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NATIONAL INSTITUTE OF ECONOMIC AND SOCIAL RESEARCH

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Martin Weale	Institute Director

CHAIRMAN'S PREFACE

The National Institute aims to produce high quality academic research which is relevant to the needs of business and public policy-makers. Although we receive no core funding from government and are outside the university sector, we have attempted to assess our performance against the standards applied nationally to academic institutions.

In November 1998, at the Director's suggestion, the Council of Management instigated a review of the Institute's research and strategy. The purpose was to check how far the Institute is fulfilling its goal of producing high-quality research, by carrying out an evaluation similar to the Research Assessment Exercise which is run periodically by the Higher Education Funding Council in England.

The university exercise is conducted by committees of experts. In our case we felt it was important to establish a general impression of the Institute's reputation in a manner which did not put an excessive burden on any individual. The Review was therefore conducted by despatching enquiry forms about the Institute's standing and research outputs to about 200 evaluators, including our Governors, financial sponsors and supporters as well as senior civil servants, journalists and key business leaders. Respondents were invited to rate the Institute's research as if scoring it on the scale (1–5*) used for the purposes of the Research Assessment Exercise; they were also asked about the impact and visibility of Institute research and about the usefulness of the Institute's quarterly *Economic Review*. Over 100 completed enquiry forms were received, giving a response rate of 53 per cent, with the majority (60 per cent) coming from the academic world.

The Institute's work falls into three distinct fields:

- economic, modelling and macro analysis;
- education, training and employment;
- the international economy.

Each field was assessed separately by respondents with appropriate expertise. I am pleased to report that the modal score in each of the three main areas of our research was rated as grade 5, which the Higher Education Funding Council defines as 'Quality that equates to attainable levels of international excellence in up to half of research activity submitted [for assessment] and to attainable levels of national excellence in virtually all of the remainder'. Ratings by our academic peers tended to be slightly higher than those given by other groups.

Given the findings on quality, we were encouraged by the strong consensus that the Institute has a higher profile than most research institutes within universities. One quarter of respondents believed that our visibility was comparable with leading international institutes, many of which are larger and receive public core funding. In all categories of the National Institute's work we achieved a high score for visibility and policy relevance.

All types of readers found the articles we publish in the *National Institute Economic Review* highly interesting, with the quality of material in the *Review* showing an improving trend. Most respondents identified the same trend of continuous improvement in the Institute's output and reputation; this impression was most marked in economic modelling and macroeconomic analysis.

Respondents were also invited to suggest areas for further development of Institute research and activities. These, along with other material, will be considered by a Strategy Committee of the Council of Management as the second stage of the review process. We will suggest ways in which the Institute might build on its present strengths as identified in the first stage, to enhance the quality of our output.

At the start of the year, the role that independent institutes can play in helping government to conduct its business was brought into sharp focus. I was approached by HM Treasury and the Bank of England for help in conducting a review of the Average Earnings Index (AEI), which is one of the variables the Monetary Policy Committee looks at when setting interest rates. The review was urgent, since the operation of the Index had apparently become disrupted, leading to unjustified fears about inflation. The work was undertaken jointly by myself and a Treasury civil servant, Peter Sedgwick, and started towards the end of 1998. By March 1999, the statistical problems had been isolated and a series of recommendations made to prevent further disruption. I appreciate the understanding which colleagues on the staff of the Institute showed while I was pre-occupied with this assignment.

A major achievement of the past year has been the renewal of support from the Economic and Social Research Council (ESRC) for our programme of macroeconomic research. The National Institute has a long and distinguished record in such research, and we were pleased to be able to maintain our position in this field. This follows the winding up of the Macroeconomic Modelling Consortium and a shift in the ESRC's priorities for work in macroeconomics. A particular aspect of our proposal is that we have set up a group of users of research with whom we will discuss our work as it progresses. We are very happy that Dr DeAnne Julius of the Monetary Policy Committee has agreed to chair this group.

The development of our Global Econometric Model has continued. The latter has its own group of users including a majority of the Central Banks in the European Union; we are glad to have welcomed the Bank of England as an additional model user in 1999. Users are able to feed in their own assumptions, manipulate data and analyse policy options; we value the insights that users provide to us and the benefits that our links with them give to our research programme.

The division between macroeconomics and microeconomics is not as clear as it used to be and much of our work has always had microeconomic or microeconometric content. This can be illustrated by reference to some of our new projects which have just started or are about to start. One of these, funded by the ESRC, is intended to look at the way in which the provision of welfare benefits has influenced savings behaviour. This international study, in partnership with the universities of Boston and Verona, involves the combination of household survey and demographic data.

Another new project, also supported by the ESRC, lies on the happy boundary between methodological research and an important policy question. Considerable attention is paid by government, analysts and the media to surveys of firms as indicators of business confidence. The figures are usually presented as the proportion of optimists less the proportion of pessimists. But is this really an efficient way of extracting the information from the individual responses of the firms? Does one need to distinguish firms which rarely change their mind from those which shift from optimism to pessimism at the drop of a hat? Only a study of the individual responses can answer these questions.

Over the past year, the high calibre of the Institute's research has received tangible recognition from many other grant-giving organisations, both within the UK and overseas. We are indeed grateful for this support, notably from the Joseph Rowntree Foundation and the Leverhulme Trust. Towards the end of 1999, the latter announced that they would support work in another research area in which the Institute has considerable expertise: education. The Trust is supporting a multidisciplinary study of the effect of student fees on universities. This will allow us to examine the social composition of university students, and levels of demand for higher education, in the last year of free tuition as compared with conditions under the new fee-paying regime. As universities respond to the changes, their costs as well as the structure and content of courses are likely to alter. The exact effects are difficult to predict, as each university will face different pressures; but it is important to understand the implications of fees for the future of higher education so that government can act to counter unintended detrimental effects.

Yet another research project which is now well-established is an evaluation of the effects of the government's New Deal for young people. This research was commissioned for a total of three years as part of a wider evaluation strategy by the Employment Service in collaboration with the Department for Education and Employment. Key findings which have already emerged include a fall in youth unemployment in Great Britain of about 30,000 – equivalent to a fall in youth long-term unemployment of about 40 per cent. On the other hand, less progress has been made in reducing long-term unemployment in other age groups.

Over recent years, the Institute has progressively been extending the wider European aspects of its work. It has had considerable success in attracting research funds from the European Union, including an ACE programme grant for a study of trade, growth and integration with reference to the countries of central Europe who are now seeking membership of the Union. Special projects on forecasting and leading indicators have also been undertaken for the European Statistical Office (EUROSTAT) in Luxembourg. In September 1999, a National Institute Senior Research Fellow, John Arrowsmith, was seconded to the Foreign and Commonwealth Office so that he could be attached to the office of the European Central Bank in Frankfurt. His position there will help UK government to track the progress of European monetary union at a critical stage in the development of the single currency.

New staff for 1999: from left Atsushi Kobori, Tracy Anderson, Paul-Emmanuel Micolet, Tatiana Kirsanova, James Mitchell, Francis Terry, Simon Kirby and Paul Ashworth.

Further details of the Institute's progress are set out on the following pages of this report. We continue to give strong emphasis to the dissemination of research results, through publication in learned and professional journals, including the National Institute's *Economic Review* and our series of Discussion Papers. Coverage of the Institute on the Internet has again been expanded, with the exciting development of an interactive web-site, thanks to ESRC support. This allows users to assess the implications of tax and public spending decisions for themselves, and is explained more fully on page 8. Other details of our research outputs are listed on pages 6–17.

Finally, I should re-iterate our deep appreciation to the many sponsors of our research, to our corporate members and other donors. Nor, of course, would we be able to conduct our far-reaching programmes of inquiry without the skills and reputations of our staff, whose contributions to our output and standing I am proud to acknowledge.

Economic forecasts based on macro models continue to attract considerable attention from business, government and the media. But statistical leading indicators of economic activity can provide an alternative basis for short-term forecasts. Two projects at the National Institute, supported by EUROSTAT and the ESRC, have looked at the question of producing 'automatic' indicators from time-series of statistical data.

Although the OECD continues to publish leading indicators of economic activity, in the traditional form, official bodies in both the UK and the United States have discontinued the practice. The main problems with constructing leading indicators are that they involve manipulating a large number of potential variables and tend to be subject to large variations. Bitter experience suggests that, if indicators are selected on the basis of their performance in regression equations, they are often likely to perform rather poorly, thus undermining confidence in their application.

