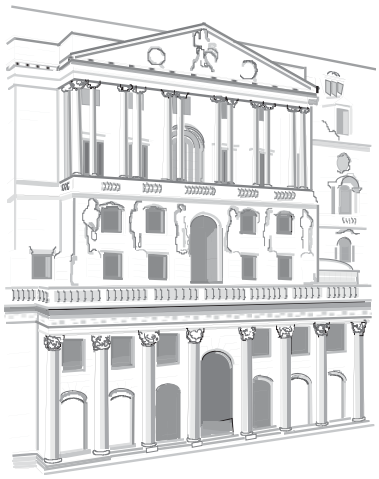
Bank of England Quarterly Bulletin



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Bank of England Quarterly Bulletin

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The Quarterly Bulletin and Inflation Report

Inflation Report
(published separately)

The *Inflation Report* reviews developments in the UK economy and assesses the outlook for UK inflation over the next two years in relation to the inflation target. Section 1 provides an introduction and summary, Section 2 investigates money, credit, and financial market data, including the exchange rate, and Sections 3, 4 and 5 examine demand and output, the labour market and pricing behaviour respectively. The concluding sections present an assessment of medium-term inflation prospects and risks, and information about non-Bank inflation forecasts.

Changes at the Bank of England
(pages 241–47)

In this article, Peter Rodgers, Secretary of the Bank of England, outlines the major changes affecting the Bank recently announced by the Chancellor of the Exchequer. These include a new framework for monetary policy—giving the Bank operational responsibility for setting interest rates—and reform of financial services regulation, under which responsibility for banking supervision will be transferred to an enhanced Securities and Investments Board.

Monetary operations
(pages 248–64)

UK official interest rates were increased twice in the second quarter of 1997. The first move, from 6% to 6.25%, followed the Monetary Meeting between the new Chancellor of the Exchequer and the Governor of the Bank of England on 6 May. The second increase in official rates, to 6.5%, was announced by the Bank on 6 June following the first meeting of the Monetary Policy Committee. Sterling rose by 3.4% to 102.1 on its effective exchange rate index (ERI). The gilt yield curve flattened markedly in this quarter; gilt sales of £8.6 billion were made, about one quarter of the initial gilt sales target for the 1997/98 financial year.

The international environment
(pages 265–73)

Growth in the United States and Japan was strong in the first quarter, but latest data suggest that activity in both countries slowed in the second quarter. By contrast, activity in Germany and France strengthened from the moderate growth seen in the first quarter. Activity in Italy is more subdued, though there are signs of a gradual recovery. The smaller EU countries continue to grow strongly. Real broad money growth in the major six overseas (M6) economies rose further in the second quarter and is consistent with increasing activity. Rising equity markets should also help to strengthen demand, particularly in the United States, where consumer confidence is already strong. Producer prices remain subdued in all the M6 economies; consumer price inflation is currently very low, with little evidence of emerging wage pressures, even in the United States. M6 short-term interest rates were broadly stable in the second quarter. Long-term interest rates fell in Japan and the European Union (despite uncertainties about EMU) and were stable in the United States.

Research and analysis
(pages 274–300)

Research work published by the Bank is intended to contribute to debate, and is not necessarily a statement of Bank policy.

Quantifying some benefits of price stability (by Hasan Bakhshi, Andrew G Haldane and Neal Hatch of the Bank's Monetary Analysis Divisions). This article quantifies some of the costs of inflation in the United Kingdom. It focuses in particular on tax distortions under an imperfectly indexed tax system and distortions to money demand. In the United States, a similar study found that lowering inflation by 2 percentage points could generate welfare benefits of as much as 1% of GDP per year forever. In the United Kingdom, the benefits are found to be smaller but still substantial, at 0.2% of GDP per year.

Inflation and inflation uncertainty (by Michael Joyce of the Bank's Monetary Assessment and Strategy Division). This article examines whether higher inflation has been associated with greater inflation uncertainty in the United Kingdom during the post-war period, using

various descriptive and econometric estimates of uncertainty. Though the results cannot establish conclusively whether there has been a causal link, they do suggest that the level of inflation and inflation uncertainty are positively correlated. If inflation uncertainty is costly, this provides a potential justification for directing policy at establishing and sustaining an environment of low inflation.

Quantifying survey data (by Alastair Cunningham of the Bank's Conjunctural Assessment and Projections Division). In this article Alastair Cunningham explains how data from economic surveys can be used to complement official statistics. He sets out a simple framework to analyse how firms respond to surveys and outlines the most widely used technique for converting qualitative responses into a quantitative measure. He shows that the results of this technique are often biased, and describes a more rigorous approach. Possible explanations are put forward for why survey data tend to be less volatile than official data. Finally, the use of forward-looking survey data is discussed.

Reports

(pages 301–10)

The evolving role of the IMF in the light of the 1994/95 Mexican crisis (by Jon Shields, Alternate Executive Director for the United Kingdom at the IMF, on secondment from the Bank of England). In this article, Jon Shields describes how the role of the IMF has developed since the Mexican crisis in 1994/95, which prompted the largest international support operation ever undertaken. He sets out the background to the crisis, including the rapid expansion of international capital markets, how the crisis was resolved and the lessons learned from it. Since then, the Fund has acted to improve the quality and extent of data that countries provide, and to enhance its own surveillance. It has also improved its procedures for allowing rapid financial support to be given and taken steps to ensure the adequacy of resources available to the Fund. Two possibilities still under consideration by the Fund are identified: burden-sharing with other creditors and adding the liberalisation of capital controls to the Fund's objectives. Jon Shields concludes that though risks remain, the changes made by the Fund have put it in a better position to deal with another crisis such as that in Mexico.

Changes at the Bank of England

*In this article, **Peter Rodgers**, Secretary of the Bank of England, outlines the major changes affecting the Bank recently announced by the Chancellor of the Exchequer. These include a new framework for monetary policy—giving the Bank operational responsibility for setting interest rates—and reform of financial services regulation, under which responsibility for banking supervision will be transferred to an enhanced Securities and Investments Board.*

In May 1997 the Chancellor of the Exchequer announced the most important institutional and operational changes at the Bank since nationalisation in 1946.

New legislation, expected to be approved by Parliament early next year, will give the Bank operational responsibility for setting interest rates and will transfer banking supervision to an enhanced Securities and Investments Board. The Bank will remain responsible for the overall stability of the financial system. Responsibility for debt management will be transferred from the Bank to the Treasury.(1)

The Chancellor announced the new monetary policy framework on 6 May, four days after he took office. He described it as a British solution to meet British needs, putting the arrangements for monetary policy on a sound and stable long-term footing. The reforms of monetary policy and supervision will have a profound effect on the functions and internal processes of the Bank and on how it accounts to Parliament and the public.

The Chancellor said that the Bank would have operational responsibility for setting short-term interest rates to achieve an inflation target. The inflation target will be confirmed in each Budget Statement. Without prejudice to this objective of price stability, monetary policy will 'support the Government's economic policy, including its objectives for growth and employment'. The changes establish clear responsibilities for monetary policy, with the Government setting the target and the Bank of England charged with meeting that target.

In extreme economic circumstances, if the national interest demands it, the Government will have the power to give instructions to the Bank on interest rates for a limited period. This power will only be exercised through subordinate legislation approved by Parliament. Publication of the Bank's *Inflation Report* each quarter will become a statutory requirement, as a means of setting out and justifying the Bank's analysis of the economy, and of explaining how the Bank intends to meet the inflation target and support the Government's economic policy.

The Bank's operational decisions on interest rate policy will be made by a new Monetary Policy Committee (MPC), comprising the Governor, the Deputy Governor, a second Deputy Governor who will be formally appointed when the new legislation has been passed,(2) and six other members. Decisions on interest rates will be made by a vote of the MPC, with each member having one vote. The Governor will have a casting vote if there is no majority. A representative of the Treasury will attend meetings of the MPC and may contribute to the discussion, but has no vote.

Under the proposed legislation, two members of the MPC will be appointed by the Governor, after consultation with the Chancellor, to take full-time executive responsibility for the Bank's monetary policy functions. Their appointments will be for three years. Four members will be appointed by the Chancellor, also for three years, and they will be recognised experts in their field. The intention is that eventually these six members of the MPC will be appointed on a rolling basis, two per year. There will be no limit to the number of terms a member can serve.

The Governor and the Chancellor agreed to establish immediately an interim MPC. Until the new legislation comes into force, all aspects of the new procedures for making and announcing decisions on monetary policy will operate *de facto*. On 14 May the governing body of the Bank, Court, appointed two Executive Directors of the Bank, Mervyn King and Ian Plenderleith, to the interim MPC. On 2 June, the Chancellor announced the names of a further four members of the MPC, who were subsequently appointed formally by Court as part of the agreed interim arrangements. When the legislation has been passed, the four will be reappointed by the Chancellor as Bank officials, but they will be allowed to engage, with the permission of the Chancellor, in outside activities that do not represent a conflict of interest.

Two of the members announced by the Chancellor joined the MPC immediately and were present at the meeting on 5–6 June, which made the first decision by the independent Bank to change interest rates. They are Professor Willem Buiter, Professor of International Macroeconomics at

(1) The main relevant documents are attached as annexes to this article: the Chancellor's letter to the Governor, the Chancellor's statement on the Bank of England, and an extract from the Chancellor's speech at the Mansion House.
(2) The existing legislation, the Bank of England Act 1946, makes provision for the appointment of only one Deputy Governor.

Cambridge since 1994 and a Professor at Yale from 1985–94, and Professor Charles Goodhart, the Norman Sosnow Professor of Banking and Finance at the London School of Economics since 1985, who worked previously at the Bank of England for 17 years.

The other two members are Sir Alan Budd, Chief Economic Adviser at the Treasury since 1991, who was Group Economic Adviser at Barclays Bank from 1988–91 after 14 years at the London Business School, and Dr DeAnne Julius, Chief Economist at British Airways since 1993 and Chief Economist at Royal Dutch Shell from 1989–93. Dr Julius will join the Bank on 1 September and Sir Alan Budd will join later in the autumn when he retires from the Treasury.

On 31 July, it was announced that David Clementi, vice-chairman of Kleinwort Benson Group, will become Deputy Governor from 1 September, succeeding Howard Davies. He will support the Governor on financial stability issues and will be responsible for the day-to-day running of the Bank. It was also announced that, following the passage of the Bank of England legislation, it will be recommended to the Queen that Mervyn King will become the Deputy Governor supporting the Governor on monetary policy issues.

MPC meetings and pre-meetings

The MPC will normally meet on the Wednesday afternoon and Thursday morning following the first Monday of each month, though this arrangement has been varied for September. At the Wednesday meeting, the MPC will identify and discuss the important underlying issues, and any tactical considerations. The Thursday meeting will decide on any necessary policy action. Decisions will be announced at noon, immediately after the Thursday meeting. In addition, the MPC will meet for a whole day shortly before these meetings to be briefed by Bank staff on the latest developments. Three of the Bank's Agents will attend the pre-meetings, to provide regional input.

The MPC will be supported by the whole range of the Bank's monetary, economic, statistical and market expertise, supplemented by intelligence from the Bank's network of twelve regional Agencies, which covers the whole country. The non-executive members of Court and the Bank's wide range of industrial, commercial and financial contacts will provide further input. The MPC will be closely involved in preparing the quarterly *Inflation Report*, contributing both to analysis and forecasting.

The dates of the Thursday meetings for the rest of the year are 11 September, 9 October, 6 November and 4 December. Decisions taken by the MPC will be announced on the wire services' Bank of England pages.

The MPC meets monthly, and its decisions are announced immediately after the meeting, once the Chancellor has been notified. The minutes of the meetings are published within six weeks, usually on the Wednesday following the subsequent meeting, and in the Bank's quarterly *Inflation Report*. The minutes identify how each member voted, with an explanation of why any individuals voted against the majority decision. They contain a summary of the recent economic developments considered by the committee. The MPC reports to a monthly meeting of Court as part of Court's responsibility to review the performance of the MPC.

The Chancellor also announced plans to set out new terms of reference for Court. The Bank will continue to be accountable to Court for its operations and finances. Court will be reconstituted by the legislation to comprise no more than 19 members. These will include the Governor and his two deputies. All three will be appointed, as now, for five years, by the Queen on the recommendation of the Government. The rest of Court will be non-executive and will be appointed by the Queen on the recommendation of the Government, but for three years rather than the present four. These members will be representative of the whole of the United Kingdom; they will be appointed for their expertise, and drawn widely from industry, commerce and finance.

The non-executive members will be responsible for reviewing the performance of the Bank as a whole, including the MPC. They will have particular regard to whether the Bank is collecting proper regional and sectoral information for the purposes of monetary policy formation, and they will continue to be responsible for ensuring that the internal financial affairs of the Bank are properly conducted.

The Chancellor said that accountability would be enhanced by a fully transparent decision-making process on monetary policy, through the arrangements for appointing Court and the MPC, and by the Government's overall accountability to Parliament for economic policy, including the inflation target that the Government sets. The Bank will make reports and give evidence to the House of Commons through the Treasury Select Committee. There will also be a debate in Parliament on the Bank's *Annual Report* each year.

The Chancellor said that the Government would be responsible for determining the exchange rate regime, but the Bank would have its own separate pool of foreign exchange reserves to use at its discretion to intervene in support of its monetary policy objective. If the Government gave instructions, the Bank, acting as its agent, would intervene in the foreign exchange markets by buying or selling the Government's reserves, as it does now. All such intervention would be automatically sterilised.

The Chancellor also announced two other changes at the Bank. He proposed that the Bank's role as the Government's agent for debt management, in selling gilts, overseeing the gilts market and in cash management should

The inflation target

The Chancellor announced on 12 June that he was setting the Bank a target of 2.5% for retail price inflation, excluding mortgage interest payments (RPIX). The previous target was set at '2.5% or less'. The Treasury commented in notes on the inflation target and the remit for the MPC, published on 13 June, that this ambiguity had caused confusion because it could have been interpreted as setting a ceiling for the Government's aspirations, but no floor. The target will be confirmed in each Budget, but the Treasury said that it expected the same target to remain in force for at least the current Parliament.

As Chairman of the MPC, the Governor is required to write an open letter to the Chancellor if inflation strays by more than 1% either side of the 2.5% target. The letter would refer as appropriate to the *Inflation Report*, and explain why inflation was adrift, how long the divergence was expected to last, and the action taken to bring it back on course. The Chancellor has, however, made clear that this is not to be seen as a target range for inflation. A deviation of 1% either side of 2.5% simply provides trigger points for a letter.

The new inflation target makes clear that, in setting policy, the Bank is to aim consistently at 2.5% as a mid-point. Operationally it implies that, with a balanced distribution of risk, there should be an even chance of an outturn either above or below 2.5% at the end of the two-year forecast horizon. The measure of the Bank's success will be how close it comes to 2.5% on average over time.

be transferred to the Treasury. The financial arrangements of the Bank will be reviewed to ensure that they are in line with the new responsibilities, with appropriate standards of accountability and transparency.

On 20 May, two weeks after announcing operational independence for the Bank in setting interest rates, the Chancellor proposed that the Treasury should start work on legislation to simplify and reform the regulatory structure by ending the two-tier system that splits responsibility between the Securities and Investments Board (SIB) and the Self Regulatory Organisations. He said that this system was inefficient, confusing for investors and lacked accountability and a clear allocation of responsibilities. As part of the consolidation into a single regulatory body, responsibility for banking supervision will be transferred to the enhanced SIB. This transfer will be included in the Bank of England Bill.

The Chancellor said that the Governor would be fully involved in drawing up the detailed proposals. The Bank will remain responsible for the overall stability of the financial system, with the enhanced SIB responsible for prudential supervision and for conduct of business rules. He also announced that Howard Davies, Deputy Governor of the Bank, had agreed to be the first chairman of the enhanced SIB, replacing Sir Andrew Large, who stepped down at the end of July.

On 18 June, the Securities and Investments Board announced a project team to assist in establishing the new regulatory body. The team comprises representatives from the Bank, the Investment Management Regulatory Organisation, the Personal Investment Authority, the Securities and Futures Authority and the SIB. The team was asked to prepare a plan to be submitted to the Chancellor by the end of July.

Annex 1
Letter from the Chancellor to the Governor: 6 May 1997

Dear Governor

The new Monetary Policy Framework

Improving the institutional arrangements for economic policy will be accorded a high priority by the Government in order to deliver long-term economic stability and rising prosperity. Our Manifesto commitment is to 'ensure that decision-making on monetary policy is more effective, open, accountable and free from short-term political manipulation'. The reforms I lay out below will put the arrangements for monetary policy-making on a sound and stable footing for the long term.

Within its overall responsibility for economic policy, including stability, growth and employment, and for setting the inflation target, the Government intends to give the Bank of England operational responsibility for setting interest rates. The Government plans to provide in the Queen's Speech for legislation to amend the Bank of England Act 1946. The Bank will of course remain in public ownership. The legislation will set up the new monetary policy framework, and provide for greater accountability. It is my intention to ensure the passage of this legislation as soon as possible.

This letter sets out how the new arrangements for monetary policy-making will work and how I propose that we manage matters during the transition.

1 The New Framework

(i) Objectives of the Bank of England

Price stability is a precondition for high and stable levels of growth and employment, which in turn will help to create the conditions for price stability on a sustainable basis. To that end, the monetary policy objective of the Bank of England will be to deliver price stability (as defined by the Government's inflation target) and, without prejudice to this objective, to support the Government's economic policy, including its objectives for growth and employment.

(ii) The Inflation Target

The Bank will have operational responsibility for setting short-term interest rates to achieve an inflation target which the Government will determine. This target will be confirmed in each Budget Statement. The Bank will be required to publish a quarterly *Inflation Report* in which it will account for its monetary policy actions, set out and justify its analysis of the economy, and explain how it intends to meet the Government's inflation target and support the Government's economic policy.

The legislation will provide that if, in extreme economic circumstances, the national interest demands it, the Government will have the power to give instructions to the Bank on interest rates for a limited period. This power is in line with practice in other countries, and could only be exercised through subordinate legislation approved by Parliament.

(iii) Exchange Rate Policy

The Government will be responsible for determining the exchange rate regime. The Bank will have its own separate pool of foreign exchange reserves which it may use at its discretion to intervene in support of its monetary policy objective.

If the Government so instructs, the Bank, acting as its agent, will intervene in the foreign exchange markets by buying or selling the Government's foreign exchange reserves. All such intervention will be automatically sterilised.

(iv) Governor and Deputy Governors

The Bank will be managed on a day-to-day basis by the Governor and two Deputy Governors. One Deputy will support the Governor on monetary stability and the other will support the Governor on financial stability. The Governor and Deputy Governors will be appointed according to the existing procedure and for five-year terms.

I am grateful to know that you are willing to allow the current contracts of yourself and your Deputy Governor to run their course. The second Deputy Governor will be appointed once the legislation has come into force, at which point the division of responsibilities will take effect.

(v) Monetary Policy Committee

Operational decisions on interest rate policy will be made by a new Monetary Policy Committee comprising the Governor, the Deputy Governors and six members. The decisions will be made by a vote of the Committee, with each member having one vote. If there is no majority, the Governor will have the casting vote. The Treasury will have the right to be represented in a non-voting capacity.

Two of the members will take management responsibility for monetary policy and market operations, respectively. They will be appointed by the Governor, after consultation with the Chancellor, for three-year terms.

The remaining four members will be appointed by the Chancellor, for three-year terms. They will be recognised experts. They will be allowed to engage, with the Chancellor's approval, in other activities which do not give rise to a conflict of interest.

The intention is to move to a situation where the six members of the Monetary Policy Committee are appointed on a rolling basis (two per year). There will be no limit to the number of terms a member can serve.

The Monetary Policy Committee will meet on a regular monthly basis. Any decisions on interest rates will be taken by the Committee and announced immediately, after the Chancellor has been notified of the decisions and proceedings of the Committee. The meetings will be minuted, and the minutes, including a record of any vote, will be released no later than six weeks after the

meeting. The new arrangements for release will be agreed between us and announced this month.

The Monetary Policy Committee will report to a monthly meeting of a reformed Court of the Bank, my proposals for which are set out next.

(vi) Reform of the Court

The legislation will set out the Court's terms of reference. The Bank will be accountable to the Court for its operations and finances.

I propose that the Court of the Bank be reconstituted to comprise no more than 19 members consisting of the Governor, his two Deputies, and 16 non-Executive Members. The Court will be representative of the whole of the United Kingdom. The non-Executive Members will be appointed for their expertise and will be drawn widely from industry, commerce and finance.

The non-Executive Members will be appointed according to the existing procedure and for three-year terms. I do not intend to increase the size of Court beyond its present size, other than the addition of a new Deputy Governor. But, in the first instance, I intend to appoint four new non-Executive Members, as soon as the legislation has come into force. The non-Executive Members will review the performance of the Bank as a whole, including the Monetary Policy Committee. They will have particular regard to whether the Bank is collecting proper regional and sectoral information for the purposes of monetary policy formation. In addition, they will be responsible for ensuring that the internal financial affairs of the Bank are properly conducted.

(vii) The Bank's Financial Arrangements

The financial arrangements of the Bank will be reviewed to ensure that they are in line with the Bank's new responsibilities, and appropriate standards of accountability and transparency.

(viii) Funding

The Bank's role as the Government's agent for debt management, the sale of gilts, oversight of the gilts market and cash management will be transferred to the Treasury.

(ix) Accountability

The changes I propose will enhance accountability by ensuring that the decision-making process is fully transparent, by the arrangements for appointing the Court and the Monetary Policy Committee, and by the Government's overall accountability to Parliament for economic policy, including the setting of the inflation target. The Bank of England will make reports to and give evidence to the House of Commons, through the Treasury Select Committee, on an enhanced basis, and I will write to the Chairman of the Committee.

2 The Transition

It will take some months for this legislation to be enacted. In the meantime, the following arrangements will be put in place.

(i) May Monthly Monetary Meeting

The May monthly monetary meeting will be brought forward to 8.00 am on Tuesday 6 May. It will be held in the normal way. It will be the last such monthly meeting.

(ii) Transitional Arrangements for Monetary Policy

I propose to make the following announcements immediately after the May meeting:

(a) the details of any decision taken at that morning's meeting;

(b) the Government will provide in the Queen's Speech for legislation to give the Bank of England operational responsibility for setting interest rates, and to give effect to the other reforms outlined in this letter;

(c) we have agreed to establish immediately an interim Monetary Policy Committee. You, the Deputy Governor and two of the existing Executive Directors will be members of this interim Committee. In addition, you have asked me to give you the names of four new members of the Committee as soon as is practicable. You will then ask the Court to appoint them as Bank officials. I will subsequently confirm these appointees as members of the new Monetary Policy Committee once the legislation is in force;

(d) during the intervening period until the legislation has come into force, all aspects of the new procedure for making and announcing decisions on monetary policy will operate *de facto*;

(e) in this interim period, you will set policy to meet the Government's inflation target.

I intend to use the Mansion House speech to set out more fully the Government's overall approach to economic policy and how these new monetary arrangements will form part of our wider strategy to improve the performance of the British economy in the long term, and deliver high and stable levels of growth and employment. I am confident that these arrangements will enhance the credibility of UK monetary policy-making.

With best wishes

Gordon Brown MP
Chancellor of the Exchequer

Annex 2
The Chancellor's statement on the Bank of England: 20 May 1997

It has long been apparent that the regulatory structure introduced by the Financial Services Act 1986 (FSA) is not delivering the standard of supervision and investor protection that the industry and the public have a right to expect. The current two-tier system splits responsibility between the Securities and Investments Board (SIB) and the Self Regulatory Organisations (SROs), together with the Recognised Professional Bodies. This division is inefficient, confusing for investors and lacks accountability and a clear allocation of responsibilities. Reform is long overdue to simplify the delivery of financial service regulation, and this was a key commitment in our Business Manifesto. At the same time, it is important to preserve the beneficial aspects of the current Act, including practitioner involvement and differential levels of regulation for wholesale and retail business.

I can announce today that work is to start immediately on the legislation needed to give effect to these reforms. We will introduce a Bill to simplify and reform the regulatory system at the earliest opportunity. I am announcing our intentions in advance to give the SIB and the self-regulating bodies the opportunity to work very closely with the industry on the detailed implementation of our proposals, to ensure the smoothest possible transition to the new regime. I am confident that the simpler system we are proposing will reduce compliance costs, and increase public confidence in the regulatory regime.

But simply reforming the Financial Services Act is not enough in itself. In today's world of integrated global markets, the financial services industry transcends geographical and political boundaries. The regulatory response must meet this challenge. The UK financial services industry needs a regulator which can deliver the most effective supervision in the world.

You cannot ensure the success of British financial services in the 21st century without modernising arrangements for the protection of investors. My reforms are essential to ensure the future confidence of investors, large and small, and the future success of the increasingly integrated financial services industry on which so many British jobs rely.

At the same time it is clear that the distinctions between different types of financial institution—banks, securities firms and insurance companies—are becoming increasingly blurred. Many of today's financial institutions are regulated by a plethora of different supervisors. This increases the cost and reduces the effectiveness of supervision.

So there is a strong case in principle for bringing the regulation of banking, securities and insurance together under one roof. Firms organise and manage their businesses on a group-wide basis. Regulators need to look at them in a consistent way. This would bring the regulatory structure closer into line with today's increasingly integrated financial markets. It would deliver more effective and more efficient supervision, giving both firms and customers better value for money. This would improve the competitiveness of the sector and create a regulatory regime to meet the challenges of the 21st century.

So I have decided to take the opportunity presented by the Bank of England Bill to reform the regulatory system. Responsibility for banking supervision will be transferred, as soon as possible after passage of the Bill, from the Bank of England to a new and strengthened Securities and Investments Board, which will also, as a result of forthcoming legislation take direct responsibility for the regulatory regime covered by the Financial Services Act.

SIB will become the single regulator underpinned by statute. The current system of self-regulation will be replaced by a new and fully statutory system, which will put the public interest first, and increase public confidence in the system.

The Governor of the Bank of England will be fully involved in drawing up the detailed proposals. The Bank will remain responsible for the overall stability of the financial system as a whole. The enhanced Securities and Investments Board will be responsible for prudential supervision and, in due course, for conduct of business rules.

As the House will already be aware, Sir Andrew Large, the current Chairman of the SIB, has decided to step down in July. I would like to take this opportunity to pay tribute to him and thank him for his contribution to financial regulation over the past years.

It is crucial to the success of these reforms that we have a new Chairman with the stature and calibre to implement them quickly and smoothly. Because of the importance I attach to drawing on the Bank of England's expertise in these areas I have asked Howard Davies, the Deputy Governor of the Bank, to be the first Chairman of the enhanced Securities and Investments Board responsible for integrating the supervision of banking and financial services. I am pleased he has agreed. He is of course already a member of the SIB Board. He will take over as Chairman when Sir Andrew Large steps down. Two new Deputy Governors of the Bank will be appointed in due course.

I have today written to Sir Andrew Large with further details of my proposals. I have placed a copy of this letter, together with my earlier letter to the Governor on monetary policy, in the Library of the House.

I am confident that the new arrangements, taken together, will enhance significantly the credibility of UK monetary policy and improve the workings of the financial markets. That means lower long-term interest rates and higher growth and investment. Indeed, we have already seen long-term interest rates fall by over 30 basis points since my announcement a fortnight ago, reflecting the positive reaction to the new monetary framework.

These reforms are founded on sound economic principles. This is a long-term policy for long-term prosperity. It provides the building blocks for a new economic strategy for monetary and financial stability aimed at enhancing longer term growth and prosperity. I am confident that their success will be reflected in a stronger and more robust economy for the long term.

Annex 3
Extract from the Chancellor's speech at the Mansion House: 12 June 1997

If inflation is 1% higher or, for that matter, lower than the target of 2.5%, then the Governor, on behalf of the Monetary Policy Committee, should write an open letter to the Chancellor.

That letter should explain:

- the reasons why inflation has moved away from the target by more than one percentage point;
- the policy action which they are taking to deal with it;
- the period within which they expect inflation to return to the target;
- how this approach meets the Bank's objectives as set by the government.

Of course, any economy at some point can suffer from external events or temporary difficulties, often beyond its control. Attempts to keep inflation at the target in these circumstances may cause undesirable volatility in output.

But, if inflation is still more than 1% away from the target after three months, I will expect the Governor to write to me again.

Instead of the old procedures that were *ad hoc*, personalised, and could not last credibly for the long term, this government has set in place clear rules, divisions of responsibility and a target supported by tight procedures for monitoring whether it is delivered. It is because there are clear rules and rigour that our approach will command greater confidence.

Over the coming years I want the British economy to enjoy the far greater underlying strength that comes from a base of low and stable inflation.

If we succeed in strengthening the ability of the British economy to sustain growth with low inflation, and if international conditions permit, I would hope to lower the inflation target. But the long-term inflation target of 2.5% I have reaffirmed for the Bank of England today, reinforced by the open letter system, provides the final building block for our new framework of British monetary policy.

The open letter is yet another example of the Government's commitment to a more transparent and accountable system of monetary decision-making.

The committee's performance and procedures will also be reviewed by the reformed court. The Bank will be accountable to the House of Commons through regular reports and evidence given to the Treasury Select Committee. Finally, through the publication of the minutes of the Monetary Policy Committee meetings and the Inflation Report, the Bank will be accountable to the public at large. I believe, in time, our new framework may become a model for other countries to follow.

Monetary operations

- *UK official interest rates were increased twice in the second quarter. The first move, from 6% to 6.25%, followed the Monetary Meeting between the new Chancellor of the Exchequer and the Governor of the Bank of England on 6 May. After this meeting, the Chancellor announced that the Bank was to be given operational responsibility for setting short-term interest rates to achieve the Government's inflation target.*[1] *The second increase in official rates, to 6.5%, was announced by the Bank on 6 June following the first meeting of the Monetary Policy Committee. The Bank raised its repo rate again, to 6.75%, on 10 July—after the period covered by this article.*

- *Sterling rose by 3.4% to 102.1 on its effective exchange rate index (ERI) in the second quarter: by the end of June it had risen by 24% from its all-time low of 82.2 on the ERI reached in November 1995, and by 21% since the recent appreciation began in August 1996.*

- *The gilt yield curve flattened markedly in this quarter, with longer yields and derived inflation expectations falling sharply after the Chancellor's announcement on the new monetary policy framework. The yield on the ten-year benchmark gilt fell by 61 basis points to 7.09% during the second quarter as a whole.*

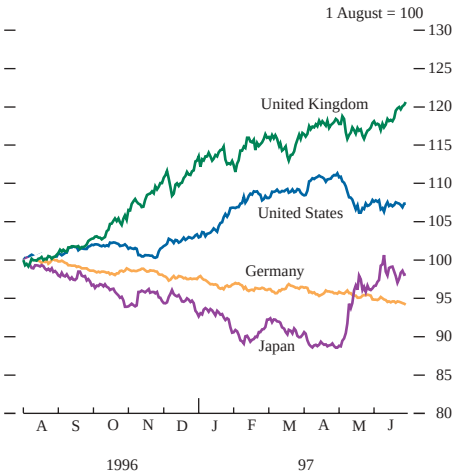
- *Gilt sales of £8.6 billion were made in the quarter, about one quarter of the initial gilt sales target for the 1997/98 financial year. A reduced target for gilt sales was announced in the Budget on 2 July.*

International background

The most significant international developments providing the context for UK financial markets in the second quarter were: the easing in market expectations of the path of US official interest rates; developments within the European Union (EU) which appear to have increased further the confidence of financial markets that Economic and Monetary Union (EMU) will begin in 1999 with a relatively wide membership; and the appreciation of the Japanese yen.

US official interest rates were unchanged in the second quarter. The Federal Reserve's earlier decision to raise its target for the Federal funds rate from 5.25% to 5.50% on 25 March had been almost fully discounted. During the second quarter market expectations of further early rises in US official rates were revised down sharply, as economic data suggested that growth in the economy had moderated from the levels seen in the first quarter, and that price pressures remained subdued. Against this background, US bond yields fell steadily. Although not directly observable, inflation expectations for the United States can be derived at a maturity of ten years from the difference between the yield on a conventional ten-year US Treasury Note and that on the newly issued ten-year Treasury Inflation Indexed Notes. The difference is referred to as a break-even inflation rate, and is an indication of average market expectations of US inflation over the

Chart 1
Effective exchange rate indices: United Kingdom, United States, Germany and Japan



(1) See separate article in this edition of the *Quarterly Bulletin* on pages 241–47, and the August *Inflation Report* for a fuller discussion.

Table A
Interest rates, gilt yields and exchange rates; selected dates[a]

	Interest rates (per cent per annum)					Gilt yields (b) (per cent per annum)				Exchange rates		
	Sterling interbank rates (c)				Short sterling future (d)	Conventionals			Index-linked			
1997	1 month	3 months	6 months	12 months	3 months	Short	Medium	Long	Long	ERI	$/£	DM/£
1 April	6 3/32	6 11/32	6 19/32	7	7.01	7.44	7.70	7.81	3.64	98.7	1.6467	2.7497
2 May	6 17/64	6 31/64	6 43/64	6 61/64	6.87	7.09	7.37	7.53	3.60	99.7	1.6180	2.7964
6 May	6 5/16	6 7/16	6 5/8	6 7/8	6.81	6.92	7.08	7.14	3.52	100.6	1.6368	2.8202
6 June	6 1/2	6 41/64	6 49/64	7	6.86	6.94	7.05	7.10	3.65	99.6	1.6275	2.8143
30 June	6 5/8	6 13/16	6 63/64	7 1/4	7.12	7.05	7.09	7.12	3.63	102.1	1.6636	2.8990

(a) Close of business rates in London.
(b) Gross redemption yield. Representative stocks: short: 7% Treasury 2002; medium: 7 1/4% Treasury 2007; long: 8% Treasury 2021; index-linked: 2 1/2% Index-Linked Treasury 2016 (real yield assuming 5% inflation).
(c) Middle-market rates.
(d) Implied futures rate: September 1997 contract.

Chart 2
International ten-year bond yields

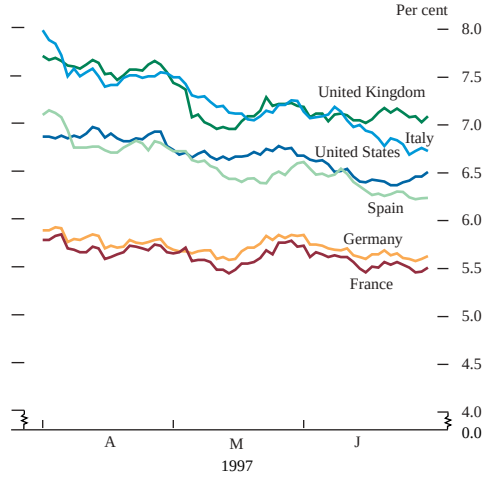
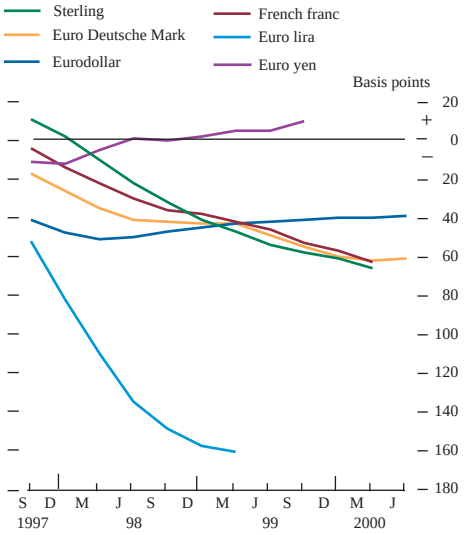


Chart 3
Changes in three-month interest rates implied by futures contracts[a]



(a) The chart shows the extent to which the term structure implied by futures contracts has moved up or down in the quarter from 1 April to 30 June.

next ten years.[1] Chart 4 shows the ten-year break-even inflation rate for the United States and for the United Kingdom, and shows that the US rate declined through the quarter. The UK rate also fell, largely associated with the Chancellor's announcement of 6 May (see below). The dollar appears to have been little affected by the revisions to expectations of the prospects for US monetary policy: it maintained the same range as it had since early February against the Deutsche Mark of DM 1.66–DM 1.72 throughout the quarter.

Two main developments influenced market expectations of EMU. In France the election of the new Socialist government, which stated its intention to make employment its main priority, caused markets uncertainty as to whether—given France's budget position—this could be reconciled with a strict interpretation of the Maastricht fiscal deficit criterion. At the meeting of the European Council in Amsterdam in June, EU Member States adopted a set of guidelines designed to keep employment at the top of the political agenda of the Union. In Germany, the government advanced proposals for a revaluation of the country's gold and foreign exchange reserves sooner than would have been required by the Maastricht Treaty. Though agreement on the issue was subsequently reached with the Bundesbank, it was interpreted by financial markets as raising questions about the attitude of the German authorities towards the Maastricht criteria. These two episodes appeared to strengthen the markets' conviction that the criteria could be interpreted flexibly, and would not therefore necessarily form an obstacle to EMU starting as planned in 1999; and that, if in the event a strict interpretation of the criteria was not applied in the case of France or Germany, it would be difficult to exclude from EMU a wider group of similarly placed countries. The markets' concern that the result might in some sense be a 'soft' euro seems to have been a factor in the appreciation of the dollar and sterling against 'core' ERM currencies. Consistent with this, there was further convergence in money and bond markets in the second quarter, with falls in short and long-term interest rates in Spain and Italy. It should be noted, however, that the convergence in financial asset prices could also be interpreted as being consistent with economic fundamentals, as both Spanish and Italian inflation fell further in the quarter to levels very close to those in Germany and France.

Within the ERM, the French franc weakened from FFr 3.3650 to FFr 3.3750 against the Deutsche Mark after President Chirac's

(1) See the box 'Auctions of US Treasury Inflation Indexed Notes' on page 128 of the May 1997 *Quarterly Bulletin*. The auction by the US Treasury of five-year Inflation Indexed Notes on 8 July means that it is now also possible to calculate a five-year break-even inflation rate.

