

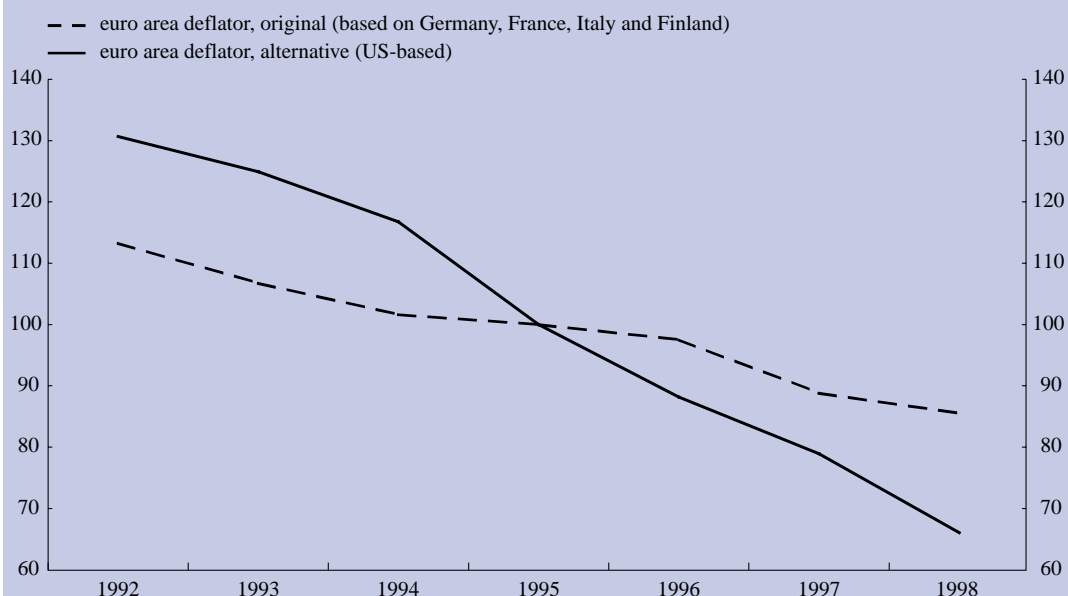
## **Box 6**

### **The sensitivity of euro area growth to the measurement of ICT prices**

Measurement problems related to international comparisons of growth in real GDP were discussed in qualitative terms in the July 2001 issue of the Monthly Bulletin in the article on “New technologies and productivity in the euro area”. Recent discussions on the relative growth performances of the euro area and United States have often focused on one particular difference: the measurement of price indices for information and communication technology (ICT) equipment. In particular, it has been argued that, unlike US deflators, official euro area

### Price deflators for ICT equipment – euro area

(index 1995 = 100)



statistics do not take into account all quality improvements, which means that they understate price declines in these categories of goods and consequently underestimate the rate of growth of real GDP in volume terms. This, it is argued, could partly account for the observed difference in real GDP growth between the euro area and the United States. This box presents a quantitative analysis of the sensitivity of euro area real GDP growth to the use of alternative (US-based) deflators for ICT equipment.

The euro area estimates are based on detailed sectoral input-output data on real value added (or GDP) for four euro area economies – Germany, France, Italy and Finland – which together comprise around three-quarters of euro area nominal gross value added. The focus here is on manufacturing sectors producing ICT equipment, i.e. the “office accounting equipment and computer hardware industry” and the “radio, TV and communications equipment industry”. The US deflator was substituted for national deflators for euro area countries after correcting for differences in domestic inflation. This correction is made in order to make the alternative deflator for ICT equipment independent of differences in prevailing inflation in the different countries. The chart above shows both the original implicit value added deflator for ICT equipment and the alternative US-based deflator for the euro area. Between 1992 and 1998 the alternative (US-based) deflator for ICT equipment in the euro area decreased by 10.7% per year on average, compared with an average decline of 4.6% for the original deflator.

National accounts guidelines recommend the construction of price and volume indices for value added using the so-called double-deflation method, i.e. applying deflators both to gross output and to intermediate inputs. In the present context, this is of significance as many sectors consume intermediate ICT products, the price changes of which may also be overstated. Therefore, both output and input prices have to be adjusted in order to assess the full impact on total gross value added. If prices are adjusted for a product in one sector that is then delivered to another sector, real value added will be affected in both sectors, but the adjustments will be made in opposite directions. A fully internally consistent assessment of the inter-sectoral effects of input and output price and volume adjustments, and of their ultimate impact on overall value added, must therefore be made using detailed input-output tables.

### Impact on euro area real value added growth of using alternative (US) deflators for ICT equipment (production side)<sup>1)</sup>

(percentages (real value added growth) and percentage points (adjustments))

	1992	1993	1994	1995	1996	1997	1998	average 1992-98
Unadjusted real value added growth	1.6	-0.9	2.1	2.1	1.2	1.9	2.4	1.5
<i>Adjustments due to</i>								
ICT output adjustment	0.03	0.21	0.03	0.26	0.16	0.04	0.29	0.15
ICT input adjustment	-0.03	0.02	-0.01	-0.15	-0.13	-0.04	-0.25	-0.08
Total impact	0.00	0.24	0.02	0.11	0.03	0.00	0.04	0.06
Adjusted real value added growth	1.6	-0.6	2.2	2.2	1.2	1.9	2.5	1.6

Source: ECB calculations based on OECD Stan database and Eurostat 1995 input-output tables.

Notes: Figures may not add up due to rounding.

1) Euro area estimate based on Germany, France, Italy and Finland, which together account for around 73% of euro area nominal gross value added.

The table above summarises the results of this double deflation analysis for the euro area. It shows a decomposition of the total effect of the use of the alternative (US-based) ICT deflator on measured real value added growth in the euro area, distinguishing between the effects of using an alternative deflator for ICT equipment output and of an alternative price index for the use of ICT equipment as an input.

Since the effects computed are typically small, the adjustments are presented to two decimal points in the table above, even though the margins of error would probably only allow rounding to one decimal point. The effects of the use of alternative deflators for ICT equipment for the period from 1992 to 1998 period average somewhat more than 0.1 percentage point per year for gross output growth (which has an upward effect) and somewhat less than 0.1 percentage point for the growth rate of intermediate inputs (which has a negative impact on the growth rate of real value added). The effects of the gross output and intermediate input corrections on the growth rate of real gross value added (and hence on real GDP) cancel each other out to a large extent. Between 1992 and 1998 the net effect on real value added growth is only visible at the two decimal point level, averaging a mere 0.06 percentage point. Furthermore, the adjustments show no clear pattern over time.

Thus, these estimates suggest that the mechanical impact of alternative (US-based) deflators for ICT equipment on real GDP growth in the euro area is relatively small, albeit with some variation over time. However, the use of different deflators is only one of the methodological differences between euro area countries and the United States in the compilation of national accounts. Other methodological differences, such as the treatment of software investment, the estimation of real value added in services sectors producing and using ICT, and the impact of weighting methods on measured GDP growth, are potentially more important. Hence, a more comprehensive study of these differences would be needed in order to draw firm conclusions as to whether statistical differences explain part of the observed real GDP growth differential between the euro area and the United States in recent years.