

The Impact of Interest Rate Policy in the Eurozone and the UK

Oxford Economic Forecasting

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Key Points

- Comparisons of the UK and Eurozone responses to interest rates suggest that the Eurozone requires greater increases in rates to achieve any given cut in inflation.
- Inside EMU, the UK economy's response to economic shocks would change – partly because of the fixed exchange rate, and partly because of the common monetary policy. We estimate that the UK response is generally likely to be more pronounced inside EMU than outside, that is entry could be potentially destabilising to the UK.
- These results are due largely to the UK's relatively rapid income and price responses: inside EMU, ECB interest rate reactions may be larger than the Bank of England would otherwise choose – and this may impose an economic cost on the UK.
- We find that this outcome still applies even in a 'reformed EMU' – one in which the ECB and the labour market are assumed to be closer to the Anglo-Saxon model. Indeed, differences in non-wage income effects may be much more important.

Introduction

Using Oxford Economic Forecasting's Global Macroeconomic Model, we firstly examine the responses of the Eurozone and UK economies to changes in interest rates. This suggests that the UK economy is more responsive to interest rate changes than the Eurozone. To achieve a reduction of about 1% in consumer prices (versus the base forecast) over two years is estimated to require a rate rise of only one percentage point (100bps) in the UK but two percentage points for the Eurozone – albeit the impact on Eurozone GDP is small. It is also possible that the Eurozone's price sensitivity to interest rates is less than used to be the case for, say, Germany on its own – this could be linked to capital flows and exchange rate behaviour, or to some form of Eurozone moral hazard problem in wage negotiations. This raises an additional question of monetary policy effectiveness within the Eurozone. The main difference between the UK – and the US – response to rate rises and the Eurozone's appears to be linked to the adjustment of wages/prices. However, this may actually be caused by the marked negative impact of rate rises on household income and consumption in the UK (and also the US): we will comment further on this result in the next section.

We then explore the impact of a variety of different economic shocks on the UK economy – assessing in particular how the UK's response to these shocks would differ if the UK were to join the European Monetary Union. The question we are addressing is whether the UK would be more or less responsive to economic shocks inside monetary union than outside but we also look at the impact economic reforms in continental Europe could make to this position. The consequence of the UK entering EMU is that it becomes subject to the same interest rates as the rest of the Eurozone, set by the ECB. In principle, fiscal policy could be used more actively manage the economy in the face of shocks but in the tests presented here, we have simply allowed fiscal stabilisers to operate and assumed no discretionary policy changes except where required to meet the Growth and Stability Pact.¹

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¹ Outside EMU, UK interest rates are assumed to keep inflation two years ahead at its baseline projection, which is consistent with the 2.5% target. Inside EMU, UK interest rates are set by the ECB, based on Eurozone inflation and output, where the Eurozone macroeconomic indicators include the UK.

The impact of interest rate changes on the UK and Eurozone: potential policy dilemmas for both

The first results presented are from a model simulation assessing the impact of a one percentage point (100bps) rate rise in the UK (Table 1) and in the Eurozone (Table 2) respectively (the tables quote % difference from the base forecast for GDP, consumers prices and other key variables, the scenarios are run separately). The estimated impact of a US rate rise on the US economy is also quoted for comparison (alongside the UK in Table 1).

As we indicate above, the results for the UK and US appear relatively close (allowing for the US impact undoubtedly being enlarged by the global effects of US interest rates) but the Eurozone response to a similar rate rise is very subdued. This points to the ECB needing to implement a 200bps rate rise to achieve the same impact on consumer prices in the Eurozone as a 100bps UK rate rise would have on UK prices (say, a cut of 1% in the CPI versus the base forecast by the end of two years). While this result appears to be caused by the relatively slow reaction from the labour market in the Eurozone (versus the UK and US), we will examine this point more carefully below. Noticeably, the GDP losses are also quite small in the Eurozone. Clearly these responses point to a potential pitfall for the UK in joining EMU and accepting ECB policy rules – ECB rate swings could be over-reactive from UK standpoint. In addition, the results reveal that the Eurozone itself faces a possible dilemma in achieving an effective anti-inflationary strategy using monetary policy.

TABLE 1: Impact of a 100bps Interest Rate Rise over 2 years									
UK: Bank of England rate rise of 100bps									
Deviations from base	GDP level	Industrial Production	Private Consumption Levels, constant prices	Total Investment	Total Exports	Wages	Employment	Consumer Prices level	Short interest rate % points
Year 1	-0.6	-0.4	-0.7	-0.6	-0.5	-0.3	-0.1	-0.2	1.0
Year 2	-1.7	-1.6	-2.2	-3.2	-0.9	-2.0	-0.3	-0.8	1.0
Alternative UK model	UK without non-wage income interest rate effects								
Year 1	-0.4	-0.4	-0.3	-0.4	-0.5	-0.1	-0.1	-0.1	1.0
Year 2	-1.3	-1.4	-1.4	-2.3	-0.9	-1.4	-0.3	-0.6	1.0
The US: a FED rate rise of 100bps									
Deviations from base	GDP level	Industrial Production	Private Consumption Levels, constant prices	Total Investment	Total Exports	Wages	Employment	Consumer Prices level	Short interest rate % points
Year 1	-0.5	-0.7	-0.5	-1.2	-0.8	-0.2	-0.2	-0.2	1.0
Year 2	-2.2	-4.1	-1.8	-5.4	-2.4	-1.9	-1.0	-1.0	1.0

The still short experience of the Eurozone undoubtedly makes it difficult to rely heavily on econometric evidence in assessing the accuracy of the model with respect to the behaviour of the Euro and also the Eurozone economies post-EMU. It can be argued that the impact of interest rates on the individual economies should be fairly stable from the pre-EMU period (changes in, say, investment or consumption behaviour would be very slow in materialising if they occur at all). However, we suggest

that it is possible that some important shifts in behaviour could have occurred quite quickly. In this respect, the mechanism by which interest rates have typically influenced the EU economies may have become more attenuated post EMU. The areas of greatest concern are probably the impact of interest rates on capital flows (and thus the exchange rate) and the even more nebulous effect of monetary policy on expectations, especially in the labour market. We take as an example the current Eurozone versus pre-EMU Germany, although similar issues might arise in other countries as well.

