

# **ESRC Macroeconomic Modelling Bureau 1995-99**

## **Report of Research Activities and Results**

### **1. Background**

Macroeconometric models play a key role in the macroeconomic policy-making process. They provide a consistent and comprehensive account of the relevant economic interactions and interdependencies, quantified with reference to historical data. Different models are built for different purposes, however, and not only models but also the problems they address evolve over time, as social and political changes alter the focus of economic attention. Moreover models are built in accordance with an underlying view of the way the world works. Thus different models may provide different estimates of the response of the economy to policy interventions and innovations. It is then important to identify the sources of such disagreement, and to reduce it where possible.

The ESRC Macroeconomic Modelling Bureau was established in 1983 to improve the accessibility of macroeconomic models of the UK economy, to promote general understanding of the properties of these models, their forecasting performance and policy implications, and to undertake comparative and methodological research. This was an important initiative by the Macroeconomic Modelling Consortium, itself established in 1983 to coordinate support for a programme of research in macroeconomic modelling provided by the Research Council, HM Treasury and the Bank of England, and to manage this on a four-year cycle. The Consortium supported the Bureau in each of its four four-year phases, albeit at a declining level, until the programme was discontinued in 1999. The present report covers the period of the fourth and final award, which provided for the appointment of 2.15 full-time-equivalent research staff over this period, together with the buy-out of one-quarter of the Director's time over two years.

### **2. Objectives**

- (1) to promote general understanding of the properties and policy implications of models of the  
UK economy;
- (2) to develop and apply techniques for the comparative analysis of the models and their  
associated forecasts and policy implications, in a sustained and consistent manner;

(3) to identify the sources of disagreement between models and, where possible, to resolve such disagreement;

(4) to arrange conferences on macroeconomic modelling and research, including the work of the Bureau, that will also provide a forum for discussion of modelling issues of general interest.

The relevant models of the UK economy specified in the Bureau's contract were those developed with Consortium support and the model of HM Treasury. The former group comprises the Cambridge University Small UK Model (CUSUM), the Cambridge SVAR project, the "COMPACT" model group based in Exeter and Glasgow, and the London Business School (LBS) and National Institute of Economic and Social Research (NIESR) models.

The above objectives were met by

(1) continuation of the series of review articles in the *National Institute Economic Review*

(§4.1 below), contributions to other media (§5, §6, §7), continued distribution of the PC-Ready Reckoner program and development of the Virtual Economy website (§6),

(2), (3) a sequence of research studies (§4),

(4) the organization of an annual residential conference and other activities (§5).

### **3. Methods**

The methods used followed and extended those developed under previous awards. Various characteristics and properties of a model, and the results of various model-based exercises, can be used for descriptive and analytic purposes. Any of them can also be used for comparative purposes, given several models, and then it is necessary first to ensure that the comparison is a valid one and secondly to understand, explain, and possibly resolve any differences that emerge.

Two rounds of model deposits were planned, as in the preceding award, this time for late 1996-early 1997 and late 1998-early 1999. On the first occasion deposits of the current versions of the models and their associated solution databases were complete by mid-January 1997, covering the COMPACT, CUSUM, LBS, NIESR and Treasury models; the Ernst and Young ITEM Club kindly provided access to their forecast base for the Treasury model, for which no solution database is supplied by the model proprietor. On the second occasion some deposits were much delayed, since the modellers' own revision process had been much complicated by the revision of the National Accounts, not only to

adopt the new European System of Accounts (ESA95) but also to rebase the constant-price series to 1995. For this and other reasons an ITEM forecast base for the Treasury model was no longer available, and a solution base was constructed by a Bureau staff member with the cooperation of Oxford Economic Forecasting (his subsequent employer). These delays in turn delayed the publication of the second comparative properties article. In between times a new model, the Cambridge structural VAR model, was also received (see §4.8 below).

In addition to the models of the UK economy which were the focus of the Consortium award, three global-economy models which had been studied in a project supported by the ESRC Global Economic Institutions research programme remained available to the Bureau and remained a relevant vehicle for answering particular research questions. These were the MSG2 model of Warwick McKibbin (Australian National University and Brookings Institution), the IMF's MULTIMOD model, and the NIESR's global economic model NIGEM.