An alternative approach, being explored by staff at the National Institute, breaks away from traditional, autoregressive models for which movements in economic output are, in effect, predicted largely on the basis of past trends. We have designed instead an 'automatic' means of extracting the salient features from up to 20 possible indicator variables, in a process referred to as 'data reduction', and used these to produce forecasts of economic growth. These automatic leading indicators (ALI) models are re-estimated each quarter so that the data reduction is always sensitive to changes in the structure of the economy. The reduced data are then used to predict output growth in a dynamic equation which is also re-estimated in each quarterly period.

We compare the performance of our ALI forecasting models with the set of all possible regression equations that could be estimated from the data set. The results have shown that, forecasting two periods ahead, our automatic models outperform the majority of other models in most cases and do better than the simple autoregressive alternative. The table below gives an indication of how results from the ALI models compare over a typical period with the performance of traditional autoregressive models. Data are given for four selected European countries. Despite the encouraging results, as compared to other multivariate forecasting models, in a number of cases the models do not yet perform to the required standards of reliability. While the overall improvement in forecasting performance is not large, it tends to be greatest in periods of economic disturbance such as the UK recession of the early 1990s. Work is continuing on possible avenues for further extensions to the ALI model.

The performance of the National Institute automatic leading indicators forecasting models: 1990 (third quarter)–1998 (second quarter)

	Root mean square forecast error as % of that of autoregressive model	% of regression models beaten by automatic models
France	96.8	32
Germany	97.4	80
Italy	93.6	75
United Kingdom	76.8	85

Note: This research was financed by EUROSTAT and the ESRC.

Intangible investments such as R&D, or education and training, can give a country a competitive edge as well as playing a strategic role in companies' performance. Econometric estimation using company accounts data for five OECD countries (the UK, Germany, France, Italy and the US) have yielded some interesting results on the impact of R&D on productivity in a wide range of manufacturing and non-manufacturing sectors.

Considering all five countries together, the elasticity of output with respect to R&D was estimated at 0.25. But our research has also revealed considerable variation across countries (see table below). The US was found to have the lowest R&D elasticity, consistent with diminishing returns to R&D, since that country has typically devoted a higher percentage of GDP to research activities. The estimated R&D elasticity for the UK was significantly below that in other European countries, in particular relative to France and Italy, and was not found to be significantly different from the estimated coefficient for the US. The result for the UK is puzzling since its economy-wide R&D–output ratio is less than that of France or Germany. Part of the explanation may lie with institutional factors, such as the greater degree of competition in the UK and the US than in continental European economies.

The impact of R&D on productivity was found to be significantly greater in manufacturing than in non-manufacturing firms, and there were differences also in its impact across individual sectors. Some specific sectors were examined: namely chemicals, non-electrical machinery, computing equipment and business services. In the high technology chemicals and computing equipment sectors, the impact of R&D on productivity was higher than in manufacturing as a whole. Although R&D elasticity was smaller in traditional machinery and in business services, it was far from negligible and a greater proportion of these firms invested in R&D than in the manufacturing sample as a whole. The conclusion is that it is important not to under-rate the contribution to innovative activity of firms in traditional rather than high technology sectors.

Country/sector	R&D as % of GDP	Elasticity of output with respect to R&D
All countries		0.25
UK	1.39	0.18
France	1.47	0.53
Germany	1.78	0.27
Italy	0.60	0.39
USA	1.95	0.10
Sectors		
Manufacturing	3.97	0.24
Chemicals	7.91	0.35
Traditional machinery	2.90	0.14
Computers	7.50	0.33
Market Services	NA	0.14
Business Sector	13.00	0.17

Notes: R&D as % of GDP, average over period 1990–1996.Manufacturing: average over five countries. Individual sectors average values for company accounts sample.Source: M. O'Mahony and M, Vecchi, 'Tangible and intangible investment and economic performance: evidence from company accounts', report to the European Commission, DG3, July 1999. Copies are available on request from m.omahony@niesr.ac.uk.

In support of its policy of maintaining a tight control of public borrowing, the government has introduced two rules to which it intends to stick. The first is that, over the economic cycle, the cumulated total of public borrowing should not exceed public net investment (the 'Golden Rule'). The second is that the ratio of public debt to GDP should not exceed 40 per cent of GDP. Success in following these rules will, it is thought, keep the public finances in much better shape than they have been since before the First World War; but they do not tell us the whole story.

The annual total for public borrowing is calculated using conventional definitions of government revenues and expenditures. But there are areas of uncertainty. Are national insurance contributions government revenue or should they be treated as a loan to be repaid when the contributor starts to draw an old-age pension? Either interpretation is possible; but the choice can have a major impact on the value of public borrowing in any year, even though it has no implications for the long-term solvency of the government.

Techniques of generational accounting, developed at the National Institute, offer an alternative means of assessing fiscal policy which is isolated from such problems. Spending plans and tax revenues are related, as far as possible, to the age structure of the population, so that the present discounted value of future expenditures on, and receipts from, those currently alive can be calculated. Since the total present value of expenditures has to equal that of incomes, any imbalance between the two will have to be met by a net contribution from unborn children.

The significance of generational accounting is that it brings back to the present issues of long-term imbalance, whereas conventional accounting could leave the policy-maker to worry about the future when it comes. The fiscal burden of an ageing population can be dealt with either by running a surplus now so as to pay for the costs when they arise, or by allowing taxes to rise as the population ages. Either of these approaches is consistent with the Golden Rule but it is clear that, from the point of view of smoothing the tax burden, the first is preferable.

Following on from the Institute's work on the construction of generational accounts, a web site – www.niesr.generationalaccounts.ac.uk – has been set up to allow users to assess the tax changes needed in order to pay for shifts in public expenditure. For example, users can calculate how much income taxes need to rise if old age pensions are to be raised by any given amount. The user could specify a 'live now-pay later' policy, whereby tax changes are introduced after expenditure is increased, or alternatively could see the benefits of saving up for a rainy day, by raising taxes in advance of a planned increase in expenditure. A more elaborate spreadsheet model has also been developed, which users can download in order to assess expenditure changes in more detail. An illustration is given by the table below, which shows the increase in different types of tax which would be needed in order to pay for a 20 per cent increase in the value of old-age pensions.

Possible alternative ways of paying for a 20 per cent increase in old-age pensions

Type of tax	% increase in revenue needed
Taxes on income	6
VAT	10
Alcohol duties	97
Petrol tax	20

The past ten years have seen a rapid expansion in the number of graduates. The proportion of men aged 20–29 with degrees has risen from 12.5 to 15.3 per cent between 1986 and 1996. More strikingly, the proportion of men aged 40–49 obtaining degrees has risen from 11.9 to 21.1 per cent in the space of a decade, indicating the importance of mature study as a means of raising the graduate population. At the same time the number of men qualified to A-level has also risen sharply.

Research at the National Institute is probing the underlying characteristics of these trends. It might be expected that increased participation rates would damp the returns to higher education. Indeed, there is evidence of a steady downward drift in the earnings of young men with A-levels, but no such trend is visible in the earnings of young graduates. On the other hand the median earnings of graduates over 40 have declined fairly steadily.

The General Household Survey makes it possible to identify factors which influence earnings and thus to assess the return to a degree. It suggests that a degree gained through full-time study is worth considerably more than one earned part-time. Many of the part-time students are likely to be older than the full-time students and it may be that, for a variety of reasons, older people are not in a position to exploit fully the benefits that a degree confers.

Looking at the population of graduates who studied full-time, the data for 1995 suggest that, so far, the rate of return to a degree remains substantial. Even after allowing for fees, but also assuming some term-time earnings, there was an average private rate of return to degrees in most subjects of around 16% p.a. Returns were lower for students of architecture, engineering, mass communication and education and were negative for students of the humanities and biological sciences. Social rates of return, reflecting the cost of the provision of education to society, were in the region of 11% p.a. for most subjects, 7–8% p.a. for architecture etc. and again negative for humanities and biological sciences.

The findings of this research suggest that the government has been correct in expanding higher education beyond the average levels seen in the mid-1990s. If more recent data, when they are available, indicate that private returns have been maintained, then there is a strong case for raising the fees charged to students.

