Economic Commentaries

Flexible inflation targeting implies that monetary policy stabilises inflation around a target. In addition, consideration is given to real economic activity. According to the new Keynesian theory, monetary policy should achieve an efficient resource utilisation, which is not necessarily the same as a stable resource utilisation.

Should monetary policy stabilise resource utilisation?

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Central banks with inflation targets often conduct so-called flexible inflation targeting. This means that monetary policy stabilises inflation around a target. In addition, consideration is given to real economic activity. Inflation targeting central banks are usually transparent on their inflation measure and the average rate of inflation they desire. For example, the Riksbank's inflation target is defined as an annual change in the consumer price index (CPI) of 2 per cent. Central banks are not very transparent on how they account for real economic activity, though. No central bank has an explicit target for real economic activity or clearly shows how it should be measured.

In the debate on Swedish monetary policy many economists have argued that the Riksbank should be more transparent on how it takes real economic activity into consideration. Some argue that the Riksbank should stabilise a measure of resource utilisation. For instance, the National Institute of Economic Research bases its monetary policy recommendations on how inflation and a labour market gap (employment in relation to its trend) develop.

This commentary discusses measures of real economic activity from a new Keynesian perspective. The new Keynesian theory is currently the dominant paradigm in monetary policy research on flexible inflation targeting. An important result from this research is that monetary policy should eliminate the effects of nominal rigidities. This implies a trade-off between stabilising inflation around a target and achieving an efficient resource utilisation. However, *efficient* resource utilisation is not necessarily the same as *stable* resource utilisation.

Resource utilisation measures the utilisation of labour and capital

In general, by resource utilisation we mean to what extent labour and capital are utilised. If, for instance, unemployment is low a large part of the labour force is utilised to produce goods or services. In the same way, capital is utilised extensively if the capital stock, for instance, in the form of machinery and buildings, is used many hours a day.

There is no consensus on how to measure resource utilisation. Typically, one makes use of surveys or tries to make an estimate by using statistical methods. In surveys, firms are asked to assess to what extent their resources are utilised. They may also state whether a shortage of machinery and buildings or a shortage of labour is the main constraint to increasing output. The firms' answers are weighted together to produce measures that reflect total resource utilisation as well as labour and capital utilisation (see Figure 1).

The opinions expressed in the economic commentaries represent the authors' personal opinions and cannot be regarded as an expression of the Riksbank's view on the questions concerned.

Another method to measure resource utilisation is to study what is produced. To understand how resource utilisation is related to output, one can use a so-called production function.[1] According to this, output is determined by firms' capital and labour together with a measure of productivity called total factor productivity. Furthermore, the more intensively capital and labour are used, the more will be produced. There is thus a relation between resource utilisation and output, although the relation is not perfect. When productivity is high more will be produced than when it is low. It is therefore possible to have low resource utilisation at the same time as output is high as a result of high productivity.

Statistical methods can be used to estimate "normal" output (that is, average or trend output). The difference between actual and normal output is termed the output gap and is a measure that indirectly says something about resource utilisation. Figure 2 shows how one such output gap (the HP-gap) has developed during the past decade. The output gap broadly gives the same picture of resource utilisation as the survey-based measures in Figure 1.

Efficient resource utilisation does not need to be stable

Traditional measures of resource utilisation, such as survey-based measures and different variants of the output gap, indicate whether resources are utilised more or less than normal.[2] Hence, they measure how stable resource utilisation is. According to the new Keynesian theory, however, a central bank should not aim for a stable resource utilisation.[3] The role of monetary policy is instead to achieve an efficient resource utilisation. The reason for this is given in the remainder of this section.

Let us begin with a hypothetical economy without any frictions. In other words, there is perfect competition in all markets and there are no tax distortions. Furthermore, prices are fully flexible and adjust directly when demand changes. In this frictionless economy resource utilisation fluctuates when the economy is hit by different shocks, for example by shocks to productivity. However, since there are no frictions the households' choices of consumption and hours worked will be efficient. Similarly, firms' price setting and demand for labour and capital will also be efficient. Resource utilisation is therefore efficient, even though it fluctuates, and there is no role for welfare-improving monetary policy.

Let us now introduce price rigidities in the hypothetical economy. This means that it is costly for firms to change their prices. As a consequence, prices adjust sluggishly to changes in demand. Resource utilisation is therefore inefficient and there is room for welfare-improving policy. Monetary policy can contribute to improving welfare by eliminating the effects of price rigidities. However, as long as price rigidities are the only frictions, there is no trade-off between stabilising inflation and achieving an efficient resource utilisation. That is, if the central bank succeeds in stabilising inflation, resource utilisation will be efficient.