The impact of rates on capital flows and the exchange rate

Looking back at a casual linkage of interest rates in Germany with the performance of the exchange rate, (comparing, say real rates with those in the US), there may well be a case for seeing the Euro as less interest rate sensitive than the old DM. In the scenario quoted above, the Euro firms up by 2-3% at most (although similar to the pound or dollar response in the case of UK or US rate rises). But the equivalent for the DM may have been a swing of 10-20% or more (looking back at examples from the 1970s-1980s). That is, interest rate rises used to 'work' in Germany as an inflation suppressor because the DM strengthened quite markedly even for relatively small rate increases – i.e. with capital flows swinging the DM's way on a larger scale than has appeared to be the case for the Euro. It is possible that today's DM would have changed too – other parameters may have changed since the 1970s-1980s – and the 'new model' for the Euro will require time to discover. But recent experiences (and the OEF model) tentatively point to monetary policy being less effective in controlling inflation, certainly in the absence of larger reactions elsewhere, such as from wages.

TABLE 2: Impact of a 100bps Interest Rate Rise over 2 years									
Eurozone: original model									
Deviations from base	GDP level	Industrial Production	Private Consumption	Total Investment	Total Exports	Wages	Employment	Consumer Prices level	Short interest rate % points
Year 1	-0.5	-0.5	-0.4	-0.7	-0.8	-0.2	-0.1	-0.1	1.0
Year 2	-0.8	-1.0	-0.7	-1.4	-1.3	-0.7	-0.3	-0.4	1.0
Eurozone: assuming greater Euro sensitivity to interest rates									
Deviations from base	GDP level	Industrial Production	Private Consumption	Total Investment	Total Exports	Wages	Employment	Consumer Prices level	Short interest rate % points
Year 1	-0.8	-1.0	-0.4	-0.9	-2.6	-0.3	-0.2	-0.3	1.0
Year 2	-1.7	-2.4	-0.9	-2.3	-3.1	-1.4	-0.5	-1.1	1.0

Regarding the question mark over capital flows and the Euro, this seems a fairly intractable issue at present although some headway has been made through more detailed explanations of the various types of capital flows and their linkage to forecasts of the Euro. So far, however, the Euro has not

appeared to behave according any easy formula, even on a medium term view (when models usually perform quite well). Thus, to indicate the potential impact of a more sensitive exchange rate on inflation, we can perform another model simulation, assessing the impact of a 100bps interest rate rise on the Eurozone economy but assuming a large 10% appreciation of the Euro in each of the two years. Clearly this result would improve the inflation response to the monetary policy measure, indeed the results look very similar to those quoted above for the UK – although for different reasons. In the UK, wages fall by 2% by Year 2 versus the base forecast, whereas in the Eurozone wages fall by only 1.5% even in the ‘larger Euro response’ scenario (versus just 0.7% in the original model). The higher Eurozone result for the CPI relies on cutting import prices rather than wage growth. However, whilst this ‘solution’ would restore the effectiveness of monetary policy in EMU, a stronger Euro may not be so easy to achieve. The model results are indicative only and would probably represent a bout of wishful thinking on the ECB’s part rather than financial market reality.

Wage reactions too muted in Eurozone?

However, another possible reason for monetary policy being less effective in the Eurozone, and Germany, now than in pre-EMU Germany may be that the previous ‘understanding’ over monetary policy and wage settlements has broken down – growth and stability ‘pacts’ may work better in individual countries than at the EU level. Whether this change is because ‘expectations’ are less easy to form and influence now or because there is less sense of collective (EU) responsibility and social consensus, we cannot yet say. But the latter argument clearly indicates the potential for moral hazard rearing its head in EU wage setting. More positively, we may be in the early stages of a learning process that will lead to the establishment of an improved Eurozone ‘response’: but for now the policy dilemma remains.

Concern has regularly been expressed over the ‘inflexibility’ of the Eurozone’s labour markets and ‘reforms’ may address some of the problems raised over wage behaviour, making wages more sensitive to economic conditions without ‘understandings’ of the previous Germanic ‘pact’ form. This issue is looked at in more detail in the scenarios discussed below for the UK.

If indeed monetary policy proves ineffective in influencing Eurozone inflation, the upshot of this may be that Europe will be encouraged to turn more towards the ‘Anglo-Saxon’ means of interest rates influencing inflation. Certainly prices and wages have to be interest rate sensitive for monetary policy to be an effective tool. This possibly requires changes in labour market behaviour but it may also require demand (consumption and investment) to become more sensitive as well (to generate faster impacts on retailers’ prices, jobs and wages).

Consumer responses: the link to debt and financial markets

We also tested out this last ‘demand sensitivity’ theory – a view that has a strong institutional backing. A result that stands out in the interest rate scenarios quoted above is the extremely low impact of rate rises on *consumption* in the Eurozone versus the UK and US. This is not simply due to labour market responses rather it is strongly linked to the response of non-wage incomes to a rate change, the latter being affected by household net debt and the functioning of financial markets and the mortgage system. At least according to the OEF data and model, the average Eurozone household might even see a small *rise* in real incomes after an interest rate rise – largely offsetting other negative impacts on consumption (such as time preference). Naturally, in the case of there being very little change in household behaviour, there is no pressure on companies/retailers to cut prices and little impact on output and wages (and jobs). In the UK, in contrast, household net debt implies a large negative impact on net non-wage income following any increase in official interest rates (these rate changes are also transmitted more or less instantly and fully into consumer debt rates).

To illustrate the importance of this point, we tested the UK result again assuming that the interest rate sensitive parts of net non-wage income remain stable (instead of causing a negative impact on total disposable income). Although the outcome still shows the UK slightly more interest rate sensitive than the Eurozone, the 'gap' is substantially reduced. Within a normal margin of error we could say that the behaviour of the UK economy in this case is not very much different to that of the Eurozone.

We may argue that even if the differences between the UK and Eurozone are indeed mostly associated with households' net debt positions and the functioning of financial markets, this does not make the potential problem of appropriate interest rate setting any easier. However, changes in both debt and markets will occur over time and these changes will most likely bring the UK and Eurozone closer together. Convergence in financial markets and instruments is being actively encouraged by policy and the single European currency will promote more rapid progress. This may well satisfy at least part of the UK's potential problem by reducing some of the differential effects of rate rises. Nevertheless, if UK consumers maintain a greater preference for debt than savings – while the rest of the Eurozone maintains the opposite preference for high savings – then there will inevitably remain a markedly different impact on UK households from interest rate changes.

The comparison of the cross country results shows that investment as well as consumption may be more interest rate sensitive in the UK and US (although we note the US will be impacted by the global effects of a US rate rise – hence the large export loss – and this may also curb investment). Clearly part of this response will be due to the effect on residential construction and property markets where some of the same factors as bear upon the consumption result will tend to influence the outcome. We have less reason to expect business (plant and machinery) investment to be differentially affected by interest rates. We may also expect more rapid convergence in behaviour and institutional arrangements across Europe (and globally) in this respect.

