

## The US economy in the current economic upturn

*Aggregate US output has grown only sluggishly following the severe recession of 2008-09. Its growth has fallen far short of levels reached, in particular, during the strong upswings in the mid-1970s and early 1980s that likewise followed sharp slumps in activity. The moderate growth of the past few years is being interpreted by many as cyclical weakness, which even the extremely expansionary monetary policy has been unable to eliminate, however.*

*It is indeed possible to identify a series of demand-side factors which have weighed on aggregate growth. Private residential construction was unable to maintain its usual role as the engine of economic recovery because the processes of adjustment in the real estate markets were still ongoing following the excesses of the preceding cycle. Experience has shown that such corrections take a relatively long time. It is only in the past few quarters that a solid upward tendency has taken hold in private residential construction, although the low level of activity means it is unable to make itself felt across the economy as a whole. Moreover, the rapid expansion of fiscal policy, with which general government sought to halt the sliding economy in 2008-09, has been scaled back over the past few years. Given the still-rising debt ratio and still-yawning fiscal gaps, further consolidation measures appear necessary in order, among other things, to protect the sustainability of public finances.*

*Moreover, private consumption is often perceived as a key weak link in the current upswing because consumers were trying to deleverage as well as to rebuild wealth. This was offset, however, by the positive stimulus from the extremely loose monetary policy. Since, on balance, saving did not increase any further during the economic recovery, households were able to step up their consumer spending in line with their incomes. Seen in that light, the moderate increases in consumption over the past few years are probably less of a brake and more of a reflection of the subdued expansion in incomes and employment.*

*Ultimately, what weighs more than the various cyclical factors is the fact that there has been a considerable slowdown in the underlying pace of aggregate growth. It is largely weaker growth of production capacity that lies behind the slower real GDP growth than during the recoveries of the 1990s and the beginning of the new millennium. The chief factors here are the corrections of earlier excesses in the real estate markets and, in particular, profound demographic change, which is not only dampening growth of the potential labour force but also indirectly holding back capital formation. Although the ripple effects emanating from the recession are subsiding and an upswing has now begun in residential construction, the pace of aggregate economic growth will probably pick up only slightly, especially as the necessary fiscal consolidation has not yet been completed.*

## The current upswing in the public and academic debate

*Weakest post-war upswing*

Measured in terms of the growth of real gross domestic product (GDP), the current cyclical upswing in the United States is the weakest since the end of the Second World War.<sup>1</sup> According to the current (seasonally adjusted) data, aggregate economic output in the final quarter of 2012 was no more than 7½% higher than in spring 2009, dated by the Business Cycle Dating Committee of the National Bureau of Economic Research (NBER) as the end of the last recession. In the two preceding phases of cyclical recovery in the early 1990s and at the start of the new millennium, economic output had gone up over the same 14-quarter period by as much as 11¼% on average. Those were already being regarded as relatively flat expansions following quite mild recessions. Given the collapse of economic activity in the 2008-09 downturn, when real GDP dropped by no less than 4¾% in a six-quarter period, recent developments seem all the more surprising as severe recessions are usually followed by strong recoveries.<sup>2</sup> The expansions in the mid-1970s and the early 1980s, in particular, fit that pattern: aggregate output grew by an average of 20% within three and a half years. The latest figures appear even more meagre if *per capita* GDP is used as the measure; real *per capita* income rose by a mere 4½% up until autumn 2012, thus, as before, falling markedly short of its end-2007 level, the most recent cyclical peak.<sup>3</sup>

*Implications of preceding financial crisis by no means "open and shut"*

In this context, international organisations such as the International Monetary Fund have been pointing out repeatedly that recessions associated with severe financial crises are followed by very sluggish recoveries. The research to support this view is provided, in particular, by the studies of Reinhart and Rogoff (2009) and Reinhart and Reinhart (2010) on various countries' historical experiences of financial crises. However, these analyses are, in some cases, confined to comparisons of the severity and duration of the downturn, at most implying that financial crises leave deep and permanent scars

in the levels of macroeconomic metrics.<sup>4</sup> Although the authors also find that real per capita GDP growth in the decade following the onset of a severe financial crisis is significantly dampened compared with the preceding ten-year period, this result is due to the way in which the observation period is defined. By defining the cyclical peak as the reference point for the study, the depth of the downturn is offset against the rise in the recovery path.<sup>5</sup> If, however, the analysis is restricted to US business cycles, there is, in fact, a very pronounced relationship between a severe contraction and a strong recovery following a financial crisis.<sup>6</sup> It is therefore by no means clear-cut that the weakness of the current economic upswing is only following the usual empirical pattern, thus obviating the need for any further analyses.

The preceding financial crisis is frequently cited in an attempt to explain the moderate progress of recovery in terms of a slower intrinsic mo-

*Numerous exogenous retarding factors*

1 For what follows, see, and in particular, Deutsche Bundesbank, The current economic upturn in the United States in comparison with earlier phases of recovery, Monthly Report, August 2010, pp 18-19; Congressional Budget Office, What Accounts for the Slow Growth of the Economy After the Recession?, November 2012; and also Council of Economic Advisers, Economic Report of the President, March 2013.

2 See V Zarnowitz (1981), Business Cycles and Growth: Some Reflections and Measures, NBER Working Paper No 665; and V Zarnowitz (1992), Business Cycles: Theory, History, Indicators and Forecasting, University of Chicago Press, Chicago and London.

3 By contrast, real per capita GDP rose by 11½% on an average of the four recoveries of 1975-78, 1983-86, 1991-94 and 2002-05, surpassing the preceding peak by 8¾%. The expansion of 1980-81 has been omitted here as it was already over after four quarters.

4 See C M Reinhart and K S Rogoff (2009), The Aftermath of Financial Crises, American Economic Review, Vol 99, No 2, pp 466-472; and also C M Reinhart and V R Reinhart (2010), After the Fall, Federal Reserve Bank of Kansas City, Macroeconomic Challenges: The Decade Ahead, pp 17-60.

5 On the other hand, Howard et al (2011) conclude in their study that the cyclical upswing (seen in isolation) which begins in the cyclical trough is not much different following a financial crisis than a similar phase following another type of recession. See G Howard, R Martin and B A Wilson (2011), Are Recoveries from Banking and Financial Crises Really So Different?, Board of Governors of the Federal Reserve System, International Finance Discussion Papers, No 1037.

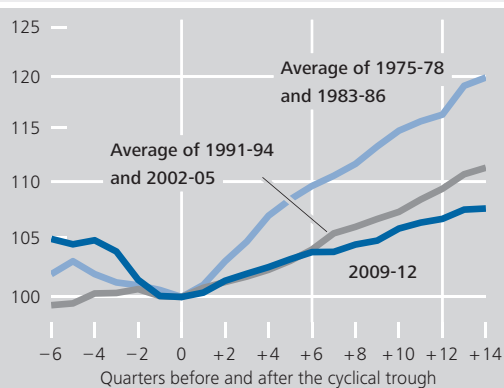
6 See M D Bordo and J G Haubrich (2012), Deep Recessions, Fast Recoveries, and Financial Crises: Evidence from the American Record, Federal Reserve Bank of Cleveland, Working Paper, No 12-14.

mentum of private sector economic activity due to financing restrictions and asset-side adjustments. An alternative approach is to attribute the subdued pace of growth to external retarding factors. Factors deserving of mention in this context include, in particular, the oil price surges that have occurred repeatedly in the past few years, which resulted from the interplay between robust growth in demand for oil in the emerging market economies, on the one hand, and actual and feared supply cutbacks, on the other.<sup>7</sup> For a country such as the United States which, on balance, imports large quantities of crude oil, but only exports limited quantities of goods to the emerging market economies, the primary impact of even a purely demand-driven rise in oil prices is likely to be an erosion of purchasing power. It was particularly US new car sales which, in the past, responded strongly to sharp surges in fuel prices. In spring 2011 in particular, when real household consumer spending on motor vehicles and motor vehicle parts was down by more than 5% on the quarter, stoppages in output in the motor vehicle industry were an added factor in the wake of a temporary interruption in international supply chains following the severe Tohoku earthquake in Japan. In the past year, the euro area's problems and the global slump in the manufacturing sector were also emphasised as straining factors.<sup>8</sup> Some economists also noted that increased uncertainty about the economic and fiscal policy path is impacting negatively on private sector firms' and households' propensity to invest.<sup>9</sup> This line of argument gained particular prominence in the summer of 2011 and autumn of 2012 amidst the escalating conflict between the executive and various legislative branches of government concerning public finances. At the end of 2012, a warning was made publicly about the danger of a looming recession owing to the "fiscal cliff".<sup>10</sup>

What must be emphasised, however, is that, despite the various factors weighing on the economy, there has not been a renewed economic downswing thus far. This is all the more

### Real US GDP in the current upswing in comparison with previous recoveries\*

Index, cyclical trough = 100, seasonally adjusted



\* The first 14 quarters of recoveries as dated by the National Bureau of Economic Research (NBER).

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remarkable given that other advanced economies, which were by no means the focal point of the preceding financial crisis, have slipped back into recession following a brief recovery. Although real GDP growth in the United States faltered at times, most recently in the final quarter of 2012, real private final demand, the actual engine of the upswing, has been showing constant and relatively solid growth since the winter of 2010, albeit at only a moderate average pace.

Against this background, it is reasonable to assume that it is not so much cyclical factors that have retarded aggregate growth but, rather,

*Despite impression of fragile upswing, economy has thus far not slipped back into recession*

*Slowdown in trend growth*

<sup>7</sup> See Deutsche Bundesbank, The price of crude oil and its impact on economic activity in the industrial countries, Monthly Report, June 2012, pp 27-49.

<sup>8</sup> See Deutsche Bundesbank, Impact of weak euro-area demand on the global economy, Monthly Report, November 2012, pp 11-13.

<sup>9</sup> Bernanke (1983) already derived analytically that, in general, high uncertainty can lead to the deferment of irreversible investment. Baker et al (2012) developed an index of economic policy uncertainty, which has recently reignited the debate on the impact of government activism. See S R Baker, N Bloom and S J Davis (2012), Measuring Economic Policy Uncertainty, Stanford University und University of Chicago Booth School of Business, Working Paper; B S Bernanke (1983), Irreversibility, Uncertainty and Cyclical Investment, Quarterly Journal of Economics, Vol 98, pp 85-106; and A Greenspan (2011), Activism, International Finance, Vol 14, pp 165-182.

