



BANK OF ENGLAND

Speech

Monetary Challenges in a New Economy

Speech given by

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EXECUTIVE SUMMARY

1. Is The UK Economy “New”?

The main reason for believing that the UK economy might be behaving differently is that economic forecasters have, on average, significantly under-predicted GDP growth while simultaneously over-predicting inflation since 1992. One plausible explanation for this phenomenon is that some of the underlying structural relationships have changed.

2. An Intensification of Product Market Competition?

The improvement in the growth-inflation trade-off might have occurred because globalisation, deregulation and, more recently, internet price comparisons might have increased perceived competitive pressure. Survey evidence is supportive of the notion that the degree of product market competition has intensified, and I report on preliminary econometric work which suggests that inflation forecasts in the 1990s would have been more accurate if they had incorporated such survey responses. This provides some support for the view embodied in the MPC’s central projection that a continuing intensification of competitive pressure is likely to depress inflation over the next two years.

3. Changes in the UK Labour Market

Changes in the unemployment benefits regime and union power have also probably contributed to the improvement in the growth-inflation trade-off in the UK during the last decade.

4. Measurement Issues

It is possible that measurement issues have led forecasters to under-estimate the supply potential of the UK economy. For example, a preliminary set of estimates of the flow of capital services to industry has shown twice the growth that has been seen in a conventional measure of change in net capital stock derived from official

estimates of wealth.¹ The use of the capital services measure could give a significantly higher growth rate of potential output.

To take another example, if one makes alternative assumptions about the classification of software spending and also substituted US-style price indices for computers and software, then, preliminary, illustrative calculations suggest that GDP growth might have been underestimated by as much as 0.4 percentage points per annum over the period 1994-98. Importantly, the size of the potential bias in the estimate of GDP growth has been growing over time, which is likely to lead to biases in estimates of indicators of inflationary pressure like the output gap. The ONS is working closely with the Bank to continue progress in the area of capital stock measures, and the issue of quality adjustment of computer prices was addressed in the recent Quality Review of Short Term Indicators of Output released by the ONS.

5. Prospects for Productivity Growth

Personally, I believe that it is likely that productivity growth is likely to be above average over the next 2 years, primarily because of the likely response of firms to intensified product market competition, the beneficial effects of B2B e-commerce, and the fact that the payoff from the significant amount of Information and Communications Technology investment that has occurred is due soon. To ‘wait and see’ for a statistically significant change in the actual, measured productivity growth might be to miss an economically significant change in the true productivity growth rate.

6. Keeping One’s Sense of Perspective

Although it is easy to be excited by the structural changes that are happening, it is important to emphasise that while the “New Economy” considerations discussed above have important disinflationary effects, they do not imply the death of inflation. It therefore remains important to continue to monitor a variety of wholly conventional influences on inflation when setting policy. It is, for example, important that the recent rise in oil prices does not lead to an increase in inflation expectations.

¹ The net capital stock is obtained by weighting each component of capital by its asset price, while the capital services measure uses the relative contributions to output as weights.

1 INTRODUCTION

There has, in recent years, been much discussion of the ‘New Economy’ (NE hereafter). There is no generally accepted definition of what one means by the NE.² There are those who see the NE as being synonymous with an acceleration in the diffusion of Information and Communications Technology (ICT, hereafter – see, eg Gordon (2000)). However, I regard that as a rather narrow definition, since much that might be different about the economy today relates one not just to ICT advances, but also to the effects of globalisation, intensifying product market competition, greater labour market flexibility and several other factors.

A more appropriate characterisation of how a central banker might define the NE is, perhaps, that provided by Chairman Greenspan.

“ ... it is certainly true that we have a new economy. It is different. It is behaving differently and it requires a different type of monetary policy to maintain its stability and growth than we had in the past.”

(Testimony before Senate Banking Committee, February 23, 2000.)

I shall, therefore, turn to a discussion of what might be different about how the UK economy operates now, as compared to, say, how it behaved in the seventies or eighties.

2 IS THE UK ECONOMY DIFFERENT NOW?

THE RECENT FORECASTING RECORD

One reason for thinking that the UK economy might be behaving differently is to look at the evidence suggesting that economic forecasters have been persistently too gloomy about the UK economy since the departure from the ERM.

Table 1 displays the average forecast errors that have been made over this period.³ Focussing on the average of all forecasts (ie the ‘consensus’), notice that, on average,

² See Browne (2000) for an extensive discussion of this issue.

³ These numbers are based on preliminary work by Nick Davey and Jennifer Greenslade of the External MPC Unit at the Bank of England.

GDP growth has been underestimated by about 0.5% pa, which is a large error in relation to the actual average growth rate of around 2.9%.

TABLE 1

AVERAGE FORECAST ERRORS¹ IN THE UK, 1993-99

FORECASTER	AVERAGE³ ERROR	SIGNIFICANT⁴ AT 10% LEVEL
<u>GDP GROWTH FORECAST</u>		
CONSENSUS ²	+0.48%	YES
<u>INFLATION (RPIX) FORECAST</u>		
CONSENSUS ²	-0.53%	YES

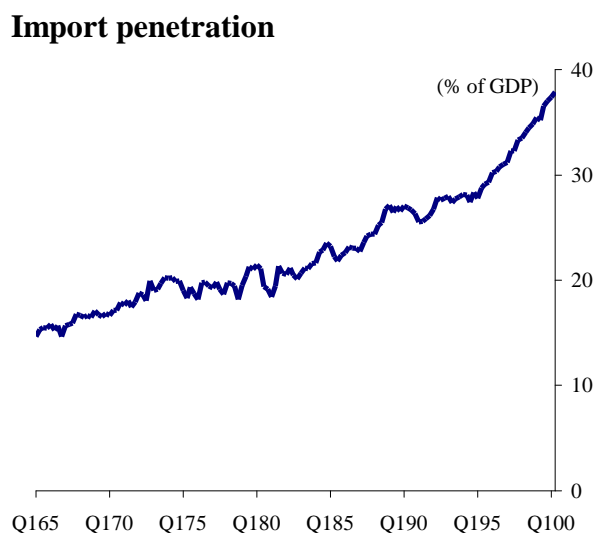
- 1 Four quarter-ahead forecast errors.
- 2 Consensus forecasts taken from ‘Consensus Economics’.
- 3 Sample period: 1993 I – 1999 IV.
- 4 Using a t-test over this sample period.

