

Foreword

In recent years, central banks have increasingly used option markets to construct measures of market conditions and market participants' expectations. Most recently, techniques have been developed that use option prices to estimate or recover the entire expected distribution (probability density function, PDF) of future financial asset prices such as interest rates, exchange rates and equity prices. These PDFs allow for a more complete characterisation of the state of market expectations.

There are a number of different techniques currently used to estimate PDFs from option prices, and in some cases they have produced different results. There is at this point no consensus on which technique should be used in which situation. Moreover, opinion differs as to how PDFs should be interpreted. As the use of estimated PDFs has become increasingly popular in the central banking community, the BIS decided to organise a one-day workshop on estimation and interpretation of PDFs. The workshop was held in Basel on 14 June 1999 and organised by Gabriele Galati of the BIS and William Melick of Kenyon College, Ohio; it brought together experts from central banks, academia and the investment community. The background paper by Kevin Chang and William Melick provides an overview of the issues involved in the estimation and interpretation of PDFs.

The workshop was divided into two sessions. The first session addressed issues related to the estimation techniques. Before the workshop, participants received a common data set of settlement price data for options on eurodollar futures between 1 September 1998 and 30 November 1998. Participants were asked to estimate an implied PDF using their own technique for each trading day in the data set and to provide a standard set of summary statistics. The results, which are summarised in a note by William Melick, were discussed at the beginning of the first session.

Three papers were then presented. The paper by Neil Cooper (Bank of England) compared the accuracy of alternative estimation techniques using simulated distributions and applying a Monte Carlo test. The paper by Sophie Coutant (Bank of France) provided a theoretical framework for separating the risk-neutral density function from a risk-aversion function. She then estimated these functions using data on CAC options. Des McManus (Bank of Canada) applied alternative techniques to estimate PDFs from eurodollar futures and used different statistics to evaluate their performance.

The second session focused on applications of PDFs and on issues related to their economic interpretation. Gordon Gemmill (City University Business School) analysed the behaviour of PDFs estimated from FT-SE 100 option prices around a number of "crash episodes" and several election dates in the United Kingdom and evaluated their predictive content. José Campa (New York University), Kevin Chang (Credit Suisse First Boston) and James Refalo (New York University) used option data from Brazil to describe expectations of the real/dollar exchange rate and analysed the credibility of different exchange rate regimes. Finally, the paper by Jorge Barros Luís and Bernardino Adão (Bank of Portugal) used PDFs to evaluate expectations regarding interest rate convergence in Europe in the run-up to monetary union.

The BIS hopes that circulation of these conference proceedings will stimulate further discussion and research on implied PDFs. As the papers in this volume make clear, these PDFs offer an important new means of characterising market expectations. However, the papers also make clear the difficulties and caveats involved in interpreting these characteristics.

