Box 5

SLACK IN THE EURO AREA ECONOMY

The amount of slack in the economy is a key element for gauging the interplay between supply and demand forces and the phase of the economic cycle, and is thus an important element in monetary policy analyses. However, there is considerable uncertainty surrounding estimates of potential output and output gaps (usually expressed as the percentage difference between actual and potential output) which are typically revised significantly over time. This stems from the fact that they are unobservable and very hard to estimate empirically, and there is no consensus on the estimation method or the definition of potential output. This box assesses what implications the different definitions of potential output have for estimates of the output gap. It also assesses how much slack exists in the euro area economy at the current juncture according to a range of alternative estimates and indicators.

Concepts used in estimates of potential output

The output gap is usually defined as the difference between actual output and the potential level of output. The latter is defined as the level of output that an economy could potentially achieve under certain circumstances – typically in a theoretical situation in which the economy is not constrained by nominal rigidities in price and wage setting. In the short run prices may be rigid and may not fully react to various developments in supply and demand; in the long run, however, prices are more likely to be flexible and adjust to shocks.

Given the non-observable nature of the output gap, assessing its size is challenging, especially in real time. Several estimation methods can be used, depending on whether short-term or long-term developments in potential output are being assessed.[1] The simplest methods, such as the Hodrick-Prescott filter, are purely statistical methods which investigate patterns in the output data series, disregarding any economic relationships with other variables. Depending on the assumptions made, these methods can produce more volatile or more stable estimates of potential output (respectively with smaller or larger output gaps). Methods based on the theoretical Phillips-curve equate potential output with the level of output corresponding to non-accelerating inflation. However, if the true relationship between the amount of slack and inflation deviates from the assumed one, estimates of the output gap may be biased.[2] This is the case for instance when prices and wages are rigid, or are subject to cost shocks (e.g. shocks to energy or other commodity prices). Estimates based on the production function approach break down potential

1 For a detailed discussion on the methods used for estimating potential output, see the article entitled "Potential output growth and output gaps: concept, uses and estimates", *Monthly Bulletin*, ECB, Frankfurt am Main, October 2000.
2 See Borio, C., P. Disyatat and M. Juselius, "A parsimonious approach to incorporating economic information in measures of potential output", *BIS Working Papers*, No 442, Bank for International Settlements, February 2014.

output into the contributions of its components (i.e. capital, labour and total factor productivity).[3] Although the separate estimates of each component of the production function are also subject to uncertainty, the advantage of this approach is that it provides an explanation of the economic factors behind estimated changes in potential output.

Recent research on output gaps (see, for example, Borio et al.)[4] argues that the information content of (labour) cost indicators is insufficient to assess overall price pressures, as some imbalances may derive from the financial side of the economy, via house prices or credit growth. In fact, the period before the financial crisis was characterised by stable and low inflation in the euro area – pointing to small positive output gaps – while financial and/or housing bubbles were emerging in some countries. A new approach is suggested, which seeks to take account of information on the financial cycle for estimating the output gap. This new approach is likely to produce somewhat larger estimates of the output gap, both in upswings and downturns, for countries experiencing such bubbles.

Finally, the definition of long-term potential output is the level of output that is achievable over the long term, when the potential output components have converged to steady-state paths. For instance, long-term unemployment rates are thought to be only influenced by labour market institutional factors (see Orlandi)[5]. Such estimates may be more useful in assessing sustainable structural fiscal or external balances, rather than short-term inflationary pressures. They suggest that there is less pro-cyclicality in potential output and larger output gaps in both upturns and downturns. Overall, output gap estimates used to assess inflationary pressures have a shorter-run perspective.