Uncertainties versus relative certainties

To summarize the results examined above, we can be fairly certain about at least the last part of the analysis: the facts concerning the size of household debt and institutional arrangements speak for themselves. If indeed a large part of the observed differential response of the UK and Eurozone economies to monetary policy is due to these facts, then the implications are also clear. In contrast, the potential influence of the labour market is less clear cut (as we also find in the tests reported later in this report). And the impact of interest rates on exchange rates is a speculative view with very little evidence so far for one model or another.

We do, however, still see a possible dilemma for the ECB in controlling Eurozone inflation – it simply may not have a very effective tool, at least for now. And if the most pertinent explanation (in contrast to the UK and US) is that households don't particularly react to rate rises because they have no/low debt (and/or debt servicing is fixed) then the ECB can do little about this fact.

For the UK, there may be an attraction in EMU that has not been much emphasised: it may curb consumers' appetite for debt if they are the main 'victims' of swings in interest rates. We could also expect a rapid move towards more Eurozone-style fixed rate debt to avoid shocks from volatile interest rates. And these changes should move the UK closer to the Eurozone in terms of its interest rate sensitivity. This argument suggests that EMU membership may gradually *stabilise* rather than destabilise the UK economy.

Reactions to economic shocks: comparing the UK outside and inside EMU

Here we consider six different economic shocks:

1. An increase in short nominal interest rates of 1% point, but lasting for one year only (in looking at the longer term evolution post-shock, this is more realistic than extending the example above).
2. A 10% sustained appreciation of the euro and sterling exchange rates against the dollar.
3. A \$10 per barrel sustained increase in the world oil price.
4. A faster recovery in the high tech sector globally.
5. A 25% fall in global equity prices, lasting for one year.
6. A recession in the US economy.

These shocks would all have a slightly varied impact on different economies, reflecting their different degrees of exposure. For example, the fact that equities are a larger proportion of consumer wealth in the UK than in most of Europe means that the same proportionate fall in equity prices in all countries may have a larger impact on consumer spending in the UK than elsewhere in Europe.

But the question we are addressing in here is not how the UK response to these shocks differs from that of other European economies. Instead, we are interested in how the UK response itself would change if the UK were to enter the EMU, and what impact various kinds of economic reforms to EMU would have on that response.

To do that, we consider the UK response to these shocks in five different EMU scenarios.

EMU scenarios

1. The UK remains outside EMU, which remains unreformed.
2. The UK enters an unreformed EMU (we assume in all of the following scenarios that the UK enters EMU at the equilibrium exchange rate and leave discussion of the UK's possibly entry cycle to another report).
3. The UK enters EMU after reform of the ECB. The reform is such that the ECB adopts a symmetric inflation target and attaches a lower weight in its policy reaction function to current inflation, and a higher weight to the output gap.
4. The UK enters EMU after reform of the labour market. The reform results in a lower NAIRU in Europe, and quicker adjustment in real wages in response to any shock, so that the process of price adjustment as a whole is quicker, and therefore the recovery in real variables (output, employment etc) to their equilibrium is also faster.
5. The UK enters EMU after both of these reforms have occurred.

The rest of this paper is organised as follows. We go through each of the six economic shocks in turn, and consider the impact on the UK of each of these shocks in each of the EMU scenarios above.

1 An increase in short interest rates

The table below summarises the impact of an increase in interest rates on the UK in each of the five EMU scenarios. For this shock, as for all the other shocks below, we consider the impact on the UK

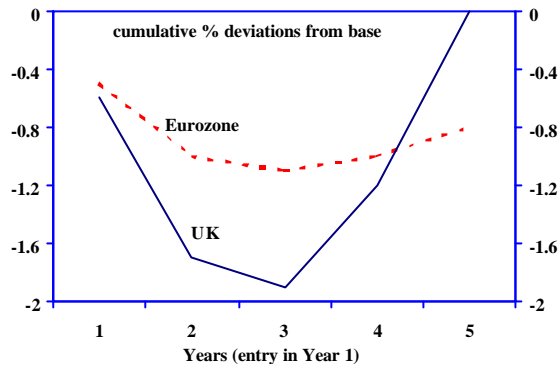
over a period of five years. For convenience, we have assumed that Year 1 is 2004, but the results would not be significantly different if it were 2005 or 2006: the results below do not depend on the date at which sterling joins EMU.

Table 3: GDP impact of interest rate rise

% change in level of GDP from base	UK					Eurozone				
	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5
UK out No reform	-0.7	-0.6	0.4	-0.1	-0.3	-0.5	-0.5	-0.1	-0.1	-0.1
UK in No reform	-0.6	-1.1	-0.2	0.7	1.2	-0.5	-0.5	-0.1	0.1	0.2
UK in ECB reform	-0.6	-1.0	0.4	1.4	1.4	-0.5	-0.3	0.2	0.5	0.4
UK in lab mkt reform, no ECB reform	-0.6	-1.1	-0.2	0.6	1.1	-0.5	-0.5	-0.1	0.1	0.2
UK in total reform	-0.6	-1.0	0.4	1.3	1.3	-0.5	-0.3	0.2	0.5	0.4

- The initial UK response to higher interest rates is more pronounced than that of the Eurozone as a whole, under all the different scenarios for EMU. That reflects the fact that in the UK, firms and businesses tend to borrow at variable rather than fixed rates, the UK has a higher proportion of home-owners and therefore mortgage payers than elsewhere and consumer debt as a whole tends to be higher as well.
- The table above shows that the response of the UK to higher interest rates increases as a result of the UK joining an unreformed monetary union – essentially because the ECB are slower to reverse the initial rate rises than would be the MPC. Because the UK is more sensitive to higher rates, when the ECB cuts do come through, those cuts result in a sharper recovery in UK output later on. The UK economy essentially becomes more volatile/cyclical.
- Reform of the ECB dampens the Eurozone response to the initial rate rise – basically because the new ECB cuts more aggressively after the initial rise. That results in a more damped initial outcome for the UK as well, though this is still a more cyclical outcome than when the UK is outside EMU – the reformed ECB is still targeting Eurozone variables like growth and inflation, not UK variables, so the UK’s extra sensitivity to interest rates means it experiences disproportionately big swings. That also shows up in the quicker recovery in the UK once the cuts in rates start to work through. This sharper recovery comes at a cost: by Year 5, inflation in the UK is 1% point higher than base – with the UK outside EMU, inflation is stable by the end of the period.
- Reform of the Eurozone labour market (so that real earnings adjust more quickly to their long-run equilibrium, and respond more to any change in unemployment) makes a very small difference to these results for the UK – damping the response in years 4 and 5. That is essentially because the faster adjustment of real earnings in Europe means interest rates do not fall quite so far after the initial increase: the cuts in rates don’t need to be as deep or as long-lasting to bring output and employment back to base in Europe as a whole. Smaller cuts in rates later on mean that UK output does not recover so quickly.

rates, with the UK in an unreformed EMU



- Reform of both the ECB and the labour market would still see the UK hit harder in the early years of a rate rise than when outside EMU, and the recovery would be sharper once rates are cut, leading to extra inflationary pressure in the UK later on.