Following successful implementation of the models, comparative work begins with a study of overall model properties, in which dynamic multipliers and ready-reckoners are calculated under standardized conditions. This study serves a dual purpose. First, it meets the demand for basic summary information about the models; the results are discussed in §4.1 below. Second, it indicates particular features of the models for more specific research. Having identified the differences of interest in model responses, the source of these differences can be located in the model structure by diagnostic simulations, in which the importance of a particular transmission mechanism is assessed by alternatively switching it off. Sometimes the results point to a basic error or inconsistency which may be readily remedied. Other times particular features of different models represent genuine alternative specifications, which may be subject to econometric evaluation. The sensitivity of overall model properties to improved or revised specifications that emerge from econometric testing may be assessed by observing the impact of the alteration on the comparative simulation results.

It should be emphasized that the model research methods summarized above would be virtually impossible to implement without hands-on access to the models and their databases. Several models are run in their own solution software; one is run in WINSOLVE, developed with Consortium support by Richard Pierse, with whom we have had several fruitful exchanges. This program is also used to develop "toy" models to illustrate particular issues. The econometric research methods employed are those of standard time-series econometrics as embodied in widely distributed packages such as PC-GIVE and MICROFIT. Routines for analysing linear rational expectations models (§4.4) are locally written in GAUSS and MATLAB.

## **4. Results**

### ***4.1 Comparative properties***

As noted above, the Bureau's analysis of the overall properties of models via standard simulation experiments helps fulfil its objective of increasing general understanding of the models while suggesting directions for further research. The results are presented in articles entitled "Comparative properties of models of the UK economy".

An article reporting the results of the first exercise appears in the July 1997 issue of the *National Institute Economic Review*. Following a brief overview of the structure of the five models, in particular with respect to their representation of the channels of the monetary policy transmission mechanism, the results of four simulation experiments are analysed. These are carried out in a standardised policy environment, in which the interest rate and the basic rate of income tax are used to target the inflation rate and to ensure fiscal solvency. The results show that monetary shocks soon affect the response of quantity variables, and fiscal shocks have monetary consequences, thus the operation of monetary and fiscal policy cannot be separated. Although the Bank of England's view is that it takes two years for monetary policy to have its maximum effect on inflation, the results show that this depends on the approach taken to the modelling of expectations. The basic simulation results also inform other research in progress. Two particular areas had already seen considerable development during the previous award, and have continued to receive attention. These are the role of equilibrium and disequilibrium concepts in the theoretical structure of the models, and the modelling of new fiscal and monetary policy regimes. We discuss these in turn in the following paragraphs.

### ***4.2 The theoretical paradigm***

This line of research explores the sources and nature of short-term rigidities and their relation to the implied long-run equilibrium of the models. What is now the standard paradigm, among both modellers and policy analysts, sees a broadly neoclassical view of macroeconomic equilibrium, in which the level of real activity is independent of the steady-state inflation rate, coexisting with a new Keynesian view of short-to-medium term adjustment, in which real and nominal rigidities result in a relatively slow process of dynamic adjustment to equilibrium. While the specification of price and wage equations may ensure that the models are inflation-neutral in the long run, the potential persistence in output and employment disequilibria may nevertheless leave considerable scope for fiscal policy whose effects, although temporary, strictly speaking, may still be well worth having.

These issues were initially explored in a paper on the LBS and Treasury models. First, a simple analytical framework illustrates the determination of the non-accelerating inflation rate of unemployment (NAIRU) in the models and acts as a benchmark for their comparison. Next, the dynamic specifications of the price and wage equations are assessed. Since this provides relatively few conclusions about the dynamic implications of the complete models, however, some simulation experiments are then undertaken. The basic experiments comprise a demand (government expenditure) shock and a supply (technical progress) shock; in the latter case this is the first time this has been done in published work on UK models, as far as we are aware. Several diagnostic simulations

provide an explanation for the differences that emerge in the basic simulation responses of the models, despite their common general framework. This work is published in a collected volume by Macmillan.

A further exercise develops the analysis of technical progress by extending its impact to both employment and investment equations, and considering the effects of a change not only in the *level* of labour-augmenting technical progress, which typically would not be expected to change the NAIRU, but also in its *growth rate*, which might be expected to give a permanent change in the natural rate of activity. Simulation results in the latter case provide some evidence that the natural rate of unemployment in the Treasury model might indeed be falling, whereas the NIESR and COMPACT models indicate substantial technological unemployment as a result of this shock. This work is published in the *National Institute Economic Review* and will also appear in a collected volume arising from the January 1998 ESRC Conference.

