Péter Gábriel and Gergő Motyovszky: Possible impacts of the financial crisis on potential output*

In a normal economic cycle, monetary policy decisions are not influenced directly by the size of potential output. In making their decisions, central banks take into account the difference between potential and actual output, i.e. the size of the output gap, which shows the cyclical position of the economy and is one of the main determinants of inflationary pressure. The underlying observation is that monetary policy is unable to influence the trend of potential growth, and it is rather only able to smooth cyclical fluctuations in aggregate demand. At the same time, in the case of a major and persistent economic downturn, when it is possible that permanently falling demand reduces the supply potential as well, by influencing demand and the length of the crisis, a more expansive monetary policy may have an indirect impact on the supply side as well, and may mitigate the damage to potential output. In order to maintain price stability and support recovery from the crisis, it is of key importance for monetary policy to know the size of the output gap and the expected path of potential output.

Following the outbreak of the crisis, the output of most economies declined considerably. The recovery is slow and fragile, and the trend of expansion to be followed by economies after the crisis subsides is uncertain. This study describes the channels through which the financial crisis may have affected potential output and outlines some possible scenarios in connection with longer-term developments in potential output.

INTRODUCTION

As a result of the financial and economic crisis that began in 2008, the majority of the countries in the developed world have suffered the most severe recession since the Great Depression of the 1930s. Recovery from the crisis has been slow, and the output of several economies has not even reached its pre-crisis level. Expansive demand-side economic policy has done a lot to reduce the magnitude of the recession, but the crisis is still very protracted. According to some opinions, the sluggishness of the recovery is attributable to the exceptional strength and size of the financial crisis as well as the insufficiency of economic policy responses. At the same time, many argue that the low growth rate has become persistent not only as a consequence of the decline in demand, which was believed to be temporary, but also because the trend of economic output has also shifted downwards considerably as compared to its pre-crisis level. Moreover, the potential growth rate may also have declined permanently.

Changes in the trend of output are of great importance in terms of monetary policy as well. If potential output has really declined, the size of oversupply in the economy and thus disinflationary pressure as well may be significantly lower than previously thought by central banks. This would also explain why the decline in inflation was not greater and more permanent in parallel with the deep recession and the slow recovery. If the output gap closes, inflationary pressure may strengthen even while growth is weak, and this influences how long the loose monetary policy can be maintained without jeopardising price stability.

At the same time, monetary policy must also take into account that in the case of a major economic downturn the trend of economic output is not necessarily independent of developments in demand. If the length of the recession and the fall in demand also significantly affect potential output, stimulation of aggregate demand by monetary policy may moderate the permanent downswing on the supply side. Accordingly, in the case of a major economic downturn,

* The views expressed in this article are those of the author(s) and do not necessarily reflect the offical view ot the Magyar Nemzeti Bank.

monetary policy may have an indirect impact on the supply side of the economy as well. Therefore, it is also important for central banks to map out the extent to which the decline and flattening in the trend of output observed during the crisis are attributable to the fall in demand or to other factors. If demand side factors dominate, it may be worthwhile to consider intensifying monetary easing (even temporarily allowing relatively high inflation), as an upswing in demand may prevent potential output from becoming permanently damaged (Thoma, 2012). If the decline in potential output is mainly attributable to a permanent, structural change in the economy, a similar step would only generate inflation and would have less of an impact on potential output. Longer-term inflation risks may also increase if the damage to potential output was caused by temporary factors. If inflation expectations are not adequately anchored, temporary toleration of higher inflation may cause problems over the longer terms as well.

Based on the above, the size of and expected changes in potential output are of key importance in terms of monetary policy as well. However, potential output cannot be observed directly; it can only be estimated indirectly, on the basis of various theoretical considerations, and its forecasting is also very uncertain. The objective of this study is to discuss the possible effects of the crisis on the production capacities of the economy and the permanence of these effects. For this, the various definitions of potential output are first clarified, and then the possible channels of the impact of the crisis are presented in detail. This study focuses on the debate on the developments in potential output in developed countries (mainly in the United States) and its monetary policy relevance, but may provide lessons for Hungarian monetary policy as well.