2 Appreciation of the exchange rate

The table below summarises the impact of an appreciation of both the euro and sterling exchange rates against the dollar in each of the five EMU scenarios. A higher exchange rate leads to a loss of competitiveness, and a deterioration of the current account of the balance of payments, thus reducing GDP. The simulation sees both sterling and the euro appreciate against the dollar in all cases, so there is no change in the competitiveness of the UK against the Eurozone from the initial exchange rate shock.

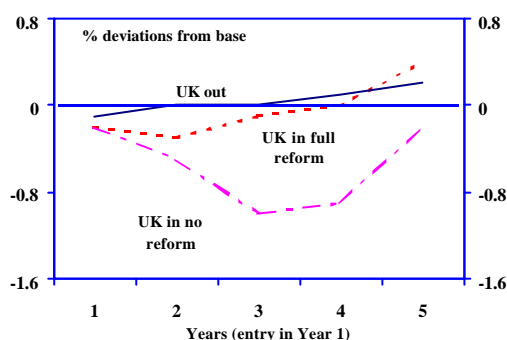
Table 4: GDP impact of exchange rate appreciation

% change in level of GDP from base	UK					Eurozone				
	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5
UK out No reform	-0.1	0.0	0.0	0.1	0.2	-0.3	-0.4	-0.6	-0.5	-0.2
UK in No reform	-0.2	-0.5	-1.0	-0.9	-0.2	-0.3	-0.4	-0.7	-0.6	-0.2
UK in ECB reform	-0.2	-0.3	-0.2	0.1	0.6	-0.3	-0.2	-0.2	0.0	0.5

UK in lab mkt reform, no ECB reform	-0.2	-0.5	-0.9	-1.0	-0.4	-0.3	-0.4	-0.7	-0.6	-0.2
UK in total reform	-0.2	-0.3	-0.1	0.0	0.4	-0.3	-0.2	-0.2	0.0	0.5

- The UK is significantly more sensitive to an appreciation of its currency against the dollar than is the Eurozone on average: that reflects the fact that a larger proportion of UK exports go to the US than of Eurozone exports. But with the UK outside EMU, the MPC can respond aggressively to such an appreciation, cutting interest rates hard. A relatively sluggish response from the ECB means that – despite the UK’s greater exposure – the UK fares better than the Eurozone average when outside EMU.
- Entry to EMU makes the hit to the UK from an appreciation against the dollar far worse: since the Eurozone on average is less exposed than the UK, Eurozone interest rates do not move by so much to offset this shock as UK interest rates would if they were independent. From being less affected than the Eurozone average, the UK moves to become more affected by entering an unreformed EMU.
- ECB reform improves the UK’s position substantially: a higher weight on output and a lower

Impact on UK GDP level of a 10% appreciation against the dollar



weight on slow-moving inflation means that interest rates fall further after the ECB has been reformed. The UK’s extra sensitivity to interest rate changes means that output in the UK returns more quickly to base later on. But even with ECB reform, the UK is still worse affected in the early stages inside EMU than outside.

- Labour market reform makes very little difference here – in the later years, output in the UK is lower than without labour market reform, since interest rates do not have to fall by so much in order to bring Eurozone output as a whole back to base.
- With reform of both the ECB and the labour market, the UK is hit harder in the early years by an exchange rate appreciation than when it is outside EMU.

3 Increase in world oil prices

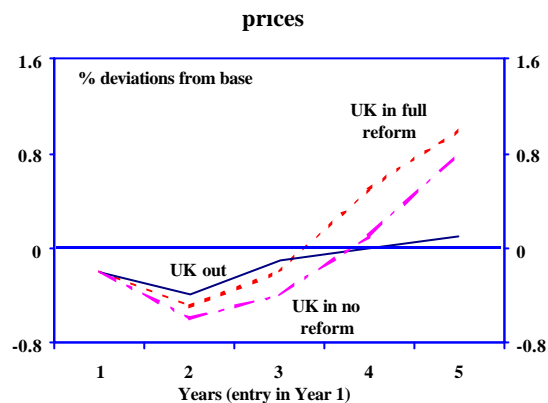
The table below summarises the impact of an increase in oil prices on the UK in each of the five EMU scenarios. Higher oil prices increase costs to business, reducing their profits and encouraging them to

increase the price of their output. To the extent that general prices do increase as a result of higher oil prices, that increase will reduce the real income of consumers and firms alike. Lower profits and lower real incomes will lead to lower investment and lower consumer spending. Moreover, to the extent that the central bank increases interest rates to counter the increase in inflation, consumer spending and investment will be further depressed.

Table 5: GDP impact of oil price rise

% change in level of GDP from base	UK					Eurozone				
	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5
UK out No reform	-0.2	-0.4	-0.1	0.0	0.1	-0.3	-0.5	-0.5	-0.4	-0.3
UK in No reform	-0.2	-0.6	-0.4	0.1	0.8	-0.2	-0.4	-0.4	-0.3	0.0
UK in ECB reform	-0.2	-0.5	-0.2	0.5	1.1	-0.1	-0.3	-0.3	0.0	0.1
UK in lab mkt reform, no ECB reform	-0.2	-0.6	-0.4	0.1	0.7	-0.2	-0.4	-0.4	-0.3	-0.1
UK in total reform	-0.2	-0.5	-0.2	0.5	1.0	-0.1	-0.3	-0.3	0.0	0.0

- If the UK remains outside EMU, its response to higher oil prices is slightly less marked than that of the rest of the Eurozone. That reflects the fact that the MPC is less inclined to increase interest rates in response to the impact of higher oil prices on general prices than is the ECB, as well as the terms of trade gains for the UK as an oil exporter. So consumer spending and investment are hit less hard in the UK than in the rest of the Eurozone in response to higher oil prices.
- Once the UK enters monetary union, however, its relatively high sensitivity to changes in interest rates dominates all other effects. Since the increase in interest rates is now the same across the UK and all other Eurozone economies, but the UK is more sensitive to this increase, GDP in the UK is hit harder than in the rest of the Eurozone.
- Reform of the ECB results in a more accommodative stance of monetary policy, so that Eurozone output falls by less. That also passes through to the UK, where the cycle is more damped than without ECB reform. But it is still larger than when the UK is outside EMU.
- Labour market reform dampens the UK response slightly in the later years, again as faster adjustment of real earnings in continental Europe means interest rates do not fall so far.
- Reform of the ECB and the labour market sees the UK hit slightly harder by an oil price rise in the early years than when outside EMU. But the subsequent cuts in ECB interest rates then drive a faster recovery in the UK: the cycle is more pronounced.