Now, a conventional view (that is found in text books and minutes of central bank meetings alike) holds that if GDP growth were faster than expected over a sustained period of time, then,⁴ on average, actual inflation must also be higher than expected. However, the actual inflation out-turn over this period was, on average, 0.5% lower than the ‘consensus’ inflation forecast. Hence, economic forecasters appear to have been simultaneously too gloomy about, both, GDP growth and inflation. I should say, in passing, that virtually all forecasters (including the Bank of England) failed to spot the improvement in the growth-inflation trade-off during the 1990s. There are a variety of possible explanations for this phenomenon. One class of hypotheses would envisage a significant change in the structural relationships that underlie the forecasting processes. I discuss some of these hypotheses next, as policymakers must always be alive to the possibility that historical relationships might be breaking down.

2.2 AN INTENSIFICATION OF PRODUCT MARKET COMPETITION?

A commonly cited reason for why the economy might be behaving differently is that the degree of product market competition has intensified over the last few years. A contributory factor may be globalisation, ie the increasing integration of global product markets. (Figure 1 suggests a striking increase in the degree of import penetration in the UK, with the rate of increase having accelerated in recent years).

Figure 1



Evidence of increased product market competition has not just been confined to globalisation. Government action has also played a role here. Privatisation and/or regulatory changes in a whole host of industries including gas, water, telecom, electricity, airports, rail, the docks and broadcasting have led to rather more competitive product market conditions.

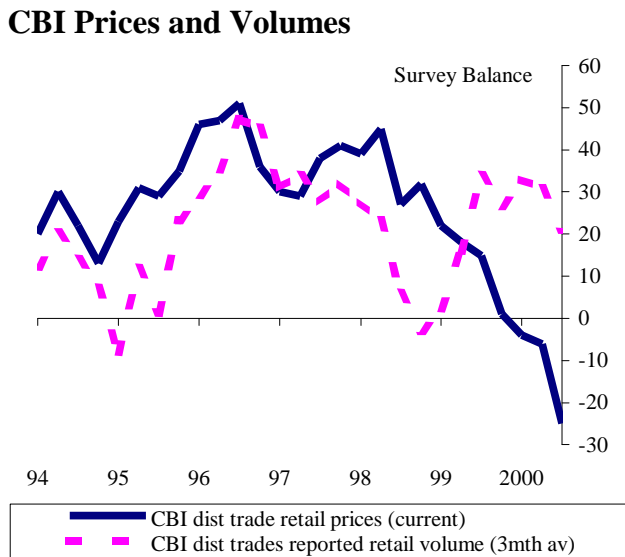
Of course, the intensification of competition does not appear to have been confined just to the internationally traded or deregulated sectors – in a conjunctural context we continue to hear much about the ‘price wars’ in retailing as well.

Figure 2 shows that, within the retailing sector, the CBI Distributive Trades Survey suggests that the perceived ability to increase prices, at a given level of demand, is lower than it used to be. Notice that while reported volumes recovered after their Autumn 1998 slowing, pressure on pricing has continued to intensify. Currently, the response to the price question is at a record low even though the survey balance for volumes is above average. It appears that, in a low and stable inflation environment,

⁴ Conditional on potential output growth having remained unchanged.

consumers have become more discriminating buyers, as they are better able to distinguish between relative and absolute changes. More recently, foreign entrants into the UK retail market, internet price comparisons and investigations into allegedly uncompetitive practices might have played some role.

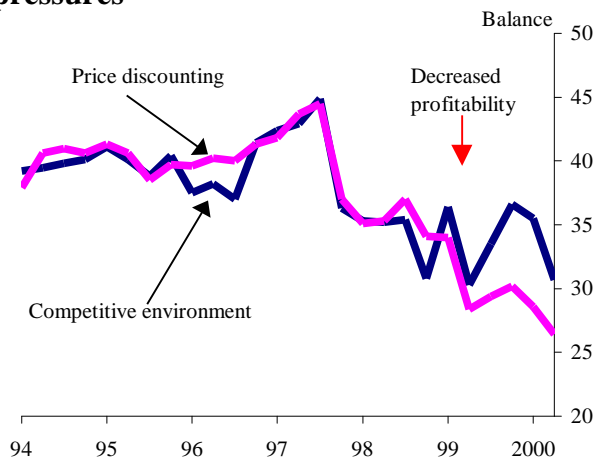
Figure 2



A crude proxy for the extent of perceived competitive pressure is to rely on survey evidence. The Euler Trade Industry Indemnity survey (which spans all the broad industry sectors) has asked questions relating to the extent to which price discounting and the competitive environment have been perceived as impacting on profitability since 1994. Figure 3 displays the responses. Note that a response below 50 suggests that the factor is having a negative impact on profitability. The responses appear to point to an intensification of perceived competitive pressures and the extent of discounting over this period, (dating back to around mid-1997), as they have fallen further below 50, suggesting a greater negative impact on profitability.

Figure 3

EULER Survey measures of pricing pressures



It is sometimes asserted that an intensification of competition is a one-off event and must, therefore, only have a transient effect on inflation. Consequently, the argument goes, it should not affect one's perception of the medium-term outlook for inflation.

As my ex-colleague, Willem Buiter (2000) has recently emphasised again, inflation is, ultimately, a monetary phenomenon. A fall in the NAIRU that was associated with intensified product market competition would not, therefore, reduce inflation in the long-run, though there would be important short-run effects.

Specifically, suppose that we start in a position where inflation is running at 2½% and would, on unchanged interest rates, remain constant thereafter. Now, assume that the NAIRU falls because of intensified product market competition, then, other things being equal, inflation out-turns will start coming in below target. A central bank that, like the Bank of England (BoE hereafter), has a symmetric inflation target will respond to the expected below target inflation by lowering interest rates. However, over time, the actual unemployment rate should drift down to the new, lower level of the NAIRU. When that happens one would expect interest rates and inflation to rise back to their original level.

Hence, in the short-run, the benign structural factors should enable inflation to come in lower than before. I should say that the “short-run” in this example could, in practice, last several years, as structural factors that lower the NAIRU can, sometimes improve gradually over a number of years. Indeed, Figure 3 suggests that, until now,

the perceived intensification of competitive pressure has been a relatively long-lasting phenomenon (has already gone on for over 3 years), and could, therefore, have legitimately been taken into account by policymakers.