Chart 4
US and UK ten-year break-even inflation rates

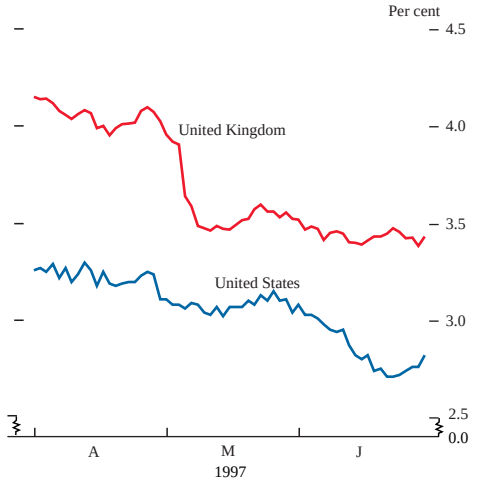


Chart 5
Deutsche Mark exchange rates

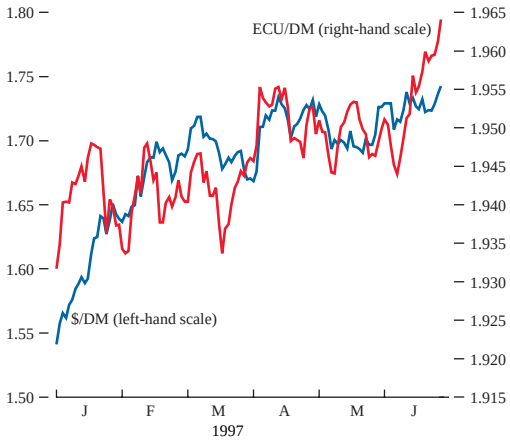
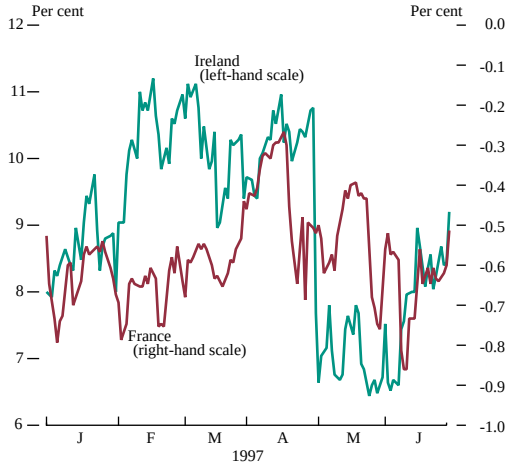


Chart 6
ERM exchange rates: divergence from the Deutsche Mark central rate



announcement on 18 April that a General Election would be held. In the immediate aftermath of the Socialist Party's victory, the franc fell to FFr 3.3860 on 2 June before recovering. The Irish punt continued to strengthen with sterling during April and reached a high at DM 2.6776 on 28 April, an increase of 13% since 2 August 1996. But the punt fell sharply against the Deutsche Mark following a comment from the Irish Finance Minister, who said that a downward move, towards its central parity at DM 2.41105, would be desirable. A tightening of Irish monetary policy on 30 April had no supportive impact on the exchange rate, which continued to weaken. In a two-day period the punt fell by nearly 3% against both the Deutsche Mark and sterling, from DM 2.67 to DM 2.59 and from £0.95 to £0.92 respectively. But the punt was subsequently aided by market anecdote that an upward revaluation to its Deutsche Mark central rate was now more likely and it strengthened with sterling, finishing the second quarter where it began, at around DM 2.65. Elsewhere in the ERM, interest rates were reduced further, as expected, in Italy and Portugal.

Another major development during the second quarter was the appreciation of the Japanese yen, which rose by 9% in effective terms. The appreciation of the US dollar, which rose by 6% from ¥116 to ¥123½ during the first quarter of 1997, was fully reversed; indeed, it fell below key technical support at ¥115. Moreover, currency option prices implied that the market expected further, and pronounced, yen appreciation as it reached ¥110–113 during June. Some possible explanations are discussed below.

The direction of the moves in the US dollar/yen exchange rate in the first half of 1997 was broadly consistent with changes in relative yields. Interest rate differentials moved in favour of the dollar in the first quarter, with market expectations of the path of US official rates being revised up while those for Japanese rates were revised down, and the dollar rose from ¥116 to ¥123. In the second quarter the downward revision to US interest rate expectations appears to have been influential in terms of explaining the US dollar's depreciation. Nevertheless, changes in relative yields(1) only account for around one third of the dollar/yen exchange rate movement during both quarters.

Exchange rates are also influenced by trade flows. Japan's current account surplus continued to increase steadily in the first half of 1997. But this trend was largely anticipated by the market, since the monthly data were generally in line with market consensus forecasts. More generally, however, the perception that US and Japanese policy makers were becoming concerned about the increase in Japan's bilateral trade surplus with the United States helped to underpin the yen.

Another factor is that the yen may have been boosted by safe-haven flows from South East Asian currencies, in particular the Thai baht. The baht came under speculative attack in the first half of May and, though this was successfully resisted by the Bank of Thailand, diversification flows were triggered into other Asian markets such as Japan (and to a lesser extent Singapore). The Bank of Thailand announced on 2 July that the baht's currency basket would be abandoned and that it would be allowed to float, subject to certain

(1) Implied paths for exchange rates can be calculated by comparing relative bond yields across countries. It is possible to estimate the part of an unanticipated exchange rate movement that is consistent with changes in relative yields. The methodology is set out in the box on page 16 of the February 1997 *Inflation Report*.

Chart 7
Japanese yen exchange rates

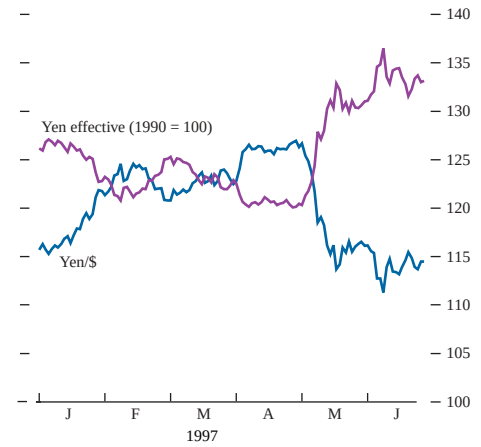


Chart 8
US dollar/Thai baht exchange rate

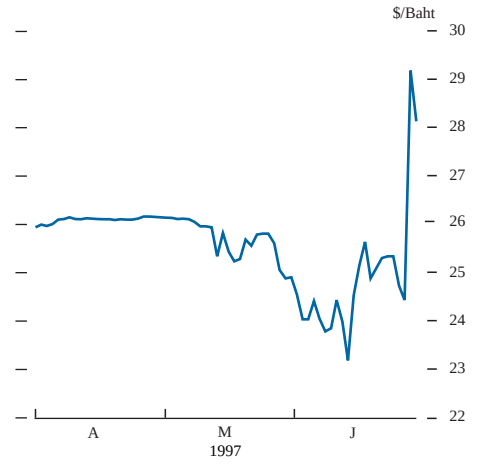
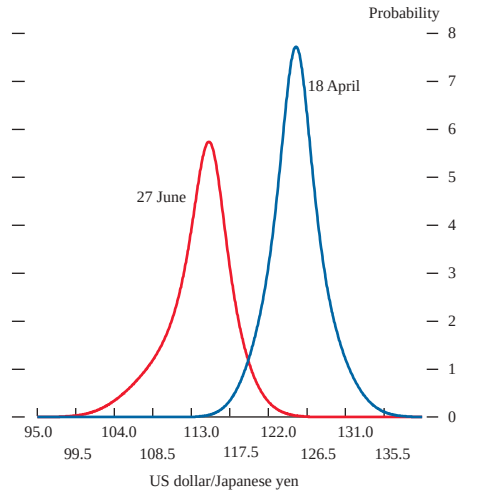


Chart 9
Implied probability density function for US dollar/Japanese yen exchange rate, 18 April 1997 and 27 June 1997



provisions. Chart 8 shows that the baht fell by 11½% against the US dollar from Thb 26.1 to Thb 29.1 between 5 May to 2 July. In contrast the yen strengthened by 9½% from ¥126.7 to ¥114.5.

In summary, changes in relative interest rates during the first half of 1997 account for only one third of the US dollar/yen rates movements. It is more difficult to quantify the contribution of other explanations. Currency option prices suggest that a pronounced shift in expectations of the US dollar's future value accompanied the yen's appreciation during the second quarter. It is possible to infer the probabilities that investors attach to an exchange rate being at different levels from a combination of currency options prices; indeed it is possible to construct an entire probability distribution (or probability density function, 'PDF') for future exchange rates. Chart 9 shows that the implied PDF on 18 April was slightly positively skewed; intuitively, a greater probability was attached to a large appreciation of the dollar than to a large depreciation. But this changed as the yen appreciated rapidly, and by June expectations of a further large dollar depreciation dominated the probabilities.

Canada was the only G7 country (other than the United Kingdom) that raised official interest rates during the second quarter. The Bank of Canada raised its operating band for the overnight interest rate on 26 June by 25 basis points to 3.5%, citing a need to counter an excessive easing in monetary conditions and to provide support for the currency, which had depreciated in the previous weeks. The currency then strengthened from C$1.3950 to C$1.3765 against the US dollar. The Australian dollar depreciated by 4% against the US dollar, from US$0.7861 to US$0.7539, in this period. Australian official interest rates were reduced further on 23 May, from 6.0% to 5.5%, in response to subdued inflationary pressures. More generally, the Australian dollar was affected by the weakness of commodity prices and the gold market. Australia is a major commodity exporter, and is also the world's third-largest gold producer. During the second quarter of 1997 the gold price, at the London fixing, fell by more than 4.5% from $350 to $334, continuing its fall from its peak at $418 on 2 February 1996. The sensitivity of the gold market to announcements of central bank sales of gold (and also proposed revaluations) appears to have increased during 1997.(1) Sharp price declines of around $6 per ounce accompanied announcements by several central banks during 1997. For example, the gold price fell to its lowest level since March 1985 at $314 on 7 July, following the Reserve Bank of Australia's announcement that it had sold 167 metric tons of gold during the previous six months.

UK markets

Sterling

Sterling rose by a further 3.4% to 102.1 on the effective exchange rate index (ERI) in the second quarter. By the end of June sterling had risen by 24% from its all-time low on the ERI at 82.2, on 20 November 1995, and by 21% since August 1996. Sterling's strength during the second quarter was again most pronounced against ERM currencies, and it reached its highest level against the Deutsche Mark since June 1992 at DM 2.8990 on 30 June. The US

(1) Since March 1989, the Belgian National Bank has issued four press communiqués announcing prior gold sales and the Netherlands has issued two. Price declines averaging less than $1 per ounce accompanied these announcements.

Chart 10
Sterling exchange rates

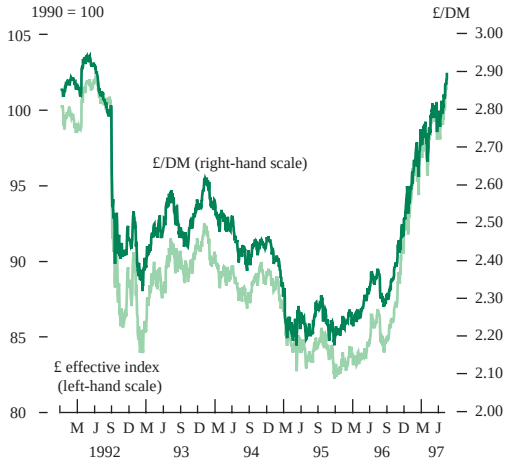
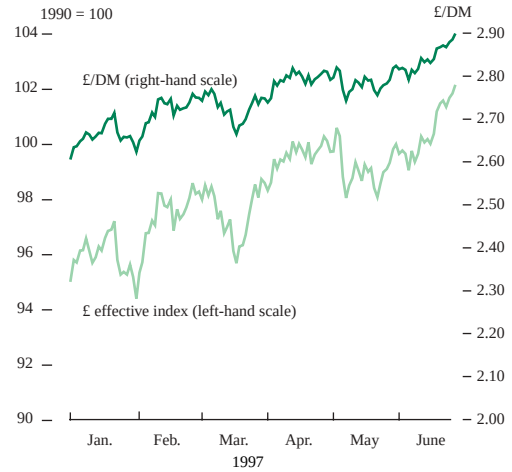


Chart 11
Sterling exchange rates



dollar also rose against the ERM currencies, and sterling spent most of the quarter trading in a range between $1.62 and $1.66 against the dollar. Sterling closed at $1.6636 on 30 June, up 1.1% over the quarter.

Sterling fell following the announcement on 17 March that the UK General Election would be held on 1 May; it briefly traded below $1.59 for the first time since October 1996, as financial markets focused on the potentially unsettling effects of a long campaign. However, this turbulence proved short-lived, in part because of the perception that UK official interest rates might rise shortly after the Election. As it became clear on 2 May that the Labour Party had won a majority substantially above market consensus forecasts, sterling was rather volatile; but it steadied in afternoon trading and closed little changed at DM 2.7964, $1.6180 and 99.7 on the ERI. Sterling appreciated by 2.5% in effective terms during the six-week campaign, rising against both the US dollar and Deutsche Mark.

Market attention then switched to the prospective Monetary Meeting between the new Chancellor of the Exchequer and the Governor of the Bank of England. The meeting was held on 6 May, and the Chancellor announced a rise in UK interest rates from 6% to 6.25%. He also announced that he was granting the Bank of England operational responsibility for setting short-term interest rates to achieve the Government's inflation target. Sterling strengthened, reaching DM 2.8330 at the close that day.

Sterling came under pressure between 6 May and 13 May, losing 10 pfennigs to fall from DM 2.83 to DM 2.73. There were market rumours that the new Government was considering re-entry into the ERM at around DM 2.50. But this was denied by the Chancellor on 12 May and the currency steadied, strengthening the following day from DM 2.73 to DM 2.77 after the publication of the Bank's *Inflation Report*, which said that a further moderate tightening of policy might be required in the months ahead. Events over the next three weeks were dominated by developments in continental Europe, in particular the outcome of the French General Election and the disagreement between the Bundesbank and the German government over a proposal to revalue Germany's gold and foreign exchange reserves. Against this background sterling and the US dollar both strengthened by nearly 2% against the Deutsche Mark between 13 May and 5 June, to DM 2.8195 and DM 1.7291 respectively.

The first meeting of the Bank's Monetary Policy Committee was held on 6 June. The 25 basis point rate increase to 6.5% that followed had been largely discounted and sterling finished the day almost unchanged. The Chancellor's announcement on 12 June of the revised formulation for the inflation target had no impact on sterling. Sterling traded in a narrow range until the release of stronger-than-expected UK economic data in the second half of June provided support, and it then appreciated against both the US dollar and the Deutsche Mark, moving above $1.66 for the first time since January.

Sterling money markets

During the quarter the term structure of rates implied by short sterling contracts flattened markedly. The rates implied by the nearer-dated contracts rose slightly, and those implied by the

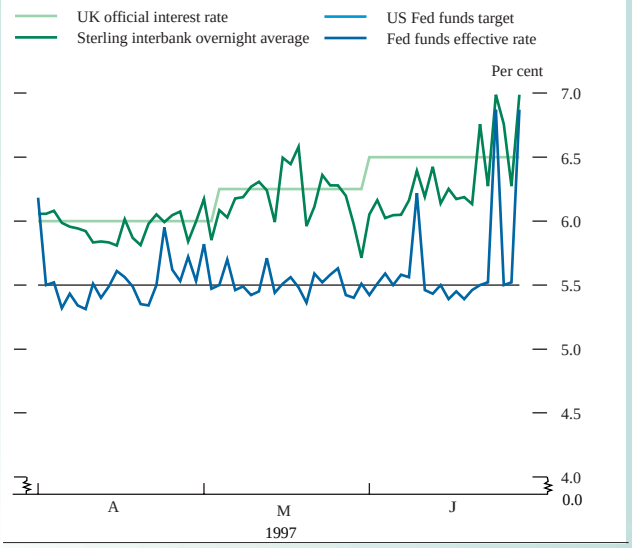
Sterling interbank weighted average overnight interest rate

The weighted average rate here is the Sterling Overnight Interbank Average—called 'SONIA'—that has been developed by the Wholesale Money Brokers' Association. SONIA is the average rate, weighted by volume, on all unsecured overnight sterling trades arranged by seven brokers, in which both counterparties are money-market institutions (or their overseas branches) listed under Section 43 of the Financial Services Act. Eligible trades are those that are arranged between midnight and 3.00 pm on settlement day, where repayment is made on the following business day. SONIA has been developed as part of the introduction of a new sterling money-market instrument called the Overnight Indexed Swap (OIS). A sterling OIS is a short-term interest rate swap against SONIA: the two parties to an OIS contract agree to exchange the difference between the interest accrued at an agreed fixed rate on an agreed notional amount and interest accrued on the same amount by compounding SONIA daily over the term of the swap.

The development of SONIA in the last quarter now allows us to compare the average sterling interbank overnight rate with similar measures in other countries, such as the US Fed funds effective rate. The latter is also a weighted average unsecured interbank overnight rate, which is calculated and published daily by the Federal Reserve Bank of New York from data on trades provided by New York banks and brokers. The chart shows SONIA plotted against the Bank of England's repo rate, and the Fed funds effective rate against the Fed's target for Fed funds.

On average during the quarter SONIA was 10 basis points below the Bank's repo rate, and the Fed funds effective rate was 5 basis points above the Fed's target.

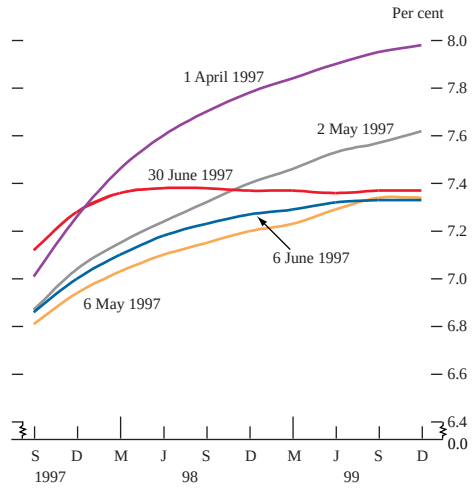
UK and US weighted average overnight interest rates



As can be seen from the chart, June accounts for much of the softness this implies in SONIA. At the beginning of June very short rates were below the Bank's repo rate as a result of the money-market yield curve pivoting(1) because of the strong expectation of an increase in the repo rate at the MPC on 6 June. Later in June, a run of much smaller-than-average daily shortages seems to have been the main reason for the softness of very short-dated rates. The standard deviation of the difference between SONIA and the Bank repo rate and the effective Fed funds rate and the Fed's target suggests that the relative volatility of the two series is broadly comparable: the standard deviation of the UK series is 21 basis points, and that for the US series is 24 basis points. The chart suggests that volatility in the Fed funds rate is most associated with the end of the half-monthly reserve averaging maintenance periods.

(1) It is frequently observed that, when there is a strong expectation of a change in official interest rates, market interest rates 'pivot' around the date at which the change is expected. When a rise in official rates is expected, rates at maturities beyond the decision point rise above the prevailing official rate, while market rates maturing before the decision point soften to below the prevailing official rate.

Chart 12
Short sterling futures(a)

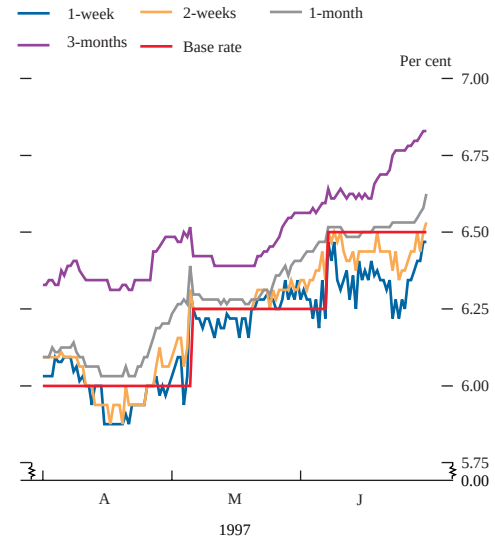


(a) Three-month Libor rates implied by short sterling futures contracts.

longer-dated contracts fell to the point where the term structure was essentially flat from the March 1998 contract onwards. This suggests that the market expected that, following the introduction of the new monetary framework, official rates would be raised sufficiently early to reduce the eventual extent of the tightening required to meet the inflation target.

The first month of the quarter coincided with the General Election campaign. In early April, the rates implied by short sterling futures contracts suggested that the market expected an increase in official rates from 6% by the early summer (the June future implied a three-month rate of 6.70% on 1 April), but there was little serious expectation that this would happen until after the Election. During April the rates implied by longer-dated contracts were revised down following the release of economic data that were weaker than the market had expected. Once the result of the Election became clear on 2 May, the rates implied by longer-dated contracts fell further, possibly in reaction to the clear-cut result which dispelled market concerns about the possibility of a hung Parliament.

Chart 13
Sterling interbank interest rates(a)



(a) Middle-market rates at 4.30 pm.

Chart 14
Benchmark yields on gilts

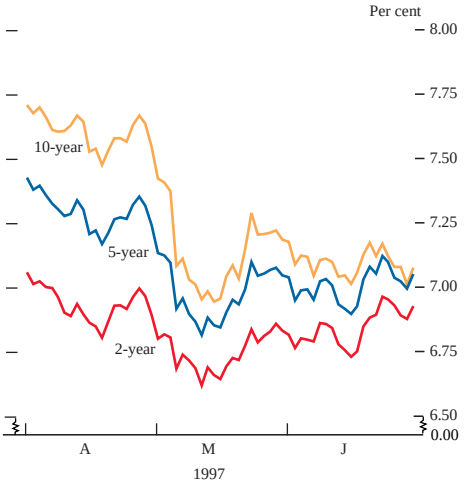


Chart 15
Implied inflation expectations(a)

(a) The implied forward inflation rates are annualised six-month rates derived from the yields on conventional and index-linked gilts.

After the announcement of the 25 basis point increase in official rates to 6.25% after the Monetary Meeting on 6 May, and of the new monetary policy framework, the entire term structure implied by short sterling futures fell: the rate on the June 1997 contract fell by 6 basis points, that on the December 1997 contract 10 basis points, and contracts for 1999 around 25 basis points. The falls in the rates implied by longer-dated contracts may be explained by the enhancement to the credibility of the monetary framework conferred by the new arrangements. It is more difficult to explain the falls in rates implied by the near-dated short sterling contracts in these terms. The explanation may be that there was some expectation in the market that official rates would be increased by 50 basis points at the Monetary Meeting, and that the increase of 25 basis points suggested that the Chancellor and the Bank did not think that the outlook for inflation at that point justified a larger increase.

By the first meeting of the Bank of England's Monetary Policy Committee (MPC) on 5 and 6 June, the market was expecting a further increase in official rates. The implied rate on futures contracts had been rising since the second half of May, in particular in response to continuing evidence of strong retail sales and the larger-than-expected fall in unemployment in April. The reaction to the announcement of a 25 basis point increase in the Bank's repo rate to 6.50% reflected the strength of the market's expectation: the rate implied by the June future rose by 6 basis points, while rates implied by contracts for 1998 and beyond fell by up to 6 basis points.

There was a further flattening of the term structure of implied rates in the second half of June, with rises of more than 25 basis points in the 1997 contracts, following the publication of retail sales figures and broad money data for May that were stronger than the market expected. By the end of the quarter there was a strong expectation that the MPC would again decide to raise official rates at its meeting on 9 and 10 July. On 10 July, the Bank announced a further increase of 25 basis points in its repo rate, to 6.75%.

Gilt-edged market

The new UK monetary policy framework, and a perception that the state of the UK economy might result in a further tightening of monetary policy sooner than the market had previously expected, contributed to a significant flattening of the term structure of gilt yields. The yield on the ten-year gilt benchmark fell by 61 basis points to 7.09% during the quarter, and the spread of the yield on the ten-year gilt benchmark above that on the two-year benchmark fell from 65 basis points to 15 basis points. The reaction of the gilt market to the Chancellor's announcement of 6 May was positive, as demonstrated by the sharp fall in yields at all maturities: the yield on the ten-year gilt benchmark fell by 29 basis points to 7.08% on the day. A sharp fall in derived inflation expectations coincided with the announcement, supporting the view that monetary policy credibility was reinforced. On the day, derived six-month forward inflation rates fell by 20 basis points at three years to 3.51%, by 29 basis points at five years to 3.65%, and by 47 basis points at ten years to 3.70%.

The yield on ten-year gilts, which was volatile but little changed on balance between mid May and mid June, rose on 18–19 June when

Chart 16
Yields on index-linked government stock

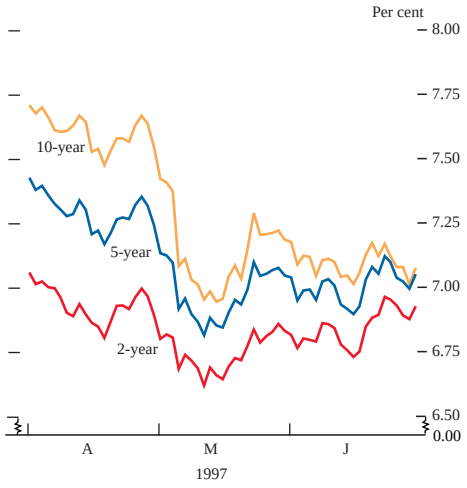
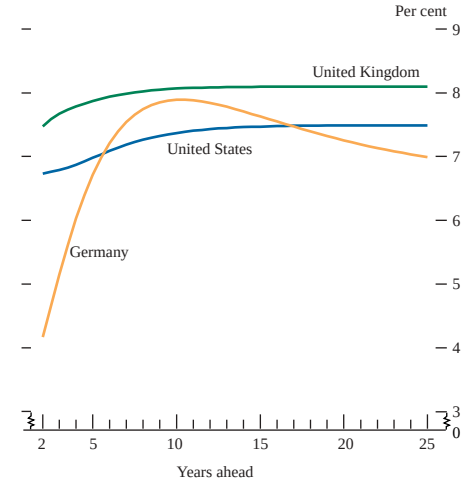
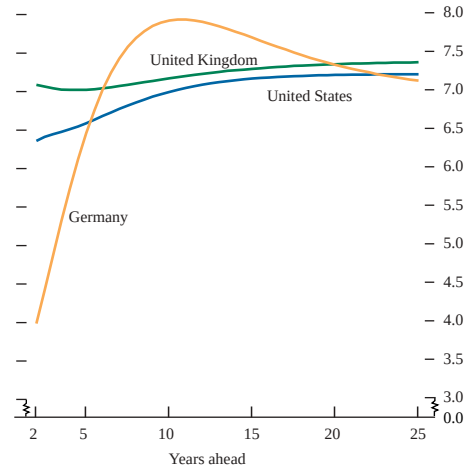


Chart 17
Term structure of six-month forward rates for the United Kingdom, Germany and the United States,(a) 1 April 1997



(a) Implied six-month annualised rates.

Chart 18
Term structure of six-month forward rates for the United Kingdom, Germany and the United States,(a) 30 June 1997



(a) Implied six-month annualised rates.

strong retail sales and broad money data reinforced the market's view that the Bank might need to raise official rates in July, the third increase in as many months. Against this, however, there was some expectation that the Budget on 2 July would contain measures designed to slow the rise in consumer spending, so that monetary policy would not necessarily need to be tightened further immediately. Derived inflation expectations rose on 18–19 June but reverted to their mid-June levels in the following days. Yields on index-linked gilts (IGs) of different maturities converged in the second quarter. In contrast with nominal yields, however, they were little affected by the Chancellor's announcement; it was not until mid May that yields on shorter-term IGs rose. The rise in IG yields perhaps reflects rising short-term real rates following the tightening of official interest rates. Charts 17 and 18 compare the six-month nominal term structure of interest rates for the United Kingdom, United States and Germany on 1 April and 30 June. The reduction in expected short-term interest rates in the United Kingdom that these charts demonstrate is consistent with the view that the credibility of UK monetary policy was enhanced by the new monetary policy framework.

Equity markets

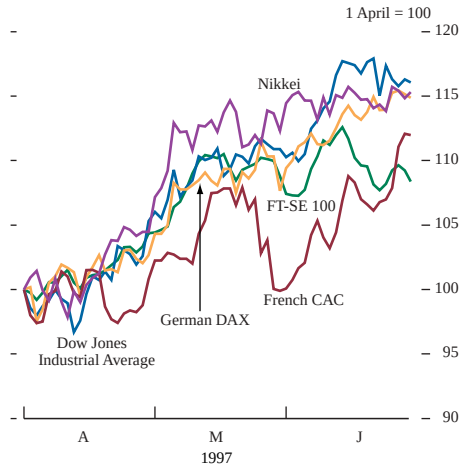
After falling sharply in late March and early April, US equity prices rose very strongly and reached new historic highs in late June, at levels nearly 20% higher than the 1997 lows reached in mid April. The Dow Jones Industrial Average rose 16% in Q2 to 7,673. The strength of US equities appears to have benefited European markets, which posted strong price gains: the FT-SE 100 index rose 8%, the German DAX index 15% and the French CAC 40 index 11% (see Chart 19). This nevertheless represented underperformance by the FT-SE 100 index, which closely tracked the Dow Jones until late May. Several factors, including shifting expectations about the post-Budget treatment of dividend tax credits, the prospective windfall tax on the privatised utilities and the impact of further sterling appreciation on corporate profits, which are unique to the UK markets, may help to explain the relative underperformance of the FT-SE 100. Higher real yields also weighed on UK equity prices.

Sterling issues

There was a lull in sterling bond issuance in the second quarter, perhaps in part because of the uncertain background of the General Election campaign and, subsequently, the prospects for the new government's first Budget. Nevertheless, total fixed-rate sterling issuance (excluding equity related) in the quarter remained strong at £6.6 billion. As a result, the total for the first half of 1997 is already close to the £21 billion issued in the whole of 1996.

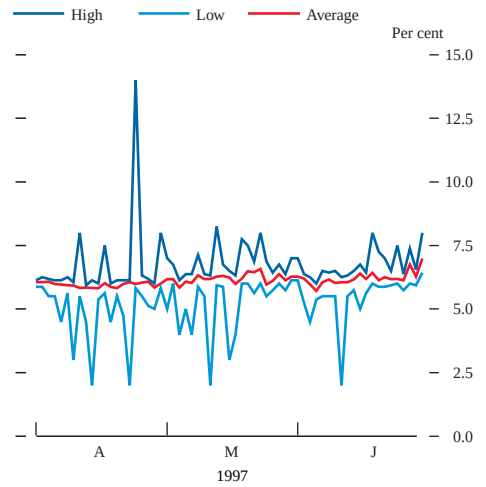
The strength of sterling continued to attract overseas issuers, who accounted for £4 billion. Issues were primarily for public sector or supranational bodies, including a £750 million five-year bond for the World Bank and a £500 million ten-year bond for the European Investment Bank. The latter was the first sterling issue to incorporate a clause allowing the issuer to re-denominate the bond in euros should the United Kingdom adopt it as its currency. Two Latin American emerging market bonds were also issued in sterling. Mexico's five-year bond was launched at a spread of 175 basis points over the benchmark gilt; Argentina's ten-year issue came at 280 basis points over the benchmark. Though

Chart 19
Major equity indices[a]



(a) In national currencies.

Chart 20
Sterling interbank overnight high, low and weighted average



overseas issuance was mainly in short to medium maturities, the flattening of the UK yield curve in this period encouraged domestic financial and corporate issuers to borrow for longer maturities.

Fixed-rate issuance by UK companies was £1.4 billion. In addition to household names such as Asda, National Power and Carlton TV, there were two long-dated deals to finance Private Finance Initiatives relating to the M6 motorway extension and Sutton Bridge Power station. The fledgling UK high-yield bond market was also given a boost by two deals brought for Castle Transmission and Eco-Bat Technologies.

Floating-rate note issues amounted to £2.3 billion in the quarter. Four mortgage-backed deals raised over £500 million, with the remainder issued primarily by UK and overseas financial institutions.

Operations in the sterling money market

This was the first full quarter of operation of the Bank's reformed money-market operations, introduced on 3 March. On 19 March the Bank announced that its twice-monthly gilt repo facility, which had been used as a supplementary refinancing mechanism alongside its daily operations, would be withdrawn after the maturity of the final repos taken up on that date. The successful introduction of the new operating arrangements meant that the facility was no longer needed as a standard feature.(1) Since 14 April, therefore, the Bank's refinancing has been provided exclusively through its daily operations. The new system has coped well with the resulting larger daily shortages: the average size of the daily shortage was £1,270 million in March, £1,360 million in April, £1,525 million in May and £958 million in June, compared with an average of £895 million for January and February.

Chart 20 shows the high and low of the sterling interbank overnight rate in the second quarter, and the weighted average rate.(2) The steadiness of the weighted average overnight rate confirms the impression that, for the most part, peaks and troughs in the overnight rate tended to be associated with relatively low volumes of business towards the end of the trading day. The spike in the overnight rate on 23 April, for example, arose only after it became clear that the Bank's counterparties had not applied for enough refinancing in the last open market operation (OMO) of the day at 2.30 pm to clear the residual shortage. The extent of the peak in the overnight rate on this day may have been exacerbated by the unfamiliarity of some market participants with the capacity of the new system: the amount of refinancing needed after 2.30 pm was within the capacity of the discount houses' late repo facility(3) at the Bank, which was available at rates well below those seen in the market in late trading. In the event, the residual shortage was met via the houses' late repo facility.

Chart 21 and Table B give a breakdown of the instruments used in the Bank's refinancing operations in the second quarter. Gilt repo increased slightly in the second quarter as a proportion of total

(1) The facility is, however, retained for future reintroduction if ever necessary.
(2) See the box on page 253.
(3) The late repo facility is one of the transitional provisions that have been made available to the discount houses while they restructure their businesses following the Bank's money-market reforms. They are described in the article, 'The Bank of England's operations in the sterling money markets' on pages 204–7 of the May 1997 *Quarterly Bulletin*.

Chart 21
OMOs—instrument overview

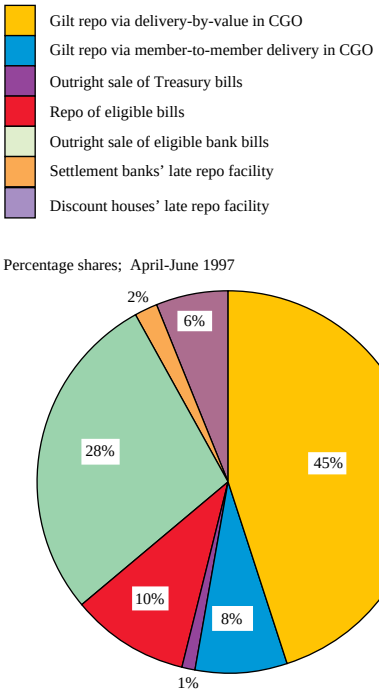


Table B
Influences on the cash position of the money market

£ billions; *not seasonally adjusted*
Increase in settlement banks' operational balances (+)

	1996/97	1997/98		
	Apr.-Mar.	Apr.	May	June
CGBR (+)	25.1	-1.4	5.4	5.1
Net official sales of gilts (-) (a)	-26.4	-2.1	-3.3	-3.2
National Savings (-)	-4.8	-0.1	0.0	-0.1
Currency circulation (-)	-2.3	1.9	-1.7	1.2
Other	0.3	-2.1	-0.3	-0.3
Total	**-8.1**	**-3.8**	**0.1**	**2.7**
Outright purchases of Treasury bills and Bank bills	-2.2	0.8	-0.5	0.1
Repos of Treasury bills, Bank bills, and British Government stocks and non-sterling debt	4.9	2.6	-0.2	-3.9
Late facilities (b)	-0.4	0.3	-0.1	0.3
Total refinancing	2.3	3.7	-0.8	-3.5
Treasury bills: market issues and redemptions (c)	-6.2	0.3	-0.9	-0.7
Total offsetting operations	**8.5**	**3.3**	**0.1**	**-2.8**
Settlement banks' operational balances at the Bank	0.4	-0.5	0.2	-0.2

(a) Excluding repurchase transactions with the Bank.
(b) Since 3 March 1997, when the Bank introduced reforms to its daily money-market operations, discount houses and settlement banks have been eligible to apply to use the late facilities. Prior to this, late facilities were available to the discount houses and the gilt-edged market makers.
(c) Issues at weekly tenders plus redemptions in market hands. Excludes repurchase transactions with the Bank (market holdings include Treasury bills sold to the Bank in repurchase transactions) and tap Treasury bills.

refinancing to 53%, compared with 50% in March. The outright sale to the Bank of eligible (bank and Treasury) bills declined from 39% to 29%. This is perhaps explained by a combination of the larger shortages in the second quarter and the relatively fixed supply of bills to the market. The other major contrast with March was the increased use of the discount houses' late repo facility, by which 6% of refinancing was supplied in the second quarter compared with 2% in March. The houses' repo facility was used on average eight times each month in the second quarter, as in March, but the amounts involved were larger and mainly reflected the failure of counterparties to bid for enough refinancing in the earlier open market operations.

The weekly tender of three-month Treasury bills was reduced from £400 million to £200 million with effect from 4 April, and maintained at that level for the rest of the quarter.

Gilt repo market

The gilt repo market grew quickly last year, reaching £68 billion outstanding by November. Between February and May this year, the outstanding amount of gilt repo reported to the Bank rose from £71 billion to £79 billion.(1)

Table C shows the outstanding amounts of gilt repo and reverse repo by maturity, since the data were first collected in May 1996. Most repo activity continues to be at shorter maturities, with about three quarters of outstandings of maturity one month or less. Repo turnover is concentrated even more heavily at shorter maturities: in May, about 70% of gilt repo turnover reported to the Bank was on call and next day. Average daily turnover in gilt repo was about £15 billion in the quarter to May, compared with £17 billion or so in the previous quarter.

Gilt repo data are also reported to the Bank for monetary statistics purposes (gilt repo contributes to M4 and gilt reverse repo to M4 lending). Those data are reported on a monthly basis and are therefore more timely than the more detailed quarterly data. In June, gilt repo made a negative contribution to M4 growth and the total amount of gilt repo outstanding on banks' and building societies' balance sheets fell. This may have been partly because banks and their customers were attempting to reduce balance sheet size ahead of their end-June reports.

The data collected by the Bank suggest that so far, the enhanced role of gilt repo in the Bank's money-market operations from 3 March has not affected turnover and outstandings significantly. After its rapid growth last year, the gilt repo market is now consolidating its position as an important source of secured money at the short end of the sterling money markets. Over time, as this position is established more widely, further entrants—including more corporates and institutional investors—might be encouraged into the market, leading to further growth in turnover and outstandings. Relatively subdued gilt repo turnover during the past three months might also be linked to a decline in specials(2) trading. Although some of the shorter benchmark stocks have continued to be in demand, for example as a hedging tool for corporate bond

(1) The number of institutions reporting gilt repo statistics to the Bank rose a little over the past six months, and so accounts for some of the growth.
(2) When a stock is particularly difficult to obtain and its repo rate falls below the prevailing general collateral rate by more than about 5 to 10 basis points, it is said to be trading 'special'.

Table C
Maturity breakdown of outstandings over time(a)

	On call and next day	2–8 days	9 days–1 month	1–3 months	3–6 months	Over 6 months	**Total**
Per cent							
Repos							
1996 May	20	34	23	15	7	1	**100**
Aug.	19	33	33	11	4	1	**100**
Nov.	19	36	22	19	2	2	**100**
1997 Feb.	20	29	33	15	3	0	**100**
May	27	23	27	18	4	1	**100**
Reverse repos							
1996 May	20	30	20	23	6	2	**100**
Aug.	22	29	29	14	5	1	**100**
Nov.	21	34	21	20	3	2	**100**
1997 Feb.	18	32	26	21	3	0	**100**
May	23	21	30	20	6	1	**100**

Note: Rows may not sum to total owing to rounding.

(a) From the data reported under the voluntary quarterly arrangements.

Table D
The 1997/98 financing requirement

£ billions (a)

	Original remit March 1997	Budget July 1997
CGBR forecast	20.0	12.4
Expected net change in official reserves	0.0	0.0
Gilt redemptions	19.6	19.6
Gilt sales residual from 1996/97	n.a.	-3.9
Financing requirement	39.5	28.1
Less net financing from:		
National Savings	3.0	3.0
Certificates of Tax Deposit (b)	0.0	0.0
Remaining debt sales required	36.5	25.1
Made up by net sales of:		
Treasury Bills and other short-term debt (c)	0.0	0.0
And gross gilt sales of:		
Ultra-short Conventionals (1–3 years)	0.0	0.0
Short Conventionals (3–7 years)	10.2	7.0
Medium Conventionals (7–15 years)	8.8	6.0
Long Conventionals (15+ years)	10.2	7.0
Index-linked Gilts	7.3	5.0

n.a. = not available.

