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**MONETARY MISCONCEPTIONS:  
NEW AND OLD PARADIGMATA  
AND OTHER SAD TALES**

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## **ABSTRACT**

### **Monetary Misconceptions: New and Old Paradigmata and Other Sad Tales\***

The Paper identifies a number of misconceptions about the monetary policy process and the monetary transmission mechanism in the UK. Among the misconceptions about the process are the alleged lack of regional and sectoral representativeness of the Monetary Policy Committee and the view that operational central bank independence means that monetary and fiscal policy are not properly coordinated.

Among the transmission mechanism misconceptions, the 'New Paradigm' figures prominently. Among the New Paradigm changes in the British economy that have been given prominence are the following: increasing openness; lower global inflation; lower profit margins, reflecting stronger competitive pressures; buoyant stock markets; a lower natural rate of unemployment; and a higher trend rate of growth of productivity. I argue that the New Paradigm has been over-hyped and misunderstood as regards its implications for monetary policy.

Other misconceptions include the 'death of inflation', the 'end of boom and bust', a couple of Neanderthal Keynesian fallacies and the monetary fine-tuning fallacy.

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Submitted 30 November 1999

## **NON-TECHNICAL SUMMARY**

The Paper reviews, and attempts to correct, some of the most common misconceptions about the monetary policy process and the monetary transmission mechanism in the United Kingdom.

Among the misconceptions about the monetary policy process in the UK following operational central bank independence since June 1997, is the view that the Monetary Policy Committee of the Bank of England ought to be a body representative of regional, sectoral, industrial or other sectional interests, rather than a collective of technical experts. A related criticism is a variant of the 'one-size-fits-all' critique of a common, nationwide monetary policy when different regions or sectors exhibit divergent behaviour, either because they are hit by asymmetric shock or because they respond differently to common shocks. The critics are, however, unable to explain how a single nationwide instrument can be used to fine-tune the cyclical performance of divergent sub-national regions and sectors.

The criticism that operational independence of the central bank invites a lack of coordination between monetary and fiscal policy confuses centralisation and coordination. In the UK, there can be no conflict of objectives between the monetary and fiscal authorities, because the chancellor sets the objectives for both. There are also effective mechanisms for exchanging information between the MPC and the Treasury. Strategic uncertainty (uncertainty about how one player will respond to the actions of the other player) is not an issue because of mutual recognition that both parties are locked into a repeated game without an obvious terminal date. Even without the formal, visible trappings of binding agreements, this encourages cooperative behaviour.

As regards misconceptions about the monetary transmission mechanism, the so-called 'New Paradigm' deserves special mention. Stripped of the razzmatazz surrounding it, the 'New Paradigm' is the assertion that globalization and information technology are transforming the global economy and the way we work, shop and live. Directly or indirectly, this could have any or all of the following six implications for the real economy of the UK.

(1) The UK economy could become more open. This could manifest itself in trade in real goods and services, trade in financial claims and international movements of real factors of production, including labour, physical capital, corporate headquarters and other organisations. Knowhow and technology also become more footloose. Finally, persons can move more freely across national boundaries in any or all of their capacities: as workers, consumers and shoppers, as portfolio holders and as tax payers or subsidy/benefit-seekers. Tax avoidance and evasion and benefit-seeking

through international mobility can of course be undertaken (or used as a threat) by any entity with legal personality, not just by natural persons. This threatens national tax bases and puts upward pressure on national public spending programmes. It also creates incentives for intergovernmental cooperation and harmonization of tax and benefit regimes.

(2) Global inflation could be lower. This may apply just to commodity price inflation or to the prices of all internationally traded goods and services.

(3) There could be a permanent reduction in profit margins or mark-ups in many sectors.

(4) Stock market valuations could be boosted to unprecedented levels.

(5) The NAIRU (the equilibrium or natural rate of unemployment) could be lower than before.

(6) The underlying rate of growth of productivity could be higher than before. This would raise the sustainable growth rate of potential and actual real output.

The fourth of these, booming stock markets warranted by fundamentals, that is, by higher future profits or lower equity risk premia, is argued to be the opposite of what is likely to be implied by globalization and IT. What is good news for productivity and for consumers is unlikely to be good news for shareholders.