4 ICT recovery

The table below summarises the impact of sharper recovery in the global ICT sector on the UK in each of the five EMU scenarios. The ICT sector includes both manufacturing and related service industries for IT, telecoms and semi-conductors. Different economies have different levels of exposure to the ICT sector as a whole; in particular, the IT sector is far more important in the US than in Europe, while the opposite is true of the telecoms sector. Relative to the Eurozone average, the UK is more exposed to the cycle in the ICT sector than is the Eurozone overall.

Table 6: GDP impact of ICT recovery

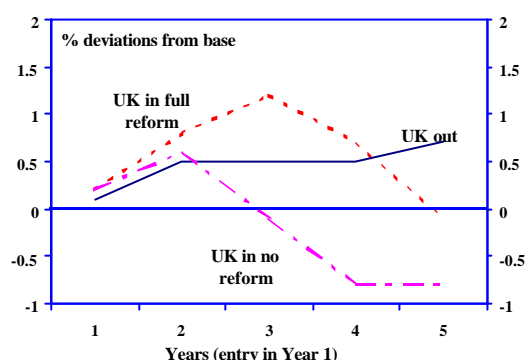
% change in level of GDP from base	UK					Eurozone				
	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5
UK out No reform	0.1	0.5	0.5	0.5	0.7	0.1	0.2	0.1	0.1	0.3
UK in No reform	0.2	0.6	-0.1	-0.8	-0.8	0.2	0.5	0.3	0.1	0.2
UK in ECB reform	0.2	0.7	0.6	0.0	-0.2	0.2	0.6	0.6	0.5	0.7
UK in lab mkt reform	0.2	0.7	0.5	-0.1	-0.7	0.2	0.7	0.7	0.4	0.3
UK in total reform	0.2	0.8	1.2	0.7	-0.1	0.2	0.8	1.0	0.8	0.8

- With the UK outside the Eurozone, the impact of a sharper recovery in the ICT sector is greater in the UK than in the Eurozone as a whole. That is because of the UK's relatively high exposure to the ICT sector and the MPC's less hawkish anti-inflationary stance.
- Entry to monetary union ensures the same interest rates in the UK as elsewhere in the Eurozone. The ECB's relative hawkishness and the UK's extra sensitivity to interest rate changes means the UK is hit relatively hard, with output actually falling relative to base later on.
- ECB reform means the ECB becomes more like the MPC, and is less hawkish on inflation. Consequently, extra growth is allowed across the Eurozone as a whole, including in the UK.

But even the reformed ECB tightens rates to control Eurozone average demand growth later on, and the UK's excess interest-rate sensitivity means it is hit hardest.

- Labour market reform sees a slightly larger effect on both the Eurozone and the UK. This effect comes about because faster increases in real earnings encourage more people into the labour market, boosting equilibrium employment and potential output. With potential output higher, the ECB has less need to increase interest rates, which crowds in extra growth in both the UK and the Eurozone. However, the ECB is still as hawkish as ever in this scenario, so they do not accommodate as much extra growth as the MPC would in the UK in the early years, and later on – to squeeze Eurozone demand overall – interest rates go up, hitting the UK hardest.
- Reform of both the ECB and the labour market sees UK output benefiting a little from a more accommodative stance of monetary policy combined with faster adjustment in the labour market in Europe reducing the need for interest rate rises. However, despite these reforms, the UK still sees a more pronounced cycle inside EMU than outside.

Impact on UK GDP level of a faster recovery in the ICT sector



5 Global fall in equity prices

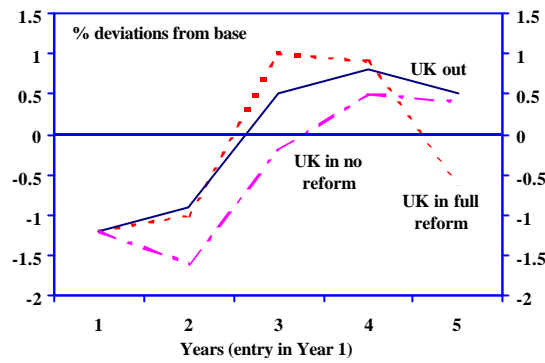
The table below summarises the impact of global fall in equity prices on the UK in each of the five EMU scenarios. Lower equity prices will reduce consumers' financial wealth, and will therefore reduce consumer spending. Lower spending will hit demand and company profits, which will feed back on to unemployment, incomes and consumer spending once again. Different countries will be exposed in differing degrees to changes in equity prices, reflecting the role that equities play in wealth in those countries. In general, equities are a more important component of consumer wealth in the UK than in the Eurozone, so – for the same fall in equity prices – the UK should expect to be hit harder than the Eurozone as a whole. On top of the direct impact of lower equity prices, we have also allowed for some confidence effects, such that consumer spending and investment are hit harder than would be implied by the reduction in equity prices alone. Such confidence impacts are often associated with sharp falls in equity prices. The confidence effects are assumed to be the same in all the reform scenarios below.