<sup>10</sup> See also Deutsche Bundesbank, Possible macroeconomic effects of the fiscal cliff in the United States, Monthly Report, August 2012, pp 15-17.

### Expenditure components of real US GDP compared with previous recoveries\*

Percentage points, annual

Item	Average contribution to growth, <sup>1</sup> 2009-12	Difference from average	
		1991-94 and 2002-05	1975-78 and 1983-86
Real GDP	2.1	- 1.0	- 3.1
Private consumption	1.5	- 0.7	- 1.7
Business gross investment	1.0	0.3	- 0.5
Private residential construction	0.1	- 0.3	- 0.6
Public demand	- 0.3	- 0.5	- 1.0
Net exports	- 0.2	0.2	0.5

Source: Bundesbank calculations based on data from the BEA.  
 \* The first 14 quarters of recoveries as dated by the NBER. <sup>1</sup> Real GDP growth rate in per cent. Contributions to growth do not necessarily add up.

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that there has been a slowdown in the underlying trend growth. In this context, the term “new normal” has already been coined to describe the post-crisis era.<sup>11</sup> It is quite possible for an earlier severe recession to have a temporary impact on potential output. Even so, in addition, there are indications that the cyclical fluctuations of the past few years have obscured a flattening of the trend path, which is due to fundamental and long-term shifts on the supply side of the economy. Stock and Watson (2012), in particular, have attempted to identify the importance of individual drivers in the past recession and the subsequent upswing.<sup>12</sup> According to their analysis, the comparatively weak employment growth during the current recovery is being caused more by a slowdown in trend job growth than by cyclical factors. Since productivity growth was relatively nondescript by historical standards, this implies a relatively weak upward tendency in trend output. They ultimately regard profound demographic change as being the cause. Looking at potential growth in the next 20 to 50 years, and abstracting completely from the latest financial crisis and its potential fallout, Gordon (2012) predicts a secular slowdown in real *per capita* income growth.<sup>13</sup>

## Demand-side factors

In order to approach the factors affecting the current cyclical recovery from the demand side, it makes sense to compare the average contributions to growth made by the individual expenditure components of real GDP with those of earlier expansions.<sup>14</sup> On the whole, the rise in aggregate output, which averaged 2% over the past three and a half years, was sustained by household consumption and business investment alike, whereas private residential construction had only a marginal positive impact. On the other hand, public demand and foreign trade both markedly curbed GDP growth. A comparison specifically with the two preceding business cycles shows that not all demand components were developing more unfavourably over the past few years; in fact, firms expanded their investment markedly more strongly, owing not only to comprehensive restocking following the severe recession but also to their higher spending on equipment and software. This fosters doubts about the occasional assertion that the recovery has been hampered by financing constraints, particularly on small business. In addition, foreign trade has not been weighing on aggregate output as heavily as in earlier recoveries.<sup>15</sup> By contrast,

*Private residential construction, public demand and private consumption weak compared with earlier business cycles*

<sup>11</sup> See M El-Erian (2008), *When Markets Collide*, McGraw-Hill, New York.

<sup>12</sup> Stock and Watson (2012) explain the latest downturn by the same factors which drove earlier recessions and caused reactions similar to those at the time. They hold that only the extent of the movements is greater, and that no specific “financial crisis” factor is necessary for explanation. See J H Stock and M W Watson, *Disentangling the Channels of the 2007-2009 Recession*, *Brookings Papers on Economic Activity*, Spring 2012, pp 81-156.

<sup>13</sup> See R J Gordon (2012), *Is U. S. Economic Growth Over? Faltering Innovation Confronts the Six Headwinds*, National Bureau of Economic Research, Working Paper, No 18315.

<sup>14</sup> See Deutsche Bundesbank, *The current economic upturn in the United States in comparison with earlier phases of recovery*, *Monthly Report*, August 2010, pp 18-19, and Congressional Budget Office, *What Accounts for the Slow Growth of the Economy After the Recession?*, November 2012.

<sup>15</sup> This effect is not attributable to weaker import growth. In fact, the average (negative) contribution made by imports to growth in the current recovery is consistent with historical experience. However, exports have been more positive. This could be due mainly to a relatively large degree of synchronicity between economies in the latest recession and the subsequent countermovement.

private residential construction, public demand and private consumption – each seen in terms of their average contribution to growth – have remained, in some cases, well short of their levels during previous recoveries, which is why they will be examined in more detail below.

## Real estate market and private residential construction

*Residential construction listless for long time*

Given the real estate market's role as the epicentre of the financial crisis, it is not much of a surprise that, in the past few years, private residential construction was unable to play its typical role as the engine of economic recovery. The temporary government programmes which afforded tax relief for the purchase of owner-occupied housing were simply a cyclical "flash in the pan". Only since the 2011 Q4 to 2012 Q1 period has a rather strong upturn in investment become entrenched in this area.

*Retarding impact of oversupply in real estate market*

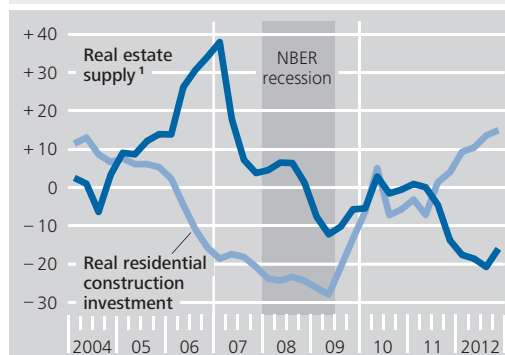
It is particularly problems stemming from earlier undesirable developments which are likely to have had a retarding impact, as were reflected in the pent-up oversupply in the real estate market. The stock of uninhabited housing units up for sale skyrocketed beginning in 2006, peaking in the winter of 2008. This stock of real estate was not substantially reduced until after the summer of 2011. In addition, the "shadow inventory", ie housing units which, owing to the poor price environment, have been temporarily taken off the market, is likely to have limited the need for investment.<sup>16</sup> Moreover, only minimal positive stimuli were generated by the demand side of the real estate market in the early stages of the economic recovery. Young adults, in particular, were hesitant to establish households and purchase residential property, owing to the situation on the job market and tight lending standards.<sup>17</sup>

*Strong upswing in the housing market as of late*

Only in the last year and a half has the investment climate in the housing market seen a distinct improvement. Progress was made initially in reducing the oversupply. The stock of vacant

### Private residential construction investment and real estate supply in the United States

Annual percentage change



Sources: Bureau of Economic Analysis (BEA) und Census Bureau. <sup>1</sup> Number of vacant housing units up for sale.

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owner-occupied homes up for sale is returning to pre-crisis levels. House prices, too, are showing a tendency towards resurgence in both nominal and real terms. In keeping with the more favourable underlying conditions, residential construction investment has picked up sharply of late. Its average growth of 12% over the past year even outpaced that of all other demand components of GDP. The valuation level is still comparatively low, and there is pent-up demand owing to household formation being deferred; these factors currently appear to indicate a continuation of the housing market upswing. However, the relative restrictive conditions for real estate lending could possibly act as a brake; that said, returning to the lax lending standards of earlier years is hardly a

<sup>16</sup> Owing to a lack of data, the size of the shadow inventory can only be estimated. It is typically understood as comprising those housing units which have been included in banks' balance sheets as collateral for defaulted mortgage loans and those which are still in foreclosure. According to analyses by Fed staff, this shadow inventory has markedly restrained the recovery in the housing sector. See Board of Governors of the Federal Reserve System, Minutes of the Federal Open Market Committee, 12-13 September 2012.

<sup>17</sup> Thus, only ½ million households were established on average over the 2008-10 period. The annual average figure for the 2003-07 period had been as high as 1¼ million. The number of households in which the head of the household is below 30 years of age has, in fact, been in a continuous decline since 2008. The home ownership rate, too, has been showing a downward tendency since as long ago as autumn 2006.

desirable alternative. On the whole, the direct growth stimuli emitted by residential construction investment to the economy as a whole are likely to remain moderate for the time being because of their low level relative to aggregate demand. This share has dropped by 3¾ percentage points from its cyclical peak at the end of 2005 to 2½% at the end of the period under review. For that reason, even the strong growth of private residential construction investment in 2012 raised the aggregate growth rate by no more than ¼ percentage point.

## Fiscal policy

The effects of the recent recession were alleviated markedly by a strongly expansionary fiscal policy. The starting fiscal situation at the cyclical peak was by no means favourable; at the end of 2007, aggregate gross debt was around two-thirds of GDP, whereas the deficit ratio had already surpassed the 3% mark. The automatic stabilisers, along with extensive economic stimulus packages, then caused the deficit to rise sharply, with the deficit ratio peaking at nearly 13% in spring 2009. Although the estimates of the budget gap, adjusted for cyclical factors, differ in their details, they, too, indicate a sharp rise.<sup>18</sup> At the same time, the debt ratio has risen very sharply and is now over 100%.

Since the beginning of the economic recovery and especially in the last two years, however, the expansiveness of fiscal policy has been scaled back.<sup>19</sup> In this respect, the latest cycle is different from, in particular, the preceding cycle, when the adjusted deficit even went up considerably in the cyclical recovery.<sup>20</sup> Admittedly, from the vantage point of fiscal stabilisation of the economy, it is quite appropriate to reduce the stimuli in the wake of economic recovery. Looking at current developments in the United States, it should be taken into account that the cyclically adjusted deficits in the past year were considerably higher than in 2007 and that public budgets were thus still geared towards strong expansion in comparison with

the beginning of the downturn. Timely consolidation is also appropriate, not least to ensure the sustainability of government finances given a high and still rising debt ratio.