(a) Figures may not sum owing to rounding
(b) Certificates of tax deposits (CTDs) are deposits made by taxpayers with the Inland Revenue in advance of potential tax liabilities. Changes in the level of CTDs act as a financing item for central government. The working assumption at the beginning of each year is that the level of CTDs remains unchanged.
(c) The level of net Treasury Bill issuance may fluctuate during the year as a result of money-market operations.

Table E
Gilt auction dates 1997/98

23 July 1997
23 and 25 September 1997 (a)
29 October 1997
26 November 1997
28 January 1998
25 March 1998 (b)

(a) The dual auction for the second quarter of the financial year (July-September) was set for September after consultation with GEMMs and end-investors.
(b) This date is subject to change if it should coincide with the spring 1998 Budget.

underwriting, and have therefore traded special on occasion, the overall level of specials trading was probably less than in the previous quarter.

Gilt financing

Organisation of debt management

On 6 May, the Chancellor's letter to the Governor on the new monetary policy framework stated (in paragraph 21) that: 'The Bank's role as the Government's agent for debt management, the sale of gilts, oversight of the gilts market and cash management will be transferred to the Treasury.' This was followed on 13 May by the Treasury announcement that: 'The Treasury, in consultation with the Bank, will now work up detailed proposals. These proposals will be offered for consultation with gilt market participants with a view to being finalised by the end of July and implemented as soon as feasible thereafter. In the interim, the Bank will continue to carry out their present functions and responsibilities.' An article on pages 241–47 of this *Bulletin* discusses the changes to the Bank of England's role in more detail. On debt management the Bank is working closely with HMT to ensure that the handover of responsibilities takes place as efficiently as possible. In the meantime, the Bank continues to execute the policies set out in the remit.

Financing requirement and gilt sales

At the beginning of the financial year the gilt sales target was £36.5 billion. This was revised down by £3.9 billion, the carry-over of excess gilt sales from 1996/97. As part of the Budget on 2 July, the CGBR forecast for 1997/98 was reduced from £20 billion to £12.4 billion. As a consequence the gilt sales requirement for 1997/98 is now £25.1 billion. Table D sets out the revised financing arithmetic.

The Bank aims to sell gilts at a broadly even pace through the year. Gilts sales to end June amounted to £8.6 billion, about one quarter of the initial gilt sales target for the year, and hence close to even pace funding. Measured against the new target, close to one third of the gilt sales target was achieved in the first quarter. Conventional gilts accounted for £7.2 billion, all of which was sold in the scheduled auctions. Taps of conventional stocks are undertaken for market management purposes; there were none during the quarter. £0.9 billion (nominal value) of index-linked gilts were sold through taps in the quarter.(1)

Auctions

The 1997 remit set out the auction calendar for the financial year. At that time, seven single auctions and four dual auctions were planned. This schedule was revised in the light of the reduced target for gilt sales announced in the Budget, reflecting the market preference for maintaining the minimum size of auctions and so reducing their number. The new auction calendar included three changes to the original remit:

- The two dual auctions due to be held in the third and fourth quarters of the 1997/98 financial year were changed to single auctions.

(1) Which raised £1.4 billion inclusive of the inflation uplift on the index-linked gilts.

- The auctions due to be held in August 1997 and February 1998 were cancelled.

- The auction previously scheduled for late November/December 1997 was set for 26 November, reflecting the Government's decision not to hold a Budget in November. The date of the March 1998 auction may need to be considered in the light of the Budget.

Following the quarterly consultation with gilt-edged market makers (GEMMs) and end-investors, which took place immediately after the Budget, the dual auction for Q2 (July-September) was fixed for September. Table E sets out the auction program for the final three quarters of the year.

Three auctions were conducted in the first quarter of the financial year. The 1997 remit stated that the specific stocks to be auctioned in the forthcoming quarter would be announced at the end of the previous quarter, unless further feedback from the market would be valuable, in which case only the maturity range would be indicated. The 27 March announcement set out the following auction schedule:

- 23 April 1997: 7% Treasury Stock 2002;

- 20 and 22 May 1997: 7% Treasury Stock 2002 and 8% Treasury Stock 2021 respectively;

- 25 June 1997: 7¼% Treasury Stock 2007.

This reflected advice from market participants in the Bank's quarterly meetings. There was a widespread view that the April auction should proceed on the scheduled date despite the imminent General Election, but that, in view of the election and the perception that interest rates might be raised at the Monetary Meeting scheduled for the following week, a short auction would limit the exposure that the market would be required to assume. The announcement was consistent with the policy of issuing strippable benchmark stocks, in order to maximise the outstanding amount of strippable stock ahead of the introduction of strips.

The announcement that the April auction would comprise £2 billion stock was towards the lower end of market expectations, but the March PSBR, published the day after the announcement of the auction size, was also lower than expected, suggesting that the gilt financing target for 1996/97 had been exceeded, implying a lower gilt sales target for 1997/98. The auction was well covered—3.5 times—in line with the 1996–97 average for short stocks. The tail was 1 basis point, higher than the previous year's average for short auctions, and consistent with a wider-than-usual distribution of bids.

The May dual auction combined the benchmark short and long stocks. The first leg, £1.5 billion 7% 2002 was covered 3.03 times, and had no tail. Cover at the second leg, £1.5 billion of 8% 2021, was 1.29 times, well below the average for longs (2.05) and the lowest cover since December 1995. The tail was 4 basis points, significantly above the 1996–97 average for long auctions of 1.4 basis points, as would be expected given low cover. The relatively low cover surprised the market, since When Issued (WI)

Table F
Gilt issuance

Date	Stock	Amount issued (£ millions)	*of which: to CRND*	Price at issue (per £100 stock) (a)	Yield at non-competitive allotment price (b)	Yield at issue	Yield when exhausted (c)	Average yield (d)	Cover (e) at auctions	Tail (f) at auctions (basis points on yield)	Date exhausted
Auctions of Conventional stock											
23.4.97	7% Treasury Stock 2002	2,000	0	98.9688	7.24	n.a.	n.a.	n.a.	3.49	1	23.4.97
20.5.97	7% Treasury Stock 2002	1,500	0	100.2500	6.94	n.a.	n.a.	n.a.	3.03	0	20.5.97
22.5.97	8% Treasury Stock 2021	1,500	0	108.6250	7.24	n.a.	n.a.	n.a.	1.29	4	22.5.97
25.6.97	7¼% Treasury Stock 2007	2,000	0	100.8125	7.13	n.a.	n.a.	n.a.	2.71	1	25.6.97
Tap Issues of Index-Linked Stock											
17.4.97	2½% Index-linked 2013	200	0	146.5625	n.a.	3.61	3.61	3.60	n.a.	n.a.	30.4.97
3.6.97	2½% Index-linked 2016	325	25	156.5000	n.a.	3.67	3.67	3.67	n.a.	n.a.	3.6.97
3.6.97	2½% Index-linked 2009	125	25	172.2500	n.a.	3.62	3.62	3.62	n.a.	n.a.	3.6.97
16.6.97	2½% Index-linked 2013	150	0	147.8750	n.a.	3.61	3.62	3.62	n.a.	n.a.	27.6.97
16.6.97	2½% Index-linked 2024	150	0	125.3750	n.a.	3.65	3.65	3.65	n.a.	n.a.	16.6.97

n.a. = not applicable.

(a) Non-competitive allotment price.
(b) Gross redemption yield per cent based on the weighted average price of successful competitive bids.
(c) Gross redemption yield or real rate of return (assuming 5% inflation) based on the price when the issue ceased to operate as a tap.
(d) Weighted average gross redemption yield or real rate of return (assuming 5% inflation), based on actual price at which issues were made.
(e) Total of bids divided by the amount on offer.
(f) Difference in gross redemption yield between the weighted average of successful competitive bids and the lowest accepted competitive bid.

trading had been active. The yield on 8% 2021 had fallen very sharply, and the spread over German bunds narrowed accordingly, after the Chancellor's announcement on 6 May, and it is possible that this process had taken yields to a point at which long stock was relatively less attractive than before. Yields reached a low point of 7.03% on 14 May, but had risen to 7.20% the evening before the auction. The market reacted sharply to the announcement of low cover and high tail, falling ½ point immediately, and closing on auction day at a yield of 7.34%.

On 25 June the first medium stock of the financial year, 7¼% 2007, was sold, again in the minimum size for a single auction of £2 billion. Ahead of the auction there was a marked lack of activity in the WI and parent stock, reflecting increased expectations of higher interest rates following the sharp rise in retail sales for May released on 18 June, and possibly also some residual nervousness from the second half of the May auction. In the event, both cover and tail were in line with the 1996–97 average, at 2.71 times and 1 basis point respectively.

Turnover in switches of stocks from the Bank of England's shop window for gilts dropped only slightly in this period compared with the first quarter of 1997; nominal monthly turnover averaged £547 million, against £570 million. Unlike the previous quarter, activity was fairly even each month. There were also outright sales made from the window in May (£56.25 million) and June (£180.5 million). The bulk of the May sales took place on 6 May after the announcement of the changes to the monetary policy framework. In June the sales included £35 million of 8½% 2007, which were sold in response to tightness connected with the delivery of the stock into the long gilt futures contract. During the period all the activity in both switches and outright sales was in shorts and mediums, ie stocks with residual maturities of between 3 and 15 years.

Index-linked gilts

A number of factors weighed on index-linked gilts in early April. The rise in target for index-linked issuance to 20% of gilt sales implied an increase in supply from £5.8 billion in 1996/7 to £7.3 billion in the current financial year; the second auction of ten-year US Inflation Indexed Notes on 8 April met with much less demand than the first (a higher-than-expected yield of 3.65% and

relatively small cover of 2.26, compared with 3.45% and 5.51 for the January auction); and fears of emerging inflation and expectations of higher interest rates in the United Kingdom and the United States were depressing bond markets generally.

The gilt market, including the index-linked sector, stabilised in mid April after the release of more benign economic data in the United Kingdom and the United States. The underperformance of index-linked against both conventionals and equities, as well as nervousness ahead of the May election, prompted some switching back into the sector. Consequently, and with the long absence of supply also leading to some illiquidity, it was decided to accept lower bids for the outstanding £36 million of the 2% index-linked 2006 issued in February. The tap was exhausted in a mini-tender on 16 April at 191 14/32, 4 5/16 below the original selling price. The following day £200 million of 2 1/2% index-linked 2013 was issued and, with almost half of the tap sold in the initial tender, the price was raised 1/8. But the market subsequently softened and no further sales were made until the end of April, the tap finally being exhausted on the day before the 1 May General Election.

The reforms to the monetary policy framework announced by the new Chancellor on 6 May led to a reassessment of the prospects for price stability in the United Kingdom. With inflation expectations revised down, the demand for index-linked stock dried up for a while and the sector underperformed markedly in May.

In part because of speculation that the July Budget would abolish pension funds' dividend tax credit (making equities less attractive relative to bonds), investor interest in index-linked gilts began to re-emerge in June and, in response to specific known demand, the Bank issued a £400 million tap package on 3 June. The £100 million 2 1/2% index-linked 2009 and £300 million 2 1/2% index-linked 2016 were both exhausted on the first day. This helped to restore market confidence that the index-linked issuance target was achievable. With demand for longer-dated stock continuing as the nominal and real yield curve flattened, this was followed on 16 June by £150 million each of 2 1/2% index-linked 2013 and 2 1/2% index-linked 2024. The latter was also exhausted in the initial tender but the bulk of the 2013s were not sold until later in the month, the tap being exhausted on 27 June.

Sectoral investment activity

The latest ONS statistics, covering the first calendar quarter of 1997, show a sharp drop in net investment by institutions in gilts, falling to £2.3 billion, the lowest quarterly total for five years. Since the total level of net institutional investment in securities markets generally remained very buoyant, this probably reflects the relatively high level of gilt redemptions (nearly £5 billion) falling in the quarter. Net investment in gilts by pension funds remained strong, rising to £2.1 billion in the quarter. Pension funds have shown a propensity to invest heavily in gilts consistently in the last few years; once again in this quarter gilts accounted for almost 50% of total net investment by pension funds (compared with 11% of their total portfolios at end 1996, up from 7% in 1992). The Minimum Funding Requirement, introduced under the Pensions Act in April, is thought likely further to increase demand for gilts among pension funds. Long-term insurers by contrast invested only £332 million in gilts, the lowest quarterly level for six years, reversing the trend over the previous four quarters of heavy buying.

Table G
Official transactions in gilt-edged stocks

£ billions; *not seasonally adjusted*

	1996/97	1997/98		
	Apr.-Mar.	Apr.	May	June
Gross official sales (+) (a)	38.8	2.1	3.3	3.2
Redemptions and net official purchases of stock within a year of maturity (-)	-12.4	0.0	0.0	0.0
Net official sales (b)	26.4	2.1	3.3	3.2
of which net purchases by:				
Banks (b)	-2.3	0.2	0.7	-0.5
Building societies (b)	0.3	0.1	0.8	-0.1
M4 Private sector (b)	21.9	1.6	2.8	3.1
Overseas sector	5.9	0.2	-1.1	0.7
LAs & PCs (c)	0.6	0.0	0.0	0.0

(a) Gross official sales of gilt-edged stocks are defined as official sales of stock with over one year to maturity net of official purchases of stock with over one year to maturity apart from transactions under purchase and resale agreements.
(b) Excluding repurchase transactions with the Bank.
(c) Local Authorities and Public Corporations.

Data compiled by the Bank for the most recent quarter, April to June, saw net sectoral investment in gilts rising back up to £8.6 billion, buoyed by the absence of redemptions falling during this period. The domestic non-monetary sector made net purchases of £7.5 billion compared with £8.6 billion the previous quarter. For the overseas sector, sales outweighed purchases of gilts in May, perhaps reflecting further profit-taking on sterling's continuing rise, and the narrowing spreads against European bonds following the Chancellor's announcement of 6 May. The monetary sector made net purchases of gilts of £1.1 billion, following a significant reduction in holdings the previous quarter, with demand in April and May encouraged by two auctions of the 7% 2002 five-year benchmark stock.

Technical developments

On 30 May the Bank announced the results of its consultations on gilt market conventions and on the ex-dividend period for gilt-edged securities.

Daycounts and decimals

The consultation invited views on possible changes to two gilt market conventions. The first was the daycount convention used for the calculation of accrued interest. This is part of the formula used to calculate the accrued interest payable to the seller by the buyer when gilts are traded between dividend payments. Because dividends on gilts are paid semi-annually, the 'actual/365' convention calculates the accrued interest as half of the annual coupon multiplied by the number of days between the start of the dividend period and the settlement date, divided by 182.5. The calculation of accrued interest on gilts using 'actual/actual' convention differs from the 'actual/365' approach only in that the number of days is divided by the actual number of days in the coupon period rather than 182.5. The majority of those responding to the paper wished to switch from the 'actual/365' to the 'actual/actual' convention.

The second was whether to change the quotation of gilt prices from fractions (£$^{1}/_{32}$nds per £100) to decimals (£0.01 per £100). Almost all major international bond markets use decimal prices; the United States is the only other exception. A large majority of those responding to the paper favoured making such a change.

The Bank proposed that both these changes should be made next year. The implementation date will be determined in consultation with market participants as soon as possible, and will take account of the implications for firms' systems and for the specification of LIFFE gilt contracts; the change will not be implemented before April 1998.

Calculating strip prices from yields

The consultation invited views on what standardised formula for computing market prices from gross redemption yields should be adopted to allow gilt strips to trade on a yield basis. The majority of those responding to the paper favoured compound interest for all strips, including the shortest, on an 'actual/actual' basis. The Bank therefore proposed that this be the pricing method for strips from the start of the strips market.(1) The Bank also proposed that, from

(1) The date for the start of the strips market will be announced later in the summer, but is expected to be a month or so after the Central Gilts Office upgrade goes live.

the same time, the Stock Exchange price/yield formula for conventional bonds should be brought into line with this method; this will be discussed with the Exchange. The conventions proposed for the number of decimal points in strip yields and in settlement prices are, respectively, three and six.

Ex-dividend period

The consultation also sought views on possible changes to the ex-dividend period and to the special ex and special cum-dividend facilities. A large majority of those responding favoured the proposal to abolish the ex-dividend period for gilts held in the Central Gilts Office; it was recognised that there would be consequential changes to arrangements for trading gilts between CGO members and gilt holders outside CGO or holders on the National Savings Stock Register, where the ex-dividend period could only be reduced from seven to five working days (ten to eight for War Loan). A large majority also favoured the abolition of special ex and special cum-dividend facilities.

No decision has yet been made on whether to proceed with these changes, which would require secondary legislation and systems changes at the National Savings Stock Register and at the Bank's Registrar's Department. The implementation date for any change would take into account the implications for firms' systems and for the specification of LIFFE contracts, and would not be before April 1998.

London Stock Exchange rules for GEMMs

Following the end of the Bank's separate capitalisation requirement for GEMMs, the London Stock Exchange has amended its membership rules as they relate to GEMMs that merge with another group firm. All GEMMs continue to be required by the Bank to be members of the London Stock Exchange, but under the revised membership rules a firm may apply to be a member on terms that mean that only transactions that are related to its gilt-edged market-making functions, other than gilt repo transactions, are subject to Exchange rules. The precise scope of business that is on and off Exchange is a matter for determination by the London Stock Exchange on a case-by-case basis.

HM Government ECU issuance

The United Kingdom continued to hold regular monthly tenders of ECU 1 billion of Ecu Treasury bills in the second quarter, comprising ECU 200 million of one-month, ECU 500 million of three-month and ECU 300 million of six-month bills. The tenders continued to be oversubscribed, with issues covered by an average of 2.9 times the amount on offer, compared with the average cover of 2.5 in both the first quarter and in 1996 as a whole. During the second quarter, bids were accepted at average yields between 3 and 10 basis points below the ECU Libid rate of the appropriate maturity. There are currently ECU 3.5 billion of UK Government Treasury bills outstanding. Secondary market turnover in the second quarter averaged ECU 1.6 billion per month, slightly lower than average turnover in 1996 but at around the same level as turnover in the first quarter of 1997.

On 15 April the Bank re-opened the Ecu Treasury Note maturing in January 2000 with a further tender for ECU 500 million, raising the

amount of this Note outstanding with the public to ECU 1.0 billion. There was strong cover at the auction, 2.7 times the amount on offer, and accepted bids were in a tight range of 4.62%–4.64%. The total of Notes outstanding with the public under the UK Note programme rose to ECU 5.0 billion.

The international environment

- *Growth in the United States and Japan was strong in the first quarter, but latest data suggest that activity in both countries slowed in the second quarter.*

- *By contrast, activity in Germany and France strengthened from the moderate growth seen in the first quarter. Activity in Italy is more subdued, though there are signs of a gradual recovery. The smaller EU countries continue to grow strongly.*

- *Real broad money growth in the major six overseas (M6) economies rose further in the second quarter and is consistent with increasing activity. Rising equity markets should also help to strengthen demand, particularly in the United States, where consumer confidence is already strong.*

- *Producer prices remain subdued in all the M6 economies; consumer price inflation is currently very low, with little evidence of emerging wage pressures, even in the United States.*

- *In the absence of price pressures, M6 short-term interest rates were broadly stable in the second quarter. Financial markets do not expect significant rises in short-term interest rates during the remainder of the year.*

- *Long-term interest rates fell in Japan and the European Union (despite uncertainties about EMU) and were stable in the United States.*

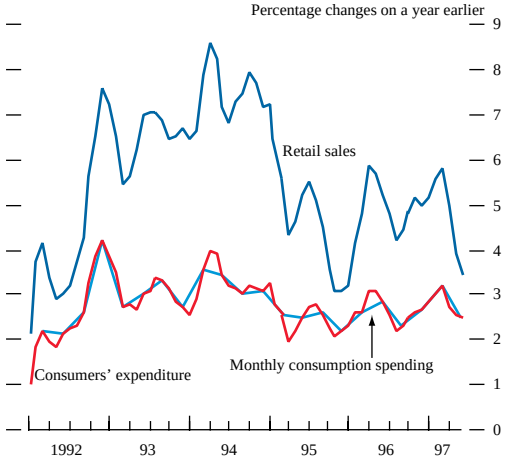
Table A
Contributions to US GDP growth[(a)]

Percentage points

	1996		1997	
	Year	Q4	Q1	Q2
Domestic demand	**3.0**	**0.6**	**1.5**	**0.8**
Consumption	1.8	0.6	0.9	0.1
Investment	1.2	0.1	0.6	0.5
Stocks	0.0	-0.1	0.4	0.0
Government	0.0	0.1	0.0	0.2
Net trade	**-0.2**	**0.5**	**-0.3**	**-0.3**
GDP growth	**2.8**	**1.1**	**1.2**	**0.5**

(a) Contributions may not sum because of rounding.

Chart 1
US consumer activity



Latest data suggest that activity in the United States and Japan may have slowed from the strong first quarter.

US GDP rose by 0.5% in the second quarter, following a 1.2% rise in the first quarter. In both quarters, the increases in GDP were driven by domestic demand, with net trade making a negative contribution (see Table A). Consumption, which accounted for three quarters of the first quarter rise in GDP, rose by just 0.2% in the second quarter. That recent weakness in consumption is reflected in the latest retail sales data (see Chart 1). But consumer confidence remains strong, probably due to strong growth in employment and income (real disposable income grew by 1.1% and 0.8% in the first and second quarters, respectively).

A key question is whether the 0.2% increase in consumption in the second quarter represents a permanent slowdown in consumer activity towards more sustainable growth rates, or whether it is simply temporary, like the slowdown in the third quarter of 1996. Consumer confidence continues to improve, owing to high levels of job creation (and perhaps wealth effects from a rising equity market), suggesting that the recent slowdown may be temporary. Employment growth has continued: the average monthly increase in non-farm payrolls was 239,000 in Q2, up from 229,000 in Q1, suggesting a rise in income from employment.

By contrast with the slowdown in retail sales, industrial activity has remained more buoyant (see Chart 2). Industrial production rose by 1.1% in the second quarter. The National Association of

Chart 2
US industrial activity

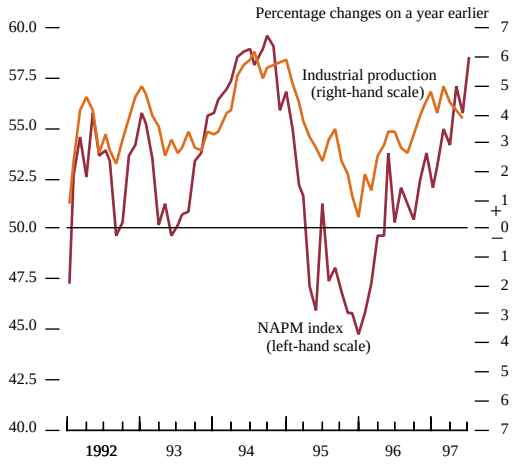


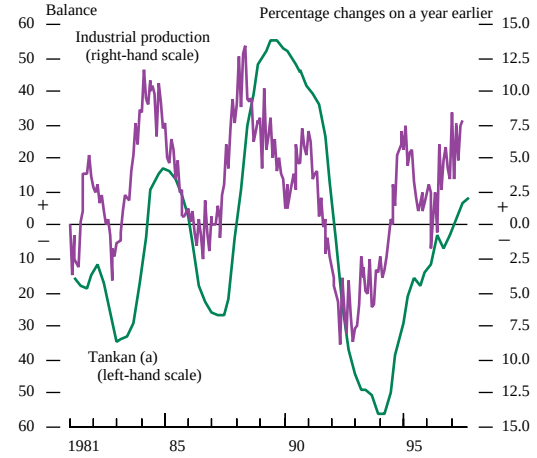
Table B
Contributions to Japanese GDP growth[(a)]

Percentage points

	1996			1997
	Year	Q3	Q4	Q1
Domestic demand	**4.4**	**0.1**	**0.5**	**1.5**
Consumption	1.7	-0.1	0.7	2.7
Investment	2.6	0.1	-0.1	-1.2
Stocks	-0.1	0.0	-0.1	0.0
Government	0.2	0.1	0.1	0.0
Net trade	**-0.9**	**0.2**	**0.4**	**0.1**
GDP growth	**3.6**	**0.3**	**0.9**	**1.6**

(a) Contributions may not sum because of rounding.

Chart 3
Japan: Tankan Survey and industrial production



(a) Major manufacturers' view of business conditions.

Table C
Contributions to German GDP growth[(a)]

Percentage points

	1996			1997
	Year	Q3	Q4	Q1
Domestic demand	**0.8**	**-0.1**	**0.3**	**0.3**
Consumption	0.7	0.1	-0.2	0.1
Investment	-0.2	0.2	0.0	-0.6
Stocks	-0.3	-0.5	0.6	0.3
Government	0.5	0.2	-0.2	0.6
Net trade	**0.6**	**0.8**	**-0.2**	**0.1**
GDP growth	**1.4**	**0.7**	**0.1**	**0.4**

(a) Contributions may not sum because of rounding.

Purchasing Managers' (NAPM) index which averaged 55.7 in Q2 (compared with 53.4 in Q1), rose to 58.6 in July, consistent with further increases in industrial output. And in the second quarter the index of new orders was 61.4, its highest quarterly level since the third quarter of 1994, suggesting that further increases in output are likely over the next few months.

Japanese GDP rose by 1.6% in the first quarter, largely because of increased consumption (see Table B). Net external trade contributed only 0.1 percentage points, despite the depreciating yen (the nominal effective exchange rate fell by 9.3% during 1996). Investment was weak despite the low cost of capital, reflecting subdued industrial confidence, particularly in smaller firms.

The Japanese recovery has been erratic, but the underlying trend is gradual expansion. Analysts have attributed much of the first-quarter strength in consumption to advance purchasing prior to April's indirect tax increase (consumption tax rose from 3% to 5%). So consumption growth is likely to be weaker in the second quarter. And with little evidence of any improvement in the labour market (the unemployment rate was 3.5% in May), consumer sentiment is likely to remain weak. The sluggish nature of the industrial recovery was reflected in the June Tankan Survey (see Chart 3). Though industrial sentiment improved, this continued to be skewed towards larger export firms, with the response from smaller domestically orientated firms still quite muted.

Activity in the larger continental European economies was slow in the first quarter, though more recent data show continuing recovery in Germany and France. Economic performance in Italy remains weak. By contrast, activity in the peripheral European countries has been more buoyant.

In Germany, GDP grew by 0.4% in the first quarter, largely driven by government expenditure (see Table C). In line with the pattern in the previous two quarters, consumer demand and investment remained subdued. French GDP grew by 0.2% in the first quarter: growth was entirely export-led, with weak consumption and investment (see Table D).

More recent data indicate some revival in industrial activity in both countries, which seems to be largely export-driven. Industrialists in both countries continue to report strong export orders, but domestic orders are less buoyant. In Germany, the increase in exports has been sufficient to stimulate business confidence: the IFO balance of manufacturing sentiment was +4.6 in the second quarter, up from -1.4 for the first quarter (see Chart 4). French industrial production has also picked up: increasing export orders more than offset weak domestic demand, leading to an increase in business confidence.

Italian GDP fell by 0.2% in the first quarter, reflecting a negative contribution from net external trade (see Table E). Unlike its two larger European neighbours, Italy has not benefited from any stimulus from external demand since the third quarter of 1996. Domestic demand rose by 0.2% in the first quarter, but that was largely because of consumption growth (up 0.5% on the quarter), reflecting an incentive scheme that encouraged the demand for cars. The underlying picture of activity is more subdued.

Table D
Contributions to French GDP growth[a]

Percentage points

	1996 Year	1996 Q3	1996 Q4	1997 Q1
Domestic demand	**0.9**	**0.6**	**0.0**	**-0.3**
Consumption	1.3	0.5	-0.3	0.2
Investment	-0.1	0.3	0.0	-0.3
Stocks	-0.5	-0.3	0.2	-0.3
Government	0.2	0.1	0.1	0.1
Net trade	**0.6**	**0.2**	**0.2**	**0.5**
GDP growth	**1.5**	**0.8**	**0.2**	**0.2**

(a) Contributions may not sum because of rounding.

Chart 4
Industrial confidence

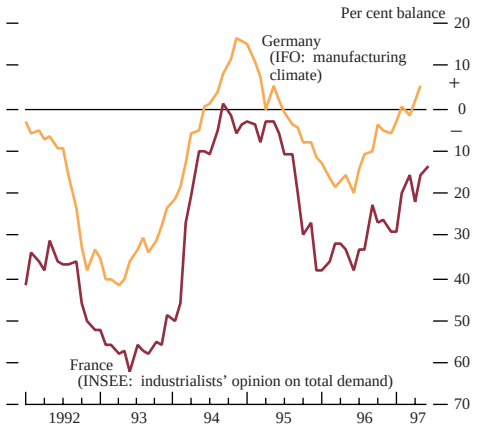


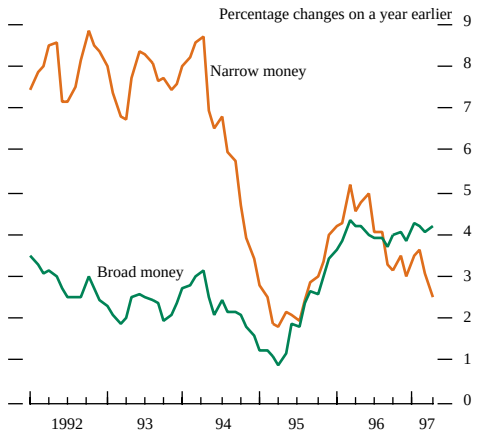
Table E
Contributions to Italian GDP growth[a]

Percentage points

	1996 Year	1996 Q3	1996 Q4	1997 Q1
Domestic demand	**0.2**	**0.6**	**0.4**	**0.2**
Consumption	0.5	0.2	0.2	0.3
Investment	0.2	-0.1	-0.1	0.0
Stocks	-0.5	0.4	0.3	-0.1
Government	0.1	0.1	0.0	0.0
Net trade	**0.5**	**0.1**	**-0.9**	**-0.4**
GDP growth	**0.7**	**0.7**	**-0.5**	**-0.2**

(a) Contributions may not sum because of rounding.

Chart 5
Average narrow and broad money growth in the M6 economies



In all three countries, underlying consumer activity is weaker than industrial output, reflecting the weak labour market conditions that currently prevail. But it might also partly reflect uncertainty about the tightness of fiscal policy in the run-up to EMU. There have been signs more recently of a slight pick-up in consumer confidence, but it still remains low.

Overall, total GDP in the M6 economies (aggregated using UK export weights) rose by 0.7% in the first quarter, compared with 0.3% in the final quarter of 1996. Much of this increase reflects the strong growth in the United States and Japan. Latest data suggest that second-quarter growth in both countries will be lower, though this effect should be partly offset by stronger growth in Germany and France.

Activity in the smaller EU countries has been more buoyant than in their larger continental European neighbours. In Spain, GDP rose by 0.9% in the first quarter, driven by consumption and investment, as private demand replaced net exports as the main force behind the recovery. In the Netherlands, GDP fell by 0.6%, though that was largely because of a smaller number of working days in the first quarter of 1997. The underlying picture in the Netherlands is of broad-based growth: industrial production rose by 0.4% in the first quarter and latest industrial surveys suggest continued improvement in order books.

In the M6 economies, recent trends in narrow and broad money growth have continued. The annual growth rate of GDP-weighted broad money has picked up, and the annual increase in narrow money has contracted slightly.

Broad money growth has increased in the M6 economies: the annual increase averaged 4.2% in April and May, the highest rate since the first quarter of 1992. This mainly reflects a smaller annual decrease in French money supply and a rise in the annual rate of increase in Italian M2, from 7.4% in the first quarter to 9.4% in the second. The annual increase in US M2 has remained stable, averaging 4.8% in the second quarter, slightly below the upper edge of its 1%–5% target band. German broad money growth, as measured by M3, fell from 7.7% in Q1 to 6.5% in Q2.

By contrast, the decline in M6 GDP-weighted narrow money growth has continued in 1997. The annual increase in M6 narrow money averaged 2.6% in April and May, compared with 3.4% in the first quarter. This reflects lower rates of increase in narrow money across the G3. In the United States, narrow money contracted by 4.9% in Q2 from a year earlier, following a contraction of 3.9% in Q1. In Japan, the annual increase was 8.7% in Q2, down from 9.7% in Q1. The German narrow money growth rate fell by a similar amount, down from 10.3% in Q1 to an average annual rate of 9.3% in April and May.

Equity market performance in the M6 economies has also been buoyant.

All major equity market indices rose in Q2. The Dow Jones and Nikkei Dow were up 13.8% and 15.4% respectively, while in Europe, the German DAX and Paris CAC 40 rose by 10.4% and 7.6% (see Chart 6).

Chart 6
Equity indices in domestic currencies

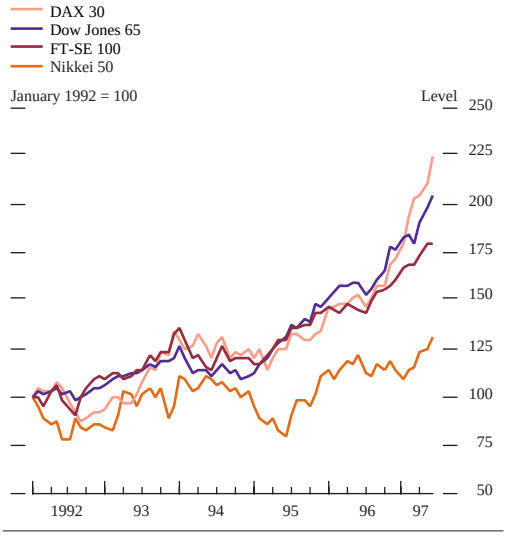


Chart 7
US producer price inflation

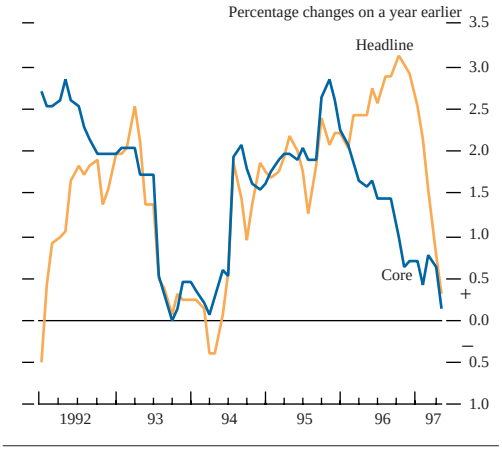
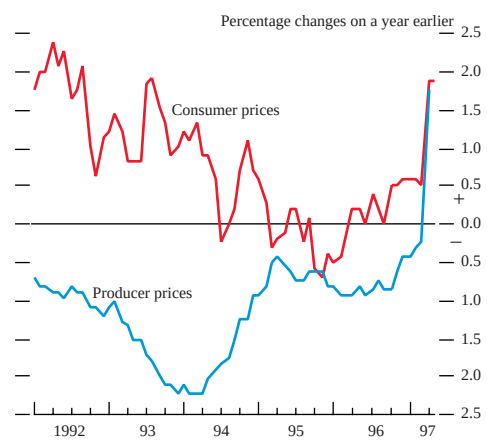


Chart 8
Japanese inflation



But despite strengthening activity, broad money growth and rising asset prices, inflation in the M6 economies has been quite low.

In the United States, there is little evidence of inflationary pressure either from the labour market or from within the supply chain. The unemployment rate was 4.9% in the second quarter the lowest for 23 years. But there is little evidence that the reduction in the unemployment rate since 1992 Q3 (when it was 7.6%) is feeding through to a significant increase in wage pressures. Wage inflation did pick up slightly in the first quarter (to 3.9%), but fell back (to 3.6%) in the second quarter.

US producer price inflation of both crude materials and finished goods has fallen sharply over the past few months. This largely reflects the effects of lower oil prices, reversing the rises in 1996 (see Chart 7). But it might also reflect the effects of lower import prices as a result of the dollar appreciation. The low producer price inflation is reflected in consumer price data. The headline rate of consumer price inflation has fallen sharply over the past three months and, at 2.3% in June, is at its lowest since 1986.

Despite rising import prices, Japanese producer price inflation remains low. In contrast with the United States, Japanese import prices have risen sharply: the annual inflation rate was 10% in the second quarter. The level of producer prices fell throughout 1996, but has levelled out since January 1997. This could reflect rising import price pressures; in addition, producers may have attempted to widen margins in response to the revival in domestic demand. As well as this underlying pick-up in producer prices, there was also a step increase in prices in April (up 1.9% on the month), reflecting the effects of the increase in the consumption tax rate. Nonetheless, producer price pressures remain muted.

Japanese consumer price inflation has also been low (see Chart 8). Historically high levels of unemployment may partly explain low levels of consumer confidence, which in turn is restraining private demand and creating a competitive pricing environment. As with producer prices, the sharp increase in consumer prices since April reflects the increase in consumption tax. This effect will drop out of the index in April 1998.

European consumer price inflation remains subdued despite the contrast in the pace of activity between the core and peripheral countries.

As in Japan, rising import prices in Germany and France have not yet led to a significant rise in producer price inflation (see the box on page 269). In Germany and France, where the nominal effective exchange rates depreciated by 4.1% and 2.1% respectively during 1996, annual import price inflation has risen quite sharply since mid 1996, reaching 2.7% in Germany and 1.5% in France in the first quarter. These pressures may be reflected in producer prices, which have been rising in both countries since the start of the year. But the annual inflation rates remain quite low.

Italy, by contrast, has benefited from lower import prices owing to the appreciation of the lira prior to its entry to the ERM in November 1996. As a result, Italian producer price inflation has been modest, remaining slightly below 1% during the past twelve months.

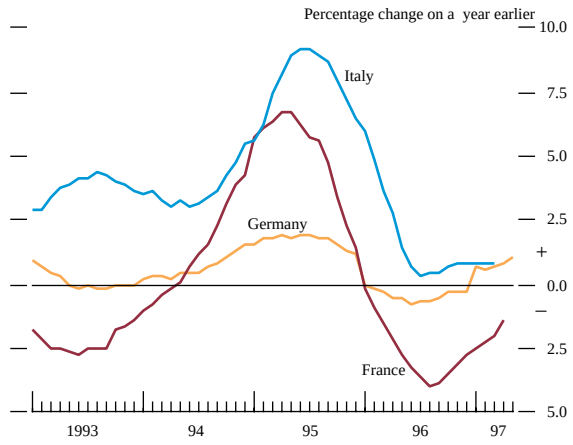
Trends in European producer price inflation

This box assesses recent producer price inflation[1] across the European Union. The main finding is that trends in producer prices have been similar, despite differing rates of activity between the larger and smaller economies. And though there has been a modest pick-up in producer price inflation over the past year as the European economies recover, these rising producer prices are so far putting little pressure on consumer prices.

Larger economies

Despite differences in the absolute rate of producer price inflation, the trend since 1993 has been similar in Germany, France and Italy (see Chart A). In all three countries producer price inflation rose in 1993, and picked up sharply during 1994 in response to the global rise in commodity prices.