VARIOUS CONCEPTS OF POTENTIAL OUTPUT

There are various definitions of potential output, which may even cover significantly different concepts. The common feature of all definitions, however, is that they attempt to capture the supply side of the economy under the title 'potential output'. Accordingly, it can be interpreted as some kind of production capacity of the economy. By contrast, actually measured GDP is also influenced by the aggregate demand present in the economy. Aggregate demand always equals aggregate supply, but the *utilisation* of supply capacities may be different from 'normal', and the goal is to capture this latter aspect under the term 'potential output'. The difference between actual and potential output, the so-called output gap is the difference between supply capacities attainable in the case of current demand and normal utilisation, and it is an important indicator of the cyclical position of the economy. The above, rather general definition of potential output can be interpreted in several ways. The difference between the various approaches typically lies in what they mean by 'normal' capacity utilisation. The various approaches may result in considerable numerical differences as well in the estimation of both potential output and the output gap.

The most important objective of monetary policy is the maintenance of price stability. Therefore, for central banks measuring potential output and the output gap is mainly important in terms of measuring and forecasting inflationary pressure. The production capacities available in the economy are typically defined in a narrower sense by central banks, as they only take account of the capacities that can start production already in the near term. Moreover, they define potential output as output in the case of 'normal' utilisation, i.e. the level of production capacity utilisation which can be sustained over the long term. The difference between potential output defined as above and actual output can be explained well by fluctuations in aggregate demand and is one of the main determinants of inflationary pressure. In this approach, potential output may also be defined as the level of GDP that can be achieved and maintained using the production factors available in the economy without creating inflationary pressure (ECB, 2011).[1]

In another approach, potential output means the long-term trend of GDP. This is determined by structural factors in the economy, such as technological progress, the rate of population growth, the institutional system of the economy (protection of private property and contracts, educational system, market regulations, predictable economic policy), and the structural policies that change these factors, and by the structural characteristics and rigidities of the various markets (ECB, 2011). The majority of these factors only change slowly over time, and therefore the trend calculated based on them also only changes slowly. Actual output may be significantly different from potential output defined as above for a longer period as well. This approach can mainly provide useful information for economic policy questions, answers to which require a longer-term forecast

[1] It is important to emphasise here that this does not mean the output achievable in the case of the 'maximum' utilisation of production capacities in the literal sense. It is conceivable that if demand increases suddenly, the economy is *physically* able to reach this level of output, but only in parallel with generating higher inflationary pressure (Okun, 1962). This status, however, is not sustainable, as the adjustment of prices will eventually reduce demand as well (unless inflationary pressure is maintained by further demand shocks). Accordingly, 'normal' utilisation of supply capacities is identical to the lack of inflationary pressure.

of GDP (which may even exceed a period of ten years). This includes the issue of the sustainability of government debt, in respect of which GDP developments constitute one of the most important factors.

Box 1
Definition of the output gap according to a New Keynesian approach

In terms of developments in inflation, a shorter-term concept of potential output is also considered relevant by the New Keynesian school. In this model framework, the deviation of actual GDP from potential output is allowed by the stickiness of prices. If prices do not adjust themselves perfectly flexibly, following a shock, aggregate demand will not always be equal to the supply capacities (under normal utilisation conditions). If price adjustment is slow, companies' capacities may be temporarily over- or underutilised, if demand requires so. In this case, potential output can also be defined as the so-called *natural* level of output that would exist in the absence of nominal rigidities and the presence of perfectly flexible prices (Clarida et al., 1999). In this case, the output gap can be interpreted as the difference between actual ('sticky-price') output and natural/potential ('flexible-price') output. This *does not* equal the deviation of actual GDP from its long-term trend, which sets in not only in the absence of nominal rigidities, but also in the absence of shocks, in the so-called *steady state*.

This last conclusion is worth emphasising. The deviation of actual output from its long-term trend (the steady state) can be divided into two parts. One of these is the deviation of natural output from the shock-free steady state, i.e. from the trend. This shows to what extent the normal production capacities deviate from their long-term equilibrium values as a result of the shocks to the supply side of the economy. The other part is the difference between actual GDP under nominal rigidities and the natural output that sets in in their absence; accordingly, this difference can be interpreted as the deviation of actual demand from normal supply capacities. This latter difference stems from the fact that prices cannot adjust perfectly flexibly.

