

Key drivers and uncertainties

Efforts to accelerate basic technological development cycles are driven by better access to information and increasing scientific cooperation, building upon continued economic growth and trade. The value creation and competitiveness of many companies in the OECD world is determined not just by the price of their products but also their ability to innovate and remain at the forefront of technological progress. Rising levels of education together with increased per capita incomes in many parts of the world mean that demand for new products is growing, leading to shorter product innovation cycles.

The general acceleration of innovation and technological change is a stable trend. But the concrete direction and speed of innovation and diffusion is very uncertain. Technological constraints are key uncertainties — many of the NBIC technologies are still in the laboratory. But there are also important uncertainties regarding the availability of R&D funding because of public and corporate budget constraints, public policy development and the availability of a sufficiently skilled labour force, which could be affected by barriers to international migration. Many applications of NBIC technologies might also trigger ethical concerns.

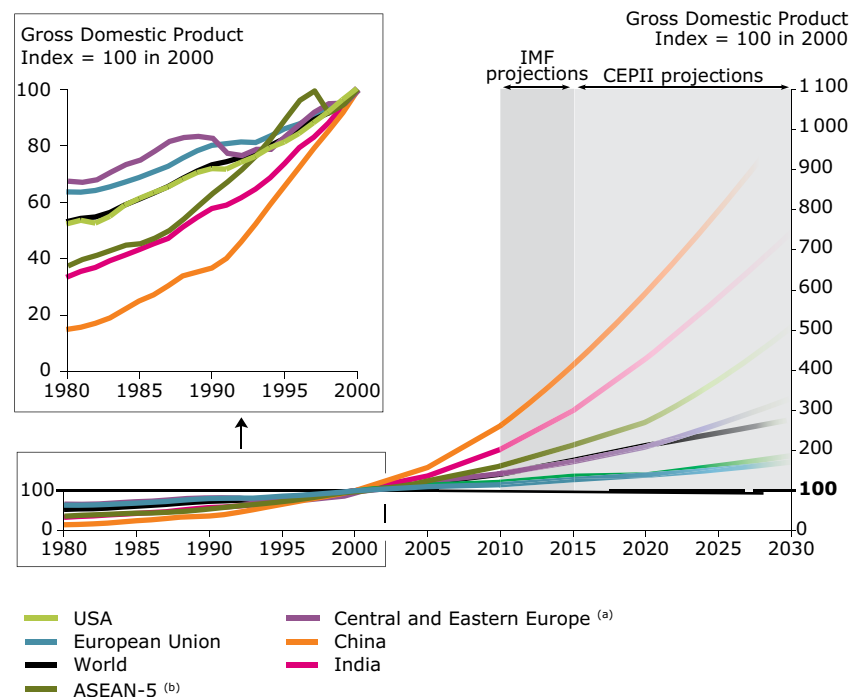
5 Continued economic growth?

Rapid growth accelerates consumption and resource use. But it also creates economic dynamism that fuels technological innovation, potentially offering new approaches to addressing environmental problems and increasing resource efficiency.

Virtually all mainstream outlook studies assume that economic growth will be positive on average across the globe in the coming decades. The rate of growth seems more uncertain than previously, however, given the depth of the 2008–2009 economic crisis, which was unprecedented since 1945. Due to developments such as ageing and the need for more controls on financial markets, growth may be less than usually assumed in the past, in particular in the developed world. For example the European Commission's 2009 report on the implications of ageing in the EU revises the EU's average Gross Domestic Product (GDP) growth expectations in the period to 2060 downward — from 2.4 % to about 1.8 % (DG ECFIN, 2009).

IMF data show that the world economy grew by 3.2 % annually on average in the period 1980–2010. Developed economies grew 2.6 % annually on average, while China and India grew by 10.0 % and 6.2 % respectively in the same period. Although the gap in terms of GDP per capita (in purchasing power parity terms) between the USA and China has decreased considerably, it still is wide, standing at USD 45 000 in the USA and USD 5 400 in China. Poverty in China has been reduced considerably but in 2005 10 % of Chinese people still lived on less than USD 1 a day, against 35 % in 1990 (IMF, 2010). Although developing economies now account for a larger share of the world's GDP, some regions, in particular Africa, have lagged behind due to trade barriers in agricultural markets.

