

**A1** The analysis in the assessment makes use of models of the economy which aim to capture the main interactions between economic variables and provide estimates of how the economy responds both to changes in policy instruments, such as interest rates or taxes, and to factors such as changes in consumer and business confidence, production technology or oil prices. Models range widely in terms of the scope of the variables that they cover and the way in which they are calibrated. Different types of model may be better suited to different purposes. All models are necessarily a simplified representation of the economy, and hence should be viewed as illustrative of the way that the economy might respond in different scenarios.

**A2** Parts of the Treasury's analysis use the National Institute of Economic and Social Research's NiGEM model. This is a detailed multi-country model covering all OECD countries, with the rest of the world in blocks. The model is empirically estimated and so suitable for the range of modelling uses made of it in the assessment and some of the EMU studies. The model incorporates the links between economies through trade, competitiveness and financial markets, with extensive treatment of the factors that determine supply and demand in labour, capital and product markets, and in the monetary and financial sectors. The model is calibrated on past data, using econometric methods, although the precise detail of the model evolves from version to version as some relationships are respecified or re-estimated.<sup>1</sup> The complexity of the NiGEM model is both an advantage and a disadvantage. It captures a wide range of interactions and feedbacks between economic variables, but it is not always straightforward to identify the extent to which particular relationships in the model affect the results. The EMU studies also review results from other large-scale estimated models, including those of HM Treasury, the Bank of England, the European Commission, the IMF and Oxford Economic Forecasting.

**A3** As well as using NiGEM where appropriate, the two EMU studies by Dr Peter Westaway, *Modelling shocks and adjustment mechanisms in EMU* and *Modelling the transition to EMU* employ a smaller and simpler model of the world economy, which focuses on a limited number of variables in three blocks, representing the UK, the euro area and the rest of the world. The model is calibrated by selecting appropriate parameter variables reflecting the characteristics of each economy and estimated responses from other studies. The advantage of this approach is that the simple form of the model makes it easier to track the interactions between variables, while it is also straightforward to conduct controlled experiments by varying model parameters.

**A4** The model used by Professor Simon Wren-Lewis in his EMU study *Estimates of equilibrium exchange rates for sterling against the euro* has similar characteristics. This model is specifically designed to analyse equilibrium relationships and as a result does not attempt to model adjustment processes in detail.

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<sup>1</sup> For example, a change to the specification of trend productivity in the January 2003 version of NiGEM led to changes in the simulated price responses. To preserve consistency with analysis carried out in earlier phases of the preliminary and technical work, the original specification was used for the analysis described in the EMU study *Modelling the transition to EMU*.

**A5** Treasury estimates of the relationship between trade growth and GDP are derived from empirical analysis undertaken by Frankel, Romer and Rose (see the EMU study *EMU and trade*). The EMU studies, including the study by Professor Michael Artis, include comprehensive reviews of economic research that draw on a wide range of empirical analysis and models. Where necessary in the studies, this has been supplemented by new empirical work, including panel regressions to assess the extent to which EMU may have boosted trade between euro area countries, development of a structural vector auto-regression (SVAR) model of the UK economy, and regression analysis of the determinants of house prices in the UK and in large euro area economies, and of the determinants of inflation in the euro area since 1999.

# B

## ANNEX B: ASSISTANCE WITH THE PRELIMINARY AND TECHNICAL WORK

This assessment is the work of HM Treasury. The Treasury is grateful for assistance with the preliminary and technical work provided in a personal capacity by the following external economists in various ways:

- author of EMU study;
- reviewer of EMU study;
- contributor to the EMU study *Submissions on EMU from leading academics*;
- invited seminar presenter or discussant; and
- consultant to HM Treasury.

All content and conclusions in the assessment are the responsibility of HM Treasury alone.

Christopher Allsopp, reviewer of EMU study

Professor Michael Artis, EMU study author, reviewer of EMU study, seminar discussant and consultant to HM Treasury

Dr Martin Baily, reviewer of EMU study and seminar discussant

Professor Ray Barrell, contributor to EMU study and seminar presenter

Dr Jonathan Beaverstock, seminar presenter

Professor David Begg, seminar presenter

Professor Iain Begg, contributor to EMU study

Erik Britton, seminar presenter

Professor Willem H. Buiter, contributor to EMU study

Professor Lars Calmfors, contributor to EMU study

Professor Wendy Carlin, contributor to EMU study and seminar presenter

Professor K. Alec Chrystal, seminar presenter

Dr David Cobham, seminar presenter

Professor E. Philip Davis, reviewer of EMU study and seminar presenter

Professor Paul De Grauwe, contributor to EMU study

Professor Jean Dermine, contributor to EMU study

Dr Karen Dury, assistance on EMU study

Professor Barry Eichengreen, contributor to EMU study

Professor Antonio Fatás, contributor to EMU study

Professor Carlo A. Favero, contributor to EMU study

Professor Jeffrey Frankel, contributor to EMU study

Professor Francesco Giavazzi, contributor to EMU study

Dr Andrew Glyn, contributor to EMU study and seminar presenter

Professor Charles Goodhart, reviewer of EMU study and seminar discussant

Dr Clemens Grafe, contributor to EMU study

Dr Daniel Gros, contributor to EMU study

Professor Andrew Hughes Hallett, contributor to EMU study and seminar presenter

Professor Peter B. Kenen, contributor to EMU study

David Marsh, seminar presenter

Professor Paul Masson, contributor to EMU study

Professor Geoffrey Meen, contributor to EMU study

Professor Jacques Mélitz, contributor to EMU study

Dr Laurence Meyer, reviewer of EMU study and seminar discussant

Professor Patrick Minford, contributor to EMU study and seminar presenter

Professor John Muellbauer, contributor to EMU study, reviewer of EMU study and seminar presenter

Professor Robert Mundell, contributor to EMU study

Dr Kathryn Pain, seminar presenter

Nigel Pain, seminar presenter

Dr Laura Piscitelli, advice on EMU study

Professor Christopher Pissarides, reviewer of EMU study and seminar discussant

Dr Stephen Redding, reviewer of EMU study

Professor Lucrezia Reichlin, seminar presenter

Professor Andrew K. Rose, contributor to EMU study

Professor Bob Rowthorn, seminar presenter

Professor David Soskice, seminar presenter

Dr David Stasavage, seminar presenter

Professor George S. Tavlas, contributor to EMU study

Professor Peter Taylor, seminar presenter

Edwin Truman, reviewer of EMU study and seminar discussant

Professor Tony Venables, advice on EMU study in capacity as consultant to HM Treasury

Professor David Vines, reviewer of EMU study

Dr Peter Westaway, EMU study author on secondment to HM Treasury

Professor Holger Wolf, contributor to and reviewer of EMU study

Professor Simon Wren-Lewis, EMU study author and seminar presenter

Professor Charles Wyplosz, contributor to EMU study