.7	1.9	3.0	0.1	1.2	2.5
USA	1.8	0.4	0.4	1.4	1.9	0.7	0.8	2.0	2.0	1.1	1.3	2.7

Source: model calculations

Table 11 shows the sources of growth in the OECD area in the period 2000-2040. The most important observations are:

- Despite some differences among scenarios, the growth of labour is either going to affect negatively the GDP growth rate, or – at the best - to have an insignificant impact.
- There are no significant differences among the scenarios in the increase of the fixed capital. Taking into account the insignificant – or negative – increase of the labour, the total increase in the use of the production factors over the whole period remains relatively low (below 1% in majority of countries).
- Therefore, the acceleration of the TFP increase is the only way to achieve satisfying GDP growth rates in the OECD area, responsible – in the high case – for 2/3 of the total growth.
-

Detailed results of the projections

Tables 12-17 show the detailed results of the projections, according to the three scenarios, and to four periods (2000-2010, 2010-2020, 2020-2030, 2030-2040). The tables show, respectively, average yearly growth rates of the following variables: TFP, production factors (fixed capital and labour), total GDP, population (UN projections), and GDP per capita adjusted for the Purchasing Power Parity (PPP).

Tab.12 Average growth rate of total factor productivity (TFP) in OECD countries 2000-40, scenario projections

	Low				Base				High			
	2000-10	2010-20	2020-30	2030-40	2000-10	2010-20	2020-30	2030-40	2000-10	2010-20	2020-30	2030-40
Austria	1.2	0.9	0.3	-0.4	1.4	1.3	0.8	0.3	1.7	1.7	1.4	1.0
Belgium	0.8	0.5	0.1	-0.4	1.1	0.9	0.6	0.2	1.3	1.3	1.1	0.9
Denmark	1.1	0.8	0.3	-0.1	1.4	1.2	0.9	0.6	1.7	1.7	1.5	1.3
Finland	1.7	1.1	0.6	0.2	1.9	1.6	1.1	0.8	2.1	2.0	1.7	1.6
France	1.2	0.8	0.4	0.0	1.4	1.2	0.9	0.6	1.6	1.7	1.5	1.3
Germany	0.9	0.5	0.1	-0.4	1.1	0.9	0.6	0.3	1.4	1.4	1.2	1.0
Greece	1.1	0.9	0.5	0.1	1.3	1.3	1.1	0.7	1.6	1.7	1.7	1.5
Ireland	1.2	0.9	0.5	0.1	1.5	1.3	1.0	0.7	1.7	1.8	1.6	1.4
Italy	-0.7	-0.3	0.0	0.2	1.3	1.1	0.8	0.3	1.6	1.6	1.4	1.1
Luxembourg	0.5	0.2	-0.3	-0.7	0.7	0.6	0.2	-0.1	1.0	1.0	0.8	0.6
Netherlands	1.2	0.8	0.2	-0.3	1.5	1.2	0.8	0.3	1.7	1.7	1.4	1.1
Portugal	1.4	1.2	0.8	0.3	1.6	1.6	1.3	0.9	1.9	2.1	2.0	1.8
Spain	1.0	0.8	0.3	-0.3	1.2	1.1	0.8	0.3	1.5	1.6	1.4	1.1
Sweden	1.4	1.0	0.6	0.2	1.6	1.4	1.1	0.9	1.9	2.0	1.8	1.7
UK	1.3	1.0	0.5	0.1	1.5	1.4	1.1	0.8	1.8	1.9	1.8	1.6
Iceland	1.4	1.1	0.6	0.1	1.7	1.6	1.2	0.8	2.0	2.1	1.8	1.6
Norway	1.3	1.0	0.5	0.2	1.5	1.4	1.1	0.9	1.8	1.9	1.8	1.6
Switzerland	1.0	0.6	0.1	-0.5	1.2	1.0	0.6	0.2	1.5	1.5	1.2	0.9
Australia	1.3	0.9	0.4	-0.1	1.5	1.3	1.0	0.7	1.7	1.7	1.6	1.3
Canada	1.1	0.7	0.2	-0.2	1.2	1.1	0.7	0.5	1.4	1.4	1.3	1.1
Japan	1.0	0.4	0.0	-0.4	1.2	0.9	0.5	0.3	1.5	1.3	1.1	0.9
USA	1.0	0.7	0.1	-0.2	1.2	1.0	0.6	0.4	1.5	1.4	1.2	1.0

Source: model calculations

Please note that the rate of growth of TFP is, generally, falling over time. This is mainly due to the two trends: the falling marginal productivity of capital, and the process of ageing. The stronger the ageing trend in a given country, the more problem the country has in counteracting the TFP growth slowdown, as the ageing society is less likely to absorb efficiently the new technology, even if the appropriate R&D and human development policies are applied.

Tab.13 Average growth rate of fixed capital in OECD countries 2000-40, scenario projections

	Low				Base				High			
	2000-10	2010-20	2020-30	2030-40	2000-10	2010-20	2020-30	2030-40	2000-10	2010-20	2020-30	2030-40
Austria	2.8	2.6	2.3	2.1	2.8	2.7	2.5	2.3	2.9	2.8	2.7	2.6
Belgium	2.3	2.1	1.9	1.7	2.4	2.2	2.1	1.9	2.4	2.3	2.2	2.1
Denmark	2.1	1.9	1.7	1.6	2.2	2.0	1.9	1.7	2.2	2.1	2.0	1.9
Finland	2.0	1.8	1.7	1.5	2.1	1.9	1.8	1.7	2.1	2.0	1.9	1.9
France	2.0	1.8	1.7	1.5	2.1	1.9	1.8	1.7	2.1	2.0	1.9	1.8
Germany	2.3	2.1	1.9	1.7	2.3	2.2	2.0	1.9	2.4	2.3	2.2	2.1
Greece	2.6	2.3	2.1	1.9	2.6	2.4	2.3	2.1	2.6	2.5	2.4	2.3
Ireland	2.7	2.4	2.2	2.0	2.7	2.5	2.4	2.2	2.7	2.6	2.5	2.4
Italy	2.0	1.8	1.6	1.5	2.0	1.9	1.8	1.6	2.1	2.0	1.9	1.8
Luxembourg	2.1	1.9	1.7	1.5	2.1	1.9	1.8	1.7	2.1	2.0	1.9	1.9
Netherlands	2.5	2.3	2.1	1.9	2.5	2.4	2.2	2.1	2.6	2.5	2.4	2.3
Portugal	2.9	2.6	2.4	2.2	2.9	2.7	2.5	2.4	2.9	2.8	2.7	2.6
Spain	2.7	2.5	2.3	2.1	2.8	2.6	2.4	2.3	2.8	2.7	2.6	2.5
Sweden	1.7	1.5	1.3	1.2	1.7	1.6	1.5	1.3	1.7	1.6	1.6	1.5
UK	1.8	1.7	1.5	1.3	1.9	1.7	1.6	1.5	1.9	1.8	1.7	1.7
Iceland	2.2	2.0	1.8	1.6	2.2	2.0	1.9	1.8	2.2	2.1	2.0	2.0
Norway	1.1	0.9	0.7	0.5	1.1	1.0	0.8	0.7	1.2	1.1	1.0	0.9
Switzerland	2.2	1.9	1.8	1.6	2.2	2.0	1.9	1.8	2.2	2.1	2.0	2.0
Australia	2.7	2.5	2.3	2.0	2.8	2.6	2.4	2.3	2.8	2.7	2.6	2.5
Canada	2.1	1.9	1.7	1.6	2.2	2.0	1.9	1.8	2.2	2.1	2.0	1.9
Japan	3.1	2.8	2.6	2.3	3.1	2.9	2.7	2.6	3.1	3.0	2.9	2.8
USA	2.1	1.9	1.7	1.5	2.1	2.0	1.8	1.7	2.1	2.0	2.0	1.9

Source: model calculations

Tab.14 Average growth rate of employment in OECD countries 2000-40, scenario projections

	Low				Base				High			
	2000-10	2010-20	2020-30	2030-40	2000-10	2010-20	2020-30	2030-40	2000-10	2010-20	2020-30	2030-40
Austria	0.3	-0.1	-0.4	-0.7	0.4	0.1	-0.1	-0.3	0.5	0.3	0.2	0.0
Belgium	0.2	0.0	-0.2	-0.5	0.3	0.2	0.0	-0.2	0.5	0.4	0.3	0.2
Denmark	0.1	-0.1	-0.3	-0.6	0.3	0.1	0.0	-0.1	0.4	0.3	0.3	0.2
Finland	0.4	0.2	0.0	-0.3	0.5	0.4	0.2	0.0	0.7	0.6	0.5	0.3
France	0.5	0.2	0.0	-0.2	0.7	0.5	0.3	0.2	0.8	0.7	0.6	0.5
Germany	0.2	0.0	-0.2	-0.4	0.3	0.2	0.1	-0.1	0.5	0.4	0.3	0.3
Greece	0.2	-0.2	-0.4	-0.6	0.3	-0.1	-0.3	-0.4	0.5	0.1	0.0	0.0
Ireland	0.8	0.7	0.4	0.2	1.0	1.0	0.7	0.5	1.2	1.2	0.9	0.9
Italy	0.0	-0.3	-0.6	-0.9	0.4	-0.4	-0.3	-0.5	0.3	0.0	-0.1	-0.2
Luxembourg	0.6	0.1	-0.2	-0.5	0.8	0.4	0.1	-0.1	0.9	0.5	0.4	0.3
Netherlands	0.3	0.0	-0.2	-0.5	0.3	0.1	0.0	-0.2	0.5	0.3	0.3	0.2
Portugal	0.1	-0.1	-0.3	-0.6	0.1	-0.1	-0.2	-0.3	0.4	0.2	0.2	0.2
Spain	0.3	0.0	-0.3	-0.6	0.4	0.1	-0.2	-0.4	0.6	0.3	0.1	0.1
Sweden	0.3	0.2	0.0	-0.3	0.4	0.3	0.2	0.0	0.7	0.6	0.6	0.5
UK	0.1	0.1	-0.1	-0.4	0.3	0.3	0.2	0.0	0.5	0.6	0.5	0.4

Iceland	0.7	0.5	0.6	-0.3	1.0	0.7	0.6	0.4	1.1	1.0	0.9	0.7
Norway	0.4	0.2	0.0	-0.2	0.6	0.5	0.3	0.2	0.7	0.6	0.6	0.5
Switzerland	0.4	0.0	-0.2	-0.6	0.5	0.2	0.0	-0.2	0.6	0.4	0.3	0.1
Australia	0.9	0.7	0.3	-0.1	1.2	1.1	0.9	0.7	1.5	1.4	1.1	0.7
Canada	0.9	0.8	0.3	-0.2	1.2	1.1	0.9	0.7	1.5	1.4	1.0	0.6
Japan	0.1	-0.3	-0.5	-0.7	0.3	-0.1	-0.3	0.1	0.4	0.1	-0.1	0.0
USA	0.7	0.5	0.3	0.1	0.9	0.8	0.7	0.5	1.1	1.2	1.0	0.9

Source: model calculations

The UN demographic projections lead to the gradual slow-down of the rate of increase of the labour (employment). Please note, however, that such a process may be strongly influenced by the immigration policies of the OECD countries.
Additional impact, probably mainly in the period 2010-2020, may be expected due to the EU enlargement, leading to the complete freedom of the movement of labour within the enlarged Union.