The reduction in the cyclically adjusted deficit means that fiscal policy has put the brakes on the economic recovery. One key transmission channel is through individual state and municipal public demand; institutional rules and regulations are applying relatively strong pressure on these entities to balance their budgets. Recently, though, muted federal government demand has been gaining importance. Public finances affect not only government consumption and investment but also economic developments, especially through taxation and transfer payments to households and firms. The extensive stimulus packages launched during the recession were designed to strengthen private demand through lower taxes and higher

*Braking effect on the economy as a whole of the falling adjusted deficit ...*

*Strong expansion of general government budget in recession and ...*

*... partial reduction in stimulus in the upswing*

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**18** The fiscal balance is to some degree a reflection of the business cycle, with, for instance, fluctuations in employment leading to fluctuations in tax revenue and spending on unemployment assistance, thus causing cyclical swings to be dampened automatically through income effects. Additional stimuli are evident in changes in the balance as adjusted for cyclical factors. One thing to be taken into account is that there are various approaches to cyclically adjusting government budgets, the results of which may vary widely owing to the uncertainty involved and which are prone to revision at the current end, particularly with regard to the cyclically adjusted deficit level. It should also be emphasised that changes in the structural fiscal or primary balance cannot be equated with the financial impact of active fiscal policy measures. Instead, they may be attributable to developments which are not directly associated with current fiscal policy. See, for example, Deutsche Bundesbank, A disaggregated framework for analysing public finances: Germany's fiscal track record between 2000 and 2005, Monthly Report, March 2006, pp 61-76. The estimated cyclically adjusted balance assumed here is performed separately for revenue and expenditure as modelled in the national accounts of the Bureau of Economic Analysis (BEA) for both the federal government and the level of individual states and municipalities. The underlying data on potential output are taken from data supplied by the Congressional Budget Office (CBO). See also pp 23-25 for a discussion of the cyclical adjustment method.

**19** See B Lucking and D Wilson (2012), U. S. Fiscal Policy: Headwind or Tailwind?, Federal Reserve Bank of San Francisco, Economic Letter, No 2012-20.

**20** Spending on military actions is also likely to have been a key reason for the difference in the focus of fiscal policy in the two cycles. It should also be noted that the debt ratio has risen to a worrisome level in the current cycle, both in terms of the sustainability of public finances and with respect to the effectiveness of additional fiscal stimulus measures.

transfer payments. The swing in the cyclically adjusted deficit is probably, at least in part, a reflection of the expiry of this extensive package of measures.

*... and specifically of the expiring fiscal stimulating measures*

Such temporary measures to prop up demand are intended to stabilise real GDP in a cyclical downturn but cannot lift aggregate output higher than its underlying path in the long term. Once its impact on the level of output has peaked, growth is no longer spurred relative to its underlying pace but retarded. According to data from the Congressional Budget Office (CBO) and also Bundesbank simulations performed using the NiGEM global economic model developed by the National Institute of Economic and Social Research (NIESR), the cyclical impact of the 2009 fiscal package is likely to have undergone a turnaround during 2010. Although estimates vary as to the extent of the retarding effect, they are all the larger, the higher the preceding positive impact is rated.<sup>21</sup>

## Private consumption

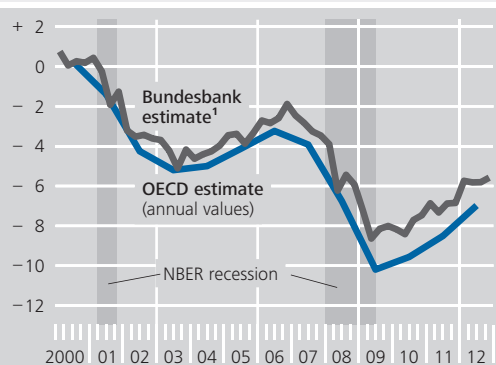
*Sluggish consumption of services connected with housing market woes*

On the expenditure side, the perceptible slowdown in the pace of real GDP growth was associated with a slowdown in household consumption, for which over two-thirds of aggregate income is spent in the United States. All the same, a comparison with typical behavioural patterns in the cycle shows that this expenditure component has recently been tending to show positive growth (see box on pages 23 to 25). In addition, the national accounts directly show a clear dichotomy within (real) household consumer spending between a relatively strong recovery of the consumption of goods and a merely muted upward growth in the consumption of services. Since this is attributable in large part to a virtual standstill in the accommodation subsector, it is probably a reflection of earlier unsound developments in the real estate market.<sup>22</sup>

Nevertheless, many observers see households' asset-side adjustments, particularly their efforts

### Cyclically adjusted general government balance in the United States

As a percentage of potential GDP, seasonally adjusted, quarterly



Sources: OECD Economic Outlook, November 2012, and Bundesbank calculations. <sup>1</sup> Based on data on potential GDP provided by the Congressional Budget Office (CBO).

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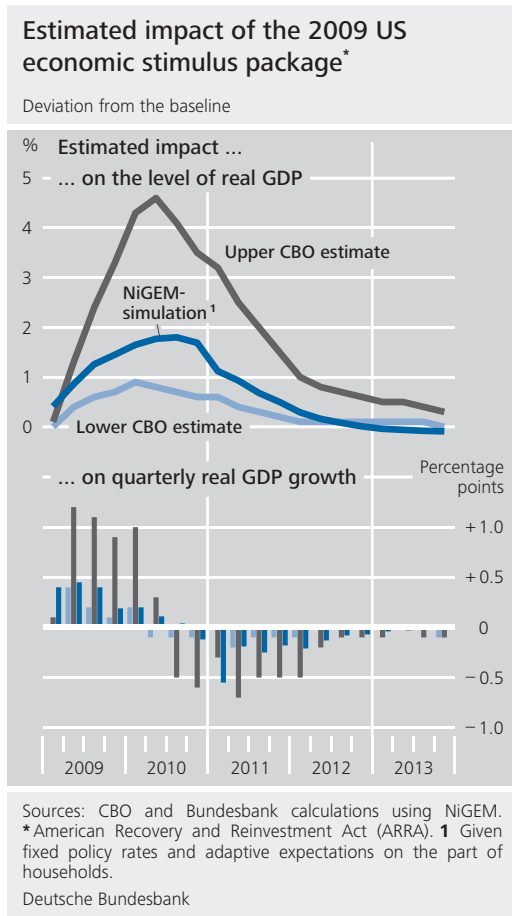
to deleverage, as the driving force behind the dampening of household consumption growth.<sup>23</sup> Owing to falling property prices and the tailspin in stock prices, the crisis year of

*Housing wealth and financial wealth exerting countervailing influences*

<sup>21</sup> The CBO is required by law to assess the impact on employment and output of the American Recovery and Reinvestment Act (ARRA). Looking at real GDP, no direct empirical evidence is cited. Instead, the effects are estimated based on the impact of similar measures in the past and with the help of models. A high and a low setting are designed to reflect uncertainty about the extent of the actual impact. The outcome of our NiGEM simulation is largely within the range of the CBO estimates, albeit closer to the lower bound. However, it hinges decisively on the assumptions that monetary policy will not respond to the assumed fiscal policy measures and that households do not form expectations in a forward-looking manner. If, by contrast, an endogenous interest rate response, or forward-looking expectations of households are permitted, the GDP response will be even weaker. The shocks underlying the simulation are based on BEA data on the size and distribution over time of the federal government sector transactions associated with the ARRA. See Bureau of Economic Analysis, Effect of the ARRA on Selected Federal Government Sector Transactions, available at [www.bea.gov/recovery/index.htm](http://www.bea.gov/recovery/index.htm); Congressional Budget Office, Estimated Impact of the American Recovery and Reinvestment Act on Employment and Economic Output from October 2012 Through December 2012, February 2013; and F Reichling and C Whalen (2012), Assessing the Short-Term Effects on Output of Changes in Federal Fiscal Policies, Congressional Budget Office, Working Paper, No 2012-08.

<sup>22</sup> Compared with the average of the two preceding recoveries, the contribution of private consumption to annual real GDP growth was  $\frac{3}{4}$  percentage point lower in the past few years. Of this deficit, more than  $\frac{1}{2}$  percentage point can be attributed directly to services, of which  $\frac{1}{4}$  is due to accommodation, which is defined as containing not only actual and imputed rents but also home care.

<sup>23</sup> See eg R Glick and K J Lansing (2009), U. S. Household Deleveraging and Future Consumption Growth, Federal Reserve Bank of San Francisco, Economic Letter, No 2009-16.



2008 saw consumers being suddenly confronted with a perceptible erosion of net wealth and a matching rise in indebtedness. In order to reduce their debt and offset the severe wealth losses, the conventional wisdom has it that households save a larger percentage of their income than in the past. In contrast to given income growth, the expansion of consumer spending falls while the saving rate rises. Although there is indeed empirical evidence of a relationship between the saving rate and households' net wealth as a percentage of disposable income,<sup>24</sup> what should not be overlooked is that, in reality, it is not only the saving rate which adjusts: net wealth is also in flux through the relevant prices. Owing to the strong recovery of stock prices in the past few years, households' financial wealth has now even returned to pre-crisis levels. This positive impact on consumption growth is likely to have offset potentially dampening effects caused by real estate markets.<sup>25</sup>

The term deleveraging is often used, however, with reference to a reduction in debt that goes further than restoring the earlier debt ratio as a motive for cutting back on consumption. It is held that the violent upheaval in the financial markets and in the macroeconomic environment – specifically, for instance, in the wake of the drying-up of credit flows, massive downsizing and rapidly rising uncertainty – has reduced the debt ratio desired by households compared with pre-crisis periods. Indeed, households' turnaround from amassing debt to deleveraging is likely to have played a major role in the 2008 cyclical downswing, over the course of which the saving rate shot up by 4 percentage points and real consumer spending was cut back considerably. Since then, the saving ratio has tended slightly downwards, if anything, and has thus ultimately not done anything to dampen the growth of consumer spending.<sup>26</sup> Whereas only the change of the saving ratio is of major relevance to the business cycle – similar to the line of argument surrounding the fiscal balance – deleveraging only requires income to exceed expenditure by a sufficient margin. Hence the continuing deleveraging, along with an elevated but henceforth largely constant saving ratio, has been causing con-

*Deleveraging continued without further increase in saving ratio*

<sup>24</sup> See, for instance, C Carroll, J Slacalek and M Sommer (2012), *Dissecting Saving Dynamics: Measuring Wealth, Precautionary, and Credit Effects*, International Monetary Fund, Working Paper, No 12/219.

<sup>25</sup> See Deutsche Bundesbank, *Explaining growth in US private consumption during the current upturn*, Monthly Report, November 2011, pp 18-19.