Chart A
Larger EU: producer price inflation



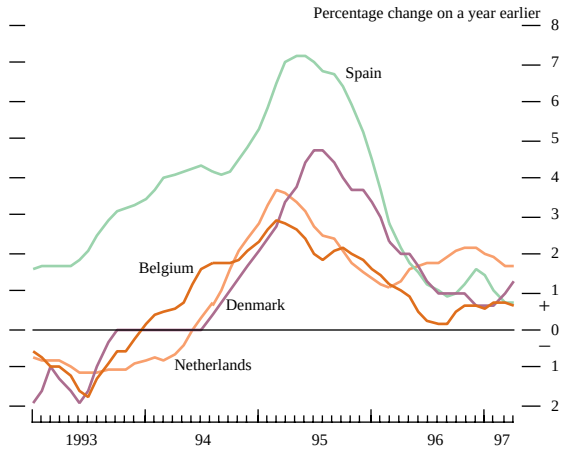
In all three countries producer price inflation peaked in early 1995 but then fell, in line with the fall in commodity prices. This reduction continued until mid 1996, when there was producer price deflation in Germany and France; in Italy, prices were slightly higher than a year earlier.

Since mid 1996, producer prices have picked up slightly. In Germany and Italy, producer price inflation is now mildly positive. And though French producer prices are below their level of a year earlier, the price index has been rising over the past few months: in May 1997, the index was 0.5 percentage points above its level at the end of 1996.

Smaller economies

The trend in producer price inflation in the smaller European economies has been similar to that in the larger economies (see Chart B). Producer price inflation increased in 1993 and 1994, reflecting rising commodity prices. During that period, inflation rates in Belgium, Denmark and the Netherlands were similar, peaking at around 4% in early 1995. Inflation in Spain was higher, reaching 7%. Producer price inflation fell sharply during 1995, though it remained positive during 1996. (In the Netherlands, it increased during 1996.)

Chart B
Smaller EU: producer price inflation



Implications for EU consumer prices

One explanation why producer price pressures in 1996 may have been slightly stronger in the smaller countries (excluding Belgium) than in the larger ones could be the relative cyclical position. Real GDP growth in 1996 was 2.7% in the Netherlands, 2.2% in Spain and 2.4% in Denmark. This compares with 1.4% in Germany, 1.5% in France, 1.3% in Belgium and 0.7% in Italy. The contrast in activity could explain why in the Netherlands and Spain producer prices increased in 1996, while there was producer price deflation in Germany and France.

But more recently, producer price inflation has also picked up slightly in countries where activity has been more subdued. This might reflect rising prices of imported commodities priced in dollars because of exchange rate depreciation against the US dollar. It could also reflect demand-led pressures as these economies recover. Nonetheless, producer price inflation across the European Union remains low and, as yet, is putting little pressure on consumer prices.

(1) This refers to an aggregate measure of manufacturers' output prices (though the precise definition of these series differs between countries).

Chart 9
Consumer price inflation in Germany, France and Italy

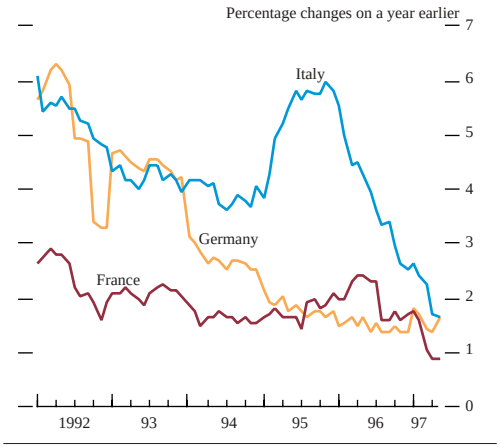


Chart 10
Consumer price inflation in the smaller economies

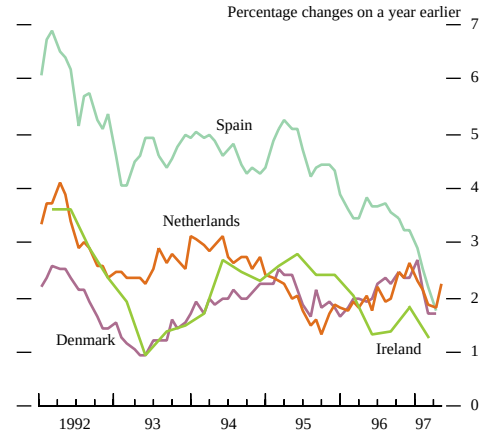
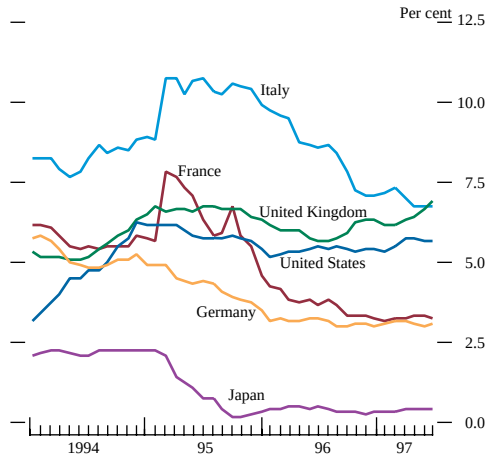


Chart 11
Short-term interest rates



But in these three economies, weak demand seems to have offset any cost pressures, leaving consumer price inflation either very low or falling further (see Chart 9). In Germany, inflation averaged 1.6% in Q2, compared with 1.7% in the first quarter and 1.5% for 1996 as a whole. In France, consumer price inflation continued to fall, averaging 0.9% in Q2, down from 1.5% in the first quarter and 2.0% in 1996. Italy's recent inflation performance has been even more striking, with annual inflation of 1.6% in Q2, down from rates above 6% at the end of 1995.

Consumer price inflation (measured on a national basis) also remains relatively low in those smaller European economies where activity has been more robust (see Chart 10). In the Netherlands, where GDP growth was 2.7% in 1996, inflation was 1.9% in Q2, compared with 2.1% in 1996. In Denmark, inflation averaged 1.9% in April and May, compared with 2.0% in 1996.

Policy interest rates were unchanged in most of the major economies in the second quarter and, as a result, short-term market interest rates remained stable during this period.

US three-month market interest rates averaged 5.7% in Q2, compared with an average of 5.45% for each of the previous four quarters, reflecting the 25 basis points rise in the federal funds rate in March (see Chart 11). But market expectations of future short-term rates have fallen during the past three months. This followed a combination of weaker activity data in Q2 (most notably retail sales) and further falls in inflation. Short-term rates (as implied by the December 1997 futures contract) are now expected to remain around 5.75% by the year end, almost 75 basis points lower than at the time of the May *Inflation Report*.

Financial markets are now not expecting Japanese short-term rates to rise by as much as they were three months ago, despite strong Q1 GDP data and improved industrial sentiment described in the Tankan Survey. Three-month interest rates, which averaged 0.4% in Q2 (compared with 0.3% in the first quarter), are expected to rise to around 0.7% by the year end (40 basis points lower than implied three months ago).

Short-term rates in Germany and France were stable during Q2, averaging 3.1% and 3.3% respectively. There has been little change in interest rate expectations implied by the futures markets: three-month rates are expected to rise by about 50 basis points by the year end, reflecting the benign inflationary outlook for 1997. The Banca d'Italia cut its discount rate by 50 basis points to 6.25% on 27 June 1997, but short-term rates had already fallen during Q2, in response to the reduction in consumer price inflation. And the weakness of the current Italian expansion, together with a limited inflationary risk, means that financial markets expect further reductions in interest rates. The December 1997 futures contract implies three-month interest rates of 6.30% by the year end, little changed from expectations three months ago.

Long-term rates have picked up marginally in the United States, but continue to converge in Europe, despite uncertainty over progress towards EMU.

In the United States, long-term interest rates averaged 6.7% in Q2, 15 basis points above their Q1 average. But after rising sharply at the beginning of Q2, long-term rates fell during the following three

Chart 12
Long-term interest rates

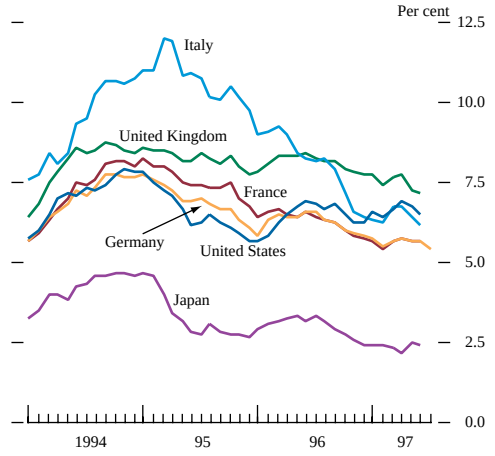


Table F
Harmonised indices of consumer prices

Annual inflation rates (per cent)

	1996		1997	
	Aug.	Nov.	Feb.	May
United Kingdom	n.a.	n.a.	2.0	1.6
Austria	1.9	2.2	1.5	1.5
Belgium	1.2	2.1	2.0	1.5
Denmark	2.2	2.1	2.0	1.9
Finland	1.0	1.2	0.6	0.9
France	1.7	1.6	1.7	0.9
Germany	1.2	1.3	1.6	1.4
Greece	7.7	7.4	6.5	5.3
Ireland	2.0	2.1	1.7	1.4
Italy	3.5	2.9	2.3	1.7
Luxembourg	1.3	1.3	1.5	1.1
Netherlands	1.3	1.7	1.6	1.7
Portugal	3.5	2.9	2.4	1.9
Spain	3.7	3.3	2.5	1.3
Sweden	0.6	0.2	1.1	1.2
EU 15 average	**2.2**	**2.2**	**2.0**	**1.5**

n.a. = not available.

Table G
Forecasts of 1997 fiscal deficits

Percentage of GDP

	EC	OECD	IMF
Belgium	-2.7	-2.8	-2.9
Denmark	0.3	0.0	-0.1
Germany	-3.0	-3.2	-3.3
Greece	-4.9	-5.2	-5.1
Spain	-3.0	-3.0	-3.2
France	-3.0	-3.2	-3.3
Ireland	-1.0	-1.2	-1.6
Italy	-3.2	-3.2	-3.3
Luxembourg	1.1	n.a.	-0.1
Netherlands	-2.3	-2.3	-2.2
Austria	-3.0	-3.0	-2.5
Portugal	-3.0	-2.9	-2.9
Finland	-1.9	-2.0	-1.9
Sweden	-2.6	-2.1	-0.8
United Kingdom	-2.9	-2.8	-3.1

n.a. = not available.

months (see Chart 12). By contrast, Japanese long-term rates were little changed, averaging 2.4% in both Q1 and Q2.

European long-term rates converged further during Q2 and satisfy most interpretations of the Maastricht interest rate criterion, despite recent uncertainty surrounding progress towards EMU.

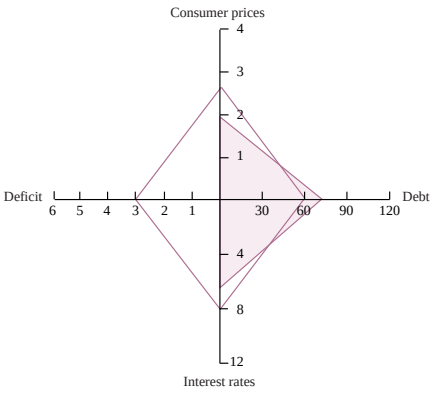
Since the inflation and interest rate criteria are quite likely to be satisfied by prospective members, the main hurdle for EMU is the fiscal criteria.

There has also been further convergence in inflation measured on a harmonised basis. Table F outlines the EU harmonised CPI data. In May, the differential between the highest and lowest inflation rates (excluding Greece) was 1.0 percentage points, compared with a 1.9 percentage points differential in February, indicating that the convergence in EU inflation rates under way since mid 1995 has continued into 1997. The inflation criterion in the Maastricht Treaty applies to the inflation rate for 1997 as a whole, and so will depend on relative inflation trends over the course of the year. Nonetheless, on the basis of the recent convergence, it seems unlikely that the inflation criterion will be the main problem for prospective members.

It is less clear how many countries will satisfy the fiscal criteria. Table G shows the latest EC, IMF and OECD deficit forecasts, and indicates that a small amount of overshoot is expected by both the IMF and the OECD. The box on page 272 outlines an appraisal of the extent of convergence in 1997 based on OECD projections for the deficit and debt ratios, together with data on the nominal variables for the first half of the year. This analysis underlines that it is the fiscal, rather than the inflation or interest rate, criteria on which the decision about EMU entry will need to be made.

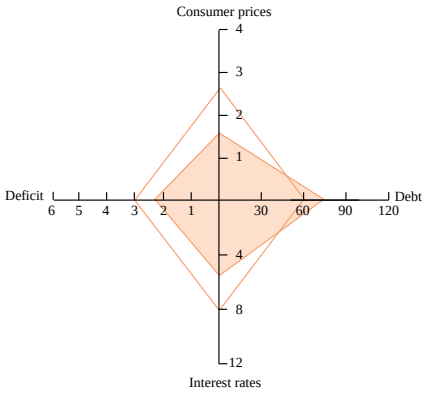
Performance relative to Maastricht convergence criteria in 1997

Denmark

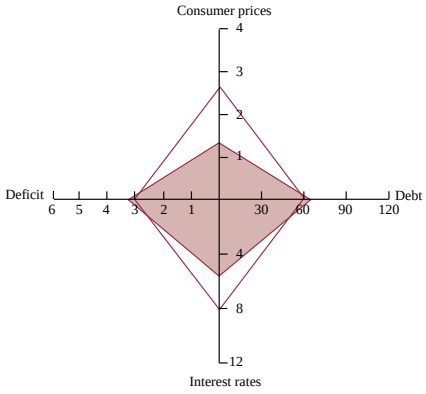


Note: The EC has ruled that Denmark does not have an excessive debt.

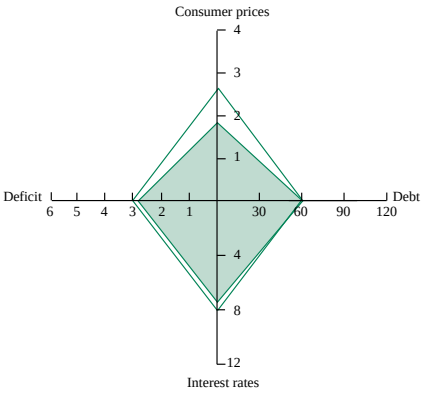
The Netherlands



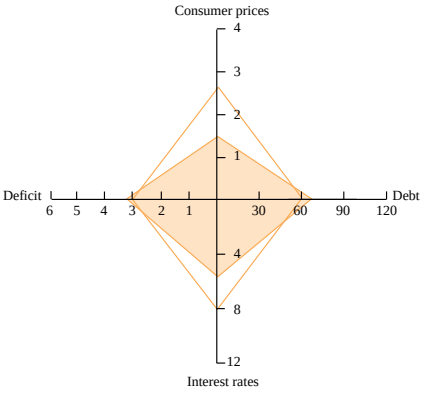
France



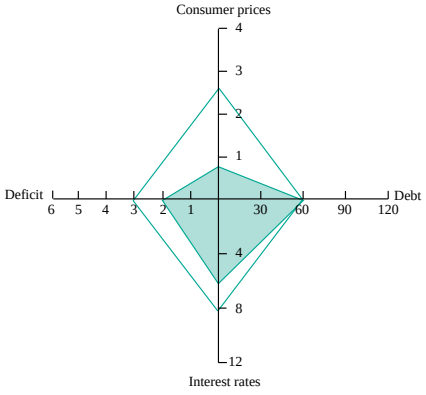
United Kingdom



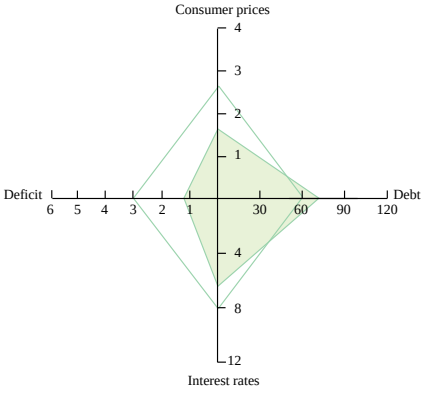
Germany



Finland

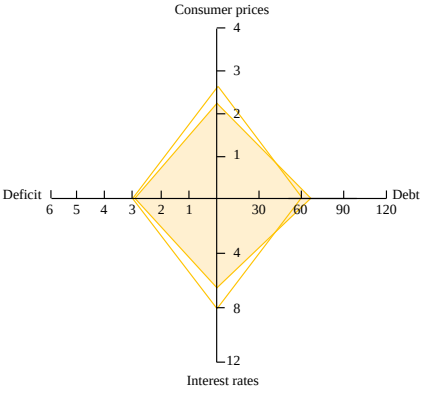


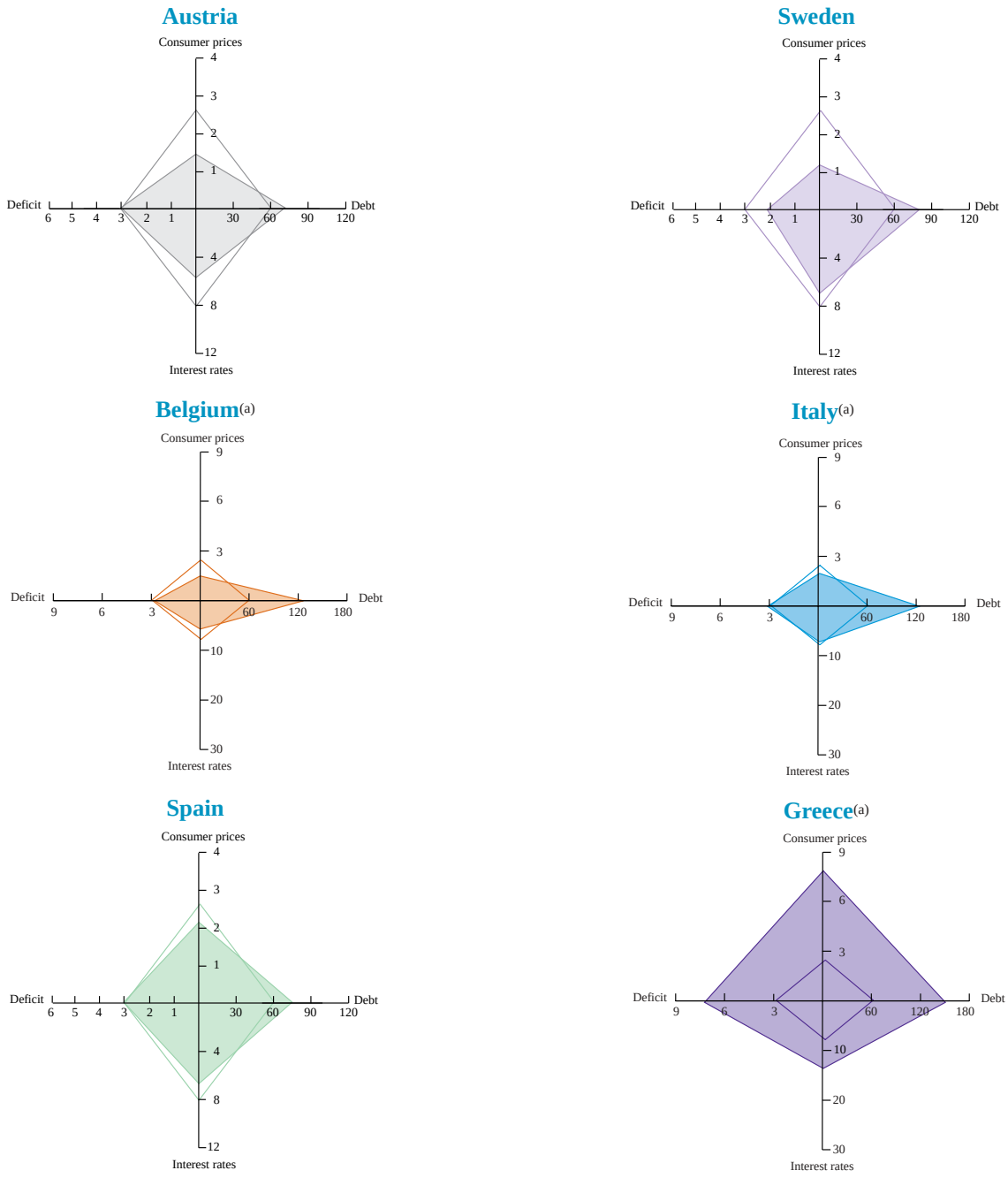
Ireland



Note: The EC has ruled that Ireland does not have an excessive debt.

Portugal





Source: Eurostat data and OECD.

(a) A different scale is used for these three countries.

The diagrams show the recent performance of EU countries against the convergence criteria for inflation and long-term interest rates as well as OECD forecasts of their fiscal debt and deficit positions in 1997. The shaded 'kite' shows the country's performance, while the other 'kite' shows the reference points for each criterion.

- The measure of inflation is the harmonised measure of consumer prices. The diagrams show the average annual increase in the indices in the first five months of 1997. The reference value for the convergence criterion is 1.5 percentage points above the three best-performing countries.
- The interest data are average long-term (ten-year) government bond yields for the first six months of 1997. The reference value is 2 percentage points above the three best-performing countries in terms of inflation.
- The deficit and debt, expressed as a percentage of GDP, are OECD forecasts for 1997, and are in line with Maastricht Treaty definitions. The reference values are 3% of GDP for the deficit and 60% of GDP for the debt.

Quantifying some benefits of price stability

By Hasan Bakhshi, Andrew G Haldane and Neal Hatch of the Bank's Monetary Analysis Divisions.

This article[1] quantifies some of the costs of inflation in the United Kingdom. It focuses in particular on tax distortions under an imperfectly indexed tax system and distortions to money demand. In the United States, a similar study found that lowering inflation by 2 percentage points could generate welfare benefits of as much as 1% of GDP per year forever. In the United Kingdom, the benefits are found to be smaller but still substantial, at 0.2% of GDP per year.

Introduction

Policy-makers pursue price stability because they believe that high and variable inflation rates are costly to the economy. A recent survey in the United States by Shiller (1996) found that the general public shares this aversion to high inflation. The costs that inflation imposes have been clearly identified and widely discussed. For example, the first London School of Economics Bank of England Lecture (1992), by Governor Leigh-Pemberton, articulated the following costs of fully anticipated inflation:

- the costs of operating a less than perfectly indexed tax system;
- the costs of economising on real money balances ('shoe-leather' effects);
- the costs of 'front-end loading' nominal debt contracts; and
- the costs of constantly revising price lists ('menu costs').

But quantifying these costs and their welfare implications is no easy matter.

Recent work in the United States by Feldstein (1996) has shed some quantitative light on the first two of the above costs. Feldstein calculated the benefits arising from an unindexed tax system and money demand distortions of a fall in US inflation from 4% to 2%.[2] He found that these benefits amounted to 1% of GDP each year. Since these benefits accrue into the infinite future, their present value—the sum of all future gains, suitably discounted—is potentially very significant indeed.

This article replicates Feldstein's analysis for the United Kingdom. It finds that the welfare benefits of a 2 percentage point reduction in inflation, though smaller than in the United States, are still material. They are equivalent to around 0.2% of GDP each year. Moreover, because these estimated benefits take no account of other well-known welfare costs of inflation—in particular the costs of unanticipated inflation, which many economists believe to be more important—they provide a strict lower bound on the benefits of reducing inflation.

The article begins with some general observations on the costs of inflation and how these costs can be identified analytically and quantified empirically. Later sections discuss the quantification of these costs in greater detail.

The costs of inflation: theory and evidence

(a) The permanent benefits and temporary costs of price stability

There are many theoretical studies of the costs of inflation.[3] But there is much less quantitative evidence about these costs. And what evidence there is does not give a clear indication that the costs of inflation are significant. For example, in a cross-section study of over 100 countries, Barro (1995) finds little relationship between inflation and economic growth at inflation rates below 10%, though at inflation rates above this there is evidence that inflation significantly hinders growth. Judson and Orphanides (1996) and Sarel (1996) reach similar conclusions.

But irrespective of the effect of lower inflation on an economy's *growth* rate, it can still lead to a permanent increase in the *level* of GDP. The resulting welfare gain may then have a large present value, even if its effect in any one year appears small. To give an example, consider Feldstein's estimate that reducing inflation by 2 percentage points generates a welfare benefit in the United States equivalent to 1% of GDP per year. To calculate the present value of this welfare gain, a rate at which to discount future

(1) The results in this article are drawn from a paper produced for a US National Bureau of Economic Research (NBER) conference on the Costs and Benefits of Price Stability held at the Federal Reserve Bank of New York in February 1997. A forthcoming Bank of England *Working Paper* will contain further details of the calculations described here.
(2) When account is taken of measurement bias in price indices this corresponds roughly to a fall in true inflation from 2% to 0%.
(3) Fischer and Modigliani (1975) is a classic treatment, and useful surveys are provided by Fischer (1981), Driffill, Mizon and Ulph (1990) and Briault (1995).

welfare benefits must be chosen, and allowance must be made for the fact that the level of GDP on which the welfare cost is being calculated grows over time.[1]

Assuming a real discount rate (r) of 5% and a trend rate of output growth (g) of 2.5%,[2] the present value of the annual welfare benefit (B) expressed as a percentage of GDP is calculated as:

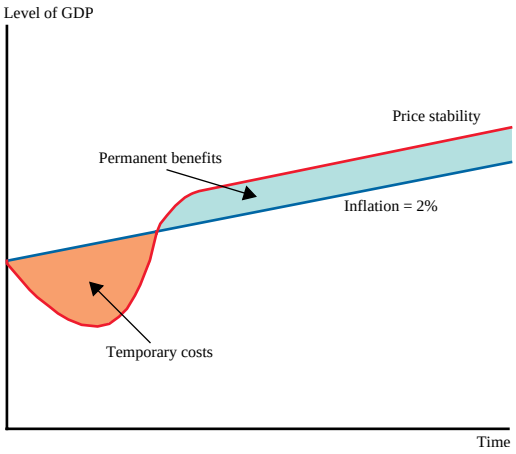
$$\text{Present value} = B / (r - g) \quad (1)$$
$$= 1 / (0.05 - 0.025)$$
$$= 40\% \text{ of initial GDP}$$

So, suitably discounted, a welfare gain of as little as 1% of GDP per year can generate a total welfare benefit with a present value of 40% of initial annual GDP. Of course, there are uncertainties in such present value calculations. In particular, there is little consensus among economists on the appropriate rate at which to discount the welfare of future generations. But if anything, r = 5% is likely to be on the high side.[3] So 40% of initial GDP may be a conservative estimate of the welfare benefits that Feldstein finds for the United States.

Another factor supports the argument that the benefits of price stability could be significant: the benefits are *permanent*, but the disinflationary costs of achieving it are likely to be *temporary*. This is because disinflationary monetary policy is not thought to have any lasting impact on the level of output in the economy: money is neutral in the long run. So any welfare analysis of the costs and benefits of price stability is inevitably a comparison between the *static* or one-off costs of disinflation and the *dynamic* or permanent benefits of price stability. This stacks the cards heavily in favour of the pursuit of price stability. Using the US example above, reducing inflation by 2 percentage points would need to result in a cumulative loss of output of more than 40% of GDP to offset the benefits. Empirically, such an outcome is highly implausible.

Chart 1 illustrates these costs and benefits. The blue line plots the level of GDP on the assumption that inflation remains at 2% throughout: GDP grows steadily over time. The red line shows the path of the level of GDP assuming that inflation is reduced by 2 percentage points. This is associated with a temporary fall in the level of GDP. But in the long run, though the growth rate of GDP returns to trend, its level is permanently higher, reflecting the permanent welfare benefits of the reduction in inflation.[4] The undiscounted *net* welfare benefit is given by the sum of the shaded areas on either side of the blue line. Because the welfare benefit is permanent, and the cost temporary, this undiscounted welfare gain will be infinite, summing up into the indefinite future.

Chart 1
The costs and benefits of price stability



It is, however, necessary to allow for discounting of the welfare of future generations. Then the net welfare benefit is no longer infinite, reflecting the effects of discounting. Nor, indeed, is it necessarily positive. But as the example above made clear, for plausible discount rates and using the welfare benefits estimated by Feldstein for the United States, the total shaded area is likely to be positive: reducing inflation by 2 percentage points will yield a net welfare benefit.

(b) Inflation as a tax

The costs of inflation are typically divided into costs due to *anticipated* inflation and costs due to *unanticipated* inflation. Of these, the latter are often believed to be the more significant. For example, inflation 'surprises' and uncertainties are likely to increase relative price variability, distorting resource allocation; to cause arbitrary redistributions of income, for example from savers to borrowers; and to lead holders of long-maturity nominal assets to demand higher risk premia, increasing the cost of capital for firms.[5] But Feldstein's work has shown that the welfare costs of fully anticipated inflation can also be significant.

The literature on the costs of fully anticipated inflation views its welfare effects as operating as a tax. This occurs through two channels. First, inflation acts like a tax because of its interaction with the less than fully indexed tax system. Second, inflation is a direct tax on holdings of money balances. Considering these in turn:

(i) Most tax systems around the world operate in nominal terms. As a result, assuming that *headline* tax rates are unchanged, *effective* tax rates alter as inflation changes, typically rising as inflation rises. A simple example illustrates this. Consider the *real* (that is, inflation-adjusted) return that investors receive after

(1) This is because the welfare benefit is calculated as a percentage of *initial* GDP.
(2) These are close to the values used by Feldstein (1996) in his US study.
(3) Microeconomic studies of discount rates often arrive at lower estimates; and some economists have argued that the welfare of future generations should not be discounted at all. This article presents some sensitivity analysis of the welfare benefits to the discount rate in a later section.
(4) Welfare gains are calculated as a percentage of GDP. But this does not mean that GDP necessarily changes by that amount in order to generate the increase in welfare.
(5) See the article on pages 285–91 for further details.

tax, where taxes are levied on the nominal amount they receive. The real post-tax return (ρ) is:

$$\rho = (r + \pi)(1 - \tau) - \pi \qquad (2)$$

where r is the real pre-tax return that investors receive, π is inflation and τ is the rate of tax investors pay on their return. Now substitute some numbers into (**2**) and consider the effects of inflation. Let the real pre-tax return be 2% and the tax rate be 20% ($\tau = 0.2$).

At price stability ($\pi = 0$), investors earn a post-tax real return of 1.6%. But if inflation rises to 8% ($\pi = 8$) the investors' real return is wiped out: nothing is earned on the investment. In this way, inflation raises the effective tax rates faced by economic agents in countries with unindexed tax systems. This distorts the return on saving, which in turn distorts private sector saving decisions, with corresponding welfare costs.

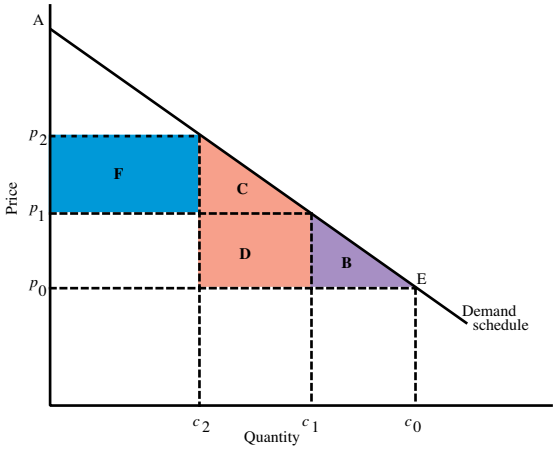
(ii) Inflation is a direct tax on holders of cash balances, because it erodes the real value of these balances. This induces the public to hold less currency than they otherwise would, which is costly in a welfare sense. This is often dubbed a 'shoe-leather' cost, because agents need to make more trips to the bank to replenish their currency holdings.

(c) Calculating direct welfare losses

Viewing inflation as a tax has one great advantage. It allows the welfare losses arising from inflation to be calculated directly using simple demand curve analysis. Welfare losses are captured by the area of unsatisfied demand underneath the demand curve, whenever the observed price of a good or service is different from what it would have been in the absence of the tax. This is easiest to illustrate graphically.

Chart 2 plots the demand curve for some good or service with demand on the horizontal axis and price on the vertical axis. In later sections the article will consider the specific examples of demand for retirement consumption, residential investment and money. But it is useful to start with a general example. In the absence of taxes and inflation, the price is p_0. Demand is then c_0 and market equilibrium is given by the point E. At this market equilibrium, agents earn a 'consumer surplus' equal to the triangle p_0 - E - A. This measures the excess that consumers would be willing to pay for that quantity over the amount they have to pay.

Chart 2
Calculating welfare losses



Now allow a direct tax to be levied that raises the price to p_1, while inflation remains at zero. Demand falls to c_1. The welfare loss is given by triangle B. This measures the amount of consumer surplus forgone as a result of the tax being imposed. It is a 'deadweight loss' of welfare, because the welfare loss that consumers suffer does not benefit anyone else.

Finally, imagine that inflation is allowed to rise and that this raises the effective tax rate on the good or service. The price now rises to p_2 and demand falls to c_2. This eats further into the consumer surplus, by the amount $C + D$. There is an additional deadweight loss, but it is a trapezium rather than a triangle. This deadweight loss trapezium measures the welfare loss consumers suffer as a result of the inflation tax, when it is operating in tandem with the unindexed tax system.

The calculations below quantify the welfare trapezium $C + D$. If the demand curve is a straight line, then simple geometry gives the area $C + D$ as:

$$C + D = (p_1 - p_0)(c_1 - c_2) + 0.5(p_2 - p_1)(c_1 - c_2) \qquad (3)$$

In the calculations below, a modification of this formula is used that allows the welfare trapezium in Chart 2 to be expressed in terms of the three prices (p_0, p_1 and p_2), the slope (or elasticity, ε) of the demand curve, and the quantity demanded when there is both inflation and taxes, c_2:

$$C + D = \left[(p_1 - p_0) + 0.5(p_2 - p_1)\right] c_2 \varepsilon \left[\frac{(p_1 - p_2)}{p_2}\right] \qquad (4)$$

So by calculating the three prices in Chart 2 and the slope of the associated demand curve, it is possible to calibrate the likely welfare losses arising from the interaction between inflation and the unindexed tax system.

(d) Accounting for government revenue effects

Taxes do not simply alter the prices and quantities of goods demanded; they also raise revenue for the government. By changing the effective tax rate, reducing inflation will have implications for government revenue. If this change in government revenues could be offset by raising (or lowering) other taxes that have no effect on agents' behaviour at the margin, then the total welfare effect of a change in inflation would still be captured by the trapezoidal area outlined above.

But in practice most taxes, such as income tax and value-added tax, distort economic decisions. This means that a change in inflation that alters government revenues will have wider welfare implications than just the deadweight loss trapezium.(1) In Chart 2 the inflation tax ($p_2 - p_1$) yields extra revenue to the government equal to the area *F*, owing to the effectively higher tax *rate*. But the higher tax rate also raises the price and hence reduces demand, lowering the tax *base*: there is an offsetting revenue loss equal to the area *D*. The net revenue gain from inflation is simply the area $F - D$, which is given by:

$$F - D = (p_2 - p_1)\, c_2 - (p_1 - p_0)\,(c_1 - c_2) \qquad (5)$$

This change in revenue can be either positive or negative, reflecting the opposing effects of lower inflation on the tax rate and the tax base. As with the trapezium calculation, it can be computed using the three prices and the slope of the demand schedule.(2)

To calculate the *welfare loss* (or *gain*) associated with this change in government finances, the revenue change needs to be scaled. The scaling variable measures the loss of welfare resulting from every extra pound of taxation that needs to be raised to fill any financing gap induced by lower inflation. This is termed the deadweight loss parameter. In the central case below, this parameter is set at 0.4.(3) This implies that if a fall in inflation lowers government revenues by £1, then in raising other taxes to make good this shortfall there will be an associated welfare loss of 40 pence. This indirect welfare loss needs to be offset against the direct welfare gain to arrive at the *net* welfare change arising from lower inflation.

In the following sections, the direct welfare losses and revenue changes are calculated for consumption, housing investment and money demand behaviour. The welfare effects of a change in inflation on government debt servicing are also considered. In line with Feldstein, the following policy question is posed in each section: what are the welfare implications of a 2 percentage point reduction in inflation?

Quantifying the effects of inflation on consumption

The direct welfare benefits of reducing inflation

Households have two main expenditure decisions to make in each period: how much to consume in goods and services and how much to invest in housing. This section quantifies distortions to consumption behaviour, and the next considers distortions to housing investment. Consumption distortions arise because inflation reduces the real post-tax return that savers receive, as the earlier example illustrated. Put differently, inflation raises the effective price of consuming when retired, through its effect on the return to saving. This then lowers consumption when retired, which has a welfare cost.

In this framework, saving can be thought of as investment expenditure when young to finance consumption expenditure when retired. The price of this 'retirement consumption' is then inversely related to the rate of return on saving: an increase in the rate of return on saving permits more retirement consumption for a given level of saving, which is equivalent to a fall in the price of retirement consumption. So calculating the price of retirement consumption requires estimates of the rate of return on saving. Three estimates of the rate of return are needed: with no taxes and no inflation, with taxes and no inflation, and finally with taxes and inflation.

So, from (**4**), the welfare cost of this consumption distortion can be calculated from the three rates of return on saving and from an estimate of the interest elasticity of saving (the slope of the saving demand schedule). The saving channel captured here is the flow of investment funds from domestic households to domestic companies.(4) Domestic households are assumed to own all the capital of domestic firms. So the return on households' saving is a reflection of firms' return on capital. This flow-of-funds channel is reflected in the choice of rates of return on saving used in calculating welfare costs.

In a world with no taxes, the rate of return on firms' capital would exactly equal the rate of return that households earn on their saving, since domestic households own all domestic firms. There would be no distortionary 'tax wedge' between these two returns. So a proxy for the rate of return on saving in the no-tax world (which can be used to calculate the price of retirement consumption—the equivalent of p_0 in Chart 2) is provided by the pre-tax real rate of return on capital among industrial and commercial companies. Between 1970 and 1995, the period used in this study, this real average rate of return was 8.2%.

Now consider a world with taxes and with 2% inflation. Calculating the return on saving in this world requires some adjustment for various tax wedges between the pre-tax return earned by companies and the post-tax real return received by individuals. There are two such wedges: the first reflecting *corporate* taxes on companies' profits; the second *personal* taxes when these profits are dispersed to households.

Some countries, notably the United States, operate a 'classical' tax system. Under this system, dividend payments are taxed twice, at the corporate level and at the personal level. By contrast, the United Kingdom operates an 'imputation' tax system which provides protection against the double taxation of dividends through Advance Corporation Tax (ACT) credits. So the estimate of the

(1) This is a point first emphasised by Phelps (1973).
(2) The analytical expression is presented in the forthcoming *Working Paper* version of this article.
(3) The estimate of 0.4 is based on a previous study (Ballard *et al* (1985)) and on a small calibrated general equilibrium model. A higher value is used below as part of a sensitivity analysis. A value of 1.5 is selected to maintain consistency with Feldstein (1996). Again, further details are in the forthcoming *Working Paper*.
(4) This article does not consider open economy distortions. These are discussed in Desai and Hines (1997).

corporate tax rate used here measures the additional tax paid by companies over and above ACT payments.[1] In 1995, the base year for the computations, this tax was around 22% of firms' pre-tax profits. Netting this off the pre-tax rate of return gives a rate of return, after corporate taxes, of 6.4%.