Importantly, preliminary work by Nick Davey and Jennifer Greenslade of the External MPC Unit (at the Bank of England) suggests that during the 1990s, a regression of actual RPIX out-turns on RPIX forecasts (4 quarters ago) and the Euler survey responses (also 4 quarters ago) results in a statistically significant coefficient on the survey measure of competitive pressure (Table 2). The evidence suggests that the Euler survey responses contain incremental predictive power relative to the ‘consensus’ RPIX forecasts (or, indeed, the NIESR or Bank of England forecasts) (see Table 2), ie it is possible that the tendency to over-predict inflation is related to not paying enough attention to the possibility that the intensification of product market pressure has been altering some of the relationships built into existing macro-econometric models.⁵

TABLE 2

INCREMENTAL PREDICTIVE POWER OF EULER SURVEY RESPONSES FOR RPIX OUTTURNS (ONE YEAR AHEAD)^{1,2}

FORECAST INCLUDED	EULER SURVEY RESPONSE	
	COEFFICIENT	t- RATIO ³
CONSENSUS ECONOMICS	0.05	2.1
NIESR ⁴	0.06	3.3

Notes:

- 1 Sample period is 1995 Q1 – 2000 Q2.
- 2 Regression run is Actual RPIX out-turns on a constant term, the relevant forecast (four quarters ago), and the Euler survey response (four quarters ago).
- 3 t-ratios are based on Newey-West standard errors.
- 4 NIESR denotes the National Institute of Economic and Social Research

⁵ It is plausible to believe that some of the over-prediction of inflation might be explained by exchange rate forecasting errors over the post-1997 periods. However, Davey-Greenslade included actual exchange rate forecasting errors or the Euler survey question on exchange rates within this regression. However, the basic result that the survey measures of prices discounting and a competitive environment help to explain the inflation forecast errors was intact.

There is also some direct support for the notion of a change in the underlying structural relationship linking retail goods prices to its underlying determinants. Some preliminary econometric work at the External MPC unit at the Bank of England has found that a conventional equation⁶ which could explain the behaviour of retail goods prices reasonably well until early 1998, has broken down since with actual outturns significantly lower than fitted values. Of course, as with any econometric exercise, alternative explanations might be offered, but the hypothesis of a structural change in margins is quite compelling as it accords with anecdotal and survey evidence.

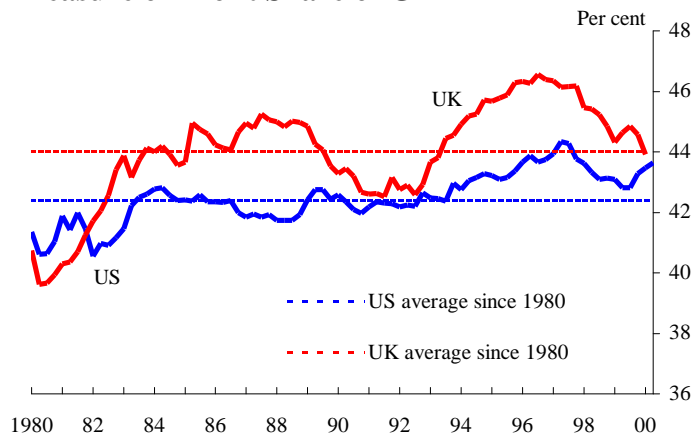
Note that, since the November 1999 Inflation Report, the MPC has in fact, incorporated a 'structural' compression of price-cost margins within the central projection, which, of course, is consistent with some of the evidence discussed above. The assumption that we made was a judgement that was necessarily based on a host of different considerations, mainly of a forward-looking nature. It, is, though, notable that, perhaps, our behaviour can also be justified by the observed correlation between actual forecast errors and survey-based measures of the intensity of product market competition that emerges from the Davey-Greenslade work (Table 2).

If one were, however, sceptical of the view that an intensification of product market competition has been an important factor, one might point to the fact that the profit share of nominal GDP for the UK is around its post-1980 average (see Figure 4), which does not, at first sight, point to a significant squeeze in margins. Although the profit share has fallen back in recent years (which would be consistent with a compression of margins), the level of the profit share is broadly unchanged since 1992, which is around when the trade-off between inflation and GDP growth appears to have altered. Moreover, the profit-share of GDP in the US is also, if anything, slightly above its post-1980 average (see Figure 4).

Figure 4

⁶ In a regression of retail goods prices on the exchange rate, oil and commodity prices, unit labour costs, foreign export prices, a time trend and retail sales. The work was carried out by Nick Davey.

Measure of Profit Share of GDP ^(a)



(a) Measured as that share of income not taken by labour.

However, it is important to recognise that an intensification of competitive pressure would only be associated with an actual fall of observed profit margins if everything else remains unchanged.⁷ Specifically, if, for example there was a technology-driven rise in productivity growth, and the real wages of workers did not initially rise in line with the increase in productivity (which is an historical regularity), then, we might nevertheless observe a rise in the profit share. This may help explain why the profit share in the US has not fallen in the 1990s.

Alternatively, if the power of labour were diminishing (say, because of a fall in union power), then, this would, of itself, be associated with a rise in the profit share. Of course, a simultaneous intensification of product market competition would put downward pressure on the profit share. As to what happens to the actual observed profit margin depends on which of these two factors predominates.

As I shall remind you below, there is much that has happened in the UK labour market to strengthen the relative bargaining position of firms vis-à-vis workers. Consequently, I am quite content to believe that an intensification of competitive pressure has occurred even though the profit share has been broadly stable.

2.3 CHANGES IN THE LABOUR MARKET

I have previously discussed the far-reaching changes that have occurred in the UK labour market over the last two decades (see Wadhvani (2000a)), so I will not have much to say on that topic today. However, Table 3 reminds us that, along a variety of

dimensions, a great deal is different today (cf. 1998 vs 1980). Union membership and strike activity are much lower. Imbalances in the pattern of labour demand and supply have diminished significantly. Turning to the unemployment benefits regime, the conventional replacement ratio (ie the ratio of out-of-work benefit to estimated in-work income) has fallen. Further, the New Deal, and other measures which have tightened the availability of benefits have also probably been influential.

It is notable that if one takes the wage equation that is to be found in the Bank of England's core macro-econometric model (see Bank of England (1999)), then, there is evidence that it has over-predicted wage growth in recent years (ie since around 1992).

TABLE 3
SOME KEY FEATURES OF THE LABOUR MARKET (1998 VS 1980)

<u>FACTORS</u>	<u>1998</u>	<u>1992</u>	<u>1980</u>
UNION DENSITY	0.30	0.36	0.49
NUMBER OF WORKING DAYS LOST (000s)	30	48	957
<u>MISMATCH</u>			
(a) INDUSTRIAL*	0.24	1.26	1.18
(b) SKILLS**	4.9	8.0	8.00
REPLACEMENT RATIO	0.18	0.18	0.24

*Annual (absolute) change in the ratio of employee jobs in the production and construction industries to total employee jobs.