Table 7: GDP impact of equity price fall

% change in level of GDP from base	UK					Eurozone				
	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5
UK out No reform	-1.2	-0.9	0.5	0.8	0.5	-0.9	-0.8	-0.2	-0.2	-0.6
UK in No reform	-1.2	-1.6	-0.2	0.5	0.4	-1.0	-1.0	-0.1	0.0	-0.5
UK in ECB reform	-1.2	-1.1	1.0	1.2	-0.4	-0.9	-0.5	0.6	0.3	-0.7
UK in lab mkt reform, no ECB reform	-1.2	-1.5	-0.2	0.2	0.2	-1.0	-0.9	-0.1	-0.1	-0.6
UK in total reform	-1.2	-1.0	1.0	0.9	-0.6	-0.9	-0.4	0.6	0.2	-0.8

- With the UK outside EMU, the UK response to lower equity prices is slightly more pronounced than that of the Eurozone as a whole in the early years, but UK output recovers back to base (and above) more quickly. Again, this is down to the more aggressive policy response from the MPC than from the ECB: increased exposure to equity price movements in the UK is more than offset in the medium term by more aggressive monetary policy loosening.
- But when the UK joins monetary union, that changes: subject to the same interest rates as the rest of the Eurozone, the UK suffers a steeper fall in output over the first two years than in the Eurozone as a whole.
- Reform of the ECB to something more like the MPC means the initial response of the UK is very similar inside EMU to when the UK is outside. But later on, as ECB interest rates fall in order to stabilise Eurozone output, the UK's extra sensitivity to interest rate changes means that output in the UK recovers more quickly than in the base case, overshooting the base scenario by more than the Eurozone average. UK output, as a result, is more cyclical than in the case where the UK is outside EMU.
- Labour market reform has a slightly damping effect on the impact of an equity price fall both on the Eurozone and the UK: interest rates do not fall so far as they might otherwise have done.
- Reform of both the ECB and the labour market sees an equity price fall trigger a more pronounced cycle in the UK than when the UK is outside EMU, even though the cycle is slightly damped relative to the case of the UK entering an unreformed EMU.

with confidence effects



6 US recession

The table below summarises the impact of a simulation of US recession on the UK in each of the five EMU scenarios. A recession in the US will reduce US domestic demand and in doing so, it will hit demand for exports to the US from the Eurozone and the UK. So the current account of the balance of payments in the Eurozone and the UK will suffer, reducing GDP, and feeding through therefore to income, profits, employment and domestic demand in the Eurozone and the UK. On top of these trade linkages, a recession in the US is likely to have damaging confidence effects on other countries as well (there was clear evidence of such effects across the world during 2001). Different countries will be affected in differing degrees according to the extent of trade linkages and the impact on confidence. The UK is more heavily exposed via trade and probably confidence as well to the US than is the Eurozone as a whole. So the direct impact of a recession in the US is likely to be larger in the UK than in the Eurozone.

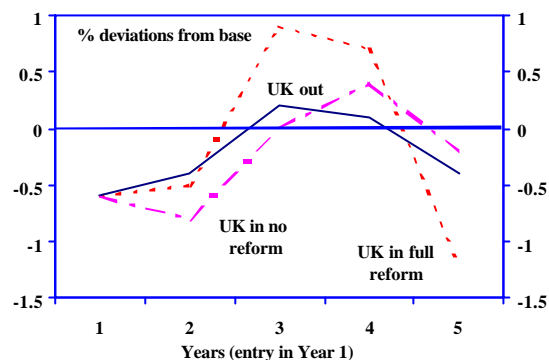
Table 8: GDP impact of US recession

% change in level of GDP from base	UK					Eurozone				
	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5
UK out No reform	-0.6	-0.4	0.2	0.1	-0.4	-0.6	-0.6	0.1	0.3	-0.1
UK in No reform	-0.6	-0.8	0.0	0.4	-0.2	-0.6	-0.6	0.2	0.5	0.0
UK in ECB reform	-0.6	-0.5	0.9	1.0	-1.0	-0.6	-0.3	0.7	0.7	-0.2
UK in lab mkt reform	-0.6	-0.8	0.0	0.1	-0.4	-0.6	-0.6	0.1	0.4	0.0
UK in total reform	-0.6	-0.5	0.9	0.7	-1.2	-0.6	-0.3	0.6	0.6	-0.2

- Despite the UK’s relatively high exposure to the US, with the UK outside EMU, the impact on UK GDP is slightly smaller than in the Eurozone as a whole, at least in the early years.
- Entry to EMU increases the hit to the UK sharply: subject to the same interest rates, the more exposed economies will suffer the steepest falls in output, and the UK is one of those.

- ECB reform damps the Eurozone response somewhat due to a more aggressive policy loosening, and that passes through to the UK as well. But even with ECB reform, the UK

Impact on UK GDP level of a US recession



cycle is more pronounced inside EMU than outside – a consequence of the fact that the ECB is targeting the whole of the Eurozone and not just the UK. With ECB reform, UK growth overshoots in the recovery period, leading to higher inflation.

- Labour reform sees the UK recovery after the initial shock more subdued, because interest rates do not need to fall so far to boost growth across the Eurozone as a whole.
- Reform of both the ECB and the labour market sees the UK pushed into a more pronounced cycle as a result of the US downturn than when the UK is outside EMU. The MPC succeeds in stabilising UK output fairly quickly, consistent with stable inflation. Inside EMU, even after reform, the UK's extra sensitivity to the US means that stabilising Eurozone growth and inflation is consistent with a more pronounced cycle in the UK. The consequence is significantly higher inflation in the UK by the end of the period.

Labour market reform in Europe

One of the scenarios reported above sees the labour markets of continental Europe reformed dramatically, in much the same way as the UK labour market was reformed in recent decades. The main purpose of such change would be to achieve a lower equilibrium rate of unemployment in Europe. In the scenarios above, we assume that this objective is achieved: that the reform of the labour market sees the Eurozone's NAIRU fall to 5.5% points, i.e. to a rate closer to that enjoyed in the UK and the US.

However, in addition to changing the equilibrium unemployment rate, labour market reform has an effect on the response of the Eurozone economy to different kinds of shock. To explain why this is so, we provide a brief description of the changes we have made to the OEF model in order to try and capture the impact of labour market reform.

We have assumed that real earnings become more responsive to shocks of various kinds: they adjust more quickly to their long-run equilibrium value, and they respond more markedly to deviations in unemployment away from the NAIRU. So any shock that results in a rise in unemployment will see

real earnings fall more quickly relative to base. Faster adjustment of real earnings then allows unemployment to return more quickly to its long-run equilibrium.

The labour market is one of the key channels of the transmission mechanism for most economic shocks. By speeding up the rate at which equilibrium is achieved in the labour market, the transmission mechanism as a whole is changed. In general, we should look for labour market reform to damp down the real effects of economic shocks, especially after the first couple of years, once the adjustment towards the long-run starts to kick in.

