

The Impact of the Financial Crisis on the Real Economy

The cost of the financial crisis to the real economy has so far remained underexamined, probably because of the difficulty in making such an assessment. The crisis was precipitated by an unsustainable bubble that artificially inflated economic figures, so what should be used as a benchmark for measuring the effects of the crisis on the real economy? How reliable are current estimates of the output gap? Could overestimating this indicator lead to underestimating the current risk of inflation? Finally, what effect will the crisis have on the declining long-term productivity gains in Europe and the USA, and what does this mean for potential output?

Daniel Gros and Cinzia Alcidi

The Crisis and the Real Economy

The present crisis was caused by a combination of asset price bubbles, mainly in the real estate sector, and a credit bubble that led to excessive leverage. This is by now well accepted. We also showed in a previous contribution¹ that Europe (and in particular the euro area) was affected by both “bubble” symptoms as much as the USA. House prices increased as much in Europe as in the USA, and on most indicators of leverage or excessive credit expansion the euro area also did worse than the USA (in particular the corporate and financial sectors show a higher degree of leverage in Europe than in the USA, and the increase was higher in Europe as well). From this perspective, it is not surprising that Europe also experienced a deep crisis.

The crisis became truly global because of two main transmission mechanisms: the sudden rise in risk aversion (and financial market volatility) was transmitted worldwide because financial markets are highly integrated at the global level. Moreover, the sudden drop in demand, especially for capital intensive goods, was transmitted rapidly along the global supply chain. Within Europe, the integration of financial markets and supply chains is even stronger than it is at the global level, and consequently, the crisis affected all member countries, even those that had not shown any bubble symptoms (i.e. those that had had stable housing prices and no increase in leverage). It is thus not

surprising that all member countries were affected by the crisis, even those without a bubble (e.g. Germany, where housing prices and leverage had not increased).

How to Measure the Impact of the Crisis on the Real Economy

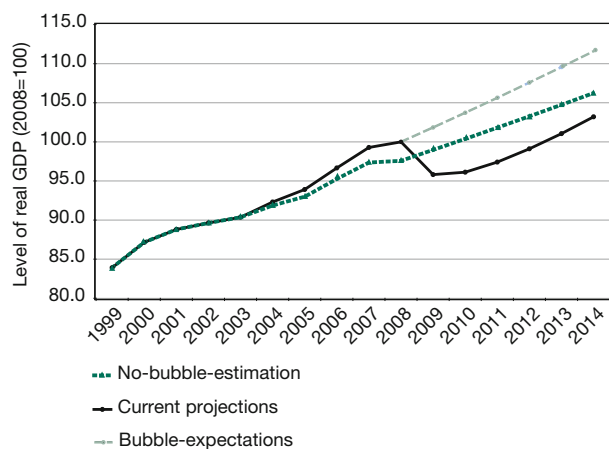
The Impact of the Crisis on Output

We start by briefly discussing the impact of the crisis on growth (GDP). The first crucial point to emphasise is that since the crisis emerged from the bursting of a bubble, an assessment of it requires setting the excess growth during the bubble against the loss of output during the crisis. Figure 1 shows an attempt to measure the impact of the entire boom-bust cycle on the real economy. The dark solid line shows the level of real GDP as currently projected by the IMF (projections available through 2014), whereas the light dashed line shows the expected levels based on the average growth rates of the pre-crisis years. The light dashed line thus shows what might have been expected close to the peak of the bubble when it was not widely recognised as such. Yet the central question is: what would the path for output have been if there had been no bubble (and no crisis)?

This requires an estimate of the potential growth of the European economy without the bubble. We estimated this in the following way: the latest data from the European Commission (issued at the end of 2009) show that

¹ C. Alcidi, D. Gros: Why Europe Will Suffer More, in: *Intereconomics*, Vol. 44, No. 4, July/August 2009.

Figure 1
Long-term Effect of the Crisis on GDP in the Euro Area



Sources: IMF: World Economic Outlook, October 2009, and own calculations.

in 2007, the output gap was at 2.5% (one year ago, the Commission thought that the output gap had been close to zero in 2007). If we assume that this is the effect of a bubble, we can conclude that the bubble has increased the observed growth rate by 0.5% a year between 2004 and 2008. Hence the “no-bubble” GDP level, plausibly, should have followed the green dotted line in the chart. Without a bubble, the level of real GDP would have been below the actual rates between 2004 and 2008 but from 2009 onwards well above. The figure also illustrates that, at least according to the current IMF projections for 2014, the European economy has not yet returned to the likely no-bubble path of GDP, suggesting a considerable overshooting: the crisis caused additional losses in output.

Contributors to this Forum

Daniel Gros, Centre for European Policy Studies (CEPS), Brussels, Belgium, and CEPR.

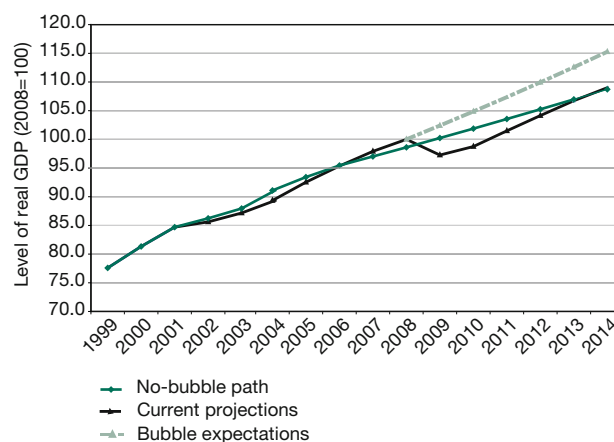
Cinzia Alcidi, Centre for European Policy Studies (CEPS), Brussels, Belgium.

Michael Biggs, Deutsche Bank.

Thomas Mayer, Deutsche Bank.

Bart van Ark, The Conference Board.

Figure 2
Long-term Effect of the Crisis on GDP in the USA



Sources: See Figure 1.

By contrast, one could argue that there has been no additional loss of output from the bust for the USA, as the “no-bubble” path would have brought the economy to a very similar position as the actual path now predicted (see Figure 2).

Table 1 provides two alternative estimates of the cost of the crisis in terms of GDP. The first column reports the percentage difference between the IMF’s current prediction of 2014 real GDP levels in its World Economic Outlook (WEO) of October 2009 and the 2014 GDP levels expected at the peak of the bubble under the assumption that it would not burst. The second column shows the percentage difference between the estimated levels of output expected for 2014 if there had never been a bubble (or a burst) and the 2014 GDP if the bubble had lasted. This latter calculation, by using an estimation of the “normal” path of the economy as a benchmark, is likely to be a better indicator of the cost in terms of lost output from the crisis. This column suggests that the cost of the bubble burst is quite similar across the Atlantic, though larger in the USA, and that within Europe the euro area has suffered somewhat less than the UK and the new member countries. By contrast, the first column suggests that the cost of the crisis (if compared to “bubble expectations”) is much higher in the EU.

The Crisis and (the Loss of) Happiness

Although the crisis went global, it is still hitting different countries in quite different ways. It has become a popular pastime to rank countries by the fall they experience in GDP and then pass judgement accordingly on their “eco-

Table 1
Long-term Implications of the Crisis

	Percentage difference between:	
	current projections and "bubble expectations" for 2014	no-bubble path and "bubble expectations" for 2014
EU	-9.6	-5.5
Euro Area	-8.4	-5.4
USA	-6.3	-6.5

Note: The no-bubble path is based on the assumption that the "excess growth" driven by the bubble is 0.5% each year over the period 2004-2008 for Europe and 2003-2007 for the USA.

Source: IMF: World Economic Outlook, October 2009; own calculations.

conomic model". But even apart from the argument made above, one has to ask the question: is the fall in GDP the appropriate measure for a cross-country comparison of the real world impact of the crisis, particularly for this crisis? GDP refers to the amount of goods and services produced in a given economy. However, the GDP statistics have little real meaning for the wider public whose lives are affected much more by the amount of money that can be spent on consumption and by job stability. Movement in consumption and employment levels should represent a better indicator of the impact of the crisis than changes in GDP.

These considerations apply in particular to the EU, given that economic policy is still determined primarily at the national level and a large heterogeneity of effects has emerged. A comparison of Germany with the USA and Spain provides a good example of the degree of heterogeneity in the consequences of the crisis.

A key factor behind cross-country heterogeneity is the existence of different growth models in each country. It is apparent that Germany's huge current account surplus has provided a cushion and allowed consumption to remain constant. In 2009, Germany's GDP fell by about 5%, but consumption remained roughly unchanged. The discrepancy between consumption and production is due to two factors: the current account surplus has declined by about 3 percentage points of GDP and investment has fallen by about 2 percentage points of GDP (this represents a fall in investment of about 10%). These two factors account for the 5 percentage points difference between the growth rate of GDP (-5%) and consumption (0).