Tab.15 Average growth rate of GDP in OECD countries 2000-40, scenario projections

	Low				Base				High			
	2000-10	2010-20	2020-30	2030-40	2000-10	2010-20	2020-30	2030-40	2000-10	2010-20	2020-30	2030-40
Austria	2.5	1.8	1.0	0.1	2.8	2.4	1.8	1.0	3.2	3.0	2.6	2.0
Belgium	1.9	1.4	0.7	0.0	2.2	1.9	1.4	0.9	2.5	2.5	2.2	1.9
Denmark	2.1	1.5	0.8	0.2	2.4	2.1	1.7	1.2	2.8	2.7	2.5	2.2
Finland	2.7	2.0	1.2	0.6	3.0	2.6	2.0	1.5	3.4	3.2	2.8	2.5
France	2.3	1.7	1.1	0.4	2.6	2.3	1.9	1.4	3.0	2.9	2.6	2.4
Germany	1.9	1.4	0.7	0.1	2.2	1.9	1.5	1.0	2.6	2.5	2.3	2.0
Greece	2.2	1.7	1.1	0.5	2.5	2.2	1.8	1.3	2.9	2.9	2.7	2.5
Ireland	2.8	2.3	1.6	1.0	3.2	2.9	2.4	1.9	3.6	3.6	3.2	2.9
Italy	0.1	0.2	0.3	0.3	2.3	1.7	1.3	0.7	2.6	2.4	2.1	1.7
Luxembourg	1.7	0.9	0.3	-0.4	2.0	1.6	1.0	0.6	2.4	2.2	1.8	1.5
Netherlands	2.4	1.7	1.0	0.2	2.7	2.2	1.7	1.0	3.1	2.9	2.5	2.1
Portugal	2.5	2.1	1.5	0.8	2.8	2.6	2.3	1.7	3.3	3.4	3.3	2.9
Spain	2.3	1.8	1.0	0.1	2.6	2.2	1.7	1.0	3.0	2.9	2.6	2.1
Sweden	2.2	1.7	1.1	0.5	2.6	2.3	1.8	1.4	3.1	3.0	2.8	2.6
UK	2.1	1.7	1.1	0.4	2.5	2.3	1.9	1.4	2.9	3.0	2.8	2.5
Iceland	2.7	2.2	1.7	0.6	3.2	2.8	2.3	1.8	3.6	3.5	3.2	2.8
Norway	2.0	1.5	0.8	0.2	2.4	2.1	1.7	1.2	2.7	2.7	2.5	2.3
Switzerland	2.1	1.4	0.6	-0.2	2.4	2.0	1.4	0.8	2.8	2.6	2.2	1.8
Australia	2.9	2.3	1.5	0.7	3.3	3.0	2.5	2.0	3.8	3.7	3.3	2.7
Canada	2.5	1.9	1.1	0.3	2.8	2.5	2.0	1.6	3.2	3.1	2.7	2.2
Japan	2.3	1.4	0.7	0.1	2.6	2.0	1.5	1.4	3.0	2.6	2.3	2.0
USA	2.3	1.7	1.0	0.4	2.6	2.3	1.8	1.4	3.0	3.0	2.6	2.4

Source: model calculations

Tab.16 Average growth rate of population in OECD countries 2000-40, United Nations projections

	Low				Base				High			
	2000-10	2010-20	2020-30	2030-40	2000-10	2010-20	2020-30	2030-40	2000-10	2010-20	2020-30	2030-40

Austria	0.1	-0.3	-0.5	-0.9	0.2	-0.1	-0.3	-0.5	0.3	0.1	-0.1	-0.2
Belgium	-0.1	-0.3	-0.5	-0.7	0.0	-0.1	-0.2	-0.4	0.1	0.0	0.0	-0.1
Denmark	-0.1	-0.3	-0.5	-0.8	0.1	-0.1	-0.2	-0.4	0.2	0.1	0.1	0.0
Finland	0.0	-0.1	-0.3	-0.6	0.1	0.1	-0.1	-0.3	0.2	0.2	0.2	0.0
France	0.1	-0.1	-0.2	-0.5	0.3	0.1	0.0	-0.1	0.4	0.3	0.2	0.2
Germany	-0.1	-0.3	-0.5	-0.7	0.0	-0.1	-0.2	-0.3	0.1	0.1	0.0	0.0
Greece	-0.1	-0.4	-0.7	-0.9	-0.1	-0.4	-0.6	-0.7	0.1	-0.2	-0.3	-0.3
Ireland	0.6	0.5	0.2	-0.1	0.7	0.7	0.4	0.3	0.9	0.9	0.7	0.6
Italy	-0.3	-0.6	-0.9	-1.1	0.0	-0.8	-0.7	-0.8	-0.1	-0.4	-0.4	-0.5
Luxembourg	0.4	-0.1	-0.4	-0.6	0.6	0.2	-0.1	-0.3	0.7	0.3	0.2	0.1
Netherlands	0.1	-0.2	-0.3	-0.7	0.1	-0.1	-0.2	-0.4	0.3	0.1	0.1	-0.1
Portugal	-0.1	-0.3	-0.5	-0.7	-0.1	-0.3	-0.4	-0.5	0.1	0.0	0.0	0.0
Spain	-0.2	-0.4	-0.7	-0.9	-0.1	-0.4	-0.5	-0.7	0.1	-0.2	-0.3	-0.3
Sweden	0.1	0.0	-0.2	-0.5	0.1	0.1	-0.1	-0.2	0.4	0.4	0.3	0.2
UK	-0.1	-0.1	-0.3	-0.6	0.1	0.1	0.0	-0.2	0.2	0.3	0.3	0.2
Iceland	0.6	0.3	0.4	-0.5	0.8	0.5	0.4	0.2	0.9	0.8	0.7	0.5
Norway	0.2	0.0	-0.1	-0.4	0.4	0.3	0.1	0.0	0.5	0.4	0.4	0.3
Switzerland	0.2	-0.1	-0.4	-0.8	0.3	0.0	-0.2	-0.4	0.4	0.2	0.1	-0.1
Australia	0.6	0.4	0.1	-0.3	0.9	0.8	0.6	0.4	1.1	1.1	0.8	0.4
Canada	0.6	0.5	0.1	-0.4	0.9	0.8	0.6	0.4	1.1	1.1	0.7	0.3
Japan	-0.1	-0.4	-0.7	-0.9	0.0	-0.3	-0.5	-0.1	0.1	-0.2	-0.3	-0.2
USA	0.5	0.3	0.1	-0.1	0.7	0.6	0.5	0.3	0.9	0.9	0.8	0.7

Source: United Nations

Tab.17 Average growth rate of GDP per capita in OECD countries 2000-40, scenario projections

	Low				Base				High			
	2000-10	2010-20	2020-30	2030-40	2000-10	2010-20	2020-30	2030-40	2000-10	2010-20	2020-30	2030-40
Austria	2.4	2.1	1.5	0.9	2.6	2.5	2.1	1.6	2.9	3.0	2.7	2.2
Belgium	2.0	1.7	1.2	0.7	2.2	2.0	1.7	1.3	2.4	2.4	2.2	1.9
Denmark	2.2	1.8	1.3	0.9	2.4	2.2	1.9	1.6	2.6	2.6	2.4	2.2
Finland	2.7	2.1	1.5	1.2	2.9	2.5	2.1	1.8	3.2	3.0	2.7	2.5
France	2.1	1.8	1.3	0.9	2.4	2.2	1.8	1.5	2.6	2.6	2.4	2.2
Germany	2.0	1.7	1.2	0.7	2.3	2.0	1.7	1.4	2.5	2.5	2.3	2.0
Greece	2.4	2.2	1.8	1.4	2.6	2.6	2.4	2.0	2.9	3.1	3.0	2.7
Ireland	2.2	1.9	1.4	1.0	2.4	2.2	2.0	1.6	2.7	2.7	2.5	2.2
Italy	0.4	0.8	1.2	1.4	2.4	2.4	2.0	1.5	2.7	2.8	2.6	2.2
Luxembourg	1.2	1.0	0.6	0.3	1.4	1.4	1.1	0.8	1.7	1.8	1.6	1.4
Netherlands	2.3	1.9	1.3	0.9	2.6	2.3	1.8	1.5	2.8	2.8	2.4	2.1
Portugal	2.7	2.5	2.1	1.5	2.9	2.9	2.7	2.2	3.2	3.4	3.3	3.0
Spain	2.5	2.2	1.7	1.1	2.7	2.6	2.3	1.7	2.9	3.1	2.9	2.4
Sweden	2.2	1.7	1.3	1.0	2.4	2.2	1.9	1.7	2.7	2.6	2.5	2.4
UK	2.2	1.8	1.4	1.0	2.4	2.2	1.9	1.7	2.6	2.7	2.5	2.4
Iceland	2.2	1.9	1.2	1.1	2.4	2.3	1.9	1.6	2.6	2.7	2.5	2.2
Norway	1.7	1.4	1.0	0.6	1.9	1.8	1.5	1.3	2.2	2.3	2.1	2.0
Switzerland	1.9	1.6	1.0	0.6	2.1	2.0	1.6	1.2	2.4	2.4	2.2	1.9
Australia	2.3	1.9	1.4	1.0	2.4	2.2	1.8	1.5	2.6	2.6	2.4	2.3
Canada	1.8	1.4	1.0	0.7	2.0	1.7	1.4	1.1	2.1	2.1	2.0	1.9
Japan	2.3	1.8	1.4	1.0	2.6	2.3	1.9	1.5	2.8	2.8	2.6	2.3
USA	1.8	1.4	0.9	0.5	1.9	1.7	1.3	1.1	2.1	2.0	1.8	1.6

Source: model calculations

Detailed assumptions of the forecast

Tables 20-22 show the detailed assumptions underlying the three scenarios. The assumptions on the demographic process (share of population over 65 years old) are taken from the UN projections (United Nations [1998]).

Tab18. Assumptions of the scenarios: share of population over 65 years old

	Actual	Low				Base				High			
	2000	2000-10	2010-20	2020-30	2030-40	2000-10	2010-20	2020-30	2030-40	2000-10	2010-20	2020-30	2030-40
Austria	14.7	15.7	18.2	22.9	29.0	15.6	17.8	21.9	27.0	15.5	17.4	21.0	25.1
Belgium	15.8	17.2	19.6	24.0	28.2	17.1	19.2	23.1	26.4	17.0	18.8	22.2	24.7
Denmark	15.1	16.3	19.4	23.2	26.6	16.1	18.8	21.8	24.2	16.0	18.4	20.9	22.5
Finland	14.1	16.1	20.1	24.8	27.1	16.0	19.7	23.8	25.4	15.8	19.2	22.9	23.7
France	15.3	16.4	18.9	22.8	26.3	16.3	18.4	21.7	24.3	16.2	18.0	20.9	22.7
Germany	15.2	18.2	21.1	24.9	29.5	18.1	20.7	23.9	27.5	17.9	20.2	22.8	25.5
Greece	15.9	19.1	21.6	24.9	29.6	19.0	21.4	24.5	28.6	18.9	20.8	23.2	26.3
Ireland	11.4	12.0	14.1	17.4	20.7	11.8	13.7	16.5	19.0	11.7	13.3	15.7	17.5
Italy	16.1	45.6	41.2	36.0	32.6	19.5	22.5	26.6	31.8	19.3	22.0	25.6	29.7
Luxembourg	13.7	15.2	17.8	22.0	26.4	15.1	17.2	20.8	24.2	14.9	16.8	19.8	22.3
Netherlands	13.2	14.9	18.4	23.7	28.5	14.8	18.2	23.1	27.3	14.6	17.7	22.0	25.2
Portugal	16.1	16.5	18.5	21.7	26.5	16.4	18.3	21.2	25.4	16.2	17.6	19.8	22.7
Spain	15.4	17.9	20.0	24.3	31.1	17.7	19.8	23.8	29.8	17.5	19.1	22.4	27.1
Sweden	17.4	18.6	21.7	25.0	27.7	18.5	21.3	24.3	26.4	18.1	20.4	22.5	23.4
UK	15.8	16.8	19.0	22.7	26.3	16.5	18.4	21.5	24.1	16.4	17.9	20.3	22.0
Iceland	11.6	12.1	14.4	18.6	22.7	11.9	13.9	17.6	20.8	11.8	13.5	16.6	19.1
Norway	16.0	15.9	18.4	22.5	26.3	15.7	17.9	21.3	24.1	15.6	17.5	20.4	22.4
Switzerland	14.3	15.9	19.1	24.4	30.2	15.8	18.7	23.4	28.1	15.6	18.2	22.3	26.0
Australia	11.7	13.0	15.9	20.1	24.1	12.8	15.1	18.4	21.0	12.5	14.5	17.3	19.6
Canada	12.1	13.7	16.9	22.0	26.3	13.6	16.3	20.4	23.2	13.3	15.6	19.1	21.6
Japan	14.6	19.5	24.4	27.9	31.0	19.3	23.9	26.8	28.8	19.2	23.5	25.9	27.2
USA	12.5	13.1	15.5	19.9	23.2	12.9	14.9	18.6	21.1	12.7	14.4	17.4	19.1