** Ratio of manufacturing firms reporting skilled labour shortages to those reporting shortages of other labour (source: CBI Industrial Trends Survey).

It is sometimes pointed that while many of the labour market variables that are supposed to underlie the NAIRU changed during the 1980-92 period, much of the evidence for a lower NAIRU appears to post-date 1992. Hence, some argue that the changes in the labour market cannot be the explanation for the change in the NAIRU.

On the other hand, industrial relations experts like Professor William Brown of Cambridge argue that the structural improvements in the labour market during the

⁷ I am grateful to my colleague, Stephen Nickell, for helpful discussions on these issues.

1980-92 period did not translate into improved wage performance until other catalytic events induced firms to undertake radical industrial relations change in the early 1990s. Possible candidates as catalysts are the 1990-92 recession, and the re-election of the government in 1992, which implied that many of the structural changes in the labour market were not going to be reversed. There is case-study evidence in favour of both these factors having played some role (see eg Brown et al (1999)). Other possible catalytic events include the adoption of an explicit inflation target after 1992. Personally, I have no problem with the notion that structural changes can take time before they manifest themselves in improved macroeconomic performance. Any changes to the way labour is used (eg reforming pay systems, improving selection, etc) requires managerial effort, and takes time to get in place and be effective.

Of course, it is plausible that some of the improvement in the wage-unemployment trade-off during the late 1990s is attributable to lower import prices – caused by a combination of an appreciation of sterling, weak commodity prices during the 1997-98 Asian crisis and possible supply-side improvements in other countries. Note though that the trade-off appeared to improve after the UK left the ERM in 1992 even though a fall in sterling boosted import prices.

Looking over the last decade, it is reasonable to believe that the NAIRU has fallen because of, both, labour market improvements and the intensification of product market competition, some of which may have been associated with changes in regulation. Moreover, it is possible that recent outcomes (1998-99) have been somewhat flattered by lower real import prices during 1997-98. Looking ahead, the higher real import prices over the past year (mainly due to higher oil prices) should worsen the apparent short-run trade-off, but the likely intensification of product market competition (through the internet, etc) should continue to help reduce the NAIRU over the next few years. Obviously, this is a complex affair, and I am not surprised that Chairman Greenspan was recently quoted as saying:

“My forecast is that the NAIRU which served as a very useful statistical procedure to evaluate how the economy was behaving over a number of years, like so many types of temporary models which worked, is probably going to fail in the years ahead as a useful indicator” (Reuters, July 20, 2000)

It will, therefore, remain especially important to closely monitor actual developments as we attempt to form the difficult judgements in this area. Recall that the intensification of product market competition has already gone on for several years. At some point, this process will come to an end. It will be important for us to be vigilant to signs that this might be happening.

I have, so far, discussed how structural changes in the economy make an assessment of the conjuncture and the preparation of our inflation forecast a rather tricky matter. However, our problems are compounded by the existence of measurement error, an issue to which I turn next.

SECTION 3

SOME PROBLEMS CAUSED BY MEASUREMENT ERROR

It is inevitable that the economic aggregates that we are interested in will be measured with error. If the size of the bias caused by measurement error varies significantly over time, this can make it especially difficult to set policy appropriately. I shall discuss a couple of illustrative examples below.

3.1 MEASURING THE SUPPLY POTENTIAL OF THE ECONOMY

We discussed above the use of the NAIRU in policy-setting. A closely related concept is that of the ‘output gap’, which is the difference between actual and potential output. Of course, the level of potential output is rather difficult to measure.

3.1.1 SOME US EVIDENCE

Researchers at the US Federal Reserve System (see Orphanides and Norden (1999)) have shown that:

“..... the ex post revisions of the output gap are of the same order of magnitude as the output gap itself, and the real-time estimates tend to be severely biased around business cycle turning points, when the cost of policy induced errors due to incorrect measurement is at its greatest.”

In related research, Orphanides (1999) argues that:

“The evidence points to misperceptions of the economy’s productive capacity as the primary underlying cause of the 1970s inflation.”

As we argued above, estimating the level of equilibrium unemployment (or, relatedly, the level of potential output) at a time of significant structural change is extremely difficult. Just as it is possible that a ‘supply shock’ in the form of cheaper information costs is plausibly boosting the level of potential output today, a ‘supply shock’ in the form of much higher oil prices (in real terms) hurt productive capacity in the 1970s, and the work of Orphanides suggests that policymakers and the economics profession in general may have been a little slow to realise that.

3.1.2 ALTERNATIVE CONCEPTUAL MEASURES OF THE CAPITAL STOCK

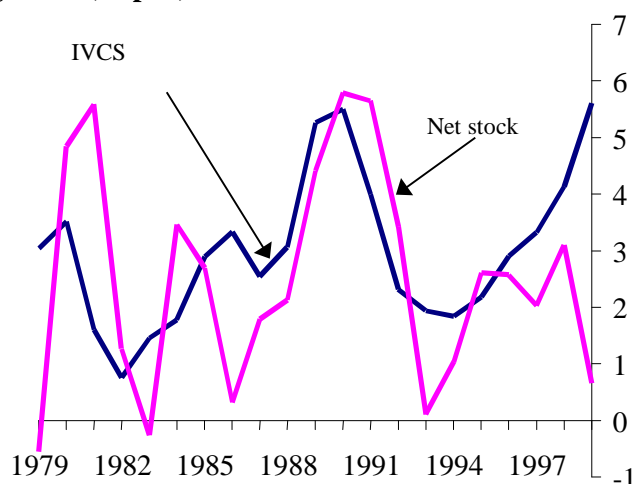
At the Bank, one of our methods of computing the supply potential of the economy relies on summing the weighted growth rates of employment, the capital stock and technical progress. Among other things, it is obviously rather important to use a measure of the capital stock which reflects its productive potential when performing this calculation. The different methods of obtaining a measure of the capital stock can yield rather different results.

For example, current ONS estimates of the capital stock are a so-called ‘wealth type measure’, where each item is weighted by its current asset price. While this is a valid measure for balance sheet purposes, it will be less appropriate for an assessment of productive potential, where one might want to compute an index of the volume of capital services (IVCS hereafter) instead. Note that in the IVCS, each item of capital is, in principle, weighted by its contribution to output (ie its marginal revenue product) rather than its asset price. A consequence of using the IVCS instead is that it increases the weight accorded to shorter-lived assets such as machinery, equipment and software relative to buildings. If the stocks of shorter-lived assets (eg computers) are growing more rapidly than other types, then the IVCS will, in turn, grow more rapidly than the wealth-based measure.