Measures of slack and recent estimates of slack in the euro area

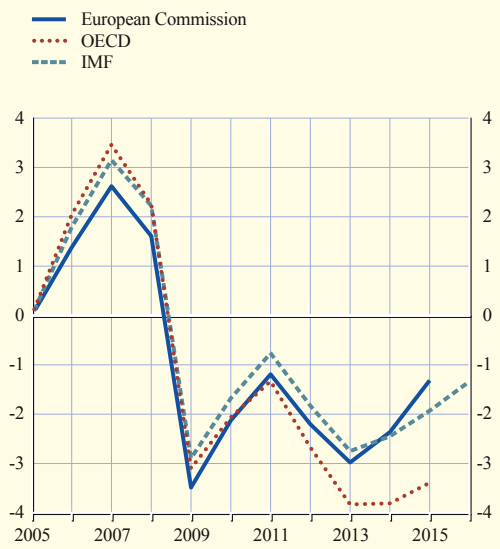
In order to assess the degree of slack and possible inflationary pressures in the euro area economy, indicators that focus on the short to medium term are considered in this box. They broadly fall into two groups: the first group are output gap estimates by international institutions, which are derived from the respective potential output estimates. For this purpose, the international institutions use mostly the production function approach, while for assessing developments in structural unemployment rates, which play a large role in potential output growth, Phillips curve-based filters are often used.

According to recent output gap estimates by international institutions, there is a considerable amount of slack in the euro area: the European Commission's estimate of the output gap for 2014 is -2.4% and the OECD's estimate is -3.8%. The range of these estimates widens further over the projection horizon to 2016 (see Chart A). It should be borne in mind that the international institutions use somewhat different methods. However, a common feature of all forecasts is that the gap is expected to close only gradually and to remain negative over the period 2014-16.

3 See D'Auria, F. et al., "The production function methodology for calculating potential growth rates and output gaps", *European Economy*, Economic Papers 420, European Commission, July 2010.
4 See Borio, C. et al., "Rethinking potential output: Embedding information about the financial cycle", *BIS Working Papers*, No 404, Bank for International Settlements, February 2013.
5 These are the active labour market policies, the unemployment benefit replacement rate, the labour tax wedge and union density. See Orlandi, F., "Structural unemployment and its determinants in the EU countries", *European Economy*, Economic Papers 455, European Commission, May 2012.

Chart A Output gap projections for the euro area from different institutions

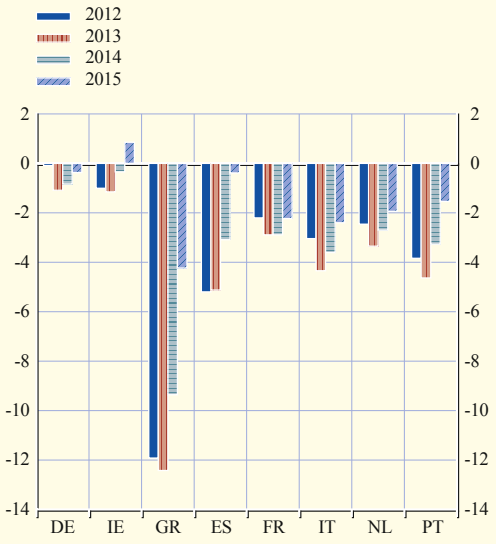
(percentages of potential output)



Sources: European Commission Winter Forecast, February 2014; IMF World Economic Outlook, October 2013; and OECD Economic Outlook, November 2013.

Chart B Cross-country differences in the output gap

(percentages of potential output)



Source: European Commission.

Chart B reveals that there are considerable cross-country disparities in the estimates by the European Commission of the amount of economic slack.[6] According to these estimates, Germany has a small amount of slack, with an output gap of below -1% at present which is expected to close almost entirely by 2015. However, in countries heavily affected by the crisis, particularly Greece, the estimated output gaps are much larger. The output gap of these countries is expected to close only gradually and to remain around -2% in 2015.

To check the robustness of the output gap estimates, a number of alternative measures of slack can be used, such as capacity utilisation and survey-based indicators, which report the extent to which factors such as the availability of labour and the level of demand limit production. These data are taken from the industry survey by the European Commission's Directorate General for Economic and Financial Affairs. The drawback of the output gap estimates is that they are subject to considerable revisions, as the reassessment of the output gap estimates for the period prior to 2008 has shown. Survey-based measures are more up to date and generally not revised, but they have their drawbacks as well. The capacity utilisation rate covers only one sector of the economy and, when reporting their individual degree of utilisation of resources, respondents do not have in mind the general amount of slack in the economy. Regarding the factors constraining production, these survey data are by nature subjective, and responses may be highly influenced by recent developments rather than referring to a reliable long-term average value.