Source: United Nations

Tab.19 Assumptions of the scenarios: gross enrollment ratio, tertiary education

	Actual	Low				Base				High			
	2000	2000-10	2010-20	2020-30	2030-40	2000-10	2010-20	2020-30	2030-40	2000-10	2010-20	2020-30	2030-40
Austria	47.4	55.3	62.0	67.7	72.5	60.6	70.4	77.8	83.4	73.7	86.9	93.4	96.7
Belgium	56.3	62.9	68.4	73.2	77.2	67.2	75.4	81.6	86.2	78.1	89.1	94.5	97.3
Denmark	48.2	56.0	62.6	68.2	73.0	61.2	70.9	78.1	83.6	74.1	87.1	93.5	96.8
Finland	70.4	74.8	78.6	81.8	84.5	77.8	83.4	87.5	90.6	85.2	92.6	96.3	98.2
France	51.0	58.4	64.6	69.9	74.4	63.3	72.4	79.3	84.5	75.5	87.8	93.9	96.9
Germany	46.1	54.2	61.1	66.9	71.9	59.6	69.7	77.3	82.9	73.0	86.5	93.3	96.6
Greece	42.3	51.0	58.3	64.6	69.9	56.7	67.5	75.7	81.7	71.1	85.6	92.8	96.4
Ireland	39.6	48.7	56.4	62.9	68.5	54.7	66.0	74.5	80.9	69.8	84.9	92.4	96.2
Italy	42.3	51.0	58.3	64.6	69.9	56.7	67.5	75.7	81.7	71.1	85.6	92.8	96.4
Luxembourg	50.0	57.5	63.9	69.3	73.9	62.5	71.9	78.9	84.2	75.0	87.5	93.8	96.9

Netherlands	48.0	55.8	62.4	68.1	72.9	61.0	70.8	78.1	83.5	74.0	87.0	93.5	96.8
Portugal	38.8	48.0	55.8	62.4	68.1	54.1	65.6	74.2	80.6	69.4	84.7	92.3	96.2
Spain	47.8	55.6	62.3	67.9	72.8	60.8	70.6	78.0	83.5	73.9	86.9	93.5	96.7
Sweden	46.7	54.7	61.5	67.3	72.2	60.0	70.0	77.5	83.1	73.4	86.7	93.3	96.7
UK	49.6	57.2	63.6	69.0	73.7	62.2	71.6	78.7	84.1	74.8	87.4	93.7	96.8
Iceland	35.4	45.1	53.3	60.3	66.3	51.6	63.7	72.7	79.6	67.7	83.9	91.9	96.0
Norway	58.6	64.8	70.1	74.6	78.4	68.9	76.7	82.5	86.9	79.3	89.6	94.8	97.4
Switzerland	32.6	42.7	51.3	58.6	64.8	49.4	62.1	71.6	78.7	66.3	83.1	91.6	95.8
Australia	72.9	77.0	80.4	83.4	85.9	79.7	84.8	88.6	91.4	86.5	93.2	96.6	98.3
Canada	87.8	89.6	91.2	92.5	93.6	90.9	93.1	94.9	96.1	93.9	97.0	98.5	99.2
Japan	35.0	44.8	53.0	60.1	80.6	51.3	63.4	72.6	89.6	67.5	83.8	91.9	98.6
USA	80.9	83.8	86.2	88.3	90.0	85.7	89.3	91.9	94.0	90.5	95.2	97.6	98.8

Source: Model calculations

The assumptions on the education - gross enrollment in tertiary education - is based on the assumption that the OECD countries should move towards the general proliferation of the tertiary education (currently only the US and Canada are close to achieving this target).

In the scenarios it is assumed that, over the each decade, the OECD countries will be reducing the gap between the current gross enrollment ratio, and the target 100% ratio according to the formula:

$$level_1 = level_{-1} + \square\ (100\% - level_{-1})$$

that is, the countries reduce - during the decade - the gap against the target education level existing at the beginning of the period by the factor of $\square$ ($0<\square<1$). In the low case we assumed $\square=0.15$, in the base case $\square=0.25$, in the high case $\square=0.5$.

Tab.20 Assumptions of the scenarios: R&D spending as % of GDP

	Actual	Low				Base				High			
	2000	2000 -10	2010 -20	2020 -30	2030 -40	2000 -10	2010 -20	2020 -30	2030 -40	2000 -10	2010 -20	2020 -30	2030 -40
Austria	1.5	2.3	2.9	3.3	3.5	2.7	3.4	4.0	4.3	3.0	4.0	4.7	5.1
Belgium	1.7	2.4	2.9	3.3	3.5	2.8	3.5	4.0	4.3	3.1	4.1	4.7	5.1
Denmark	1.8	2.5	3.0	3.3	3.6	2.9	3.6	4.0	4.4	3.2	4.1	4.7	5.2
Finland	2.2	2.8	3.2	3.5	3.6	3.1	3.8	4.2	4.4	3.5	4.3	4.9	5.2
France	2.5	3.0	3.3	3.5	3.7	3.3	3.9	4.2	4.5	3.6	4.4	4.9	5.3
Germany	2.5	3.0	3.3	3.5	3.7	3.3	3.9	4.2	4.5	3.6	4.4	4.9	5.3
Greece	0.6	1.7	2.5	3.0	3.3	2.1	3.0	3.7	4.1	2.4	3.6	4.4	4.9
Ireland	1.2	2.1	2.8	3.2	3.4	2.5	3.3	3.9	4.2	2.8	3.9	4.6	5.0
Italy	1.3	2.2	2.8	3.2	3.5	2.5	3.3	3.9	4.3	2.9	3.9	4.6	5.1
Luxembourg	2.0	2.7	3.1	3.4	3.6	3.0	3.7	4.1	4.4	3.3	4.2	4.8	5.2
Netherlands	1.9	2.6	3.1	3.4	3.6	2.9	3.6	4.1	4.4	3.2	4.2	4.8	5.2
Portugal	0.6	1.7	2.5	3.0	3.3	2.1	3.0	3.7	4.1	2.4	3.6	4.4	4.9
Spain	0.9	1.9	2.6	3.1	3.4	2.2	3.2	3.8	4.2	2.6	3.7	4.5	5.0
Sweden	3.3	3.5	3.7	3.8	3.9	3.8	4.2	4.5	4.6	4.2	4.8	5.2	5.4
UK	2.2	2.8	3.2	3.5	3.6	3.1	3.7	4.2	4.4	3.4	4.3	4.9	5.2
Iceland	1.3	2.2	2.8	3.2	3.5	2.5	3.4	3.9	4.3	2.9	3.9	4.6	5.1
Norway	1.9	2.6	3.1	3.4	3.6	2.9	3.6	4.1	4.4	3.3	4.2	4.8	5.2
Switzerland	2.7	3.1	3.4	3.6	3.7	3.4	4.0	4.3	4.5	3.8	4.5	5.0	5.3
Australia	1.6	2.4	2.9	3.3	3.5	2.7	3.5	4.0	4.3	3.0	4.0	4.7	5.1
Canada	1.5	2.3	2.9	3.2	3.5	2.7	3.4	3.9	4.3	3.0	4.0	4.6	5.1
Japan	2.9	3.3	3.5	3.7	3.8	3.6	4.1	4.4	4.6	3.9	4.6	5.1	5.4
USA	2.7	3.1	3.4	3.6	3.7	3.4	3.9	4.3	4.5	3.8	4.5	5.0	5.3

Source: Model calculations

In the scenarios it is assumed that the OECD countries will be increasing their R&D spending as % of GDP, according to the formula:

$level_1 = level_{-1} + \square$ (target - $level_{-1}$)

that is, the countries reduce - during the decade - the gap against the target R&D spending level existing at the beginning of the period by the factor of $\square$ ($0<\square<1$). In the low case we assumed the target to be 4%, in the base case the target 5%, in the high case the target 6%, and in all the scenarios $\square$=0.33.

Tab.21 Assumptions of the scenarios: investment as % of GDP

	Actual	Low				Base				High			
		2000	2010	2020	2030	2000	2010	2020	2030	2000	2010	2020	2030
	1990-99	-10	-20	-30	-40	-10	-20	-30	-40	-10	-20	-30	-40
Austria	23.5	23.5	21.8	20.3	18.9	23.7	22.5	21.4	20.3	24.0	23.3	22.6	21.9
Belgium	22.2	20.3	18.9	17.6	16.3	20.5	19.5	18.5	17.6	20.7	20.1	19.5	18.9
Denmark	19.8	19.0	17.7	16.5	15.3	19.2	18.3	17.3	16.5	19.4	18.8	18.3	17.7
Finland	23.9	18.5	17.2	16.0	14.8	18.7	17.7	16.8	16.0	18.8	18.3	17.7	17.2
France	20.8	18.3	17.1	15.9	14.7	18.5	17.6	16.7	15.9	18.7	18.2	17.6	17.1
Germany	21.2	20.2	18.8	17.5	16.3	20.4	19.4	18.4	17.5	20.6	20.0	19.4	18.8
Greece	22.5	21.9	20.4	18.9	17.6	22.1	21.0	20.0	19.0	22.4	21.7	21.0	20.4
Ireland	21.0	22.6	21.0	19.5	18.1	22.8	21.7	20.6	19.5	23.0	22.3	21.7	21.0
Italy	20.2	18.3	17.0	15.8	14.7	18.4	17.5	16.6	15.8	18.6	18.1	17.5	17.0
Luxembourg	21.9	18.5	17.2	16.0	14.9	18.7	17.8	16.9	16.0	18.9	18.3	17.8	17.2
Netherlands	22.2	21.5	20.0	18.6	17.3	21.7	20.6	19.6	18.6	21.9	21.3	20.6	20.0
Portugal	25.1	23.8	22.2	20.6	19.2	24.1	22.9	21.7	20.7	24.3	23.6	22.9	22.2
Spain	24.9	23.0	21.4	19.9	18.5	23.3	22.1	21.0	20.0	23.5	22.8	22.1	21.5
Sweden	19.9	16.0	14.9	13.8	12.9	16.2	15.4	14.6	13.9	16.3	15.8	15.4	14.9
UK	19.2	17.2	15.9	14.8	13.8	17.3	16.5	15.6	14.9	17.5	17.0	16.5	16.0
Iceland	19.6	19.2	17.9	16.6	15.5	19.4	18.5	17.5	16.7	19.6	19.0	18.5	17.9
Norway	21.9	21.5	20.0	18.6	17.3	21.7	20.6	19.6	18.6	21.9	21.2	20.6	20.0
Switzerland	23.5	19.2	17.8	16.6	15.4	19.4	18.4	17.5	16.6	19.6	19.0	18.4	17.9
Australia	23.1	23.0	21.3	19.9	18.5	23.2	22.0	20.9	19.9	23.4	22.7	22.0	21.4
Canada	20.4	19.1	17.7	16.5	15.4	19.3	18.3	17.4	16.5	19.5	18.9	18.3	17.8
Japan	28.9	25.2	23.4	21.8	20.2	25.4	24.2	22.9	21.8	25.7	24.9	24.2	23.4
USA	18.3	18.6	17.3	16.1	15.0	18.8	17.9	17.0	16.1	19.0	18.4	17.9	17.3

Source: Model calculations

In the low case we assumed the fall of the investment to GDP ratio by 7% (ca.1.5 per cent point) over a decade for all the countries (similar to the fall observed during the 1980s and 1990s), in the base case the fall of the ratio by 5% (ca.1 per cent point) over a decade for all the countries, and in the high case the fall of the ratio by 3% (ca.0.6 per cent point) over a decade for all the countries.