If the concept of 'short-term' potential output is used, the output gap can be interpreted as the second part of the above breakdown. If the concept of 'long-term' potential output that occurs in the steady state is used, the output gap can be interpreted as the *sum* of the first and second parts, and shows not only the size of excess demand or excess supply, but also the temporary impact of the shocks on production capacities. The short-term concept may be very volatile as a result of shocks, whereas the long-term potential output is less volatile, as it shows the level of output in a state without shocks.

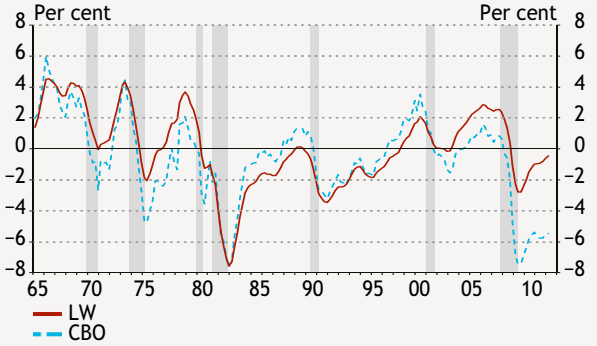
Prior to the crisis, the growth of developed economies followed a rather stable trend, and potential outputs (as well as the output gap) quantified on the basis of the two types of approaches were also close to one another. In the crisis period, however, there was a considerable difference between the two approaches. The potential output calculated on the basis of the first approach followed the change in actual output faster, while the trend quantified on the basis of the second approach remained more stable.

Box 2
Output gap estimates for the US economy

The two types of approaches have also led to a significant difference in the estimation of the US potential output. Phillips curve-based measures (proposed by Laubach and Williams [2003]) show a significantly lower potential output and, accordingly, a negative output gap which is smaller and closes earlier during the crisis than the production function-based measures of the Congressional Budget Office (CBO) (Weidner and Williams, 2012). While the CBO indicates approximately 1 percentage point lower but positive potential growth, according to the method proposed by Laubach and Williams, potential output declined in 2009. Accordingly, as opposed to the

CBO's output gap lasting for 10 years and standing above 5 per cent for a long time, this method points to the gap closing in 2012 and 2013 (Chart 1). The estimation method based on the Phillips curve (inflationary pressure) can probably better capture short-term potential output, which is relevant for monetary policy, as compared to the CBO's production function-based estimate, which assumes a much smoother trend and can rather be identified as output that can be sustained over the longer term (which is relevant, for example, in terms of the sustainability of government debt).

Chart 1
Estimate for the output gap of the US economy



Note: The estimates shown in the chart used a 2012 Q1 information base.

IMPACT OF THE FINANCIAL CRISIS ON POTENTIAL OUTPUT

The financial crisis and recession that started in 2008 can be interpreted as a very serious negative demand shock, as economic agents suffered a significant loss of wealth with the bursting of the asset price bubble and were compelled to spend a greater part of their income on debt repayment. As a result, a significant amount of demand disappeared from the economy. The decline in demand proved to be permanent, which is in line with the observation that after financial crises the reduction of debt is a protracted process and recovery takes longer (Reinhart and Rogoff, 2009). At the same time, most of the developed countries were characterised by a build-up of imbalances prior to the crisis. Therefore, presumably it would not have been possible to maintain their growth within the pre-crisis structure over the longer term. Reallocation across economic sectors is a time-consuming process, and may affect the developments in potential output over the short and long run as well.[2]

At the beginning of the crisis, aggregate demand fell significantly in most economies, inflation declined considerably, and several developed countries faced risks of deflation. In terms of monetary policy, it was clear that significant monetary easing was needed in this economic environment. The main challenge was that merely reducing the base rates would have been insufficient to achieve the necessary easing. The protracted crisis also represents a significant challenge for monetary policy decision-makers.