In the USA, the current account swing is in the other direction. As a consequence, even though US GDP declined by less (about 3-4%, according to the IMF and the Commission) than in Germany, US consumption had to fall. Despite

an improvement of about 2 percentage points of GDP in 2009 in the US current account deficit, domestic absorption fell by about 5% (a 3% decline in production plus a 2% decline in net resource transfer from abroad). This is a much more painful adjustment than in Germany. Part of this overall decline in domestic absorption has fallen on investment.² Yet since consumption accounts for roughly 70% of GDP, consumption had to fall significantly as well. In the USA, consumption had been increasing trend-wise by about 2.5 to 3% in recent years. US consumers will thus have to accept a swing in the growth rate of consumption from plus 3% to minus 1-2%; a change of over 4 percentage points. By contrast, in Germany consumption had in any event been stagnant since about 2001 with little change brought about by the crisis.

The wide difference in terms of the current account in the starting positions of Germany (+6% of GDP) and the USA (-6% of GDP) implies that in Germany stable consumption is sustainable in the longer run even if GDP does not recover,³ while in the USA, consumption has to fall even if there is to be a sustained recovery.

But why do German consumers continue to spend? The best answer is: why not? German consumers did not rely on credit or inflated house prices to finance their expenditures. By contrast, consumers in the USA (or Spain) had little choice but to spend less when the value of their houses tumbled and access to credit became more difficult.

Another reason why German consumption remains stable is the performance of the labour market: so far, employment has not fallen noticeably in Germany.

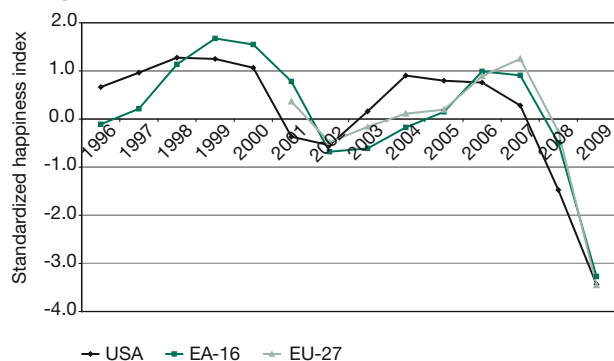
This leads to the second indicator of how much the crisis really hurts: the unemployment rate. Here again there are wide differences across countries. In Germany unemployment has so far increased only marginally (by 0.3 percentage points, from 7.2% in October 2007 to 7.5% in October 2009), compared to increases of 4.4 percentage points over the same time period in the USA (from 5.8% to 10.2%) and over 8 percentage points in Spain (from 11.4% to 19.3%).

What is the reason for these differences? German enterprises have invested greatly in the skills of their labour force and therefore hold on to their skilled workers even if some of them are temporarily not needed. Generous provisions

² In 2009, US investment fell by more than 15% (year-on-year change).

³ Many commentators have recently argued that Germany should rethink its export-led growth model because this model did not prevent a fall in its GDP, which was even larger than in the USA or France, for example. However, is this model so bad if it allows Germany to carry on consuming in the midst of the most severe recession in 70 years while consumers elsewhere have to tighten their belts considerably?

Figure 3
Standardised “Happiness Index”: the USA and Europe



Sources: Data for growth in consumption extracted from Eurostat, December 2009, and for rates of unemployment from AMECO (database of DG Ecofin, European Commission), December 2009.

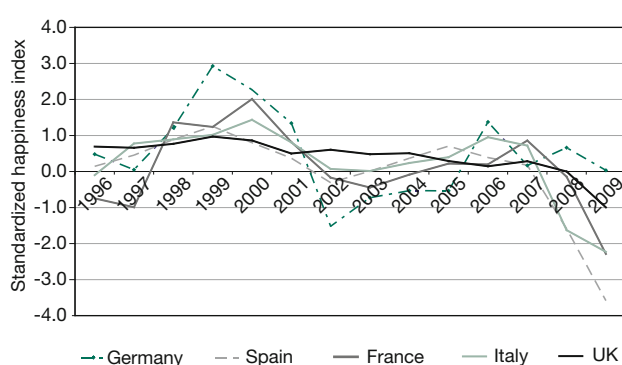
for the financing of temporary part-time work also help to stabilise employment. But other European countries have similar labour market rules. The key difference here is that in Spain most of the increase in employment over the last decade was in low-skilled workers in the construction and tourism industries. Since these sectors are contracting, Spanish enterprises see no reason to retain these workers, who do not possess the highly specialised skills necessary for globally competitive manufacturing. Moreover, these workers were usually hired on the flexible fringe of the Spanish labour market, using temporary or other atypical contracts.

Putting consumption and unemployment together in one index, one obtains a quite different picture from the one revealed by looking solely at GDP. Figure 3 shows a transatlantic comparison of the “happiness index”. This is simply the combination of the growth rate of real consumption and the increase in the unemployment rate with a negative sign. In order to make these two series comparable, they have first been “standardised”⁴ so that a value of minus four means that the index has fallen four standard deviations below its average – which should be an extremely rare occurrence.

Standardising the variables in this way has the advantage of taking into account the expectations of what constitutes a “normal” or acceptable economic performance, which is usually based on actual data over recent years. The “misery” index based on standardised variables thus represents the element of surprise in the combination of negative growth and unemployment experienced by the economies under consideration.

4 In the usual way, that is, by subtracting the mean and dividing by the standard deviation. Mean and standard deviation are computed using observed data over the period 2004–2009.

Figure 4
Standardised “Happiness Index” for Major EU Countries



Sources: See Figure 3.

On this account, Europe does only slightly better than the USA. The difference is small because unemployment is usually much more stable in Europe. Although unemployment increased much less in the euro area than in the USA, this translates into a similar deterioration because, with the lower variance in Europe, such an event is equally exceptional.

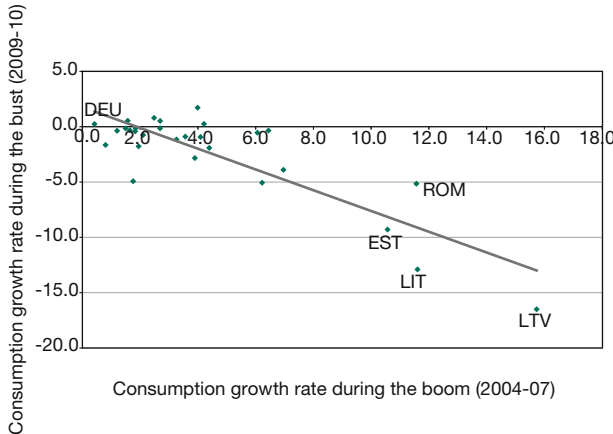
As already discussed above, the euro area data average out both bubble-led (e.g. Spain) and export-led economies, such as Germany. As shown in Figure 4, strong differences exist within the euro area, with a clear hierarchy: Germany is better off than all the others, with little deterioration in its index, while Spain is at the other extreme. Its value of -3.6 implies that the current combination of consumption growth and unemployment is 3.6 standard deviations below the average – which should be an extremely rare event if disturbances are normally distributed. Italy and France are between these two extremes.

Boom and Bust: What Goes Up Must Come Down

The previous section argued that a combination of consumption growth and (un)employment is a better indicator than GDP for measuring the impact of the crisis on the real economy. However, it may be misleading to look at changes in these variables only since the outbreak of the crisis, the reason being that those years do not constitute an appropriate benchmark.

This is obviously true for the availability of credit. By common consent, credit was excessively available during the boom in many countries on the periphery of Europe. Consumption and investment were largely financed by capital flows which, with hindsight, were only forthcoming because risk aversion (and risk recognition) was distorted by the credit boom.

Figure 5
Financial Crisis: Consumption During Boom and Bust in EU Countries



Sources: See Figure 3.

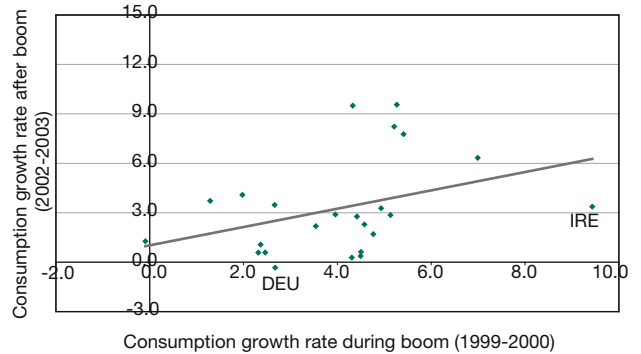
Evidence of this is provided by the consumption paths. Across member countries there is strong negative correlation between the change in consumption over the period 2009-10 and the last two years before the bubble burst: consumption is now falling the most in those countries where it had increased the most during the boom. The Baltic States represent the most extreme case: consumption increased at double digit rates until 2007 and is now also falling at double digit rates. By contrast, consumption is essentially stable in Germany, where it did not increase noticeably even during the bubble years.