Tab.22 Assumptions of the scenarios: unemployment rate

	Actual	Low				Base				High			
		2000	2010	2020	2030	2000	2010	2020	2030	2000	2010	2020	2030
	1990-99	-10	-20	-30	-40	-10	-20	-30	-40	-10	-20	-30	-40
Austria	4.2	4.4	4.5	4.7	4.8	4.1	4.1	4.1	4.1	3.9	3.7	3.5	3.4
Belgium	9.1	8.3	7.7	7.3	7.0	7.8	6.9	6.2	5.6	7.6	6.4	5.6	4.9
Denmark	5.5	5.6	5.6	5.6	5.7	5.1	4.8	4.6	4.5	4.9	4.4	4.1	3.8
Finland	11.3	10.0	9.0	8.2	7.7	9.5	8.1	7.1	6.3	9.2	7.7	6.5	5.6
France	11.8	10.4	9.3	8.4	7.8	9.9	8.4	7.3	6.5	9.6	8.0	6.7	5.8

Germany	9.7	8.8	8.1	7.6	7.2	8.3	7.2	6.4	5.8	8.0	6.8	5.8	5.1
Greece	10.8	9.6	8.7	8.0	7.5	9.1	7.8	6.9	6.2	8.9	7.4	6.3	5.5
Ireland	7.8	7.4	7.0	6.8	6.6	6.9	6.1	5.6	5.2	6.6	5.7	5.0	4.5
Italy	11.4	10.1	9.0	8.3	7.7	9.6	8.2	7.1	6.3	9.3	7.7	6.5	5.7
Luxembourg	3.1	3.4	3.7	3.9	4.1	3.1	3.1	3.1	3.1	3.1	3.1	3.0	3.0
Netherlands	4.4	4.6	4.7	4.8	5.0	4.3	4.2	4.2	4.1	4.1	3.8	3.6	3.4
Portugal	5.0	5.1	5.2	5.3	5.3	4.8	4.6	4.4	4.3	4.5	4.1	3.8	3.6
Spain	15.9	13.4	11.6	10.2	9.1	12.9	10.7	9.0	7.8	12.7	10.3	8.4	7.1
Sweden	6.5	6.4	6.3	6.2	6.2	5.9	5.4	5.1	4.8	5.6	5.0	4.5	4.1
UK	6.1	6.1	6.1	6.0	6.0	5.6	5.2	4.9	4.7	5.3	4.7	4.3	4.0
Iceland	2.7	3.0	3.3	3.6	3.8	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7
Norway	2.6	2.9	3.2	3.5	3.8	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6
Switzerland	3.6	3.8	4.1	4.3	4.4	3.6	3.6	3.6	3.6	3.4	3.3	3.3	3.2
Australia	8.0	7.5	7.1	6.8	6.6	7.0	6.3	5.7	5.3	6.8	5.8	5.1	4.6
Canada	8.3	7.7	7.3	7.0	6.7	7.2	6.4	5.8	5.4	7.0	6.0	5.2	4.7
Japan	4.1	4.3	4.5	4.6	4.8	4.1	4.1	4.0	4.0	3.8	3.6	3.5	3.3
USA	4.5	4.7	4.8	4.9	5.0	4.4	4.3	4.2	4.2	4.1	3.8	3.6	3.5

Source: Model calculations

In the scenarios it is assumed that the unemployment in the OECD countries will be falling, due to the economic growth combined with the labour market reforms, according to the formula:

$$level_1 = level_{-1} - \square (level_{-1} - natural\ rate)$$

that is, the countries reduce - during the decade - the distance of the unemployment rate from the "natural unemployment" level by the factor of $\square$ ($0<\square<1$). In the low case we assumed the "natural unemployment" level to be 6%, in the base case 4%, in the high case 3%, and in all the scenarios $\square=0.25$.

Projections of the economic growth for the Central and Eastern European countries, 2000-2040

Overview of the scenarios

The projection is made in 3 variants: low, base, and high case. The general definition of the scenarios can be found in the introduction. Let us remind that:

- **Low case:** very slow progress in the political, social and economic stabilization, lack of policies aimed at enhancing the domestic saving and investment, low level of absorption of the technology, and little investment in the human capital. Slow growth of the OECD countries (low case) and unfavourable demographic trends (low UN demographic variant).
- **Base case:** steady improvement in the policies aimed at accelerating the real convergence (including relatively fast path of the EU enlargement), efficient absorption of the technology leading to the steady reduction in the technological gap, relatively fast growth in the OECD area (base case), and more favourable demographic trends (medium UN demographic variant).
- **High case:** acceleration of the process of the economic, social and political stabilization of the region, with the relatively rapid expansion of the EU not only to the countries currently engaged in membership negotiations, but also to Turkey and Balkan states. Efficient policies enhancing saving and investment, improving rapidly the human capital. The rapid process of technological catching-up. Good economic performance of the OECD countries (high case) and relatively good demographic trends (high UN demographic variant).

The detailed assumptions and results of the scenarios are presented below.

General results of the projections

The projections point out to the process of the economic growth and real convergence towards the EU-15 development levels in the CEEC. The most important features of the expected growth in the CEEC area are:

- The expected speed of convergence is ca. 1% in the low scenario (below the "natural" – or market led - convergence speed of 2%); slightly below 2% in the base case, and 2.6% - above the "normal" speed – in the high case.
- The expected speed of convergence is generally higher in the CEEC joining the EU, mainly due to the fast improvement in the political and economic stability.
- The speed of convergence in the Balkan and FSU countries may match this one in the CEEC joining the EU only in the case of the high case, that assumes aggressive policies supporting real convergence.

Tab.23 The speed of convergence in CEEC, 2000-40

	Beta-convergence parameter				GDP p.c. (PPP, EU-15=100)			
	Observed	Scenario projection 2000-40			Data/estimate	Scenario forecast for 2040		
	1995-99	Low	Base	High	2000	Low	Base	High
Bulgaria	1.3	-0.9	-1.8	-2.5	22.6	45.4	62.6	71.5
Czech Republic	1.9	-1.4	-2.2	-2.8	60.0	77.4	83.6	87.3
Estonia	-1.2	-1.4	-2.2	-2.9	38.0	65.2	74.8	80.6
Hungary	-1.4	-1.4	-2.2	-2.8	52.0	72.8	80.2	84.7
Latvia	-0.7	-1.5	-2.3	-3.0	29.0	61.5	72.4	78.9
Lithuania	-0.3	-1.4	-2.2	-2.9	29.0	60.0	71.3	78.0
Poland	-1.3	-1.5	-2.3	-3.0	39.0	66.4	76.1	81.8
Romania	1.7	-1.0	-2.1	-2.8	26.7	51.7	68.1	76.2
Slovakia	-1.3	-1.5	-2.3	-2.9	48.5	71.5	79.5	84.3
Slovenia	-2.8	-1.3	-2.1	-2.8	72.4	83.9	88.3	91.1
Cyprus	-0.5	-1.1	-1.8	-2.5	83.0	89.0	91.7	93.7
Malta	..	-1.2	-1.9	-2.5	53.0	70.9	78.0	83.1
Turkey	0.3	-0.8	-1.9	-2.6	29.1	47.8	66.5	74.9
Albania	-0.1	-0.8	-1.9	-2.2	12.5	35.7	59.5	63.9
Bosnia and Herz.	..	-0.6	-1.7	-2.1	11.8	31.2	56.4	63.0
Croatia	-0.9	-1.0	-1.9	-2.5	28.6	52.3	66.8	74.6
Macedonia, FYR	0.2	-0.7	-1.7	-2.4	17.9	37.0	58.9	69.0
Yugoslavia	..	-0.6	-1.7	-2.4	17.0	35.9	58.1	68.6
Belarus	-1.4	-0.7	-1.5	-2.3	26.4	44.0	60.6	71.3
Moldova	0.6	-0.6	-1.5	-2.3	7.8	28.4	50.4	63.0
Russian Federation	1.3	-0.7	-1.6	-2.4	29.0	47.4	63.0	73.0
Ukraine	0.9	-0.8	-1.7	-2.4	13.4	36.8	55.6	67.6
Average	**-0.2**	**-1.0**	**-1.9**	**-2.6**	**33.9**	**55.1**	**69.2**	**76.4**

Source: model calculations

Tab.24 Average growth rates of GDP and population in CEEC 2000-40, scenario projections (in constant 1999 US$)

	Low			Base			High		
	GDP p.c.	Population	GDP	GDP p.c.	Population	GDP	GDP p.c.	Population	GDP
Bulgaria	3.3	-0.9	2.4	4.7	-0.7	4.0	5.5	-0.2	5.3
Czech Republic	2.2	-0.6	1.6	2.9	-0.4	2.4	3.5	0.0	3.5
Estonia	2.9	-0.9	2.0	3.8	-0.8	3.0	4.5	-0.4	4.1
Hungary	2.4	-0.7	1.6	3.2	-0.5	2.6	3.8	-0.1	3.7

Latvia	3.4	-0.9	2.5	4.4	-0.7	3.6	5.1	-0.4	4.7
Lithuania	3.4	-0.6	2.8	4.4	-0.4	4.0	5.1	0.0	5.1
Poland	2.9	-0.2	2.6	3.8	-0.1	3.7	4.4	0.2	4.7
Romania	3.2	-0.6	2.5	4.5	-0.5	3.9	5.3	0.0	5.3
Slovakia	2.5	-0.4	2.1	3.3	-0.1	3.2	4.0	0.2	4.2
Slovenia	1.9	-0.6	1.3	2.6	-0.5	2.1	3.1	-0.1	3.0
Cyprus	1.7	0.1	1.8	2.3	0.4	2.7	2.8	0.7	3.5
Malta	2.3	-0.1	2.2	3.0	0.2	3.3	3.7	0.5	4.2
Turkey	2.8	0.5	3.3	4.2	0.9	5.2	5.0	1.3	6.4
Albania	4.2	0.3	4.6	6.1	0.7	6.9	6.8	1.1	8.0
Bosnia and Herzegovina	4.0	-0.3	3.7	6.1	0.0	6.2	6.9	0.4	7.3
Croatia	3.1	-0.6	2.4	4.2	-0.3	3.9	5.0	-0.1	4.9
Macedonia, FYR	3.4	0.0	3.4	5.1	0.3	5.5	6.1	0.6	6.7
Yugoslavia	3.4	-1.2	2.2	5.2	0.0	5.3	6.2	0.4	6.6
Belarus	2.8	-0.6	2.2	4.2	-0.4	3.8	5.1	-0.1	5.0
Moldova	4.8	-0.2	4.6	6.9	0.1	7.0	8.0	0.4	8.4
Russian Federation	2.8	-0.6	2.2	4.0	-0.3	3.7	4.9	0.1	5.0
Ukraine	4.1	-0.6	3.5	5.7	-0.4	5.3	6.8	-0.2	6.6
Memo:									
EU-15	1.5	-0.4	1.1	2.0	-0.2	1.9	2.5	0.0	2.6
CEEC-10	2.8	-0.5	2.3	3.7	-0.3	3.4	4.4	0.1	4.5
Balk-5	3.5	-0.6	2.9	5.2	0.1	5.3	6.0	0.4	6.5
FSU-4	3.0	-0.6	2.4	4.4	-0.3	4.0	5.3	0.0	5.3
Total CEEC	2.9	-0.4	2.5	4.2	-0.1	4.1	5.0	0.3	5.3

Source: World Bank, Eurostat, model calculations

As indicated in table 24, the economic growth and the real convergence process may lead to achieving in 2040 the GDP per capita level of:

- in the **low case**: ca. 80%-90% of the EU-15 in the most developed candidate countries (Slovenia, Czech Republic, Cyprus); 60-70% in the other Central European candidate countries (in Poland 66%), 45-50% in the Balkan candidate countries (Bulgaria, Romania) and Turkey; 30-35% in the other Balkan countries (with the exemption of Croatia, at 52%); 30-45% in the FSU countries (in Russia 47%);
- in the **base case**: ca. 84%-92% of the EU-15 in the most developed candidate countries; 70-80% in the other Central European candidate countries (in Poland 76%), 65% in the Balkan candidate countries (Bulgaria, Romania) and Turkey; 60% in the other Balkan countries; 50-60% in the FSU countries (in Russia 63%);
- in the **high case**: ca. 90%-95% of the EU-15 in the most developed candidate countries; 80-85% in the other Central European candidate countries (in Poland 82%), 75% in the Balkan candidate countries and Turkey; 65-70% in the other Balkan countries (in Croatia 75%); 65-75% in the FSU countries (in Russia 73%).

Table 24 shows the growth rates of GDP per capita, population, and total GDP. The average growth rate of GDP in the low case ranges from 1-1.5% in the most developed CEEC (Slovenia, Cyprus) to 4.6% in the poorest CEEC (Albania, Moldova), in the base case from 2% to 7%, and in the high case from 3% to over 8%.