### **4.3 Fiscal policy**

The specification of a fiscal policy reaction function or fiscal closure rule that enforces the government's intertemporal budget constraint is increasingly recognised to be an essential requirement in large-scale models. However different models typically embody different fiscal closure rules, and there has been little study, either analytical or practical, of the comparative properties of the different rules, although it has long been suspected that differences in the rules have contributed to observed differences in comparisons of simulation results. Accordingly a systematic study of the characteristics of different fiscal policy rules was undertaken, considering both their theoretical properties and their comparative behaviour in model simulations. The rules developed by the proprietors of the three models studied in our global model comparison exercise are a good representation of the range of possibilities in more general use, and for this purpose we continued to work with the same three models. All the rules in use choose a tax variable as the relevant policy instrument.

The theoretical properties of the different rules are analysed in the context of a two-equation dynamic system comprising a rule and the government budget constraint. The style of analysis follows that used by the IMF in the development of the MULTIMOD rule, except that it is formulated in discrete time and uses difference-equation methods. For tax-difference rules that target either the debt/GDP ratio or the deficit/GDP ratio and tax-level rules which include the MSG2 "incremental interest payments" rule as a special case we establish stability conditions and show how both the steady-state implications and, to some extent, the short-run dynamics can be made comparable across the different forms of rule. For tax-difference rules the steady-state position depends on the exogenous target values, which can be made mutually consistent in the sense that the Maastricht targets of a 60 per cent debt ratio and a 3 per cent deficit ratio, while arbitrary, are exactly compatible if nominal GDP grows at 5 per cent per annum. The parameterisation of the tax-level rules determines both the equilibrium response and the speed of adjustment to equilibrium.

The operating characteristics of the different policy rules in full-model simulations are then studied. The simulation is of a permanent fiscal contraction in the United States, in

which the level of US government expenditure is decreased by 1 per cent of baseline US GDP. This is associated with a rule-of-thumb ten percentage point reduction in the debt/GDP ratio in the long run. Many of the theoretical equivalences and differences previously established are observed in the simulation results, and where differences emerge their implications for the general macroeconomic outcomes are also explored.

The results of this work have an important message for the organisers of model comparison conferences, such as those sponsored by the Brookings Institution. When inviting model proprietors to come to a conference armed with the results of model simulations of a given scenario of interest, it is not enough to ask that the simulations be run with their "normal tax-rate reaction functions" in place. Since the "normal" rules on some leading models differ substantially in their impact on simulation results, their performance must be standardised along with the conditions of the given scenario, and we have shown that there are various ways in which this can be done.

#### **4.4 Monetary policy**

The shift in the objective of monetary policy from the maintenance of sterling within its ERM bands to the direct control of inflation had a considerable impact on monetary policy modelling during the period of the previous award. This was further stimulated by the granting of operational independence to the Bank of England and the establishment of the Monetary Policy Committee in May 1997. The use of monetary policy rules that attempt to reflect the inflation targeting objective of the MPC is now commonplace in macro models and hence in our standard simulation exercises, as noted above, and further explorations of three related issues have been undertaken.

A first piece of research, published in *Economic Modelling*, comprises a comparative control exercise on four of the UK models. The target is the reduction of inflation; the policy instrument is the short-term interest rate. Within a standardized experimental design full numerical optimization or feedback control rules are employed as appropriate. An important distinction between models is whether expectations, particularly concerning exchange rate behaviour, are treated in a backward-looking or forward-looking manner. It is found that only the model that adopts the rational expectations hypothesis comes close to satisfying the theoretical proposition that the inflation rate should be changeable without altering any real magnitude.