Men's qualifications and earnings: 1981–96

	Degree				A-level			
	20–29	30–39	40–49	50–69	20–29	30–39	40–49	50–69
	Percentage of male cohort qualified to level shown							
1981	8.2	11.3	6.7	5.8	18.5	10.8	6.2	4.1
1986	12.5	15.2	11.9	9.2	19.6	13.9	6.9	
1991	10.3	13.5	15.7	10.2	20.8	16.1	11.1	7.3
1996	15.3	18.3	21.1	11.6	25.3	17.2	15.3	10.6
	Median earnings (median of whole population = 100)							
1981	103	161	218	249	93	123	135	119
1986	103	164	176	183	90	111	120	
1991	116	164	189	183	85	121	122	115
1996	107	167	165	160	81	119	119	116

Source: *General Household Survey.*

Changing technologies and globalisation have increased the demand for skilled workers. A recent Institute study has examined trends in the demand for workers by highest educational qualification and industry sector.

Throughout the member countries of the OECD, earnings and employment prospects of unskilled workers in comparison to skilled workers have deteriorated over the past two decades. These developments are generally associated with a shift in labour demand against those who are unskilled, caused by changes in technology and globalisation. However, existing research has been relatively vague as to where in the distribution of skills such trends are becoming important, and it has predominantly focused on the manufacturing sector.

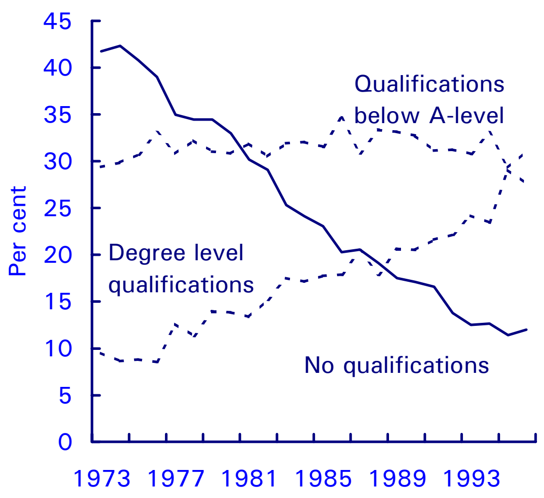
A recent Institute study has examined the skill bias of technical progress in the UK, using information on earnings and employment by highest educational qualification from the General Household Survey and from the Labour Force Survey. Although it might be argued that occupational classifications are a better proxy for skill than educational qualifications, the study finds that looking at education levels better captures recent trends in labour demand. The trend increase in the wage bill share of non-manual workers, in both the production and service sectors over the past two decades, is mainly due to the trend increase in the wage bill share of highly qualified workers.

Workers are classified according to whether they have degree level qualifications, qualifications below degree and above A-level, A-level qualifications, qualifications below A levels, or no qualifications. The study finds evidence that technical change has been biased towards skills at all levels of this skill distribution in the production and service sectors. Econometric evidence suggests that the demand for skilled labour can be split into three distinct skill categories: the high skilled, with qualifications at or above A-level, the intermediate skilled, with qualifications below A-level, and the low skilled, with no qualifications.

One important finding from the analysis of results is that the increase in demand for skills is not only an increase in the demand for the high skilled, but also an increase in the demand for basic qualifications. Furthermore, the study finds that the skill bias against those with no qualifications compared to those with basic qualifications has increased from the mid-1970s to the mid-1990s. But, from the 1980s onward, as the number of highly qualified people has increased, the bias towards those with higher qualifications has decreased.

This research follows on from previous work at the National Institute which compared workforce skills in Germany and the UK. One implication of the present study is to confirm the importance of raising qualifications at the lower end of the UK skill distribution. The government's initiative to establish National Vocational Qualifications (NVQs) was in part a response to this problem, although clearly further progress needs to be made.

Service sector wage bill share of workers with:



EMPLOYERS DOMINATE PAY SETTING

The joint determination of pay and other major terms of employment by employers and unions declined dramatically between 1984 and 1998, setting Britain apart from its European partners as having the most decentralised and employer-dominated arrangements for setting pay.

The Institute has played a major part in the analysis of the 1998 Workplace Employee Relations Survey, the latest in a series of internationally-regarded surveys of employment relations. Its analysis shows that the proportion of employees whose pay is determined by collective bargaining declined more steeply in the 1990s than it had done in the 1980s. The decline was particularly rapid in the services sector, both private and publicly owned. Around a half of the overall decline arose because fewer workplaces, especially new ones, recognised trade unions at all; the remainder arose because fewer employees were covered by union negotiations in workplaces where unions retained recognition.

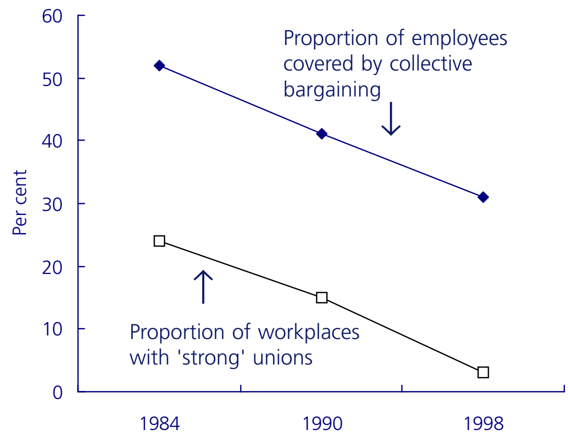
Coverage of collective bargaining, 1984–98

	Proportion of employees covered		
	1984	1990	1998
All workplaces	70	54	40
Broad sector			
Private manufacturing	64	51	46
Private services	40	33	21
Public sector	95	78	62

Source: Workplace Industrial Relations Survey series: workplaces with 25 or more employees

These changes are part of a broader picture of increasing employer dominance and union weakness that has emerged from the Institute's analysis of the survey series. Of particular note is the rapid demise of private sector workplaces with strong unions, as indicated by very high membership density, a closed shop or strong

Coverage of collective bargaining and 'strong' unionism in the private sector, 1984–98



Source: Workplace Industrial Relations Survey series: private sector workplaces with 25 or more employees

support for unionism from management. These are the workplaces where unions had a demonstrable effect on private sector pay levels in the 1980s. This effect still shows through in the 1998 results, but these forms of strong unionism are now confined to fewer than one in twenty workplaces in the private sector.

Ongoing analysis suggests that any remaining union wage premium might simply be a historical residue, reflecting union strength in earlier times and lags in the adjustment of pay levels in unionised workplaces to current economic conditions.

The Institute's work analysing the 1998 Workplace Employee Relations Survey and its three predecessors, dating back to 1980, is led by Neil Millward and John Forth. The Leverhulme Trust supported the work leading to a book – *All Change at Work?* – to be published in May 2000 by Routledge. Other organisations co-funding the survey series are the DTI, ESRC, ACAS and the Policy Studies Institute. The Joseph Rowntree Foundation is supporting the Institute's work on pay determination.

Many people are familiar with the evidence that points to high average mathematical attainment among Japanese pupils; the Third International Mathematics and Science Study (TIMSS) survey of 1995 provided further evidence – if any were needed – of the advantage that Japanese children as young as 8 or 9 years have over English children of similar ages in terms of mathematical achievement. The reasons for the difference in attainment are harder to find, however. Do Japanese children possess greater mathematical knowledge on beginning schooling? Or do they make faster progress in the acquisition of mathematical knowledge in the early days of schooling? And, if so, what is it about the education system or the pedagogy that enables this faster learning to take place?

These and other questions have been addressed in a comparative study of children's mathematical learning published by the National Institute (see page 20), which identifies key areas for changes in policy and practice.

The study relates to the attainment and progress of pupils aged six and seven years in a small number of state primary schools in London and Tokyo, carefully chosen to be as representative as possible. It was clear that when Japanese children began school aged six, their mathematical knowledge and numerical competency were significantly below that of the English children of a similar age who, by dint of an earlier age of starting school, had had the benefit of between one and two years of formal schooling by that time. Twelve months later, however, positions had been reversed, with the faster progress made by Japanese pupils enabling them to out-perform their English counterparts.

While differences in cultural attitudes and practices must be contributory factors in explaining the faster progress, the study identified major structural and pedagogical differences in the teaching and learning of mathematics. The dangers of cultural borrowing in the teaching of mathematics have been elaborated by other authors, but it is instructive here to consider a single contributory factor which is not distinctively a part of the Japanese culture.

For example, the study indicates that the use made in Japan of rigorous, thorough, well-presented teachers' manuals helps all teachers – including those who are not especially confident in their subject – to present and deliver competent, properly sequenced lessons. The result is that children's understanding and knowledge develops in a step-by-step logical way. The teachers' manuals, together with textbooks and supplementary work sheets, identify the concepts to be developed, key points to be covered and questions to be asked that will draw explanations from pupils. Whereas teachers in England face the time-consuming task of preparing wide-ranging lesson materials, teachers in Japan, freed from this burden, are able to concentrate on the successful delivery of the lesson and the level of understanding acquired by each pupil.

