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PRESS RELEASE

Estimating monetary policy reaction functions: A discrete choice approach

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Central banks generally tend to adjust their policy rates in incremental steps, usually by multiples of 25 basis points. However, the bulk of the literature devoted to estimating monetary policy reaction functions that explain changes in policy rates on the basis of a series of macroeconomic variables uses estimation methods for continuous data. These studies therefore assume that the policy interest rate is a continuously changing variable and do not take account of the fact that policy rates are adjusted in discrete steps.

This Working Paper takes account of the discontinuous nature of interest rate decisions and proposes a new discrete choice method for estimating monetary policy reaction functions. The method used is based on a 2004 paper by Hu and Phillips, which presents a model making a clear distinction between, on the one hand, setting the desired target rate, which is a continuous variable, and, on the other hand, adjusting the policy rate, which is a discrete process. The Hu and Phillips (2004) estimation method is nevertheless adapted in order to estimate endogenously the variance of the disturbances as well and thus correctly estimate the uncertainty affecting the parameters. Moreover, in contrast to Hu and Phillips (2004), the method proposed in this paper does not impose the absence of gradualism in the desired policy rate.

This new method has been applied to ECB interest rate setting since the beginning of the third phase of Economic and Monetary Union in 1999. The ECB's interest rate policy is explained by a simple forward-looking Taylor rule, which is based on the one-year-ahead growth and inflation expectations derived from the Survey of Professional Forecasters. The lower bound on nominal interest rates has a considerable influence on the estimated reaction to changes in economic forecasts. The estimated parameters on the growth and inflation outlook are a lot smaller when the estimation period is extended to cover the period after the financial turmoil deepened in September 2008. This constraint on monetary policy has nevertheless been circumvented, at least in part, by the non-standard measures that the ECB has been taking since the autumn of 2008. A comparison between the parameters estimated using the discrete choice method and traditional methods for continuous variables highlights the fact that the estimated desired policy rate is more aggressive (higher parameters on economic forecasts) and less gradual (a smaller parameter on the lagged policy rate) when the discrete choice method is applied. The techniques used for continuous data actually ignore the friction that interest rates are usually adjusted by discrete amounts – and that some deviation of the desired rate from the actual prevailing rate is therefore necessary before a central bank adjusts its policy rate –, so that the desired policy rate is estimated to be more gradual and less aggressive.

The discrete choice model attaches a probability to the outcome of each meeting during which a decision on interest rates is taken, in this case either raising or lowering rates or leaving them unchanged. Although the model's performance is below par when it comes to predicting interest rate decisions in specific months, changes in the probabilities inferred from it give a good indication of forthcoming interest rate decisions. However, the model does not perform as well as interest rate expectations derived from a monthly poll among commercial bank economists. The expectations drawn from these surveys actually take account of all relevant information – including the central bank's communication –, while the model attempts to explain interest rate decisions on the basis of only two macroeconomic variables.