The output gap estimates and survey-based measures do not always agree on the assessment of the amount of slack, but their empirical link is considered to be generally strong.[7] Indeed,

6 Estimates by the European Commission published in "European Economic Forecast", *European Economy*, 2, February 2014.
7 See the box entitled "A cross-check of output gap estimates for the euro area with other cyclical indicators", *Monthly Bulletin*, ECB, Frankfurt am Main, June 2011.

the correlation between the output gap estimated by the European Commission and the two survey-based measures (capacity utilisation and the extent to which insufficient demand constrains production) is reasonably high for the period 1997-2013, which can also be illustrated by the close similarities in the cyclical patterns of these measures (see Chart C). Moreover, the survey-based measures seem to provide a useful real-time indication of the size of the output gap: for the period to 2008, they are relatively highly correlated with the output gap estimates for the period that have been produced since end-2013 (which can be regarded as "ex-post" estimates), but have a much lower correlation with the estimates produced in 2007, which largely underestimated the positive output gap.

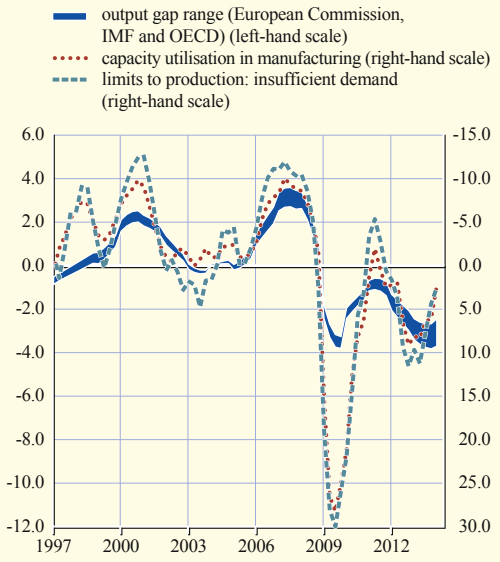
Turning to the most recent assessment of economic slack, the estimates by international institutions and the two survey-based measures indicate excess supply and slack in the euro area economy for the entire period since 2009, but also a gradual narrowing of the output gap which started in 2013 (see Chart C). While the available survey-based indicators for the first quarter of 2014 point to a further reduction in slack, it is still estimated to be significant.

Slack in the labour market

Slack in the labour market is assessed through the unemployment gap, or the difference between the unemployment rate and the non-accelerating inflation rate of unemployment (NAIRU; see Chart D). Recent estimates of the unemployment gap by international institutions suggest on average that labour market slack is at its highest level since 1997. At the same time, the uncertainty surrounding the unemployment gap, as measured by the range of estimates by international institutions, has increased substantially since 2012.

Chart C Output gap, capacity utilisation and limits to production from insufficient demand in the euro area

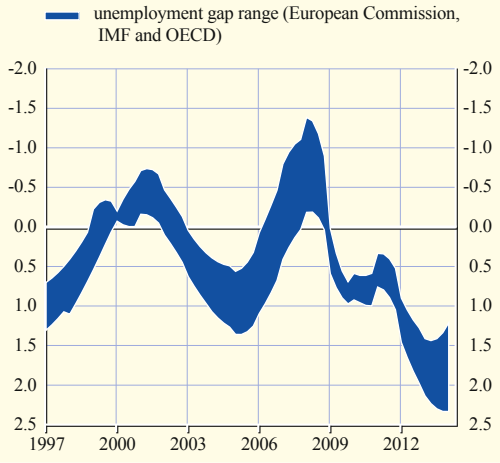
(percentages of potential output; deviations from the mean)



Sources: European Commission Winter Forecast, February 2014; IMF World Economic Outlook, October 2013; and OECD Economic Outlook, November 2013.
Notes: Quarterly output gaps are interpolated from annual estimates by the international institutions. The latest observation for capacity utilisation and limits to production refers to January 2014.

Chart D Unemployment gap in the euro area

(percentages of the labour force; deviations from the mean)



Sources: European Commission Winter Forecast, February 2014; IMF World Economic Outlook, October 2013; and OECD Economic Outlook, November 2013.