Figure 5 plots the data for all EU member countries. The horizontal axis shows the average annual increase in consumption in 2005-2007 (the peak of the bubble), and the vertical axis shows the corresponding values now that the bubble has burst (2009 actual data and forecasts for 2010 by the European Commission).

The present crisis is clearly different from the aftermath of the dot-com bubble, since the correlation between pre- and post-bubble growth of consumption is negative. Figure 6 shows, by comparison, the same data (average annual growth of consumption) for the dot-com boom and bust years. Not only is the correlation positive, there is also much lower cross-country variability during the dot-com episode than now.

As shown in Table 2, data on imports and investment (in equipment) confirm the trend shown by consumption but with deeper swings before and after the crisis. Across EU countries, correlation in import growth rates pre- and post-financial crisis is highly negative and much larger than what was observed at the time of the dot-com bubble,

Figure 6
Dot-com Crisis: Consumption During Boom and Bust in EU Countries



Sources: See Figure 3.

though negative in both cases. In the case of investment growth rates, despite the large positive average before the crisis and the negative one in the years following the bust, correlation is very weak (close to zero) and lower than what was observed at the time of the dot-com bubble. Data simply suggest a generalised fall in investment across all countries during the bust period with all growth rates indistinctly negative and a fall after the bust far larger (in absolute terms) than the increase during the boom. Such behaviour cannot be ascribed to sector-specific effects or adjustments to overinvestment in the previous period (as is likely to be the case in the construction sector), but rather the consequence of global factors, namely the dramatic increase in risk aversion and the dire outlook for the whole economy as a result of the financial crisis.

There is thus clear evidence that in many respects this crisis represented a return to more stable, “normal” conditions. It is always difficult to measure what rate of growth

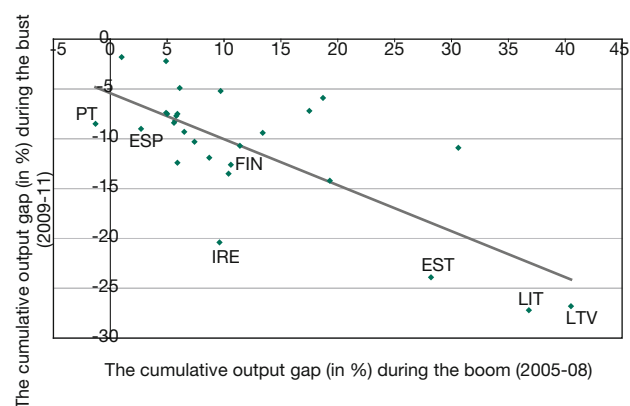
Table 2
Financial Crisis: Imports and Investment in Equipment During Boom and Bust

	Imports		Investment in equipment	
	Boom: 2005-2008	Bust: 2009-2011	Boom: 2005-2008	Bust: 2009-2011
EU	7.0	-6.1	6.4	-10.8
Euro area	6.6	-5.7	6.2	-9.7

Note: EU is the average of the EU27 for imports and of the EU15 for investment. Euro area is the EA16 in the case of imports and the EA12 in the case of investment.

Sources: AMECO and own computations.

Figure 7
Cumulative Output Gap During the Boom and the Bust



Source: European Commission Economic Forecast, 22 October 2009, output gap relative to potential GDP (deviation of actual output from potential output as % of potential GDP 1992-2001).

of consumption (and GDP) would be sustainable. However, there is one variable that gives some information about the extent to which the economy is operating at a “normal” level of activity. This is the output gap. Of course, there are many different measures of the output gap. Here we use the most recent data from the Commission (ECFIN). The data in this respect (shown in Figure 7) portray a similar pattern for consumption: the countries with the strongest boom (highest output gap) also have (and are expected to have) the greatest fall (highest negative output gap).

Of course, a crisis implies adjustment but, by itself, does not just lead to a return to normal conditions. As the boom supported “above normal” levels of activity for some time, large negative output gaps are expected to persist for a while. Table 3 shows the cumulative output gain during the boom represented by the sum of the output gap during the boom years (2005-2008) compared to the loss of output for the first three years of the bust, while Table 4 reports similar (end of period rather than cumulative) data for unemployment.

The key message of this table is that in terms of the output gap, the new members are still in positive territory (overall they benefitted from the “package” boom and bust), whereas “old” member states (and of course the euro area) show a “net loss”.

In terms of unemployment, the crisis seems destined to leave a net negative legacy everywhere with forecasted rates higher than pre-boom levels. Yet as of 2009, new member states, on average, still exhibit a net gain in the

Table 3
Cumulated Output Gap by Country Groups

	Boom: 2005-2008	Bust: 2009-2011	Boom plus bust
Old Members	6.2	-9.6	-3.4
New Members	20.7	-13.0	7.6
EU	6.5	-9.0	-2.5
Euro area	5.6	-8.4	-2.8

Sources: Own computations based on EC Economic Forecast.

Table 4
Unemployment Rate During the Boom and the Bust

	Before the boom 2004	Peak of the boom 2007	2009	Forecast 2011
Old Members	7.1	6.0	8.0	9.2
New Members	10.4	6.4	10.1	11.1
EU	9.0	7.1	9.1	10.2
Euro area	9.0	7.5	9.5	10.9

Sources: AMECO and own computations.

sense that their unemployment rates were still (at 10.1%) somewhat below their values before the boom (2004), when they stood at 10.4%.

As far as financial market indicators are concerned, risk aversion increased dramatically during 2008/9. This explains the sharp contraction in investment and consumption in 2009, but with financial market indicators rapidly returning to average or even better than average pre-crisis values, one would also expect a rapid recovery. However, this is not materialising. One reason can be summarised under the heading “balance sheet constraints”: overly indebted consumers and firms cannot maintain their levels of consumption and investment if they have not worked off their debt beforehand. However, this can only be a partial explanation, because the debt data by sectors⁵ suggest that while firms might have problems, the household sector in the euro area does not appear to be overly indebted (at least not on average).

Another reason is that the credit bubble has been going on for so long that households (and firms) have accumulated an overhang of durable consumer goods (e.g. in some of the new member countries) and of fixed capital (especially housing in Spain and Ireland).⁶

⁵ See C. Alcidi, D. Gros: Why Europe Will Suffer More ..., op. cit.

⁶ See D. Gros: Bubbles in real estate? A Longer-Term Comparative Analysis of Housing Prices in Europe and the US, CEPS Working Document No. 239, Brussels 2007, for estimates of the huge housing overhang in Spain and Ireland.

This is a key point: in analysing the impact of the crisis on the real economy, one must start by understanding the build-up of the bubble that preceded the crisis. In fact, it might turn out to be erroneous to expect that once the recovery starts, the global economy will go back to pre-crisis levels. Those growth rates were to some extent fake and will be attainable again only if new bubbles are fuelled.

That the bubble distorted the view of what is “normal” can also be seen by the fact that the official estimates of the output gap have changed considerably over the last year. For example, the Commission estimated as late as early 2008 that in the preceding year, 2007, the euro area had not substantially exceeded its potential level, as it estimated the output gap for 2007 to be only 0.2% (i.e. the excess of actual output over potential). One year later, after the crisis had broken, the estimate of the output gap for 2007 was revised upwards to 2.5%. This shows how bubbles can distort the view of what is “normal”. The dot-com bubble had a similar effect. In early 2000, it was thought that the euro area economy still had a lot of slack because the output gap was estimated at -2%; today this value has been revised to +1.2% (implying that there was no slack in the euro area economy already in 1999, because actual output was already above potential).

As an aside, we should keep in mind that this overestimation of potential output was at least partially responsible for the overly optimistic targets set in the Lisbon Strategy.

Concluding Remarks

A recurrent theme of this paper is that we should see the present crisis in light of the bubble that preceded it. It is thus inappropriate to look simply at the fall in GDP to measure the severity of the crisis. The current situation should be compared to a pre-bubble period if we are to use a proper benchmark.

Viewing this crisis as a violent adjustment from an unsustainable bubble thus leads to a different perspective. It implies that the recovery will depend not only on financial markets returning to normal, but also on the amount of excess capacity that was created during the bubble. As there might now be significant excess capacity in several sectors (housing, durable consumption etc.) investment might remain sluggish for some time to come. The legacy left by the bubble, more than official “stimulus” programmes, will be decisive for the speed and durability of the recovery.