Let us finally introduce cost-push shocks to the hypothetical economy.[4] Examples of such shocks are temporary rises in price markups or temporary rises in commodity prices. If the economy is hit by cost-push shocks a trade-off arises between stabilising inflation and achieving an efficient resource utilisation. According to the theory, monetary policy should strike a balance between stabilising inflation and achieving an efficient resource utilisation.[5] Such monetary policy still implies that resource utilisation varies.

Flexible inflation targeting means that the central bank, in addition to stabilising inflation, tries to bring about the output level that would prevail in the absence of price rigidities. This output is known as flexprice output. The difference between actual and flexprice output is the flexprice gap. It is important to note that this measure of resource utilisation differs from traditional measures. Traditional measures tell whether resource utilisation is high or low in relation to the normal level while the flexprice gap tells how resource utilisation relates to the efficient level.

Monetary policy and productivity shocks

To calculate the flexprice gap it is necessary to have a model where the effects of price rigidities can be analysed. The reason for this is that flexprice output is not observable. Figure 2 shows the flexprice gap, which has been calculated with the Riksbank's macro model Ramses, together with the HP-gap.[6] The flexprice gap reached its highest level in 1999, while the HP-gap (and the survey-based measures) peaked in 2000.

Productivity shocks are one reason why the flexprice gap and traditional measures of resource utilisation, such as the output gap, can differ. It can be understood as follows. An increase in productivity leads to an increase in output. Since the increase in productivity is temporary, trend output is not affected. The output gap, the difference between actual and trend output, is thus positive.

To understand the effect on the flexprice gap it is informative to examine what happens to prices. Higher productivity means that more goods can be produced with the same inputs. This means that the cost of each unit produced falls and firms lower their prices. But due to the price rigidities they will not cut their prices fully. Actual output is thus associated with higher prices than flexprice output. This implies that actual output increases less than flexprice output. Hence, the flexprice gap is negative.[7]

How should monetary policy react to a temporary increase of productivity? A central bank that tries to achieve an efficient resource utilisation should conduct a more expansionary monetary policy, since inflation falls and the flexprice gap is negative.
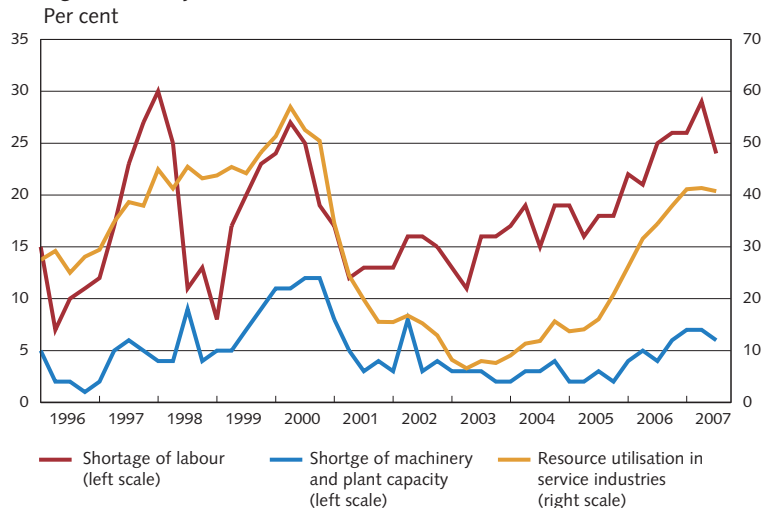
Concluding comments

According to the new Keynesian theory, a flexible inflation targeting central bank should strike a balance between stabilising inflation around a target and stabilising the flexprice gap. By attaching a weight to the flexprice gap an efficient resource utilisation can be achieved. But efficient resource utilisation does not need to be stable.

It should, however, be emphasised that using the flexprice gap in practice is not a free lunch. It requires advanced analytical tools and models to calculate the flexprice gap, which can make it difficult for outsiders to replicate the results. In addition, the flexprice gap can differ from model to model, depending on the frictions and shocks included. Finally, it is a relatively complicated concept, which can make monetary policy communication more difficult.

