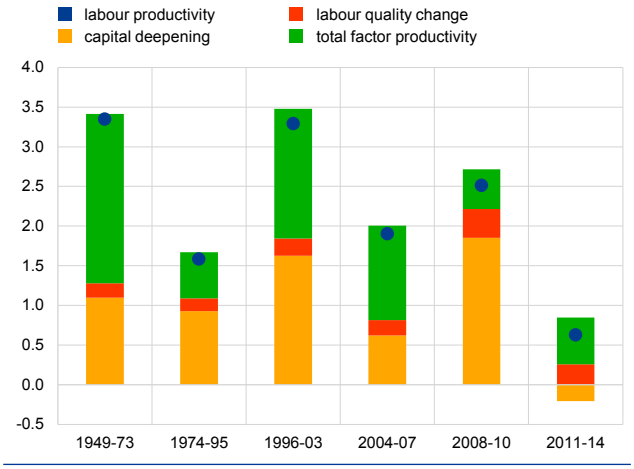
Box 1
The slowdown in US labour productivity growth – stylised facts and economic implications

The long-term growth prospects of the US economy are important from a euro area economic perspective as the United States is a major engine of global activity: US labour productivity growth – a key driver of long-term growth prospects – has been surprisingly weak in recent years. This development has also been observed in many advanced and emerging market economies.[1] Understanding the reasons for the recent slowdown is thus important for assessing the growth outlook for the United States and, in turn, the euro area economy.

Stylised facts and possible explanations

Chart A
Decomposition of labour productivity growth

(percentage point contributions to average annual percentage changes)



Source: US Bureau of Labor Statistics.
Note: Labour productivity is defined as output per hour worked.

Historically, US labour productivity growth (defined as output per hour worked) in the business sector has varied greatly (see Chart A). Strong growth rates (of 3.3%) in the period 1949-1973 were followed by a sharp slowdown (to 1.6%) in the two decades that followed. The information and communication technology (ICT) boom of the period 1996-2003 led to the "productivity miracle", when labour productivity growth doubled. As the gains from the ICT boom had largely been reaped, productivity growth slowed down to 1.9% in the pre-crisis years (2004-07). While the Great Recession led to a cyclical rebound in 2008-10, this was followed by disappointing labour productivity growth. Since 2011 US labour productivity has grown on average by only 0.5% per year, compared with a long-term growth rate of 2.5%.

A decomposition[2] of US labour productivity growth suggests that most of the slowdown can

1 See *The future of productivity*, OECD, 2015, and *Productivity Brief 2015*, The Conference Board, 2015.

2 According to neoclassical growth accounting, labour productivity growth can be decomposed into contributions of capital deepening, labour quality and TFP. Capital deepening is defined as capital services derived from the stock of physical assets and intellectual property assets, divided by hours worked. Labour quality (or composition) measures the effect of shifts in the age, education and gender composition of the workforce on the efficiency of hours worked. TFP growth is measured as a Solow residual and captures the increase in efficiency (in particular the increase in the efficiency and intensity of the inputs utilised in production) which is due to other factors such as new technologies, more efficient business processes and organisational improvements.

be explained by a decline in the contribution of capital deepening and, to a lesser extent, slower total factor productivity (TFP) growth. TFP growth was already slowing before the global financial crisis in 2008, in part due to the waning of the earlier ICT-induced TFP growth surge[3], but the slowdown was reinforced by the recession that followed. The contribution of capital deepening, by contrast, initially increased during the recession as the large drop in total hours worked led to a sharp rise in the amount of capital per hour. This was followed by a pronounced decline into negative territory over the period 2011-14. In recent years, the contribution of labour quality, the third component of labour productivity, has increased compared with past decades, perhaps as the recession hit low-skilled workers hardest, thus raising the aggregate efficiency of those that remained employed.