The personal tax wedge paid by households depends on how saving income is received—as dividends, capital gains or bond interest income—and on the tax status of the individual. To arrive at the average marginal tax rate, the marginal tax rates for each of the three types of income are weighted together.

At this stage no adjustment is made for tax-exempt saving, which is important in the United Kingdom. In effect, it is assumed that marginal saving flows into taxable assets. This assumption is discussed further below and alternative estimates based on different assumptions about the importance of tax-exempt saving at the margin are presented. Making no adjustment for tax-exempt saving gives an estimated average marginal individual tax rate of 23%.[2] This implies a real post-tax rate of return to UK savers of around 4.9% (which can be used to calculate p_2 in Chart 2). The estimated wedge between pre and post-tax returns in the United Kingdom (3.3 percentage points) is around two thirds of that in the United States (5.1 percentage points). This largely reflects the difference between the United Kingdom's imputation tax system and the classical system in the United States, and it has important implications for the estimated welfare costs.

Finally, it is necessary to calculate how the post-tax return on saving would be affected by a 2 percentage point reduction in inflation. There are inflation non-neutralities in both the corporate and personal tax systems in the United Kingdom. For companies, these have three sources:

- Since 1984 UK companies have received no stock relief: any nominal capital gains made on stocks as a result of general price level rises are treated as taxable profit. This means that the effective corporate tax rate rises with inflation.

- Depreciation allowances are based on historic cost asset valuations and so are reduced in real terms by inflation. This also raises the effective corporate tax rate with inflation.

- Acting against the first two effects, nominal debt interest payments are tax-deductible, thereby lowering the effective corporate tax rate with inflation.[3]

Bond, Devereux and Freeman (1990) calibrate these inflation non-neutralities using micro-level data drawn from company accounts, and a modified version of their corporate tax ready-reckoner is used here.

On the personal sector side, inflation non-neutralities in the tax system depend crucially on the debt-equity-deposit composition of the household sector's portfolio. For deposit and corporate bond income, there are significant inflation non-neutralities, because *nominal* interest income is taxed. But that is not the case with equity, as UK capital gains tax has been indexed since 1985. This effectively neutralises any effect from inflation on equity income—unlike, for example, in the United States. The relatively high weight of equity in the UK household sector's balance sheet means that the effect of inflation on the personal sector tax wedge is somewhat smaller in the United Kingdom than in the United States.[4] Nonetheless, a 2 percentage point reduction in inflation is still estimated to raise the post-tax rate of return to individuals by around 0.25 percentage points to around 5.2%, owing to personal and corporate sector tax non-neutralities. (This estimate can be used to calculate p_1.) By comparison, in the United States the rise in the return to saving is double that, at around 0.50 percentage points.

Having identified the three rates of return, all that is now required to calculate the welfare loss is an estimate of the interest elasticity of saving—the slope of the saving schedule. There is a good deal of academic controversy about this parameter. Most studies of UK saving behaviour point to elasticities close to zero, where the income and substitution effects of an interest rate change are broadly offsetting. This is the central estimate used in this analysis, though calculations have also been made using a range of saving elasticities. Note that a zero saving elasticity does not eliminate the potential welfare benefits from price stability. Even if a higher return does not induce additional saving, it will still serve to increase income receipts on existing saving, thereby boosting consumption and welfare.

Using the central assumption of a zero saving elasticity and the three rates of return in (**4**), the direct welfare gain from reducing inflation by 2 percentage points is estimated at 0.35% of GDP (see the table). Making a comparable assumption for the United States, the gain is around 0.75% of GDP. This difference is largely because the UK tax system is less susceptible to inflation-induced distortions, especially as regards equity income. The table also shows estimates of the welfare gain using different values for the saving elasticity.

The indirect revenue and net welfare effects

Because reducing inflation alters effective corporate and personal tax rates, it also has implications for tax revenue. Lower inflation reduces effective tax rates (with a negative effect on revenues) but raises the tax base as saving rises (with positive revenue effects). It is an empirical question which of these two offsetting factors dominates.

(1) The effective corporate tax wedge is not zero because corporate tax rates are generally higher than household sector tax rates and because not all profits are distributed as dividends.
(2) Further details of the tax rates and the weights attaching to them are contained in the forthcoming *Working Paper*.
(3) In the United States, only the second and third of these effects are relevant.
(4) Pension fund and insurance company holdings are included in the household sector's balance sheet.

The welfare effects of a 2 percentage point reduction in UK inflation

Measured as a percentage of GDP

Source of change		Direct welfare effect of reduced distortion	Indirect welfare effect of revenue change		Net welfare effect	
			$\lambda = 0.4$	$\lambda = 1.5$	$\lambda = 0.4$	$\lambda = 1.5$
Consumption timing	$\eta_{sr} = 0.2$	0.40	-0.12	-0.43	0.29	-0.03
	$\eta_{sr} = 0.0$	0.35	-0.14	-0.51	0.21	-0.17
	$\eta_{sr} = 0.4$	0.46	-0.09	-0.35	0.37	0.11
Housing demand		0.04	0.07	0.27	0.11	0.30
Money demand		0.02	-0.05	-0.17	-0.02	-0.15
Debt service		n/a	-0.09	-0.33	-0.09	-0.33
Total	$\eta_{sr} = 0.2$	0.47	-0.18	-0.67	0.29	-0.20
	$\eta_{sr} = 0.0$	0.41	-0.20	-0.75	0.21	-0.34
	$\eta_{sr} = 0.4$	0.52	-0.16	-0.59	0.37	-0.06

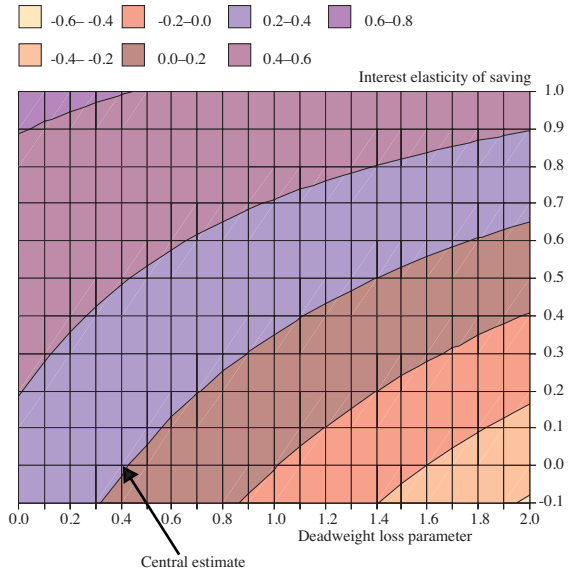
Notes:
n/a = not applicable.
η_{sr} is the interest elasticity of saving.
λ is the marginal deadweight loss parameter.

Substituting the estimated rates of return to saving and the central estimate for the interest elasticity of saving into (**5**), the reduction in inflation by 2 percentage points results in a loss of government revenue of around 0.34% of GDP. This revenue loss is scaled using the deadweight loss parameter of 0.4 discussed earlier, giving a welfare loss of 0.14% of GDP. So the *net* welfare gain from a 2 percentage point reduction in inflation is 0.21% of GDP, evaluated with a zero saving elasticity and a deadweight loss parameter of 0.4. The results are shown in the table, together with estimates based on alternative estimates of the saving elasticity (0.2 and 0.4) and deadweight loss parameter (1.5).

Chart 3 illustrates more generally the sensitivity of the welfare calculations to different assumptions about the saving elasticity and deadweight loss parameter. For any given pair of parameter values, there is a point on the contour map that shows the size of the net welfare gain from a 2 percentage point reduction in inflation. It is evident that relatively small adjustments to the central assumptions—in particular regarding the deadweight loss parameter—can markedly alter the estimated net welfare gain. But the net welfare benefit in the central case is still non-trivial, at around 0.2% of GDP, even when the saving elasticity is assumed to be low.

Clearly, there are a number of uncertainties about such an estimate. For example, the calculations take no account of the role of non-savers (which would increase the estimates); they make no allowance for the effects of social security income during retirement (which would reduce the estimates); and they make restrictive assumptions about the pattern of company financing by banks (which, if altered, would also reduce the estimates).(1) Perhaps most

Chart 3
Net welfare benefits from consumption (as a percentage of GDP)



importantly, the calculations make no allowance for tax-exempt saving vehicles.

The analysis so far has assumed that all marginal saving flows into taxable assets. In practice, a relatively high proportion of personal sector saving is held in a tax-exempt form. Only just over one third of equity holdings are estimated to be held directly and subject to tax. Another two fifths are tax-exempt because they are held via pension funds, pension business of life assurers and in Personal Equity Plans. The remainder are held via non tax exempt unit trusts and non-pension business of life assurers. The average marginal individual tax rate on (weighted) dividends, bond interest, deposit income and capital gains was 23% before adjusting for tax-exempt saving. This falls to just under 15% after allowing for tax-exempt saving, on the assumption that marginal saving flows follow existing average portfolio shares. This fall in the effective tax rate is sufficient to reduce the net welfare gain by 0.07% of GDP to 0.14%. So the choice of destination for marginal saving is important to the welfare calculations. Indeed, if all saving flowed into tax-exempt vehicles then the welfare gain arising from the effects of lower inflation on saving behaviour would be zero.

But this would almost certainly overestimate the effects of tax-exempt saving vehicles. There are restrictions on the quantity of saving allowed to flow into tax-exempt assets. For example, there are ceilings on the amount that can be invested in Tax Exempt Special Saving Accounts (TESSAs), and restrictions on the Additional Voluntary Contributions (AVCs) that can flow into a personal pension. Further, ACT credits to pension funds were abolished with immediate effect in the July 1997 Budget. These institutional features help to justify the main case, under which saving flows into taxable assets.

(1) The forthcoming *Working Paper* version of this article quantifies each of these effects.

Quantifying the effects of inflation on housing investment

The direct welfare effects of reducing inflation

The deadweight loss calculations carried out for housing investment use the same basic tools as for consumption. But the distortions to behaviour are subtly different. These distortions arise because of the availability of interest relief on mortgage payments in the United Kingdom, which is normally implemented through Mortgage Interest Relief At Source (MIRAS). Similar distortions exist in the United States. By reducing mortgage costs, tax relief serves as a subsidy on housing investment in the United Kingdom. This induces over-investment in housing by the public. And this distortion, in turn, gives rise to a welfare loss.

Moreover, because tax relief is levied on *nominal* interest payments, the effective extent of this subsidy—and hence welfare loss—rises with inflation. The real value of the mortgage subsidy in the United Kingdom has actually been eroded since a limit was first introduced in 1974: the nominal ceiling for the subsidy has risen only once over the period but the rate of tax relief was cut on a number of occasions, reaching 15% in financial year 1995/96.(1) In the July 1997 Budget, the rate of MIRAS was reduced again, to 10% effective from April 1998. This would further reduce the distortions identified here since our calculations are based on the 1995 tax system. But the potential welfare loss associated with this tax distortion may nonetheless be non-trivial.

To calculate the welfare loss it is necessary to estimate the 'user cost' of housing for agents: the cost of the service flow agents receive from housing investment. As with the earlier calculations, this user cost needs to be calculated with and without taxes and inflation. In the absence of taxes, the user cost of housing comprises: an interest rate, reflecting the cost of the mortgage or, equivalently, the opportunity cost of investing in housing; the continuing cost of maintaining the house; transactions costs; and an allowance for housing depreciation. Using estimates for these components(2) gives a user cost of 9.6 pence per pound of housing investment in a world with no taxes.

Now consider a world with both taxes and inflation. For owner-occupiers who are able to claim full MIRAS on their mortgages, the user cost of housing is reduced by the amount of the mortgage scaled by the rate of tax relief. This yields a user cost of housing of 6.9 pence per pound of housing capital, using the average rate of MIRAS prevailing in 1995 (16%). Predictably, this user cost is lower than that in the no-tax world.

Finally, consider the user cost when taxes remain but inflation is reduced by 2 percentage points. This increases the user cost of housing, because the effective extent of the housing subsidy is reduced. The reduction in this subsidy occurs through two channels: a direct channel whereby lower inflation reduces the real value of MIRAS; and an indirect channel as lower inflation increases the opportunity cost of housing (post-tax return on alternative non-housing investments). Together these have the effect of raising the user cost of housing to around 7.2 pence per pound of housing capital when inflation is reduced by 2 percentage points.

In practice, the ceiling for mortgage interest relief is well below the average price of a house. This means that relatively few owner-occupiers are able to claim tax relief on the full value of their house. But it is possible to derive a user cost for the part of the owner-occupied housing stock that lies above the MIRAS ceiling. This yields an estimated user cost of 7.5 pence per pound of housing capital with inflation, rising to 7.6 pence when inflation is 2 percentage points lower. Not surprisingly, the distortion to the user cost is smaller than for loans eligible for MIRAS. But there is still some distortion because of the effect of inflation on the opportunity cost of non-housing assets. These MIRAS and non-MIRAS components of the housing stock can then be weighted together to give an average user cost for all owner-occupiers following a 2 percentage point reduction in inflation.(3)

Completing the welfare calculation requires an estimate of the elasticity of the housing stock with respect to the user cost. A value of 0.4 is used, in line with a previous study (King (1980)). Using this and the three user cost estimates, the direct welfare gain associated with a 2 percentage point reduction in inflation is calculated to be 0.04% of GDP (see the table). This is around one quarter of the size of Feldstein's estimate for the United States. The difference reflects the somewhat smaller mortgage interest relief available under the current UK tax system, with its relatively low nominal ceiling and low rate of tax relief.

The indirect revenue and net welfare effects

The reduction in inflation, through its effect on housing demand, also affects government revenue in the following four ways:

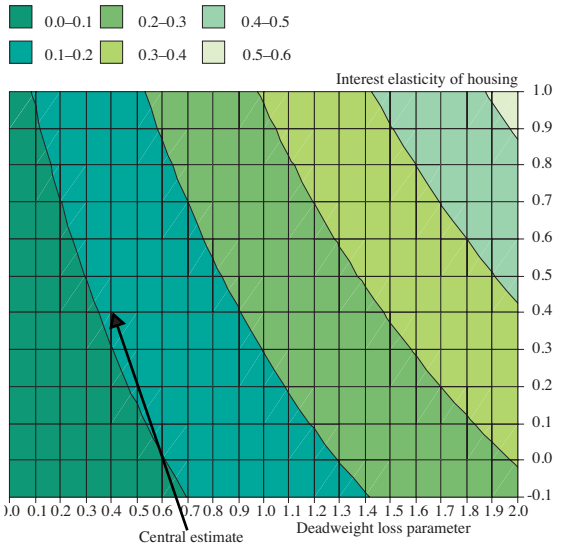
- A reduction in inflation lowers nominal mortgage interest payment *flows* and hence the value of the tax relief subsidy.
- A reduction in the nominal *stock* of mortgages (compared with what it would have been had inflation been higher) reduces the cost of tax relief.
- A reduction in the stock of properties lowers council tax receipts.
- A transfer of capital from residential housing to the business sector increases tax revenue, because the increase in business capital yields a return that is subject to tax.

(1) Relief was first given at source in 1983, when the limit was raised to £30,000.
(2) Based on Robinson and Skinner (1989) and the 1995 RPI Advisory Committee Report.
(3) The rental sector is also considered in the calculations and is discussed in detail in the forthcoming *Working Paper.*

The estimated net effect of these changes is to *raise* revenue by around £1.25 billion per year. Multiplying this by the deadweight loss parameter and adding it to the direct welfare gain produces a net welfare gain of 0.11% of GDP (see the table), less than half Feldstein's estimate of the corresponding figure for the United States. This is not surprising given the gradual erosion in the real value of mortgage subsidies in the United Kingdom over the past 20 years.

Chart 4 offers some sensitivity analysis of the results, plotting welfare gains against the housing user cost elasticity and the deadweight loss parameter. As in Chart 3, any combination of the two parameters is associated with a point on the contour map that indicates the size of the welfare gain. These welfare gains are positive in every case.

Chart 4
Net welfare benefits from housing investment (as a percentage of GDP)



Quantifying the effects of inflation on money demand

The direct welfare effects of reducing inflation

The most widely studied deadweight loss of fully anticipated inflation derives from distortions to money demand, so-called 'shoe-leather' costs. These costs refer to *non-interest-bearing* money, principally currency. They capture the transactions time agents spend in replenishing cash balances, the stock of which is held at a sub-optimally low level at any positive nominal interest rate.

The gain in consumer surplus that results from a fall in inflation is given by a trapezium under a money demand schedule, and can be calculated in much the same way as for consumption. In this case the price is the opportunity cost of money balances, approximated here by the nominal post-tax return on a debt-equity portfolio. The calculation requires an estimate of the change in opportunity cost when inflation is reduced by 2 percentage points and an estimate of the interest elasticity of money demand. Earlier calculations provided an estimate of the post-tax real interest rate at 2% inflation (4.9%), and when inflation is 2 percentage points lower (5.2%). These can be used, together with the inflation rate, to provide estimates of the nominal post-tax rate of return. The money demand calculations are based on the stock of non-interest-bearing M1.

The Bank's work on narrow money demand suggests a steady-state interest elasticity of demand of around 0.3 (Breedon and Fisher (1993)). On this estimate, the direct 'shoe-leather' welfare gain from 2% inflation is 0.02% of GDP (see the table). This is of the same order of magnitude as Feldstein's estimate for the United States. Although small, this estimate is similar in size to that found in previous studies. For example, Fischer (1981) and McCallum (1989) both arrive at a figure of around 0.3% of GDP when moving from 10% inflation to zero inflation. Linearly interpolating, this would deliver a gain of around 0.06% of GDP when inflation is reduced by 2 percentage points.

The indirect revenue and net welfare effects

Three government revenue effects arise from a reduction in inflation of 2 percentage points and the associated rise in real money holdings:

- Lower direct seigniorage revenues as the inflation rate falls, on account of lower nominal interest rates.
- Less revenue as assets are switched from taxed capital assets to non-taxed money balances.
- Lower debt-servicing costs as money balances substitute for interest-bearing debt.

These effects are estimated to reduce government revenues by 0.11% of GDP. Given a deadweight loss parameter of 0.4, this implies that the welfare cost associated with the loss of revenue more than offsets the direct welfare gain from reduced shoe-leather costs. The overall net welfare loss is estimated at around 0.02% of GDP.

Chart 5 shows the sensitivity of this net welfare loss to the interest elasticity and the deadweight loss parameter. This shows that it is difficult to make a strong case for a positive net welfare contribution from money demand distortions. The net welfare effects are also small in every case. This reflects the small size of the outstanding money stock (around 5% of GDP) compared with the owner-occupied housing stock (around 160% of GDP).

Quantifying the effects of inflation on debt servicing

The final cost of inflation to be quantified is the effect of reducing inflation by 2 percentage points on the government's debt-servicing costs. Lower inflation reduces tax receipts on nominal interest payments by the

Chart 5
Net welfare benefits from money demand (as a percentage of GDP)

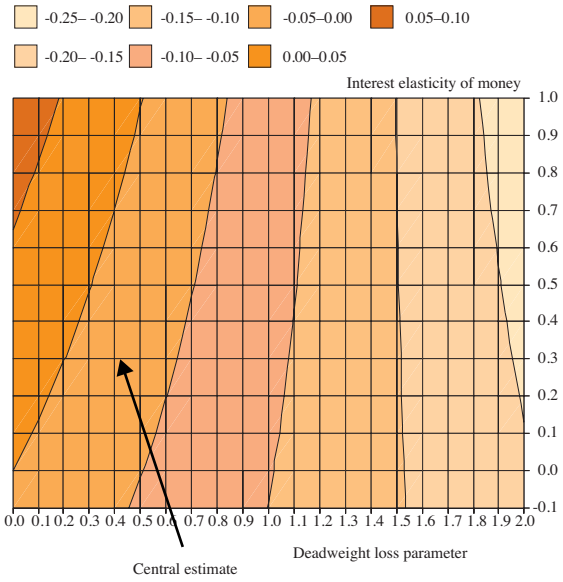
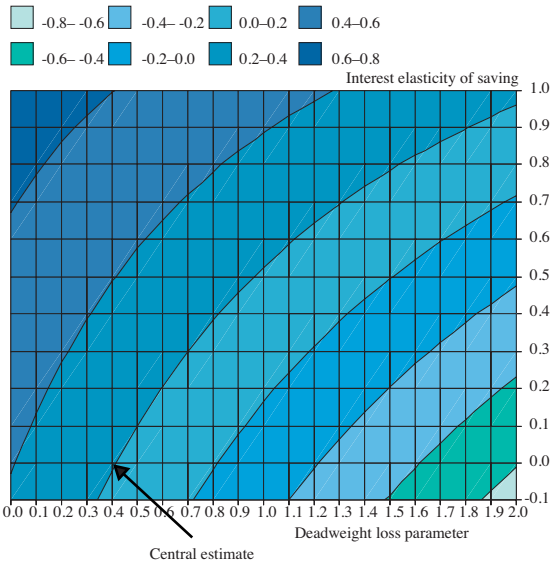


Chart 6
Aggregate welfare benefits (as a percentage of GDP)



government when servicing its debt. This in turn raises its real cost of debt servicing. Feldstein shows that the increase in taxes necessary to maintain a stable debt:GDP ratio in the face of this higher debt-servicing cost is the product of the effective tax rate on interest payments, the stock of government debt and the percentage point change in inflation.

Allowing for the fact that some holders of government debt are tax-exempt and that most debt held overseas is not taxed, the revenue loss associated with higher debt-servicing costs when reducing inflation by 2 percentage points is estimated at 0.22% of GDP. So with an estimated deadweight loss parameter of 0.4, the welfare cost of this revenue loss is 0.09% of GDP (see the table). Again this is slightly lower than Feldstein's US estimate.

Conclusions

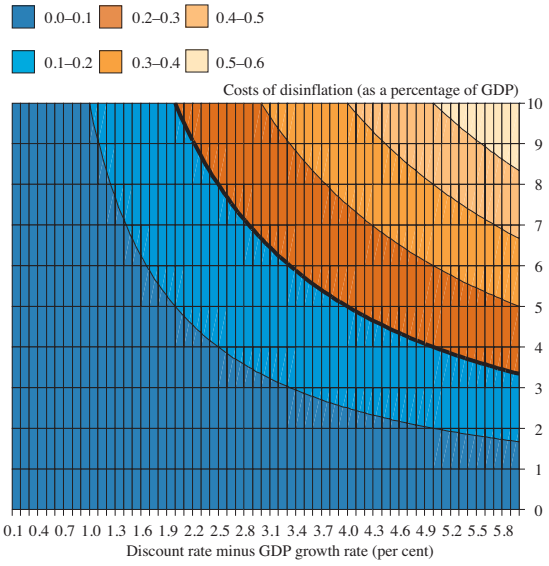
Adding together the net welfare gains arising from consumption, housing investment, money demand and debt-servicing distortions gives an aggregate welfare benefit of around 0.2% of GDP, using central estimates of the key parameters (see the table). This annual net welfare gain is translated into a present value using the formula in (**1**). Given an estimated discount rate of 5.3% and growth rate of 2%,(1) the net present value of an annual welfare gain of 0.2% of GDP is equivalent to around 6.5% of GDP.

There are of course uncertainties on both sides of this central estimate, not least about the magnitude of the key parameters, most importantly the parameter measuring the welfare loss resulting from an extra pound of taxation and the saving elasticity. Chart 6 considers the sensitivity of the aggregate net welfare benefit to both of these parameters.

Any combination of the two parameters is associated with a point on the contour map indicating the size of the net welfare gain. High values of the deadweight loss parameter, such as 1.5, eliminate the aggregate benefits entirely. But a higher saving elasticity increases the estimated welfare benefits.

The welfare benefits of lowering inflation must be set against any potential disinflationary output costs. One way of doing this is to calculate the level of welfare benefit that would be needed to counterbalance these costs, given values for the discount rate and the growth rate of the economy. This 'breakeven' welfare benefit is plotted against output costs and the discount rate in Chart 7. Intuitively, the more GDP that is lost for each percentage point reduction in

Chart 7
Breakeven welfare benefits (as a percentage of GDP)



(1) The calculation of these estimates is discussed in the forthcoming *Working Paper*.

inflation, the higher the welfare benefit required to make disinflation worthwhile. Similarly, the higher the discount rate, the higher the welfare benefit that is required. A welfare gain of 0.2% of GDP corresponds to the line between the lighter shaded blue area and the darkest shaded orange area on the chart. For any pair of parameter values lying in the blue areas below the line, welfare benefits are sufficient to offset disinflationary costs. And even with high estimates of the output costs of disinflation—say, 4%–6% of a year's output lost for a 2 percentage point reduction in inflation—the welfare benefits of reducing inflation exceed the output costs of doing so.

This comparison clearly understates the benefits of reducing inflation. In Chart 7 a *subset* of the benefits of reducing inflation is being compared with *all* of the costs of achieving price stability. Other benefits of price stability, such as those associated with the—possibly much larger—welfare costs of unanticipated inflation, are not quantified. Because these costs are positive, they would increase the permissable breakeven range of discount rates and output costs. All in all, the costs of inflation quantified here go some distance towards justifying and explaining the aversion to inflation that is shared by the public, economists and policy-makers alike.

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Inflation and inflation uncertainty

By Michael Joyce of the Bank's Monetary Assessment and Strategy Division.

This article examines whether higher inflation has been associated with greater inflation uncertainty in the United Kingdom during the post-war period, using various descriptive and econometric estimates of uncertainty. Though the results cannot establish conclusively whether there has been a causal link, they do suggest that the level of inflation and inflation uncertainty are positively correlated. If inflation uncertainty is costly, this provides a potential justification for directing policy at establishing and sustaining an environment of low inflation.

Introduction

One of the most important costs of inflation is thought to be the uncertainty it generates about future inflation. This uncertainty potentially introduces various distortions into economic behaviour by, among other things, making it more difficult for economic agents to distinguish between (real) relative price movements and (nominal) inflationary ones; adding risk premia to longer-term nominal bonds and increasing the real cost of capital; and encouraging unproductive investment in real assets as a hedge against unanticipated inflation.(1) These effects are likely to inhibit the allocative efficiency of the price mechanism, thereby reducing economic welfare and possibly growth. (These costs of inflation uncertainty are additional to those related to anticipated inflation, as discussed in the article on pages 274–84.)

At least as far back as Okun (1971) and Friedman (1977), it has been claimed that higher inflation itself leads to greater inflation uncertainty. If this proposition is correct, it provides a strong justification for a policy aimed at securing low, and so more stable, inflation. But the findings from the vast body of literature looking at this relationship, using data both across country and over time, are far from conclusive. Though it is fairly well established that high rates of inflation are associated with greater inflation variability, the link with inflation uncertainty—the unpredictability of future inflation—is less clear-cut (see for example Driffill, Mizon and Ulph (1990)).(2)

The aim of this article is to present some evidence on the association between UK inflation and inflation uncertainty during the post-war period. Since inflation uncertainty is not directly observable, we consider various proxies, including descriptive measures of inflation variability and econometric estimates of uncertainty derived using an ARCH (autoregressive conditional heteroskedasticity) model approach.(3) Though the framework adopted does not allow any conclusive inference to be drawn about causality, the results support the view that inflation uncertainty is positively associated with the level of inflation.

Why might inflation uncertainty increase with the level of inflation?

The best-known exposition of the link between inflation and inflation uncertainty appears in Friedman's Nobel lecture on 'Inflation and Unemployment' (1977), though similar arguments were advanced earlier by Okun (1971) in his article on 'The Mirage of Steady Inflation'. In an often-quoted passage, Friedman proposed the following explanation for expecting a relationship between inflation and inflation variability or uncertainty:

> 'A burst of inflation produces strong pressure to counter it. Policy goes from one direction to the other, encouraging wide variation in the actual and anticipated rate of inflation. And, of course, in such an environment, no one has single-valued anticipations. Everyone recognises that there is great uncertainty about what actual inflation will turn out to be over any specific future interval.'

More recently, Ball (1992) has formalised this basic intuition in a game-theoretic setting. In his theoretical model, two types of policy-maker alternate in power. One policy-maker cares solely about inflation, the other about inflation and unemployment; but agents in the economy do not know which type of policy-maker is in charge. (The real-world equivalent of this might be that people do not know what the true preferences of the authorities are.) When inflation is low, there is no difference between the actions of either policy-maker: both act to maintain low inflation. But when inflation is high, there is a difference. One policy-maker would be prepared to pay the temporary

(1) These and other costs of inflation were discussed in the then Governor's inaugural London School of Economics, Bank of England lecture (Leigh-Pemberton (1992)). A recent review of the literature on this subject appeared in Briault (1995).
(2) This is a particularly important distinction from the perspective of measuring the costs of inflation uncertainty because it is clearly the possibility of unexpected inflation outcomes, rather than its variability *per se*, that is most important. For example, provided that it can be accurately predicted, inflation need have no effect on the real cost of capital.
(3) This work is described more fully in Joyce (1995).

unemployment costs of disinflating the economy; the other would not. And since the public does not know which type of policy-maker is in charge, uncertainty about future inflation increases.

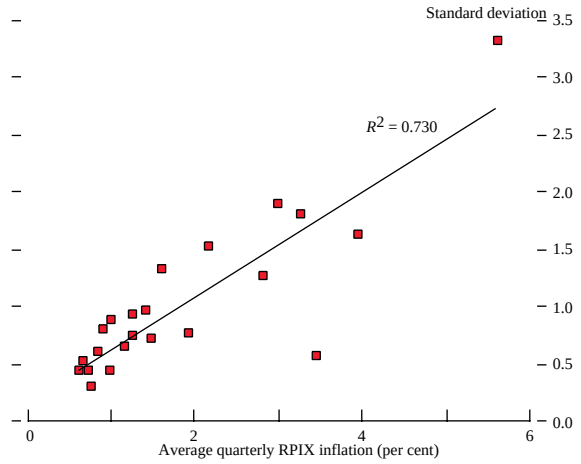
There are other possible theories that imply a causal relationship from inflation to inflation uncertainty, but a correlation could also arise for reasons quite unconnected with causality, and there are several theoretical models with this property. For example, in Devereux (1989), a correlation between the level and the variability of inflation arises through the common influence of the variability of 'real' disturbances.(1) Indeed, there is some empirical evidence that the historical association between the level and volatility of US inflation may partly reflect the independent influence of energy price shocks (see Holland 1984).

Inflation and inflation variability

The early literature on the inflation-uncertainty relationship measured uncertainty using various descriptive measures of inflation variability, such as the variance or standard deviation. The difficulty with using such measures is that they may bear little relation to uncertainty if variations in inflation are predictable. Nevertheless, for completeness and as a cross-check on the ARCH model-based estimates of inflation uncertainty that follow, some descriptive measures of UK inflation variability and how they relate to inflation are considered below.

Chart 1 plots the standard deviation of underlying quarterly (RPIX) inflation against average inflation for non-overlapping four-quarter periods, using the available data back to 1975.(2) The least-squares regression line plotted through the data suggests that there is a positive relationship between the two series, though its strength is clearly sensitive to one outlying observation (for 1975(3)).

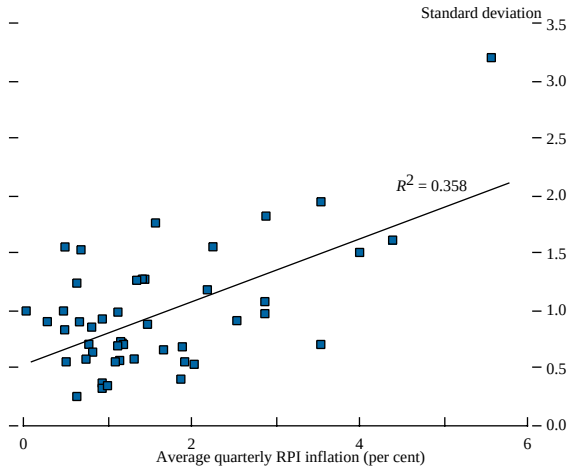
Chart 1
Standard deviation and average level of RPIX inflation,(a) over non-overlapping four-quarter periods



(a) Derived from quarterly data, 1975 to 1996.

The fairly short sample period used in Chart 1 is dictated by the availability of data for RPIX. To extend the sample back for the post-war period, the rest of this article focuses on RPI inflation data.(4) Chart 2 repeats the same analysis as in Chart 1 using these data back to 1950. The association is somewhat weaker for this longer sample, but still positive, suggesting that higher inflation tends to be more volatile over quite short horizons.

Chart 2
Standard deviation and average level of RPI inflation,(a) over non-overlapping four-quarter periods



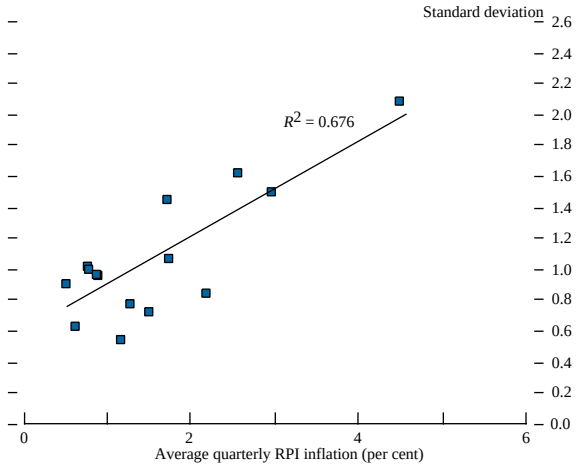
(a) Derived from quarterly data, 1950 to 1996.

It is sometimes argued that, in measuring the costs of inflation, longer-run uncertainty about inflation is more important, because this form of uncertainty is most relevant to the risk involved in entering long-term nominal contracts (see for example Ball and Cecchetti (1990)). By averaging over longer periods, it is possible to examine whether longer-run variability is more associated than shorter-run variability with the level of inflation. Charts 3 and 4 therefore consider the same relationship but using twelve-quarter and twenty-quarter periods. Though comparison of the charts provides some evidence for there being a stronger relationship over longer horizons, in each case the correlation is positive and statistically significant.

So on the basis of this simple descriptive analysis, it seems that during the post-war period higher inflation in the United Kingdom has been associated with greater inflation variability.

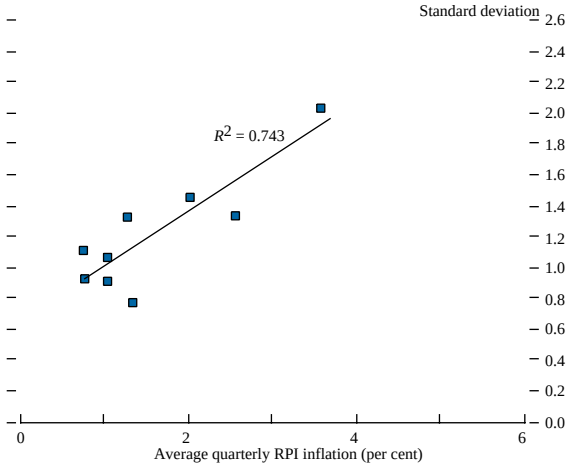
(1) This arises in the following way. As the variance of real shocks increases, the level of wage indexation in the economy is assumed to fall and the monetary authorities are assumed to have a greater incentive to create inflation surprises to engineer higher output. This raises average inflation. At the same time, the greater variability of real shocks also leads to higher variability in output and inflation. Hence the correlation, without causation, between average inflation and inflation variability.
(2) Throughout this article, inflation is measured using the conventional logarithmic approximation, so that any one quarter's inflation rate is calculated as 100 multiplied by the logarithmic difference between the retail price index for that quarter and that for the previous quarter. End-quarter (final-month) data are used throughout.
(3) The high variability of inflation during 1975 partly reflects a large change in VAT in that year.
(4) An alternative method of extending the sample would be to splice together the series for RPIX and RPI. None of the results illustrated here is changed significantly by doing so, but using RPI throughout has the benefit of consistency.

Chart 3
Standard deviation and average level of RPI inflation,(a) over non-overlapping twelve-quarter periods



(a) Derived from quarterly data, 1950 to 1994.

Chart 4
Standard deviation and average level of RPI inflation,(a) over non-overlapping twenty-quarter periods



(a) Derived from quarterly data, 1950 to 1994.

Inflation and inflation uncertainty

As already noted, finding a link between the level of inflation and inflation variability need not imply a relationship between inflation and inflation uncertainty. Unfortunately, measuring inflation uncertainty is problematic because it is not directly observable. In previous studies, researchers have typically used proxies based on survey data (often measures of the dispersion of inflation forecasts among individual survey respondents, see for example Holland (1984)) or the variance or standard deviation of the forecast errors from an econometric model of inflation, assuming that the latter is representative of the implicit model being used by economic agents to forecast inflation. For the period considered here, there are no suitable survey data with which to measure inflation uncertainty, so an econometric approach is adopted.

The measures of inflation uncertainty used are derived from the estimation of various forms of ARCH model for UK post-war inflation. (Further background on ARCH models is given in the box on page 288.) ARCH models provide a natural framework for measuring inflation uncertainty and, though now more commonly associated with the finance literature, were in fact first applied in this way (see for example Engle (1982 and 1983) and Bollerslev (1986)). An ARCH model takes the form of a regression model (here for quarterly inflation) which is estimated subject to an assumption that the model's conditional error variance (here the variance of errors in predicting inflation—a natural analogue of uncertainty) changes over time in a particular way. The ARCH acronym relates to the fact that uncertainty (the conditional variance of the variable) is assumed to depend only on the size of past squared errors in predicting the variable being modelled. So when applied to modelling inflation, the use of an ARCH model assumes that inflation uncertainty depends only on the size of past squared errors in forecasting inflation. This assumption is appropriate where both large and small forecasting errors occur in clusters, which has been observed to be the case with inflation.

Recent extensions of the ARCH framework—motivated primarily by the inability of these simple models to explain important features of financial data(1)—have resulted in a variety of models that allow uncertainty about the future value of a variable (its conditional variance) to respond differently according to whether the model over or under-predicted the level of the variable in previous periods. These developments are useful in estimating inflation uncertainty, because some of the arguments for expecting higher inflation to lead to greater inflation uncertainty might suggest that higher-than-expected inflation ('bad news') could generate more uncertainty about future inflation than lower-than-expected inflation ('good news'). Asymmetric ARCH models allow this hypothesis to be tested.

To apply the ARCH approach, a model of the level of inflation first needs to be estimated. The results described below are based on a simple autoregressive model in which the level of inflation in each quarter was explained by the behaviour of inflation in previous quarters and seasonal factors (to allow for the fact that the RPI figures are not seasonally adjusted).(2) This approach is obviously restrictive, since it assumes that the relevant information set for forecasting inflation is both limited and timeless—it cannot therefore make any allowance for the effects on uncertainty arising from different monetary regimes. Nevertheless, this model appears to explain the level of inflation reasonably well on most statistical criteria. However, the prediction errors from this model show the

(1) In particular, the 'leverage' effect, whereby an unexpected stock price fall produces a bigger increase in volatility than an equivalent price rise.
(2) Adjustments were also made for the effect of two particularly large VAT changes in 1975 and 1979, implicitly assuming that these were perfectly anticipated and therefore did not lead to additional inflation uncertainty. Details are contained in Joyce (1995).