Japan is not alone in providing high quality teacher's manuals for use in the classroom; this approach is shared by many of those countries in which pupils – as judged by results of international tests – achieve high average standards in mathematics. Indeed, in recent years, inspectors and advisory teachers in the London Borough of Barking & Dagenham, in collaboration with researchers at NIESR, have successfully developed teaching materials for primary mathematics – based on models brought from Switzerland – in which detailed teachers' manuals play a key part. These teaching materials have been instrumental in raising average standards of mathematics and are now attracting interest nation-wide for the improvements they can bring.

INWARD INVESTMENT AND TECHNICAL CHANGE

The creation and exploitation of knowledge are viewed as key factors driving economic growth. Foreign direct investment is one of the mechanisms for the diffusion of knowledge across national borders. Thus the location of economic activity could be an important influence on national growth prospects. The UK has long been the primary location for inward investment within Europe, with the total stock of inward direct investment rising from 10½ per cent of GDP in 1978 to almost 25 per cent of GDP by the end of 1998. The political appeal of such an achievement may, however, divert attention from some of the longer-term economic factors at work.

Popular discussion of the benefits of inward investment often focuses on the number of jobs linked to such investments. This may not be an appropriate way of assessing whether there are benefits from inward investment in the economy as a whole. Ultimately, if real wages are sufficiently flexible, inward investment should affect only the types of jobs available rather than the quantity, unless it can be shown that it has wider effects on the growth process. The key question is whether inward investment raises national income. As improvements in technical and organisational efficiency, sometimes referred to as total factor productivity, are known to be the main driver of economic growth in the industrialised economies, it is natural to ask whether inward investment affects technical progress.

Research at the National Institute has investigated the impact of inward investment on technical change throughout the UK economy using a number of different models and data sets. Our results indicate that inward investment has had an important effect on technical efficiency, and hence productivity growth, in the manufacturing, financial services and distribution sectors, but has not affected public services or transport and communications. These findings appear to be robust to the presence of other potential determinants of growth such as imports, domestic R&D expenditures and human capital. They do not indicate that inward investment is the only source of technical change in the UK economy, but they do indicate that it is an important and significant one, accounting for around one-third of output growth in manufacturing and the private service sectors from 1972 to 1996.

The potential disadvantage of an aggregate analysis for a single sector such as manufacturing is that the findings may reflect a 'batting average' effect rather than genuine spillovers of technology or working practices from inward investors to domestic producers; foreign firms are more productive on average, so a rising share of them within the total population of firms will raise the average level of productivity.

A separate study, using a panel data set of the activities of domestic firms in fifteen manufacturing industries, has been undertaken to test directly whether the presence and scale of foreign-owned firms affects the performance of domestically-owned firms.

The results confirm that the presence of foreign firms has helped to raise the technical efficiency of domestic firms. Besides significant intra-industry effects, there is evidence of inter-industry spillovers from foreign firms located elsewhere in the manufacturing sector. These two effects are of similar size, suggesting that inward investment has helped to transfer innovative business techniques, and management practices, that can be applied across a wide range of industries, rather than just new processes and products that are specific to a particular industry.

The implication is that investment promotion policies designed to improve the attractiveness of the UK as a business location, and improve the dissemination of new business practices across industries, are at least as important as policies designed to target inward investment in selected industries.

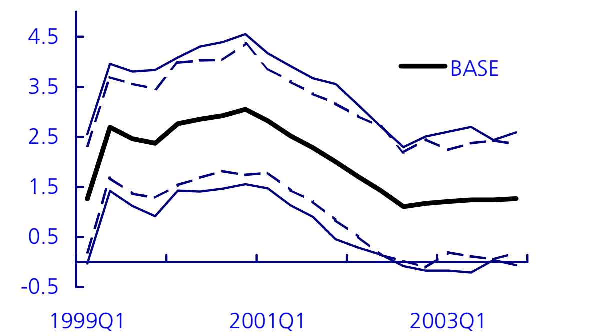
Evaluating monetary and fiscal policy by deterministic simulations is of great value in understanding the effect of particular shocks to the economy. However the evaluation of options and risks in an uncertain world using different policy assumptions is important and the ability of policy rules to deal with repeated shocks is the most effective way in which they can be evaluated.

Over the past year the development of stochastic simulation techniques on the National Institute's Global Econometric Model, NiGEM, has enabled research to be carried out into the properties of various types of monetary policy rules. Investigation has focused on the stabilisation properties of policy rules: inflation targeting, money targets and combined regimes such as those adopted by the European Central Bank.

The effects of output and inflation on reducing volatility in economic time series have been examined with the aim of contributing to the debate on the best overall monetary policy rule for some of the main economies including the US, UK and 'Euroland' as a whole, as well as individual EMU member states. Stochastic simulation techniques also allow for the probable occurrence of events, such as deficits in excess of 3 per cent of GDP, to be analysed. The probabilities of individual EMU member countries breaching the Stability Pact developed from the Maastricht Treaty have been examined under various monetary policy rules. Further work has also examined the possible gains from policy coordination between some of the major economies. Increased economic integration has resulted in more rapid transmission of macroeconomic shocks across world economies and the role that policy coordination could play is being investigated. Results suggest that coordination can lead to some reductions in economic volatility.

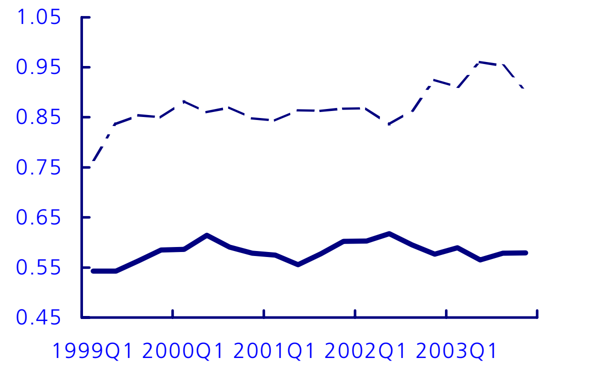
Research has also focused on analysing forecast uncertainty using stochastic simulations. We can construct forecast error bounds using stochastic simulations and Chart 1 below shows bounds around our forecast for UK inflation, under a combined nominal GDP and inflation targeting rule, and under a pure inflation targeting rule. Inflation targeting alone reduces uncertainty but not by much. We have also examined the effects of applying shocks to the exchange rates in stochastic simulations. Chart 2 plots the variability of UK inflation with and without shocking exchange rates. The chart shows that the variability of UK inflation is relatively flat for much of the forecast period and that shocking the exchange rate raises inflation uncertainty by 50 per cent in the UK. Our results suggest that fixing the exchange rate through membership of EMU will reduce the volatility of the UK economy.

Chart 1. 95 per cent confidence bounds for UK inflation under a combined money and inflation rule and inflation targeting rule



Dotted lines: inflation targeting. Solid lines: combined rule

Chart 2. Variability of UK inflation with and without shocking the exchange rates (RMSD)



Dotted line: all shocked. Solid line: exchange rates not shocked

FOREIGN DIRECT INVESTMENT IN CENTRAL EUROPE

Recent research at the Institute has investigated the factors influencing the flow of foreign direct investment (FDI) into central Europe and the impact it has had on the prospects for growth in the region.

The long-term nature of FDI motivates investors to take an active part in the decision-making process in host country firms. It, therefore, has the potential to accelerate technological convergence and improve economic growth prospects in central Europe. The aim of the research was to determine the factors influencing the distribution of FDI across countries and manufacturing sectors in central Europe, and to test the hypothesis that the presence of foreign-owned firms can increase productivity levels and lead to faster growth.

The research first considered aggregate inflows of FDI into eleven of the so-called transition economies which are seeking membership of the European Union. Country-specific characteristics were found to be important in determining flows, in particular the dominant methods of privatisation used, the extent of trade linkages with the advanced economies, and proximity to the European Union. A role was also found for relative costs within the region and perceived risk.

Spillovers from the inward stock of foreign investment and international trade were found to have a positive impact on the productivity of labour, indicating that increases in FDI were reflected in output and growth. The beneficial effects of FDI were also found to be higher in the more market-orientated economies. The study suggested that the observed increase in labour productivity was largely picking up the increasing presence of foreign firms within national economies, rather than significant spillovers from foreign firms to domestic firms.