The implications of the other five manifestations of the New Paradigm for monetary policy in the UK are argued to be rather less than straightforward. I assume that the objective of monetary policy, a consumer price inflation target, remains the same. All the New Paradigm stories are about real, structural changes in the economy. To infer their implications for inflation (in the short, medium and long run) for a given monetary policy rule, or for the monetary policy behaviour (nominal interest rate rule or monetary growth rule) consistent with a given inflation target), requires a fully articulated view of the monetary transition mechanism. This includes an explicit characterization of the nominal anchor for the economy, that is, the exogenous or predetermined nominal quantity or price that ultimately determines the path of current and future money costs and prices. In a world with price level inertia and a Taylor rule for the short nominal interest rate (or any other interest rate rule that relates the short nominal rate only to real variables, such as the real interest rate, the inflation rate and the output gap) the only nominal anchor is the past history of nominal costs and prices.

Increased openness has no implications for the average level of the UK short nominal interest rate that supports an unchanged inflation target, in either the short run or the long run.

With a floating UK exchange rate, lower global price inflation does not have any implications for the average level of the short nominal interest rate that supports an unchanged UK inflation target, in either the short run or the long run.

Even a permanent reduction in profit margins, or a permanent reduction in the NAIRU, has at most a temporary downward effect on the level of short nominal interest rates consistent with an unchanged inflation target.

A permanent increase in the growth rate of total factor productivity has no obvious implications for the level of nominal interest rates that supports an unchanged inflation target, in the short run or in the long run. In the long run, the effect on the short nominal interest rate depends on what happens to real interest rates. In the short run, it depends on how the gap between demand and potential output is affected by the structural changes that boost the underlying growth rate of productivity.

Other popular misconceptions include the belief that inflation is dead, that we have seen the end of the business cycle ('the end of boom and bust') and the belief that monetary policy can be used to fine-tune the national business cycle.

# I. Introduction

The Monetary Policy Committee of the Bank of England has just completed its 30th monthly interest rate setting round and its 10th quarterly inflation forecast round.<sup>1</sup> Having been part of the MPC process since its inception in June 1997, I feel well-placed for a bout of reflection. On another occasion I intend to reflect on what I have learned during these past 27 months - about processes, institutions and the monetary transmission mechanism. Today I want to review, and debunk the most common misperceptions I have encountered, out there in the 'real world', about the monetary policy process and about the monetary transmission mechanism. These misconceptions matter for the conduct and performance of monetary policy, because they help shape the psychological environment, anticipations and confidence, within which we operate.

Since June 1997, our nine-member Committee has been charged by the Chancellor of the Exchequer to pursue an inflation target (a 2.5% annual inflation rate for the Retail Price Index exclusive of Mortgage Interest Payments (RPIX)), and subject to that, to support the government's other objectives, two of which are mentioned specifically: growth and employment. Since June 1998, these objectives and the *modus operandi* of the MPC have had a statutory basis in the Bank of England Act 1998.

On the basis of our experience thus far, I conclude that the legal and institutional framework within which we operate was rather well-designed, and that the conduct of monetary policy within that framework has been reasonably competent.

A key feature of our arrangement is that it combines an operationally independent Monetary Policy Committee with the political determination of the objectives of monetary policy.

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<sup>1</sup> I am stopping the clock on revisions to this first sentence as of November 8, 1999.



That is the way it should be. Central banks or monetary authorities, run by appointed technocrats, do not have the political legitimacy to determine the targets of monetary policy. In a democratic society, only the elected government can be entrusted with that responsibility.

Another key feature of our inflation target is that it is *symmetric*. It does not say: 2.5% or less. It says: 2.5%, neither more nor less. The symmetry of the inflation target sets a ceiling on where inflation can go, but it also, indirectly, sets a floor under the level of real economic activity.

The symmetry of the target is underlined by the so-called *open letter procedure*. Should inflation outcomes depart from the target by more than 1%, *in either direction*, the Governor, on behalf of the MPC, is to write an open letter to the Chancellor. In this letter he has to explain why the overshoot or undershoot happened; what we are going to do about it; over what horizon we expect to be back at the target; and how all this is consistent with our mandate. An important feature of this open letter procedure is that it recognises that there are circumstances, temporary supply shocks are an example, under which pursuit *à l'outrance* of the inflation target would be excessively costly in terms of real economic performance. There has not yet been any need to invoke the procedure.