Nicholas Oulton of the Bank of England has computed a preliminary measure of the IVCS, which may, for purely illustrative purposes, be compared to the wealth-based aggregate (see Figure 5).

Figure 5

Comparison of measures of capital input growth (% p.a.)



Notice that while, on the wealth-based measure, the growth rate over the last two decades is broadly constant, the IVCS grew faster over 1989-99 (3.38% pa) vs 1979-89 (2.62% pa). If one concentrates on the post-1996 period, then, the wealth-based measure has grown at around 2% pa, while the IVCS measure has grown at around twice that rate (approximately 4% pa). Of course, this can make a significant difference to any estimate of the growth rate of potential output. For example, if one makes the extreme assumption that one's estimate of total factor productivity (TFP) growth is unaffected, then the alternative estimate of the growth rate of the capital stock would imply an increase in the growth rate of potential output of as much as 0.6% p.a. which in relation to conventional estimates of a growth rate of potential output in the 2%-2½ % p.a. area is a rather large difference. Note, though, that as a matter of arithmetic, if the productive capital stock has indeed grown faster in recent years, then measured TFP growth must have been slower, which might lead one to lower the assumption about the trend growth rate of TFP. This would correspondingly lower the degree to which correct estimates of the growth rate of potential output might be understated. Alternatively, the lowering of the measured growth rate of TFP might lead one to question the plausibility of the GDP estimates. Hence, the precise impact of the understatement of the growth rate of the productive capital stock on the growth rate of potential output is necessarily uncertain, though the direction of the bias is clear. Fortunately, the Bank and the ONS are currently cooperating on a project on the IVCS, and we await the results with great interest.

SECTION 3.1.3

ALTERNATIVE MEASURES OF ICT INVESTMENT

With the growing consensus that the growth of investment in information and communications technology (ICT hereafter) has contributed to an upsurge in productivity growth in the US, there is obvious interest in investigating the role of ICT and productivity growth in the UK. I have initiated some work on this issue at the Bank, though, as yet, I can only share with you some rather preliminary results.

Nicholas Oulton has started the project by applying US methods for measuring ICT. He has used US price indices for computers and software, because they incorporate a substantial amount of research into adjustment for quality change. Because ICT products are extensively traded internationally, it is plausible that the rate at which quality adjusted prices are falling should be much the same in all countries (after adjustment for exchange rate changes). However it should be noted that the measurement of price indices for computers is conceptually very challenging due to the rate of technological change and no single approach of quality adjustment is without its drawbacks.

Table 4 compares the price indices used by both countries in their national accounts. In computers and software, the UK price index was growing much faster than its US counterpart in 1979-89. In computers, this gap narrowed in the early 1990s, but then widened substantially in the latest period, 1994-98. In software, the gap narrowed in 1994-98 while still remaining substantial. In telecommunications, by contrast, the gap was in the other direction over 1979-89. Since then, it has been small by comparison with other components.

TABLE 4

DIFFERENCES BETWEEN THE GROWTH RATES OF UK AND US¹ PRICE INDICES: AVERAGE GROWTH OF UK INDEX MINUS AVERAGE GROWTH OF US INDEX (% PA)

	COMPUTERS ²	SOFTWARE ³	TELECOMMUNICATIONS ² EQUIPMENT
1979-89	7.32	13.20	-10.02
1989-98	6.61	10.09	0.34
1989-94	1.39	12.56	-2.05
1994-98	13.14	7.00	3.32

- (1) US price indices adjusted for exchange rate changes.
- (2) Uses the official producer price indices for computers and telecommunications for the UK.
- (3) Uses adjusted version of official US software price indices. For the UK, software investment is deflated by the overall implicit deflator for machinery and equipment.

Obviously, if inflation in computers and software is overstated in the UK, then real growth has been understated, since it is money values that are measured directly. Using US-style price indices should lead to higher estimates of ICT investment, GDP growth and productivity growth for the UK (as we discuss below). In the recently released National Statistics Quality Review report, there are some calculations which suggest that using US price indices for the computer industry (but not changing the assumptions regarding software), the level of industrial production in 2000 Q1 would have been about 6% higher, with much of the gap being established in the post-1997 period. There are those who believe that the hedonic price indices used by the US actually somewhat understate inflation, and this is clearly a controversial area. However, on the basis that it is important to be aware of the quantitative importance of alternative assumptions about price indices in the ICT sectors, I shall discuss some preliminary illustrative estimates of the potential biases in estimated GDP growth below.

Note that there are other important differences between ICT measurement practices in the US and the UK which might also have the effect of overstating the amount of ICT investment in the US versus the UK.

For example, although the growth rate of software investment (measured in current prices) is very similar in the US and the UK, there is a large discrepancy in the levels. Specifically, in the US, software investment has averaged 140% of computer investment, while, by contrast, the corresponding ratio was only 39% in the UK. Since people buy computers to run software, it seems very unlikely that there should be such a large discrepancy between the UK and the US. This striking difference in the estimated levels of software investment might arise because of differences in the interpretation of what is investment, and what is intermediate consumption in computer services – in the US, about three-fifths of the total products of the computer

services industry is classified in investment – in the UK, the corresponding proportion is less than one-fifth.

Therefore, Oulton suggests, for illustrative purposes, that it might be appropriate to inflate the UK figure for software investment by a factor of 3, which is at the lower end of the possible range of grossing-up factors considered by him. Of course, this is an extremely difficult area, and because of the paucity of reliable information, what might seem a conservative assumption to someone, might appear to be too high to another. However, as a policymaker, it is important to be aware of the full range of possibilities, and it is in that spirit that I look at alternative illustrative computations of ICT investment.

