

Box 4

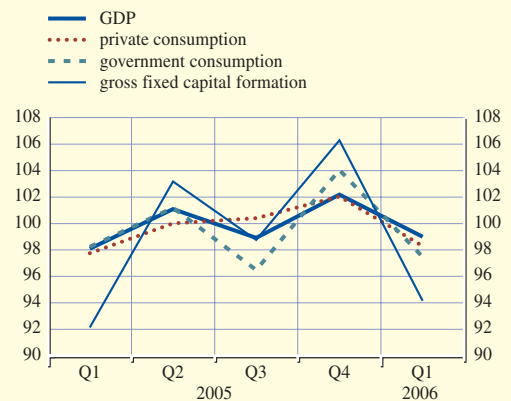
SEASONAL AND CALENDAR EFFECTS ON EURO AREA GDP

Seasonal and calendar variations significantly affect quarterly GDP. It is necessary to adjust for these effects in order to assess the underlying economic developments. For example, the adjusted quarter-on-quarter growth of euro area real GDP reported for the first quarter of 2006 was 0.6%, whereas unadjusted growth pointed to a decrease of 2.5% over the same period. This box outlines the most important factors underlying seasonal and calendar variations and explains their impact by focusing on the volumes of euro area GDP and selected expenditure components as well as on GDP across the four largest euro area countries.

Most unadjusted GDP series show regular seasonal profiles, which are caused in particular by weather conditions, socio-economic behaviour and habits, and administrative regulations and arrangements (e.g. extended shop opening hours before Christmas). In addition, the varying number of working and trading days¹ affects output, expenditure and income statistics, although to a lesser extent than seasonal effects.² However, in some quarters the variation in the number of working or trading days is greater, for example as a result of particular calendar occurrences, such as Christmas falling on a weekend or Easter occurring in the first or second quarter of the year. The pattern created by calendar variations is thus more complex than that created by seasonal effects, which reoccur in the same period every year. Cross-country differences in working-day variations and their impact can be traced back to different national public holiday practices. For quarterly GDP, the impact of one additional working day might vary between 0.1% and 0.4% across euro area countries.

Chart A Seasonal and calendar effects on euro area GDP and selected expenditure components

(index: 100 = zero impact)¹⁾



Sources: Eurostat and ECB calculations.

1) The impact is calculated as the ratio of unadjusted data to adjusted data.

Chart A illustrates the combined impact of seasonal and calendar corrections made for the volume of quarterly euro area GDP and of selected expenditure components since 2005 (changes in inventories, exports and imports are not shown). Values above (below) 100 indicate that seasonal and calendar variations in combination had an upward (downward) impact on the series, and the calendar and seasonal adjustment accordingly reduces (increases) the series level. The adjustments are estimated as average impacts of seasonality and calendar profiles over several years. For the latter, the estimated average impact of one additional working day is applied to the actual working-day pattern relevant for the reported time series value. Overall, seasonal and calendar adjustment corrects for the regular, average seasonal and calendar influences. However, it does not correct for non-regular influences, such as very cold or unusually long winter periods or exceptional leave patterns.

During 2005 unadjusted euro area real GDP varied quarter-on-quarter by $\pm 2\%$ solely as a result of seasonal and calendar effects. The first quarter shows a downward impact of seasonal influences on euro area GDP of about 2%. This is partly due to the pronounced seasonality of gross fixed capital formation. The subdued construction activity during the winter season reduces the series' value by 6% to 8%. In the fourth quarter, GDP shows an upward seasonal impact of about 2%. This partly reflects the seasonal peaks in gross fixed capital formation (6%) and in government consumption (4%). Private consumption, which accounts for more than half of total GDP, shows a fairly similar profile to that of GDP.

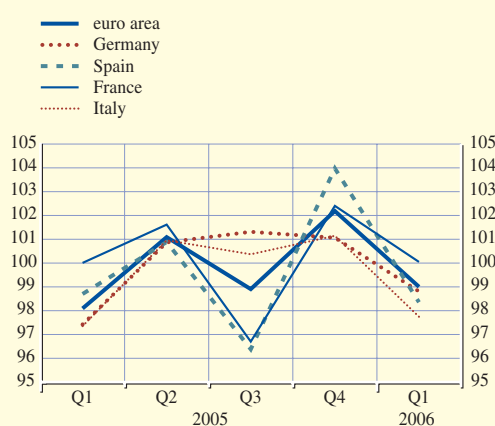
1 Working days are Mondays to Fridays excluding public holidays, whereas trading days also include Saturdays.

2 Working-day effects and their impact on GDP are described in the box entitled "The impact of the number of working days on euro area GDP in 2004" in the June 2004 issue of the Monthly Bulletin.

In terms of quarter-on-quarter rates of change, the largest upward impact is typically from the third to the fourth quarter, increasing quarter-on-quarter growth of the unadjusted euro area GDP by about 3 percentage points over recent years. This is followed by a downward impact on the growth rate from the fourth quarter to the first quarter of the following year, typically of between 3 and 3½ percentage points. In terms of year-on-year growth rates, calendar effects are the main cause of differences between adjusted and non-adjusted results.³ For example, while Easter fell in the first quarter in 2005, it fell in the second quarter in 2006. As a consequence, the combined downward impact on GDP volume of seasonal and calendar variations was about 2% in the first quarter of 2005, but was only about 1% in the first quarter of 2006, resulting in a downward correction of the year-on-year growth rate for the first quarter of 2006 from 2.9% in terms of unadjusted data to 2.0% in adjusted terms.

Chart B Seasonal and calendar effects on GDP in the four largest euro area countries

(index: 100 = zero impact)¹⁾



Sources: Eurostat and ECB calculations.

1) The impact is calculated as the ratio of unadjusted data to adjusted data.

Chart B compares the impact of seasonal and calendar variations on the volume of GDP for the four largest euro area countries. It reveals fairly similar effects in the second quarter only. The largest difference across the four countries occurs in the third quarter, with the impact varying by almost 5 percentage points.

The magnitude of and differences in seasonal profiles in GDP statistics call for an accurate and comparable adjustment for seasonal and calendar effects in euro area country data. This is a prerequisite for high-quality euro area results, since Eurostat compiles seasonally and calendar-adjusted GDP series by aggregating adjusted country GDP data. European standards have been developed and progressively implemented by national statistical institutes in the euro area and the EU. For the euro area results, a desirable improvement would be the release of calendar-adjusted series only, in order to make it possible to distinguish between adjustments made for seasonal effects and those made for calendar effects.

³ Furthermore, seasonal profiles and their impact on a time series might vary over time, which causes additional but small differences between adjusted and non-adjusted annual growth rates.