The target is 2.5% on the RPIX index, not zero. Most real-world price indices are likely to overstate the rate of increase of the true, but unobservable, cost of living index. One reason is what economists call 'substitution bias'. Inflation rates are never uniform for all goods and services. When they are not uniform, relative prices change, and consumers will typically substitute towards goods and services whose relative prices have fallen. In addition, there are likely to be quality improvements, including new and superior goods and services, that are not captured by the index.

Against these unrecorded quality improvements should, however, be set some unrecorded

quality deterioration. Quality deterioration does occur, and ‘technical regress’ is not limited to the fall of the Roman Empire. In the UK, for instance, the quality of public transport services has been in secular decline. In the US, the quality of public education is likely to have been on a downward path for quite a while. To the extent that local taxes, which finance most of public education at the primary and secondary levels, enter the consumer price index, the rate of inflation will be underestimated.

Even making generous allowance for a possible net upward bias, a 2.5% RPIX target is unlikely to represent much less than 1.5% inflation in the true cost of living.<sup>2</sup> So why not shoot for true price stability, 0% inflation on the true cost of living index and, say, 1.0% inflation on the RPIX?

I believe that an important reason for not targeting a significantly lower rate of inflation than our current target, is a key asymmetry in the monetary transmission mechanism. Until we implement procedures for paying negative interest on currency (taxing money), there is a floor at zero under our main policy instrument, the short nominal rate of interest.<sup>3</sup> The inflation target should be set at a level that makes it unlikely that, for the kind of exogenous shocks and endogenous cycles likely to be encountered, short nominal interest rates would hit that zero floor and be constrained by it.

Our openness and accountability are unsurpassed among modern central banks and monetary authorities. We are answerable to Chancellor of the Exchequer through the open letter procedure. We are answerable to the appropriate House of Commons and House of Lord

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<sup>2</sup> Recent attempts by the Bureau of Labor Statistics in the US to reduce various biases in the way it measures its consumer price index (CPI) has lowered recorded CPI inflation by about 0.7 percent a year.

<sup>3</sup> See Orphanides and Wieland [1998], Buitert and Panigirtzoglou [1999] and McCallum [1999].

Committees, who can call any or all of us whenever they want to. The Bank of England's Court vets our procedures, including the key issue as to whether we make appropriate use of regional, sectoral and industrial information, and the internal resource allocation in the Bank of England.

We publish the individual votes cast at our monthly meetings within 2 weeks of the meeting, together with a set of non-attributed minutes that summarises the key issues, concerns and point of views that shaped the collective decision and the 9 individual votes. We publish a detailed quarterly inflation forecast.

Individual MPC members travel widely and regularly around the country, talking and listening. This supplements the information we get from the Bank's network of regional agents, from the Non-Executive members of Court, and from the very wide range of data, statistics and surveys that we absorb every month.

## **II. Misconceptions about the monetary policy framework**

### **IIA. The composition of the MPC**

The composition of the MPC is a feature of our arrangements that I consider to be a source of great strength. It has, however, given rise to considerable, and continuing, criticism.

The MPC is a collective of technical experts, not a body representative of regional, sectoral and industrial interests. It should be no other way. Once the objectives of monetary policy are set, monetary policy becomes a technical issue. The fact that monetary theory is a contested field, and that our capacities as forecasters are limited, simply means that monetary policy is a very difficult technical matter. But, if you have a tooth ache, you want the best possible dentist, not a regionally, sectorally or industrially representative dentist. The composition of the MPC should be representative of the best monetary policy expertise that is

available, in the UK and worldwide.<sup>4</sup>

Monetary policy expertise can be acquired in many different ways. It does not require an advanced degree in economics or other obvious manifestations of pointy headedness. It is certainly possible, that people who have spent their entire working lives as entrepreneurs, or in executive or managerial positions in businesses or in trades unions, may have acquired knowledge, skills and expertise that would make them effective members of a monetary policy making committee. It is, however, not likely to be a common occurrence, since those directly engaged in creating wealth have many other demands on their time. Monetary policy, whether working through the exchange rate, through interest rates or through the credit channels, is but one among a multitude of factors impacting on enterprise performance and on the terms and conditions of employment of unionized and non-unionized workers.