In some countries' inflation targeting regimes, the objective is specified as a range of outcomes for future inflation; in the UK a similar range is used for ex-post monitoring. How wide should this band be? One way of answering this question is to build a macroeconomic model of the economy and then use suitable analytic or numerical techniques to assess the variance of inflation under alternative policy reactions to shocks. A Bank of England study estimated a "small semi-structural model" of the UK economy with backward-looking expectations, and used stochastic simulation techniques to calculate the variance of inflation under simple feedback rules for interest rates, concluding that there exists "a fairly substantial lump of inflation uncertainty" in the United Kingdom, which implies, for example, that there is "on average, a no better than one in four probability of hitting a 1%-4% inflation target". The model had several important shortcomings, however, such that inflation responds only weakly to interest

rate changes, and hence was ripe for re-evaluation. In revising the model, our main extensions are the endogenization of the exchange rate and the adoption of an explicit forward-looking treatment of expectations. These changes, together with a recalibration of the error covariance matrix to reflect the reduced magnitude of shocks experienced in the last decade of the sample, achieve a fairly substantial reduction in inflation uncertainty: the estimated probability of hitting a 1%-4% inflation target is increased from "no better than one in four" to almost 0.9. From a methodological point of view, this work also shows how analytical solution methods can replace the Bank's stochastic simulation methods in linear models with rational expectations. Following the receipt of referee reports, this work is undergoing further revision prior to resubmission for publication.

A third exercise explores in detail the characteristics of the monetary transmission mechanism in the United Kingdom, as portrayed by the NIESR model. Sensitivity to different monetary policy regimes and to alternative models of consumers' expenditure is assessed. The methods adopted quantify not only the total impact of a temporary monetary shock on the main GDP components but also the contributions of the various transmission channels. Our analysis supports the evidence that the interest sensitivity of consumption becomes significantly lower when consumers "excessively discount" the future. More interestingly, we note that monetary shocks have relatively large effects on the real economy through their repercussions on fiscal variables; this is more obvious when the exchange rate is fixed and departures from Ricardian equivalence are enhanced.

#### ***4.5 Fundamental Equilibrium Exchange Rates***

Public discussion of possible UK membership of the European single currency prompted a return to the question of the value of the real exchange rate that is compatible with medium-term macroeconomic equilibrium - the fundamental equilibrium exchange rate (FEER) - also studied in our previous award. The FEER is the rate compatible with an economy growing at its "natural" rate with unemployment at the NAIRU and where any deviation of the current account from balance is sustainable through inflows or outflows of capital over the medium term. The long-run relationships which form the supply side and trading sectors of the Treasury model are solved to give this equilibrium rate. The actual real exchange rate in the middle of 1997 is found to be 18% overvalued, and given the movements in domestic and world prices and the nominal exchange rate in the last year the gap in the last quarter of 1998 is probably of similar magnitude. Sensitivity analysis shows the calculations to be reasonably robust to assumptions about the level of the NAIRU and the size of the current account deficit that can be financed in the medium term. This work was published in the *National Institute Economic Review* in July 1999 and received much press attention at the time.

#### ***4.6 The tax wedge***

Different modellers make different assumptions about the impact of changes in taxation on wage determination and hence on the NAIRU. For example the Treasury presents econometric evidence that tax changes do have a long-run effect, whereas the London Business School assumes that they do not. Thus the Treasury model, on which the

Chancellor probably places greater weight, can be shown to predict a beneficial unemployment response to an income tax cut. In the LBS model such benefits disappear in the long run, although adjustment is relatively slow and the temporary benefits are not dissimilar. These findings appear in our October 1996 *Newsletter*.

#### **4.7 *Uncertain forecasts***

The importance of accompanying published macroeconomic forecasts with some measure of their uncertainty is increasingly recognised. The Treasury has reported the mean absolute error of its forecasts for many years; more recently complete probability distributions (densities) of inflation and growth forecasts have been introduced by the National Institute, while the Bank of England also presents a density forecast of inflation in the form of a fan chart. Some technical objections to the way this is done and the presentation of an alternative fan chart are discussed in an article published in the January 1999 issue of the *National Institute Economic Review*; this work was the subject of the "Economics Focus" feature in *The Economist*, 27 March 1999. The production and publication of any kind of forecast subsequently requires an evaluation of its quality, although for density forecasts the appropriate techniques scarcely exist. In a joint project with researchers at the University of Pennsylvania and the National University of Singapore, evaluation techniques are developed and applied to a long-established series of density forecasts of US inflation. This work is published in a collected volume by Oxford University Press.