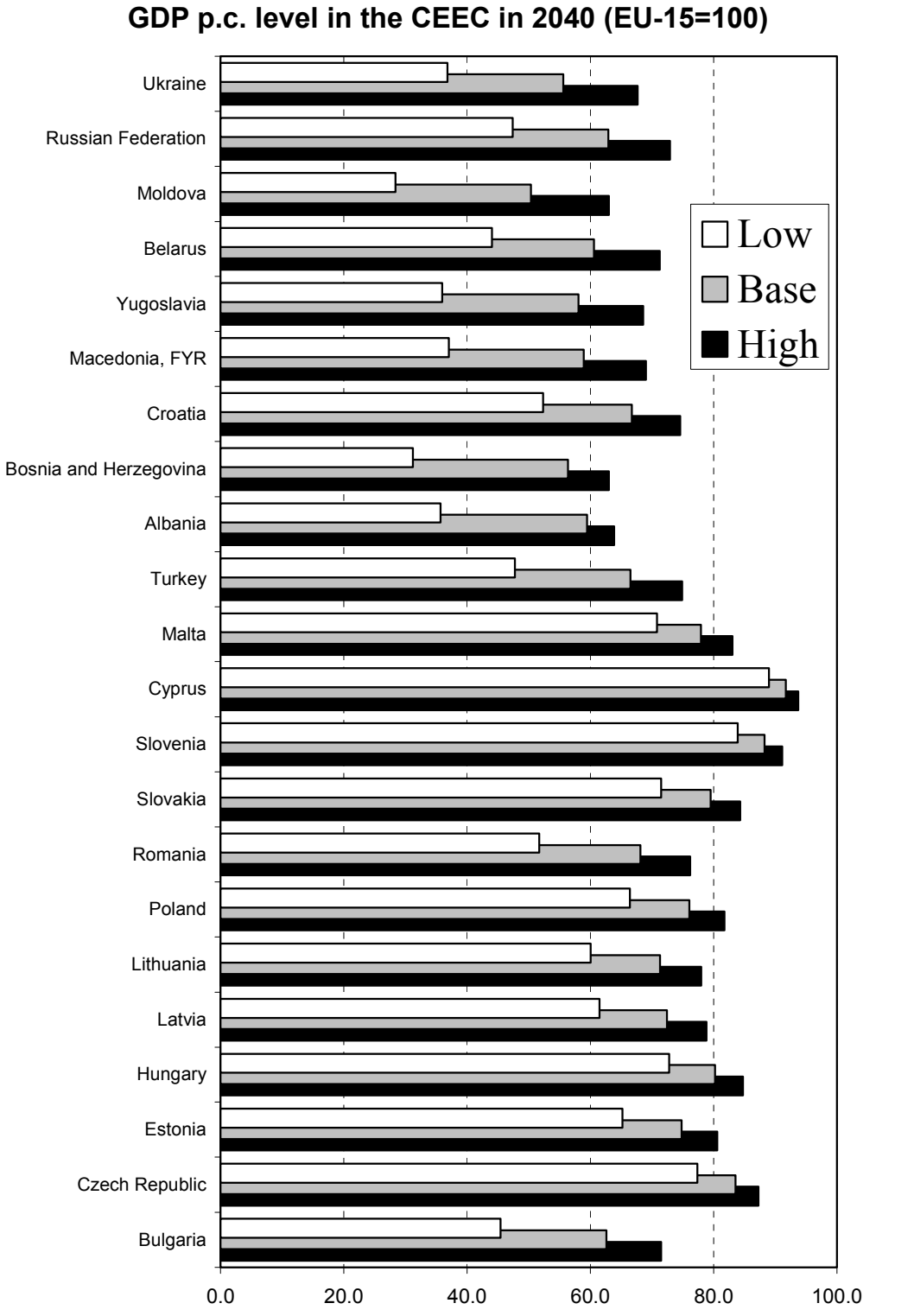
The speed of the real convergence of CEEC may be also observed while analyzing graph 4. Graphs 5 and 6 show growth rates of GDP and population.

Tab.25 GDP and population in CEEC 2000-40, scenario projections (in constant 1999 US$)

	Data/estimate for 2000				Low				Base				High			
	GDP p.c. (PPP adjusted)		Pop-ulation (mn)	GDP (bn US$)	GDP p.c. (PPP adjusted)		Popu-lation (mn)	GDP (bn US$)	GDP p.c. (PPP adjusted)		Popu-lation (mn)	GDP (bn US$)	GDP p.c. (PPP adjusted)		Popu-lation (mn)	GDP (bn US$)
	EU-15=100	in US$ (000)			EU-15=100	in US$ (000)			EU-15=100	in US$ (000)			EU-15=100	in US$ (000)		
Bulgaria	22.6	5.2	8.2	42	45.4	18.9	5.8	110	62.6	32.0	6.2	200	71.5	44.2	7.7	339
Czech Republic	60.0	13.7	10.2	140	77.4	32.2	8.2	263	83.6	42.7	8.6	366	87.3	54.0	10.4	562
Estonia	38.0	8.6	1.4	12	65.2	27.1	1.0	26	74.8	38.3	1.0	39	80.6	49.8	1.2	60
Hungary	52.0	11.8	10.0	119	72.8	30.3	7.4	225	80.2	41.1	8.1	331	84.7	52.4	9.7	507
Latvia	29.0	6.6	2.4	16	61.5	25.6	1.6	42	72.4	37.1	1.8	65	78.9	48.8	2.0	99
Lithuania	29.0	6.6	3.7	24	60.0	25.0	2.9	73	71.3	36.5	3.2	115	78.0	48.2	3.7	177
Poland	39.0	8.9	38.8	344	66.4	27.6	35.4	980	76.1	38.9	37.7	467	81.8	50.6	42.3	138
Romania	26.7	6.1	22.3	136	51.7	21.5	17.2	371	68.1	34.9	18.0	628	76.2	47.1	22.5	060
Slovakia	48.5	11.0	5.4	60	71.5	29.7	4.6	137	79.5	40.7	5.1	208	84.3	52.1	5.9	309
Slovenia	72.4	16.5	2.0	33	83.9	34.9	1.6	54	88.3	45.2	1.6	74	91.1	56.4	1.9	106
Cyprus	83.0	18.9	0.8	15	89.0	37.0	0.8	30	91.7	46.9	0.9	43	93.7	58.0	1.0	60
Malta	53.0	12.1	0.4	5	70.9	29.5	0.4	11	78.0	39.9	0.4	17	83.1	51.4	0.5	25
Turkey	29.1	6.6	66.6	441	47.8	19.9	80.8	607	66.5	34.0	96.9	297	74.9	46.3	113.1	5 236
Albania	12.5	2.8	3.1	9	35.7	14.9	3.5	53	59.5	30.4	4.2	127	63.9	39.5	4.9	193
Bosnia and Herz.	11.8	2.7	4.0	11	31.2	13.0	3.5	46	56.4	28.8	4.0	117	63.0	39.0	4.7	182
Croatia	28.6	6.5	4.5	29	52.3	21.8	3.5	76	66.8	34.1	3.9	133	74.6	46.1	4.3	198
Macedonia, FYR	17.9	4.1	2.0	8	37.0	15.4	2.0	31	58.9	30.1	2.3	70	69.0	42.7	2.6	111
Yugoslavia	17.0	3.9	10.6	41	35.9	15.0	6.5	97	58.1	29.7	10.7	319	68.6	42.4	12.4	524
Belarus	26.4	6.0	10.2	61	44.0	18.3	7.9	146	60.6	31.0	8.9	275	71.3	44.1	9.7	429
Moldova	7.8	1.8	4.4	8	28.4	11.8	4.0	47	50.4	25.8	4.6	117	63.0	39.0	5.1	197
Russian Feder.	29.0	6.6	146.9	969	47.4	19.7	115.2	271	63.0	32.2	128.9	4 150	73.0	45.1	151.6	6 839
Ukraine	13.4	3.1	50.5	154	36.8	15.3	39.3	602	55.6	28.4	42.1	1 199	67.6	41.8	47.5	1 986
Memo:																
EU-15	100.0	22.8	375.5	8 546	100.0	41.6	321.2	13 365	100.0	51.2	348.4	17 825	100.0	61.8	382.8	23 677
CEEC-10	38.9	8.9	104.4	925	63.9	26.6	85.8	2 280	74.8	38.3	91.3	3 493	80.8	50.0	107.2	5 357
Balk-5	17.8	4.0	24.2	98	38.1	15.9	19.1	303	59.5	30.4	25.2	766	67.8	41.9	28.8	208
FSU-4	24.7	5.6	212.0	1 192	44.3	18.4	166.4	3 066	60.8	31.1	184.4	5 742	71.5	44.2	213.8	9 451
Total CEEC	28.8	6.6	408.4	2 676	49.6	20.7	353.3	7 296	65.4	33.5	399.1	13 357	74.3	45.9	464.5	21 336