Michael Biggs and Thomas Mayer

The Output Gap Conundrum

The global economy suffered a severe downturn in 2008 and 2009, and the impact on GDP and macroeconomic policy could be felt for some time. OECD estimates suggest that potential GDP can fall by 1.5% and 2.5% after a recession, and by up to 4.0% after a severe recession.¹ The IMF²² estimates that the permanent loss of output is around 2.5% after currency crises, but as much as 10.0% after banking crises. The recent downturn has probably had a significant impact on global potential output.

The IMF research concludes that while potential output falls after a crisis, potential growth finally returns to its pre-crisis state for most economies. Even this may prove to be too optimistic this time around. In a number of countries (e.g. the USA) it can be argued that total factor productivity growth was boosted by easy credit conditions and a reallocation of resources that gave rise to the build-up of imbalances. If this reallocation of resources is halted as credit conditions tighten, TFP growth rates could fall back to their long-term averages. In the USA, for example, this could take 0.6% off potential growth.

These costs have important implications for the conduct of monetary policy. Conventional measures of the output gap – defined as the difference between actual and potential GDP – point to a very large under-utilisation of capacities in the first quarter of 2009, when economies contracted at record rates worldwide. The US Congressional Budget Office, for instance, estimates the gap for the USA at more than 6% of GDP for 2009 as a whole. These estimates have important implications for the outlook for inflation, the conduct of monetary policy, and investment strategy. If there is a very low degree of capacity utilisation, real GDP could grow at solid rates for many years before inflation risks would return and monetary policy would have to be tightened. At the same time, investors could do without inflation insurance, or even sell such insurance.

However, past experience suggests that estimates of output gaps are very unreliable and that too much faith in these estimates can lead to serious policy (and investment) errors. In a 2002 research paper, Athanasios Orphanides (who now heads the central bank of Cyprus and is a member of the ECB's Governing Council) analysed US

monetary policy during the 1970s, which today is dubbed the period of the Great Inflation.³ He found that “policy decisions were consistent with a ‘modern’ systematic, activist, forward-looking approach to policy. Policy was consistent with an inflation target of 2%....[and]...responded strongly to forecasts of inflation and the unemployment gap, which could have been reasonably expected to result in a high degree of economic stability.” How could things then go so wrong that the result was the Great Inflation instead of economic stability? Orphanides gives the following answer: “...the error in the real-time assessment of the natural rate of unemployment meant that for much of the 1970s policy decisions were based on the incorrect belief that the economy was operating below its full employment potential, while the opposite was true.” In other words, policymakers relied on deeply flawed estimates of the output gap.

Could this happen again? In the following we argue that the risk of over-estimating the output gap (and hence under-estimating the risk of inflation) is considerable. We identify three sources of potential errors related to: (1) estimates of historical developments of potential GDP; (2) estimates of the effect of the recent recession on the level of potential GDP; and (3) forecasts of potential growth after the recession. From our analysis we conclude that inflation risks are higher than presently priced by the markets.

What Was Potential GDP Growth in the Past?

Real-time estimates of the output gap are heavily influenced by estimates of the historical path of potential GDP, and estimates of the latter are subject to considerable uncertainty. In a recent paper, Justin Weidner and John Williams of the Federal Reserve Bank of San Francisco therefore used a different method (pioneered by two other economists) to estimate the output gap for the USA. In this approach, estimates of the output gap are inferred from developments of core inflation.⁴ They find that the Congressional Budget Office's method leads to output gaps inconsistent with the behaviour of core inflation. Specifically, given the very large output gap estimated by the CBO for 2009, US core inflation should have been much

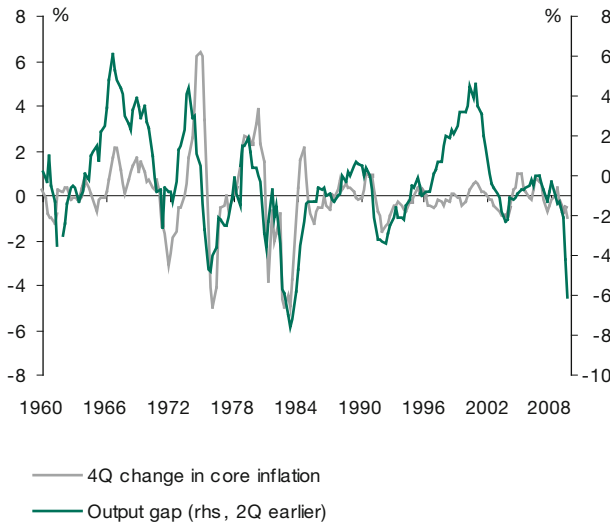
1 OECD Working Paper, No. 699.

2 WEO, 2009.

3 “Monetary Policy Rules and the Great Inflation”, AER Papers and Proceedings 92, May 2002, pp.115-120.

4 “How big is the output gap?”, FRBSB Economic Letter, 12 June 2009.

Figure 1
The Output Gap and Inflation in the USA



Sources: Congressional Budget Office (CBO), Haver, Deutsche Bank.

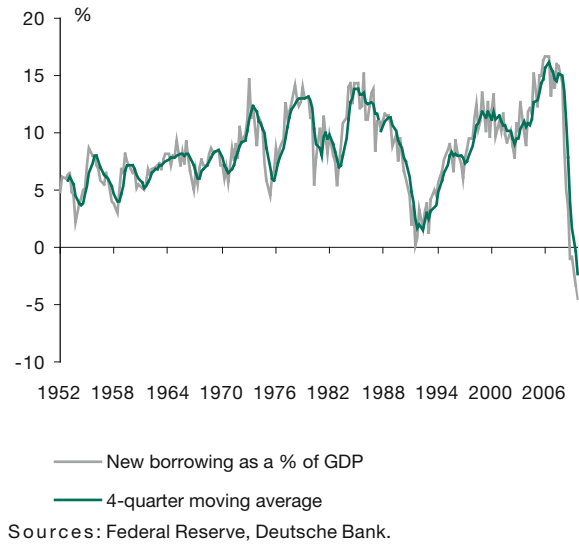
lower. Inferring from core inflation to the output gap gives a gap of only -2.0% for Q1 2009 (compared to the CBO's -6.2%, where a negative sign indicates spare capacity).

This analysis does raise the important point that the output gap may be incorrectly estimated. But in our view this approach places far too much faith in the stable relationship between the output gap and changes in core inflation. The relationship was extremely strong from 1975-1995, but it appears to have broken down over the last 12 years. Inflation increased by less than expected in the late 1990s, and fell by less than expected in Q1 2009. This may have been due to mis-measurement of the output gap in Q1 2009, but it was more likely due to a breakdown in the output gap/inflation relationship in the late 1990s.

In our view one of the weaknesses of both the production function and indirect inflation approach that could cause the output gap to be incorrectly measured is that neither recognises the effects that widening current account deficits and rising debt levels can have on trend growth.

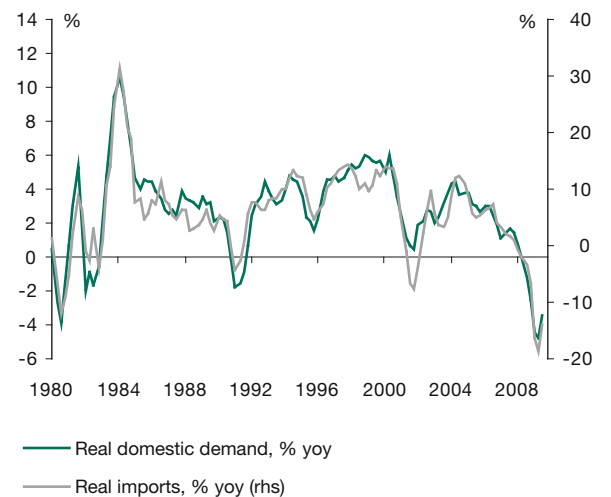
Consider an economy in which the easy availability of domestic and external credit pushes up domestic demand. The increased demand for tradables could be satisfied by increased imports and a widening current account deficit, while the increased demand for non-tradables could be met by a reallocation of domestic resources from the tradable sector to the non-tradable sector. Inflation will stay low and, if productivity growth in the non-tradable sector is higher than in the tradable sector, potential GDP

Figure 2
New Borrowing by the US Non-financial Sector Surged in 1990-2007



Sources: Federal Reserve, Deutsche Bank.

