

The Bank of Korea's Developments of a DSGE Model (BOKDPM) for Forecasting the Korean Economy

In order to implement inflation targeting, it is essential that monetary policy be operated in a preemptive and transparent manner. To that end, central banks need to provide accurate economic forecasts and timely and clear communication. To meet such needs, central banks in major advanced countries have developed their own Dynamic Stochastic General Equilibrium model (hereinafter referred to as a DSGE model) and have used it as a main tool for making monetary policy decisions. The DSGE model systematically reflects the operational mechanism of monetary policy namely the formation of expectation by economic agents and the reciprocal feedback between the agents and monetary authorities.

In line with such needs, the Bank of Korea also made efforts to create an economic forecasting system based on the DSGE model, which has led to the development of the **BOK Dynamic Projection Model (BOKDPM)**. Taking into account the requirements for economic forecasting models, such as explainability, adequacy and accuracy, characteristics of BOKDPM are as follows. First, considering the accentuated influence of global economic conditions on the domestic economy, BOKDPM was designed as a two-country open economy model, with the US economy as a counterpart to the Korean economy. In addition, the model explicitly addresses the mutual relation between the financial and real economic sectors, so as to explain the influence of global financial markets seeping into the domestic economy. Second, the model introduces modern econometric techniques, such as the stochastic-trend modelling and Bayesian estimation technique, to prevent the short-term predictive power of forecasts from declining even in the case of changes in the growth trend. Third, the BOKDPM was run on various statistical test methods recently developed in central banks of major countries, including ex-post

forecasting tests like forecasting memory, correlation between forecasts and outcomes, and so on, to systematically evaluate whether BOKDPM is suitable as an economic projection model.

According to the test results, forecasts made by the BOKDPM retain highly stable accuracy for more than four quarters ahead, and its accuracy is comparable to that of a VAR model specialized at data tracing. This result is seen to imply that the BOKDPM, which is developed on coherent and internally consistent theories, can also provide reliable forecasts, and can therefore be used effectively in making monetary policy decisions.

The Bank of Korea plans to ameliorate the BOKDPM further in the following ways: first, global oil and asset prices sectors will be included into the model, given their growing influence over the global economy. Meanwhile, by conditioning policy rate on the Taylor rule and market expectation paths, the BOKDPM can now be used for simulation of alternative policies. Second, the model will be expanded further to apply stochastic trend modelling techniques to consumption, investment and import/export so that the model can suggest growth paths for each sector that constitutes the aggregate GDP. In addition, the model will incorporate China, Japan and other countries rich in natural resources in order to reflect indirect repercussions of the externals shocks through those economic blocs. Third, uncertainty pertaining to economic forecasts will be accurately estimated using the Bayesian approach, so that the BOKDPM can present probability distributions for all other endogenous variables coherently besides GDP and CPI. The BOKDPM could also be utilized to calculate the joint probability of concurrent events under a given scenario.