Source: World Bank, United Nations,

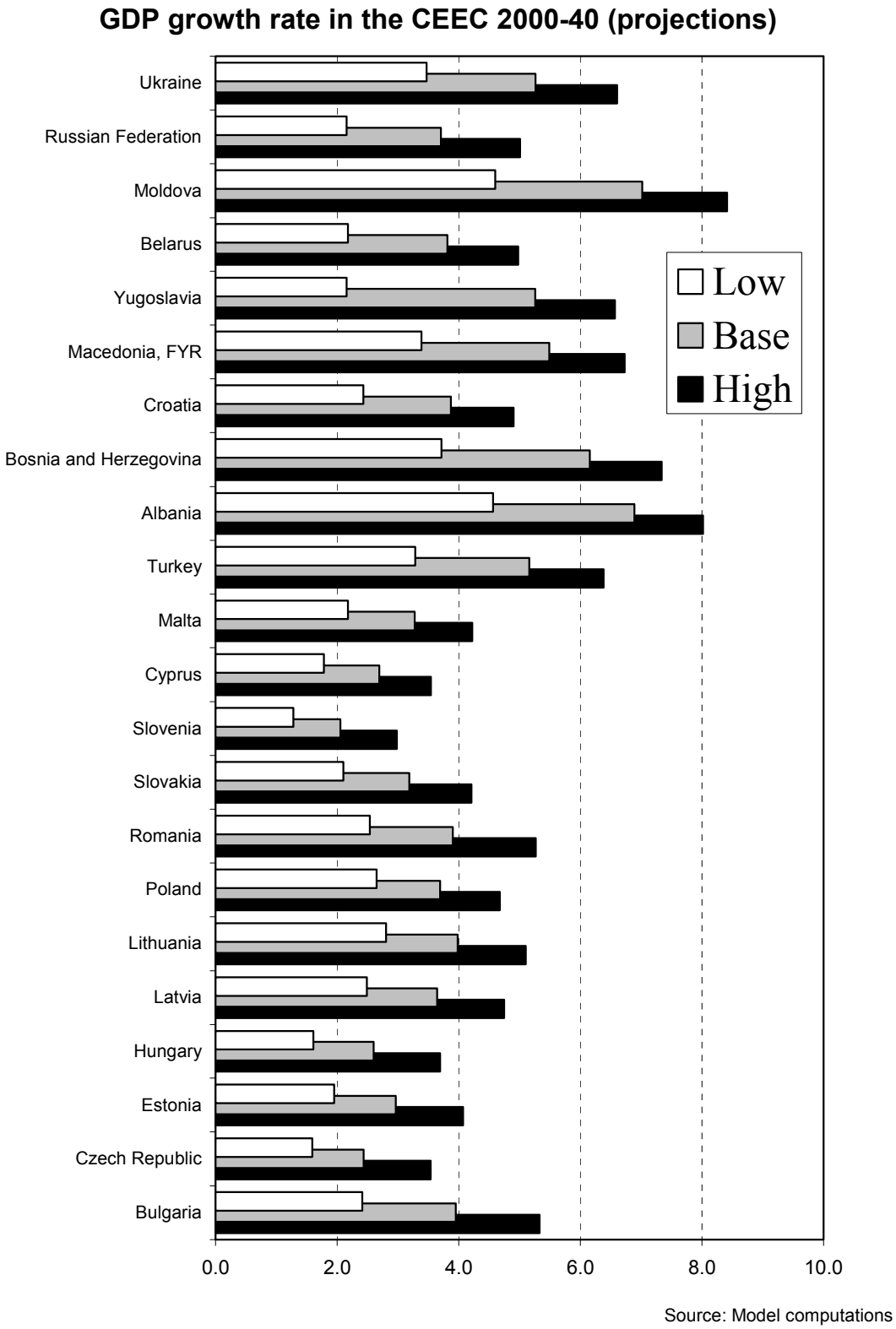
Eurostat, model calculations



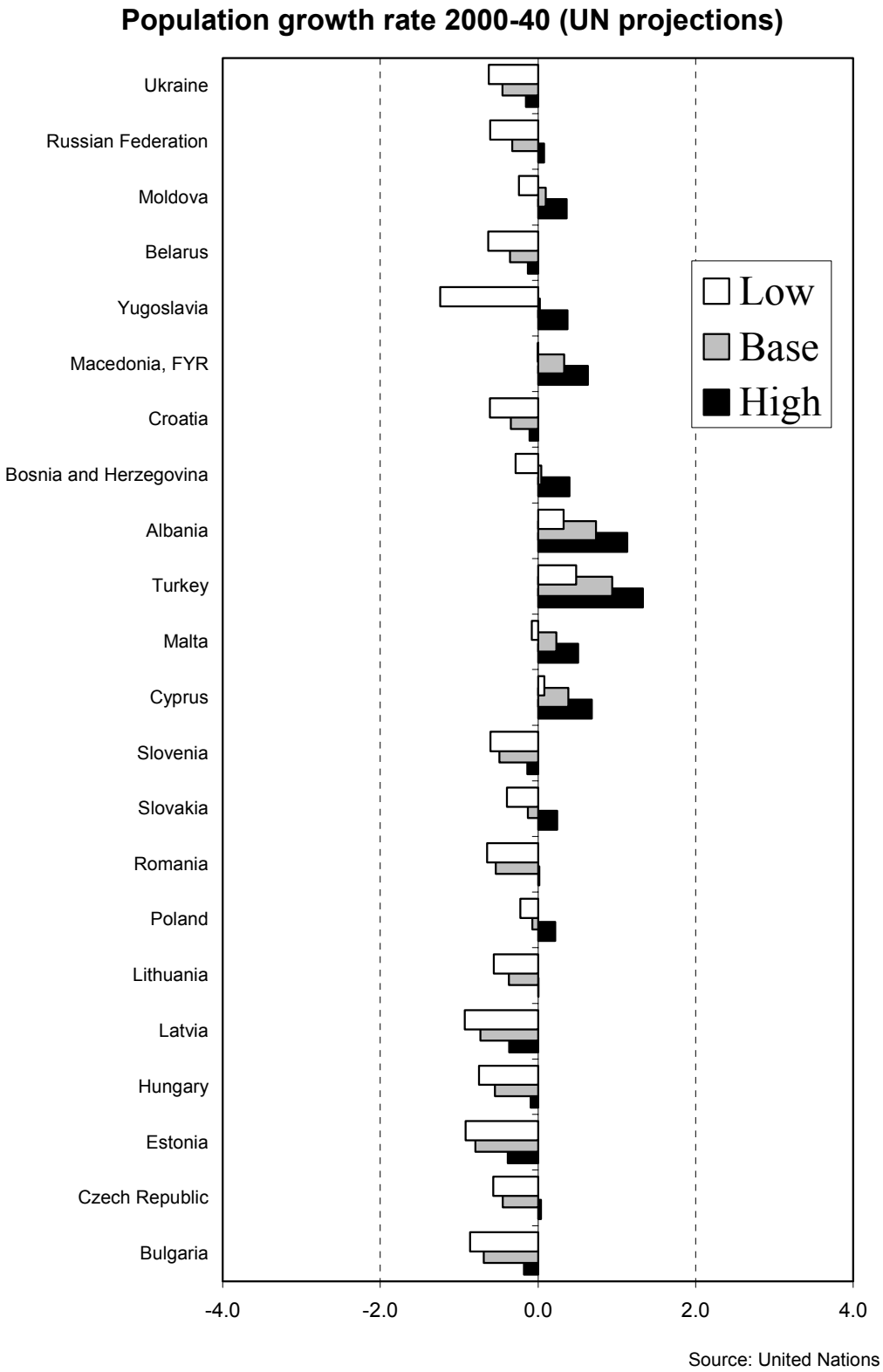
Index, EU-15=100

Source: Model computations

Graph 4


GDP growth rate in the CEEC 2000-40 (projections)
Ukraine
Russian Federation
Moldova
Belarus
Yugoslavia
Macedonia, FYR
Croatia
Bosnia and Herzegovina
Albania
Turkey
Malta
Cyprus
Slovenia
Slovakia
Romania
Poland
Lithuania
Latvia
Hungary
Estonia
Czech Republic
Bulgaria
Low
Base
High
0.0
2.0
4.0
6.0
8.0
10.0
Source: Model computations

Graph 5


Population growth rate 2000-40 (UN projections)
Ukraine
Russian Federation
Moldova
Belarus
Yugoslavia
Macedonia, FYR
Croatia
Bosnia and Herzegovina
Albania
Turkey
Malta
Cyprus
Slovenia
Slovakia
Romania
Poland
Lithuania
Latvia
Hungary
Estonia
Czech Republic
Bulgaria
Low
Base
High
-4.0
-2.0
0.0
2.0
4.0
Source: United Nations

Graph 6

Detailed results of the projections

Tables 26-28 show the detailed results of the projections, according to the three scenarios, and to four periods (2000-2010, 2010-2020, 2020-2030, 2030-2040). The tables show, respectively, average yearly growth rates of the following variables: GDP per capita adjusted for the Purchasing Power Parity (PPP), total GDP, and population (UN projections).

Tab.26 Average growth rate of GDP p.c. in CEEC 2000-40, scenario projections

	Low				Base				High			
	2000-10	2010-20	2020-30	2030-40	2000-10	2010-20	2020-30	2030-40	2000-10	2010-20	2020-30	2030-40
Bulgaria	2.7	3.6	3.9	3.0	5.9	5.4	4.3	3.1	7.7	6.0	4.8	3.6
Czech Republic	2.7	2.5	1.9	1.4	3.6	3.3	2.6	2.0	4.2	3.9	3.2	2.7
Estonia	3.7	3.5	2.5	1.9	5.2	4.4	3.2	2.4	6.1	5.0	3.8	3.0
Hungary	3.0	2.8	2.1	1.6	4.0	3.7	2.8	2.1	4.7	4.2	3.4	2.8
Latvia	4.6	4.2	2.8	2.1	6.6	5.1	3.5	2.5	7.7	5.7	4.0	3.1
Lithuania	4.3	4.2	2.9	2.1	6.3	5.1	3.5	2.6	7.4	5.7	4.1	3.2
Poland	3.5	3.6	2.5	1.9	5.1	4.4	3.2	2.4	6.0	5.0	3.7	3.0
Romania	2.8	3.5	3.8	2.8	5.7	5.1	4.1	2.9	7.4	5.7	4.6	3.4
Slovakia	3.1	3.0	2.2	1.7	4.3	3.9	2.9	2.2	5.0	4.5	3.5	2.8
Slovenia	2.4	2.2	1.7	1.3	3.1	2.9	2.3	1.8	3.5	3.4	3.0	2.5
Cyprus	2.1	1.9	1.5	1.2	2.7	2.6	2.2	1.7	3.1	3.1	2.8	2.4
Malta	2.7	2.6	2.0	1.7	3.7	3.5	2.8	2.1	4.3	4.3	3.3	2.8
Turkey	2.9	2.9	2.7	2.5	5.4	4.6	3.7	2.9	6.9	5.3	4.2	3.5
Albania	1.8	5.6	4.9	4.6	7.1	8.1	5.3	4.0	10.0	8.1	5.0	4.2
Bosnia and Herz.	0.7	5.0	5.3	5.1	6.8	7.9	5.6	4.2	9.8	8.2	5.3	4.4
Croatia	3.6	3.1	3.1	2.4	5.7	4.6	3.8	2.8	7.0	5.3	4.4	3.4
Macedonia, FYR	2.6	3.7	3.7	3.6	6.1	6.1	4.7	3.7	8.2	6.9	5.1	4.0
Yugoslavia	2.3	3.8	3.9	3.8	5.9	6.4	4.8	3.8	8.3	7.1	5.2	4.1
Belarus	3.1	2.7	2.7	2.7	5.3	4.4	3.9	3.1	6.9	5.4	4.5	3.7
Moldova	0.5	6.8	6.8	5.3	8.3	8.9	6.2	4.3	12.9	8.9	6.1	4.3
Russian Federation	3.1	2.6	2.8	2.7	5.0	4.3	3.8	3.1	6.5	5.2	4.4	3.7
Ukraine	4.4	4.0	4.2	3.9	8.0	6.3	4.9	3.8	10.7	7.0	5.3	4.2
Memo:												
EU-15	2.0	1.7	1.4	1.0	2.4	2.3	1.9	1.6	2.7	2.7	2.5	2.2

Source: model calculations

As the data in table 26 show, the growth rate of GDP of CEEC changes over time. In the low case, the growth rate is relatively stable, and falls down slightly only in the period 2030-40 (mainly in Central European candidate countries). In the base case, the peak of the growth dynamics is achieved in 2000-20 in Central European candidate countries, in 2010-20 in the Balkan countries and in FSU countries. In the high case, the peak of the growth dynamics is achieved in 2000-10 in Central European candidate countries, in 2000-20 in the Balkan countries and in FSU countries.

Tab.27 Average growth rate of GDP volume in CEEC 2000-40, scenario projections

	Low				Base				High			
	2000-10	2010-20	2020-30	2030-40	2000-10	2010-20	2020-30	2030-40	2000-10	2010-20	2020-30	2030-40
Bulgaria	2.0	2.9	2.9	1.8	5.2	4.7	3.6	2.3	7.4	5.8	4.6	3.5
Czech Republic	2.4	2.2	1.3	0.5	3.4	3.0	2.0	1.3	4.4	3.9	3.2	2.6

Estonia	2.6	2.7	1.6	0.9	4.1	3.6	2.5	1.6	5.3	4.6	3.5	2.8
Hungary	2.4	2.2	1.2	0.6	3.6	3.2	2.2	1.5	4.6	4.1	3.3	2.7
Latvia	3.5	3.4	1.9	1.1	5.5	4.4	2.8	1.9	6.9	5.3	3.7	3.0
Lithuania	4.0	3.8	2.2	1.3	6.0	4.8	3.1	2.1	7.4	5.8	4.0	3.2
Poland	3.6	3.5	2.2	1.3	5.2	4.5	3.0	2.1	6.3	5.3	3.9	3.2
Romania	2.3	2.9	3.0	1.8	5.4	4.6	3.5	2.2	7.4	5.6	4.6	3.4
Slovakia	3.0	2.8	1.7	0.9	4.4	3.8	2.6	1.8	5.4	4.7	3.6	2.9
Slovenia	2.2	1.7	0.9	0.3	2.9	2.5	1.7	1.1	3.6	3.3	2.7	2.3
Cyprus	2.7	2.2	1.5	0.8	3.4	3.1	2.4	1.8	4.0	3.9	3.3	2.9
Malta	3.1	2.7	1.8	1.2	4.3	3.9	2.9	2.0	5.1	4.9	3.7	3.1
Turkey	3.9	3.6	3.1	2.5	6.9	5.7	4.6	3.6	8.6	6.8	5.5	4.6
Albania	2.2	6.2	5.3	4.6	7.9	9.0	6.1	4.6	11.2	9.4	6.2	5.3
Bosnia and Herz.	1.3	4.9	4.6	4.1	7.7	8.0	5.3	3.7	11.0	8.6	5.4	4.4
Croatia	3.3	2.5	2.4	1.5	5.5	4.3	3.4	2.3	7.0	5.2	4.2	3.3
Macedonia, FYR	2.9	3.8	3.6	3.2	6.7	6.5	5.0	3.8	9.1	7.6	5.7	4.6
Yugoslavia	2.2	3.6	3.5	-0.7	6.0	6.5	4.8	3.7	8.7	7.5	5.5	4.5
Belarus	2.7	2.2	2.0	1.8	5.0	4.1	3.5	2.6	6.7	5.2	4.3	3.6
Moldova	0.4	6.8	6.5	4.9	8.4	9.1	6.3	4.3	13.2	9.3	6.5	4.7
Russian Federation	2.8	2.1	2.0	1.8	4.8	4.1	3.4	2.6	6.6	5.2	4.4	3.7
Ukraine	4.0	3.4	3.4	3.0	7.7	5.9	4.4	3.2	10.5	6.8	5.1	4.1