It is highly probable that as a result of the persistently negative output gap the supply capacities of the economy have also been damaged, meaning that the output gap 'closes from above', i.e. declines in spite of the fact that no material growth in actual GDP is observed. In terms of monetary policy, this issue is extremely important, because if potential output also declined during the crisis, the output gap is smaller than we had previously thought. This would explain why inflation does not decline more strongly, which should happen in the case of a permanently negative output gap. If the output gap closes, inflationary pressure may strengthen even while growth is weak, and this influences how long loose monetary policy can be maintained without jeopardising price stability. It cannot be excluded, however, that the inflation that was observed during the crisis and that was relatively high compared to the fall in demand was a result of other factors, and the output gap continues to be wide and negative. In this case, a looser monetary policy is justified, as premature tightening would break the otherwise weak recovery from the crisis. Tightening of the looser conditions is also undesirable when potential output has declined, but the damage is not yet permanent and can be reversed by accelerating the upswing. However, it is important to emphasise that in this case temporarily high inflation can be tolerated without jeopardising longer-term price stability only if longer-term inflation expectations are adequately anchored.

[2] The unsustainability of the earlier trend of economic growth may be a consequence of other factors as well, not only of the fact that it was a 'bubble' not justified by the fundamentals. For example, in the case of catching-up economies, with the progress of convergence, growth is expected to slow down from the earlier values. Another reason may be that the labour market is becoming global, which requires very strong adjustment on the part of developed economies in order to preserve their competitiveness.

Box3
Debate on potential output and monetary policy in the United States

The monetary policy relevance of potential output and the main arguments for a smaller or larger output gap can be clearly followed in the debate on the Fed's interest rate policy as well.

According to those who argue for declining potential output (Bullard, 2012; Andolfatto, 2012), the crisis damaged the supply side of the economy as well. In addition, they believe that the output gap, which is smaller than previously thought , is also a consequence of the unsustainability of the earlier observed trend, which only reflected the pre-crisis bubble and not real potential output. Accordingly, the decline in GDP following the bursting of the bubble has to reflect at least partly the return of the trend to the level justified by fundamentals. Therefore, the output gap compared to the pre-crisis trend is inevitably overestimated. For example, this also explains the phenomenon why inflation does not decline to a greater extent, as should occur in the case of a large negative output gap (Ip, 2012).

However, according to the so-called 'saltwater' economists (e.g. Paul Krugman, 2012; Tim Duy, 2012 or Janet Yellen, 2012 [Vice Chair of the Fed]), who typically belong to the New Keynesian school, the protracted crisis is caused by demand side problems stemming from balance sheet adjustment due to the financial crisis. The consumption and investment of economic agents which are repaying their debts decline for a considerable period, but this does not represent an erosion of the supply potential. The lack of stronger disinflation, in turn, is attributable to the firmly anchored inflation expectations and the feed-through of higher energy prices. In this case, the output gap also continues to be very wide and negative, and thus economic policy stimulus must be increased further (Avent, 2012). Further easing is also voted for by those who emphasise that potential output in terms of monetary policy is not completely exogenous, and the stimulation of demand may prevent permanent damage to supply capacities, as well as help to drive potential output back to its long-term trend (Thoma, 2012).[3]