Capital deepening has been growing at its weakest rate in over 60 years, largely due to the combination of a sharp slowdown and subsequent weak recovery in business investment, and the cyclical recovery in hours worked. The decline in the rate of capital accumulation seems to be mostly explained by the subdued outlook for economic activity and by uncertainty about whether growth will make a sustained return to pre-recession levels. In addition, mismeasurement (mostly of ICT deflators) could also partly account for the weak investment performance during the recent expansion, leading to underestimates of real GDP and labour productivity growth.[4]

TFP growth is determined by a multitude of factors. These include the resources spent on innovation; how innovation is transmitted to and commercialised in the rest of the economy; the dynamism of firms and the labour market, which governs how quickly innovations are adopted, how long inefficient firms survive and how easily labour moves to its most productive use; and possible misallocations of resources via excessive asset and credit booms.

The slowdown in TFP growth could be linked to reduced business dynamism, which may have lowered the speed and extent of the transmission of innovation within the economy. As spending on research and development and the number of patent applications have held up well in recent years, a decline in the resources spent on innovation is unlikely to be one of the main explanations for the slowdown in TFP growth. This is corroborated by a growing number of technological advances in scientific fields such as robotics and 3D printing. By contrast, while the US economy is known for its dynamism – both in terms of how easily firms can start up and close down, and as regards labour market flexibility – there is some evidence that this dynamism has receded in recent years. In particular, the rate of new business creation declined sharply during the last recession and has not recovered

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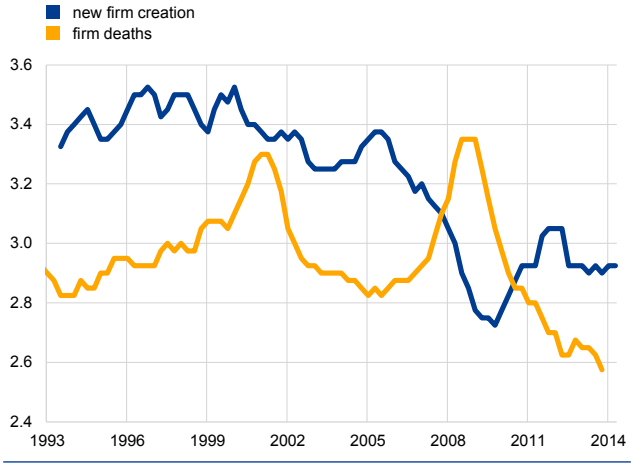
3 See Fernald, J., "Productivity and Potential Output before, during and after the Great Recession", Federal Reserve Bank of San Francisco, *Working Paper Series*, No 2012-18, 2012.

4 Key reasons for potential mismeasurement include a shift in computer investment from domestically produced goods to imported goods, together with less effective efforts to account for rising product quality in imports, as well as the effect of a change in the pricing strategy for microprocessor units by Intel, which led to biases in the matched model methodology. See Byrne, D. and Pinto, E., "The recent slowdown in high-tech equipment price declines and some implications for business investment and labor productivity", *FEDS Notes*, 2015 and Hatzius, J. and Dawsey, K., "Doing the Sums on Productivity Paradox 2.0." *Goldman Sachs US Economics Analyst*, Issue 15/30, 2015.

Chart B

Economic dynamism as measured by business birth and death rates

(percentages of the average number of establishments in the previous and current year; four-year moving average)



Source: US Bureau of Labor Statistics.

since (see Chart B), which could be linked in part to more restrictive credit conditions for small firms and less appetite for risk-taking. The rate of firm failures and bankruptcies has also declined. Lower rates of business creation and death may signal that resources are being hindered from moving to their most productive use.

In addition, the excessive build-up of household debt during the housing boom prior to the financial crisis may have weighed on TFP growth in the recovery owing to a misallocation of resources. Household debt was excessive in the United States for much of the period after 2003, leading to a prolonged period of household deleveraging.[5] During this time of excessive household debt, the housing sector may have drawn in excessive resources and lowered TFP growth.