In a second phase of the work we focused on the three largest economies in central Europe, Poland, Hungary and the Czech Republic, and looked at the distribution of FDI across manufacturing sectors. Sector-specific characteristics such as privatisation and market size were found to have an important place in making investment decisions. In addition, long-run cost differentials between the host and investor countries were found to play an important role. We found evidence that FDI has increased productivity levels in most manufacturing sectors, although some sectors have clearly absorbed more benefits than others. Labour productivity in the leather, transport equipment and 'other' manufacturing sectors does not appear to be strongly related to the stock of FDI. This may be explained by the fact that the model cannot capture changes in the quality of goods produced. Labour productivity in the former two sectors has, however, increased very rapidly over time, owing to external factors.

The findings of this research indicate that if a goal of the governments in central Europe is to increase the productive capacity of their economies, attracting foreign investors can accelerate this process. This may be particularly important for those sectors where there is no indication that productivity levels have increased over time due to influences other than FDI. These sectors include food, beverage and tobacco manufacturing; textiles; chemicals and petroleum refinery; and rubber manufacturing.

The research was conducted in collaboration with Charles University in Prague, the Institute of Economics of the Hungarian Academy of Sciences in Budapest and the Gdansk Institute for Market Economics. The National Institute would like to acknowledge the generous support of the European Commission which has been funding the research under its PHARE ACE Programme.

LABOUR PRODUCTIVITY AND SERVICE QUALITY IN BANKING AND HOTELS

Although Britain is widely believed to perform better in service industries than in manufacturing, recent international comparisons of service sector productivity levels based on national accounts data suggest that this is not the case for market services as a whole (although it may be true for some individual service sectors).

In an effort to shed light on the factors determining relative productivity performance in service industries, National Institute researchers, together with US and German collaborators, have carried out new detailed comparisons of matched samples of banking establishments and of hotels in Britain, the US and Germany.

The banking study focussed on commercial lending to 'middle market' or 'mid-corporate' business customers in the three countries and found that, after standardising for average loan size, average lending output per employee-hour in the German sample was an estimated 23 per cent higher than in the US and almost two-thirds higher than in Britain. This productivity ranking remained unchanged after consideration of various indicators of service quality as experienced by borrowers. For example, the British and German banks both sought to engage in 'relationship banking', making an effort to gain a detailed understanding of clients' businesses and markets and their associated credit needs while processing their credit requests. However, German banks were typically able to deliver this quality of service more rapidly and using fewer labour inputs than their British counterparts for several reasons, including their longer experience in pursuing relationship banking practices and their greater access to nationally-available business information systems which facilitate credit appraisal. Another factor enhancing German labour productivity was its lower use of clerical and secretarial support staff than in Britain (facilitated by the much higher proportion of apprentice-trained clerical staff in German banks).

In the case of the British–US comparison, it can be argued that the measured shortfall in British lending productivity partly reflected a more in-depth analysis of client credit needs provided to customers at the lower end of the mid-corporate market than typically occurred in the US. However, British productivity relative to the US was also hampered by the fact that British lending offices began working with personal computers later than in the US, and had therefore had less time to 'streamline' their working methods and procedures to take advantage of the potential efficiency benefits offered by this equipment.

In the hotels' comparison, the problems of controlling for service quality were addressed by confining the study to 3- and 4-star hotels in the three countries. On two different measures of average labour productivity – occupied rooms per employee-hour in front desk and related departments, and guest-nights per housekeeping employee-hour – the British sample was found to lag behind both the German and US samples in the 3-star category but came second to Germany, and ahead of the US, in the 4-star category. The main factors explaining this pattern of difference were: typically more efficient methods of work organisation and higher levels of workforce skills in German hotels than in either Britain or the US; a deliberately more labour-intensive approach to service delivery in US 4-star hotels than in Britain or Germany, reflecting the efforts of US hotels to maximise market share in a highly competitive market by competing on the quality of service (eg by providing more concierges and porters).

The results of the research have been published in *The California Management Review*, the *International Journal of Human Resource Management* and a forthcoming book published by Cambridge University Press on behalf of the Institute entitled *Productivity, Innovation and Economic Performance* (see page 21).

BUSINESS BENEFITS OF RACE EQUALITY MEASURES

More than two decades after the Race Relations Act, racial discrimination persists in the labour market. Unemployment among some of Britain's main ethnic minority groups is about double that of whites and people from ethnic minorities are less likely to achieve the same career progression as their white counterparts. Keen to encourage employers to improve race equality at work, the Department for Education and Employment (DfEE) commissioned a study into whether employers might derive business benefits from increasing race equality at work.

The study identified the following business benefits of race equality at work:

- *improvements to staffing*, including the alleviation of recruitment shortages, improvement in staff quality, improved morale, reduction in turnover, easier deployment of staff;
- *improved management and employee relations*, including reduction in disputes, improved management systems and ideas;
- *improved service to customers*, including improved understanding of cultural differences amongst customers and ability to converse in the customers' first language;
- *increased sales and improved marketing* through the use of the ideas and specialised knowledge of ethnic minority staff, through compliance with customer organisations requiring a race equality policy and through a public image which attracts ethnic minority customers;
- *improved relations with public bodies*, affecting, for example, the granting of planning permission and the receipt of grants;
- *avoidance of tribunal costs.*

Although all companies might derive benefits from improved race equality, the precise benefits are related to company circumstances. Not surprisingly, benefits are influenced by the labour markets in which the company operates: gains are more likely in tight labour markets. Product markets also influence benefits (for example, those selling to ethnic minorities, whether to the public or to other companies, are more likely to derive benefits) as does the degree of sophistication of the company's human resource system, with more developed systems enabling improvements to be made with little cost.

The companies which maximised benefits were those which had moved from an Equal Opportunities approach to race equality (trying to ensure that individual employees were not treated differently) to a Diversity approach (whereby the company recognised the diverse knowledge and approaches of employees and sought to exploit these). Such companies treated differences in culture, experience and knowledge between ethnic groups as a source of competitive strength, enriching the variety of ideas for product development, marketing and management. This approach also eased the introduction of race equality measures, as it resulted in race equality being seen as a contributor to (rather than a distraction from) business success.

As well as being of interest to academics and practitioners, the study will be used by the DfEE in its work with companies to improve race equality.

Crime and employment

UNEMPLOYMENT AMONGST OFFENDERS IS ABOUT 50 PER CENT – AND GAINING A JOB IS CLOSELY LINKED TO REDUCED RE-OFFENDING. FUNDED BY THE DFEE, THE NATIONAL INSTITUTE IS CONDUCTING A MAJOR STUDY OF THE BARRIERS TO EMPLOYMENT FOR OFFENDERS, EXAMINING THE RELATIVE EFFECTS OF PERSONAL AND EMPLOYMENT CHARACTERISTICS, THE CONVICTION ITSELF AND EMPLOYER DISCRIMINATION. THE LATTER IS OF PARTICULAR IMPORTANCE CURRENTLY, AS THE POLICE ACT WILL, FOR THE FIRST TIME, ALLOW EMPLOYERS TO BE PROVIDED WITH FORMAL STATEMENTS OF APPLICANTS' AND EMPLOYEES' CRIMINAL RECORDS.

NIESR COLLABORATES WITH AMUE TO HOST SEMINAR ON THE EURO

In April the National Institute joined forces with the Paris-based Association for Monetary Union in Europe (AMUE) to organise a one-day conference on *Managing the Euro in an international context: implications for domestic and external policy and institutions*. The conference aimed to stimulate debate between academic economists, business interests and policymakers on the European and wider consequences of the single currency. Speakers at the conference included Professor Ronald McKinnon of Stanford University and the Bank of England, and Robert McCauley from BIS, Hong Kong. Business was represented by, among others, Graham Bishop of Salomon Smith Barney and Michael Dicks of Lehman Brothers. The contribution from NIESR included presentations from Ray Barrell and John Arrowsmith.

LEADING EXPERTS CONTRIBUTE TO A ONE-DAY CONFERENCE THAT EXAMINES ISSUES RELATING TO INWARD INVESTMENT

The Institute organised a conference on foreign direct investment (FDI) into Britain in September 1999. The event took place at the British Academy and, apart from the attendance of over seventy leading experts and policymakers, attracted considerable interest from enterprise agencies and economic development units. The National Institute has a major programme of research on FDI, led by Nigel Pain (see above, page 15).