ARCH models

Autoregressive conditional heteroskedasticity (ARCH) models were originally introduced by Engle (1982). In broad terms, the approach involves estimating a regression model, subject to an assumption that the model errors follow a specific form of heteroskedasticity (or non-constant error variance). More specifically, in the simplest case of an ARCH(1) model, the error term is specified as conditional normal, with the variance a time-varying function of the one-period lagged squared errors. Thus, if the dependent variable is described by a first-order autoregression, the complete AR(1)-ARCH(1) model can be written as

$$y_t = \alpha + \beta y_{t-1} + \varepsilon_t \qquad (1)$$

$$\varepsilon_t | \Omega_{t-1} \sim N(0, h_t) \qquad (2)$$

$$h_t = \gamma_0 + \gamma_1 \varepsilon_{t-1}^2 \qquad (3)$$

where y_t is the level of the variable being modelled, h_t is its conditional variance, ε_t is a random error, and α, β, γ_0 and γ_1 are parameters.

Estimation of this model is possible using maximum likelihood techniques, subject to initial starting values for the lagged squared forecast error.

An extension of the model to include the lagged dependent variable in the conditional variance equation—termed 'generalised ARCH' (or GARCH)—was subsequently suggested by Bollerslev (1986). Thus equation (**3**) becomes

$$h_t = \gamma_0 + \gamma_1 \varepsilon_{t-1}^2 + \delta h_{t-1} \qquad (4)$$

The order (or number of lags) of the ARCH or GARCH process can in principle be extended to any value, but in many applications a GARCH model including only the first period lags of h_t and e_t^2 has been found to be adequate (this is known as a GARCH(1,1) model).

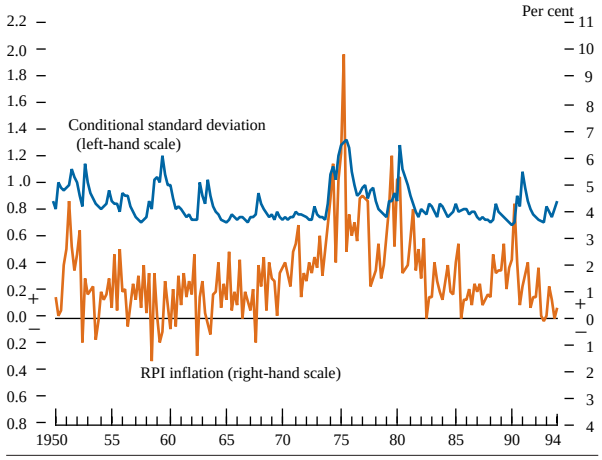
For modelling inflation uncertainty, standard ARCH and GARCH models have the undesirable feature that they impose a symmetry restriction on the lagged errors, which implies that good news and bad news have identical effects on uncertainty. In fact, in the empirical work reported in this article, a variety of asymmetric models were found to be superior in fitting UK inflation data. The text reports results from the best-fitting asymmetric models, the exponential GARCH (EGARCH) model (due to Nelson (1990)) and the GJR model (proposed by Glosten, Jagannathan and Runkle (1993)), both of which allow higher-than-expected inflation in the previous quarter to increase measured inflation uncertainty by a greater amount than lower-than-expected inflation.(1)

(1) For further discussion of asymmetric ARCH models, see Engle and Ng (1993).

clustering which is consistent with there being ARCH effects. The conditional error variance of the model was therefore modelled in terms of various types of ARCH process. The analysis shows that asymmetric models that allow this conditional variance to respond more sharply to previous under-predictions of inflation are slightly superior in fitting the data.

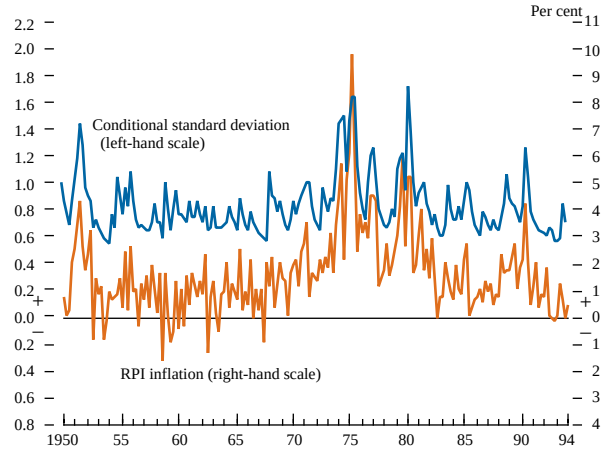
Charts 5, 6 and 7 plot measures of short-run inflation uncertainty (expressed in terms of the one-quarter-ahead conditional standard deviations) from three slightly differently ARCH models against post-war quarterly RPI inflation.(1) The uncertainty measure shown in Chart 5 is

Chart 5
Quarterly RPI inflation and estimated inflation uncertainty from GARCH model



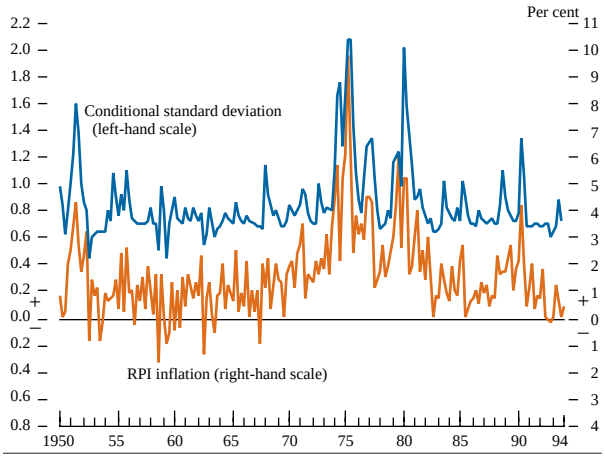
from a generalised ARCH (GARCH) model that imposes the symmetry restriction that the forecast of the next period's inflation volatility responds only to the size of this period's inflation news, ignoring whether inflation was higher or lower than expected. By contrast, Charts 6 and 7 show uncertainty derived from two models—the exponential GARCH (EGARCH) model and the GJR model (see the box for further details)—that allow the next period's expected

Chart 6
Quarterly RPI inflation and estimated inflation uncertainty from EGARCH model



(1) The choice of a short-run measure of inflation uncertainty is dictated by the use of the ARCH framework, since the set-up of these models implies that over longer-run horizons the conditional variance must converge to the constant unconditional variance of the model.

Chart 7
Quarterly RPI inflation and estimated inflation uncertainty from GJR model



inflation volatility to respond differently according to whether this period's outturn for inflation was higher or lower than expected.

All three measures of inflation uncertainty (shown in blue on each chart) track inflation (the orange line) reasonably closely during the post-war period. Thus inflation and inflation uncertainty in the 1990s have both been at low levels, broadly similar to those achieved on average in the 1950s and 1960s. The two periods of greatest uncertainty were in the mid 1970s, when inflation reached its post-war peak, and in the early 1980s.

But despite these broad similarities, it is noticeable that the uncertainty measures based on the models that discriminate between the effects of good and bad inflation news are much more sensitive to movements in inflation than the model that imposes the restriction that all news generates the same amount of uncertainty. This is brought out very clearly in the scatter plots in Chart 8, 9 and 10, which show the correlation between lagged inflation and estimated uncertainty from each of the three models. As is shown by

Chart 8
Estimated inflation uncertainty from GARCH model and lagged quarterly RPI inflation

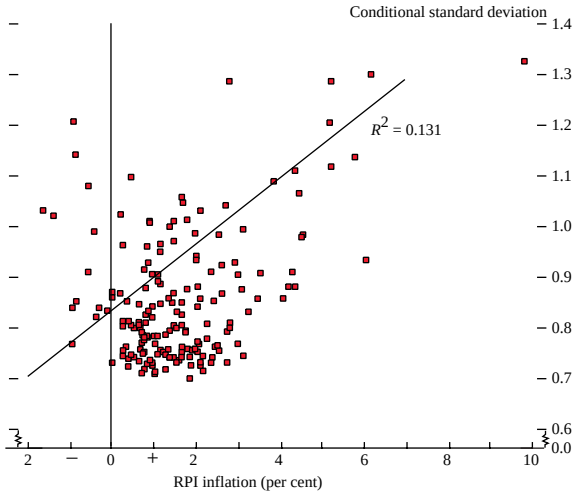
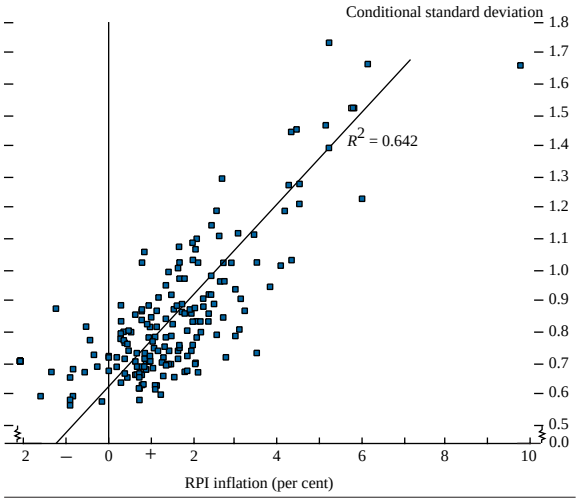
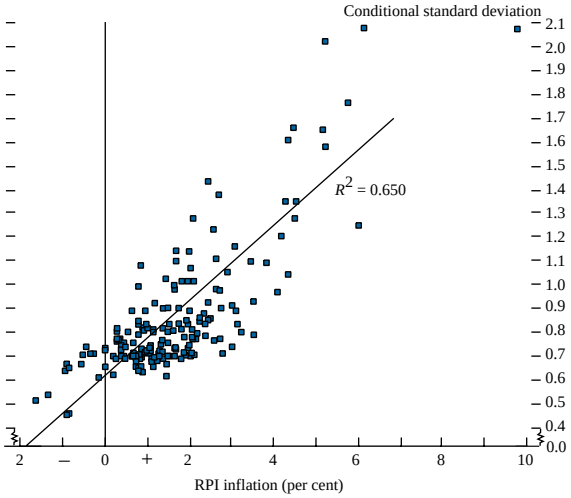


Chart 9
Estimated inflation uncertainty from EGARCH model and lagged quarterly RPI inflation



the statistical fit of the associated regression lines, though there is a clear positive relationship in each case, there is a much stronger association between lagged inflation and measured uncertainty based on the asymmetric EGARCH and GJR models. This finding, which mirrors that of Brunner and Hess (1993) for the United States using a slightly different asymmetric approach, emphasises the importance of allowing positive and negative inflation shocks to have different effects on expected volatility.

Chart 10
Estimated inflation uncertainty from GJR model and lagged quarterly RPI inflation



Conclusions

The aim of this article has been to review some evidence on post-war inflation in the United Kingdom to see whether it is consistent with the claim that higher inflation is associated with greater inflation uncertainty. The descriptive analysis presented supports the existence of a positive relationship between the level of inflation and various measures of inflation variability during this period. More interestingly perhaps, the econometrically derived estimates of inflation uncertainty also appear to be

associated with the level of inflation, and these correlations are greater when uncertainty is modelled in what seems *a priori* to be a more plausible way, allowing it to respond differently to good and bad inflation shocks. Clearly, these estimates of inflation uncertainty are subject to the limitations of the modelling approach adopted, which may not correspond to that used by households and firms in the economy. Moreover, since no allowance is made for other factors in the models employed, the findings cannot establish conclusively that there is a causal link between the level of inflation and inflation uncertainty. One must therefore be cautious in drawing policy inferences. Nevertheless, the balance of the evidence is consistent with there being a positive association, which suggests there may be benefits—in terms of the costs of uncertainty—in directing policy at establishing and sustaining an environment of low inflation.

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Quantifying survey data

By Alastair Cunningham of the Bank's Conjunctural Assessment and Projections Division.

In this article[1] Alastair Cunningham explains how data from economic surveys can be used to complement official statistics. He sets out a simple framework to analyse how firms respond to surveys and outlines the most widely used technique for converting qualitative responses into a quantitative measure. He shows that the results of this technique are often biased, and describes a more rigorous approach. Possible explanations are put forward for why survey data tend to be less volatile than official data. Finally, the use of forward-looking survey data is discussed.

Introduction

In addition to official data, mainly from the Office for National Statistics (ONS), the Bank receives around 30 regular economic surveys from the private sector. These include the CBI's quarterly *Industrial Trends Survey* and the *Quarterly Economic Survey* produced by the British Chambers of Commerce (BCC). Many private sector surveys offer a qualitative indication of economic conditions whereas the official data (though also usually based on surveys) are quantitative estimates.

The first section of this article explains how surveys can usefully complement official estimates—the context in which we analyse survey data. Before the implications of the survey data can be assessed, we need to convert any qualitative survey responses into quantitative estimates. To do this accurately, we need to understand how the information in the survey is collected and presented. This is explored in the second section of this article. The third section discusses a widely used technique for converting qualitative survey data into quantitative estimates; next, we outline a more rigorous approach before reviewing the issues raised when the official data are more volatile than the private sector survey data. Finally, we discuss the additional factors that we need to consider when interpreting forward-looking surveys of expectations.

How are survey data useful?

Understanding how data from various sources relate to one another is central to economic analysis. We want to know how different variables are related: for example, when analysing the housing market, how do housing completions (data source: Department of the Environment) relate to data on housing sales (such as supplied by the Royal Institute of Chartered Surveyors survey)? And we want to reconcile estimates of a single variable, such as manufacturing output, from different sources (the ONS and private sector surveys).

Research into quantifying survey data is part of a general effort—both in the Bank and by external economists—towards integrating the diverse data available into a systematic analysis of the economy. For example, the National Institute of Economic and Social Research (NIESR) has recently started publishing a monthly indicator of GDP, relating a range of monthly data to total output.

Survey data can help economists to analyse the economy in a number of ways:

(i) Giving early information on the current state of the economy

Official data provide the foundations for economic assessment. UK data are high quality by international standards—of 13 national statistical offices covered in a 1993 survey (published in *The Economist*), the ONS was ranked joint second for the timeliness of publication and the small size of revisions. But there is a lag between the publication of the data and the period to which they refer. And perhaps more importantly, the data are often revised after publication as more information becomes available. Because of the delay before official estimates are finalised, economists may use surveys and other indicators to improve their analysis of the recent past.

(ii) Covering sectors for which official data are less frequent

Not all sectors of the economy are covered equally well by regular and timely official data. For example, the ONS currently produces monthly estimates of manufacturing production, but only a quarterly estimate of output in the (much larger) service sector. Where official data are scarce, other sources of information such as the CBI's *Distributive Trades Survey* become more valuable.

(iii) As an indicator of expectations

Many surveys ask respondents about their expectations, as well as about recent experiences. For most variables,

(1) This article draws heavily on earlier research undertaken in conjunction with Martin Weale (NIESR) and Richard Smith (Bristol University).

surveys are the only source of information on expectations. Information about expectations is useful because economic agents' views of future prospects can affect their current behaviour. For example, if consumers come to expect faster income growth in the future, they may raise expenditure on goods and services today.

Quantifying surveys of expectations is more complex than quantifying backward-looking surveys, because there are rarely any official statistics on expectations to compare the survey data with. Although the bulk of this article focuses on backward-looking surveys, the points also apply to surveys of expectations, and the lack of official data on expectations is discussed in the final section.

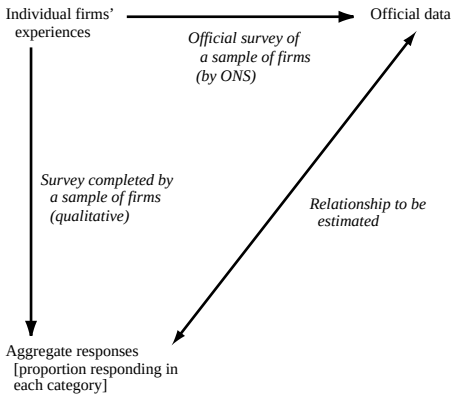
Economists may also be interested in how good an indication of the state of the economy the various surveys give, and indeed whether the official estimates are the best indicator. That may be the focus of future Bank research, but is not discussed in this article. Here we are concerned with how best to match survey and official data, regardless of their relative performance as indicators. We do not aim to model the official data in any behavioural sense. Instead, we wish to transform the qualitative survey data into a quantitative estimate that is (on average) consistent with the official estimates, once they have been finalised.

To make the fullest use of survey data as a complement to official data, we need to turn qualitative survey responses into quantitative estimates. There is a wide range of possible techniques that economists can use to relate survey data to official estimates. To choose between them, we need to understand how the information in surveys is collected and presented.

A simple framework for analysing surveys

Chart 1 represents the relationships between the official and survey-based estimates of an economic variable. The official data are the (weighted) average experiences of a sample of firms. Surveys are also based on questions about the experiences of a sample of firms, but these questions are usually qualitative and published in aggregated form as the proportion of firms answering in each of a series of categories—typically 'rise', 'fall', or 'the same'.

Chart 1
Relationships in surveys



We can use a simple framework to reveal any implicit assumptions that we make when analysing survey data. This should help us to choose between the various possible techniques we can use to interpret the survey. The framework has two parts, corresponding broadly to the first links in the triangle in Chart 1:

- Sampling: how do the experiences of individual firms covered by the official (ONS) sample differ from those of the firms completing the private sector survey?
- An 'observation rule': how do the responses given by the individual firms completing the survey relate to their experiences?

The answers to these two questions can inform our approach to the final leg of the triangle: relating the aggregate survey responses to official estimates of the variable.

All the numerous techniques that economists use to relate survey data to official estimates rest on assumptions about the relationships embodied in the survey, in particular the nature of the observation rule. Our simple framework can be used to judge between these different approaches.

Sampling errors

It is easiest to describe the framework in terms of a specific variable, such as output. Each firm's output growth can be divided into two parts: the economy-wide average plus some firm (or industry)-specific influence. These specific influences must average zero across all firms and industries, so the economy-wide average will approximately equal the average growth rate experienced by individual firms.(1)

But the official and survey data are both usually based on samples of the firms in the economy. So the average experience recorded will equal the economy-wide average *plus* a random sampling error. Because the official data and the survey data are usually based on different samples, they are subject to different sampling errors.

Attempts to match the data will be impeded if there is a pattern—a systematic variation—in the differences in sampling error. This will only occur if firms sampled in the official data experience consistently different conditions from those in the survey data. So for example, some commentators have been concerned that the CBI's *Industrial Trends Survey* may be biased towards exporters. If this is so, and exporters' experiences are not thought to be representative of the economy as a whole, then the user of the survey must make allowances for this.

(1) For the purposes of this paper we ignore any differences due to 'aggregation bias'.

An observation rule for individual firms

The next (and more complex) step is to understand how firms report their individual experiences. In most surveys, firms are not asked to report their output directly, but to state, for example, whether output has 'risen', 'fallen' or 'stayed the same'. To understand how firms' experiences relate to their responses, we need to define the range of output growth that firms regard as falling into each category. In the usual case, where there are only three categories, this merely involves defining the range of outcomes that firms regard as 'the same'.

At first glance, the answer seems obvious—firms should only report 'the same' if output growth is exactly zero. But the probability of output growth being *exactly* zero is very small under most circumstances, so firms should rarely give this response. But we observe, for example, that since 1972, an average of 48% of respondents to the CBI's *Industrial Trends* survey have reported unchanged output volumes in any one quarter.

If firms are reporting 'the same' when output has changed, there must be some range of output variation that they regard as essentially unchanged. This range, which is termed the 'indifference band', underlies the information offered by the survey.

The CBI periodically investigates the answering practices of its respondents. The results of the most recent enquiry were published in 1990 (Junankar 1990) and suggested that the indifference band could be significant. When asked 'what range of movement would you regard as falling within the reply 'the same'?', only 11% responded 'up to 1%' and over a quarter responded 'up to 4%–8%'.

One reason for the existence of an indifference band may be that firms are uncertain about what has happened and how to report it. The CBI's investigation of answering practices suggests one potential source of uncertainty: the timing of the period used to assess changes in output. Respondents to the quarterly survey are asked about the trend 'over the past four months'. The CBI's investigation found that this was interpreted differently by different respondents. Around one half of the respondents compared the latest four-month period with the previous four months. But significant minorities compared the start with the end of the four-month period (21%); or compared with experiences a year earlier (9%); or even used a combination of the three (16%).

If a firm is uncertain about its experiences, then it is likely to regard a small change as essentially the same. The firm will only record a rise if it is sufficiently certain that the change is significant. If this reasoning is correct, then we might expect the indifference bands to be widest for questions about experiences of which the firm is most uncertain. In that case, indifference bands should be wider for surveys of expectations than for surveys of experiences, because of the additional uncertainty faced when taking a view about the future.

If a firm becomes less uncertain about its experiences then we might expect the indifference band to become narrower over time. So for example, uncertainty may have risen as markets have become increasingly global. Alternatively, the introduction of computerised stock control may have reduced uncertainty. Because we have no prior view about how (and if) uncertainty has shifted over time, the approaches discussed in this article all make the simplifying assumption that the bands are constant through time.

In the remainder of the article, we discuss techniques that may be used to quantify survey data in the light of our discussion. The methods set out are illustrated by an application to the CBI's *Industrial Trends Survey*. But the purpose of this article is to set out the techniques rather than the results of these specific regressions. The points made should apply to any qualitative surveys. Details of the regression results underpinning the charts in this article are set out as an appendix.

A common approach: the 'balance' statistic

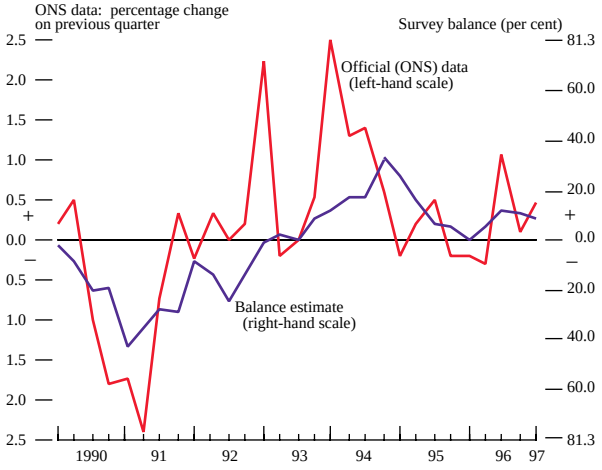
One of the most commonly used representations of survey data is the 'balance' statistic: the difference between the proportion of firms reporting a rise and those reporting a fall. Because it is a single figure, the balance statistic is often used to summarise the information in a survey; with a positive balance being associated with output growth and a negative balance associated with falling output.

The balance statistic is frequently used (informally) to quantify the extent of any growth or shrinkage. Here the balance may be plotted alongside the official estimates as in Chart 2, with a balance of zero associated with zero growth. This implicitly regresses the balance against the data, as in equation **(1)**:

$$Data_t = \beta\, Balance_t + \varepsilon_t \qquad \textbf{(1)}$$

The summary of the survey given by the balance statistic assumes (implicitly) that the average increase in output

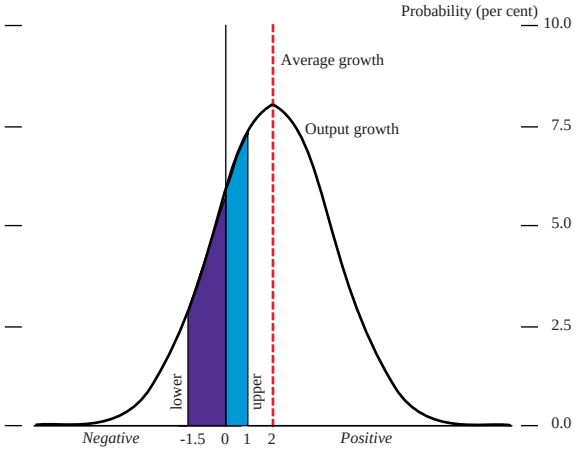
Chart 2
Example of balance estimate: applied to manufacturing output



reported as a ‘rise’ has the same magnitude as the average reported ‘fall’. This will only be true if the range of outcomes that the firm perceives to be insignificantly below zero is the same size as the range perceived to be insignificantly above zero. In other words, the indifference band is symmetric around zero growth. But this will only normally occur if growth averages zero—a property violated by many macroeconomic time series.(1) So the balance statistic will generally be biased.

This strong conclusion follows from our interpretation of the indifference band as a confidence interval covering growth rates that the reporting firms perceive to be insignificantly different from zero. As the band is a confidence interval, the probability of growth being positive and insignificantly different from zero *must* equal the probability of growth being negative but insignificantly so. Chart 3 shows why, given this property of confidence intervals, the indifference band must be asymmetric when average growth is not zero.

Chart 3
Asymmetric indifference band



The chart plots a normal (bell-shaped) probability distribution of the firm’s output growth over time. The average growth rate is 2% per quarter. In this case, the probability of output growth being between 0% and +1% must be greater than the probability of growth between 0% and -1%, because the positive range is closer to the average. So if we want to equalise the probabilities of growth falling within the positive and negative ranges, the negative range must be larger than the positive range (say from 0% to -1.5% as in Chart 3). Because we think of the indifference band as a confidence interval, we do want the probabilities to be equal, so the band must be asymmetric.

In line with previous research (see for example Pesaran 1984), this approach suggests that estimates based on the balance statistic will often be biased. In addition, the bias may vary over time. Any bias should fall as the proportion of firms reporting ‘same’ increases, because the bias derives from average reported ‘rises’ being different from average reported ‘falls’. As the proportion reporting ‘same’ increases, there are fewer ‘rises’ and ‘falls’ to generate bias.

Analysis when the balance is biased

Despite the shortcomings of balance statistics, economists often choose to use them. Indeed, some surveys are only published as a balance statistic (for example the BCC’s *Quarterly Economic Survey*), and so the user cannot distinguish between rises and falls. Even when survey data are published by category, the ease of presenting balance statistics makes them useful for *ad hoc* analysis. Although balance statistics may be biased, we can still gain valuable insights from them, especially if we can predict what any bias is likely to be and so correct (or allow) for it. This may be possible: our framework suggests some properties that any bias is likely to have.

Analysis of the CBI’s *Industrial Trends Survey* suggests that the bias may be (fairly) significant. For example, a balance-based estimate of quarterly manufacturing output derived using equation **(1)** was, on average, 0.4 percentage points lower than an alternative using the ‘best-practice’ estimation technique described later. And since the ‘best-practice’ technique provides unbiased estimates, the 0.4 percentage points difference may be considered as bias in the balance estimate.

We can correct for average bias fairly trivially by including a constant in the balance regression, as in equation **(2)**:

$$Data_t = \alpha + \beta\, Balance_t + \varepsilon_t \qquad \textbf{(2)}$$

Because of the constant, a balance of zero may not be associated with zero growth. Any *ad hoc* assessment of survey balance statistics should allow for this.

Although we can correct for average bias by including a constant term, balance statistics may still distort the results, if bias varies over time. Our empirical work confirms that bias varies, though often not to an extent that would significantly affect our view of the trend in that variable. For example, in the application to manufacturing output, the variance of the bias was equivalent to just 3% of the total variance of output, as estimated using the balance statistic. But for some other variables, such as manufacturing export volumes, we found a greater variance, which could affect our conclusions.

Economic inference will be improved if we can predict when bias is likely to vary most. Again, the simple framework suggests an answer. The more uncertain firms are about their experiences and how to record them, the greater the variation of bias. This follows because any asymmetry is likely to become more marked as the width of the bands increases. And band width increases with uncertainty. If we think that uncertainty is related to the volatility of the economic variable, we may be able to ‘predict’ when the bias will vary most.

(1) Technically, the balance statistic may be unbiased despite a non-zero average growth rate, if output growth is not distributed normally across time.

Our analysis can be improved by using known properties of the bias in the balance statistic. But we could improve our analysis further by avoiding the bias altogether.

More rigorous estimation

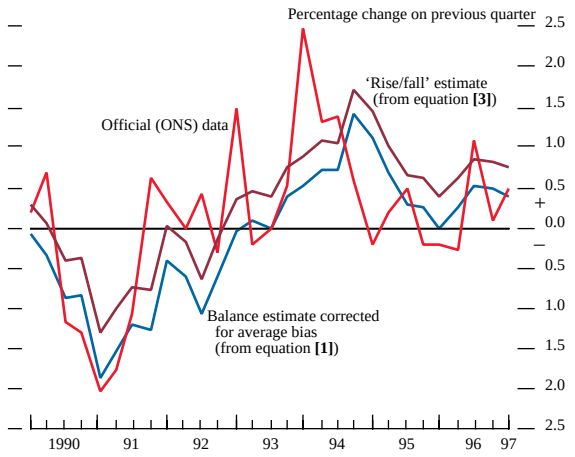
A slightly more complex approach (associated with Pesaran 1984 and 1987) uses the information contained in both the 'rise' and 'fall' proportions. In this approach, the official data is regressed against the proportions reporting in each category:

$$Data_t = \alpha + \beta_r RISE_t + \beta_f FALL_t + \varepsilon_t \qquad \textbf{(3)}$$

This approach does not impose symmetry. Indeed, it can be used to test for symmetry, which requires the coefficients attached to the 'rise' and 'fall' responses to be equal and opposite. Our research has rejected symmetry for the majority of survey questions that we have tested.

Chart 4 plots an estimate of manufactured output derived by applying this technique to the CBI's *Industrial Trends Survey* and compares it with the simple balance estimate from equation **(1)**. There are clear observational differences between the series—in particular, the balance estimate suggests flat output (zero growth) in 1996 Q1 while the 'rise/fall' estimate shows continued (albeit slowing) growth. The differences between estimates from the 'corrected' balance in equation **(2)** and the 'rise/fall' estimate are much smaller. But using equation **(2)** does not remove all of the bias from the balance statistic.

Chart 4
Example of 'rise/fall' estimate: applied to manufacturing output(a)



(a) Estimated for the period 1981 to 1994.

As predicted, the 'fall' term in equation **(3)** had a negative coefficient (so that greater proportions reporting falls were associated with lower output growth). The 'rise' coefficient was positive. We can reject symmetry because the 'fall' coefficient was significantly larger than the 'rise' coefficient (-0.07 compared with +0.01). The larger size of the 'fall' coefficient accords with our framework, because average output growth is greater than zero (as in the example in Chart 3).

Although equation **(3)** is an improvement on the simple balance model, all three equations share a problem. When a relationship is estimated using regression analysis, the explanatory variables appear on the right-hand side, and the dependent variable is on the left-hand side. The error term should be correlated with the left-hand side dependent variable but not the explanatory variables. Equations **(1)** to **(3)** all use survey responses as an explanatory variable, with the official data as the dependent variable. This may be the wrong way round. Intuitively, the survey response is being transformed to predict (or model) the official data. But in order to get unbiased and efficient estimates of the relationships between the survey and official data the survey data should be the dependent variable. This is because of the assumption that (after any revisions) the official data give an unbiased indication of the state of the economy, while survey data may contain measurement errors. In that case, the survey data should be on the left-hand side of any regression.

Of course, as noted earlier, most official data *are* subject to measurement error, since they are based on the experiences of a sample of firms. And it is possible that the official data may be biased—in other words that any measurement errors do not average zero. For example, the official data may pick up new firms with a lag and those firms' experiences may differ from the economy-wide average. In some cases private sector surveys may be less prone to such error.

Economists may wish to test whether the survey data give a better indication than the official data of the 'true' state of the economy. If they do, then survey data may *substitute* for official data. This possibility raises a number of interesting issues—in particular, how to quantify the survey data in the absence of a base against which to match it. But this article focuses on the best way to quantify survey data when it is used to *complement* official data.

When an equation is mis-specified by reversing explanatory and dependent variables, the results are not biased but the efficiency of the estimation process is reduced. In other words, any confidence intervals will be wider than they would be under efficient estimation.

An efficient estimator

Recent Bank research undertaken with Martin Weale (NIESR) and Richard Smith (Bristol University) has derived an approach in which the survey responses are treated as dependent variables. We set up two equations—one for the 'rise' and one for the 'fall' proportions. In each case, we regress the survey responses on the official data.(1)

(1) The rise and fall proportions must be within a range of 0% to 100%. To avoid violation of this range, the survey variables are subjected to a logistic transformation prior to estimation.

$$RISE_t = \alpha_r + \beta_r Data_t + \varepsilon r_t$$
$$FALL_t = \alpha_f + \beta_f Data_t + \varepsilon f_t \qquad \textbf{(4)}$$

Once this system has been estimated, we can rearrange the equations to generate two transformations of the survey responses. Both give quantitative estimates of the economic variable, which we use to produce a single weighted average. The weights are chosen to minimise the variance of any errors in the estimate. The final estimate is simply a transformation of the survey data. It is not part of a behavioural model of the official data. Nor is the estimation an attempt to maximise the fit of an equation 'explaining' the official data.

In practice, the differences between the best-practice estimates and those derived using equations **(2)** and **(3)** are very small. But the best-practice approach should be preferred for any rigorous analysis: it does not require any further data; it is not much more complex to use; and it is potentially more efficient.

Problems encountered when survey data are smoother than official data

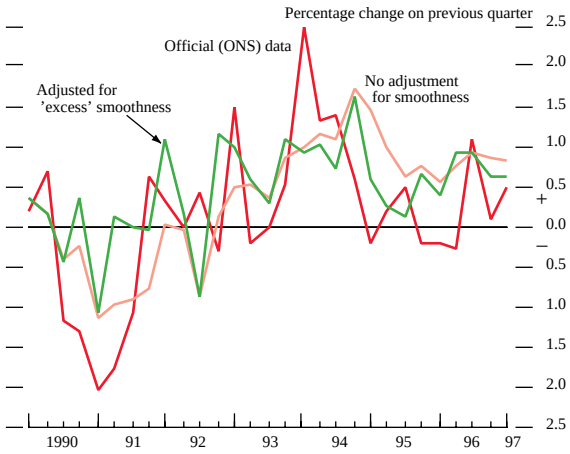
The quantitative estimates derived from surveys are often smoother than the official data they complement. As a result, we tend to find patterns in the residuals of the regressions used to match the survey data to the official data. These patterns, termed 'serial correlation', are a common problem in economic analysis. They may bias our estimates if the serial correlation is caused by omitted variables: perhaps the survey fails to pick up all the shocks to the economy and so is excessively smooth. In that case, we may add variables to 'absorb' the serial correlation.(1) If we think that the official data are more volatile than the (true) economic variable, despite being accurate on average, then there may not be an omitted variable problem and our estimates may not be biased.

Chart 5 compares our best-practice estimates of manufacturing output with and without an adjustment for serial correlation. The analyst needs to decide whether the surveys are too smooth, or whether the official ONS data are just more volatile than the 'true' data. This depends on what caused the relative smoothness. We put forward three possible explanations here.

Seasonal adjustment problems

Seasonal patterns and trends are a widespread problem in macroeconomic analysis, making it difficult to compare growth rates in different months or quarters. The ONS seasonally adjusts much of its data, and most surveys also ask respondents to allow for seasonal variations. But seasonal adjustment is complex, and neither the ONS nor survey respondents are likely to adjust perfectly. These problems may cause serial correlation when we try to match data from different sources:

Chart 5
Approaches to smoother survey data: applied to manufacturing output(a)



(a) Estimated for the period 1981 to 1994.

- Occasionally, the ONS adjustments may leave seasonal 'spikes' in the data. For example, the ONS seasonal adjustment of earnings data has been complicated by large and variable bonuses paid in the first quarter of each year.

- Survey respondents' attempts to adjust for seasonal variation may smooth the data more (or indeed less) than the ONS does. This is because any adjustments tend to be subjective. The CBI's investigation of answering practices found that only 26% of those who made adjustments did so 'by an established quantitative procedure'.

As a preliminary test of whether seasonal adjustment problems caused the serial correlation found in our empirical work, we re-ran our regressions after seasonally adjusting both the ONS and the survey data. Serial correlation was still present, suggesting other causes.

Firms infrequently update their responses

Surveys ask firms a number of questions, each of which may take some thought, and even research, to answer correctly. Firms may not be prepared to bear the cost of this research every time the survey is circulated. Or they may choose not to change their responses until the experience has changed significantly (perhaps reflecting their own uncertainty). If responses are only changed infrequently, then the survey estimates will be relatively smooth.

We have not devised a statistical test of this hypothesis. But the CBI's investigation of answering practices gave no indication of this problem (though it did not ask respondents explicitly about how often they reviewed their position).

Timing issues

Respondents to a survey may not record changes in output over the same period as the official data, even when the series purport to cover similar periods:

(1) We can absorb serial correlation by adding lagged dependent variables or estimating the correlation pattern directly.

- ONS data are recorded using a rigid set of rules. These define the period for which a change is recorded, for example comparing output on two days or averages for a quarter. Occasionally these rules may cause the data to be lumpy because output is recorded in discrete chunks. For example, in the Balance of Payments, exports and imports are only recorded on delivery, with no account made for progress payments. This may explain why trade data are relatively volatile.

- Survey respondents may smooth their responses by comparing recent experience with that a year earlier, even if asked about the trend during the past four months.

We have not devised a test of either ONS lumpiness or survey smoothing. But the preliminary evidence against other potential causes of serial correlation makes this explanation a likely focus for further analysis.

Surveys of expectations

This article has focused on questions about firms' past experiences. The same intuition and arguments can be applied to forward-looking questions. But there is a further problem to address: namely that there are rarely any quantitative estimates of expectations against which to match the survey data. There are two possible solutions:

(a) Assume that parameters estimated for the backward-looking responses apply to the expectations questions

Some surveys ask questions about both experiences and expectations. In this case, it is possible to estimate parameters for the backward-looking questions and apply them to the forward-looking survey responses.

But this procedure violates one aspect of the intuitive reasoning developed in our earlier discussion of how surveys work. The assumption that the parameters are the same is equivalent to assuming that the average indifference bands underlying the survey are the same in both the backward and forward-looking questions. But firms may attach a greater margin of error to their expectations of the (uncertain) future than to their perceptions of the past. In that case, the framework outlined earlier suggests that the indifference band will be wider in the expectations responses. Then the parameters of the forward-looking estimate should be larger. So imposing the backward-looking parameters will induce error—the estimate will have too little variance.

(b) Estimate parameters using the official data to model expectations

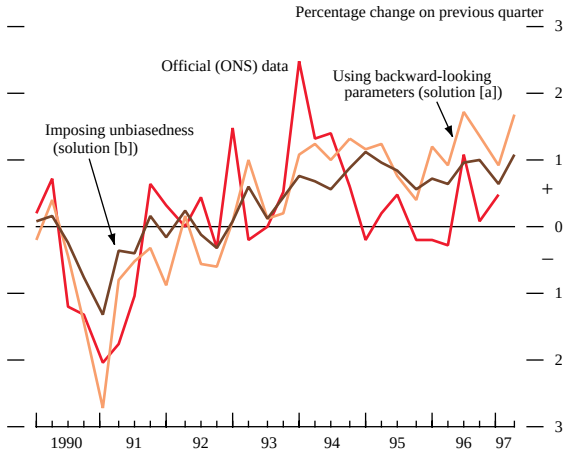
The alternative technique does not use information on respondents' past experiences. Instead, it makes an assumption about how expectations are formed, to derive 'expectations' against which to quantify the survey.

Individual firms are assumed to form expectations that are on average correct. In that case, expectations can be proxied by the official data on actual growth.

This method does not make any assumptions about the indifference bands in the forward-looking responses relative to those in the backward-looking responses. But the vital assumption that firms' expectations are on average correct has not been tested.

