

### *The neutral rate of interest: concept and calculation*

As economic recovery in a number of countries increasingly gained momentum after the global financial crisis, central banks have started to raise their policy interest rates towards “normal” levels. However, what is the appropriate level of the policy interest rate that supports output growth and price stability? This is an important question for monetary policy makers.

The neutral interest rate, usually expressed in real terms, may be defined as the level of the short-term interest rate that keeps the economy at its potential level without inducing inflationary pressures. This level of the interest rate therefore reflects the neutral monetary policy stance that is neither too easy nor too tight. A level of the inflation-adjusted policy rate below the neutral rate thus indicates an accommodative monetary policy, which helps to stimulate economic growth and consequently puts pressures on prices. In contrast, a real policy rate above the neutral interest rate slows down economic growth and as a result relieves inflationary pressures. One can thus compare the neutral interest rate with the policy rate to gauge the monetary policy stance at any instant.

Measuring the natural rate of interest is not an easy task, since the neutral rate can vary over time depending on (1) shocks that hit the economy at any moment in time and (2) the evolution of the long-term structure of the economy. There are several estimation approaches, although each has its own set of assumptions and limitations. A selection of methodologies is presented below.

The first method is to simply interpret the historical average of the real interest rate as a measure of the neutral rate. This approach assumes that the vicissitudes of business cycles in the past have resulted in corresponding monetary policy stances that, albeit subject to fluctuations from short-term shocks, are balanced out in the sample. However, this measure is clearly only a rough indicator. Even the steady-state neutral interest rate can vary if there is a change in structural fundamentals of the economy.

The second method is to use the Taylor rule<sup>1/</sup>, which describes the policy interest rate as a response to deviations of inflation and output from their respective target levels. Here, the natural interest rate over the long run can be inferred as the prevailing rate when inflation is at the inflation target and output is at its potential. Among many difficulties of this approach is the fact that the output gap itself is unobserved and must be estimated. Moreover, unless further assumptions are made, this estimation approach only gives the historical estimate of the natural rate of interest and, as is the case with the first approach, is therefore of limited use if one seeks a trajectory of the natural rate going forward.

The third method is to refer to the market-implied path of the future policy interest rate. Assuming that the market correctly expects the policy rate to approach the neutral level in the long run, this method uses information from the government debt market to calculate the implied forward curve<sup>2/</sup>, which may be interpreted as representing the expected path of short-term rates at each specific point in the future. One difficulty with this methodology is that, as the implied forward curve is devined from government bond yields, the estimated neutral rate may be inadvertently driven by investors' perception of risks in the bond market. The presence of large and volatile risk premiums can invalidate the forward rates as good proxies for market expectations of future policy rates.

Relying on the natural rate of interest as an exclusive guide in the conduct of monetary policy is not advisable. A precise estimate of the natural rate is difficult to obtain, as it constantly changes in light of real shocks and the evolving structure of the economy. In this way, the natural rate of interest is exogenously determined. Furthermore, it is not desirable to always target the policy interest rate at the neutral real interest rate at every point in time, because gearing monetary policy to respond to factors extraneous to developments in the economy—in particular, inflation—will potentially fail to bring about the most efficient economic outcome. Instead, the natural rate of interest can be used as an approximate guide to determine the monetary policy stance to supplement many other economic indicators in the deliberation of monetary policy.

1/  $i_t = i^* + \alpha(\pi_t - \pi^*) + \beta(y_t - y^*) + \varepsilon_t$  where  $i_t$  = policy interest rate,  $i^*$  = equilibrium interest rate,  $\pi_t - \pi^*$  = deviation of inflation from the target,  $y_t - y^*$  = output gap.

2/ For more details, see "Assessing Inflation Expectations," *Inflation Report*, July 2008 (pages 30-31)