<sup>26</sup> Admittedly, the saving rate is subject to numerous influences, not least monetary and fiscal policy influences, which could have counteracted one another. Statistically, saving is determined only as a residual from the difference between income and expenditure and is thus highly prone to revision. Since income is regularly underreported initially, the saving ratio has tended to be revised upwards in the past. Given the difficulty of finding macroeconomic evidence of the impact of deleveraging on consumption, Dynan (2012) attempts to collect microeconomic evidence. See K Dynan, *Is a Household Debt Overhang Holding Back Consumption?*, *Brookings Papers on Economic Activity*, Spring 2012, pp 299-362.



## Is private consumption in the USA following its typical cyclical pattern?

Private consumption is often seen as a significant weakness in the US economy's current upswing. Many would argue that households' efforts to deleverage and to rebuild wealth have dampened real consumption growth and in turn hampered growth of overall economic output.<sup>1</sup> On the other hand, due to the intertwined nature of these elements, it is possible that the subdued growth in consumption is less of a burden on and more of a response to the restrained expansion in income and employment, which is ultimately due to the levelling out of the underlying trends (see box on pages 31 to 35) and to a modest recovery in cyclical output overall.

To neutralise the effect of the slower underlying pace, the expenditure components of gross domestic product (GDP) can be measured against potential output. The contribution of each of the expenditure components to the output gap, ie to the percentage difference between actual GDP and potential output, can then be calculated, facilitating a comparison of the current upturn with previous recoveries. In 2012, the Congressional Budget Office (CBO) established in such an analysis that public demand in particular but also private residential investment and private consumption were behind the comparatively modest reduction in the negative output gap in previous years. The CBO indicated losses in wealth and households' dwindling confidence as well as a decline in the wage ratio as reasons for the subdued contribution of consumption to increasing the cyclical output.<sup>2</sup>

As private consumer spending essentially depends on income, it is certainly also pos-

sible that this subdued contribution is itself a reflection of the modest recovery in cyclical output. To identify cyclical burdens, we can examine how the ratios of expenditure components to potential output behaved in general depending on the aggregate output gap.<sup>3</sup> The actual (nominal) ratios of GDP expenditure components to potential output are then adjusted for the estimated cyclical effects. Shifts between the resulting percentage shares of potential output can then indicate specific developments in the individual expenditure components. Nonetheless, it should be noted that such an analysis cannot as such explain the modest recovery in cyclical output in the current upswing; rather, it is assumed to be exogenous. The analysis only looks at the extent to which the individual expenditure components have deviated from cyc-

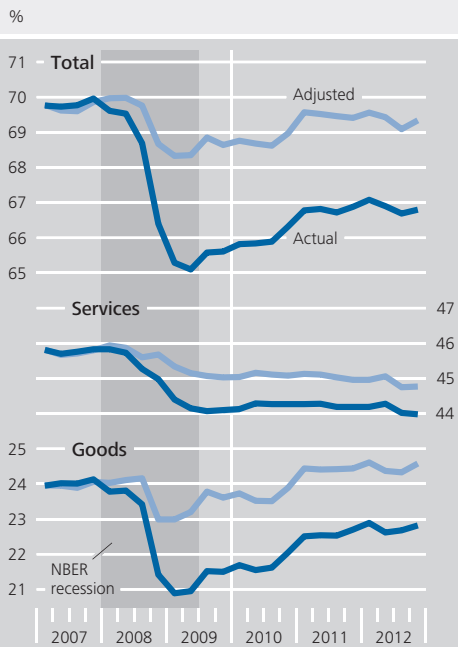
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<sup>1</sup> See, for example, B Lavender and N Parent (2013), *The U.S. Recovery from the Great Recession: A Story of Debt and Deleveraging*, Bank of Canada Review, Winter 2012-13, pp 13-26.

<sup>2</sup> In its analysis, the CBO examined real GDP expenditure components against its estimate for real potential output. See Congressional Budget Office, *What Accounts for the Slow Growth of the Economy After the Recession?*, November 2012.

<sup>3</sup> The starting point for the analysis is the CBO's most recent estimate of nominal potential output, against which the values for the expenditure components are examined. The ratios were regressed on the output gap, with linear trends additionally included segment-by-segment. The cyclical effect was then calculated using estimated regression coefficients for the output gap. The underlying observation period for the estimation runs from spring 1953 to 2007 Q4. This comprises complete business cycles, which, for this analysis, are measured from peak to peak, as defined by the NBER. The analysis examined whether the cyclical effect is dependent on the sign of the output gap. However, evidence to this effect could only be found in private residential construction and in net exports, if at all; a symmetrical approach was therefore assumed for the rest of the analysis. Additionally, a similar calculation based on real ratios was performed at the same time. This analysis came qualitatively to similar results. However, as the real ratios could not be interpreted as shares, the calculated changes and contributions do not add up.

**Actual and cyclically adjusted ratios of private consumption to potential output in the USA**



Source: Bundesbank calculations based on CBO estimates of potential output.  
 Deutsche Bundesbank

lical patterns, compared with previous averages.

In this regard, the CBO's estimates of potential GDP suggest that aggregate capacity utilisation fell by 7½ percentage points over the last recession. Consequently, based on previous business cycles, a decline of 3¼ percentage points in private consumption relative to potential output would have been expected. In reality, however, private consumption slid by 5 percentage points relative to potential output, thus emphasising the exceptionally weak consumption in the last downturn. According to the CBO's calculations, capacity utilisation has gone up by only 1½ percentage points since the cycle hit its trough in spring 2009. Looking at previous cycles, private consumption should have improved by ¾ percentage point relative to potential output. However, with an increase of 1¾ percentage points, this has more than doubled. Thus, private

consumption has not weighed on the recovery; on the contrary, it has been an important driver of growth. However, this improvement should be seen against the background of the slump in consumption in the previous recession. Since then, two-thirds of the cyclically adjusted decline in consumption relative to potential output has been recovered.

A breakdown of private consumption according to spending on goods and spending on services also returned some interesting results. While both ratios fell more sharply in the most recent recession than had been expected based on previous downturns, the decline in the consumption of goods was somewhat greater than the fall-off in demand for services. On the other hand, during the recovery, only the consumption of goods increased relative to potential output; demand for services did not. When adjusted for the impact of the aggregate output gap, the consumption of goods over potential output is, in fact, higher at the current end than it was during the last cyclical peak. Consequently, the demand for services taken by itself was remarkably weak in the current recovery. A more in-depth analysis shows that this applies in particular to the housing subsector of services and is directly related to the problems in the real estate market.<sup>4</sup>

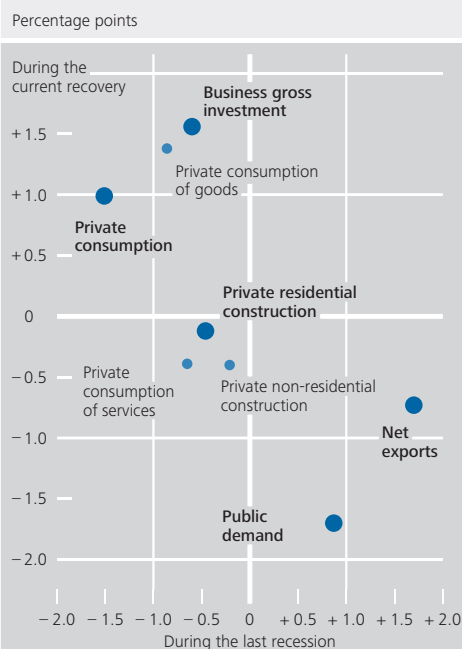
A similar pattern can also be found in the other expenditure components. If the cyc-

<sup>4</sup> The cyclically adjusted values for expenditure on housing have fallen relative to potential output by just over ½ percentage point over the last three and a half years, which explains fully the decline in the equivalent ratios for services as a whole. When adjusted for the impact of the output gap, the residual subcomponents of service consumption show a slight increase relative to potential output. However, the current values represent an overall balance and are not indicative of whether individual subcomponents developed positively or negatively.

lically adjusted changes in the GDP components relative to potential output during the last recession are plotted on the horizontal axis of a coordinate system and the equivalent changes during the current recovery are plotted on the vertical axis, the expenditure components, whose values have fallen relative to potential output in both phases, will show up in the south-west quadrant. This is indicative of a loss in structural importance. In addition to private residential construction, this implies only those sub-components which are related to the real estate market, specifically components which involve private demand for services (predominantly in the housing sector) and private non-residential construction. Owing to their procyclical behaviour in the downturn as well as in the upswing, aggregate business gross investment and private consumption are to be found in the north-west quadrant. In contrast, public demand and net exports, located in the south-east quadrant, had a stabilising effect: their cyclically adjusted value relative to potential output increased during the recession, but decreased during the recovery.

When adjusted for typical cyclical effects, it is evident that the expenditure components have deviated from previous patterns both in the recent downturn and the current upswing. Private residential construction investment diminished in importance in both phases, which can be attributed to the necessary adjustment processes on the real estate market. In addition, public demand and net exports have had a greater dampening effect than usual on both the upward and downward cyclical swings. By contrast, private consumption and business gross investment have intensified the fluctuations compared with the typical cyclical pattern. This means that these components grew relatively favourably during the economic

### Changes in the cyclically adjusted ratios of GDP expenditure components\* to potential output in the USA

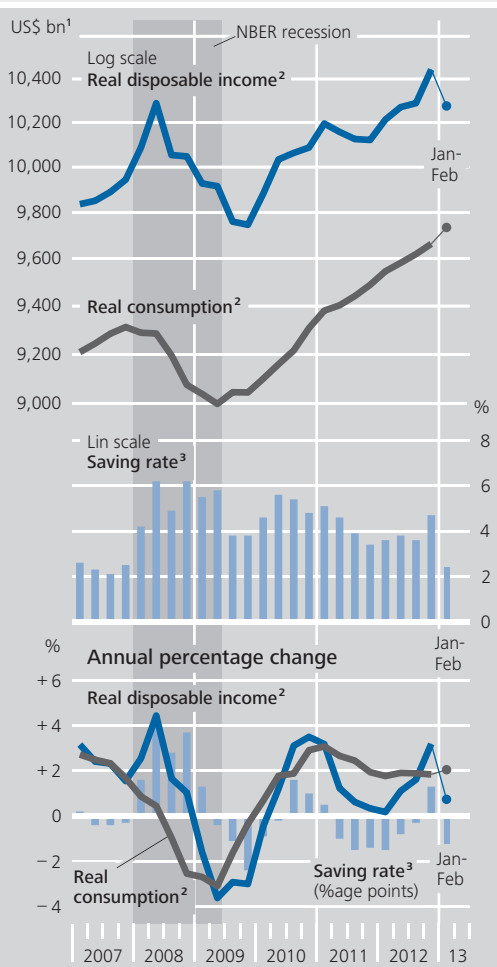


Source: Bundesbank calculations based on CBO estimates of potential output. \*Smaller circles indicate sub-components. Deutsche Bundesbank

recovery, following an above-average loss of importance during the recession.