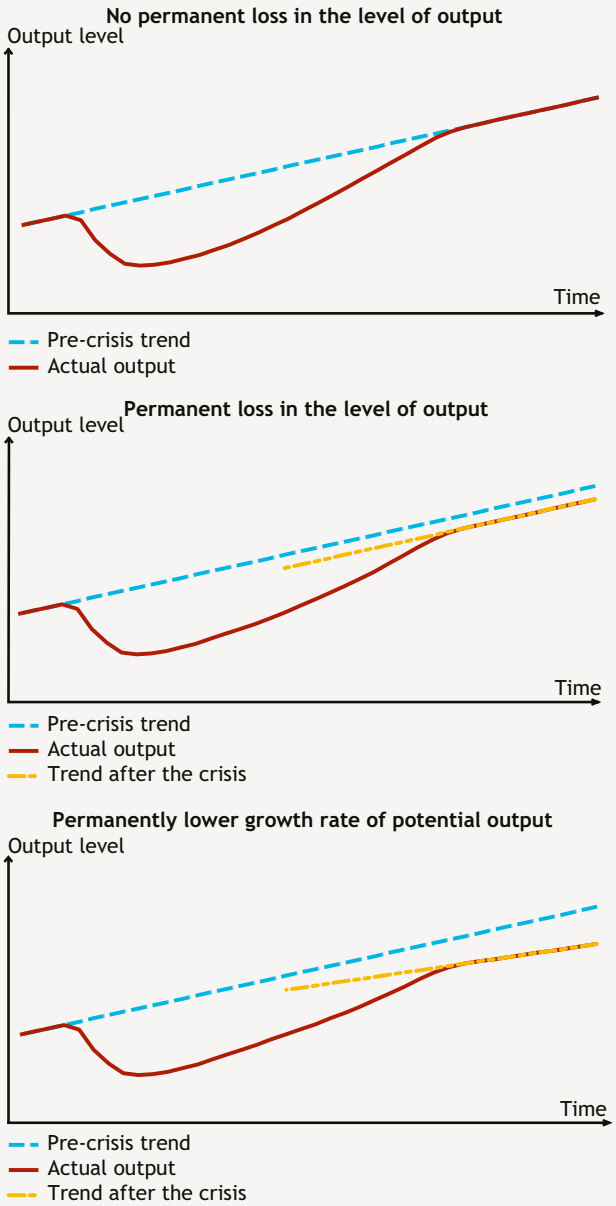
For monetary policy decisions, it is important to have the most accurate possible view of the contribution of permanent and temporary factors to the decline in economic output, i.e. how the path of potential output may change over the longer term. At the same time, the current size and future trend of potential output continue to be surrounded by high uncertainty. First, the impact of the crisis is difficult to measure. Second, economic policy measures also have a material influence on future potential output. Therefore, in connection with longer-term growth prospects most international institutions typically develop several scenarios, which are significantly different from one another.

Not long after the onset of the crisis, the European Commission (2009) outlined three scenarios in connection with longer-term developments in potential output. In the first scenario, although potential output declined during the crisis, this was only a temporary phenomenon, and supply capacities did not suffer permanent damage. With the passing of the crisis, potential output will return to the earlier trend, and thus there is no loss in level over the long term. Compared to the pre-crisis potential growth this requires faster potential growth right after the crisis to offset the effect of the recession on output. In the second scenario, there will be a permanent decline in the level of potential output. Following the decline during the crisis, potential growth will only return to the earlier rate, and thus the shortfall in level will not be compensated: the economy will follow a new trend that is parallel with the earlier one, but at a lower level. In the third scenario, the potential growth rate is also permanently damaged after the crisis, thus leading to increasingly accumulating output losses over the long term compared to the pre-crisis trend.

A detailed overview of the channels through which the financial crisis affects the elements of potential output is presented in the following section. This may provide information on the conditions in which the above outcomes take place with higher probability. For the survey of the

[3] Although it is not related to the debate on the output gap, it is worth mentioning that *temporarily* higher inflation is popular even among those who believe that the way out of the crisis and the liquidity trap situation which underlines the ineffectiveness of traditional monetary policy is the reduction of real interest rates by raising inflation expectations. In the United States, the Federal Reserve is highly credible, and thus presumably there is insignificant risk that *temporarily* higher inflation will jeopardise long-term price stability via a permanent increase in expectations.

Chart 2
Three possible scenarios for the development of potential output



Note: The dashed lines indicate potential output (before and after the crisis), whereas the continuous line shows the current GDP. The difference between the two is the output gap. The level of the curves represents the level of output, whereas their steepness depicts the growth rate of output.
Source: EC, 2009, p. 48.

potential channels we use the production function approach, i.e. we analyse how the crisis may affect longer-term developments in capital, labour and total factor productivity (TFP).

RETURN TO THE PRE-CRISIS TREND

The first and at the same time most favourable outcome is a return to the pre-crisis trend. As a result of the recession and the unfavourable demand outlook, the decline in investment activity is a natural phenomenon, leading to a slower expansion or perhaps a decline in the capital stock. However, if the unrealised investment is implemented after the passing of the crisis and with an upswing taking place in demand again, a higher investment rate will be observed during a transitional, catch-up period, and thus in terms of the production capacities there will be no permanent difference in the levels compared to the pre-crisis trend. In this scenario, the increase in unemployment is also only a temporary, cyclical phenomenon. It facilitates the return of unemployment to the pre-crisis levels if the recession is relatively short (hysteresis is smaller), the labour market is flexible, and in general there are no significant structural rigidities in the economy, e.g. no economic policy decisions that have a permanently adverse effect on labour market incentives are taken during the crisis.