In particular, on the official numbers, the UK lags the US considerably in terms of ICT investment as a percentage of GDP (see Figure 6A). By contrast, on Oulton’s estimates, the UK stacks up rather well vis-à-vis the US (see Figure 6B).⁸

Figure 6A

ICT investment: US and UK compared

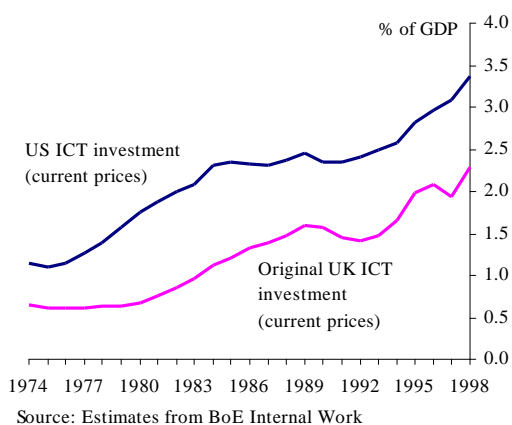


Figure 6B

ICT investment: US and UK compared

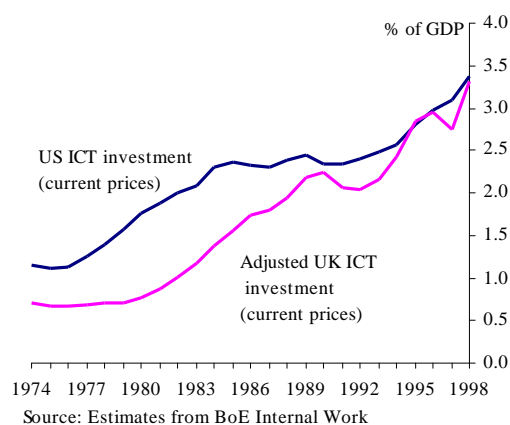


Table 5 shows the impact of adjusting for the aforementioned biases on estimates of GDP growth on Oulton’s assumptions. Notice that the potential bias is substantial (up to 0.38pp pa by 1994-98) and moreover, has been rising over time (only 0.07-0.1 pp pa during 1979-89). If GDP growth has truly been 0.4% pa faster than we

⁸ Some authors (eg Kneller and Young (2000)) suggest that computers contributed very little to productivity growth in the UK in the 1990s. However, they exclude the contribution of software and telecommunications. On the measure of ICT discussed here, the contribution of ICT to productivity growth would rise significantly.

currently believe, then this affects one's estimates of productivity growth, which, in turn, might affect our assessment of domestically generated inflationary pressure. Note that if the growth rate of actual and potential output were higher than we thought by the same amount, but this amount remained constant over time, then our estimates of the output gap would be unaffected by this measurement error.

However, if the size of the understatement of actual output growth is rising over time (on these numbers, it accelerated in 1994-98 by 0.25% compared to 1989-94), but estimates of the potential growth rate are, in part, backward looking, then contemporaneous measures of the output gap are likely to end up underestimating the degree of slack in the economy.

Also, there are, of course, other indicators of inflationary pressure that we monitor which would be affected by an understatement of productivity growth. For example, measures of unit labour cost growth would obviously be overstated were productivity growth understated.

TABLE 5**GDP GROWTH WITH AND WITHOUT ADJUSTMENT FOR ICT EFFECTS, 1979-98: PERIOD AVERAGES**

INCREASE IN GDP GROWTH DUE TO ADJUSTING FOR:

	GDP growth (not corrected for ICT)	Computers	Software (low)	Software (high)	Telecommunications equipment	All three together (software low)	All three together (software high)
	% pa (1)	Pp pa (2)	Pp pa (3)	pp pa (4)	pp pa (5)	pp pa (6)	pp pa (7)
1979-89	2.37	0.02	0.06	0.10	-0.02	0.07	0.10
1989-98	1.91	0.07	0.10	0.18	0.01	0.17	0.25
1989-94	1.17	0.00	0.07	0.15	-0.01	0.07	0.15
1994-98	2.83	0.15	0.14	0.21	0.02	0.31	0.38

Of course, Oulton's preliminary estimates are predicated on his assumptions and are designed to be purely illustrative. It is possible that further work (with the active and essential cooperation of the ONS) might lead to different point estimates of the size of the biases in GDP growth. However, the direction of the bias in GDP estimates and the direction in which the bias is moving seem relatively uncontroversial and as policymakers, it is important for us to be aware of them.

Having discussed some examples of the problems caused to us by measurement difficulties, I now turn to consider the issue of attempting to forecast likely productivity growth, a rather important component of any inflation forecast.

SECTION 4**FORECASTING PRODUCTIVITY GROWTH**

Currently, our best collective projection builds in the assumption that labour productivity growth will not materially differ from its 40-year average of around 2% pa. Of course, this is in sharp contrast to the US, where, in recent years, forecasts of productivity growth have been increased significantly (by, at least, 1.00pp pa). Given that it is accepted that ICT advances have played a significant role in recent US productivity experience (see, eg Oliner and Sichel (2000) or Jorgensen and Stiroh (2000)), and given the significant amount of ICT investment that has been undertaken in the UK (the numbers discussed above suggested that, as a fraction of GDP, the UK might even have invested as much as the US), it is rather puzzling that the UK does

not appear to have experienced any significant upsurge in terms of measured productivity growth. I discussed above the ICT-related biases in the measurement of GDP growth, with the preliminary illustrative calculations suggesting a recent understatement of labour productivity growth of perhaps around 0.4pp pa.

However, if this were the only source of bias in the measurement of productivity growth, this would, by itself, not change the fact that labour productivity growth in 1994-98 was below its average level. Of course, there may be other reasons for believing that productivity growth has been understated during the late 1990s. I have previously discussed this issue at some length (see Wadhvani (2000b)), so I shall be brief here, but I would point to –

- (i) Official data suggests that manufacturing productivity growth was zero during 1995-97, while survey responses from the CBI Pay Databank sample suggested productivity growth averaged around 4% pa over this period.
- (ii) No-one has satisfactorily explained why the measured deceleration in manufacturing productivity growth appeared to coincide with a rise in profitability (over the 1995-97 period).
- (iii) The “hard-to-measure” service sectors have become more important over time.

Of course, more research is needed, but, as a policymaker, it is important to be alive to the possibility that measured productivity growth numbers significantly understate actual growth.

Even if there were no reasons for believing that historical, measured productivity growth has been understated, one might believe that productivity growth might be set to rise in coming years.

Another possible explanation for the fact that UK productivity growth has not risen despite significant ICT investment is that there are time-lags associated with learning

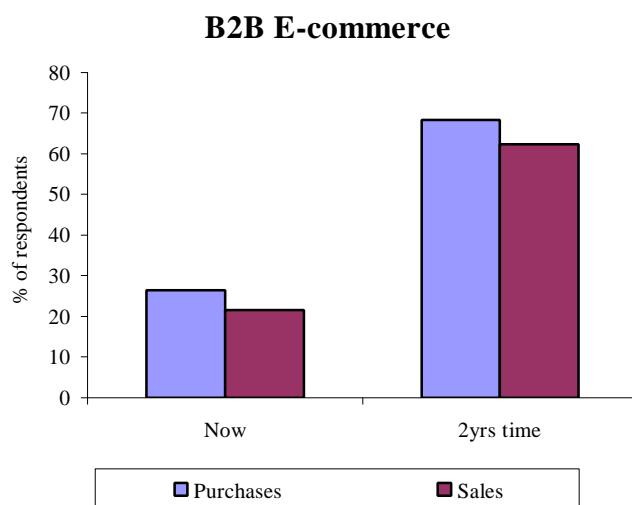
how to use the technology appropriately. Note that US productivity growth did not rise until after 1995 despite many years of significant ICT-related investment. Hence, it is possible that productivity growth in the UK might be about to rise.