Factors behind developments in potential output

Given the substantial decline in real GDP in the euro area and in several individual countries, the estimated negative output gaps would have been even larger if potential output growth had not also decelerated substantially. Multiple factors account for the slowdown in potential output growth.[8] Investment in the euro area has shrunk by more than 15% since the peak in activity in 2008, as a result of factors such as the sizeable stock of obsolete capital stock and permanent downsizing in some sectors; high uncertainty; the deterioration in financing conditions; and company indebtedness. In addition, the average scrapping rate of capital assets is likely to have increased in parallel with the crisis-related rise in company liquidations. In some countries, net company formation in the construction sector has turned from a positive figure prior to the crisis to a strongly negative figure since 2009, associated with a loss of capital resulting from obsolete capital stock and company liquidations. The capital and technology-intensive manufacturing sector in some countries has also suffered from downsizing and the closure of companies since 2009.

Structural unemployment rates have increased since the outbreak of the financial crisis, reducing the labour contribution to potential output growth. The rise in structural unemployment is related to the rise in long-term unemployment in many countries. The longer the unemployed are out of work, the more their skills and human capital are eroded and the less favourably they are viewed by potential employers. They may also become discouraged and cease looking for work. Skill mismatches have also increased, indicating a sharp fall in demand for low-skilled workers. According to econometric analyses, the Beveridge curve, which plots unemployment rates and vacancy rates, has shifted outwards in many countries (see Chart E), meaning that when a higher number of vacancies is posted, this is not followed by a decline in unemployment, thus pointing to a structural deterioration in the labour market.[9]

Chart E Shifts in the euro area Beveridge curve

(percentages of the labour force)

Sources: Eurostat and European Commission.

The contribution of total factor productivity (TFP) to potential output also declined somewhat during the crisis and has remained subdued since, which is consistent with experience in previous financial crises. Persistent low levels of capacity utilisation resulting from weak economic activity have reduced the efficiency of capital and labour usage. Firm and sector-specific human capital in permanently downsized sectors and enterprises may have been considerably damaged. However, the shifting of factors of production from shrinking sectors with lower

8 For a more detailed discussion, see the article entitled "Potential output, economic slack and the link to nominal developments since the start of the crisis", *Monthly Bulletin*, ECB, Frankfurt am Main, November 2013.

9 For additional information, see Bonthuis, B., V. Jarvis and J. Vanhala, "What's going on behind the euro area Beveridge curve(s)?", *Working Paper Series*, No 1586, ECB, Frankfurt am Main, September 2013.

productivity to expanding sectors with higher productivity is likely to have offset some of these negative effects on aggregate TFP growth in the euro area.

Conclusions

Overall, multiple factors have contributed to a decline in potential output growth in the euro area as a whole in recent years. These factors comprise sectoral restructuring, skill erosion, and loss of physical and human capital, among other factors, together with the overestimation in real time of potential output growth in the years before the crisis in a context of strong leveraging and imbalances in several euro area countries. This has resulted in a smaller degree of economic slack than the level that would exist with a more stable trend in potential output. That said, slack in the euro area economy, as measured by different types of indicator, is still considerable and is likely to dampen upward pressure on inflation. In this respect, it is important to note that in recent years not only has uncertainty surrounding the estimates of economic slack been higher than usual, but so too has uncertainty related to the way in which economic slack has affected inflation and the magnitude of this impact. For instance, there is evidence that, for the euro area as a whole, the impact of slack on prices has weakened since the onset of the crisis. This may reflect, for example, a better anchoring of inflation expectations.[10] At the same time, the structural reforms in labour and product markets undertaken in many euro area countries in recent years may have reduced nominal rigidities and this would not only have implications for estimates of the degree of slack itself but might also imply a higher responsiveness of inflation to slack in the future. All of this creates high uncertainty which cautions against relying on point estimates of slack as a gauge for predicting inflation.

10 See the box entitled "The anchoring of long-term inflation expectations in the euro area", *Monthly Bulletin*, ECB, Frankfurt am Main, October 2013.