Source: model calculations

Tab.28 Average growth rate of population in CEEC, 2000-2040, UN projections

	Low				Base				High			
	2000-10	2010-20	2020-30	2030-40	2000-10	2010-20	2020-30	2030-40	2000-10	2010-20	2020-30	2030-40
Bulgaria	-0.7	-0.7	-0.9	-1.1	-0.6	-0.6	-0.7	-0.8	-0.2	-0.2	-0.2	-0.1
Czech Republic	-0.2	-0.4	-0.7	-1.0	-0.2	-0.3	-0.5	-0.7	0.2	0.0	0.0	-0.1
Estonia	-1.0	-0.8	-0.8	-1.0	-1.0	-0.7	-0.7	-0.7	-0.8	-0.4	-0.2	-0.2
Hungary	-0.5	-0.6	-0.8	-1.0	-0.4	-0.5	-0.6	-0.7	-0.1	-0.1	-0.1	-0.1
Latvia	-1.1	-0.8	-0.9	-1.0	-1.0	-0.7	-0.6	-0.6	-0.7	-0.4	-0.3	-0.1
Lithuania	-0.3	-0.4	-0.6	-0.8	-0.3	-0.3	-0.4	-0.5	0.0	0.0	0.0	0.0
Poland	0.0	0.0	-0.3	-0.5	0.1	0.0	-0.2	-0.3	0.3	0.3	0.1	0.2
Romania	-0.4	-0.5	-0.7	-0.9	-0.4	-0.5	-0.6	-0.7	0.0	0.0	0.0	0.0
Slovakia	-0.1	-0.2	-0.5	-0.8	0.1	0.0	-0.2	-0.4	0.4	0.3	0.2	0.1
Slovenia	-0.2	-0.5	-0.7	-1.0	-0.2	-0.4	-0.6	-0.8	0.1	-0.2	-0.2	-0.3
Cyprus	0.5	0.2	0.0	-0.3	0.7	0.5	0.3	0.1	0.9	0.8	0.6	0.5
Malta	0.4	0.1	-0.2	-0.5	0.6	0.3	0.1	-0.1	0.8	0.6	0.4	0.3
Turkey	1.0	0.7	0.4	0.1	1.3	1.0	0.8	0.6	1.6	1.4	1.2	1.1
Albania	0.4	0.5	0.4	0.0	0.7	0.9	0.8	0.5	1.0	1.2	1.2	1.0
Bosnia and Herz.	0.6	-0.1	-0.6	-0.9	0.9	0.1	-0.3	-0.5	1.1	0.4	0.1	0.0
Croatia	-0.3	-0.5	-0.7	-0.9	-0.2	-0.3	-0.4	-0.5	0.0	-0.1	-0.2	-0.1
Macedonia, FYR	0.3	0.1	-0.1	-0.3	0.6	0.4	0.3	0.1	0.7	0.6	0.6	0.5
Yugoslavia	-0.1	-0.2	-0.3	-4.2	0.1	0.1	0.0	-0.1	0.4	0.3	0.4	0.4
Belarus	-0.4	-0.5	-0.7	-0.9	-0.3	-0.3	-0.4	-0.5	-0.1	-0.1	-0.1	-0.1
Moldova	-0.2	0.0	-0.3	-0.4	0.1	0.2	0.1	0.0	0.3	0.4	0.4	0.4
Russian Federation	-0.3	-0.5	-0.7	-0.9	-0.2	-0.3	-0.4	-0.5	0.1	0.1	0.0	0.1

Ukraine	-0.4	-0.5	-0.7	-0.9	-0.3	-0.4	-0.5	-0.6	-0.2	-0.2	-0.2	-0.1

Source: model calculations, United Nations

Detailed assumptions of the forecast

Tables 29-33 show the detailed assumptions underlying the three scenarios. The assumptions on the demographic process are taken from the UN projections (United Nations [1998]).

Tab.29 Assumptions of the scenarios: political stability (6=full stability)

	Actual	Low				Base				High			
	1995-00	2000-10	2010-20	2020-30	2030-40	2000-10	2010-20	2020-30	2030-40	2000-10	2010-20	2020-30	2030-40
Bulgaria	3.0	3.0	4.0	5.0	5.5	4.0	5.5	6.0	6.0	4.5	5.5	6.0	6.0
Czech Republic	5.0	5.0	5.5	5.5	6.0	5.5	6.0	6.0	6.0	5.5	6.0	6.0	6.0
Estonia	5.0	5.0	5.5	5.5	6.0	5.5	6.0	6.0	6.0	5.5	6.0	6.0	6.0
Hungary	5.0	5.0	5.5	5.5	6.0	5.5	6.0	6.0	6.0	5.5	6.0	6.0	6.0
Latvia	4.0	5.0	5.5	5.5	6.0	5.5	6.0	6.0	6.0	5.5	6.0	6.0	6.0
Lithuania	4.0	5.0	5.5	5.5	6.0	5.5	6.0	6.0	6.0	5.5	6.0	6.0	6.0
Poland	5.0	5.0	5.5	5.5	6.0	5.5	6.0	6.0	6.0	5.5	6.0	6.0	6.0
Romania	3.0	3.0	4.0	5.0	5.5	4.0	5.5	6.0	6.0	4.5	5.5	6.0	6.0
Slovakia	4.0	5.0	5.5	5.5	6.0	5.5	6.0	6.0	6.0	5.5	6.0	6.0	6.0
Slovenia	5.0	5.0	5.5	5.5	6.0	5.5	6.0	6.0	6.0	5.5	6.0	6.0	6.0
Cyprus	5.0	5.0	5.5	5.5	6.0	5.5	6.0	6.0	6.0	5.5	6.0	6.0	6.0
Malta	5.0	5.0	5.5	5.5	6.0	5.5	6.0	6.0	6.0	5.5	6.0	6.0	6.0
Turkey	3.0	3.0	3.5	4.0	4.0	4.0	5.0	6.0	6.0	4.5	5.5	6.0	6.0
Albania	1.0	3.0	3.0	3.5	4.0	3.0	4.0	5.0	6.0	3.0	4.5	5.0	6.0
Bosnia and Herz.	0.0	3.0	3.0	3.5	4.0	3.0	4.0	5.0	6.0	3.0	4.5	5.0	6.0
Croatia	3.5	4.0	4.0	5.0	5.5	4.5	5.5	6.0	6.0	5.0	5.5	6.0	6.0
Macedonia, FYR	1.0	3.0	3.0	3.5	4.0	3.0	4.0	5.0	6.0	3.0	4.5	5.0	6.0
Yugoslavia	0.0	3.0	3.0	3.5	4.0	3.0	4.0	5.0	6.0	3.0	4.5	5.0	6.0
Belarus	2.5	2.5	3.0	3.5	4.0	3.0	3.5	4.0	4.0	3.0	4.0	4.5	5.0
Moldova	3.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0	4.0	3.0	4.0	4.5	5.0
Russian Federation	3.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0	4.0	3.0	4.0	4.5	5.0
Ukraine	3.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0	4.0	3.0	4.0	4.5	5.0

Note: Shaded area indicates EU membership for more than half of the decade

Source: model calculations

In the low case we assume that the EU enlargement will be postponed until the year 2007-8, and for the Balkan candidate countries (Bulgaria and Romania) until 2017-18. The enlargement will include Croatia (together with the Balkan candidates), but exclude Turkey. Other Balkan countries, as well as FSU countires will achieve the relative stability of the democratic political system only after 2025.

In the base case we assume the EU enlargement to take place around 2004-5 (around 2010 for Balkan countries including Croatia). Turkey will join around 2020, and the other Balkan countires around 2030. The FSU countires will achieve full stability since 2010.

In the high case, we assume the EU enlargement to take place around 2004-5 (around 2007-8 for Balkan countries including Croatia). Turkey will join around 2015, and the other Balkan countires around

2025. The FSU countires will achieve full stability since 2010, and the enhanced stability (including joining the major Western organizations) around 2025-30.

Tab.30 Assumptions of the scenarios: technological gap (EU-15=100, end of period)

	Actual	Low				Base				High			
	1995-00	2000-10	2010-20	2020-30	2030-40	2000-10	2010-20	2020-30	2030-40	2000-10	2010-20	2020-30	2030-40
Bulgaria	39.7	35.7	32.2	25.7	20.6	31.8	25.4	17.8	12.5	29.8	22.3	13.4	8.0
Czech Republic	36.8	33.1	26.5	21.2	17.0	29.5	20.6	14.4	10.1	27.6	16.6	9.9	6.0
Estonia	39.2	35.3	28.2	22.6	18.1	31.4	22.0	15.4	10.8	29.4	17.6	10.6	6.4
Hungary	36.8	33.1	26.5	21.2	17.0	29.5	20.6	14.4	10.1	27.6	16.6	9.9	6.0
Latvia	48.9	44.0	35.2	28.2	22.5	39.1	27.4	19.2	13.4	36.7	22.0	13.2	7.9
Lithuania	46.9	42.2	33.7	27.0	21.6	37.5	26.2	18.4	12.9	35.2	21.1	12.7	7.6
Poland	55.2	49.7	39.8	31.8	25.4	44.2	30.9	21.6	15.2	41.4	24.8	14.9	8.9
Romania	71.6	64.4	58.0	46.4	37.1	57.3	45.8	32.1	22.4	53.7	40.3	24.2	14.5
Slovakia	47.7	43.0	34.4	27.5	22.0	38.2	26.7	18.7	13.1	35.8	21.5	12.9	7.7
Slovenia	35.6	32.1	25.7	20.5	16.4	28.5	20.0	14.0	9.8	26.7	16.0	9.6	5.8
Cyprus	7.2	6.5	5.2	4.1	0.0	5.8	4.0	0.0	0.0	5.4	0.0	0.0	0.0
Malta	12.8	11.5	9.2	7.4	0.0	10.3	7.2	0.0	0.0	9.6	0.0	0.0	0.0
Turkey	52.7	47.4	42.7	38.4	30.7	42.1	33.7	27.0	18.9	39.5	29.6	22.2	13.3
Albania	93.9	89.2	80.3	72.2	57.8	84.5	67.6	54.1	37.8	79.8	59.8	44.9	26.9
Bosnia and Herz.	83.7	79.5	71.5	64.4	51.5	75.3	60.2	48.2	33.7	71.1	53.3	40.0	24.0
Croatia	37.8	34.1	30.7	24.5	19.6	30.3	24.2	17.0	11.9	28.4	21.3	12.8	7.7
Macedonia, FYR	60.2	57.1	51.4	46.3	37.0	54.1	43.3	34.6	24.3	51.1	38.3	28.8	17.3
Yugoslavia	63.6	60.4	54.3	48.9	39.1	57.2	45.8	36.6	25.6	54.0	40.5	30.4	18.2
Belarus	56.2	53.4	50.8	45.7	36.5	50.6	45.6	36.4	25.5	47.8	40.6	30.5	18.3
Moldova	78.4	74.5	70.7	63.7	50.9	70.5	63.5	50.8	35.6	66.6	56.6	42.5	25.5
Russian Federation	64.2	61.0	58.0	52.2	41.7	57.8	52.0	41.6	29.1	54.6	46.4	34.8	20.9
Ukraine	66.1	62.8	59.7	53.7	43.0	59.5	53.6	42.8	30.0	56.2	47.8	35.8	21.5

Source: model calculations

The assumptions on the speed of reducing the technological gap is based on the model, in which a country reduces over a decade the technological gap in a fast, medium or slow way:

$gap_1 = (1 - \square\square\ gap_{-1}$

Central European EU candidate countries are assumed to reduce the gap at the medium speed until 2010, and then at the fast speed; the Balkan candidate countries (Bulgaria, Romania), Croatia and Turkey are assumed to reduce the gap at the medium speed until 2020, and then at the fast speed; the other Balkan countries at the slow speed until 2010, medium speed until 2030, and then at the fast speed; the FSU countries at the slow speed until 2020, medium speed until 2030, and then at the fast speed. Slow speed means reduction of the gap by 5% over the decade in the low case, 10% in the base case, 15% in the high case; medium speed means reduction of the gap by 10% over the decade in the low case, 20% in the base case, 25% in the high case; fast speed means reduction of the gap by 20% over the decade in the low case, 30% in the base case, 40% in the high case.