#### **4.8 *Structural VAR modelling***

The Cambridge structural VAR model is a quarterly model in eight core variables, based on long-run relations from economic theory embodied in an otherwise unrestricted vector autoregressive framework. It is structural in the sense that classical exact or over-identifying a prior restrictions are imposed, but only on the cointegrating relations of the model, thus it is an example of what is termed in the MICROFIT manual and elsewhere "long-run structural modelling". This model is rather different from the mainstream models to the extent that several of the Bureau's "standard simulations" are not relevant to the study of its properties. Accordingly it was not included in the usual "Comparative properties ..." exercise. Instead, a separate comparative study was initiated, comparing impulse responses for cointegrated VAR systems with selected simulation dynamic multipliers, extending the methods used in similar work by Adrian Pagan and others. This study was undertaken in collaboration with a visiting research fellow who had previously analysed similar Dutch models; unfortunately he was taken ill before the work was completed, and further progress awaits his return to full health.

### **5. *Activities***

A two-day residential seminar was held at Warwick each July. The programmes contained between 14 and 16 papers, typically two or three by Bureau members and the remainder by outside speakers. Average attendance was 70. Overseas attendance grew, with participants from the Central Banks of Armenia, Austria, France, Israel, Italy, Korea, Norway and the Netherlands, and from university, government and business



communities in Australia (TGM Ltd), Denmark (Danish Economic Council, Statistiks Denmark), Finland (ETLA), France (CEPII, OECD), Germany (Heidelberg), Poland (Warsaw), Sweden (National Institute of Economic Research), the Netherlands (CPB) and the USA (Federal Reserve Board). The July meeting thus became a focal point for the modelling community, initially domestic but increasingly international; many overseas visitors used it as an opportunity to keep up-to-date with what is going on in the UK, which is seen as a world leader in this area.

The Bureau was approved as a "host laboratory" by the Human Capital and Mobility Programme of the European Union, and awarded funding for four "institutional fellowships", two one-year post-doctoral and two two-year pre-doctoral, to be held at the Bureau during this period. This provided a valuable research training opportunity for the four HCM fellows. The two post-docs, Rudy Douven and Marga Peeters, now hold positions at the Central Planning Bureau and the Central Bank of the Netherlands, respectively, while the two pre-docs, Reinhard Madlener and Olivier Salomé, are continuing postgraduate research in their home countries, Austria and Belgium respectively.

Over 30 external seminar and conference presentations on the Bureau research programme and related issues were made. Highlights included a keynote address to the International Symposium on Forecasting, Barbados; a one-day workshop on recent developments in macroeconomic modelling at the National Institute for Economic Research, Stockholm; and testimony on the role of model-based analysis in the evaluation of new policy proposals to the Australian Senate Select Committee on a New Tax System.

## **6. Outputs**

The REGARD database return includes publications on the research topics described above and comprises 4 book chapters and 11 journal articles; 4 further journal articles have been accepted for future publication, and 15 discussion papers were issued, listed in the Appendix. The Discussion Paper series includes Bureau research papers in the pre-publication stage, as is common practice, together with relevant papers by other researchers for whom this represents a convenient outlet for their work. (DP47, by Chris Melliss of HM Treasury, has been particularly widely cited.) Publication lags imply that further articles are "forthcoming" in 2000.

The PC-Ready Reckoner program was updated periodically and continued to be widely used. The same approach to macroeconomic policy analysis was also incorporated into the *Virtual Economy* website. This was developed by a consortium of the Institute for Fiscal Studies, Biz/ed (a curriculum development service for economics and business education based at the Institute for Learning and Research Technology at the University of Bristol) and the Bureau, with support from the Nuffield Foundation. Launched in February 1999, the site combines an updated version of IFS's "Be Your Own Chancellor" internet service and a macroeconomic model based on the Treasury model. It allows users to see the effects of changes in taxes and benefits, government expenditure and interest

rates at both micro and macro levels. It has proved very popular, and has an active user group operating through a mailbase discussion list.

Eight *Newsletters* were distributed during the period of the award, together with a "farewell" issue in November 1999. These contained information about seminars and conferences, Bureau research and other activities, and other items of interest to the macro-modelling community. The average circulation was approximately 540 copies.

Bureau web pages were further developed and were heavily visited.

## **7. Impacts**

The research results and other development work described above have fed back into the modellers' own development work and into education and training in macroeconomics more generally. Several individual pieces of research have been the subject of press comment, and have also provided an opportunity for letters to the press on topical issues, published by the *Financial Times* and the Business Section of *The Times*.