Chart 6 compares two estimates of expectations of quarterly output growth (derived using the two approaches) relative to the ONS estimate of growth in the same quarter. There are clear differences, which may cause concern, particularly if we wish to use the derived expectations for statistical analysis.

Chart 6
Approaches to expectations estimation: applied to manufacturing output(a)



(a) Estimated for the period 1981 to 1994.

Neither approach is entirely satisfactory. The first violates the intuition of our framework and the second makes an untested imposition. Perhaps the safest approach is to use both where possible. If they suggest similar results, then those results are at least robust.

Summary

To make the best use of the qualitative survey data to complement quantitative official estimates, survey data need to be converted as accurately as possible into quantitative estimates. This article has set out a simple framework to analyse the assumptions made in different techniques for making this conversion. Using this analysis, it has argued that the widely used balance statistics tend to give biased estimates and that, even when corrected for bias, the equations generally used are mis-specified and so reduce the efficiency of the estimation process. Re-specifying the equations results in a more efficient estimator, which should be preferred for economic analysis. Areas for further research include more work on serial correlation and on assessing how best to analyse survey data on firms' expectations.

Appendix

Estimation results

This appendix gives a brief description of the regression results underpinning the charts used.

All the regression techniques were applied to question 8 of the CBI's *Industrial Trends Survey*, which asks about changes in output. Since the survey covers manufacturers, the qualitative responses are matched to ONS estimates of manufacturing output. The variable *Data* is quarterly growth of manufacturing output.

The equations were estimated for the period 1981 Q1 to 1994 Q4. Later observations were omitted from the estimation because they may still be prone to revision.

Balance estimate—equation ***(1)***

$Data_t = 0.043\ Balance_t + \varepsilon_t$

R^2 0.37 LM(2) serial correlation: 0.12
S.E. 1.04 White heteroskedasticity: 0.62

Balance estimate corrected for average bias—equation ***(2)***

$Data_t = 0.38 + 0.04\ Balance_t + \varepsilon_t$

R^2 0.37 LM(2) serial correlation: 1.58
S.E. 0.98 White heteroskedasticity: 0.62

Separate rise and fall proportions—equation ***(3)***

$Data_t = 0.16 + 0.045RISE_t - 0.035FALL_t + \varepsilon_t$

R^2 0.37 LM(2) serial correlation: 1.65
S.E. 0.99 White heteroskedasticity: 0.32

'Efficient' estimator—equation ***(4)***

The 'rise' and 'fall' proportions have been given a logistic transform.(1) The transformed variables are denoted by *LRISE* and *LFALL*.

$LRISE_t = -1.26 + 0.24\ DATA_t + \varepsilon_t$

R^2 0.32 LM(2) serial correlation: 9.87
S.E. 0.43 White heteroskedasticity: 0.08

$LFALL_t = -1.26 - 0.27\ DATA_t + \varepsilon_t$

R^2 0.30 LM(2) serial correlation: 16.3
S.E. 0.49 White heteroskedasticity: 0.89

Note the serial correlation in the 'rise' and 'fall' equations.

'Efficient' estimator adjusted for serial correlation

$LRISE_t = -1.02 + 0.11\ DATA_t + 0.43LRISE_{t-1} - 0.24LFALL_{t-1} + \varepsilon_t$

R^2 0.75 LM(2) serial correlation: 2.45
S.E. 0.27 White heteroskedasticity: 0.41

$LFALL_t = -0.83 - 0.08\ DATA_t - 0.24LRISE_{t-1} + 0.59LFALL_{t-1} + \varepsilon_t$

R^2 0.82 LM(2) serial correlation: 0.58
S.E. 0.26 White heteroskedasticity: 0.61

Expectations estimator

Note that approach (a)'s system (page 298) was estimated for the backward-looking question, and so is identical to the 'efficient' estimator with no adjustment for serial correlation. The logistic transforms of expected rises and expected falls are denoted *LERISE* and *LEFALL*.

$LERISE_t = -1.25 + 0.14\ DATAt_{t+1} + \varepsilon_t$

R^2 0.24 LM(2) serial correlation: 5.15
S.E. 0.32 White heteroskedasticity: 0.48

$LEFALL_t = -1.66 - 0.25\ DATAt_{t+1} + \varepsilon_t$

R^2 0.30 LM(2) serial correlation: 11.9
S.E. 0.49 White heteroskedasticity: 0.81

(1) Under a logistic transform, LRISE = $ln\left[\frac{rise}{100 - rise}\right]$.

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The evolving role of the IMF in the light of the 1994/95 Mexican crisis

By Jon Shields, Alternate Executive Director for the United Kingdom at the IMF, on secondment from the Bank of England. The views expressed reflect those of the author rather than those of the Bank of England, the UK Government or the IMF.

In this article, Jon Shields describes how the role of the IMF has developed since the Mexican crisis in 1994/95, which prompted the largest international support operation ever undertaken. He sets out the background to the crisis, including the rapid expansion of international capital markets, how the crisis was resolved and the lessons learned from it. Since then, the Fund has acted to improve the quality and extent of data that countries provide, and to enhance its own surveillance. It has also improved its procedures for allowing rapid financial support to be given and taken steps to ensure the adequacy of resources available to the Fund. Two possibilities still under consideration by the Fund are identified: burden-sharing with other creditors and adding the liberalisation of capital controls to the Fund's objectives. Jon Shields concludes that though risks remain, the changes made by the Fund have put it in a better position to deal with another crisis such as that in Mexico.

Background

On 1 February 1995, the IMF agreed a standby credit to Mexico of nearly $18 billion. At the same time, the US government agreed credits worth a total of $20 billion. This was the largest international support arrangement ever made; the Fund's contribution exceeded its normal guidelines for credit ceilings by a factor of nearly five.

Many of the circumstances leading up to these arrangements were unique to Mexico. But the size of the support provided and the fact that Mexico had previously been regarded as an example of successful economic adjustment—and had recently joined the OECD—encouraged a wide-ranging debate about the criteria by which countries' success was judged and how to give assistance. This debate took place against the background of ever-growing international capital markets, as described in the box on page 302.

In particular, questions were raised about the role and power of the IMF in the context of massive flows of private capital:

- Why had the Fund not been able to warn Mexico of the risks that it faced?
- Was the Fund's analysis sufficiently penetrating to provide warning signals of changes in market confidence?
- Were the markets properly supplied with information?
- Should the Fund be using its financial resources to attempt to change the direction of large capital flows?
- Were the Fund's resources sufficient to contemplate such action in the future?
- Had the policy prescriptions applied with Fund support during the late 1980s and early 1990s been at fault?
- Did the Fund need new financial facilities?
- Were there structural problems in international capital markets that threatened coherent policy-making?

These issues are all still very much with us. But the Fund and the international community have made considerable progress over the last two-and-a-half years in identifying possible weaknesses in approach and developing ways of responding to potential problems. The Fund in particular has adjusted its attitudes and activities in several crucial areas.

The central questions have been whether the international financial system has changed fundamentally during the last decade and, if so, whether the Fund has adapted quickly enough. As markets have opened up and the role of international private finance has been seen as increasingly beneficial, differences of opinion have widened over whether public institutions can and should exercise power over global capital flows. Some have warned that governments and inter-governmental institutions need to reassert their capacity to prevent unfettered markets exercising too much influence over domestic policies. Others have seen free, well-informed markets as instruments that are always more efficient than public sector agencies at allocating resources and putting pressure on governments to adopt responsible domestic policies. In between are those

Capital flows

Financing in international capital markets (defined as the sum of new international loans, notes, bonds and equities) has tripled over the last eight years in dollar terms. This dwarfs official flows.

In industrial economies, the predominance of prudent monetary policies, the elimination of capital controls, a willingness outside the ERM to permit exchange rates to float freely and the proliferation of instruments and intermediaries (including other central banks) to provide credit have all but eliminated calls for co-ordinated international support or IMF finance in times of difficulty.

This is not yet the case for emerging markets or poorer developing countries. Nevertheless, the options for using private rather than multilateral official credit have increased substantially. As countries with market access have used these options more and more effectively in good times (through inward direct investment, bank credit, public or private foreign currency bond issues or external purchases of domestic currency securities, as well as private equities), so the potential to cover large financing gaps in bad times has also increased. Such financing can be risky, but it is generally possible to organise as long as some measure of confidence is maintained and other shocks have not imperilled the supply of funds. Meanwhile, there has been a five-fold increase in total private net capital flows to developing countries and countries in transition in the last six years, albeit concentrated on a handful of Asian and Latin American countries.

The composition of private capital flows has also shifted. In the 1970s, international banks provided much of the private capital resources to the public sectors of the faster-growing developing countries, through foreign currency loans carrying explicit guarantees from the governments of the borrowing country. Policies of high growth seemed certain to assure timely repayment and the banks had adequate funding, particularly through the recycling of petro-dollars. But borrowing countries' abilities to maintain financing of their loans proved very susceptible to appropriate domestic policies and external shocks, especially commodity prices and international interest rates. By 1982, many countries (in particular in Latin America, most clearly Mexico) were unable to continue to service their interest payments. The resultant crisis was, however, responsive to action by the international financial community and creditors together, though over a long period and at considerable cost to the debtor countries. Support operations provided new official finance while protracted negotiations opened with the major banks to agree on terms to settle outstanding claims and eventually open the way to new private finance.

The lesson that reliance on floating-rate and essentially short-term bank debt could dangerously increase the vulnerability of both emerging markets and banks was learned effectively by both borrowers and lenders. Banks became much more wary. Securitisation seemed a safer option. Bond markets grew more extensive and more sophisticated with greater resources available. So as countries emerged from the debt crises of the 1980s, with more liberalised systems and macroeconomic policies centred on a prudent fiscal position and steady monetary growth, they turned increasingly to international bond markets.

This formed part of a general surge in portfolio inflows into what were by then termed 'emerging markets'. In 1990, nearly one third of such inflows were from bank and other credits. By 1993, this share had dropped to one fifth.

who want to see markets with a dominant role but who are anxious to ensure that market failures do not cause excessive volatility; furthermore, if countries make mistakes, they want the speed and cost of correction to be optimised through official assistance.

Under the 'minimalist' approach, the IMF would simply provide information and advice to member countries and markets, and possibly facilitate private sector support. Under the 'interventionist' approach, it would continue to provide finance as needed, conditional on the implementation of sounder policies.

The Mexican crisis

Mexico in the early 1990s benefited considerably from the rapid development of international capital markets. Between 1990 and 1993 it received net capital inflows worth about 8% of GDP per year and totalling $91 billion, about one fifth of all such inflows to developing countries. Two thirds of Mexico's net inflow was portfolio investment.

During 1994, external holdings of short-term public sector debt rose particularly rapidly. This partly reflected a major shift in debt management policy. As uncertainty about domestic developments pushed domestic yields higher and external financing needs rose in the face of a current account deficit approaching 8% of GDP, the Mexican authorities issued a new form of short-term debt, the 'tesobono'. These bills, though formally designated in local currency, with high peso yields, contained exchange rate guarantees that made them equivalent to high-yield US dollar debt and hence very attractive to foreign holders. By the end of the year 85% of the $20 billion of foreign holdings of Treasury bills were in tesobonos and total short-term external debt (maturing within a year) exceeded $67 billion. Meanwhile,

Mexico's gross foreign exchange reserves declined from $30 billion in February 1994 to $6 billion in December.

Even if confidence had remained high, it would have been difficult to service this short-term debt through new borrowings. But the announcement of a 15% devaluation on 20 December sparked a widespread reassessment of Mexico's position. Markets and international authorities quickly came to the view that Mexico would find it impossible to meet its obligations without a co-ordinated package of support and tighter policies. The peso and the domestic stock market crumbled.

So there were two issues at the heart of the Mexican crisis. First, the existence of massive foreign currency requirements in the short term, with no obvious sources of finance. Second, the collapse of confidence because of growing evidence that Mexico's economic policies had strayed from the prudent line on which its reputation had been rebuilt, and that its banking system was ill-prepared for currency shocks.

Linking these developments, and amplifying their effect, was a shortage of hard information to markets. There had been little recognition in the year leading up to the crisis of the extent of pressure on Mexico's reserves, or the means that it had used to fill the gaps. Moreover, the expansion of domestic credit had gone largely unnoticed. This meant that when the reassessment took place, it involved a major shift in perception over a very short period of time. There were also wide differences in understanding about the nature of the economy and policy formulation. Many domestic players were able to respond very quickly—some seemingly just in anticipation of the devaluation—leaving some international investors in panic at the rapidly falling markets.

Crisis resolution

In theory, some sort of 'market solution' should have been possible even in the depths of the crisis. A combination of reduced payments on debt-servicing obligations and firm undertakings on policy corrections might have provided the basis for new finance that could have seen Mexico through—albeit at the cost of a substantial devaluation, falling activity and higher future borrowing costs. But that would have been extremely difficult to organise with creditors widely dispersed and no way of binding the government on future actions. And with the ultimate level of compensation uncertain, individual investors might well have preferred simply to unload their stock as quickly as they could, a 'rush for the exits'.

To overcome such difficulties, the international community, notably the Fund and the US government, stepped in to provide sufficient finance to prevent Mexico from defaulting and to support the policy changes announced by the Mexican government. The problem was that such action also then 'bailed out' holders of tesobonos and similar securities. Though these holders had been receiving very high yields to compensate for the theoretical risks involved, when it came to the ultimate risk—of non-payment because of a currency crisis—they found themselves fully protected.

International support

The prime need was to restore market confidence at minimum cost to the international community. Risks were seen not only to Mexico itself but also to other countries in the region and in similar positions. Such contagion—the so-called 'tequila effect'—was evident from the earliest days of the Mexican crisis. Other Latin American countries, particularly Argentina and Brazil, saw falls in their stock markets and pressure on their currencies. Banking systems came under severe strains. Some Asian emerging markets, such as Thailand, also suffered the effects of reduced confidence, as investors retreated from these and other markets perceived to be similar in character to Mexico. The impact was accentuated by better returns in industrial economies. Some commentators even warned of 'systemic' risk if confidence failed simultaneously in a number of markets. A Mexican default on its debt was feared for its knock-on effects on all bond markets; and a return to exchange controls would have set back the liberalisation of currency markets by many years.

The credibility of economic adjustment was also an issue. Mexico had been seen as a great success story as it had adopted stability-oriented macroeconomic policies and structural reforms under IMF programmes and guidance. Low inflation, a predictable exchange rate and steady growth were seen as signs of stability, reinforced by the involvement of Mexico in the North American Free Trade Association (NAFTA). Membership of OECD was seen as further confirmation of Mexico's graduation from developing to industrial country status.

So the problems that Mexico faced in 1994 were viewed by the international community not as the consequences of a failed economic framework, but as arising from errors made over a relatively short period. With hindsight, it became clear that the exchange rate had been maintained at an unsustainably high nominal rate against the backdrop of a swelling current account deficit and higher inflation than its competitors. Rising US interest rates accentuated the problems. The policy mix had been wrong. Swings in market confidence caused by political events during 1994 (the Chiapas revolts and political assassinations) had not been addressed by coherent economic policy responses. The hiatus between the Presidential election on 21 August and the swearing-in of a new government on 30 November had allowed domestic credit to continue to expand rapidly. The restructuring of government debt towards short-term notes with exchange rate guarantees had been misconceived. Data to which markets had been accustomed during Mexico's programmes with the IMF (which finished in 1992) were no longer being made available; and there were serious weaknesses in the banking system associated particularly with loans to companies with high foreign exchange exposures.

A resolution of the Mexican crisis was particularly important to the United States because of NAFTA, common borders and mutual investments. But efforts by the US Administration to persuade Congress to provide substantial guarantees to Mexico (up to $40 billion) proved unsuccessful and were abandoned on 31 January 1995. These were to have been supported by a conventional, but nevertheless very large, Fund programme. The object was to demonstrate to the markets both that Mexico's short-term financing needs could be met and that the IMF and United States believed that Mexico's planned economic policies would be sufficient to stabilise the economy.

In place of the intended US support operation and an IMF package of $7.8 billion, the IMF agreed at very short notice—within two days—to increase substantially its own potential financial contribution to $18 billion, complementing $20 billion from the US Exchange Stabilisation Fund and promises of other support from the international community. The IMF contribution was in the form of a 'standby' arrangement, which made SDR 12 billion of foreign currency available in tranches over an 18-month period. The total amount of finance was seven times the size of Mexico's quota (or shareholding) in the IMF; normally, there is a ceiling on annual credit disbursements equal to the member's quota. In addition, a much greater proportion than normal of this credit was disbursed at the beginning of the arrangement.

Market turbulence continued for some time. Nevertheless, Mexico managed to service all of its outstanding obligations and re-enter private capital markets within a few months. By mid 1996, it was able to repay a substantial proportion of the US loan, to begin reimbursing the IMF and to give undertakings that it would not draw upon its remaining entitlement under the (extended) IMF programme. The costs of the crisis to Mexico were severe—recorded unemployment doubled, output fell by 6% in 1995, bank support operations cost 6½% of GDP and inflation surged for a while above 50%—but Mexico's recovery now seems to be well under way.

Lessons of the Mexican crisis

The Mexican crisis was particularly disruptive because policy errors were identified at a very late stage, after a rapid build-up of foreign currency liabilities. Efforts at preventing such crises in the future have therefore concentrated on providing better 'early warning indicators'. These rely on the timely provision of reliable information by country authorities and coherent assessments by markets.

The ability to judge whether policy is sustainable is also an issue. This is particularly important when price indicators have been suppressed, such as when fixed or crawling exchange rates are being used as anchors to policy. In addition, it is important to assess the capacity of the infrastructure, especially in the banking and wider financial sector, to withstand necessary policy adjustments, such as higher interest rates or fiscal consolidation.

If policies fail, restoring market confidence demands a coherent and substantial response by national authorities and the international community. They must be able to demonstrate that financing needs can be met in the short term and that effective policy corrections will be maintained over the medium term. This can only be done on a case-by-case basis.

Intervention must avoid creating problems of moral hazard. If some parties—particularly groups of creditors but sometimes also policy-makers in the affected countries—are seen to have been protected against the consequences of their errors, support operations will be questioned and market allocation mechanisms disrupted because of expectations of future bail-outs. Future actions will then prove even more expensive.

The Fund and other international groupings, such as the G7 and G10, have been looking in some detail at these issues and have taken a series of measures to help resolve some of the perceived deficiencies. These can be grouped under four headings:

- Better information (data and Fund assessments).
- Improved surveillance.
- Speedy financial support.
- Adequate resources.

Better information

(a) Data

The economic importance of private capital flows, which can sometimes be extremely volatile, makes it crucial that markets receive timely and accurate information about the economy and economic policy. This enables markets to adjust expectations continually, so that any necessary corrections to price or availability of finance can be made smoothly and consistently. Otherwise, assessments can change precipitously, and then price changes are more likely to overshoot and finance effectively to dry up. Similarly, if information is not shared widely, different assessments can lead to inefficient market allocations, and possibly a drastic correction once details are more widely disseminated.

Crucial data relate to the current account of the balance of payments, a country's gross foreign exchange reserves and the level and composition of its external debt. It is always tempting for authorities to try to cover up problems to avoid additional costs of finance or painful policy adjustments. Normally, however, such withholding of information simply delays the correction, which imposes higher total costs.

Most financing problems can be predicted on the basis of standard macroeconomic data and knowledge of the stance of economic policy. So timely publication will enhance the ability of both markets and domestic authorities to identify forthcoming problems. The Fund has for a long time

Special Data Dissemination Standard (SDDS)

The Fund's Special Data Dissemination Standard (SDDS) identifies a set of minimum statistical requirements for macroeconomic data. It is targeted at countries with, or seeking, access to international markets. Participation is voluntary; so far 42 countries have subscribed, including all the major industrial economies and emerging markets such as Thailand, Hungary and Mexico. Some countries are taking advantage of the transitional period (up to the end of 1998) to bring their data fully up to the required standards.

The SDDS has four dimensions:

(i) *Coverage, periodicity and timeliness*. All the main macroeconomic data sets are included: output, inflation, employment, fiscal deficits and accounts, public debt, monetary aggregates, interest and exchange rates, balance of payments, external reserves and external debt. Some should be reported daily; others weekly, monthly, quarterly or annually. The SDDS also specifies how promptly all data should be published.

(ii) *Access by the public*. The SDDS requires publication of release calendars and simultaneous release of data to all interested parties, so that access is easy and uniform.

(iii) *Integrity*. To allow users to assess how much confidence they should place in the integrity of the data, the SDDS specifies that they should be told how the data are produced; whether government is allowed access to data before publication, and comments on it on release; and when revisions are made to data or methodology.

(iv) *Quality*. Certain procedures that should give some indication about quality are specified, such as public documentation of methods and sources; and release of component details and reconciliations that allow cross-checks.

Information about all of the subscribing countries' data is available on a bulletin board that the IMF has established on the Internet. The address is http://dsbb.imf.org. There are now also hyperlinks to the actual data for a number of countries, together with a summary data page on the bulletin board.

advocated production of regular high-quality macroeconomic data and demanded the provision of such data if countries are pursuing IMF-supported programmes. Under its Article IV surveillance procedures, it has also documented the data available and pointed out weaknesses. But it has not in the past intervened very much in the public availability of data, other than to re-publish data in standardised format (sometimes with considerable delay) in its *International Financial Statistics*. Indeed, the Fund has no jurisdiction over the publication of statistics. It can only hope to use its influence to encourage good practice.

The Mexican crisis convinced the Fund that it should do more to encourage more consistent data provision. The result, after extensive debate about how to strike a reasonable balance between uniformity and flexibility, was agreement in April 1996 that the Fund would set up its own 'Special Data Dissemination Standard'. This sets minimum requirements for macroeconomic data in terms of coverage, frequency, timeliness, quality, integrity and availability. It was intended for countries which have or seek substantial access to international capital markets. Particularly important provisions under the data standard are the publication, within a week of the end of the calendar month, of monthly levels of international reserves and regular data on the balance of payments, monetary aggregates, fiscal accounts, inflation and growth. More than 40 countries (including Mexico and the United Kingdom) have already subscribed to this standard. Their procedures can now be viewed on the Internet. In addition, many have established links between the Fund Internet site and their own data (see the box above). Markets should now be able to identify any slippage in coverage quickly and put pressure on the relevant authorities to provide missing details.

The Fund has also tightened up its own requirements for data provision by countries. This ensures that surveillance is conducted consistently and deeply, and also warns a country's peers if there are important deficiencies. Technical assistance can be made available to help countries with poor data.

The Fund is also developing a 'General Data Dissemination System' that can apply to a wider group of countries, including those who do not at present rely much on international capital markets. The system is intended particularly to help such countries to improve the quality and delivery of their data. This will help them to focus their efforts and ensure that a basis is laid from which they can eventually meet the stricter requirements of the Special Data Dissemination Standard.

(b) Fund assessments

The Fund has become conscious of the need to make its own assessments more public, so that policy sustainability is accurately and consistently judged. The Fund's assessments cover both the state of a country's economy and judgments about the appropriateness of economic policies; they increasingly include structural, as well as macroeconomic, aspects.

The Fund has published an expanding range of material in recent years. For instance, in addition to its assessments of the *World Economic Outlook* and *International Capital Markets*, background reports on economies undergoing Article IV surveillance are now frequently made available. Under the Article IV procedures, consultations are held between staff and every member country, normally once a year. These start with a visit to the country by a small staff mission and conclude with a detailed staff paper, including an objective appraisal, and discussion in the Fund Executive Board. The consultations are designed to help each member evaluate its policies through peer review. Summaries of Article IV assessments are published in the Fund's annual report and often drawn upon in the monthly *IMF Survey*. Speeches or articles by Fund management provide further information, sometimes with clear warnings.

The latest innovation is a series of 'Press Information Notices'. These are published at a country's discretion, following conclusion of the annual Article IV consultations. They summarise background information about the economy given by Fund staff to the Executive Board and indicate the views expressed by the Board about economic and policy developments. They can include specific warnings about the direction of policy and make recommendations for change, although highly market-sensitive judgments are likely to be excluded.

Some have advocated going even further. They would like to see confidential staff reports also published. This would make the process more transparent. But in doing so it might also reveal details of discussions between Fund officials and Ministers and civil servants about the possible direction in which policies might develop. This might reduce the amount of information that officials were prepared to discuss with the Fund and thus the value of surveillance. If the trade-off is between transparency and quality, the choice at the moment is to preserve quality (though it is understood that openness might also improve incentives for higher-quality work).

Even more contentious is the suggestion that Fund management should give clear, public warnings if at any time they perceive a country's policies as being dangerously disruptive. Such warnings would be intended to have a powerful impact on policy-makers and markets. The risk of course is that markets might over-react. But an early correction by the markets might prove to be much less harmful than delayed reaction caused by a failure to identify policy errors and risks. It might also prevent unjustified contagion.

Sometimes it is as important for the Fund to issue general statements about policy as it is for it to make statements about specific countries. Messages about the necessity of sustainable fiscal policies, the value of freely convertible currencies and the importance of properly regulated banking systems have been clearly and regularly enunciated by Fund management. But the Fund has gone further than this in recent years. Following the 'Madrid Declaration' at the 1994 Annual Meetings about the immediate prospects for global economic policy, the Governors of the Fund (through the advisory 'Interim Committee') adopted a statement called the 'Partnership for Sustainable Global Growth' in October 1996. This promulgated what the Fund's Managing Director, Michel Camdessus, has called the 'Eleven Commandments' of economic policy. These make clear the importance of sustained fiscal discipline, open economies, market-friendly structural policies and good governance (see the box on page 307). They provide effective guidance for individual governments and important criteria for the markets, with the stamp of global approval.

Improved surveillance

The Fund recognises, however, that promulgating a message is not the only issue. The message itself must be timely, correct and absolutely clear. In the case of Mexico, there was a perception that the Fund—like the markets—had failed to see how risky the situation had become and had failed to warn the authorities clearly of policy errors. Though it was understood that the rising real exchange rate (resulting from a nominal exchange rate band and a relatively high domestic inflation rate) would be difficult to sustain against current account pressures, and that the banking system was not sufficiently robust to withstand large exchange or interest rate changes, the onset of the crisis caught the Fund largely unawares.

Ideally, the Fund's annual Article IV surveillance process would have identified the problems at an early stage and provided a vehicle for recommendations of policy changes. Under this process, Fund staff assess in detail the state of the economy, the policy stance and economic prospects. In addition to traditional concerns about macroeconomic policy, such as whether monetary policy can deliver a sustainable balance of payments position, if fiscal policy is supportive and what the impact is of any restrictions on the exchange rate on trade, staff are looking increasingly at structural policies. This reflects an appreciation that macroeconomic policy can only deliver high growth and low inflation if markets are not restrictive and public sector management is efficient. So labour, product and financial markets, public involvement in productive industry and governance considerations, including public spending control and fiscal transparency, have become important areas of interest.

The problem in the past was that, having assessed this information and come to a view on the sustainability of policies, staff would be wary of taking too obviously critical a line. Cautious about their judgments and conscious of political sensitivity, they would tend to wrap up the conclusions in 'Fundese'—a mixture of economic jargon and understatement. This made it too easy for national authorities not to hear the message.

Fund staff are now encouraged to be much more direct in their conclusions. Not only are they asked to focus their efforts on areas that might need improvement, but they are

The 'Eleven Commandments' of economic policy

In its 'Partnership for Sustainable Global Growth' statement, agreed in October 1996, the Interim Committee of the IMF declared that it attached particular importance to the following:

1. Stressing that sound monetary, fiscal and structural policies are complementary and mutually reinforcing: steady application of consistent policies over the medium term is required to establish the conditions for sustained non-inflationary growth and job creation, which are essential for social cohesion.

2. Implementing sound macroeconomic policies and avoiding large imbalances are essential to promote financial and exchange rate stability and avoid significant misalignments among currencies.

3. Creating a favourable environment for private savings.

4. Consolidating the success in bringing inflation down and building on the hard-won credibility of monetary policy.

5. Maintaining the impetus of trade liberalisation, resisting protectionist pressures, and upholding the multilateral trading system.

6. Encouraging current account convertibility and careful progress toward increased freedom of capital movements through efforts to promote stability and financial soundness.

7. Achieving budget balance and strengthened fiscal discipline in a multi-year framework. Continued fiscal imbalances and excessive public indebtedness, and the upward pressures they put on global real interest rates, are threats to financial stability and durable growth. It is essential to enhance the transparency of fiscal policy by persevering with efforts to reduce off-budget transactions and quasi-fiscal deficits.

8. Improving the quality and composition of fiscal adjustment, by reducing unproductive spending while ensuring adequate basic investment in infrastructure. Because the sustainability of economic growth depends on the development of human resources, it is essential to improve education and training; to reform public pension and health systems to ensure their long-term viability and enable the provision of effective health care; and to alleviate poverty and provide well-targeted and affordable social safety nets.

9. Tackling structural reforms more boldly, including through labour and product market reforms, with a view to increasing employment and reducing other distortions that impede the efficient allocation of resources, so as to make our economies more dynamic and resilient to adverse developments.

10. Promoting good governance in all its aspects, including by ensuring the rule of law, improving the efficiency and accountability of the public sector, and tackling corruption, as essential elements of a framework within which economies can prosper.

11. Ensuring the soundness of banking systems through strong prudential regulation and supervision, improved co-ordination, better assessment of credit risk, stringent capital requirements, timely disclosure of banks' financial conditions, action to prevent money laundering, and improved management of banks.

asked to be more explicit about their findings and recommendations. The emphasis is on selectivity in approach and frankness in presentation.

The last two years have also seen demonstrable changes in the conduct of the surveillance process. There has been increased coverage of capital account issues, seeking to identify pressure points, and intensified probing of financial systems, particularly the soundness of banks. Given the Managing Director's well-publicised assessment that 130 members have suffered significant banking sector problems since 1980 and that the next major crisis will almost certainly start in the banking system or be intensified by its condition, it is recognised that Fund staff must concern themselves with the robustness of the financial system, including regulation and supervision, and potential monetary and fiscal pressures arising from banking failures. The promulgation in spring 1997 by the Basle Committee of its 'Core Principles for Effective Banking Supervision' and more active co-ordination with the World Bank will assist this work in future; the Fund now has yardsticks against which to monitor banking frameworks. It has also devoted more of its technical assistance to banking issues (as well as to statistics).

Another sensitivity is the exchange rate regime being followed by a country in potential difficulty. Exchange rate anchors have often been supported in Fund programmes as part of an anti-inflation stabilisation mechanism for open economies. But such anchors can be vulnerable and the consistency of other policies and market confidence must be continually reassessed.

The cost of the Fund's administration is, of course, a constraint on what it can do. It has therefore become important to release staff resources from elsewhere to bolster the surveillance process for countries at risk. Consideration has been given to less frequent, or less intensive, consultations for countries where policies seem sound and where contagion or systemic effects are unlikely. Selectivity in surveillance of topics and countries will be increasingly important. But delays to Article IV consultations will be avoided: the circumstances that can often encourage countries to try to postpone consultations—such as elections, formulation of programmes, uncertainties about policy and volatile markets—are precisely those in which policy can easily be blown off course.

When countries are in serious difficulties, the surveillance process may need to be enhanced further. The Fund has shown itself to be more flexible in this regard recently. Additional missions have been despatched to assess progress or provide technical advice. These have been supplemented by more frequent reports to the Board. Authorities have found such timely, independent assessments very useful, particularly when the case for a disciplined approach has been facing internal political problems. Visits and letters by Fund management to heads of state and government have reinforced the message.

The Fund always needs to be ahead of the game: to spot which countries are most likely to be heading for crisis, in time for them to implement corrective policies. To help this process it has been setting up new internal arrangements to identify and discuss countries where sharp shifts in market sentiment may occur. As well as looking in detail at warning indicators (such as the simultaneous evolution of rising real exchange rates, growing current account deficits, large portfolio inflows, vulnerable banks and declining output growth), some staff are detailed to keep in close touch with market analysts and other sources to supplement the continuous monitoring carried out by area departments. Assessments of such countries are regularly reviewed by Fund management, who are then in a position to notify the relevant authorities or the Board as they think appropriate. The Fund management has shown a willingness to offer explicit recommendations on policy corrections.

Regular discussions by the Fund Board on world economic and market developments can also reveal problems in specific countries. The purpose of such multilateral surveillance sessions is to review general developments in international capital markets such as changes in major exchange rates, bond yields and spreads, and the overall direction of economic growth and policy. These sessions have become increasingly market-focused to help to identify pressure points or the need for policy adjustment.

Speedy financial support

Surveillance is, however, not the whole story. The Fund is also expected to be ready to contribute financial support (often as part of a wider rescue package) if things go wrong. For most countries, there will be a lengthy period of negotiation with the Fund to ensure that domestic economic programmes justify Fund endorsement and support. But where access to international markets has been shown to be volatile and there is heavy pressure on the exchange rate because of uncertainty about policy, it may be necessary to speed up agreement considerably and front-load the finance. Sometimes delays in support can impose considerable costs on the subsequent programme and may undermine its realisation. This was the risk in the case of Mexico: there was concern that, though there had already been a fairly protracted period of negotiation, the failure to agree a large package of support from the US Congress could have precipitated a much deeper reaction in the absence of a swift agreement and announcement of the final IMF programme.

In September 1995 the Fund Board agreed a new set of procedures that would allow programmes to be agreed very quickly, but which nevertheless ensured that the Board—and therefore all member countries—was kept more closely in touch with developments and negotiations than it had been on Mexico. The 'Emergency Financing Mechanism' permits an agreement to be drawn up by Fund staff within five days and approved by the Board within two or three days thereafter. It was used for the first time by the Philippines in July 1997.

Adequacy of Fund resources

The size of the Mexican programme raised some concern about whether the Fund had sufficient resources to counter further turbulence. Although the Fund was able to support the Mexican programme without difficulty, because of the very high level of Fund liquidity at that time, projections suggested for a while that the burden of this and other large programmes (such as for Russia) could put strains on liquidity in the near future. This led Fund management to press hard for a substantial 'Quota Review' to provide additional resources.

The argument that the increased volume of private capital transactions requires larger Fund resources is by no means obvious. Most capital transactions take place between countries that are unlikely to require Fund resources: no industrial country has requested Fund assistance since 1984. It is clear that capital markets have been able to provide finance to industrial countries without undue problems. Though borrowing has sometimes proved expensive for countries in difficulty, there have been no problems about availability. It can also be expected that as more emerging markets mature, capital markets will be able to satisfy their needs for emergency, as well as regular, financing. The Fund will at most have a 'catalytic' role, providing guarantees about policy while markets provide most of the finance. So the implications for Fund resources could run in either direction.

Nevertheless, no one wants to take unreasonable risks. The Fund Executive Board is currently debating the eleventh

Quota Review, which is designed to ensure that the Fund has adequate liquid resources to meet expected demands. But the size of global flows means that there is always the possibility of a large surprise. Even if problems originate in a relatively small emerging market, there could be risks of contagion to neighbouring or similar countries, and even possible effects on the global payments system if a large number of markets are affected simultaneously. This could be a particularly serious concern if weak banking systems are involved. So it makes sense for the Fund itself to be able to borrow if such cases materialise.

The IMF has had emergency borrowing arrangements in place for some time. The General Arrangements to Borrow (GAB) were first agreed in 1962 and last amended in 1983, but have not been used since. The GAB, together with a companion agreement with the Saudi Arabia Monetary Authority, allow the Fund to borrow up to SDR 18.5 billion ($25 billion) if there are threats to the international financial system. Following the Mexican crisis, the eleven member countries of the G10, (who make up the GAB), agreed to try to double the resources available. In conjunction with Saudi Arabia and another 13 countries, (mainly emerging markets, smaller European economies and Australia), they developed the 'New Arrangements to Borrow', with similar provisions to the GAB. Together, the two arrangements allow the Fund to borrow a maximum of SDR 34 billion (about $46 billion). These would, if mobilised, allow the Fund to double the amount of its credit outstanding from its end-1996 level. The Fund is also permitted to borrow from other sources if necessary.

Other areas under considerations

The Fund is still considering action in two other areas:

(a) Burden-sharing with other creditors

The possibility that an international support operation can result in private creditors being bailed out was addressed in the report of a G10 working group in the spring of 1996 on the resolution of sovereign liquidity crises. It considered whether, in the event of a debt-servicing crisis, it might be possible to arrange an orderly standstill on debt payments. This would permit a debtor country to negotiate on equal terms with all its creditors, with the objective of finding a deal that reduced its obligations but was sufficiently generous to allow the country to emerge from the current crisis without putting off any future creditors.

Such an arrangement would necessitate mechanisms to involve all bond holders or their representatives. This led the working group to suggest that the terms of sovereign bonds might in future allow for the possibility of standstills, and recognise explicitly the agreement of creditors to allow others to negotiate on their behalf. There could be an impact on yields because the risk of default would be more explicit, but more realistic pricing of this risk would improve resource allocation and discourage poor policies.

The report raises a set of issues arising from such orderly workouts. The Fund has undertaken to look at whether, in certain circumstances, it might be able to provide credit to a country that has suspended payments to its bond holders.

(b) Capital account convertibility

The growth in international capital markets has been fostered in part by the dismantling of controls over private capital flows. The United Kingdom abolished such restrictions between 1979 and 1981. The European Union agreed to dismantle them in the run-up to EMU, and capital movements between industrial countries are now generally free of restrictions. This has encouraged a much more efficient distribution of capital, supplemented savings where domestic capacity is low, and greatly facilitated the flow of trade and investment.

The international community is now largely convinced of the benefits of free capital movements, though there is still concern in some countries about the vulnerability this can produce. The Fund has been promoting the virtues of capital account convertibility for a long time, in its advice to member countries. Nevertheless, the Fund's Articles of Association, reflecting the post-war regime of controls, only deal with capital account movements in the context of permitting restrictions—and even advocating them in some circumstances, such as the provision of Fund credit. This is an anomaly, and attention is now being given to amending the Fund's Articles to align them more closely with current circumstances and to give the Fund appropriate jurisdiction. The amendments presently being considered by the Fund Board would introduce a new objective for the Fund: the liberalisation of capital movements. The Fund would also have jurisdiction over some capital restrictions, though it is likely to be accepted that there may be a need to impose controls for prudential and security reasons, or to use temporary measures to correct payments imbalances.

Conclusions

The Fund has shown an impressive ability to adapt in its 53 years: after the collapse of the Bretton Woods fixed exchange rate system in the late 1960s; since the 1982 debt crisis; and with the economic transition of the centrally planned economies including the Soviet Union in the early 1990s.

Although the Mexican crisis of 1994/95 did not have the same direct repercussions on the world economy, the questions it raised for the Fund were fundamental. Had the Fund been doing a good enough job in surveillance, its primary area of activity? And could (and should) it provide massive financial support to large countries facing sudden capital outflows?

The response on surveillance clearly recognised that some of the Fund's procedures were inadequate. It was not looking critically enough at early warning indicators of financial crises and not focusing sufficiently on the capital account or financial sector weaknesses (primarily in

banking). Moreover, its advice to member countries was couched in over-cautious language, and it had not attempted to deal with the markets' need for reliable, timely data and information about the Fund's assessments. It has now moved to remedy those deficiencies. Nevertheless, a number of issues remain. In particular, it is not clear that the right balance has yet been struck between preserving confidentiality and good relations with member countries, and providing clear and direct warnings to the markets.