### Income, consumption and saving of US households

Seasonally adjusted, quarterly

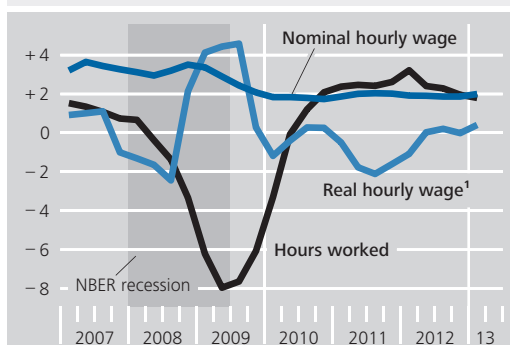


Sources: BEA and Bundesbank calculations. **1** At previous year's prices, reference year: 2005. **2** Adjusted using the Personal Consumption Expenditure deflator. **3** Saving as a percentage of disposable income.

Deutsche Bundesbank

### Hourly wages and hours worked in the US private sector

Annual percentage change, seasonally adjusted, quarterly



Sources: Bureau of Labor Statistics (BLS) and Bundesbank calculations. **1** Adjusted using the Consumer Price Index for Urban Wage Earners and Clerical Workers (CPI-W).

Deutsche Bundesbank

sumption to rise at the same pace as income during the upswing.<sup>27</sup>

Reasons why (real) income has grown only moderately are to be found in the labour market, which was hit particularly hard by the last recession.<sup>28</sup> In the recession and at the beginning of the upswing, firms undertook major efforts to reduce their labour costs and thus restore their profitability. Although this adjustment is considerably different from the path taken, for instance, by firms in the United Kingdom (see the box on pages 28-30), it was a necessary precondition for the strong recovery of business investment in machinery and equipment, a key pillar of the US economy in the past few years. What is surprising is that cost cutting – at least in the macroeconomic aggregates – was achieved solely by cutting jobs and not at all by slashing wages. According to data from the Bureau of Labor Statistics (BLS), average nominal hourly wages in the private (non-farm) sector even continued their steady rise. It was only under the weight of high unemployment that their growth slowed down, although it stabilised quickly at a rate near the Fed's current inflation target of 2%. This macroeconomic finding could be a sign of strong resist-

*Continuing growth of hourly earnings indicates disrupted wage mechanism*

**27** It also needs to be borne in mind that much of households' deleveraging is attributable not to saving current income but to defaults on loans. See W Li and S Patwari, *The Economics of Household Leveraging and Deleveraging*, Federal Reserve Bank of Philadelphia, Business Review, Q3 2012, pp 9-17.

**28** Thus, in the wake of the economic downswing, total hours worked in the commercial sector, which is calculated by the Bureau of Labor Statistics, was cut back by nearly 9%, whereas the output produced by this sector fell by only just under 7%. Restricting the observation period to the recession as dated by the NBER even obscures the extent of the gloom because the number of hours worked peaked prior to aggregate output but only hit its trough after output. In actual fact, the number of hours worked in the commercial sector was reduced by more than 10% between spring 2007 and autumn 2009; at the same time, however, hourly productivity was up by 6¼%. Even though massive downsizing in connection with great leaps in productivity initially engendered fears of a renewed and drawn-out "jobless recovery", the job market began to recover in 2010. Despite a rise of 6% in total over the past three years, total hours worked in the commercial sector remained stubbornly far below their previous peak even as this report went to press.

ance to nominal wage cuts.<sup>29</sup> From a macroeconomic perspective, forgoing wage cuts probably worsened downsizing, with simulations using macroeconomic models suggesting that the employment gains resulting from a downward adjustment in wages would ultimately have more than offset the nominal income losses of wage and salary earners in their impact on real GDP as well as on households' real incomes and consumer spending.<sup>30</sup>

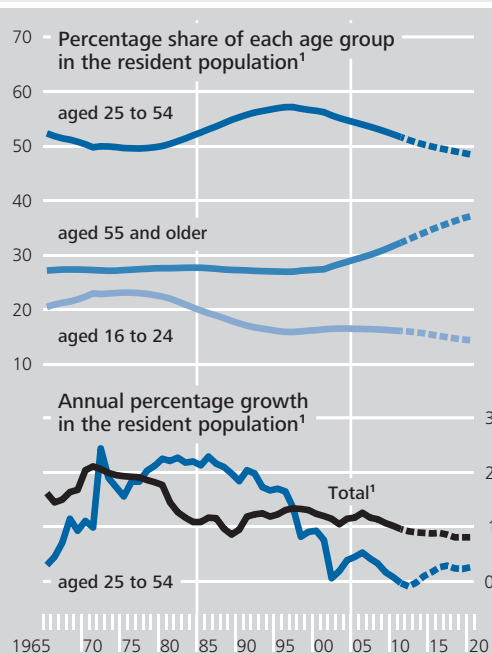
## ■ Supply-side factors

The moderate growth in employment over the past few years could also indicate a slowdown in trend growth, however. Whereas it is mainly demand-side factors which cause short-run deviations and fluctuations, aggregate output follows a long-run growth path which is determined by the supply side. In order to abstract from cyclical factors and estimate an economy's potential output, a variety of procedures are used in practice, though none can be classified as ideal (see box on pages 31 to 35). However, an approach on the basis of a simple production function showing how labour, capital and technology are combined to produce goods and services illustrates the key factors which drive aggregate production capacity growth.

*Aging of "baby boomers" causing shift in population structure*

Potential hours worked, in particular, are shaped by longer-term developments, not least because a substantial role is played not only by labour force participation, working hours and unemployment, as would result from normal utilisation of aggregate capacity, but also by the growth and structure of the population. Although the United States is still performing favourably in terms of population growth compared with many other industrial countries, this perspective obscures the profound structural change taking place within the US population. Since 1998, the growth of the entire working-age (aged 16 and up) residential population is outpacing that of the group aged 25 to 54, which accounts for the majority of employed

### Demographic change\* in the United States



Sources: Haver Analytics and Bundesbank calculations. \* From 2012, Census Bureau projections for the middle scenario with regard to birth rate, life expectancy and net immigration. <sup>1</sup> Aged 16 and older.  
 Deutsche Bundesbank

persons. According to data from the Census Bureau, the number of persons in this "prime age group" has been stagnant since 2010, whereas the total employment-age population has been growing by nearly 1% annually. The share of persons aged 25 to 54 in the residential population according to this definition was five percentage points lower in 2011 than in 1997, whereas the percentage of older persons rose by virtually the same amount. This demographic change is being driven by the ageing of the "baby boomers", the name given to the generation born during the period of surging

<sup>29</sup> See Deutsche Bundesbank, The US labour market in the current cycle, Monthly Report, April 2011, pp 35-51; and M Daly, B Hobijn and B Lucking, Why Has Wage Growth Stayed Strong?, Federal Reserve Bank of San Francisco, Economic Letter, No 2012-10, 2 April 2012.

<sup>30</sup> See Deutsche Bundesbank, The importance of nominal wage adjustments in NiGEM simulations, Monthly Report, April 2011, pp 48-49; Deutsche Bundesbank, On the problem of macroeconomic imbalances in the euro area, Monthly Report, July 2010, pp 17-38; Deutsche Bundesbank, The macroeconomic impact of an increase in wages in NiGEM simulations, Monthly Report, February 2013, pp 18-20.

## Weak productivity performance in the United Kingdom in comparison with the United States

While the United States economy is experiencing a moderate upswing, the growth path of the United Kingdom has been noticeably flattened for quite some time now. In price-adjusted terms, the aggregate output of the UK economy has been expanding by 1% on average over the past three years, compared with annual growth in real GDP of just over 2% in the United States. It is striking that the British economy has been creating new jobs in spite of the stagnation over the past quarters. According to the Labour Force Survey of the UK Office for National Statistics, employment in the United Kingdom at the end of 2012 was up on its pre-crisis level, and thus also up on its previous all-time high of 2008. In line with this, developments in labour productivity have been subdued. In the context of the typical cyclical pattern, where employment follows overall output, this is generally referred to as a “productivity puzzle”. By contrast, US firms began recruiting more staff only after growth in real economic output had picked up again noticeably.

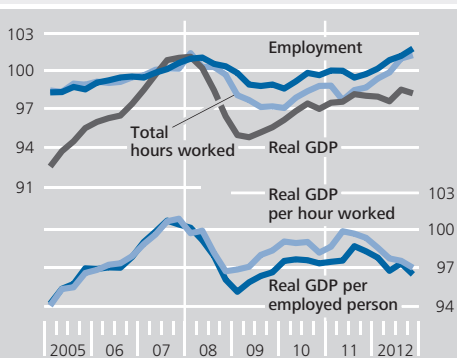
Although it is not unusual for European economies to undergo a longer period of depressed labour productivity than in the United States (among the reasons for this

are particular institutional features of the different labour markets and national welfare and social security systems), the British case stands out in terms of its marked persistence. It is important in this context to distinguish how much temporary factors are currently hampering labour productivity or if its long-term trend path has flattened. Having said that, it is all but impossible to quantify the size of the productivity gap, ie the difference between actual productivity and its trend level. Estimations by the Bank of England suggest that the level of productivity is more than 10% below its long-term path at present.<sup>1</sup> Conversely, it is unclear *ex ante* how much structural damage was suffered by the British economy during the 2008 recession and how much smaller the gap is that needs to be closed. Since the assessment of overall production capacities plays a major role in this regard, these questions concern key areas of economic policy. In view of the complexity and scope of these relationships, it may be assumed, however, that there is no single cause. It is more likely that the interplay of a large number of factors has contributed to the slowdown in British productivity growth.