Overall, the probability of this scenario is higher if the crisis is not too long, the pre-crisis economic structure does not require any major changing, and the reallocation of resources takes place within a relatively short period of time.

PERMANENT DECLINE IN LEVEL

In the second scenario, the trend of potential output declines permanently compared to the trend observed prior to the crisis. Similarly to the first scenario, the decline in demand observed in the crisis hinders investment and decelerates the expansion in capital stock. However, if the crisis is protracted, it may also happen that production capacities – at least partly – adjust to the drop in demand, and thus the decline in the level of the capital stock is permanent. In addition, it is also conceivable that the pre-crisis structure of the economy requires a major transformation. This may result in stronger capital accumulation in certain sectors and industries, while in other sectors a considerable portion of the capital stock may become obsolete. Practically, it is equivalent to the increase in the extent of depreciation and the faster erosion of the capital stock during the crisis (EC, 2009). The expansion in capital stock may remain slow as long as the sectoral reallocation lasts. A good example for this in connection with the crisis of the euro area periphery (typically Spain and Ireland) is the bursting of the bubble observed earlier in construction and the real estate market, as a result of which a considerable portion of the construction capital stock, which is difficult to use in other sectors, became redundant.

Examining the impacts from the labour side, if the recession lasts long enough, long-term structural unemployment may

reach a higher level. One of the underlying reasons is the so-called hysteresis effect (Blanchard and Summers, 1986), according to which the human capital of those who are unemployed for a long time degrades in this period, and some of their skills are lost forever. This reduces their later employability, and as a result they are not able to compete with the employed any longer, so they will not have any material impact on the changes in wages either. A drawn-out recession may have an adverse effect on the activity rate as well. If the unfavourable employment outlook lasts long, it may deter people from entering the labour market, or unsuccessful jobseekers may leave the labour market for this reason *(discouraged worker effect)*. Both effects are particularly strong in the case of disadvantaged, unskilled labour, who may be ousted from the labour market permanently.[4]

The adverse effect on structural unemployment may be stronger in economies with rigid labour market institutions. If the labour market is rigid, labour is less mobile and it is difficult to retrain people, the structural reallocation that becomes necessary because of the crisis can take place only slowly, which also results in a steady increase in unemployment (Basanini and Duval, 2009). Economic policy measures may also affect longer-term developments in employment. During recession it is easily conceivable that as a crisis management measure the government extends or increases the unemployment benefit, but it may also occur that it burdens labour with higher taxes in order to restore the fiscal balance (EC, 2009). A permanent decline in employment may also occur if the government makes it easier to leave the labour market, for example by supporting early retirement. Prior to the crisis, immigration contributed considerably to the expansion of the workforce and economic output in several developed economies. The protracted economic downturn may slow this process as well (EC, 2009).[5]

Overall, the probability of a permanent decline in the trend of potential output increases with the protraction of the crisis or if significant restructuring is needed in the economy compared to the pre-crisis status, which may lead to the depreciation of the capital stock and a steady increase in unemployment. Rigidities in the economy or economic policy measures may also add to the probability of a permanent decline.

LONG-TERM DECLINE IN POTENTIAL GROWTH

In the third and at the same time least favourable scenario even the rate of potential growth suffers permanent damage, leading to a widening gap between the level of potential output and the pre-crisis *trend*. It is important to emphasise that the flattening of potential output may also result from several processes which require significantly different economic policy responses. Recession and financial crisis may damage the longer-term growth potential as well, but it is also conceivable that the earlier trend only represented a bubble, and thus the decline or flattening in the trend is partly a consequence of the bursting of the bubble, and in this sense we do not speak about a decline in potential growth, but about a return to the 'real' potential justified by fundamentals. Accordingly, if the level and growth rate of potential output were previously overestimated, after the current decline in GDP no return to the earlier trend and growth rate can be expected, and the leeway for economic policy responses is also smaller.[6]

At the same time, the financial crisis may restrain growth in potential output even beyond the correction of the earlier excessive growth rate. Increasing risk aversion, growing uncertainty and a resulting tightening of lending conditions as well as a steady increase in risk premiums can be expected after more severe financial crises. All of this adds to the user costs, which may affect the investment rate, and thus the capital stock expands only slowly for a longer period of time, restraining the rate of potential growth. In addition to the increase in user cost, higher uncertainty also discourages investment, as it is more worth to postpone it (Pindyck, 1991).

