

The natural rate of interest

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Abstract

Wicksell's idea, the Laubach–Williams estimate, and why a number nobody can observe decides whether policy is tight.

The constant r^* in The Taylor rule is doing more work than its modest appearance suggests. It is the real interest rate at which the economy neither overheats nor slackens, the level against which any actual real rate is judged tight or loose. It is also unobservable. This lesson is about what it means and how economists try to measure it.

Wicksell's distinction

Knut Wicksell distinguished the *money* rate of interest, set by banks, from the *natural* rate, the return that would prevail if capital were lent in kind, without money (Wicksell, 1898). When the money rate is below the natural rate, borrowing to invest is profitable, demand expands and prices rise; when it is above, the reverse. Prices are stable only when the two coincide. Modern usage keeps the idea and drops the metaphysics: the natural rate is the real rate consistent with output at potential and stable inflation.

Definition 1 (Natural rate of interest). The real short-term interest rate r_t^* at which, absent transitory shocks, output equals potential and inflation is stable. In the three-equation model of The Taylor principle and determinacy it is the term r_t^n in the IS curve: the rate that closes the output gap when expectations are anchored.

Two versions travel under the same name and should be kept apart.

- The **short-run** natural rate moves with every shock to demand and supply; it is what an optimal rule would track period by period.
- The **longer-run** natural rate is the level to which the short-run rate converges once shocks fade. It is what people mean by “ r^* ” in the Taylor rule and in discussions of the neutral rate.

Why it matters for the stance

With the policy rate i_t and expected inflation π_t^e , the real policy rate is $i_t - \pi_t^e$. Policy is *accommodative* when

$$i_t - \pi_t^e < r_t^* \tag{1}$$

and *restrictive* when the inequality is reversed. A 3 percent real rate is tight if r^* is 1 percent and loose if r^* is 4 percent. Every statement about the stance therefore contains a hidden assumption about r^* ; Measuring the policy stance makes those assumptions explicit.

Measuring it: Laubach and Williams

Laubach and Williams proposed the estimate that has become the standard reference (Laubach & Williams, 2003). The model is small. Output relative to potential depends on the lagged real-rate gap, inflation depends

on the lagged output gap, and the natural rate is tied to the trend growth rate of potential output plus an additional slow-moving component:

$$r_t^* = c g_t + z_t, \quad (2)$$

where g_t is trend growth and z_t captures everything else, such as demographics or the demand for safe assets. Potential output, trend growth and z_t are unobserved states estimated with the Kalman filter. The identifying idea is Wicksell’s: if inflation keeps rising while the real rate is at some level, that level must be below the natural rate.

The international version of the model found that natural rates fell across the United States, Canada, the euro area and the United Kingdom over the previous quarter-century, to levels close to zero by the mid-2010s, and that the common decline pointed to global rather than country-specific causes (Holston et al., 2017). Hamilton and co-authors reached a similar conclusion with very different methods, while stressing how wide the uncertainty bands are (Hamilton et al., 2016).

The uncertainty problem

The published Laubach–Williams estimates come with standard errors of a percentage point or more, and revisions of the same magnitude as new data arrive. That is the same order as the distance between “tight” and “loose”. The lesson for the Variants of the Taylor rule is direct: rules that do not need the level of r^* , such as first-difference rules, avoid this error at the cost of others. The lesson for the practitioner is to state the assumed r^* whenever quoting a Taylor-rule prescription, and to show how the prescription changes with it.

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