The University of Groningen conferred an honorary doctorate on the Director of the Bureau, Professor K.F. Wallis, during its 385th anniversary celebrations in June 1999. The "laudatio" delivered on the occasion made particular reference to his "fundamental contributions to the advancement of macroeconometric model building in the broadest sense" and to the work of the Bureau.

## **8. Future research priorities**

Two pieces of work-in-progress remain to be completed in personal research time. In November 1999 the ESRC rejected an application to establish a Macroeconomic Modelling Research Seminar Group, to continue and extend the networking and seminar activities of the Bureau.

## **APPENDIX**

### ***Forthcoming publications***

Mitchell, P.R., Sault, J.E. and Wallis, K.F. (1999). Fiscal policy rules in macroeconomic models:

principles and practice. *Economic Modelling*, forthcoming.

Peeters, M. (1999). The public-private savings mirror and causality relations among private savings

investment and (twin) deficits: a full modelling approach. *Journal of Policy Modelling*, forthcoming.

Smith, P.N. (1999). Output price determination and the business cycle. *Economic Modelling*, forthcoming.

Tay, A.S. and Wallis, K.F. (1999). Density forecasting: a survey. *Journal of Forecasting*, forthcoming.

***ESRC Macroeconomic Modelling Bureau Discussion Papers***

40. Comparing global economic models, by Peter R. Mitchell, Joanne Sault, Peter N. Smith and

Kenneth F. Wallis (October 1995).

(Revised version published in *Economic Modelling*, 15 (1998), 1-48)

41. Investment, R&D and trade in manufactures, by Robert Woods (November 1995).

42. The public-private savings mirror and causality relations among private savings, investment and

(twin) deficits: a full modelling approach, by Marga Peeters (January 1996).

(Revised version published in *Journal of Policy Modelling*, 21 (1999), forthcoming)

43. Using macroeconometric models in market planning: a simplified approach, by K.G. Knight and

D.S. Turner (January 1996).

44. Short-run rigidities and long-run equilibrium in large-scale macroeconometric models, by Keith

B. Church, Peter R. Mitchell and Kenneth F. Wallis (August 1996).

(Revised version published in *Market Behaviour and Macroeconomic Modelling*

(S. Brakman, H. van Ees and S.K. Kuipers, eds), pp.221-241. London: Macmillan, 1998)

45. The sensitivity of global model simulations to fiscal closure rules, by Keith B. Church, Peter R.

Mitchell, Joanne E. Sault and Kenneth F. Wallis (September 1996).

46. GDP-spillovers in multi-country models, by Rudy Douven and Marga Peeters (March 1997).

(Revised version published in *Economic Modelling*, 15 (1998), 163-195)

47. The Treasury forecasting record: an evaluation, by Chris Melliss (August 1997).

48. Evaluating density forecasts of inflation: the Survey of Professional Forecasters, by Francis X.

Diebold, Anthony S. Tay and Kenneth F. Wallis (September 1997).

(Revised version published in *Cointegration, Causality, and Forecasting* (R.F. Engle

and

H.White, eds), pp.76-90. Oxford: Oxford University Press, 1999)

49. Inflation target bands and the Bank of England's fairly substantial lump of inflation uncertainty, by

Silvia Sgherri and Kenneth F. Wallis (October 1997).

50. Technical progress and the natural rate in models of the UK economy, by Keith B. Church,

Peter R. Mitchell, Joanne E. Sault and Kenneth F. Wallis (February 1998).

(Revised version published in *National Institute Economic Review*, No.164 (1998), 80-89)

51. Asymmetric density forecasts of inflation and the Bank of England's fan chart, by Kenneth F.

Wallis (July 1998).

(Revised version published in *National Institute Economic Review*, No.167 (1999), 106-112)

52. Fiscal policy rules in macroeconomic models: principles and practice, by Peter R. Mitchell,

Joanne E. Sault and Kenneth F. Wallis (October 1998).

(Revised version published in *Economic Modelling*, (1999), forthcoming)

53. Properties of the Fundamental Equilibrium Exchange Rate in the Treasury model, by Keith B.

Church (September 1998).

(Revised version published in *National Institute Economic Review*, No.169 (1999), 96-104)

54. Monetary transmission channels, monetary regimes and consumption behaviour, by Silvia Sgherri

(September 1999).