The typical result of a protracted bank crisis and increasing uncertainty is that the financial intermediary system is less able to allocate the resources available in the economy in a manner which ensures their most efficient use. The underlying reason for this phenomenon is that, along with the increase in user costs and interest rates, asymmetrical information problems (selection of the nonviable companies and moral hazard) grow in financial intermediation, which may thus result in a failure of otherwise desirable transactions, making capital allocation less efficient

[4] The crisis may have a positive effect as well on the activity rate – although presumably this is not typical – if the decline in households' income encourages the earlier inactive members as well to start working *(encouraged worker effect)* (Furceri and Mourougane, 2012).

[5] Immigration is likely to slow down only if the economic outlook of the given country deteriorates *relative to* the neighbouring countries. Otherwise, migration may even increase.

[6] The improbability of returning to the earlier trend can be explained not only with the bubble that built up in the pre-crisis years (see Footnote 3).

(Mishkin, 2004, p. 622). This loss of efficiency also has an adverse effect on potential growth.

Of the factors of production, capital accumulation and total factor productivity (TFP) are the ones where the above effects that restrain potential growth primarily appear. Due to the aforementioned tighter lending environment and balance sheet adjustment following the crisis, investment in research and development may decline considerably, affecting innovation and thus technological progress as well. R&D investment is typically procyclical anyway, and the less favourable financial environment only exacerbates and makes this effect more lasting (Barlevy, 2007). It is also conceivable that the increase in user cost has a greater negative impact on more innovative sectors, where productivity expansion typically used to be faster. Accordingly, resources flow into the sectors where productivity expansion is relatively slower, which also affects TFP growth (EC, 2009).[7]

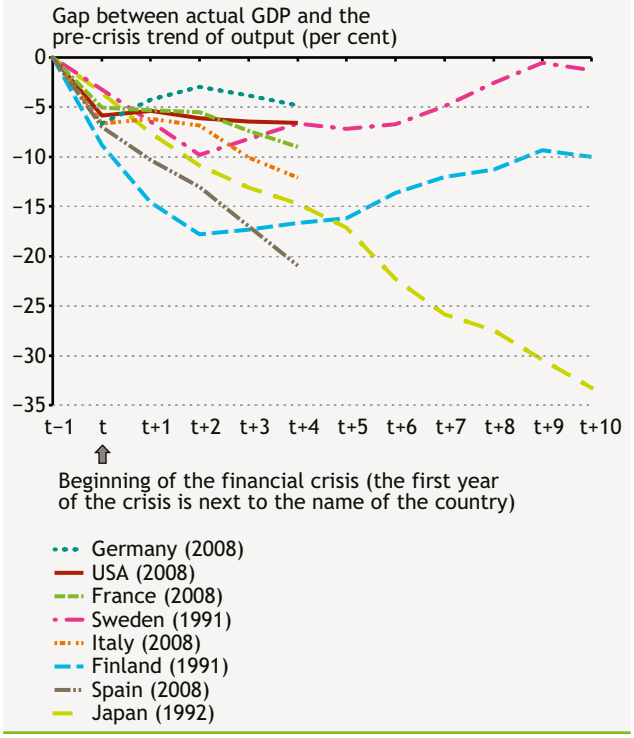
Developments in longer-term potential growth may significantly be influenced not only by the financial crisis, but also by the economic policy responses to the crisis. Some fiscal tools stimulating economic activity (for example investment in infrastructure) may be beneficial to potential output, and it is also possible that some governments launch structural reforms that have long since been desirable due to the compulsion arising as a result of the financial crisis. On the other hand, as a result of the fiscal expansion during the crisis, the weight of the government sector in the economy may permanently increase, and government debt may start to follow a rising trend; these factors have a negative impact on long-term growth.

WHICH SCENARIO MAY TAKE PLACE?