Figure 3
US Domestic Demand Driving Imports

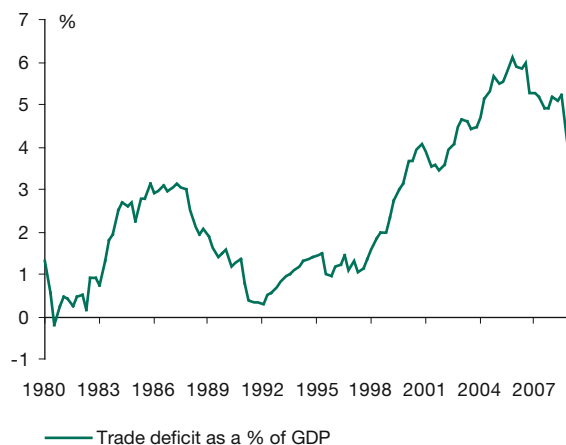


Sources: Bureau of Economic Analysis (BEA), Deutsche Bank.

growth as captured by the production function approach will rise.

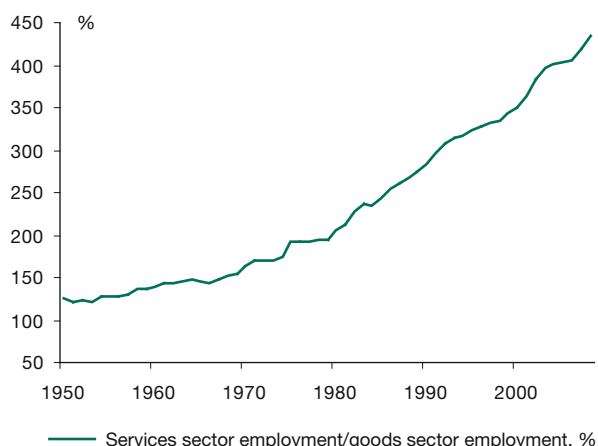
However, this stronger potential GDP growth can only be sustained while credit conditions ease, the current account deficit widens, and debt levels increase. If balance of payments or borrowing constraint started to bind, domestic demand growth would have to fall. This would force a reverse reallocation of resources back to the tradable sector from the non-tradable sector, thereby lowering productivity and potential GDP growth.

Figure 4
Surge in the US Trade Deficit



Sources: Haver, Deutsche Bank.

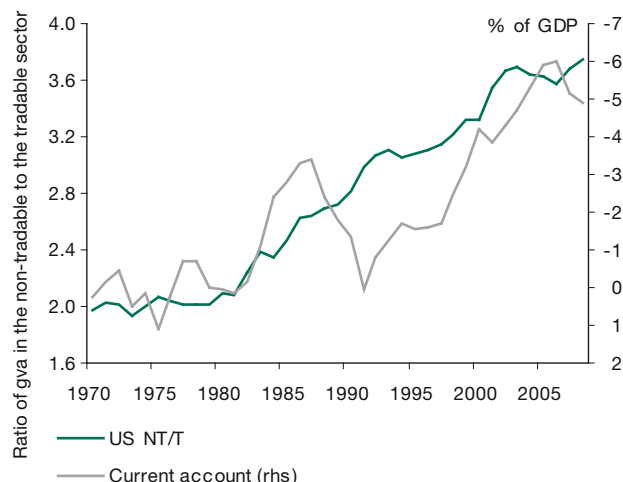
Figure 5
Shift of Resources to the Non-tradable Goods Producing Sector



Sources: BEA, Deutsche Bank.

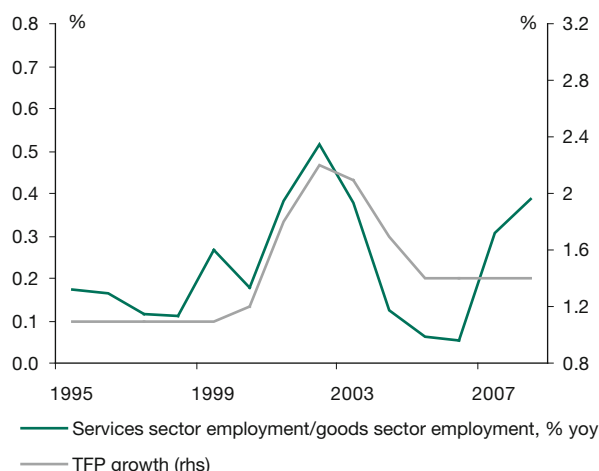
The theoretical case described above can be applied reasonably well to the USA during the 1990s. Easy credit conditions caused new borrowing as a percentage of GDP to increase (Figure 2), which in turn boosted real domestic demand growth. This fed through into imports (Figure 3), causing the trade deficit to widen (Figure 4). The increased demand for non-tradables was met by a reallocation of resources away from the tradable and into the non-tradable sector (Figures 5 and 6), which increased total factor productivity and potential GDP growth (Figure 7).

Figure 6
Shift of Resources to the Non-tradable Goods Producing Sector Correlated with Rising Current Account Deficit



Sources: OECD, Deutsche Bank.

Figure 7
Expansion on Non-tradable Goods Producing Sector Lifting Total Factor Productivity Growth



Sources: CBO, Deutsche Bank.

The above would seem to have been possible as financial innovation and advances in information and communication technology during this period probably boosted productivity growth in the non-tradable goods sector, raising factor returns and attracting resources from exporting and import competing industries. As a result, capital and labour inputs released in the traded goods sector due to substitution of domestic products by imports and reallocated to the non-traded goods sector lifted potential GDP growth. While it may be difficult to measure these

productivity growth differentials ex-post (we would not like to put too much weight on Figure 7), the reallocation of resources away from the tradable to the non-tradable sector suggests that at least ex-ante the returns to factors of production must have been higher in the non-tradables sector.

For the period 1992 to 2006, 3.5% real domestic demand growth gave rise to 8.1% growth in real imports, while growth in exports was more limited at 5.8% and the trade deficit widened throughout the period (Figure 4). If a tightening in domestic and external credit conditions meant that the current account deficit had to stabilise, import growth would have fallen to 5.8% in line with export growth. By our estimates, based on data from 1980 to 2009, a 1.0% decline in import growth would have had to be accommodated by a 0.45% - 0.55% decline in real domestic demand growth. Import growth of 5.8% would have meant domestic demand growth of 2.2% - 2.5%. This would have implied real GDP growth of a similar magnitude (as the contribution from net exports would have been zero), against actual real GDP growth during the period of 3.1%.

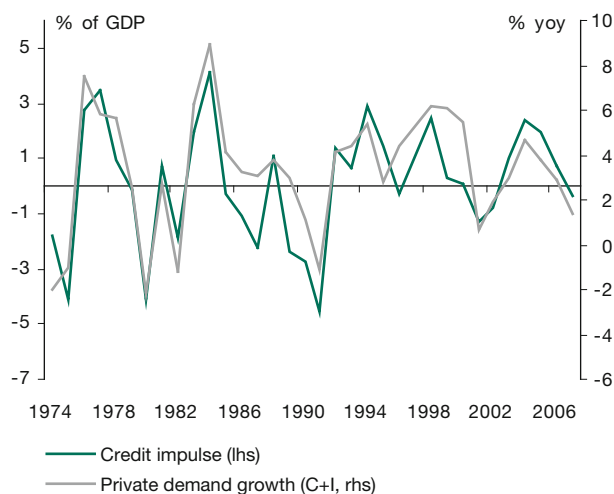
To approach the same problem from a different angle, we have argued before that real domestic demand can be boosted by an increase in net credit flows (which we dub a positive “credit impulse”).⁵ On average we would expect the credit impulse to be mildly positive as developments in the financial sector allow higher borrowing levels, but from 1996 to 2006 it averaged 1.0% of GDP. As Figure 8 shows, this positive credit impulse boosted real private sector domestic demand growth. More importantly in the context of the argument above, the credit impulse boosted real domestic demand growth in excess of real GDP growth, which implied a widening in the external deficit (Figure 9).

If the credit impulse had been only a small positive (as we would expect on average over time) rather than the robust 1.0% of GDP, by our estimates real GDP growth over this period would have been 2.7% rather than 3.1%. This suggests that in the absence of these external stimuli, potential growth from 1992-2006 was probably no more than 2.7%.