The Institute was delighted to welcome a member of the Monetary Policy Committe of the Bank of England, Dr DeAnne Julius, as Chair for part of the proceedings. Speakers included internationally known academics in the field of foreign direct investment, such as Magnus Blomström of the Stockholm School of Economics and Steven Globerman of Western

Dr DeAnne Julius of the Bank of England Monetary Policy Committee

Washington University. The experience of France was presented by Lionel Fonagne from the Centre d'Etudes Prospectives et d'Informations Internationales (CEPII) and the University of Paris. The regional impact of FDI was reviewed by a group from the University of Strathclyde, led by Professor Peter McGregor.

The proceedings of the conference are to be published by Macmillan in a book edited by Nigel Pain, and published in the autumn of 2000.

PROFESSOR JAMES STOCK OF HARVARD UNIVERSITY SPEAKS TO ACADEMIC CONFERENCE ON FORECASTING AND LEADING INDICATORS

In December 1999, the National Institute, in association with Professor David Hendry of Nuffield College, Oxford, and with ESRC support, brought together leading experts at a conference on *Forecasting and Leading Indicators*. The event was hosted by the Office for National Statistics and again attracted an international audience.

Professor David Hendry of Nuffield College, Oxford

The programme of papers featured the most respected academic figures in this area of research. Amongst those who spoke at the conference were Professor Denise Osborn of Manchester University, Neil Ericsson of the Federal Reserve Board and Professor Andrew Harvey of Cambridge University. NIESR's contribution included presentations by Martin Weale and Andrew Blake. Participants at the conference were also fortunate to hear one of the leading international experts, Professor James Stock of Harvard University. The event confirmed NIESR's position at the forefront of academic research in this area.

SEMINAR CONCLUDES NATIONAL INSTITUTE'S EUROPEAN FINANCIAL MARKETS PROGRAMME

In December 1999, the Institute held an international conference to mark the conclusion of its European Financial Markets Programme. The Programme, directed by John Arrowsmith, has been funded by a consortium of sponsors including the European Commission, financial institutions and UK government. The conference was chaired by Professor Charles Goodhart of the London School of Economics and the Monetary Policy Committee and included presentations from representatives of the Bank of England, NIESR and the financial sector.

The meeting of the European Financial Markets Programme, held at the Institute in December 1999. The chairman, Professor Charles Goodhart, sits in front of the window with John Arrowsmith, programme director, on his right.

GOVERNORS SEMINARS

The Institute continued its popular series of seminars given by members of its Board of Governors. These seminars are informal events at which the Institute's supporters and friends are particularly welcome. The year started with presentations by two leading figures in the field of macroeconomics, Professor John Vickers and Professor David Hendry. Professor Vickers, who is a member of the Monetary Policy Committee, spoke on *Aspects of Inflation Targetting*, while *Recent Developments in Economic Forecasting* was the subject for Professor David Hendry of Nuffield College, Oxford.

Clare Spottiswoode, Vice-President at PA Consulting Group

In September, Clare Spottiswoode, formerly Director-General of Gas Supply and a Vice-President at PA Consulting Group, gave a presentation on the topical subject of *Competition in Water: Is it Possible?* The seminar was chaired by the former electricity regulator, Professor Stephen Littlechild.

In addition to the Institute's Governors' Seminar series, Professor Danny Quah from the London School of Economics gave a presentation to members of NIESR's research staff. His talk concentrated on *The Weightless Economy in Economic Development.* The Institute is very grateful to all those who contributed to our seminars and conferences throughout 1999.

Britain's relative productivity performance 1950–1996. An international study

By Mary O'Mahony
ISBN 0 9526213 5 5 paperback. Price £75 including data on CD. Published by NIESR.

The author examines Britain's productivity performance in the postwar period relative to four other industrial countries – the US, Germany, France and Japan – considering both growth rates and relative levels of labour productivity, and physical capital, total factor productivity, human capital and unit labour costs. The aggregate economy is divided into ten broad sectors comprising agriculture, four production sectors, four market service sectors and non-market services. The book contains annual data series on the variables considered in the sectoral analysis, and some additional detail for sub-sectors, together with the sources and methods employed in constructing the data series.

Innovation, investment and the diffusion of technology in Europe: German direct investment and economic growth in postwar Europe

Edited by Ray Barrell and Nigel Pain
ISBN 0 521 62087 2 hardback. Price £35.00. Published by Cambridge University Press

The globalisation of the world economy has raised fears for employment and growth in the advanced economies. Foreign investment has been one of the major factors driving globalisation. The papers in this volume address the role of German foreign investment in the European growth process. The implications for the national economies are addressed, as are the determinants of outflows. The effects of foreign investment in host countries are also assessed, and the editors draw conclusions for future economic development in the European Union.

Modern budgeting in the public sector: Treasury rules in a comparative context

Edited by Ray Barrell and Florence Hubert
Occasional Paper no. 53. ISBN 0 952 6213 7 1 paperback. Price £18.50. Published by NIESR.

Public sector investment in the UK was low in the 1990s. Now budgeting methods have changed, planning has a three-year time horizon, and resources are to be better managed. This report compares public investment planning in the UK, the USA, Germany, France and the Netherlands. The UK appears to have suffered because of a lack of political will to maintain the public sector in the 1980s and 1990s but reforms are continuing, using new budgeting methods and drawing lessons from New Zealand and elsewhere. Chapters were contributed by Andrew Britton and Dirk Willem te Velde, in addition to the editors.

Strength in numbers: Learning maths in Japan and England

By Julia Whitburn
ISBN 0 9526213 6 3 paperback. Price £12.99 Published by NIESR.

Raising mathematical achievement among school-children in England is high on the political agenda. Large-scale international studies of mathematical achievement have established that Japanese school-children consistently outperform their English counterparts, and this is now apparent among children as young as 8–9 years old. This book examines at what precise age these differences first begin to emerge, and contrasts the ways in which mathematical knowledge is developed in the early years of schooling in England and Japan. The effect of pre-schooling experience on children's development in the first years of school is also considered. Ways to improve children's understanding of number structure through a consistent approach to developing both conceptual understanding and procedural competence are identified and discussed.

Forthcoming publications

Econometric modelling: techniques and applications

Edited by Sean Holly and Martin Weale
To be published by Cambridge University Press early in 2000.

Macroeconomic modelling has been one of the most important and influential areas of economic research. This book brings together contributions from the leading researchers working in the area. The papers combine a description of the latest techniques used in modelling the economy with an account of the way that models can be used for purposes of policy analysis. The book will be of interest to students and professional economists who want a better understanding of the questions that macroeconomic models can address and the techniques used to address them.

Productivity, innovation and economic performance

Edited by Ray Barrell, Geoff Mason and Mary O'Mahony
ISBN 0 521 78031 4 To be published by Cambridge University Press early in 2000.

Productivity and its determinants are at the heart of economic debate. Output per person or per capita is still the most influential measure of the prosperity of nations. Productivity depends on the quantity and quality of the factors of production available to a country and the social framework within which they operate. Education and the research base affect both the quality of factors and the ability of a nation to produce. This volume brings together papers from a number of authors from a variety of traditions. The importance of the growth and measurement of service productivity are addressed. The role of human capital in adapting to new technologies is discussed. The creation of knowledge through research and development and its diffusion through trade, investment and the interaction of firms are fully investigated. The volume starts with a discussion of differences in productivity between nations, and provides a comprehensive set of discussions as to why they exist.

Inward investment, technological change and growth: the impact of multinational corporations on the UK economy

Edited by Nigel Pain
To be published by Macmillan late in 2000.

At a conference held in September 1999, the speakers identified the channels through which inward investment can affect host economies and provided some quantitative evidence on the extent to which it has acted to shape the industrial structure of the UK economy and other industrialised economies over the past decade. The papers in this book are by leading authors in the fields of international investment and the behaviour of national and multinational firms. They have all published widely in leading academic journals and some have acted as informal academic advisors to government departments in the UK and overseas.

All change at work? British employment relations 1980–98, as portrayed by the Workplace Industrial Relations Survey Series

by Neil Millward, Alex Bryson and John Forth
To be published by Routledge in May 2000.

This book is the latest publication to report results from the series of highly-respected workplace surveys. Questions of labour management practices in Britain and trade union representation in the 1980s and the 1990s are addressed in this major analysis of longitudinal research data.