Figure 5.1 Economic growth continues – faster in emerging economies

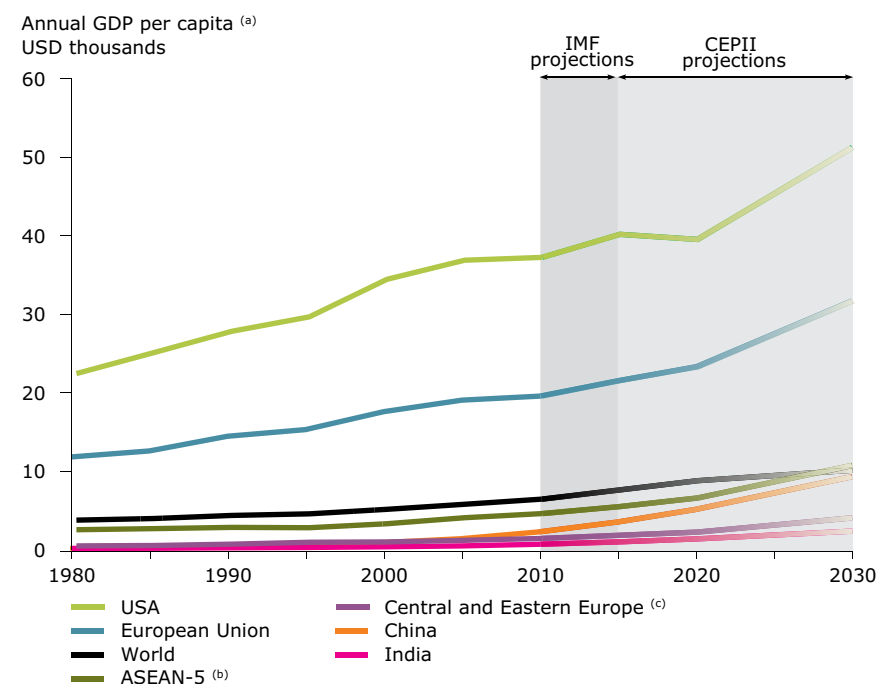


Note: (a) Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Estonia, Hungary, Latvia, Lithuania, the former Yugoslav Republic of Macedonia, Montenegro, Poland, Romania, Serbia, Turkey.
 (b) Indonesia, Malaysia, Philippines, Thailand and Vietnam.

Source: IMF, 2010; Poncet, 2006.

GDP projections up to 2050 assume somewhat reduced growth in the developed and developing economies (2.3 % against 2.6 % in the period 1980–2010) but still a relatively high growth in the emerging economies (e.g. China with 5.3 % and India with 5.2 %) (Poncet, 2006). According to these forecasts, by 2050 more than half of the world's GDP could be earned in the regions now labelled as emerging and developing, against a third in 2010. However, the USA is still projected

Figure 5.2 A large gap persists between advanced and emerging economies



Note: (a) Calculations of GDP per capita are based on UN 2008 median variant population projections and at constant 2000 prices.
 (b) Indonesia, Malaysia, Philippines, Thailand and Vietnam.
 (c) Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Estonia, Hungary, Latvia, Lithuania, the former Yugoslav Republic of Macedonia, Montenegro, Poland, Romania, Serbia, Turkey.

Source: IMF, 2010; Poncet, 2006; UN Population Division, 2008.

to be the biggest economy with the EU ranking second and China third (in constant prices, and exchange rates). China could however surpass the world's average GDP per head by 2050 (GDP exchange rates).

Box 5.1 Why is continued economic growth important for Europe?

Significant economic changes have important impacts across almost all areas of society. Economic growth is a central driver of environmental impacts, with slower growth generally implying a reduced environmental impact, although not necessarily securing a healthy environment in the long term. Slow or negative growth characterises economies with reduced efficiency and little innovation, which can increase environmental impacts, as well as reducing the funding available to maintain the environment.

Positive economic growth changes consumption patterns, in particular in emerging countries with a rapidly growing middle class. Mobility increases, durable consumption goods are replaced rather than repaired, and high-calorie food squeezes out low-calorie alternatives. It all leads to increased pressure on the environment and natural resources through increased demand for resources and growing emissions of pollutants. Although in many areas resource efficiency is increasing and the relative pollution content of our lifestyles is tending to fall, the sheer volume of economic activities is pushing resource use and pollution volumes to higher absolute levels.

This megatrend will have both a direct and an indirect effect on Europe's environment. Directly, economic growth increases the burden on the natural systems that sustain us. Indirectly, global economic development affects Europe's position and competitiveness, with economic, social and environmental consequences. Emerging economies have competitive advantages in low-skilled, labour-intensive production and gain further when they build up their capital stock and increase the quality of their products. Europe needs to maintain its high labour productivity and further increase it through technological innovation, but will nevertheless lose its share in some basic markets such as agricultural products and basic manufacturing.

The European population is demanding an ever higher quality living environment. Achieving this will depend on the success of coordinated environmental (climate, biodiversity, pollution) policy measures creating a level playing field for European economic sectors.

Key drivers and uncertainties

Continuing global economic growth is mainly driven by population growth, further market globalisation and technological innovation. Other major factors are supportive economic policies at national, regional and global levels. The world has always seen longer or shorter cycles of economic upswing and recession. Periods of depression have always been followed by a return to a positive growth path, with several growth engines through time (the USA and Japan in the past, the BRIC countries at present). This pattern can be disrupted severely as for instance in the 1930s (the Great Depression), the 1970s (the energy crisis) and 2008/2009 (the financial crisis). There is no certainty that such disruptions will not become more frequent and deeper, keeping the world economy from a positive growth path for a longer period of time.

Key uncertainties include the effects of intensifying resource scarcity, such as short-term scarcity of essential resources (for example food and energy in 2007–2008) and, even more so, long-term scarcity, such as the expected and feared 'peak oil'. The emergence of national policies and bilateral agreements aiming to monopolise natural resources are important in this context. The pace of technological innovation needed to sustain economic growth under higher resource prices and possible larger disruptions is uncertain, as is the stability of financial markets. For emerging economies in particular, socio-political developments (e.g. democratisation) are an uncertainty, as is their ability to adapt to reduced skilled labour due to ageing in the long term. The last and perhaps most important uncertainty concerns geopolitical stability and the absence of military conflicts.