The two approaches on balance suggest that if US GDP had followed a more sustainable growth path, potential growth from 1996 to 2006 may have been 2.2% - 2.7%, rather than the 3.1% actually recorded. If capacity was created in these sectors that depended on very strong

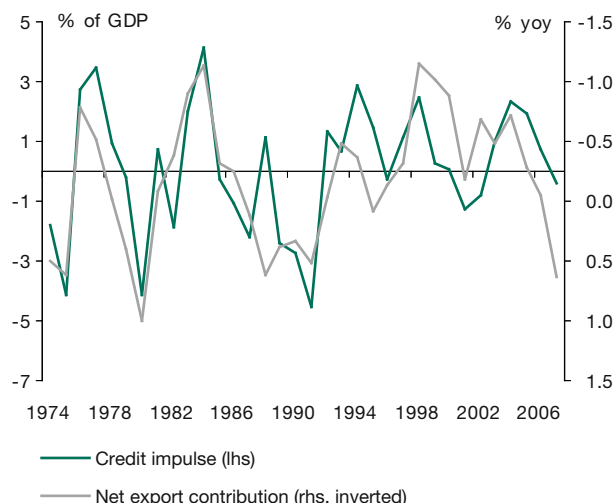
5 Cf. M. Biggs, T. Mayer: The Myth of the credit-less Recovery, Deutsche Bank, Global Macro Issues, 17 December 2009.

Figure 8
US Private Demand Growth and the Credit Impulse



Sources: BEA, Federal Reserve, Deutsche Bank.

Figure 9
The US Credit Impulse and Net Exports



Sources: BEA, Federal Reserve, Deutsche Bank.

credit-driven real domestic demand, then the removal of this credit could cause this capacity to be rendered obsolete.

What is the Effect of the Recession on the Level of Potential GDP?

A commonly held view is that potential GDP is unaffected by a downturn of actual GDP. During recessions, the latter dips temporarily below the former, catches up again during the upswing and finally exceeds potential during the phase of overheating, before entering the next recession.

sion. However, recent analysis by the OECD of a number of historical episodes suggests that recessions also depress the level of potential GDP by between 1.5% and 2.5% on average (and up to 4% for severe crises).⁶ The reason for the drop in potential GDP is that economic downturns make part of the capital stock obsolete and increase the unemployment rate consistent with stable inflation as the size of some industries is permanently reduced. Since it takes time to relocate resources potential GDP can be lower than before for some time, especially when the downturn is as long and severe as the recent one. In its Economic Outlook from mid-2009 the OECD estimates that shrinkage in the capital stock during the present recession could shave 2% off the level of US potential GDP.

In our view, this argument is reinforced by the above analysis. In the USA, excessively strong credit growth drove strong demand and robust GDP growth, but this growth path depended critically on rising debt levels and a widening current account deficit. In this process significant capacity was built up in residential construction and various financial services, but this capacity could only be utilised as debt and current account balances moved to unsustainable levels. Above we suggested that sustainable potential growth might have been significantly below the estimated levels. If we assume for a moment that past potential growth estimates were correct, then we could conclude that the current crisis is destroying big chunks of capacity in these sectors, inducing a massive plunge in the level of potential GDP.

In the previous section we argued that potential growth from 1996 to 2006 may have been overestimated on average by at least 0.4% per year. This would have left potential GDP overestimated by at least 4.0% in 2006, which is broadly the amount of capacity the OECD argues could be destroyed in a severe recession. Thus, the true output gap may have been 5% in 2006 instead of the 1% estimated by the OECD on the basis of the production function approach.

What is the Effect of the Recession on Potential GDP Growth?

The empirical evidence of the effect of recessions on the subsequent growth of potential GDP is mixed. According to an analysis of eleven countries by the EU Commission (published in their Quarterly Report II/2009), potential growth fell after recessions in about half the cases con-

sidered and increased in the other half. However, given the severity of the present downturn and the unfavourable demographic outlook, we see a high risk that potential growth will be lower in the future.

In the context of a production function, the drivers of potential GDP will be the labour force, the capital to labour ratio and total factor productivity. Firstly, both the CBO and OECD see labour force growth in the USA falling from 1.1% to 0.6% by 2011 and 0.5% by 2015. This decline, while not an impact of the recent recession, would take 0.6% off potential GDP growth.

Secondly, total factor productivity growth over the last decade has averaged 1.5%, and this contributed significantly to strong growth rates. As we argued earlier, the stronger TFP growth was probably due at least in part to a shift in resources from the tradable to the non-tradable sectors of the US economy, which was matched by a widening in the current account deficit. If this reallocation were to end, TFP growth would probably slow. TFP growth averaged 1.0% in the three decades prior to this one, and 0.8% from 1975 to 2005. A moderation in TFP growth towards these levels seems likely in the future.

If we assume that returns to capital must remain stable over time, then, within the context of a Cobb-Douglas production function framework, potential growth is:

Potential GDP growth = $1/(1-a)$ *TFP growth + labour force growth

where “a” is the capital share in the economy. If we assume that potential labour force growth is going to be equal to the 0.5% the CBO estimates, then potential growth will be a function of the capital share in the economy and TFP growth. Possible outcomes are shown in Table 1.

Table 1
US Future Potential Growth Estimates

Capital share	Total factor productivity growth			
	0.6	0.8	1.0	1.2
0.3	1.4	1.6	1.9	2.2
0.4	1.5	1.8	2.2	2.5
0.5	1.7	2.1	2.5	2.9

Source: Deutsche Bank.

⁶ See D. Furceri, A. Mourougane: The Effect of Financial Crises on Potential Output: New Empirical Evidence from OECD Countries, OECD Economic Department Working Paper, No.699, 2009.

In our view a capital share of around 0.3% - 0.4% would appear appropriate, and the most likely outcome for future TFP growth would be in the 0.8% - 1.0% range. If these ranges are correct, we would expect future potential real GDP growth to be in the range of 1.6% - 2.2% (grey cells in Table 1).

So far we have assumed no change in returns to capital. However, the present recession marks the end of a longer expansion based on credit-driven demand growth in a number of (mostly Anglo-Saxon) countries. As credit is unlikely to be as cheap and readily available again for any country in the future, capital stock growth is likely to be lower. The “capital shallowing” could lower real potential growth further, probably to 1.5% in the USA. All in all, the above considerations suggest reasonable ranges for potential growth in the USA of 1.5% - 2.0%. Following similar reasoning, we expect growth of 1.0% - 1.5% for the euro area.

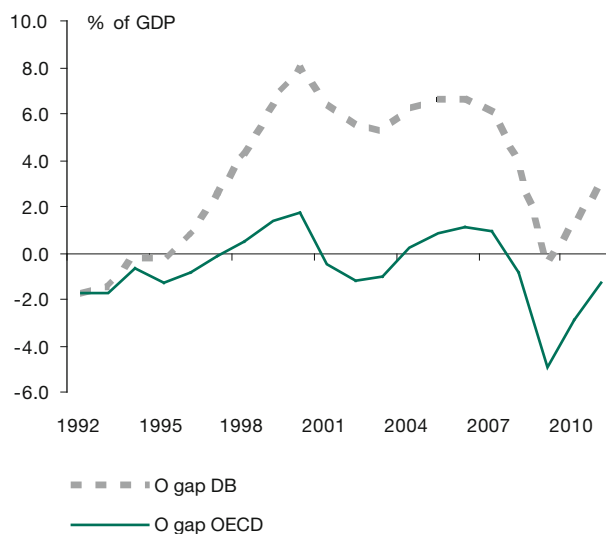
Our estimates point to a loss in potential growth in the USA between 1 and 1.5 percentage points from the pre-crisis rate. This is roughly in line with IMF estimates of the effects of banking crises on potential GDP. Analysing 88 banking crises, the IMF found that seven years following the crises potential GDP was on average 10% below the level it would have attained if growth had continued at the pre-crisis rate, which implies a drop in the annual trend rate of growth by about 1.5 percentage points.⁷

Alternative Output Gaps

Based on the discussion above we compare in this section conventional estimates and forecasts of output gaps with an alternative path based on different past estimates of potential GDP and taking into account possible effects of the present downturn on the level and growth rate of potential GDP. To represent the conventional output gap we use the OECD series for real potential GDP from the latest Economic Outlook (suggesting annual average potential growth of 3.1% in 1992-2006). Our alternative measure for the USA is based on the assumption that potential GDP growth averaged only 2.7% between 1992 and 2006 when credit-financed net imports artificially lifted average growth rates, and that it will average 1.75% as of 2008. We use Deutsche Bank’s latest US GDP forecasts for 2009-2011 (-2.5%, 3.6%, 3.3%) to calculate the predicted output gaps.

⁷ See IMF: World Economic Outlook, October 2009.

Figure 10
Alternative Estimates of the US Output Gap



Sources: OECD, Deutsche Bank.

Figure 10 shows two paths for the output gap in the USA (with negative numbers indicating under-utilisation of capacities). The conventional OECD measure puts the output gap at -2.9% in 2010, safely below any level that could raise inflation worries. Our alternative estimate based on the assumptions that potential growth during the 1990s was only 2.7% and potential growth drops to 1.75% as of 2008 shows an output gap of +1.3% for 2010. The positive output gap in 1996-2008 indicates that GDP growth during this period, which was characterised by asset price inflation and numerous financial bubbles, was way above the rate sustainable in the long term.