Past financial crises provide examples for each scenario. Of the crises of the 1990s, it is worth comparing the Swedish, Finnish and Japanese experiences. Each crisis was preceded by financial liberalisation, which led to credit and asset price bubbles, followed by a financial crisis and a significant economic downturn. At the same time, the longer-term effect of the crisis on economic growth varied considerably in the case of the three countries. The management of the Swedish banking crisis has been considered exemplary ever since, because they managed to clean banks' balance sheets relatively fast. In addition, considerable progress was achieved in the fields of fiscal and monetary policies as well (e.g. the introduction of inflation targeting), and thus the Swedish economy did not suffer any permanent loss compared to the pre-crisis trend. In the Finnish economy, financial liberalisation resulted in a problem similar to the one observed in Sweden, while the economic downturn was further deepened by the loss of eastern markets. The economic downturn resulted in a significant increase in unemployment, and a great number of those who lost their jobs were permanently excluded from the labour market. As a result of the increase in permanent unemployment, Finland was unable to reach the pre-crisis growth path even after a decade. The period following the financial crisis in Japan is an example for the third scenario. The steady decline in the potential growth rate of the Japanese economy is primarily attributed to the incorrect economic policy responses. Neither the banking sector nor the corporate sector was interested in writing off the losses, which led to a permanent deterioration in the efficiency of the financial intermediary system and a decline in the potential growth rate.

Although all three scenarios are possible on the basis of earlier experiences, empirical studies examining the many

Chart 3
Impact of financial crises on economic output



[7] Recession may restrain TFP growth via various channels, but may have positive consequences as well; thus the net effect is ambiguous. An economic downturn has a 'cleansing' effect, in so far as the least productive companies are driven out of the market (Caballero and Hammour, 1994). In addition, during crises, companies may pay more attention to more efficient utilisation of existing capacities and cost reduction, which may also add to productivity (Aghion and Saint-Paul, 1993).

crisis episodes (Furceri and Mourougane, 2012; Abidad et al., 2009 and Barell et al., 2010) have found that following financial crises the supply potential typically remains below the pre-crisis trend even over the longer term. It is a less robust consequence, but according to some studies the rate of potential growth also decelerates after a financial crisis (e.g. Benati, 2012). Comparing the developments in the current crisis with earlier crisis experiences, we can also say that for the time being no pattern that would clearly support one scenario or another has emerged yet. The interaction of the economic and bank crises as well as the sovereign debt crisis considerably reduces the probability of the most favourable outcome in several countries. Furthermore, it is important to emphasise that – in contrast with the earlier cases – the current crisis is much more global, making favourable outcomes even less likely. In more developed countries, the economy stimulating steps of fiscal and monetary policies have so far significantly reduced the size of economic downturn. However, avoiding the worst scenario requires the introduction of structural policies that treat the structural rigidities of the economy and stimulate TFP growth and innovation (EC, 2009).

SUMMARY

With the protraction of the financial and economic crisis, it is becoming increasingly probable that the supply potential of the affected economies will also be damaged. For this reason, the output gap may close 'from above' (with a fall in potential GDP), the disinflationary effect may decline even in parallel with weak demand, and this influences how long the loose monetary policy can be maintained without jeopardising price stability. At the same time, in the case of a major economic downturn, the trend of economic output is not necessarily independent of monetary policy steps. If the protraction of recession and the fall in demand also affect potential output significantly, the stimulation of aggregate demand by monetary policy may moderate the permanent downswing on the supply side.

In view of the above, it is an important question for central banks as to how the longer-term trend of economic output has changed during the crisis and what the underlying factors may be. However, longer-term developments in economic output are difficult to predict in the current uncertain environment, and therefore most international institutions prefer to use various scenarios. Which scenario will eventually take place in individual economies depends on a number of factors. It depends on the extent to which the pre-crisis economic structure must change, how flexibly the economy can adjust to the changed environment and, last but not least, on the economic policy responses. Within the realm of economic policy responses, demand stimulating measures may mitigate the decline in output and the degradation of capacities, but the structural, supply side measures aimed at easing the resource reallocation necessary due to the changed economic environment and at supporting investment and innovation are at least of the same importance.

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