The numbers reported in the tables above show the outcome for GDP in the UK and the Eurozone. In general (with a couple of exceptions) these tables do not show a large effect on the simulation results as a result of labour market reform. However, that does not imply that the reform of the labour market is having no effect: the effects are more visible on unemployment and real earnings than on GDP as a whole. This is partly a result of the size of the shocks that we consider above: in general, they are not large enough to pull out the marginal impact of labour market reform. And it is partly a consequence of the fact that the main impact of labour market reform is not on the dynamic adjustment of the Eurozone economy to different shocks, but on the long-run equilibrium unemployment rate.

The table below summarises the impact of labour market reform on unemployment in the Eurozone excluding the UK in the first two years, using the results of the six scenarios above.

Changes from base (thousands)	Eurozone unemployment (excluding UK)			
	Without labour market reform		With labour market reform	
	Yr 1	Yr 2	Yr 1	Yr 2
Higher interest rates	152	142	137	62
Higher exchange rate	83	79	76	62
Higher oil prices	62	165	56	106
ICT recovery	-65	-188	-53	-97
Equity price fall	275	281	256	157
US recession	179	206	165	121

The table shows that labour market reform generally dampens the unemployment response to the various shocks, by speeding up the adjustment of wages and real earnings.

Reform of the Growth and Stability Pact

The shocks explored above generally looked at the impact of marginal changes in one or two variables under different reform scenarios. None of these marginal shocks was in itself large enough to push the UK – or any other major Eurozone economy – close to recession. However, there is one sense in which it is informative to consider what would happen if the UK – or any other major Eurozone economy – were to go into a more serious downturn. Such a scenario would test the constraints of the Growth and Stability Pact.

The Growth and Stability Pact constrains the government budget deficit to be less than 3% of GDP, except in a recession, when the rules are relaxed. That constraint is most likely to bite when a given economy is in a downturn but (by definition) not a full-blown recession, since increases in unemployment and a reduction in the size of the tax base will tend to push up government spending and reduce government revenues simultaneously.

Below, we consider the impact of a global slowdown, hitting the UK and the rest of the Eurozone via trade links, equity prices and confidence effects – a shock comparable to that which occurred during 2001. Such a shock would seriously damage growth in the UK and Germany in particular. Unconstrained, the government deficit in both those countries would breach the 3% of GDP limit imposed by the Growth and Stability Pact. But the constraints that the Pact imposes would force both countries to tighten fiscal policy, damaging growth further. Our baseline forecast for the UK assumes that UK government borrowing evolves as in the Treasury’s Budget forecast.

The tables below show the impact of such a shock on GDP, consumer prices and interest rates in the UK and the Eurozone as a whole, under two different scenarios. The first sees the UK a member of EMU, and the Growth and Stability Pact unreformed. The second sees the UK a member of EMU with a reformed Growth and Stability Pact – one that allows the government deficit to grow to offset weaker demand growth – essentially allowing the ‘automatic stabiliser’ effects to operate. In this scenario, we are not assuming there is any discretionary loosening of fiscal policy, just that the deficit responds to higher spending and lower receipts in the normal, automatic way.

Table 9: UK in EMU, unreformed Growth and Stability Pact

% changes from base	UK		Short interest rate	Eurozone	
	GDP level	Consumer price level		GDP level	Consumer price level
Year 1	-1.7	-0.4	-1.1	-1.3	0.0
Year 2	-2.3	-1.8	-1.5	-2.0	-0.9
Year 3	-3.5	-4.7	-0.7	-1.8	-2.2
Year 4	-2.9	-8.2	-0.2	-1.5	-3.5
Year 5	-1.6	-11.4	-0.3	-1.4	-4.8
Year 6	0.8	-13.2	-0.6	-1.0	-6.0
Year 7	3.0	-12.7	-0.4	-0.6	-6.8
Year 8	3.4	-9.7	0.0	-0.4	-7.2

Table 10: UK in EMU, reformed Growth and Stability Pact

% changes from base	UK		Short interest rate	Eurozone	
	GDP level	Consumer prices		GDP level	Consumer prices
Year 1	-1.7	-0.4	-1.0	-1.2	0.0
Year 2	-2.3	-1.8	-1.5	-1.8	-0.9
Year 3	-3.4	-4.7	-0.7	-1.5	-2.1
Year 4	-2.7	-8.0	-0.2	-1.2	-3.3
Year 5	-1.5	-11.1	-0.3	-1.2	-4.4
Year 6	0.8	-12.8	-0.6	-1.0	-5.5
Year 7	3.0	-12.3	-0.4	-0.5	-6.2
Year 8	3.2	-9.4	0.0	-0.3	-6.6

The impact on the UK of reform to the Growth and Stability Pact in this scenario is small but significant: the absence of the Pact's constraint on UK fiscal policy leads to a cumulative gain in GDP of 0.4% by Year 5. But the impact on the Eurozone as a whole is more pronounced – essentially because Germany falls foul of the Pact's rules in a much more serious way than does the UK, starting from here. The loss in Eurozone output from applying the constraints of the Pact in the face of such a shock as this is a cumulative 1.1% of GDP over the first five years – most of this coming from Germany alone. If Germany can fall foul of the Growth and Stability Pact, then so can other countries, including the UK – with potentially serious implications for growth.

Conclusions

It seems both plausible and likely that the UK and the Eurozone have rather different responses to monetary policy. In particular, the UK seems to be more responsive than the average EU economy to changes in interest rates. However, as the experience of the Eurozone is still very short, and previous years saw a mixture of managed and floating rate regimes, the evidence is not yet as clear as we would like, especially regarding the reasons for the Eurozone's potentially weak reaction to rate changes. The arguments rely largely on conjecture at this point.

Most obviously, Eurozone monetary policy will never respond to UK conditions alone, but to conditions across the Eurozone as a whole. Thus, to the extent that the UK is disproportionately exposed to economic shocks and/or reacts differently than the average Eurozone economy to interest rate policy, the interest rate setting of the ECB is likely to be less than optimal from the perspective of the UK alone. This could result in greater volatility in the UK economy but if the effects (risks) appear very small then other considerations will be more important in any overall decision on EMU membership.

In general, an independent monetary policy can be expected to do a better job of controlling the cycle in any one country than a joint monetary policy. That is what we find in the scenarios above. And this is still true even with a 'reformed EMU' and/or a more flexible EU labour market: the ECB must seek to control of overall Eurozone variables (output, inflation, unemployment) rather than just those of the UK or any other individual country member. Potentially, this implies that once inside EMU, the UK economy may see more pronounced cyclical responses to external shocks. Long-term losses could well be associated with a suboptimal policy from the UK's standpoint but these may also be very small. Allowing for the overall imperfection of policy responses, and widespread uncertainties (some of which EMU membership could actually reduce), then the estimates of possible EMU related losses for the UK presented here are relatively insignificant.