The British labour market, which in recent years has been marked by growth in private sector employment, is a key explanatory factor in this. The number of public sector employees, however, has been falling steadily since the end of 2009 and recently hit a ten-year low. In the private services sector, in particular, which accounts for more than three-quarters of employment, the number of jobs remained stable during the past recession and recently went up again. It is possible that enterprises in the United Kingdom – unlike firms in the United States – held on to staff during the eco-

### Aggregate output and employment\* in the United Kingdom

2007 = 100, seasonally adjusted, log scale



Source: Haver Analytics. \* Employed persons as defined in the Labour Force Survey (LFS).  
 Deutsche Bundesbank

<sup>1</sup> See also Bank of England, Inflation Report November 2012.

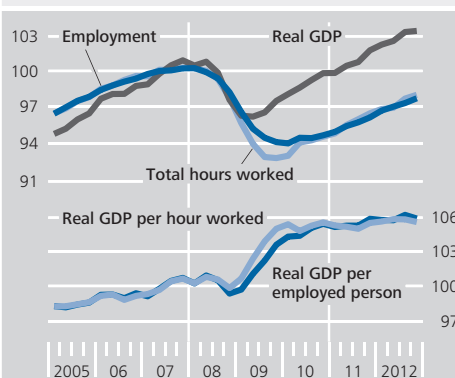
conomic downturn and used other channels of adjustment instead. The common hypothesis of labour hoarding is contradicted, however, firstly by the marked gross aggregate employment flows, ie the continuing high number of recruitments and lay-offs along with a net increase in the number of persons in work. Secondly, it is to be expected that a cyclical hoarding of labour should dampen labour productivity only temporarily.

The structure of the UK working population has shifted significantly since 2008. For example, the number of self-employed persons had risen by almost 10% by the end of 2012 and is still trending upwards. Furthermore, there has been an increase in the importance of part-time employment both in the period before the Olympic Games in London and afterwards. In the United States, there has admittedly been an even sharper increase in the number of persons who, either voluntarily or involuntarily, work only reduced hours. Their percentage share in total employment has been declining again since 2009, however, and stood at less than one-fifth at the end of the period under review. In the United Kingdom, by contrast, already more than one-quarter of all employed persons are in part-time work. Nonetheless, the increase in part-time jobs can at most only partly explain the weakness of output per person employed, since productivity relative to the number of hours worked is depressed, too.

According to a study by the Office for National Statistics, enterprises, especially those in the services sector, are increasingly operating in an environment characterised by weakening competitive pressure.<sup>2</sup> From an intra-sectoral perspective, differences in productivity between individual firms have thus increased without inefficient enterprises having been pushed out of the market. This may also have something to do with the currently relatively low lending rates and the disinclination of many ailing banks to write off credit claims. The exist-

### Aggregate output and employment\* in the United States

2007 = 100, seasonally adjusted, log scale



Source: Haver Analytics. \* Non-farm payroll employees.

Deutsche Bundesbank

ence of “zombie firms” – depending on the scale and duration – can generate considerable macroeconomic distortions and ultimately lead to misallocations of capital.<sup>3</sup> Together with the restricted lending of the financial sector, the opportunities for new innovative firms to enter the market is reduced and investment activity is dampened.

In actual fact, private non-residential gross fixed capital formation has shown markedly weaker growth than in the United States following the cyclically induced downturn in 2008. The latest reading was 10¼% down on its pre-crisis level, whereas US business investment was only 4¼% below its level of early 2008 and is still on an upward trend. Numerous factors could have played a part in the persistently gloomy UK investment climate. Besides the aforementioned frictions in the allocation of capital, heightened cyclical uncertainty and stagnating private consumption may have pre-

<sup>2</sup> See S Field and M Franklin (2013), Micro-data perspectives on the UK productivity conundrum, Office for National Statistics.

<sup>3</sup> The term “zombie firms” first emerged in the economic policy analysis of the “lost decade” in Japan and refers to firms whose entrepreneurial objective is chiefly confined to debt servicing. See also R J Caballero and T Hoshi, T and A K Kashyap (2008), Zombie Lending and Depressed Restructuring in Japan, American Economic Review, 98:5, pp 1943-1977.

vented British firms from substantially expanding their capital stock. Therefore, the ratio of utilised capital to employment has declined, which is also likely to have had an adverse impact on labour productivity. Conversely, low productivity stifles enterprises' investment activity through high unit labour costs and reduced profitability.

Substitution effects in favour of the factor labour are also likely to have contributed significantly to dampened productivity. Whereas the total number of hours worked in the United States at the current end continues to fall significantly short of its pre-crisis level, it has recovered perceptibly more quickly in the United Kingdom since 2008 – even when compared with earlier economic downturns – and was recently up on its previous cyclical peak again. The variability in the average number of hours worked can be viewed as an indication of the flexibility on the British labour market in recent years. At the same time, the average nominal hourly

wage in the private sector has been growing at a depressed rate similar to that in the United States. Given that consumer price inflation has been greater than the rise in the nominal wage over the past few years, households have had to accept a fall in their real labour incomes. Furthermore, asset losses may have prevented members of the labour force from exiting the labour market, with British firms therefore having access to a large supply of labour.

All things considered, only individual pieces of the British productivity puzzle can be explained. A clear solution to the puzzle as a whole, however, has remained elusive to date. It may possibly be a reflection of an adjustment process towards a new macro-economic balance. The extent to which structural or cyclical factors are the driving force behind this depressed productivity growth is a question whose answer depends on how long the phenomenon persists.

birth rates following the Second World War. Since labour force participation drops quite rapidly from the age of 55, this shift in the population structure would have led to a perceptible decline in the aggregate labour force participation rate even if the last few years had not seen changes in gender-specific and age-specific labour force participation.<sup>31</sup>

To make matters more difficult with regard to demographic change, the gender-specific and age-specific labour force participation rates have been developing less favourably in terms of the aggregate potential labour force. Particularly the process of integrating women into employment, which gave a boost to the total labour force participation rate up until the turn of the century, appears to have been completed now. The slight downward trend in the labour force participation rate of middle-aged men is continuing at the same time. Although the number of older persons remaining in the labour market longer than usual is increasing,

the labour force participation rate of youth and young adults is falling owing to longer periods of education and training. Given this long-run trend, the often-cited assertion that a large part of the decline in the aggregate labour force participation rate in the past few years is cyclically related seems questionable. Indeed, the participation rate of 63.7% for 2012 was forecast as the trend participation rate by Aaronson et al (2006) years before the economic and financial crisis.<sup>32</sup> The BLS now assumes that the labour force participation rate, which peaked at 67.1% in 1997-2000, will fall further to 62.5% by 2020 and even as low as 58.5%

*... and less favourable development of age-specific labour force participation*

<sup>31</sup> See Deutsche Bundesbank, The decline in labour force participation in the USA, Monthly Report, May 2012, pp 19-21.

<sup>32</sup> The model used by these authors is characterised by combining information on labour force participation broken down by age group and year of birth. See S Aaronson, B Fallick, A Figura, J Pingle and W Wascher, The Recent Decline in the Labor Force Participation Rate and Its Implications for Potential Labor Supply, Brookings Papers on Economic Activity, Spring 2006, pp 69-134.



## Determining aggregate trend output in the USA

It is not possible to pinpoint with certainty the location of an economy in the cycle at the current end. There are two main reasons for this: first, important data are not always readily available and second, these data are sometimes subject to revision many years down the line. This is compounded by the fact that it is not always possible to determine unequivocally, on the basis of the observed data changes, to what extent these reflect a change in the underlying trend, the economic cycle, or disturbance terms. With regard to the monthly and quarterly data typically examined in a business cycle analysis, the change in the growth trend between individual observation points is generally very small and therefore barely identifiable. Shifts in the underlying pace can, however, be seen over a longer period of time. In the event of a marked deceleration, for example, the cyclical component would ultimately be incorrectly evaluated if an unchanged growth trend were extrapolated. Against the backdrop of only moderate growth in real gross domestic product (GDP) in the USA in recent years, a number of methods used in practice to determine the growth in and the level of aggregate trend output are presented below.

It is not uncommon to use purely statistical methods for the purpose of trend extraction. The simplest approach involves calculating the average rate of change in aggregate output over a certain period of time. This is equivalent to approximating the trend growth by taking the gradient of a straight line which has been adjusted to the logarithmic time series of real GDP. A trend output level is also derived in the process. The log-linear trend of economic activity in the USA is sometimes calculated for the five

or ten-year period leading up to the last cyclical peak in the final quarter of 2007 and then extrapolated. Real GDP has not been anywhere close to this level since the severe one-and-a-half-year recession, which lasted from the beginning of 2008 up until the second quarter of 2009. Such a comparison has nonetheless been ventured in order to illustrate the serious repercussions of the economic and financial crisis. Working on the assumption that this dampening effect primarily affects real business activity itself and not so much the trend, this would result in a substantial underutilisation of aggregate capacity.

However, great caution should be exercised when analysing such trend rates and any comparisons based thereon. Constellations in which real GDP did not return to its thus determined previous trend path can be constructed for numerous other US recessions over the last few decades. This is ultimately due to the difficulties involved in selecting a suitable reference period for determining the trend growth. Although the period directly succeeding the most recent cyclical peak fully encompasses the last (severe) recession, it only covers part of the current expansion phase if it is assumed that no renewed downturn is currently underway or imminent. By contrast, the reference period up to the final quarter of 2007 with a time span of five years is based purely on a period of expansion; the ten-year segment would cover the entire expansion phase, the mild recession at the beginning of the millennium and part of the preceding upswing. Owing to the asymmetric cyclical effects, it is not surprising that the calculated trend growth in the reference period is relatively high and that real GDP has failed to reach the extrapolated trend path of late. It



is therefore important to ensure when generating average rates or (log) linear trends that they are based on a complete economic cycle, ie measured from peak to peak or trough to trough.<sup>1,2</sup>

This leads to an interesting thought experiment. Had the US economy slipped back into recession at the beginning of 2013, it would have been possible to compare real GDP in the final quarter of 2012 with that of the final quarter of 2007, which would have yielded a virtually flat trend. However, the longer the current expansion phase persists, the steeper the trend determined in this way could become. What is then ultimately classed as a trend is therefore also dependent on how the economy develops. This means that forecasts of future developments are therefore also relevant at the current end.

