Box 6

THE CARRY-OVER EFFECT ON ANNUAL AVERAGE REAL GDP GROWTH

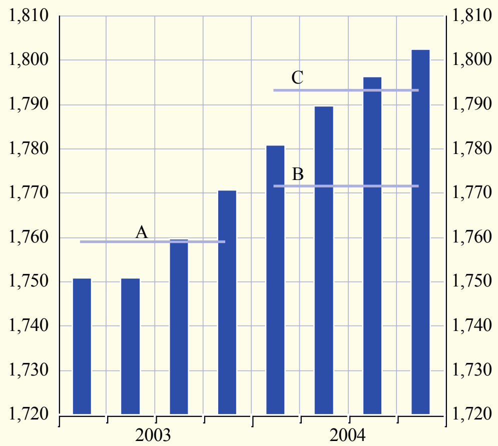
This box recalls the concept of the "carry-over effect" and highlights its importance for understanding growth dynamics in 2009 and the outlook for 2010.[1]

The annual average growth rate of real GDP for a given year is determined both by the growth dynamics in that particular year and in the previous year, the so-called "carry-over effect". The carry-over effect shows how much GDP would grow in a given year if all quarterly growth rates in that year were to have been zero (which is equivalent to the assumption that the quarterly levels of GDP in that year had remained at the same level as those in the fourth quarter of the previous year). The growth dynamics within the year considered are then merely the difference between the annual average growth rate and the carry-over effect.

Chart A displays the profile of the quarterly euro area real GDP level in 2003 and 2004 as a historical example of the use of this concept. The lines labelled A and C represent the average actual outcome of GDP in 2003 and 2004 respectively, while line B corresponds to the average level of GDP in 2004, if all quarterly growth rates in that year were to have been zero (i.e. the quarterly levels had been the same as the level recorded in the fourth quarter of 2003). The percentage difference between A and C corresponds to the average annual growth rate in 2004 (1.9%), the percentage difference between A and B to the carry-over effect (0.7%) and the percentage difference between B and C to the growth dynamics in 2004 (1.2%). These growth rates also correspond to the historical averages calculated over the period from 1981 to 2009. The average

Chart A Euro area real GDP level in 2003 and 2004

(EUR billions at 2000 prices; quarterly data)



Sources: Eurostat and ECB calculations.
Note: Data are seasonally and partly working day adjusted.

1 See Boxes 6 and 8 in the December 2001 and March 2005 issues, respectively, of the Monthly Bulletin.

positive carry-over effect relates to the fact that GDP predominantly shows a positive trend. The carry-over effect explains, on average, more than a third of annual GDP growth.

Chart B shows average annual GDP growth between 1981 and 2009 decomposed into the carry-over effect and the growth dynamics within the year. The carry-over effect for 2010 is also shown.

In 2008 the growth dynamics within the year were negative (-0.1%). In fact, the average positive growth (of 0.5%) was entirely explained by the carry-over effect from the growth profile in 2007 (0.7%).

Chart B Euro area annual GDP growth, carry-over effect and growth within the year

(annual percentage changes; annual data)

Sources: Eurostat and ECB calculations.
Note: Data are seasonally and partly working day adjusted.

One further observation is the unprecedented downturn in 2009 when GDP contracted by 4.0%. Both the carry-over effect (-1.7%) as well as the growth dynamics within the year (-2.3%) were negative. Indeed, the downturn already started back in 2008 and continued in 2009, particularly in the first half of the year.

The carry-over effect on growth in 2010 from growth in 2009 is estimated at 0.3%.[2] Although it is lower than the historical average of the carry-over effect, it is still positive, suggesting that GDP started to rise again in the course of 2009. Available forecasts and estimates from international organisations and the private sector put average annual GDP growth in the range from 0.7% to 1.3% in 2010 (see Box 8 on the ECB staff macroeconomic projections). This implies that the expectations regarding growth dynamics within the year range between 0.4% and 1.0%. While the range is below the average of 1.2% recorded over the past 30 years, it still shows that expectations are for a continuation of the upward movement of GDP that began in 2009. The same applies to the ECB staff macroeconomic projections, which envisage real GDP growth to be in a range between 0.4% and 1.2% in 2010.

One point worth mentioning is that the first estimate of real GDP growth in the fourth quarter of 2009 at 0.1% was lower than expected by many forecasters. This may lead to a downward revision of some forecasts of annual real GDP growth for 2010. For instance, the survey conducted by the Euro Zone Barometer in mid-February, prior to the release of the flash estimate for the fourth quarter, pointed to real quarter-on-quarter GDP growth of 0.4% in the fourth quarter of 2009, implying a carry-over effect of 0.5% at the time. Therefore, the rather weak outcome in the fourth quarter (of 0.1%) implies a mechanical downward effect of around 0.2 percentage point on average annual real GDP growth in 2010.

2 This estimate may change as forthcoming releases of annual accounts may contain revisions.