Conclusion: Inflation Risks Higher than Generally Expected

Past experience has shown that estimates of the output gap are highly uncertain and that reliance on such estimates for the conduct of economic policy (or for investment decisions) can lead to serious errors. The present extraordinary downturn in the wake of the burst of a global credit bubble would seem to make output gap estimates even more uncertain. Our simulations have demonstrated that output gaps could be very narrow and somewhat stronger-than-expected economic recovery could raise inflation pressures. If central banks were then prevented from exiting extremely easy policies quickly by worries about financial stability or fiscal solvency, inflation expectations could become unanchored.

Bart van Ark

Productivity, Sources of Growth and Potential Output in the Euro Area and the United States

The measurement and analysis of potential output depends crucially on the long-term growth trend of productivity. In combination with the development of the labour supply, potential output determines the highest possible level of output which could be achieved by the potential labour force (assuming some natural rate of unemployment) and the capital stock that can be employed, without inflationary pressures, and given the state of technology.

However, the actual measurement and analysis of the output gap is a tricky business. This is in part related to measurement issues with regard to actual output. In the light of the prelude to the current crisis, it is especially important to look at the reliability of measures of ICT production and services output, which have been among the key drivers of rapid growth during the late 1990s and early 2000s. The other problem with output gap analysis is that there are many moving parts (actual output, potential output and the drivers of both), which has important implications for the interpretation.

Currently there is strong evidence that a large output gap, i.e. a fall in the level of output relative to the potential output level has arisen as a result of the recession which started in late 2008. But the various estimates differ strongly. For example, according to the Congressional Budget Office the output gap in 2009 has been estimated to be as high as 6% in the USA.¹ The OECD put the US output gap at -4.9% and for the Euro Area at -4.5% in 2009.² The European Commission, in its Autumn Forecast, arrived at only 3.5% for the USA and 2.9% for the Euro Area.³ Similar differences arise for the output gap estimates for 2010 and beyond. These are partly the result of varying forecasts of actual output growth. Some forecasts suggest that the economies in the USA and Europe may recover rapidly in 2010 as the recession effects wane, so that the output gap may close within a year or two. Others argue that we will face several years of overcapacity of labour and capital, low inflationary (if not deflationary) risks and easy monetary policy. At least as important for the output gap estimates is the level of potential output

and its change over time. One argument is that the potential output growth rate itself may have come down under the influence of the crisis, thereby shrinking the size of the output gap. Long recessions, such as the current one, may bring economies to a lower growth mode than before the recession. In this light it is also important to revisit the potential output growth before the recession.

In this note we aim to shed some light on the causes of the past acceleration in potential output growth, the recent slowdown and the impact on output gap measures from the perspective of productivity, which is a key component in potential output measures. In the next section we focus on the actual measures of output and productivity growth, and the growth contributions during the past 15 years. Following that we discuss the implications of the recent productivity measures for the measurement and interpretation of potential output growth.

Recent Productivity Developments and the Long-run Trend

Productivity is pro-cyclical, and one should therefore not be surprised by the significant productivity decline that the world economy has experienced in 2009. According to the latest estimates by The Conference Board (January 2010), output per person employed declined at 1% on average for the global economy, and at 1.2% for the advanced economies (mostly OECD).⁴ Output falls more rapidly than employment when entering the recession. Hence productivity growth slows. In per-hour terms, the labour productivity slowdown is somewhat more moderate, as (in particular during the current recession) firms not only – or even not primarily – cut employment, but the working hours of employees who remain on the payroll. For example, the drop in output per person employed in the Euro Area was 2.2% in 2009, but in terms of output per hour it fell by only 1%, because labour input declined not only due to job cuts at 1.9%, but also because average hours per person fell by another 1.2% (Table 1).

One major exception to the stylised fact of pro-cyclicality was the productivity performance of the United States in 2009, which showed a growth rate of +2.5% in per-hour terms. American firms cut jobs much more aggressively

¹ Congressional Budget Office, 2009.

² OECD: OECD Economic Outlook, Paris, November 2009.

³ European Commission: European Economic Forecast, Brussels, autumn 2009.

⁴ See <http://www.conference-board.org/economics/database.cfm>.

Table 1
Growth of Labour Productivity, Real GDP and Labour Input, 1995-2010

	United States	Euro Area	United States	Euro Area
	GDP per hour		Real GDP	
1995-2004	2.5	1.5	3.3	2.2
2004-2007	1.5	1.1	2.6	2.5
2008	1.4	0.1	0.4	0.6
2009 (estimate)	2.5	-1.0	-2.5	-4.1
2010 (projection)	3.0	2.0	2.3	0.8
	Persons Employed		Total Hours Worked	
1995-2004	1.2	1.2	0.8	0.8
2004-2007	1.6	1.4	1.3	0.1
2008	-0.4	0.7	-0.9	0.4
2009 (estimate)	-3.6	-1.9	-5.1	-3.1
2010 (projection)	-0.7	-1.2	-0.7	-1.1

Note: Growth rates are based on the difference in the log of the levels of each variable.

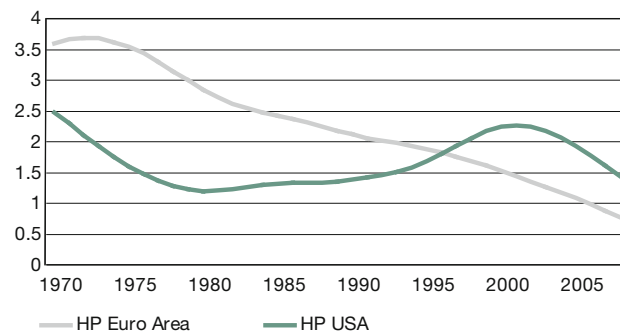
Source: The Conference Board Total Economy Database, January 2010.

than in the Euro Area (3.6% versus 1.9%) and in addition reduced the working hours of those remaining on the payroll by 1.5% (versus 1.2% in the Euro Area). For 2010, US productivity is projected to grow even faster at 3% as output recovers but employment continues to drop, albeit at a diminished rate relative to 2009. In Europe, productivity is also likely to return to positive growth rates in 2010 with lesser but still negative labour hours growth relative to 2009.

Is the cyclical recovery in productivity growth also the beginning of a reversal in the long-term trend for both economies? This is an important question to answer because the productivity trend, together with the long-term development of the labour force, determines the change in potential output. Indeed the Euro Area has shown a long-term declining trend in productivity growth since the mid 1990s, but was joined by the United States in 2004 when that country's productivity growth rate also began to slow compared to previous years (Figure 1).

To answer the question as to whether the long-term declining productivity trend might reverse coming out of the recession, we first need to look at what constituted the productivity trends before the recession. Especially, we need to focus on the sources of output and productivity growth, from both an aggregate as well as an

Figure 1
Labour Productivity Growth Trend
 (Output per Hour Worked)



The trend is based on a Hodrick-Prescott filter using a smoothing of $\lambda=100$, as is customary for annual data.

Note: Data for Euro Area start from 1990. We link the EU15 growth rate to the Euro Area growth rate for the years before 1990.

Source: The Conference Board Total Economy Database, January 2010.

industry perspective. The latter can be done by making use of the latest estimates of the EU KLEMS Growth and Productivity Accounts, released in November 2009, which provides estimates by industry group up to 2007.⁵ As aggregate estimates for the Euro Area are not yet available, we compare the sources of output growth for the market economy in France and Germany relative to the United States, and separately for major sectors (manufacturing, construction, distribution – including the retail and wholesale sectors and hotels and restaurants – and finance and business services) (Table 2). The table compares the contributions of these growth sources by sector for 1995-2004 (before the trend slowdown in the USA) and 2004-2007 (the slowdown period, before the recession).

Whereas European countries have experienced a declining trend in labour productivity for several decades now, the United States saw an upward trend beginning in 1995, due to a rise in ICT production and ICT investment in services, in particular in the distribution sector.⁶ While there has been general agreement on the growth contribution from ICT productivity and investment, the strong productivity growth in the US services sector has been challenged, as it could have been the result

⁵ See www.euklems.net.

⁶ B. van Ark, M. O'Mahony, M. P. Timmer: The Productivity Gap between Europe and the USA: Trends and Causes, in: Journal of Economic Perspectives, Vol. 22, No. 1, Winter 2008, pp. 25-44.