One known problem is that of the end point in connection with the widely used trend extraction method based on the Hodrick-Prescott filter (HP filter).<sup>3</sup> If the time series ends in proximity to its cyclical peak, the impact of the upswing biases the trend determined using this statistical procedure upward. If it ends close to its cyclical trough,

however, the trend will be shown as being too weak against the backdrop of the recession. If the HP filter is used for the period up to the final quarter of 2007, for the period up to the final quarter of 2009 or for the period up to the current end, the extracted trend paths for real US GDP are accordingly either steep or flat.<sup>4</sup> A common way of alleviating the end point problem is to smooth the time series that have been projected into the future. If the GDP series is extrapolated using the rather favourable forecasts of the participants at the recent meeting of the Federal Open Market Committee (FOMC), the trend at the current end becomes somewhat steeper, though no perceptible decline in aggregate output is apparent when compared with its derived trend path. Only subdued growth in trend output is shown for the period from 2007 to 2011, as the filter does not sift out the impact of the comparatively long and severe recession if the usual value of the smoothing parameter for quarterly data is being used.

The procedures presented so far are purely statistical instruments. They do not provide an economically substantiated analysis of

<sup>1</sup> See V Zarnowitz (1981), *Business Cycles and Growth: Some Reflections and Measures*, NBER Working Paper No 665, and V Zarnowitz (1992), *Business Cycles: Theory, History, Indicators and Forecasting*, University of Chicago Press, Chicago and London.

<sup>2</sup> Given that the recent recession is thought to have been triggered by undesirable macroeconomic developments in the preceding boom period, among other factors, measuring the trend rate from one cyclical trough to the next might turn out to be the preferable approach.

<sup>3</sup> See OECD (2009), *The Sensitivity of Output Gap Estimates to the End-Point Treatment*, *Economic Outlook*, No 85, pp 225-226.

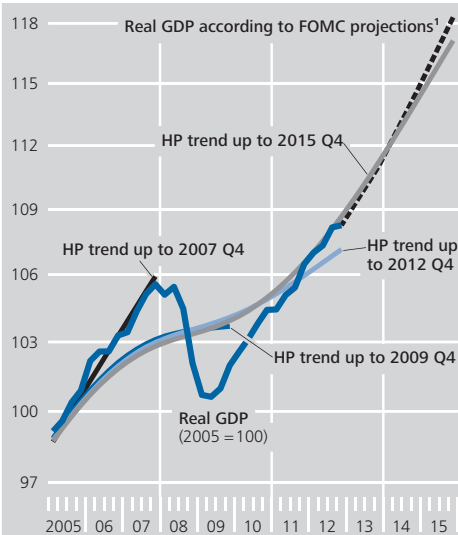
<sup>4</sup> When applying the HP filter to real-time data for real US GDP up to the final quarter of 2007, for example, as were made available at the beginning of 2008 and are today provided by the Federal Reserve Bank of Philadelphia, this results in a marginally higher trend path. According to Bundesbank calculations, however, the effect resulting from the subsequent data revision appears to be weaker for the previous years than the impact of the extended observation period.

the forces which drive growth in aggregate production capacity and thus ultimately determine the trend in output along the lines of the potential output. By contrast, production function-based approaches allow the trend developments of the supply-side factors required for the manufacture of goods and services to be factored in when deriving the growth trend.<sup>5</sup> Nevertheless, statistical trend extraction methods are also used here, albeit on a different level, when adjusting individual determinants, such as age-specific labour force participation rates or total factor productivity, for cyclical factors.

An estimate based on a simple Cobb-Douglas production function with two input factors, as used by the CBO (2001), will be outlined below.<sup>6</sup> A Cobb-Douglas function postulates constant production elasticities for labour and capital input, which are approximated using the corresponding income shares. A major difference between this function and the CBO's approach is that the production function used here is not restricted to the corporate sector, but is applied to the economy as a whole. Furthermore, important time series are fed into the HP filter after extrapolation with medium to long-term projected values in order to adjust for cyclical factors, whereas the CBO estimates linear trends for those cycles that are measured from peak to peak. Specifically, the most recent projections of the Bureau of Labor Statistics (BLS) for 2020 serve as the reference point for the forecast of the age group-specific labour force participation rate.<sup>7</sup> The size and structure of the population develop in line with the Census Bureau's middle scenario with regard to birth rate, life expectancy and net immigration. The natural rate of unemployment is derived using the Kalman filter and is projected into the future as a constant.<sup>8</sup> Unlike in the past, no further

### Impact of the end point on aggregate trend output in the USA estimated using the Hodrick-Prescott filter\*

Seasonally adjusted, log scale



Sources: BEA and Bundesbank calculations. \* Starting with a common value for quarterly figures of 1600 for the smoothing parameter and in 1947 Q1. 1 Based on the mean central tendency of the participants' projections at the meeting of the Federal Open Market Committee (FOMC) on 19 and 20 March 2013.

Deutsche Bundesbank

downward trend in the number of hours worked per employee is expected in view of the marked recovery which followed the sharp drop during the last recession. The estimates of capital input are based on BLS data<sup>9</sup> and the assumption that capital input

<sup>5</sup> See, in particular, Deutsche Bundesbank, Potential growth of the German economy – medium-term outlook against the backdrop of demographic strains, Monthly Report, April 2012, pp 13-28.

<sup>6</sup> See Congressional Budget Office, CBO's Method for Estimating Potential Output: An Update, background paper, August 2001.

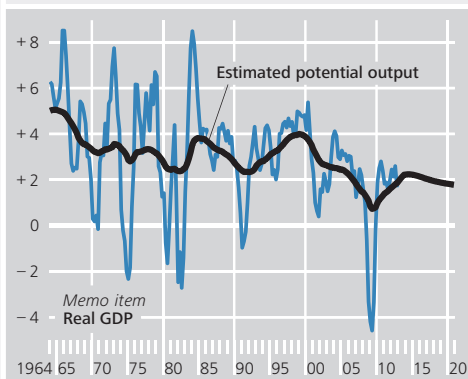
<sup>7</sup> See M Toossi, Labor Force Projections to 2020: A More Slowly Growing Workforce, Bureau of Labor Statistics, Monthly Labor Review, January 2012, pp 43-64.

<sup>8</sup> The deviations of the actual aggregated labour force participation rate from the previously determined potential labour force participation rate serve as observations here. The estimate, which is also based on certain assumptions with regard to starting values and variance, resulted in a moderate increase in the natural rate of unemployment during the recent recession; this ratio has gone back down recently.

<sup>9</sup> At the time of the estimate, BLS estimates for capital input in trade and industry were available up to 2011 at [www.bls.gov/mfp/mprdownload.htm](http://www.bls.gov/mfp/mprdownload.htm); estimates for the economy as a whole were available up to 2010.

### Estimate for the growth of potential aggregate output in the USA

Quarterly, annual percentage change



Sources: BEA and Bundesbank calculations.  
 Deutsche Bundesbank

in the household and public sectors has been affected over the last years by dampening effects stemming from the problems in the real estate market and the fiscal consolidation measures.<sup>10</sup> In order to forecast capital input for the economy as a whole over the medium to long term, use is made of a previous trend in capital intensity. With regard to growth in total factor productivity, a return to the long-term average rate is expected, after only comparatively modest progress was achieved in the years immediately prior to the onset of the recent recession.<sup>11</sup>

Under these not implausible assumptions, US production capacity could grow by around 2% on average up until 2020. The main reason for the subdued underlying pace by historical standards is the rather modest growth in potential labour input, which is also dampening growth in capital input. Growth in aggregate potential output has been considerably weaker over the past few years owing to the ripple effects of the recession and previous undesirable macroeconomic developments. This forecast is at the lower end of the spectrum when compared with other estimates of potential growth. The range of the various

results illustrates the uncertainty associated with such estimates.<sup>12</sup>

That said, there is even greater uncertainty surrounding the estimation of the level of potential output at the current end and thus also the output gap, defined as the difference between real GDP and potential output. This is due, in part, to the way in which the starting level is fixed. Furthermore, small differences in the estimated growth rates of potential output can accumulate over a longer period of time and result in substantial differences between levels. The estimation presented here, for example, at just under -2% of late, implies a significantly lower underutilisation of aggregate capacity in the USA than in the estimates published by international organisa-

<sup>10</sup> The lagged and average growth in private demand for services in the housing subsector and employment developments in the public sector are used as reference points here.

<sup>11</sup> See J Fernald (2012), Productivity and Potential Output before, during and after the Great Recession, Federal Reserve Bank of San Francisco, Working Paper 2012-18.

<sup>12</sup> In its Economic Outlook from November 2012, the OECD forecast that potential growth in the US economy would accelerate by 2.0% on average in 2013 and 2014. By contrast, the IMF forecasts for real GDP and the output gap published in the World Economic Outlook of October 2012 imply that aggregate capacity will grow by an average of 2.2% between 2013 and 2017. In line with its most recent Budget and Economic Outlook of February 2013, the CBO is also expecting potential growth to increase by 2.2% on average between 2013 and 2023. Fernald (2012) estimates an underlying pace of 2.1% for the coming years. The estimates of the participants at the recent meeting of the US Federal Open Market Committee regarding long-term growth in real US GDP ranged from 2.0% to 3.0%. The central tendency, in which the three highest and lowest values are excluded, was 2.3% to 2.5%. According to the estimate presented here, one reason for the comparatively low potential growth rate could be that this estimate is already based on the current demographic projections of the Census Bureau. Compared with previous estimates, the statistical office is projecting significantly less favourable demographic developments. See Census Bureau, What a Difference Four Years Make: U. S. Population Projected to Grow at a Slower Pace Over the Next Five Decades, December 2012, available at [blogs.census.gov/2012/12/12/](http://blogs.census.gov/2012/12/12/).

tions.<sup>13</sup> In light of such discrepancies, it is advisable to treat these data with caution. Experience has shown that, owing to the unreliability when estimating the trend output at the current end, subsequent revisions of the output gap can be equally as large as the output gap itself.<sup>14</sup>

On the whole, current estimates suggest that, by historical standards, the US economy is expanding at a subdued underlying pace. The expansionary forces are likely to have weakened, especially in view of the demographic change, which is probably also having an indirect impact by way of the slower expansion in capital input. Given the lesser significance of the accumulation of the factors of production, growth in aggregate trend output will largely depend on developments in total factor productivity, which are difficult to predict.