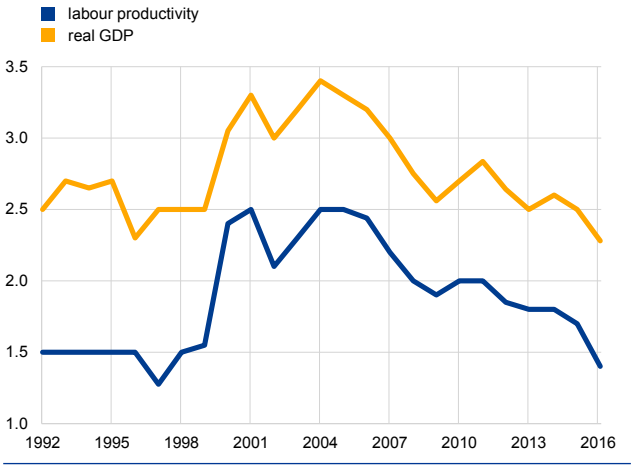
Implications for potential output and wage growth

Although forecasters have successively revised down their estimates of labour productivity growth ten years ahead, the estimates stand above the current very low levels, suggesting some rebound. The median long-term real GDP and labour productivity growth forecasts by the Survey of Professional Forecasters have been revised downwards since 2004, with the latest estimates standing at 2.3% and 1.4% respectively (see Chart C), compared with the 0.5% growth rate of actual labour productivity since 2011. This is consistent with the interpretation that, while some aspects of the productivity growth slowdown, such as firm dynamism, could prove somewhat persistent and recover only gradually, cyclical factors, particularly in relation to capital investment, are expected to unwind more quickly.

Chart C

Median forecasts of labour productivity growth and real GDP ten years ahead

(annual percentage changes)



Source: Survey of Professional Forecasters, Federal Reserve Bank of Philadelphia.

In line with the expected slower productivity growth compared with historical averages, real wages may also grow somewhat more slowly than in the past. Over the long term, if there are no shifts in the labour share, real wages are expected to grow broadly in line with labour productivity growth.[6] Across US industries,

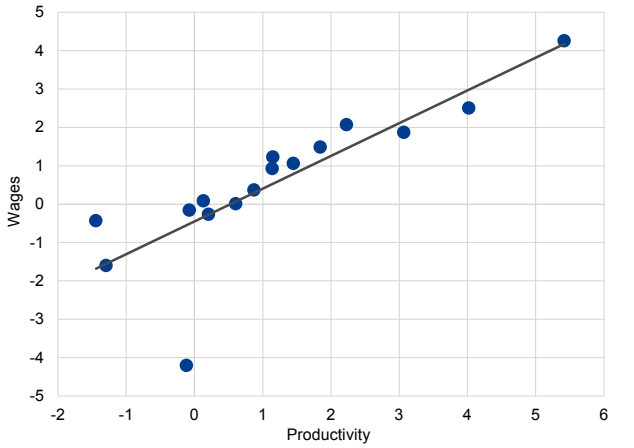
[5] See Albuquerque, B., Baumann, U. and Krustev, G., "US household deleveraging following the Great Recession – a model-based estimate of equilibrium debt", *The B.E. Journal of Macroeconomics* Vol. 15, Issue 1, 2014.

[6] See also Barro, L. and Faberman, J., "Wage Growth, Inflation and the Labor Share", Chicago Fed Letter, No 349, 2015.

Chart D

Real wage and productivity growth across industries

(annual percentage changes; period average: 1999-2014)



Sources: US Bureau of Economic Analysis and ECB calculations.
Notes: The chart covers 16 industries, based on NAICS classifications. Real wages are calculated using a value added deflator.

a positive correlation between the change in real wages per employee and average labour productivity growth is evident in the period 1999-2014 (see Chart D), with real wages growing in most industries at a slower or similar rate to that of labour productivity. In the most recent period (2011-14), both real wage and labour productivity growth have been subdued.