Of course, there may be other costs and benefits associated with membership of EMU, which we have not even addressed here. And we have raised some as yet unresolved issues over the response of the Eurozone economy to monetary policy. But the issues raised do focus on one aspect of the 'costs' of entry and loss of an independent monetary policy. Model estimates provide one means of quantifying these costs.

Detailed Simulation Results

Impact of Interest Rate Rise					
Deviations from base	UK				
	GDP level	Industrial Production level	Unemployment thousands	Consumer Prices level	Short interest rate % points
Year 1	-0.6	-0.4	20.0	-0.2	1.0
Year 2	-1.0	-0.8	68.0	-0.6	-0.7
Year 3	0.4	0.5	1.0	-0.7	-0.5
Year 4	1.3	1.8	128.0	-0.3	-0.2
Year 5	1.3	1.6	152.0	0.2	0.3
Deviations from base	Eurozone				
	GDP level	Industrial Production level	Unemployment thousands	Consumer Prices level	Short interest rate % points
Year 1	-0.5	-0.5	138.0	-0.1	1.0
Year 2	-0.3	-0.4	19.0	-0.4	-0.7
Year 3	0.2	0.1	-81.0	-0.4	-0.5
Year 4	0.5	0.3	-113.0	-0.3	-0.2
Year 5	0.4	0.3	-45.0	-0.2	0.3

Impact of Exchange Rate Appreciation					
Deviations from base	UK				
	GDP level	Industrial Production level	Unemployment thousands	Consumer Prices level	Short interest rate % points
Year 1	-0.2	-0.6	-0.1	-0.3	-0.6
Year 2	-0.3	-1.6	9.0	-0.4	-1.2
Year 3	-0.1	-2.3	8.0	-0.7	-1.6
Year 4	0.0	-2.6	-5.0	-0.8	-1.8
Year 5	0.4	-2.0	-37.0	-0.9	-1.2
Deviations from base	Eurozone				
	GDP level	Industrial Production level	Unemployment thousands	Consumer Prices level	Short interest rate % points
Year 1	-0.3	-0.4	78.0	-0.3	-0.6
Year 2	-0.2	-0.4	11.0	-0.7	-1.2
Year 3	-0.2	-0.4	-14.0	-1.0	-1.6
Year 4	0.0	-0.2	-110.0	-1.3	-1.8
Year 5	0.5	0.4	-219.0	-1.4	-1.2

Impact of Oil Price Rise					
Deviations from base	UK				
	GDP level	Industrial Production level	Unemployment thousands	Consumer Prices level	Short interest rate % points
Year 1	-0.2	-0.3	7.0	0.3	0.2
Year 2	-0.5	-0.3	21.0	0.2	-0.1
Year 3	-0.2	0.0	12.0	0.2	-0.3
Year 4	0.5	0.5	-32.0	0.2	-0.4
Year 5	1.0	1.2	104.0	-0.1	0.0
Deviations from base	Eurozone				
	GDP level	Industrial Production level	Unemployment thousands	Consumer Prices level	Short interest rate % points
Year 1	-0.1	-0.1	35.0	0.2	0.2
Year 2	-0.3	-0.3	90.0	0.5	-0.1
Year 3	-0.3	-0.3	89.0	0.4	-0.3
Year 4	0.0	-0.1	39.0	0.5	-0.4
Year 5	0.0	0.0	21.0	0.3	0.0

Impact of ICT Recovery					
Deviations from base	UK				
	GDP level	Industrial Production level	Unemployment thousands	Consumer Prices level	Short interest rate % points
Year 1	0.2	0.3	-5.0	0.0	0.1
Year 2	0.8	1.5	-40.0	0.1	0.7
Year 3	1.2	2.4	-60.0	0.5	1.2
Year 4	0.7	2.0	-8.0	1.0	1.6
Year 5	-0.1	1.4	81.0	0.9	1.8
Deviations from base	Eurozone				
	GDP level	Industrial Production level	Unemployment thousands	Consumer Prices level	Short interest rate % points
Year 1	0.2	0.3	-51.0	0.0	0.1
Year 2	0.8	1.0	-112.0	0.3	0.7
Year 3	1.0	1.3	-125.0	0.5	1.2
Year 4	0.8	1.1	4.0	0.9	1.6
Year 5	0.8	0.9	-138.0	0.9	1.8

Impact of Equity Price Fall					
Deviations from base	UK				
	GDP level	Industrial Production level	Unemployment thousands	Consumer Prices level	Short interest rate % points
Year 1	-1.2	-0.6	32.0	-0.2	-0.7
Year 2	-1.0	-0.6	76.0	-0.9	-2.0
Year 3	1.0	1.7	-48.0	-1.5	-0.8
Year 4	0.9	3.0	-141.0	-1.3	0.4
Year 5	-0.6	1.7	-41.0	-0.6	0.1
Deviations from base	Eurozone				
	GDP level	Industrial Production level	Unemployment thousands	Consumer Prices level	Short interest rate % points
Year 1	-0.9	-1.0	244.0	-0.1	-0.7
Year 2	-0.4	-0.6	43.0	-0.5	-2.0
Year 3	0.6	0.7	-215.0	-0.6	-0.8
Year 4	0.2	0.3	-64.0	-0.4	0.4
Year 5	-0.8	-0.7	226.0	-0.3	0.1

Impact of US Recession					
Deviations from base	UK				
	GDP level	Industrial Production level	Unemployment thousands	Consumer Prices level	Short interest rate % points
Year 1	-0.6	-0.4	17.0	-0.1	-0.5
Year 2	-0.5	-0.8	32.0	-0.4	-1.4
Year 3	0.9	-0.1	-42.0	-0.6	-0.7
Year 4	0.7	0.0	-83.0	-0.1	0.8
Year 5	-1.2	-1.4	36.0	0.2	0.8
Deviations from base	Eurozone				
	GDP level	Industrial Production level	Unemployment thousands	Consumer Prices level	Short interest rate % points
Year 1	-0.6	-0.7	156.0	-0.1	-0.5
Year 2	-0.3	-0.6	46.0	-0.4	-1.4
Year 3	0.6	0.5	-221.0	-0.5	-0.7
Year 4	0.6	0.6	-176.0	-0.3	0.8
Year 5	-0.2	-0.1	100.0	0.0	0.8