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**13** In October 2012, the IMF estimated the gap between real US GDP and potential output last year to stand at -4.1%, compared with the OECD's estimate of -3.7%. The most recent estimates of the CBO for 2012 indicate an output gap of as much as -5.7% of potential output. The persisting high level of underutilisation of aggregate capacity is one reason why these organisations are anticipating a significant increase in real GDP growth in the coming years. For further information on the treatment of negative output gaps in connection with forecasts, see Office for Budget Responsibility, *Is It Plausible to Assume a Negative Output Gap after Five Years?*, Economic and Fiscal Outlook, March 2013, pp 45-46.

**14** See A Orphanides and S van Norden (2002), *The Unreliability of Output-Gap Estimates in Real Time*, Review of Economics and Statistics, Vol 84, pp 569-583.

by 2050.<sup>33</sup> It must admittedly be noted with regard to such projections that labour force participation is also affected by factors such as real wage growth, legal regulations and net immigration flows, which are difficult or impossible to predict.

Above and beyond these long-run developments, the turmoil churned up by the recent recession is likely to have temporarily affected

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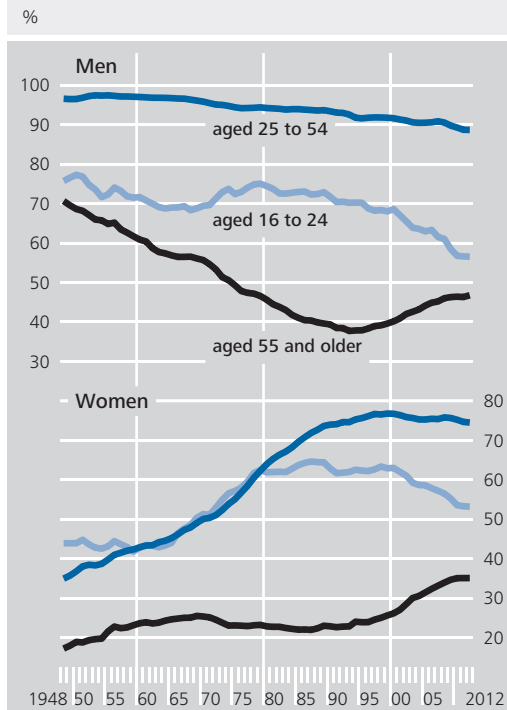
**33** See M. Toossi, *Labor Force Projections to 2020: A More Slowly Growing Workforce*, Bureau of Labor Statistics, Monthly Labor Review, January 2012, pp 43-64; M Toossi, *Projections of the Labor Force to 2050: A Visual Essay*, Bureau of Labor Statistics, Monthly Labor Review, October 2012, pp 3-16.

**34** Not only the potential labour force but also the natural unemployment rate and potential average hours worked are key factors affecting potential total hours worked. It should be noted in this connection that hours worked per employee have returned to normal following the sharp decline during the recent recession. The long-term downward trend of this metric seems to have been halted, thereby counteracting to some degree the weaker growth rate of the potential hours worked. According to the latest CBO estimate, the potential labour force is likely to increase by only ½% on average for the years 2013-23, compared with an annual increase of just over 1½% from 1950 to 2001. Given a more or less stable increase in potential labour productivity, defined here as the ratio of potential output to the potential labour force, the middle growth rate of cyclically adjusted real GDP falls from 3½% to 2¼%. For the 2002-12 period, the CBO expects the potential labour force to grow by an annual average of ¾% and potential output to rise by an annual average of likewise 2¼%, with potential labour productivity hence increasing by 1½%. See Congressional Budget Office, *The Budget and Economic Outlook: Fiscal Years 2013 to 2023*, February 2013, pp 44-45.

*... are reasons for relatively weak growth of the potential labour force*

On the whole, slower population growth, the shifting age structure and the unfavourable development of age-specific labour force participation imply that the potential labour force is currently expanding, and will continue to grow, only at a fraction of the pace in earlier decades. In fact, even if potential labour productivity continues to make advances at an unchanged rate, the growth of aggregate production capacity has to be considerably lower.<sup>34</sup> What needs to be taken into account, however, is that, given slower growth of cyclically adjusted hours worked, capital input does not need to be expanded to the same degree as previously and is therefore likely to also be making a reduced contribution to growth.

### Labour force participation\* by age group in the United States



Sources: BLS and Bundesbank calculations. \* Total labour force (employed and unemployed persons) as a percentage of the civilian noninstitutional population.

Deutsche Bundesbank

### Potential and cyclical components of real US GDP compared with previous recoveries\*

Percentage points, annual

Item	Average contribution to growth, <sup>1</sup> 2009-12	Difference from average	
		1991-94 and 2002-05	1975-78 and 1983-86
Real GDP	2.1	-1.0	-3.1
Own estimates			
Potential output	1.5	-1.1	-1.9
Potential hours worked	0.3	-0.3	-0.9
Capital input	0.3	-0.6	-0.8
Potential TFP <sup>2</sup>	0.9	-0.2	-0.2
Cyclical output <sup>3</sup>	0.6	0.1	-1.2
CBO estimates <sup>4</sup>			
Potential output	1.6	-1.0	-1.6
Cyclical output <sup>3</sup>	0.5	0.1	-1.4
IMF estimates <sup>5</sup>			
Potential output	1.7	-1.1	-
Cyclical output <sup>3</sup>	0.4	0.1	-
OECD estimates <sup>5</sup>			
Potential output	1.8	-0.8	-
Cyclical output <sup>3</sup>	0.3	-0.1	-

\* The first 14 quarters of recoveries as dated by the NBER. <sup>1</sup> Real GDP growth rate in per cent. Contributions to growth do not necessarily add up. <sup>2</sup> Total factor productivity. <sup>3</sup> Change in the output gap. <sup>4</sup> Bundesbank calculations based on quarterly CBO data according to supplemental material on the Budget and Economic Outlook (February 2013). <sup>5</sup> Bundesbank calculations on the basis of annual data on the output gap or potential output according to the IMF World Economic Outlook (October 2012) or the OECD Economic Outlook (November 2012).

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the growth of potential output.<sup>35</sup> A rise in the natural unemployment level, ie unemployment even under normal capacity utilisation, has been the subject of particular public debate. The waste of human capital through long-term unemployment, a “mismatch” between labour supply and labour demand owing to sectoral shifts, and extended unemployment benefits could have contributed to such an increase. Although estimates of the size of this effect vary considerably, plausible approaches show that the rise in the actual unemployment rate is largely due to cyclical factors.<sup>36</sup> Furthermore, the slump in investment during the recession put the brakes on growth of the capital stock. In the private household sector, the real estate crisis is likely to have constrained the use of owner-occupied housing,<sup>37</sup> whereas public capital input growth has probably been held back recently by fiscal consolidation. Lastly, total factor productivity growth may also have weakened owing, for instance, to constraints in the reallocation of resources across economic sectors, firms’ research and development activities or workers’ efforts to acquire new skills.<sup>38</sup> It is ultimately, above all, the re-

*The recession’s retarding effects on the growth of potential output*

<sup>35</sup> In a recent empirical study, Haltmaier (2012) observed that recessions perceptibly dampen the growth of potential output in the subsequent period. For advanced economies, the size of the effect depends on the depth of the preceding downswing. See J Haltmaier (2012), Do Recessions Affect Potential Output?, Board of Governors of the Federal Reserve System, International Finance Discussion Papers No 1066.

<sup>36</sup> See M C Daly, B Hobijn, A Sahin and R G Valletta (2012), A Search and Matching Approach to Labor Markets: Did the Natural Rate of Unemployment Rise?, Journal of Economic Perspectives, Vol 26, pp 3-26.

<sup>37</sup> Steindel (2009) estimates that, even under rather strong assumptions, the slower growth in housing, the contraction of financial services and conceivable spillover effects taken together could lead to a reduction in annual GDP growth of not more than around ¼ percentage point. See C Steindel (2009), Implications of the Financial Crisis for Potential Growth: Past, Present, and Future, Federal Reserve Bank of New York, Staff Reports, No 408.

<sup>38</sup> See Congressional Budget Office, Lasting Effects of the Recent Recession and the Ensuing Economic Weakness on Potential Output, An Update to the Budget and Economic Outlook: Fiscal Years 2012 to 2022, August 2012, pp 40-41. All in all, CBO (2012) has reduced its projection for the level of potential output in 2022 by 1½% owing to various recession effects. It has lowered its projection by a total of around 7% since 2007, however. According to the data, the revision is due in large part to a reassessment of long-term trends.

duced capital growth which is likely to have been holding back potential output growth to a considerable extent during the recent recession and subsequent recovery.<sup>39</sup> If energy is regarded as a factor of production in its own right, the sharp oil price rises and resulting cut-backs in consumption are likely to have had a dampening effect, too.<sup>40</sup>

hind this flattening of the potential output path. In addition, over the short term, it is the considerably reduced growth in capital input which, more than anything, is likely to have exerted a retarding influence. As the underlying pace slows down, there is a growing threat that exogenous factors will push the growth rate of real GDP down to or below the zero line, which is critical for the standard definition of a recession.

*Slower production capacity growth is the reason for weaker GDP growth*

On balance, the weaker real GDP growth over the past three and a half years compared with the two preceding cyclical recoveries can be attributed largely to slower growth in aggregate production capacity; this explains, at the very least, a large part of the gap behind the previous recoveries. In the long term, it is, above all, profound demographic change which lies be-

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<sup>39</sup> See J Fernald (2012), Productivity and Potential Output before, during and after the Great Recession, Federal Reserve Bank of San Francisco, Working Paper, No 2012-18.

<sup>40</sup> See D Holland (2012), Reassessing Productive Capacity in the United States, National Institute Economic Review, Vol 220, pp F38-F44.