I do draw some encouragement from some empirical work reported in Bean (2000), where he reports a significant link between average TFP growth and the share of ICT investment in GDP for a cross-section of OECD economies. The economic impact of ICT investment is estimated to be large, implying roughly a point-for-point response of TFP growth to an increase in the share of GDP spent on ICT investment.

Yet another possibility is that the likely growth in the ICT sector in the UK (note that productivity growth in the ICT sector itself has been a significant contributor to US productivity growth) and the effects of the internet-related B2B commerce could lead to a significant rise in productivity growth.⁹

In a special survey conducted for the Monetary Policy Committee during May 2000, the Bank's Agents found that UK companies expect a significant increase in B2B e-commerce over the next 2 years. Figure 7 shows that while the vast majority of businesses do not engage in B2B e-commerce now, over two-thirds expect to purchase over the internet within two years.

Figure7



⁹ See Wadhvani (2000b) for a discussion of this issue.

Of course, there are those who are sceptical about the significance of the internet for productivity growth – eg Gordon (2000) points out that the period 1860-1900 saw five “clusters” of inventions including, electricity, the internal combustion engine, chemicals, the telephone and indoor plumbing. He argues that in terms of the effect on living conditions, the computer revolution cannot possibly measure up to these earlier great inventions.

However, in terms of assessing the likely effects of the internet on productivity growth over the next few years (which is primarily what central bankers care about), it is important to assess the likely speed of diffusion of an invention alongside the intrinsic merit of an invention. On this criterion, the internet scores rather well relative to previous inventions. As The Economist (2000) points out, electricity achieved a 50% share of the power used by America’s manufacturing industry 90 years after the discovery of electromagnetic induction, and 40 years after the first power station was built. By contrast, the internet is approaching 50% penetration in America 30 years after it was invented and only seven years since it was launched commercially in 1993. Of course, the Agents’ survey that I discussed earlier also pointed to a quick take-up of B2B e-commerce. In the UK, 45% of adults had used the internet by July 2000. Amongst these people, as many as 28% had already used it for buying or ordering tickets/goods/services, while 70% did so for finding information about goods or services. Kneller and Young (2000) point out that the 1990s have seen strong productivity growth in the Business Services sector, an area which is ICT-intensive. Perhaps this is indicative of what might occur as ICT diffuses more widely through the economy.

An additional reason for believing that productivity growth might rise is the intensification of product market competition that was discussed in Section 2 above. In standard bargaining models, one would expect this to lead to a reduction in the degree of X-inefficiency. I must say that there is much anecdotal evidence that this might be happening.¹⁰

¹⁰ One must, though, recognise the possibility that the fact that intensified product market competition depresses profits might, of itself, hurt investment, and, thereby, labour productivity.

In the light of the above, some members of the MPC (including myself) have been prepared to assume that, at least over the next two years, labour productivity growth is likely to be above average.

It is possible to argue that we should ‘wait and see’ until there is a statistically significant increase in observed productivity growth. However, when I was a student, some of my teachers often emphasised the distinction between an ‘economically significant difference’ and a ‘statistically significant difference’. Actual productivity growth is notoriously volatile – waiting for a statistically significant increase in productivity growth could lead to inappropriate policy.

For example, Table 6 shows some estimates of TFP growth in the UK for the post-war period. Note that estimated TFP growth slowed down by 0.64 pp per year over a 26 year period after the so-called “Golden Age” of 1950-73. A difference of 0.6pp is economically significant for any assessment of underlying inflationary pressure (eg measuring unit labour costs). Yet, a formal statistical test (a t-statistic) would not reject the hypothesis that the means of TFP growth are equal. A monetary policymaker who waited for a statistically significant change in TFP growth would almost certainly have left interest rates too low in this case. Of course, it would remain important to be vigilant to the possibility that what seemed like an economically significant difference in productivity growth was not an entirely transient phenomenon, but that is why monitoring a host of indicators is so important.

TABLE 6
TFP GROWTH IN THE UK, THE “GOLDEN “AGE AND AFTER

	MEAN	STANDARD DEVIATION	t-TEST FOR DIFFERENCE
1950-73 “Golden Age”	1.52	1.47	-
1973-99 “After”	0.88	1.74	1.41

In discussing the challenges posed for monetary policy by the “new economy”, I have, so far, concentrated exclusively on the supply-side effects. Therefore, I now turn to a brief consideration of the demand-side effects.

SECTION 5

AGGREGATE DEMAND EFFECTS OF A “NEW ECONOMY”

As Chairman Greenspan and others have argued, it is possible that an expected rise in productivity growth leads to a rise in aggregate demand before one gets a corresponding rise in aggregate supply. This is because, say, share prices rise in line with the higher expected productivity growth before there is any necessary improvement in supply-side performance. Higher share prices, in turn, are assumed to boost consumption expenditure now. The existence of such a wealth effect on consumption is relatively uncontroversial, and the MPC has indeed allowed higher share prices to boost its most likely forecast for consumption.

Note that it is difficult to make sense of the current level of global equity prices unless productivity growth is expected to be rather higher than in the past.¹¹ In this situation, it seems to me that a forecaster should choose between two logically consistent possibilities. The forecaster might assume that productivity growth is going to be higher and then build this assumption into, both, the demand side (through higher share prices) and the supply-side. Alternatively, if the forecaster is a “new economy” sceptic, he/she should assume that share prices will actually fall when the markets realise that productivity growth is not going to rise, and should therefore build in lower aggregate demand. Personally, I am, therefore, a little uncomfortable with the MPC’s best collective “most likely” projection, which builds in the demand-side effects of a rise in productivity through higher share prices, but makes no corresponding adjustment to the supply-side for productivity effects.

¹¹ See eg Cecchetti et al (2000) for a discussion of how to understand the current valuation of equity markets.