Tab.31 Assumptions of the scenarios: economic stability (CPI)

	Actu	Low	Base	High

	al												
	1995-00	2000-10	2010-20	2020-30	2030-40	2000-10	2010-20	2020-30	2030-40	2000-10	2010-20	2020-30	2030-40
Bulgaria	136.4	15.0	10.0	5.0	2.0	10.0	6.0	2.0	2.0	8.0	5.0	2.0	2.0
Czech Republic	7.5	5.0	4.0	2.0	2.0	4.0	2.0	2.0	2.0	4.0	2.0	2.0	2.0
Estonia	11.1	5.0	4.0	2.0	2.0	4.0	2.0	2.0	2.0	4.0	2.0	2.0	2.0
Hungary	16.4	5.0	4.0	2.0	2.0	4.0	2.0	2.0	2.0	4.0	2.0	2.0	2.0
Latvia	8.1	5.0	4.0	2.0	2.0	4.0	2.0	2.0	2.0	4.0	2.0	2.0	2.0
Lithuania	9.5	5.0	4.0	2.0	2.0	4.0	2.0	2.0	2.0	4.0	2.0	2.0	2.0
Poland	15.0	5.0	4.0	2.0	2.0	4.0	2.0	2.0	2.0	4.0	2.0	2.0	2.0
Romania	69.2	15.0	10.0	5.0	2.0	10.0	6.0	2.0	2.0	8.0	5.0	2.0	2.0
Slovakia	7.3	5.0	4.0	2.0	2.0	4.0	2.0	2.0	2.0	4.0	2.0	2.0	2.0
Slovenia	8.5	5.0	4.0	2.0	2.0	4.0	2.0	2.0	2.0	4.0	2.0	2.0	2.0
Cyprus	2.6	5.0	4.0	2.0	2.0	4.0	2.0	2.0	2.0	4.0	2.0	2.0	2.0
Malta	2.5	5.0	4.0	2.0	2.0	4.0	2.0	2.0	2.0	4.0	2.0	2.0	2.0
Turkey	78.7	15.0	10.0	5.0	5.0	10.0	6.0	4.0	2.0	8.0	5.0	2.0	2.0
Albania	16.1	15.0	10.0	10.0	10.0	10.0	6.0	6.0	4.0	8.0	5.0	5.0	4.0
Bosnia and Herz.	5.0	15.0	10.0	10.0	10.0	5.0	5.0	5.0	4.0	5.0	5.0	5.0	4.0
Croatia	4.6	6.0	5.0	4.0	2.0	4.0	4.0	2.0	2.0	4.0	2.0	2.0	2.0
Macedonia, FYR	0.8	15.0	10.0	10.0	10.0	5.0	5.0	5.0	4.0	5.0	5.0	5.0	4.0
Yugoslavia	47.5	15.0	10.0	10.0	10.0	10.0	6.0	6.0	4.0	8.0	5.0	5.0	4.0
Belarus	103.2	20.0	10.0	10.0	10.0	20.0	6.0	6.0	6.0	15.0	5.0	5.0	5.0
Moldova	19.4	20.0	10.0	10.0	10.0	20.0	6.0	6.0	6.0	15.0	5.0	5.0	5.0
Russian Federation	41.6	15.0	10.0	10.0	10.0	15.0	6.0	6.0	6.0	10.0	5.0	5.0	5.0
Ukraine	72.0	20.0	10.0	10.0	10.0	20.0	6.0	6.0	6.0	15.0	5.0	5.0	5.0

Note: Shaded area indicates participation in EMU for more than half of the decade

Source: model calculations

The assumed level pf the economic stability is based on the assumption, that the EU candidate countries join the EMU (euro area) around 2015 in the low case (Balkan candidates around 2025); around 2010-12 in the base case (Balkan candidates around 2015-18); around 2008-09 in the high case (Balkan candidates around 2015). The other countries remain high inflation countries for the whole period in the low case, but reduce inflation to low levels in two other scenarios .

Tab.32 Assumptions of the scenarios: gross domestic saving as % of GDP

	Actual	Low				Base				High			
	1995-00	2000-10	2010-20	2020-30	2030-40	2000-10	2010-20	2020-30	2030-40	2000-10	2010-20	2020-30	2030-40
Bulgaria	17.8	18.9	19.5	22.2	23.6	21.4	23.2	26.6	28.3	22.9	25.5	29.2	31.1
Czech Republic	28.1	26.6	25.8	25.4	22.7	29.1	29.5	29.8	27.4	30.6	31.8	32.4	30.2
Estonia	21.0	23.0	24.0	24.5	22.3	25.5	27.8	28.9	26.9	27.0	30.0	31.5	29.8
Hungary	28.2	26.6	25.8	25.4	22.7	29.1	29.5	29.8	27.4	30.6	31.8	32.4	30.2
Latvia	24.3	24.6	24.8	24.9	22.5	27.1	28.6	29.3	27.1	28.6	30.8	31.9	30.0

Lithuania	18.2	21.6	23.3	24.1	22.1	24.1	27.0	28.5	26.8	25.6	29.3	31.1	29.6
Poland	18.6	21.8	23.4	24.2	22.1	24.3	27.2	28.6	26.8	25.8	29.4	31.2	29.6
Romania	15.0	17.5	18.7	21.9	23.4	20.0	22.5	26.2	28.1	21.5	24.7	28.9	30.9
Slovakia	25.2	25.1	25.0	25.0	22.5	27.6	28.8	29.4	27.2	29.1	31.0	32.0	30.0
Slovenia	24.1	24.5	24.8	22.4	18.7	27.0	28.5	26.8	23.4	28.5	30.8	29.4	26.2
Cyprus	17.0	21.0	23.0	21.5	18.3	23.5	26.8	25.9	22.9	25.0	29.0	28.5	25.8
Malta	17.6	21.3	23.2	21.6	18.3	23.8	26.9	26.0	23.0	25.3	29.2	28.6	25.8
Turkey	20.6	20.3	20.2	22.6	23.8	22.8	23.9	27.0	28.5	24.3	26.2	29.6	31.3
Albania	7.2	11.1	15.5	20.3	22.6	13.6	19.3	24.6	27.3	15.1	21.5	27.3	30.1
Bosnia and Herz.	-4.0	5.5	12.8	18.9	21.9	8.0	16.5	23.3	26.6	9.5	18.8	25.9	29.4
Croatia	14.5	17.3	18.6	21.8	23.4	19.8	22.4	26.2	28.1	21.3	24.6	28.8	30.9
Macedonia, FYR	7.1	11.0	15.5	20.3	22.6	13.5	19.3	24.6	27.3	15.0	21.5	27.3	30.1
Yugoslavia	7.0	11.0	15.5	20.3	22.6	13.5	19.3	24.6	27.3	15.0	21.5	27.3	30.1
Belarus	24.6	22.3	21.1	20.6	22.8	24.8	24.9	24.9	27.5	26.3	27.1	27.6	30.3
Moldova	22.8	21.4	20.7	20.4	22.7	23.9	24.5	24.7	27.4	25.4	26.7	27.4	30.2
Russian Federation	25.8	22.9	21.4	20.7	22.9	25.4	25.2	25.1	27.5	26.9	27.4	27.7	30.4
Ukraine	22.0	21.0	20.5	20.3	22.6	23.5	24.3	24.6	27.3	25.0	26.5	27.3	30.1

Source: model calculations

It is assumed that the high saving level is achieved in the period 2000-30 by the Central European EU candidates, in the period 2020-30 by the Balkan candidates and Turkey, and in the period 2030-40 by the other Balkan and FSU countires. High saving level is set at the level of 25% of GDP in the low case, 30% in the base case, and 33% in the high case.

The transition towards the target saving rate is governed by the formula:

$$level_1 = level_{-1} + \square\ (target - level_{-1})$$

with the □ factor set at 0.5 for all the scenarios.

Tab.33 Assumptions of the scenarios: public spending on education as % of GDP

	Actual	Low				Base				High			
	1995-00	2000-10	2010-20	2020-30	2030-40	2000-10	2010-20	2020-30	2030-40	2000-10	2010-20	2020-30	2030-40
Bulgaria	3.9	4.5	4.7	5.4	5.7	5.0	5.5	6.2	6.6	5.5	6.2	7.1	7.6
Czech Republic	5.4	5.2	5.6	5.8	5.9	5.7	6.3	6.7	6.8	6.2	7.1	7.5	7.8
Estonia	7.1	6.0	6.0	6.0	6.0	6.5	6.8	6.9	6.9	7.0	7.5	7.8	7.9
Hungary	5.3	5.1	5.6	5.8	5.9	5.6	6.3	6.7	6.8	6.1	7.1	7.5	7.8
Latvia	6.7	5.9	5.9	6.0	6.0	6.4	6.7	6.8	6.9	6.9	7.4	7.7	7.9
Lithuania	5.6	5.3	5.7	5.8	5.9	5.8	6.4	6.7	6.9	6.3	7.2	7.6	7.8
Poland	5.2	5.1	5.6	5.8	5.9	5.6	6.3	6.7	6.8	6.1	7.1	7.5	7.8
Romania	3.0	4.0	4.5	5.3	5.6	4.5	5.3	6.1	6.6	5.0	6.0	7.0	7.5
Slovakia	5.0	5.0	5.5	5.8	5.9	5.5	6.3	6.6	6.8	6.0	7.0	7.5	7.8
Slovenia	5.7	5.4	5.7	5.8	5.9	5.9	6.4	6.7	6.9	6.4	7.2	7.6	7.8
Cyprus	4.5	4.8	5.4	5.7	5.8	5.3	6.1	6.6	6.8	5.8	6.9	7.4	7.7
Malta	5.2	5.1	5.6	5.8	5.9	5.6	6.3	6.7	6.8	6.1	7.1	7.5	7.8
Turkey	2.2	3.6	4.3	4.7	5.3	4.1	5.1	5.5	6.3	4.6	5.8	6.4	7.2
Albania	4.1	4.1	4.5	5.3	5.6	4.6	5.3	6.1	6.6	5.1	6.0	7.0	7.5
Bosnia and Herz.	2.0	3.0	4.0	5.0	5.5	3.5	4.8	5.9	6.4	4.0	5.5	6.8	7.4

Croatia	5.3	5.1	5.1	5.5	5.8	5.6	5.8	6.4	6.7	6.1	6.6	7.3	7.6
Macedonia, FYR	5.0	4.5	4.8	5.4	5.7	5.0	5.5	6.3	6.6	5.5	6.3	7.1	7.6
Yugoslavia	3.9	4.0	4.5	5.2	5.6	4.5	5.2	6.1	6.6	5.0	6.0	7.0	7.5
Belarus	5.6	5.3	5.1	5.6	5.8	5.8	5.9	6.4	6.7	6.3	6.6	7.3	7.7
Moldova	10.6	7.8	6.4	6.2	6.1	8.3	7.2	7.1	7.0	8.8	7.9	8.0	8.0
Russian Federation	3.5	4.3	4.6	5.3	5.7	4.8	5.4	6.2	6.6	5.3	6.1	7.1	7.5
Ukraine	7.3	6.1	5.6	5.8	5.9	6.6	6.3	6.7	6.8	7.1	7.1	7.5	7.8

Source: model calculations

It is assumed that the move towards the high spending on education is achieved in the period 2010-40 by the Central European EU candidates, in the period 2020-40 by the Balkan candidates and Croatia, in the period 2030-40 by Turkey, and in the period 2020-40 by the other Balkan and FSU countires. High level of spending on education is set at the level of 6% of GDP in the low case, 7% in the base case, and 8% in the high case.

The transition towards the target level of spending on education is governed by the formula:

$$level_1 = level_{-1} + \square\ (target - level_{-1})$$

with the $\square$ factor set at 0.5 for all the scenarios.

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The Timber Committee is a principal subsidiary body of the ECE (UN Economic Commission for Europe), based in Geneva. It constitutes a forum for cooperation and consultation between member countries on forestry, forest industry and forest product matters. All countries of Europe; the former USSR; United States of America, Canada and Israel are members of the ECE and participate in its work.

The ECE Timber Committee shall, within the context of sustainable development, provide member countries with the information and services needed for policy- and decision-making regarding their forest and forest industry sector ("the sector"), including the trade and use of forest products and, when appropriate, formulate recommendations addressed to member Governments and interested organizations. To this end, it shall:

1. With the active participation of member countries, undertake short-, medium- and long-term analyses of developments in, and having an impact on, the sector, including those offering possibilities for the facilitation of international trade and for enhancing the protection of the environment;

2. In support of these analyses, collect, store and disseminate statistics relating to the sector, and carry out activities to improve their quality and comparability;

3. Provide the framework for cooperation e.g. by organizing seminars, workshops and *ad hoc* meetings and setting up time-limited *ad hoc* groups, for the exchange of economic, environmental and technical information between governments and other institutions of member countries that is needed for the development and implementation of policies leading to the sustainable development of the sector and to the protection of the environment in their respective countries;

4. Carry out tasks identified by the UNECE or the Timber Committee as being of priority, including the facilitation of subregional cooperation and activities in support of the economies in transition of central and eastern Europe and of the countries of the region that are developing from an economic point of view;

5. It should also keep under review its structure and priorities and cooperate with other international and intergovernmental organizations active in the sector, and in particular with the FAO (Food and Agriculture Organization of the United Nations) and its European Forestry Commission and with the ILO (International Labour Organisation), in order to ensure complementarity and to avoid duplication, thereby optimizing the use of resources.

More information about the Committee's work may be obtained by writing to:

Timber Section
UNECE Trade Division
Palais des Nations
CH - 1211 Geneva 10, Switzerland
Fax: + 41 22 917 0041
E-mail: info.timber@unece.org

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