On programmes, the international community has moved resolutely to ensure that the Fund can respond to emergencies. The Emergency Financing Mechanism now permits speedy and transparent procedures for Fund management and the Executive Board. The New Arrangements to Borrow, once ratified by the bulk of its participants, will supplement the resources that the Fund itself can mobilise. Meanwhile, though Fund liquidity remains fairly high, the Quota Review is considering whether further capital needs to be provided by member countries.

In providing for such resources, the international community is acknowledging that private markets cannot smoothly resolve all financing issues by themselves. But open capital markets are perceived to offer gains for all, and the Fund will almost certainly be called upon to promote full capital account convertibility.

The policies recommended to member countries by the Fund have been widely endorsed and encapsulated within the 'Partnership for Sustainable Global Growth'. Problems are increasingly attributed to a failure to implement these policies with sufficient rigour rather than to deficiencies in the policy design. The Fund has therefore chosen to reinforce rather than change the message.

The Fund's ability to prevent or mitigate the effects of international financial crises is limited to its persuasive powers and the leverage of the programmes it supports. It is now better equipped in both these areas. But innovation will continue to be necessary as markets develop, resources shift across the world and policy-makers reassess the choices facing them.

The euro area from the perspective of an EU central bank

*The **Deputy Governor**[1] reviews the UK position on the proposed euro area and concludes that recent changes, including the operational independence to set interest rates given to the Bank of England, should make the relationship between the United Kingdom and the euro area, if it comes into being in 1999, constructive and stable. The **Deputy Governor** notes the considerable progress already made by the EMI towards developing payment systems for the euro area, but highlights the outstanding policy issue of whether intra-day credit should be made available to EU countries not included in the first wave of monetary union. The **Deputy Governor** argues that no such discrimination should be applied, in the interest of the efficiency—and hence attractiveness to potential users—of the system and to avoid unnecessary costs to commercial banks within the euro area.*

I am honoured to have been asked to speak at today's important conference. The development of a Europe-wide payment system is one of the most important challenges that still faces the European Monetary Institute (EMI) and its successor, the European Central Bank (ECB). And I congratulate the Bundesbank on having organised the day, with a collection of important contributions from around Europe, which ought to advance the issue significantly.

I have another particular thing for which to be grateful to the Bundesbank: the title of my contribution today, 'The euro area from the perspective of an EU central bank'. This title is pregnant with constructive ambiguity. It suggests, delicately, that the UK perspective on the euro area might be an external one, but of course without exactly saying so.

I am not in a position today to resolve that ambiguity for you. You will all have seen, I hope, that the attitude of our new Government to the European Union is an entirely constructive one. The Prime Minister and his Foreign Secretary have said that they wish to lead in Europe, and not to criticise from the sidelines. I think that message has been fully understood in Germany, and elsewhere.

As far as monetary union is concerned, however, no firm decision has yet been made. The Chancellor of the Exchequer has said that he is sympathetic in principle to the idea of a single currency for the whole of the European Union, as long as it is well-founded in sustainable convergence. And we can say that the United Kingdom's policies are likely to deliver fiscal convergence this year. The Chancellor has already said that he plans to stick with the public expenditure plans of his predecessor. And most economic forecasters believe that the Government will achieve the deficit convergence criterion this year, without any special accounting measures, and without the Chancellor needing to pay a visit to the vaults of the Bank of England.

Furthermore, you will know that the new Chancellor has granted the Bank of England operational independence to set interest rates. The first meetings of the new Monetary Policy Committee took place last night and this morning. I do not wish to imply that this change in the statute of the Bank of England, which will soon be put into legislation, renders us immediately Maastricht-compatible. It does not, and the Chancellor has emphasised that this is a British solution to a British problem. Nor do I wish to imply that the United Kingdom is likely to join in 1999. The Prime Minister has said that it is highly unlikely.

What is important to note, though, is that there is no question of the United Kingdom pursuing a disruptive, inflationary monetary policy outside the euro zone, if that is where we find ourselves in 1999. The Bank of England will, we are told, be given an inflation target that will be at least as tight as the 2.5% or less regime within which we have been operating in the last few years, and you may take it that we will do our very best to meet that. So the concerns that have been expressed about the potential behaviour of the United Kingdom as a 'pre-in' country not yet in the euro zone are, I think, wide of the mark (or should I now say, wide of the euro?).

I note, in passing, that we have heard rather less in recent months of the criticism current in 1994 and 1995 that the United Kingdom was engaged in competitive devaluation. Of course, just as we rejected the charge when it was applied to us, on the sound economic basis that it was impossible to achieve competitive real devaluations by monetary policy means, so we would not dream of implying that any other countries were engaged in such a policy now.

My conclusion from all this is that the recent changes have put the United Kingdom into a position where its relationship with the euro zone, if it comes into being on 1 January 1999, should be constructive and stable. There is no question of our pursuing destabilising policies on the

(1) At a seminar on 'The future of the payment system—reality and visions for Europe' organised by the Bundesbank in Frankfurt on 6 June 1997.

outside. I think that is an important background against which to consider the payments and settlements issues that are the subject of today's conference. I therefore make no apology for having spent a little time on these broader contextual questions before coming to the specifics.

Let me now turn, therefore, to the development of payment systems for the euro area.

I should begin by saying that, in most respects, we believe that a considerable amount of progress has been made by the EMI in the last couple of years. It has not been a straightforward exercise. It has required a high degree of collaboration between many central banks around Europe who operated a variety of different domestic mechanisms. That did not make the task of achieving appropriate and efficient linkages particularly easy. But in spite of these obstacles, a lot has been achieved already. Plans for the TARGET system, interlinking real-time gross settlement (RTGS) systems around Europe, are very well-advanced and, while we must all have doubts about the extent to which our systems will be fully ready for the great day, we are modestly optimistic.

Nonetheless, there are some outstanding policy issues on which firm conclusions have not yet been reached. Some are in the process of being addressed, like the question of how to charge for cross-border transactions. But one that troubles us particularly—the question of intra-day credit for countries potentially outside the euro zone but inside the European Union—has not yet been fully resolved.

We have argued, as you will know, that there should be no discrimination by the 'ins' against the 'pre-ins' and that intra-day credit should be available throughout the European Union. Others have argued that pre-ins should not have access to such credit, invoking a number of arguments related to monetary policy in support of that contention. We believe these arguments to be wrong and, furthermore, that to restrict the pre-ins' access to intra-day credit would be damaging for the euro zone itself. I would like to trespass on your patience for a few moments today to explain why we take that view.

But first, just a word about RTGS systems in general.

Central banks like real-time settlements systems. They promote them because they eliminate interbank receiver risk. TARGET is, in essence, automated correspondent banking between central banks, and offers the opportunity of extending that reduction in risk to cross-border payments. Banks will be able to make euro payments between themselves and the domestic RTGS systems as they do now in any other currency. If they wish to make a cross-border euro payment, their central bank will act as correspondent. It will debit the commercial bank's account, convert the payment message into the format used for the link between central banks, and send it through that network. The receiving central bank will automatically credit the receiving commercial bank's account. That commercial bank will be informed of the receipt through the second domestic RTGS system, and can then credit the customer. To central banks, this all sounds terrific.

Commercial banks, on the other hand, like the speed of real-time systems but do not generally prize highly the settlement finality that they offer. RTGS systems are more costly for banks because they have to offer collateral to secure their intra-day exposures. As a result, commercial banks often choose netting arrangements rather than gross systems. For example, they may choose CHIPS rather than Fed-wire in the United States, or EAF2 rather than EIL-ZV in Germany.

It follows from this that central banks have to work hard to market the benefits of RTGS systems if they are to wean commercial banks away from these other, cheaper but more risky, methods of payment.

The comparative advantage of TARGET over the EBA's proposed netting system and the correspondent banking mechanisms themselves is intra-day finality and speed. It will therefore be promoted as a premium service. But it will have to be at least as economical, robust, reliable and efficient as its competitors if it is to attract business. This is where the intra-day credit issue assumes importance for everyone, and not just for the pre-ins.

If there are restrictions on access to intra-day credit, it will have the effect of delaying payments, initially from out banks to in banks. There will be grit in the mechanism of RTGS that will have the effect of slowing payments down throughout the system. Out banks may wait for incoming payments from in banks before making their outgoing payments. This implies that commercial banks in the euro area will have to wait longer for their incoming payments, and may themselves have to delay their outgoing payments. Alternatively, they may obtain the intra-day credit necessary to make the system work efficiently and therefore have to bear the cost of the necessary collateral. Restricting intra-day credit to out banks, therefore, has the effects of:

- making TARGET payments and receipts slower for all participants, thereby undermining the principal marketing advantage of the system; and

- making the commercial banks within the euro zone bear a disproportionate share of the costs of obtaining intra-day credit.

By contrast, if intra-day liquidity is freely available throughout the system, the incentive to delay payments will be much reduced. The system will be faster and more reliable, and the cost of collateral will be more evenly shared by all participants, making it more attractive to everyone. TARGET would, as a result, be likely to have higher volumes, which would in turn allow it to charge a lower price, further reinforcing its status as the system of choice for high-value cross-border euro transfers.

These arguments seem to us highly persuasive. Why have they not yet won the day?

Some people argue that there is a competitive dimension that comes into play here—that restricting access to intra-day credit for out financial centres may make business gravitate towards financial centres within the euro zone. But such motives would run entirely counter to the spirit and perhaps the letter of the Single Market, so I am sure they are not at issue.

But it is also argued that there is a monetary policy question—that if central banks in non-euro zone countries are able to generate intra-day credit in euros, this will complicate monetary management for the euro zone as a whole. How can a monetary union allow credit in its currency to be created outside its borders?

This argument has a kind of commonsense feel to it when simply stated. But we do not believe that it stands up to rigorous scrutiny. Indeed, in our view there are no monetary policy issues that arise from the provision of intra-day liquidity in itself.

Moreover, it is increasingly understood internationally that the supply of intra-day credit has no implications for monetary policy. This is because such credit has to be repaid before the end of the day, and thus intra-day liquidity conditions have no bearing on the overnight or longer-term interest rates.

If intra-day liquidity did, however, spill over by accident into overnight liquidity, then clearly monetary policy conditions could in theory be affected. The actual effect would depend on the size and persistence of the spill-over and on the way in which monetary policy was being implemented. In the UK system, as in the proposed system of European Central Banks (ESCB), the focus is on steering interest rates. Managing liquidity is a tool, rather than an end in itself. So spill-overs matter only to the extent that they affect interest rates. In practice, our system and the proposed ESCB system are both built on the assumption that there will be shocks to the demand for, or supply of, liquidity and the systems incorporate mechanisms to provide overnight liquidity, quasi-automatically, to prevent disturbances to interest rates. The proposed ESCB lending facility is one such mechanism. Averaging reserve requirements would be another.

No one seems to suggest that the provision of liquidity overnight through the lending facility to a bank in the euro area, at its initiative and at a penal rate of interest, will undermine the ECB's control of monetary conditions. On the contrary, the facility is designed to help the ECB retain control.

Spill-overs from intra-day liquidity would have identical monetary effects to those from the provision of overnight liquidity through standing facilities. So perhaps on those grounds alone we should not be excessively concerned about them. Nonetheless, it is highly desirable that liquidity provided to payment systems and operations designed for monetary policy purposes are kept separate. So we have always accepted the need to minimise the risk of spill-over as far as possible. In the United Kingdom, we do this in two ways. We apply an earlier cut-off after which no customer payments are accepted by the CHAPS banks. And we apply penal rates to any overnight credit required to prevent a bank that has failed to balance its books by the end of the business day from going into overnight overdraft. So we make it uneconomic for borrowers to turn intra-day credit into overnight credit.

These are theoretical arguments, about the construction of the system. But we can go one better than that, because we now have had one full year of operation of our own domestic RTGS system, which was introduced in April of last year. What has been the experience during that time?

In fact there have been just ten days when the settlement banks collectively were overdrawn at the end of the day as a result of a failure to manage their own liquidity. On none of these days was there anything at all extraordinary or difficult in the behaviour of the money market. On the day of the biggest spill-over, when it was 0.16% of throughput that day, the overnight rate traded very close to our dealing rate until after our last round of operations, and then moved up to around the higher rate at which we were providing overnight liquidity. So if the concern is that spill-overs lead to lax monetary conditions, our experience indicates clearly that such a concern is misplaced. We have experienced no impact on any longer-term rates that might be more directly relevant to the transmission of monetary policy. Our conclusion is that transitory spill-overs, which are anyway few and far between, and small, are irrelevant to monetary conditions.

In our view, there is no reason why penal rates and early cut-off times should not be just as effective in the context of TARGET as they are in domestic systems. Nor why they should not be applied equally to ins and pre-ins. The monetary policy implications of any spill-over would be identical whether it occurred inside or outside the euro area. There is nothing inherently more damaging or difficult to manage from a spill-over on the outside. Nor is there any reason why intra-day liquidity outside is more likely to crystallise into overnight credit than it is inside. Indeed, our view is that in practice the likelihood of a spill-over may be greater within the euro area, since in banks will have an automatic right to translate intra-day credit into overnight credit through the ESCB lending facility. And no one, certainly not the Bank of England, is arguing for outs to have access to such a facility.

Our firm view, therefore, is that restricting the pre-ins' access to intra-day credit to pre-ins is both unfair to the pre-ins and an own goal on the part of the ins. This ought to mean that it will not happen. But so far we do not seem to be in a position where that conclusion is generally accepted.

So we need to consider what we would do were restrictions to be imposed after 1 January 1999.

Our view on that is clear. We will ensure that banks operating in the London market will be able to make cross-border payments in euros throughout the euro zone. There are a number of ways in which they could do that. We could provide access to TARGET with appropriate intra-day liquidity provided by the Bank of England. Or we could arrange for euro settlements to take place in London through correspondent banking connections or the successor to the ECU Banking Association clearing. But we still believe that if restrictions are imposed on pre-ins, the whole system will not be as attractive as it would otherwise be. This is because banks are less likely to plan to use TARGET if they are uncertain about the conditions of use, or indeed about the policy motives of its architects. But we will certainly ensure that UK-based banks are not competitively disadvantaged if the United Kingdom is not in the first wave of EMU participants. And we hope they will choose to use TARGET. That will only happen, though, if we EU central banks have made it so efficient that it becomes the system of choice for high-value payments.

But, as our new Prime Minister has made abundantly clear, we do not wish on this or any other issue to be on the sidelines of Europe. So we very much hope that some of our colleague central banks will reflect on the arguments we have advanced here and elsewhere, and that we can still collectively reach a solution that suits everyone.

Reforms to the UK monetary policy framework and financial services regulation

*The **Governor** welcomes[1] the Chancellor's decision to give the Bank operational responsibility for delivering price stability as defined by the Government's inflation target. He argues that, like the Chancellor, he does not see a conflict between monetary policy directed at price stability and the wider economic goals of growth, employment and rising living standards. On the reform of financial services regulation, the **Governor** notes that, all around the world, there has for some time been a debate about the most effective structure, and that there is no single, or even predominant, model in place. Arguments can be made for and against the various structures, but in the final analysis the success of regulation is determined not by the structure itself, but by the way in which regulation is managed within that structure.*

Several congratulations are in order Chancellor, and in particular on your spectacular beginning in office! Much of the comment following your statement on 6 May—when you had been Chancellor for four whole days—focused on the institutional change that you announced, giving the Bank of England, through its new Monetary Policy Committee, operational responsibility for delivering price stability as defined by the Government's inflation target. And that institutional change certainly is important—not least to the Bank! But the *real* importance of the institutional change was that it demonstrated, as clearly as anything could have done, your commitment to stability and long-termism in the British economy.

In defining his inflation target this evening the Chancellor has set the Bank a challenging objective. The technical implementation of monetary policy is not at all an exact science. It operates with long and unpredictable time lags so that we are necessarily continuously straining to peer into the future, relying substantially upon uncertain economic forecasts and carefully considered, but ultimately subjective, judgments about the balance of probabilities—and of risks—surrounding them. So I welcome the Chancellor's detailed reformulation of our marching orders, which acknowledges the volatility of the real world.

Not that I am already looking for excuses! On the contrary, I welcome unreservedly, too, the Chancellor's recent nominees to the Monetary Policy Committee who will participate in making the necessary judgments. Together with our inside team I could not ask for a professionally better-qualified team to take on the important responsibility entrusted to it. The Chancellor has given us every chance to succeed and we are all looking forward to the challenge.

I am well aware that some observers have been concerned that, in exercising its new responsibility, the Bank will adopt an unduly cautious approach, thereby imparting a restrictive bias to the economy. That will *not* be our intention. The new inflation target makes it amply clear that, in setting policy, we are to aim consistently at 2½% as a *mid*-point. And that, of course, is what we shall endeavour to do. Operationally it implies that, with a balanced distribution of risk, there should be an even chance of an outturn either above or below 2½% at the end of our two-year forecast horizon. The measure of our success will be how close we in fact come to 2½% on average over time.

Other observers go further, arguing that there is a more fundamental conflict between monetary policy directed at price stability—however precisely that is defined—and the wider economic goals of growth, employment and rising living standards. The Chancellor has demonstrated through his decisions that he does not share that view. Nor, emphatically, do I.

That is why I have made a point on these occasions of drawing attention to *both* the rate of growth of output *and* the rate of inflation. Two years ago I reported to you that the rate of growth of output (measured by annual GDP growth in the year to the first quarter) had exceeded the rate of inflation (measured by the GDP deflator) for two years in succession—for only the second time since the war. Last year we very narrowly missed a hat-trick. But this year I can tell you that we have done it once again, which is a very encouraging performance.

It means that, for the whole of the five years since we began to move out of recession, annual output growth has averaged 2.7%, and so too, on this measure, has the rate of inflation. Meanwhile, claimant unemployment has almost halved since 1992, to yesterday's figure of some 1.6 million. That figure—even taken at face value—is still much higher than we would all wish to see, even though it is very much lower than in every other major country within Europe.

The point about these figures is that they do surely now demonstrate that there is no conflict—certainly no necessary conflict—between growth and price stability in the medium term. What in fact monetary policy is trying to do, in order

(1) In a speech given at the Lord Mayor's Dinner for Bankers and Merchants of the City of London on 12 June 1997.

to maintain price stability, is to keep overall demand growth continuously in line with the growth of the supply-side capacity of the economy to meet that demand—no more, no less. If we are successful, there is no reason why the economy should not continue to grow at around the underlying rate of capacity growth. Monetary policy can contribute to underlying capacity growth, indirectly, by maintaining stability in this wider sense. But capacity growth depends much more directly upon the whole range of structural, supply-side factors, including labour market flexibility and welfare reform, as both the Prime Minister and the Chancellor have recently argued to their European colleagues.

Just two weeks after his initial announcement, the Chancellor announced a radical reform of financial services regulation. This included the eventual creation of a super-SIB, to which *inter alia* the Bank's present responsibility for banking supervision will be transferred. These reforms, too, have since been much debated in the City, and perhaps I might conclude with a few observations on them from the Bank's perspective.

There has now for some years, all around the world, been a continuing debate about the most effective structure for financial services regulation. It is driven partly by the rapid changes that are occurring in the financial services industry itself—as a result of innovation and globalisation which are having the effect of blurring the boundaries between traditionally distinct forms of financial intermediation. And it is driven partly, too, by a rising tide of public expectations in terms of both the prudential and the behavioural standards required of financial intermediaries.

What is clear from this broader, international debate is that there is no single, or even predominant, model for the most effective structure of regulation that fits all cases for all time.

In the case of banking supervision, there is around the world a spectrum of arrangements, ranging from our own present arrangements, where supervision is wholly within the central bank, through various forms of banking commission with closer or more distant relationships with the central bank. Separation of responsibility for banking supervision from central bank responsibility for the overall stability of the financial system as a whole is not in itself at all unusual. There are certainly powerful arguments for such separation.

Banking supervision—the setting of minimum prudential standards and endeavouring to ensure that they are respected—seeks to reduce the risk of failure in each individual bank, primarily in the interests of protecting depositors. This is not, I have to say, a natural habitat for central banks, which have traditionally been primarily concerned—long before the first Banking Act was introduced in 1979—with seeking to prevent financial problems that may arise in one bank or in one or other of the financial markets from infecting other, otherwise healthy, institutions or markets. Combining these two conceptually distinct responsibilities, for banking supervision and for maintaining systemic financial stability, in one authority can (certainly in principle) result in a conflict of objectives and produce a 'cross-eyed controller'.

On the other hand, combining the two responsibilities within the central bank does have certain practical advantages. Central banks need a great deal of information about banks' balance sheets and behaviour, in relation to their monetary policy responsibilities—money is after all uniquely a liability of the banking system. And they clearly also need such information in relation to their responsibility for maintaining systemic financial stability—where banks remain of special importance because their balance sheets are still typically dominated by highly liquid deposits financing less liquid assets, which makes them especially vulnerable to a rush for the exit if there is a loss of confidence.

Weighing these considerations, I can see the case for separation on grounds of the potential conflict of objectives. And I certainly will not mourn the passing of the criticism—whether or not it is justified—that is visited upon the banking supervisor whenever a significant bank does in fact fail, as will inevitably happen from time to time. The key question now is how best to minimise the practical disadvantages of separation, in terms of the Bank's responsibilities for monetary and systemic financial stability, by ensuring that we preserve very close links with the super-SIB, particularly those within the SIB who will have responsibility for banking supervision. I have no doubt that we shall indeed be able to establish the necessary close relationship—in our mutual interest—not least because the new super-SIB will be headed by our own Deputy Governor, who will be taking many of our own banking supervisors with him.

Let me say, finally, a word about the super-SIB itself, where the arguments are not dissimilar. Again there is no universally applicable model, but no one who has had anything at all to do with our present 'confusion' of financial services regulators could fail to see the attraction of a single, all-purpose, regulatory body. It will undoubtedly clarify, to both the public and the regulated, where responsibility lies; and it should also be easier to resolve tensions between different regulatory approaches, where they emerge, under one roof. But here too there are potential practical disadvantages in a mega-regulator. It could become over-bureaucratic. It could mean a move towards a standardised, one-size-fits-all, approach to regulation. Or it could fail to maintain an appropriate balance between its responsibilities for protecting consumers and the need to allow competitive financial markets to breathe. These are certainly potential dangers. But they are not inevitable. In the final analysis it is not the regulatory structure that determines the outcome, but the way in which regulation is actually managed within that structure. Again in this context I am encouraged that Howard Davies is to become the first Chairman of the super-SIB. Howard is

very conscious of the dangers I have described—and of the need to consult widely within the financial services industry as he moves ahead. He has a huge job in front of him, but I cannot think of anyone more likely to succeed. He has my strongest possible personal support as well as that of the Bank as a whole.

Monetary policy in Britain and Europe

*The **Governor**[1] reviews the recently announced changes to the UK monetary policy framework, in the context of the approach to economic management throughout Europe. He identifies a broad consensus on the need for monetary policy to be directed towards stability and sustainability in the medium and longer term, and a growing recognition of the importance of supply-side flexibility. The **Governor** compares the new UK monetary policy arrangements with those planned for Europe, and concludes that the essential similarities are much greater than the differences. He warns, however, of the potential risk to monetary union posed by very high and differing rates of unemployment in the European Union.*

I was delighted to have been invited to deliver the sixteenth Mais Lecture—until some two or three months ago when you asked me to suggest a title! I confess that at that stage, I had not really thought of what I should talk about. So I offered you the portmanteau title of 'Monetary policy in Britain and Europe', hoping that something would turn up either here or on the Continent to give some topicality to what I might say. Well happily, Vice Chancellor, it has. On 6 May, just four days after taking office, the Chancellor of the Exchequer announced some radical changes to the monetary policy framework in this country, including changes to the role and constitution of the Bank of England. I should like to discuss some of those changes this evening against the background of the monetary policy framework being developed in Europe in preparation for the introduction of the euro, including the role of the future European System of Central Banks (ESCB). But I should like to discuss them in the context of the approach to economic management more generally in Europe and this country, and perhaps I might start with that.

Overall EU economic management

Sweeping generalisations are of course always dangerous. But from my particular vantage point at least, there has during the past decade or more been a clear change of emphasis—across Europe but much more widely internationally—*away* from short-term, macroeconomic demand management as the means of promoting the agreed objectives of economic policy (of growth of output and employment, and of rising living standards), *towards* the need for macroeconomic stability in the medium and longer term. Previously the implicit assumption appeared to be that the supply side of the economy would respond relatively flexibly to increasing demand. But there is now the perception that overambitious short-term demand management, which attempts to push capacity to its limits or even beyond, can generate instability and uncertainty, damaging capacity growth in the longer term by distorting economic decision-making in relation to, for example, investment or resource allocation.

The result is a broad consensus—across countries but also across a wide part of the political spectrum within countries—on the need for macroeconomic policy to be directed towards stability and sustainability in the medium and longer term. This consensus is reflected in the Maastricht Treaty through the famous convergence criteria. It is reflected, too, in the arrangements for the conduct of macroeconomic policy now being put in place for the introduction of the single European currency, including the monetary preparations for the European Central Bank (ECB), and the agreement on the fiscal Stability and Growth Pact recently confirmed by the European Council in Amsterdam.

But alongside this collective commitment to macroeconomic stability, there is a growing recognition that stability on its own is not enough. Though it may be a *necessary* condition for achieving sustainable growth of output and employment and rising living standards—the truly good things in life—and though stability may indeed be the most that macroeconomic policy can contribute in the longer term to those agreed objectives, it is not in itself a *sufficient* condition for achieving them. So attention everywhere is now focusing increasingly on the structural characteristics of our economies which essentially determine their underlying, supply-side, rate of capacity growth.

The issue is starkly illustrated by the fact that despite very substantial progress towards macroeconomic stability within the European Union as a whole in recent years—including real progress towards effective price stability (with measured inflation now below 2%) and strenuous efforts everywhere to cut back public sector deficits as required by the Maastricht convergence criteria—output has stagnated, growing at an average annual rate of only 1% or so over the past five or six years, and unemployment has risen inexorably, to around 11% across the Union as a whole. And though it is true that activity may now be beginning to recover, this is very largely driven by external demand, with the EU domestic economy still depressingly weak.

(1) In a lecture given at the City University Business School on 24 June 1997.

Against this background, the need for greater supply-side flexibility within Europe is increasingly widely acknowledged. And there are elements of common approach to bringing it about. These were reflected, for example, in the Resolution on Growth and Employment adopted at the European Summit in Amsterdam a week ago, which talks of the need to improve European competitiveness—with special attention to be given 'to labour and product market efficiency, technological innovation and the potential for small and medium-sized enterprises to create jobs'. It talks, too, of improving 'training and education systems, including life-long learning, work incentives in the tax and benefit systems and reducing non-wage labour costs, in order to increase employability'. But these policy approaches are not well-defined across Europe, and it is probably at this stage stretching a point to speak of even a broad consensus on specific approaches in this area. Even where particular needs for change have been identified nationally, recent experience in some countries suggests that there can be formidable resistance to bringing it about.

The new Government in this country is clearly joined in the European consensus on the need for macroeconomic stability; it too emphasises the importance of supply-side flexibility—indeed its thinking on supply-side issues clearly influenced the Amsterdam Resolution that I have just mentioned. To quote a recent article by the Chancellor:

> 'The Labour Government is committed to monetary stability so that businesses and families can plan for the future; to fiscal stability; and (on the supply side) to higher levels of investment in both people and business; to a modernisation of our welfare state, and, not least, to free trade and a constructive engagement in Europe.'

This country's approach overall to economic management is, therefore, wholly consistent with that of our European partners; and we start from a somewhat more comfortable position, in which our own recent progress towards greater macroeconomic stability has in fact been accompanied by somewhat stronger growth of activity—averaging over 2½% over the past five years—and by a sustained fall in unemployment to around 7¼% on a comparable International Labour Organisation basis.

Monetary management

Within this overall economic policy context, there is a particular commitment throughout the European Union to monetary stability; and I should like now to consider some of the very recent changes to our own monetary policy framework against that background.

Objective

I begin with the *objective* of monetary policy which, both here and on the Continent, is allocated specific responsibility for achieving and maintaining price stability. The Maastricht Treaty states that 'The primary objective of the ESCB shall be to maintain price stability. Without prejudice to the objective of price stability, the ESCB shall support the general economic policies of the Community...'.

In his statement to the House of Commons on 20 May, the Chancellor said: 'The Bank [of England]'s monetary policy objective will be to deliver price stability, and, without prejudice to this objective, to support the Government's economic policy, including its objectives for growth and employment.'

At this level, our respective missions are effectively identical. But it is important to understand that price stability is not simply an end in itself, but a means to the end of *sustainable* growth. What we are really, in principle, trying to do in maintaining price stability is to keep the growth of monetary demand more or less continuously broadly in line with the underlying capacity growth in the economy—in effect using price stability as an indicator of stability in the economy as a whole. And though we cannot hope to achieve that in practice with any great precision, we can reasonably aspire to help to moderate the economic cycle rather than (as so often in the past) to aggravate it.

The Maastricht Treaty makes no provision for any further definition of the ECB's primary objective. It is left to the ECB's Governing Council to determine how to interpret 'price stability' in any particular circumstance. Indeed the ECB will need to decide whether it has a specific target for inflation at all, or whether, operationally, it adopts an intermediate monetary target, or elements of both.

In the case of the United Kingdom it is the Chancellor who determines the precise inflation target, which he has set at 2½% for the retail price index excluding mortgage interest payments; and the Chancellor reserves the right, in extreme economic circumstances, to override the Bank of England's operational independence in seeking to achieve the Government's target.

In practice, in either case, the degree of latitude that these arrangements apparently provide is likely to be limited by the need to maintain the credibility of the commitment to price stability, with financial markets and with the public at large. But in the United Kingdom at least, where public support for monetary stability is more recently established than it is, for example, in Germany, the elected Government's public and explicit commitment to low inflation may provide reassurance, and help to secure greater acceptance of the policy.

In any event the Bank's remit under the new arrangements is unmistakably clear. We are charged with delivering the Government's inflation target. Operationally that means that we are to aim consistently to achieve 2½% on RPIX as a *mid*-point, so that, with a balanced distribution of risks, there should be an even chance of outturns either above or below 2½% at the end of our two-year forecasting horizon. The measure of our success will be how close we in fact

come to 2½%, not on any particular date, but on average over time.

Transparency and accountability

The clear separation of responsibility for setting the inflation target (the political decision) from responsibility for achieving it (the technical decision) also helps to ensure that the Government and the Bank are separately accountable for their respective roles in the monetary policy process. And in this area of accountability too, there are considerable differences between the arrangements that will apply to the ECB and to ourselves.

In the case of the ECB, the Treaty requires that it 'shall address an annual report on the activities of the ESCB, and on the monetary policy of both the previous and current year, to the European Parliament, the Council and the Commission, and also to the European Council. The President of the ECB shall present this report to the Council and to the European Parliament, which may hold a general debate on that basis.' In addition the ECB President and the members of its Executive Board may be invited, or volunteer, to appear before the competent Committees of the European Parliament.

In the case of the Bank of England:

- The minutes of the Monetary Policy Committee's (MPC) meetings to determine interest rates will be published, identifying how each member voted, with an explanation of why the individuals who voted against were opposed to the majority decision.

- The MPC's performance will be reviewed regularly by a reformed Court of Directors, and the Bank's *Annual Report* will be debated in the House of Commons.

- The Bank will continue to publish its quarterly *Inflation Report*, reviewing both the outturn and the prospect for inflation in relation to the target; and the Treasury Select Committee will take evidence from the MPC on the *Inflation Report*; and

- as Chairman of the MPC, the Governor is required to write an open letter to the Chancellor if inflation strays by more than 1% either side of the 2½% target. The letter would refer as appropriate to the *Inflation Report*, and explain why inflation was adrift, how long the divergence was expected to last, and the action taken to bring it back on course.

Taken as a whole, these arrangements provide for greater transparency of, and greater accountability for, the technical monetary process than anywhere else in the world.

Now I do not suppose, quite honestly, that anyone would particularly enjoy this degree of public scrutiny. But it will certainly help to concentrate the minds of the MPC members and it is, I believe, a necessary feature of our new arrangements.

The technical implementation of monetary policy, even with a very clearly defined objective, is not at all easy at the best of times. We have in practice a single instrument—the short-term interest rate—the precise effects of which on the economy are by no means perfectly understood, including by ourselves. We do know that it can take up to a couple of years or more to have its full effects. So we have to rely substantially on uncertain forecasts, which are subject to unforeseeable shocks. Policy judgments in these circumstances are necessarily an art rather than an exact science, no matter how much we apply science to informing those judgments. And the judgments themselves need to be constantly reviewed and frequently revised as relevant new information becomes available.

Transparency in these circumstances can only encourage a better informed public debate and a more sophisticated public understanding of the issues. That in turn can only help to strengthen confidence in the process—unless of course we make a frightful hash of it! I shall be surprised—and somewhat disappointed—if for similar reasons the ECB Governing Council does not go to considerable lengths to explain its policies to the public at large, even if it is not actually required to do so by statute.

The decision-making framework

Reflecting its multinational character, the policy-making body of the ECB, the Governing Council, will comprise the Governors of the participating country central banks plus the six members of the Executive Board. Our own MPC will comprise four 'outside' members directly appointed by the Chancellor, together with five Bank executives—the Governor, two Deputy Governors, and two Executive Directors. The common characteristic is that in each case the decision-makers will be professional experts rather than representatives of particular interests. Any doubts that this would in fact be the case in relation to the outside appointments to the MPC were certainly immediately dispelled when the names were announced: together with our inside appointees, they are, as a team, as well-qualified professionally for the task we have been set as I can imagine anywhere in the world—and we certainly need all the help we can get.

The processes of the Committee are inevitably still evolving. It will, as you would expect, be supported by the whole, considerable range of the Bank's monetary, economic, statistical and market expertise, supplemented by information from the Bank's network of regional agencies, with further front-line input both from the non-executive members of Court and from our wide range of industrial, commercial and financial contacts.

The Committee will be closely involved in the preparation of the quarterly *Inflation Report*, contributing to both the analysis and the forecasts. And of course, it will meet regularly on pre-announced dates each month—dates determined by the monthly cycle of statistical

information—to take its decisions on monetary policy. These monthly meetings are spread over three days: a whole-day meeting to receive briefings from the Bank staff on the latest developments; an afternoon meeting to identify and discuss the important underlying issues and any tactical considerations there may be; and a final morning meeting to decide upon any necessary policy action. The Committee will need also to provide for emergency meetings in the event of a crisis, but if we are successful in our task of achieving permanent, long-term, stability I would hope that that will prove to be a very rare occurrence.

Implementation of policy

Compared with the complexity of the decision-making process in relation to interest rates, implementation of those decisions is relatively straightforward.

In the case of the ECB, the short-term interest rate will basically be contained within a corridor, bounded at the top by an overnight lending facility to the commercial banks, and at the bottom by an overnight deposit facility in which the banks can place surplus funds. Within the corridor the market interest rate will be steered by means of open-market repurchase operations. The ECB may also require commercial banks to hold minimum cash reserves with the system; and it will offer a limited amount of longer-term credit to commercial banks at market rates. Neither of these features appears to us to be necessary for monetary policy purposes, but they represent an element of continuity with the arrangements that currently apply in some prospective member countries.

In our own case the arrangements are even simpler. The decision on interest rates will be announced at noon following the final morning meeting of the MPC, and the chosen interest rate will be applied in our daily money-market operations—mostly these days through repurchase operations in gilt-edged securities. Limited facilities for late lending to the remaining discount houses and the settlement banks are available to ensure the smooth functioning of the payments system at the end of the day.

Looking at the monetary policy arrangements planned for Europe and as they now are in this country as a whole, it is clear that though there are significant differences of detail—such that our own arrangements would certainly require considerable further modification to make them compatible with membership of the ESCB—the essential similarities are much greater than the differences. Crucially, the primary monetary policy objective of price stability is the same, and the responsibility for achieving that objective is in each case entrusted to a broadly based group of technical experts not subject to political influence. That does not of course guarantee that we will, here or in Europe, succeed in achieving permanently greater stability but, perhaps presumptuously, I do think it gives us every chance of doing so.

Concluding remarks

I have tried this evening to draw attention to what I see as a very striking coincidence of basic approach to economic—and in particular monetary—management within Europe, and also between continental Europe and this country. We are clearly, it seems to me, on parallel tracks as far as our commitment to macroeconomic, both fiscal and monetary, stability is concerned, though we may be travelling at different speeds when it comes to supply-side flexibility.

That coincidence of basic approach is a prerequisite for sustainable economic convergence within Europe—without it, I do not see how monetary union could be on the agenda. But the question that is often then put to me is, if in fact we are on parallel tracks—in terms of our basic approach—why then do we not get on the same train and commit ourselves to joining monetary union? So let me conclude with just a few remarks on that subject.

The potential attraction of travelling together with our European partners is very clear. There would, other things equal, be real economic advantages in exchange rate *certainty* across the single market area, which can only be realised through the single currency. The same *certainty* cannot be achieved by the countries of Europe independently pursuing macroeconomic discipline, although that should over time help to minimise the degree of intra-European exchange rate volatility.

But there are real risks.

We are not all starting from the same station. Domestic demand in this country, for example, is currently growing at a rate that we cannot sustain for very long without the emergence of inflationary pressures. But in the major countries of continental Europe, on the other hand, domestic demand remains relatively subdued. The possibility of such cyclical divergences will not simply disappear on 1 January 1999 and they would seriously complicate the operation of a single monetary policy. So too would a variety of possible internal or external shocks that affected euro member countries in different ways or to different degrees.

But more fundamentally—and I cannot keep up the railway analogy—I am frankly nervous at the prospect of introducing the euro at a time of very high and very different rates of unemployment across Europe. It is not that I think unemployment can be addressed directly by more expansionary macroeconomic polices—that ought to be clear from my earlier remarks. I share the view that unemployment needs to be addressed fundamentally through supply-side policies—though it may be that the problem is currently being aggravated in the short term by the heroic attempts being made to meet the fiscal criteria according to the Maastricht timetable in a context of cyclical weakness. The problem is that we cannot be confident how individual countries may respond to this situation. My concern is that the persistence

of these wholly unacceptable levels of unemployment across Europe, and the very real difficulty of implementing appropriate supply-side reforms, could begin to undermine public support for macroeconomic stability in some countries—even though significant relaxation on this front would provide at best only short-term relief. In that case, economic convergence, if it were achieved, could prove difficult to sustain. There are perhaps some suggestions that this may be beginning to happen; and it may be for this reason that the foreign exchange markets are implying that they expect relative euro weakness—to our own considerable embarrassment as a result of the corresponding strength of sterling's exchange rate. I have no doubt that, if the euro goes ahead, the ECB would in fact seek determinedly to exercise its statutory responsibility for maintaining price stability within the euro area. But its job would be enormously more difficult if this came to be seen, at least in some countries—however mistakenly—as an obstacle to the objectives of economic policy, including in particular increasing employment.

My conclusion from all this, is that whether or not the euro proceeds on the present timetable, and whether or not the United Kingdom is a part of that, the really important thing for European prosperity is that the present broad policy consensus holds together. But if we are to be able to hold on to macroeconomic stability—as we must—then we have to find answers to the urgent problem of European unemployment. That involves addressing the problems of supply-side flexibility as an immediate priority. And that, Vice Chancellor, is the message that the new Government has recently carried to Europe.

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