SECTION 6

KEEPING ONE'S SENSE OF PERSPECTIVE

There is much that is exciting about the internet and it is sometimes difficult to resist being swept along by some of the hype that surrounds it. Although I have argued above that the “New Economy” (defined in the broad sense of changes in underlying structural relationships) has already had a significant impact, it remains important to keep one’s feet firmly planted on the ground.

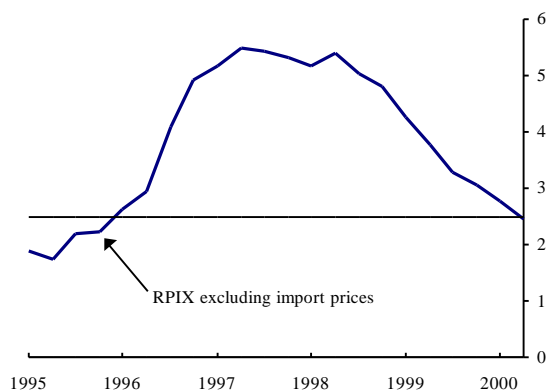
As we have already discussed above, the last 200 years have been characterised by significant technological change, and few would argue that the internet approaches the major innovations in terms of their effect on lifestyles. Also from a central banker’s perspective, one always has to guard against the possibility that underlying economic relationships might be changing – recall that the policy mistakes of the 1970s were at least partly attributable to a failure to realise that productivity growth had slowed and/or the NAIRU had risen, so there is a sense in which we always inhabit a “new” economy.

Turning to the current conjuncture in the UK, it is obviously gratifying that we appear to be able to continue to combine relatively steady growth with low and stable inflation. A concern that some of us have is that the exchange rate remains overvalued (vis-à-vis the euro). It is possible that a sharp downward adjustment in the exchange rate could have a large impact on measured inflation in the first instance.

Figures 8A-8D

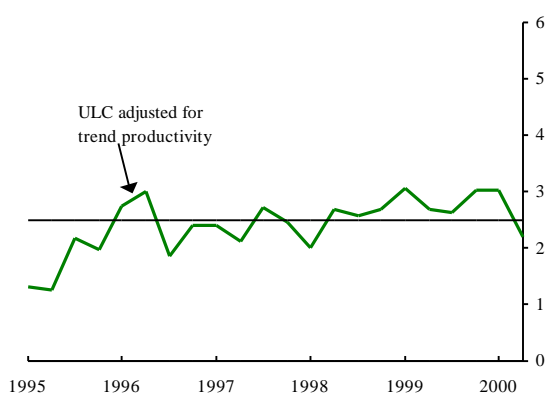
Measures of domestically generated inflation

Percentage change on a year earlier



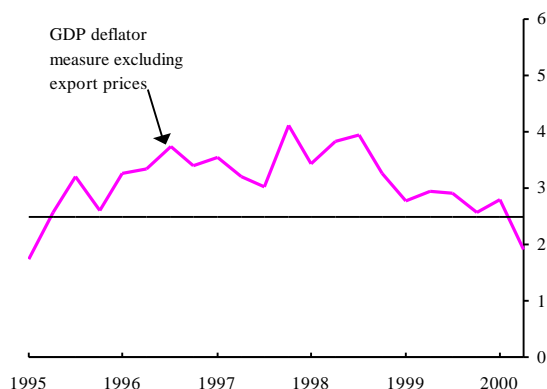
Measures of domestically generated inflation

Percentage change on a year earlier



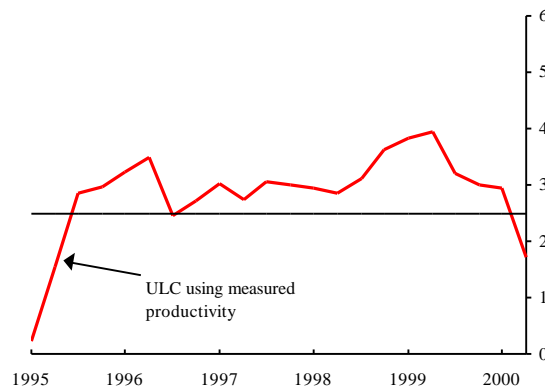
Measures of domestically generated inflation

Percentage change on a year earlier



Measures of domestically generated inflation

Percentage change on a year earlier



Over the last few years the MPC has therefore been concerned about the fact that so-called domestically generated inflation (DGI hereafter) has been above our target of 2.5%, with RPIX being only restrained by a high exchange rate. An encouraging feature of the current conjuncture is that all the four alternative measures of DGI that we monitor are either at or below the 2½% target (see Figures 8A-8D) for the first time since 1996. So-called “new economy” factors like intensified product market competition and higher (unmeasured) productivity growth have undoubtedly played an important role in keeping DGI subdued. However, it remains important for DGI to be relatively well-controlled. It has recently become fashionable to assert that

wage settlements should rise because headline inflation (RPI) is currently rather higher than RPIX (3% vs 1.9%).¹² It strikes me that a tendency for wages to follow past headline inflation was perhaps true of a world where firms had considerable product market power and inflation itself was not mean-reverting. Currently, we have a central bank that is mandated to maintain inflation at 2.5% at all times and intense product market competition. It is therefore less likely that wage settlements will rise significantly with headline inflation, but we must remain vigilant to this risk.

Another short-term risk to the benign inflation picture is the significant rise in the oil price. While the MPC has accommodated the first-round impact effect on inflation, we shall continue to look out for any evidence of second-round effects on wages, which must clearly be resisted. Once again, intense product market competition is likely to stiffen the resolve of employers, who can be expected to resist oil-related wage increases, but it remains important for us to be vigilant to this risk. Inflation expectations must not be allowed to rise. As discussed earlier, one is necessarily uncertain about the relative contribution of low import prices and structural changes to the improvement in the growth-inflation tradeoff. With import prices now having risen, we shall “learn” more about this in forthcoming months. Therefore, monitoring indicators of building wage or price pressures will be unusually important. It is important to remind ourselves that, historically, misplaced hopes of a supply-side improvement have led to poor policy decisions.¹³

More generally, it is important to emphasise that although the “New Economy” considerations discussed above have important disinflationary effects, they do not imply the death of inflation. It therefore remains important to continue to monitor a variety of wholly conventional influences on inflation when setting policy.

¹² The current RPI-RPIX differential is attributable to the abolition of tax relief on mortgage interest payments in the last budget, and the four interest rate rises since September 1999. On the MPC’s usual forecasting convention of unchanged interest rates, the RPI-RPIX differential should shrink to close to zero by next April.

¹³ See eg the discussion in Orphanides (1999), discussed above.

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