



## Wicksell's Natural Rate

Most central banks now implement monetary policy by setting a near-term target for an overnight inter-bank interest rate. In turn, policymakers face the difficult issue of how to choose, and adjust, the target rate. One widely discussed policy guide is the “natural,” or equilibrium, real rate of interest. To use this guide, one compares the level of a medium-term financial-market real interest rate—such as the yield on a 10-year Treasury inflation-indexed bond—to an estimate of the long-term “natural,” or equilibrium, rate of return on the economy’s capital stock. The idea that inflation will be approximately constant when these two rates of return are equal is an extension of an idea advanced in 1898 by the Swedish economist Knut Wicksell.<sup>1</sup>

Wicksell, throughout his career, was an unwavering advocate of the quantity theory of money. He argued that increases in the economy’s average level of prices were due to excessive increases in the monetary base, that is, increases beyond the increase in the economy’s overall output. Precisely *how* this occurred, he felt, was muddled in writings of the time. With the natural rate concept, he sought to illuminate the transmission mechanism behind the quantity theory and to begin connecting the monetary base, banks’ extension of credit, aggregate demand, and inflation.

Wicksell based his theory on a comparison of the marginal product of capital with the cost of borrowing money. If the money rate of interest was below the natural rate of return on capital, entrepreneurs would borrow at the money rate to purchase capital (equipment and buildings), thereby increasing demand for all types of resources and their prices; the converse would be true if the money rate was greater than the natural rate of return on capital. (Wicksell did not distinguish real from nominal interest rates because, under the gold standard of the time, sustained inflation was unlikely. Here, all interest rates and rates of return should be interpreted as real rates.) So long as the money rate of interest persisted below the natural rate of return on capital, upward price pressures would continue. In Wicksell’s theory, price pressure could arise even if new credit were extended only against increases in production, that is, against “real bills.” Price stability would result only when the money rate of interest and the natural rate of return on capital—the marginal product of capital—were equal.

Wicksell did not complete his theory of money, output, and inflation. He did not propose a market mechanism that

determined the money rate of interest. Nor did he advocate an activist policy based on the natural rate for Sweden’s central bank, the Riksbank. His work did, however, inspire later writers. John Maynard Keynes took up Wicksell’s unfinished quest for a theory connecting the price level to money and credit in his 1930 *A Treatise on Money*.

Implementing monetary policy by means of a natural rate framework has many uncertainties. The most relevant financial market rates for household and firm behavior likely are not the overnight rates set by central banks, but rather are intermediate-run rates of 5 to 10 years to maturity. Shocks to the economy, such as an energy or financial crisis, may cause near-term real rates of return on capital to deviate significantly from the longer-term rate of return on capital. Further, the natural rate is not observable. It varies with the economy’s underlying ability to produce, and must be estimated from empirical models often subject to substantial disagreement. Beyond differences in structure, models depend on assumed long-run projections for variables such as productivity growth, the share of national income received by capital, the aggregate savings rate from GDP, the growth of the labor force, the rate of depreciation of capital, and the variances and covariance of shocks to the economy. Agreement among economists on these issues does not seem imminent.

Ironically, Wicksell’s work laid the foundations that have led economists during the twentieth century to shift away from analysis of the quantity theory and, in some cases, to omit money entirely from their models. But, models based on the natural rate concept likely have some distance to go before they become useful guides to monetary policy.

—Richard G. Anderson

Further reading: Angelo Mascaro, “Using the Natural Rate Concept to Assess the Consistency of Projections Ten Years Ahead for Real Interest Rates and Inflation,” Congressional Budget Office Technical Paper Series, number 2004-5, March 2004; Thomas M. Humphrey, “Knut Wicksell and Gustav Cassel on the Cumulative Process and the Price-Stabilizing Policy Rule,” Federal Reserve Bank of Richmond *Economic Quarterly*, 88(3), Summer 2002; Roger W. Ferguson, Jr., “Equilibrium Real Interest Rate: Theory and Application,” speech at the University of Connecticut School of Business, October 29, 2004, available at <[www.federalreserve.gov/boarddocs/speeches/20041029/default.htm](http://www.federalreserve.gov/boarddocs/speeches/20041029/default.htm)>.

<sup>1</sup>Wicksell introduced the natural rate in the 1898 paper, “The Influence of the Rate of Interest on Commodity Prices,” reprinted in Erik Lindahl, ed., *Selected Papers on Economic Theory by Knut Wicksell* (1958, pp. 67-92); it remains one of the clearest expositions. He expanded the idea in *Geldzins und Guterpreise* (1898), translated by R.F. Kahn as *Interest and Prices* (1936). The definitive biography is Torsten Gårdlund, *The Life of Knut Wicksell* (1958).