In 1999 the Institute's quarterly Economic Review *continued to provide a unique combination of analysis, forecasts and research results. Each issue contains widely quoted forecasts for the UK and all major world economies, based on the Institute's own models, together with articles from leading commentators, and a comprehensive statistical appendix. From October 1999, the* Review *has been available to subscribers on the world wide web.*

Articles which appeared during the year were as follows:

No. 167 (January)

Analysing major recessions: an analytical summary of a new study of large recessions in the twentieth century
J.C.R. Dow
The US stock market and the global economic crisis
Sushil B. Wadhwani
Asymmetric density forecasts of inflation and the Bank of England's fan chart
Kenneth F. Wallis

No. 168 (April) Themed issue on labour market flexibility

Family-friendly management: testing the various perspectives
Stephen Wood
Flexibility, quality and competitiveness
Bernard Casey, Ewart Keep and Ken Mayhew
Employment strategies for Europe: lessons from Denmark and the Netherlands
Ray Barrell and Véronique Genre

No. 169 (July)

Global stability: risks and remedies
J.S. Flemming, M.V. Posner and J.R. Sargent
The distributional effects of education expenditures
Jayasri Dutta
The impact of employee involvement on small firms' financial performance
Alex Bryson
Properties of the fundamental equilibrium exchange rate in the Treasury model
Keith B. Church

No. 170 (November) Themed issue on cities

Migration and British cities in the 1990s
Tony Champion
Innovative clusters: global or local linkages?
James Simmie and James Sennett
Housing and regeneration: the problem or the solution
Mark Kleinman and Christine Whitehead
City size, diversification, and income smoothing
Andrea Lamorgese

Articles for January 2000 will include the following papers:

Should the UK join EMU? *Michael Artis*
Comparative properties of models of the UK economy *Keith B. Church, Joanne E. Sault, Silvia Sgherri and Kenneth F. Wallis*
How well can we measure graduate over-education and its effects? *H. Battu, C.R. Belfield and P.J. Sloane*
The implications of the comprehensive spending review for the long-run growth rate: a view from the literature *Richard Kneller*

We will also be marking the end of the millennium with a special issue in April 2000 on a historical theme, which will include papers by John McDonald of Flinders University, Adelaide on 'Domesday economy: analysis of the English economy early in the second millennium'; ' Living standards in the UK, 1920–2000: a women's century' by Sara Horrell of Cambridge University; and 'Twelve hundred years of the pound sterling' by Martin Weale of the National Institute.

ANNUAL SUBSCRIPTIONS TO THE *REVIEW* ARE £105 OR £198 FOR TWO YEARS (UK AND EU SUBSCRIBERS) AND £115 OVERSEAS. FROM OCTOBER 2000 THE ON-LINE VERSION WILL BE CHARGED AT THE SAME PRICES. SPECIAL RATES ARE AVAILABLE FOR STUDENTS, TEACHERS AND INDIVIDUAL ACADEMICS. FOR FURTHER DETAILS PLEASE CONTACT ANNE STEWART AT THE NATIONAL INSTITUTE (020 7654 1923).

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Sedgwick, P. and Weale, M.R., *Review of the Revisions to the Average Earnings Index*, Report submitted to the Chancellor of the Exchequer by Sir Andrew Turnbull and Mervyn King, House of Commons, HC 263.

Sefton, J.A., 'A solution method for consumption decisions in a dynamic stochastic general equilibrium model', *Journal of Economics, Dynamics and Control, forthcoming.*

— and in't Veld, J., 'Consumption and wealth: an international comparison', *The Manchester School,* September.

Taylor, C.T., 'The role and status of the European Central Bank: some proposals for accountability and cooperation', in Crouch, C. (ed.), *After the Euro: Shaping the Institutions for Governance in the Wake of European Monetary Union*, Oxford University Press.

—'The UK: the new prospects', in *The Euro as 'Parallel Currency' 1999–2002*, Final report of the Trans European Studies Association to the European Parliament, Brussels.

—'The global financial architecture in a time of change: an exercise in building bridges', *The South African Economic Journal*, December.

Terry, F.R., 'The impact of evidence on transport policy making: the case of road construction', *Public Money and Management*, 19, 1.

Vecchi, M., 'Increasing returns versus externalities: pro-cyclical productivity in US and Japan', *Economica, forthcoming.*

Weale, M.R., 'Monetary and fiscal policy in Euroland', *Journal of Common Market Studies*, 37, 1.

Whitburn, J., 'The slow bird must start out early: research and practice in mathematics and beyond', in Jaworski, B. and Phillips, D. (eds), *Comparing Standards Internationally: Research and Practice in Mathematics and Beyond*, Oxford Studies in Comparative Education, Oxford, Symposium Books.

—'Why can't the English learn to subtract?', in Jaworski, B. and Phillips, D. (eds), *Comparing Standards Internationally: Research and Practice in Mathematics and Beyond*, Oxford Studies in Comparative Education, Oxford, Symposium Books.

—'Moving the goal posts', in British Academy special publication on *Educational Standards* (comment on the paper by Professor A. Wolf).

—'Managing variation in mathematics', in Aubrey, C. (ed.), *Maths for the Millennium, forthcoming*.

Whitburn, J. and MacLean, M., 'A comparison of Welsh and English children's understanding of number

words', *International Journal of Behavioral Development, forthcoming*.

Young, G., 'The influence of foreign factor prices and international taxation on fixed investment in the UK', *Oxford Economic Papers*, 51, pp. 355–73.

—*NIESR Report for the Institute for Manufacturing*, quarterly report, May, August, November.

—*The Pinnacle Economic Newsletter*, quarterly report for Pinnacle Insurance plc, February, May, August, November.

Papers presented

Anderton, R., Riley, R. and Young, G., 'The New Deal for Young People' early findings from the pathfinder areas', Education and Employment Economics Group Annual Conference, Swansea, July; Department for Education and Employment seminar, London, March; Centre for Economic Performance Workshop, LSE, February.

Barrell, R., 'Financial contagion and forward looking analyses of the East Asian crisis', Conference on Financial Market Contagion, EPA, Tokyo, March.

—'Fiscal and monetary policy in Europe', ETLA, Helsinki, June; Czech Central Bank, June.

—'Forecasting the world in an uncertain environment', British Association Conference, Sheffield, September; European Finance Ministries Meeting, Dublin, September; UN LINK Conference, Athens, November.

—'Modelling the world economy', Moscow Ministry of Finance, February; Central Plan Bureau, Brussels, February; Bank of Estonia, Tallinn, August.

—'Modern budgeting in the public sector', LCCI, October.

—'Openness, foreign direct investment and growth', Imperial College London, October; AIECE Conference, European Commission, Brussels, October.

—'Post offices and privatisations', Imperial College London, January.

Barrell, R. and Dury, K., 'International monetary policy coordination. An evaluation of cooperative strategies using a large econometric model', ESRC GEI Conference, London, June; UN LINK Conference, Athens, November.

Barrell, R., Dury, K., Holland, D., Pain, N. and te Velde, D., 'Financial market contagion and the effects of the crises in East Asia, Russia and Latin America', Central Plan Bureau, Brussels, March; WIFO, Vienna, May; DIW, Berlin, May; United Nations, New York.

Barrell, R., Dury, K. and Hurst, I., 'Analysing monetary and fiscal policy regimes using stochastic simulations', Money Macro Finance Conference, Oxford; European University Institute, Florence, April; United Nations, New York, May.

—'An encompassing framework for simple monetary policy rules', European Econometric Society Conference, Spain, September; Macro Modelling Bureau Conference, Warwick, July; Cardiff University, December.

Barrell, R. and Genre, V., 'Employment strategies for Europe', AIECE Conference, Statistics Norway, Oslo, May; HM Treasury, London, October.

Barrell, R. and Holland, D., 'A three-dimensional panel analysis of foreign direct investment in central European manufacturing', Conference on Modelling Economies in Transition, University of Lódź, Poland, December.

—'Foreign direct investment in central European manufacturing', Workshop on Poland and the Transformation in Europe, SSEES, London, November.

Barrell, R., Holland, D. and te Velde, D.W., 'NIESR's Višegrad Model', Workshop on Modelling the EU Accession Countries, Bank of Estonia, August.

Barrell, R. and Pain, N., 'Prospects for the world economy', United Nations, New York; AIECE Conference, Statistics Norway, Oslo, May.

—'Real exchange rates, agglomerations and irreversibilities: macroeconomic policy and FDI in EMU', European University Institute, Florence, April.

Barrell, R., Pain, N., Hubert, F., te Velde, D.W., Holland, D. and Genre, V., 'Prospects for the Euro Area', AIECE conference at Statistics Norway, Oslo, May.

Barrell, R. and te Velde, D.W., 'Catching-up of East German labour productivity in the 1990s', CESifo Conference on German Unification Ten Years After, Berlin, November.