There are thus several reasons why central banks are not transparent on how they account for real economic activity. Nevertheless, we would like to emphasise the following. Traditional measures of resource utilisation cannot be used as guidance for good monetary policy. To conduct good monetary policy it is necessary to find the driving forces behind the development of the economy. If, for instance, high productivity is driving the high output, monetary policy should not try to counteract this. But if output is high for other reasons the conclusion could be different. Central banks that stabilise traditional measures of resource utilisation are therefore at risk of making the wrong monetary policy trade-offs.
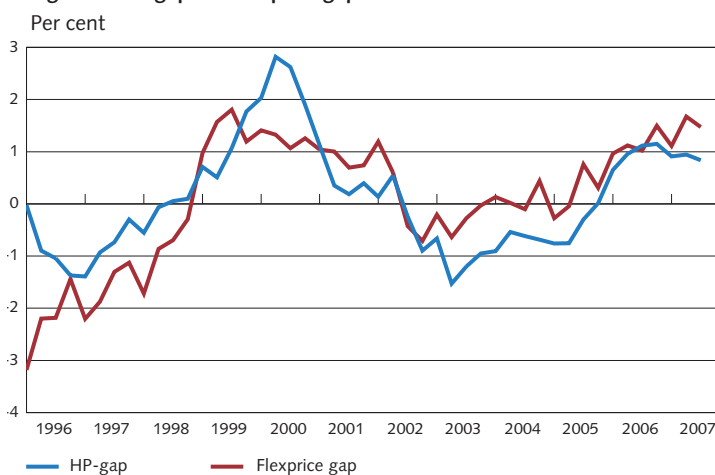
Figure 1. Survey-based measures of resource utilisation
Per cent

Legend:
- Shortage of labour (left scale)
- Shortge of machinery and plant capacity (left scale)
- Resource utilisation in service industries (right scale)

Note. Shortage data refers to the proportion of "yes" answers in the manufacturing industry. Resource utilisation in service industries refers to the proportion of firms with full utilisation (proportion of "yes" answers). The service industries are haulage firms, consulting firms and computer consultants and computer service firms.

Source: National Institute of Economic Research

Figure 2. HP-gap and flexprice gap
Per cent

Legend:
- HP-gap
- Flexprice gap

Note. The HP-gap is calculated as GDP's percentage deviation from an HP-trend. The flexprice gap is calculated with the Riksbank's macro model, Ramses.

Sources: Statistics Sweden and the Riksbank

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[1] One example of such a production function is, $y = z \cdot (a \cdot k)^{\theta} \cdot (b \cdot l)^{1-\theta}$, where y denotes output, k capital, l labour and θ capital's share of output. The parameters a and b are between zero and one and measure the utilisation of capital and labour, respectively, and z denotes total factor productivity. The higher resource utilisation (the higher a and b are) the more will be produced.

[2] In forecasting, traditional measures of resource utilisation play a central role as an indication of future inflation. The correlation between different measures of resource utilisation and inflation has, however, proved to be weak and unstable over time, see for instance, P. Jansson and S. Palmqvist, "Mer om Konjunkturinstitutets arbetsmarknadsgap", (More about the National Institute of Economic Research's labour market gap) *Ekonomisk Debatt*, no. 6, 2005, pp. 53-58. One reason for this is that the correlation between different variables such as inflation and resource utilisation depends on which shocks hit the economy and the persistence of the shocks, see the box "Resource utilisation, costs and inflation" in the Inflation Report 2006:2.

[3] The new Keynesian theory is predominant in monetary policy analysis at central banks around the world. For an introduction to this theory see M. Goodfriend, "Monetary policy in the new neoclassical synthesis: an introduction", *Economic Review*, no. 2, 2007, pp. 5-32.

[4] In a realistic description of the economy there are, of course, more frictions to take into account. For instance, taxes are distorted and there are imperfections in the labour market, such as nominal wage rigidities and inadequate matching. This means that the monetary policy trade-offs can be more complicated than described here.

[5] See J. Galí, "New perspectives on monetary policy, inflation and the business cycle", in *Advances in Economic Theory*, M. Dewatripoint, L Hansen and S. Turnovsky (ed.), vol. 3, pp. 151-197, Cambridge University Press, 2003. See also S. Palmqvist, "Flexible inflation targeting – how should central banks take the real economy into consideration?" *Economic Review*, no. 2, 2007, pp 91-105.

[6] A description of the model is given in M. Adolfson, S. Laséen, J. Linde and M. Vilani, "Ramses – a new general equilibrium model for monetary policy analysis", *Economic Review*, no. 2, 2007, pp 33-68.

[7] The labour market gap (employment's deviation from trend) is usually also negative after a positive productivity shock. However, that the labour market gap behaves as a flexprice gap is not a general result.