Table 2
Sources of Growth, 1995-2007

	Percentage point contributions from					
	Value added	Hours	Labour quality	ICT capital	Non-ICT capital	TFP growth
France, 1995-2004						
Market economy	2.5	0.4	0.4	0.4	0.5	0.8
Manufacturing	2.1	0.3	0.4	0.3	0.6	0.6
Construction	2.6	-0.4	0.3	0.3	0.3	2.1
Distribution	2.4	0.8	0.4	0.3	0.6	0.4
Finance & business serv.	2.9	1.7	0.4	0.8	0.9	-0.9
France, 2005-2007						
Market economy	2.4	0.5	0.2	0.2	0.5	1.0
Manufacturing	3.0	3.1	-0.1	0.1	0.9	-0.9
Construction	3.0	3.1	-0.1	0.1	0.9	-0.9
Distribution	2.6	0.0	0.3	0.2	0.6	1.5
Finance & business serv.	3.8	1.4	0.1	0.3	1.0	1.0
Germany, 1995-2004						
Market economy	1.1	-0.5	0.1	0.5	0.5	0.4
Manufacturing	1.4	-0.2	0.1	0.4	0.7	0.4
Construction	3.1	0.2	0.3	0.3	0.5	1.8
Distribution	1.8	-0.4	0.1	0.3	0.3	1.5
Finance & business serv.	1.4	1.5	0.1	1.5	1.6	-3.4
Germany, 2005-2007						
Market economy	2.4	0.2	-0.2	0.4	0.4	1.6
Manufacturing	-1.7	0.2	0.1	0.0	-0.5	-1.5
Construction	-1.7	0.2	0.1	0.0	-0.5	-1.5
Distribution	2.4	0.0	-0.3	0.4	0.5	1.8
Finance & business serv.	3.9	1.4	-0.4	0.9	1.1	0.9
United States, 1995-2004						
Market economy	3.8	0.4	0.3	1.1	0.5	1.4
Manufacturing	3.2	0.6	0.2	0.8	0.8	0.7
Construction	1.9	-1.0	0.4	0.6	0.5	1.4
Distribution	5.2	0.4	0.3	0.8	0.4	3.2
Finance & business serv.	4.6	1.2	0.4	2.1	0.9	-0.0
United States, 2005-2007						
Market economy	2.7	1.1	0.2	0.6	0.4	0.4
Manufacturing	2.5	0.9	0.2	0.5	0.7	0.2
Construction	-5.6	2.5	-0.3	0.3	0.4	-8.5
Distribution	0.8	0.6	-0.0	0.6	0.5	-0.9
Finance & business serv.	7.4	3.1	0.4	1.0	0.4	2.6

Source: EU KLEMS Database, November 2009.

of extraordinarily high consumer expenditure fuelled by cheap household credit.⁷ Applying this argument to the distribution sector, it seems that scale effects

7 Michael Biggs, Thomas Mayer: The output gap conundrum, in: *Intereconomics*, Vol. 45, No. 1, 2010, pp. 11-16.

from increased demand may have played some role in productivity for the distribution sector. But it is difficult to relate this directly to increased household debt in the United States. The acceleration in retail output and productivity occurred mainly during the late 1990s and early 2000s, while most of the rise in household debt occurred later, from 2003-2007. At the same time there has been significant evidence of genuine technology and innovations effects on productivity in the retail and wholesale sectors, due to extensive ICT applications during the late 1990s and early 2000s. This has been an important contributing factor to the rise of highly productive “big box” retail outlets in the United States. Moreover, retail prices in distribution have also come down rapidly as a result of cheaper goods from emerging economies, providing consumers with an additional gain.⁸

Since 2004-2007 the United States saw a slowdown in productivity growth and joined the Euro Area, which has seen a long-term decline in the productivity trend since the 1970s. This growth slowdown in the USA was related to an output and productivity decline in manufacturing, construction and distribution services, with financial and business services being the main exception. In contrast to distribution, the finance and business services sector in the United States experienced a significant acceleration in its output and productivity performance since 2004. While part of this acceleration may be the result of output gains in finance, including securities, its impact on the aggregate result is limited. In fact the aggregate financial industry in the USA showed no acceleration in output growth after 2004, as the slow growth in insurance output offset the acceleration elsewhere in the financial sector. In contrast, business services accelerated growth from 4.8% from 1995-2004 to 9.8% from 2004-2007. Productivity growth in business services also accelerated more after 2004 (3.2%) compared to financial services (1.7%).

In Europe (exemplified by France and Germany), the productivity trend has continued to decline after 2004. However, in both countries, the major service sectors, distribution and finance and business services, showed an improvement in output and productivity performance since 2004. This partly reflected a peak in the business cycle and some delayed effects of ICT technology on those industries in Europe.

8 R.H. McGuckin, M. Spiegelman, B. van Ark: The Retail Revolution. Can Europe Match USA Productivity Performance?, in: Research Report R-1358-05-RR, The Conference Board, New York 2005.

Table 3
Potential Output and GDP Growth Rates, USA and Euro Area

	United States	Euro Area
Potential output growth, 2000-2004	3.3	2.0
Potential output growth, 2004-2008	2.6	1.9
Potential output growth, 2011-2016	2.3	1.6
GDP growth projected, 2011-2016	2.0	1.0
Required growth to close output gap	3.7	3.2
1995-2005 GDP growth	3.2	2.1

Source: The Conference Board, November 2009.

In sum, one cannot assign the productivity gains in services primarily to an increase in household debt, because of the differences in timing and sector effects. Instead technology and innovation and lower prices seem to have been the major sources of productivity growth. There is strong evidence that the labour productivity growth acceleration in the late 1990s and early 2000s was related to the ICT boom and rapid installment of ICT capital across the economy. This technology gain was strongest in the USA as a result of the strength of the IT industry as well as the rapid increase in use of IT in services industries, especially in distribution and finance and business services. While the dot-com bubble and the rise in household consumption may have played a temporary role in speeding up the productivity gains due to scale advantages, the ICT technology effects must be regarded as genuine and permanent as they don't disappear during a crisis. The long-term productivity growth rate for the Euro Area seems to have been lower than in the United States as technology did not transfer as easily into output and productivity growth. However, since 2004 the United States also saw the opportunities for ICT applications decline, leading to an erosion of productivity gains in service industries. As a result potential output growth seems to have gradually slowed since the mid-2000s.

The Impact of Productivity on Potential Output

Productivity, together with the long-term development of the labour force, is the main determinant of potential output. During the late 1990s, potential output growth in the United States was above 3%, but it gradually slowed to around 2.6% on average since 2004, mainly as a result of the slowdown in productivity growth. In the Euro Area potential output growth was much lower, at around 2%

for most of the decade before the recession (Table 3).⁹ The strong increase in household debt since 2003 may have increased consumption to unsustainable levels, but there is little evidence that this translated into higher productivity growth during that period.

However, in going forward there may be a significant effect of the current recession on the potential output level, because its growth rate is not a constant in the medium term. In particular, if the recovery from the recession is slow, idle machinery may get scrapped prematurely, and discouraged job-seekers may drop out of the labour force definitively. More important, incentives for innovation may drop and slower productivity growth occur. Because of the large systemic effects of the current global financial and economic crisis, the growth of potential output is likely to slow to 2.3% in the United States, and to 1.6% in Europe from 2011 to 2016.¹⁰ As a result, the output gap may narrow faster than expected. However, even after lowering the potential output growth, the projected growth rates for GDP are still lower than for potential output. For example, The Conference Board's medium-term projection of actual output growth in the United States is 2% for the period 2011-2016, and only 1% in the case of the EU. In order to close the output gaps by 2016, the actual growth in the USA would have to be 3.7% from 2011-2016, and in Europe 3.2%. For comparison, these are much higher growth rates than those achieved during the "rapid growth phase" from 1995-2005. As the underlying trend in labour force growth is likely to be slow, most of these effects would have to come from productivity growth, which seems a big challenge.

To conclude, there is good reason to adjust the long-term US productivity growth rate downwards. The structural problems which the US economy is facing may hold recovery back and therefore lead to a gradual erosion of productivity. The European Union will also need to address remaining structural problems before the productivity trend is likely to strengthen. A continuation of growth initiatives as implemented through the Lisbon agenda, such as the strengthening of technology and innovation and continued reforms in product markets, especially in services, will be crucial elements of the upcoming Europe 2020 agenda.

⁹ B. van Ark, K. Bostjancic: Economic growth in the EU in the age of globalisation: issues and policies, The Conference Board, 5 March 2009, available at http://ec.europa.eu/dgs/policy_advisers/docs/van_ark1.pdf.

¹⁰ B. van Ark: Global Economic Outlook 2010 and Beyond, StraightTalk, The Conference Board, November 2009.