—'Catching-up of East German labour productivity and convergence in Europe', Money, Macro and Finance Research Group Annual Conference, Oxford, September.

—'Labour productivity and convergence within Europe: East German and Irish experience', seminar at London Guildhall University, December.

—'European integration and manufactures import demand: an empirical investigation of 10 European countries', IESG LSE meeting, London, December.

Blake, A.P., 'An artificial neural network system of leading indicators', Royal Economic Society Conference, Nottingham, March.

Forth, J., 'Trends in British industrial relations, 1980–1998', Trades Union Congress, May.

—'Unemployment, flexible work and family income', Institute for Social and Economic Research, University of Essex, January.

Forth, J. and Millward, N., 'Changes in British industrial

relations, 1980–98', London School of Economics, November.
— 'First findings from the 1998 Workplace Employee Relations Survey', University of Strathclyde, January; Sheffield Hallam University, February.
Gokhale, J., Kotlikoff, L.J., Sefton, J.A. and Weale, M.R., 'Simulating the transmission of wealth inequality via bequests', NBER Summer School, Boston, August.
Hubert, F. and Pain, N., 'Foreign direct investment, spillovers and technical progress in the UK', Money, Macro and Finance Research Group Annual Conference, Oxford, September.
—'Inward investment and technical progress in the UK', University of East London, March; ESRC Macroeconomic Modelling Bureau Conference, Warwick, July; Econometric Society European Meeting, Santiago de Compostela, August; European Association for Research in Industrial Economics Annual Conference, Turin, September; NIESR Inward Investment Conference, The British Academy, September; University of Kent, November.
Kapetanios, G., 'Threshold models for trended time series', Royal Economic Society Conference, Nottingham, March.
—'Tests of rank in reduced rank regression models', Econometric Study Group Conference, Bristol; Econometric Society European Meeting, Santiago de Compostela.
Kapetanios, G. and Weeks, M., 'Nonnested models and the likelihood ratio statistic: a comparison of simulation and bootstrap-based tests', Econometric Society European Meeting, Santiago de Compostela.
Kneller, R.A., Bleaney, M.F. and Gemmell, N., 'Public expenditure taxation and growth: testing growth models', Money, Macro and Finance Research Group Annual Conference, Oxford, September.
Kneller, R. and Young, G., 'A macro-model of the London economy', LSE Seminar on Regional and Urban Economics.
—'London and the Single Currency', LCCI Breakfast meeting.
Lukacs, P., Pain, N. and Price, S., 'Manufacturing price determination in OECD countries: long-run evidence from a heterogeneous dynamic panel', Theories and Methods in Macroeconomics Annual Conference, University of Quebec at Montreal, May; European Economic Association Annual Conference, Santiago de Compostela, August; Money, Macro and Finance Research Group Annual Conference, Oxford, September.
Meadows, P., 'The flexible labour market: implications for pensions', Pension Provision Group, June; National Association of Pension Funds Autumn Conference, November.
—'The UK labour market', International Consulting Economists Association, February.
—'The Working Families Tax Credit and other financial support for families', All-Party Parliamentary Group on the Family, May.
—'Unemployment, gender and national employment plans: the invisible majority', National Institute for Working Life, Stockholm, May.
—'What works: evidence from local employment and training projects', Social Exclusion Unit Skills Policy Action Team, June.
O'Mahony, M. and Vecchi, M., 'Tangible and intangible investment and economic performance: evidence from company accounts', Annual Conference of the European Association for Research in Industrial Economics, Turin, September.
Pain, N., 'Economic prospects for the United States and Euroland', Standard Chartered Group Economists Conference, London, July.
—'Foreign direct investment in Europe: institutions, agglomeration and technical progress', Austrian Institute of Economic Research, Vienna, March; University of Reading, June.
Riley, R. and Young, G., 'Skill heterogeneity and the NAIRU', ESRC Macroeconomic Modelling Conference, Warwick, July; Queen Mary and Westfield College Staff Seminar, November.
—'The impact of the New Deal for Young People on unemployment, earnings and productivity', Department for Education and Employment Seminar, London, November.
—'The skill-bias of technological change in the UK', European Economic Association Conference, Santiago de Compostela, September; European Association of Labour Economics, Regensburg, September.
Taylor, C.T., 'Balance of payments prospects in EMU', European Financial Markets Advisory Panel, December.
te Velde, D.W., 'Dynamic heterogeneous panels of import demand', Birkbeck College, London, June and European Trade Study Group Conference, Rotterdam, September.
—'"The UK economy" by R. Kneller and G. Young in *National Institute Economic Review 167*', 59th Kieler Konjunkturgespräch, Kiel.

NATIONAL INSTITUTE DISCUSSION PAPERS *exist to foster early discussion of Institute research. 1999 papers are listed below. All discussion papers are available at £4.00 each or on subscription at £30.00 for 10 consecutive papers.*

144. *An artificial neural network system of leading indicators* Andrew P. Blake
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152. *A test of* m *structural breaks under the unit root hypothesis* George Kapetanios
153. *A radial basis function artificial neural network test for neglected nonlinearity* Andrew P. Blake and George Kapetanios
154. *A radial basis function artificial neural network test for ARCH* Andrew P. Blake and George Kapetanios
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Members Forum meetings in 1999 were as follows:

23 February • Productivity and competitiveness: how does Britain *really* compare?

Discussion led by Mary O'Mahony
Guests: William Price, HM Treasury
Simon Patrick, House of Commons, Treasury Select Committee
Ken Warwick, Department of Trade and Industry.

17 May • How far can we trust economic statistics?

Discussion led by Martin Weale
Guests: Dr DeAnne Julius, Monetary Policy Committee of the Bank of England
Simon Briscoe, Financial Times

21 October • The euro: a view from Frankfurt

Discussion led by John Arrowsmith
Guests: Dr Peter Westaway, Bank of England
Michael Ellam, HM Treasury

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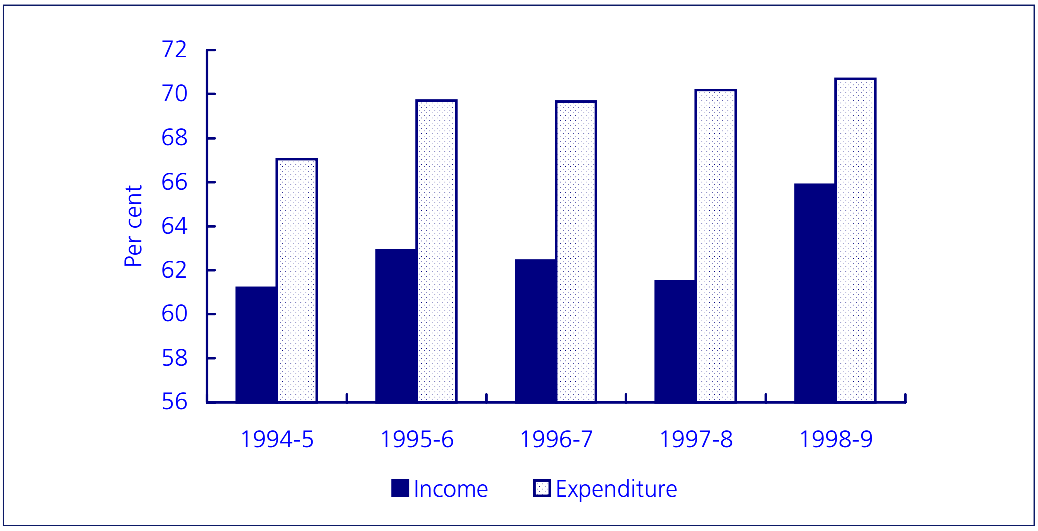
	1998–99	*1997–98*	*1996–97*
	£	*£*	*£*
INCOME			
Research	1,336,088	*1,098,949*	*1,114,504*
Publications	404,339	*412,004*	*384,971*
Corporate supporters	124,805	*123,415*	*142,558*
Investments and interest	162,742	*152,503*	142,910
Total income	**2,027,974**	***1,786,871***	**1,784,935**
EXPENDITURE			
Research	1,303,458	*1,190,856*	*1,194,084*
Publications	247,179	*249,937*	*220,227*
Premises	93,317	*79,117*	*55,794*
Administration and general services	200,006	*176,936*	244,002
Total expenditure	**1,843,960**	***1,696,846***	**1,714,107**
OPERATING SURPLUS/(DEFICIT)	**184,014**	***90,025***	***70,828***

Research income and expenditure as a percentage of total income and expenditure



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