Entrepreneurs, executives, managers and trades union officials will form views on the impact of monetary policy on their enterprise, sector, or labour market. We seek out these views assiduously, through direct personal contact during our regional visits, through the regular briefings by our regional agents and through the information provided by the non-executive members of the Court of the Bank of England. These personal views at times reinforce and at other times qualify or contradict the information we receive from the many surveys and conventional statistical sources of information that we receive on a regular basis. In either case, they are an important input into our deliberations.

Few among these entrepreneurs, executives, managers and union leaders will have the time or the inclination to venture an informed guess about the impact of monetary policy on the economy as a whole. Even fewer will be able to look at things from the opposite perspective: not

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<sup>4</sup> The UK arrangements are unusual (probably unique) in permitting non-UK nationals to co-determine UK monetary policy.

‘how does monetary policy affect me, my firm, my industry, my sector, my region or my union’, but ‘how does monetary policy have to be set to achieve the government’s objectives for the economy as a whole’? I firmly believe the current arrangement is best.

## **IIB. ‘One size fits all’: is monetary policy insufficiently sensitive to divergent regional, sectoral and industrial developments?**

The common criticism that UK monetary policy is insufficiently sensitive to divergent regional or sectoral developments is misplaced. It is true that we must pursue our single, UK-wide inflation target, and our mandate to support, subject to this inflation target, UK-wide growth and employment, with a single, UK-wide instrument, our short-term interest rate. In an integrated financial system, there cannot be one interest rate for the South East, a separate one for Northern Ireland and a third for Scotland, or one rate for the service sector, one for manufacturing and one for the oil industry.

We pursue our mandate without regional, sectoral or industrial fear or favour. We carefully build up our view of what is appropriate for the UK as a whole from a very wide range of sources of information. Much of this information is regionally, sectorally and industrially disaggregated. And it has to be, because when the whole is not homogeneous, we can only understand the whole as the explicit sum of all of its parts. An economy that grows at 2.5 % per annum on average and in each of its regions, sectors and industries, may be a very different animal, as regards its short-term and medium-term inflation performance, from an economy where half the regions, sectors or industries grows at 5.0 percent and the other at 0 %.<sup>5</sup> Likewise, an

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<sup>5</sup> Even simple non-linearities are sufficient to make the behaviour of the aggregate different from that of a scalar blow-up of any of the disaggregated units.

economy where the unemployment rate is a uniform 6.0 percent, is a very different animal from an economy with the same average unemployment rate but widely divergent regional, sectoral and industrial unemployment rates.

But, in the end, regional, sector and industrial developments matter for our policy decision if and to the extent that they inform our pursuit of the nationwide targets. We are acutely aware that monetary policy, which in an economy like the UK works to a large extent through the exchange rate, impacts very unevenly on the internationally exposed sectors and the internationally sheltered sectors. This means that when monetary policy is tightened, the internationally exposed sectors suffer more than the internationally sheltered sectors, just as the internationally exposed sectors benefit more when monetary policy is eased.

I firmly believe that, by resolutely pursuing macroeconomic stability for the UK economy as a whole, we contribute, over the long haul, to a business climate that is superior, in every region and for every industry and sector, to what could be achieved through any other policy. Economy-wide macroeconomic stability is an essential precondition for economy-wide growth and prosperity.

### **IIC. Central Bank independence and monetary-fiscal policy coordination**

Lack of monetary-fiscal policy coordination is a common criticism of the current arrangements. Under the *ancien régime*, both monetary policy and fiscal policy were the sole province of the Chancellor of the Exchequer and the Treasury. The critics of the new operationally independent Bank of England argue that while the new arrangements may have bestowed greater credibility on the monetary authority, they have reduced the ability to

coordinate fiscal and monetary policy and created scope for conflict.

This criticism is mistaken. It confuses *centralisation* with *coordination*. In the late and unlamented Soviet Union, all economic management was centralised. It was also very badly coordinated. In the UK today, there cannot be a conflict between the targets of monetary and fiscal policy. The key point is that the MPC only has *operational* independence. It does not set the *objectives* of monetary policy. There can be no conflict between the targets of monetary and fiscal policy, because the Chancellor sets them both.

Even if there is no conflict of objectives, lack of coordination could result from the MPC and the Treasury not knowing what the other party is doing and thinking. This potential lack of information has two dimensions: uncertainty about how the other party views the exogenous environment within both parties operate, and *strategic uncertainty* about how one party will respond to the actions of the other party.

There is, in fact, a very effective flow of information between the MPC and the Treasury. A Treasury Representative attends the meetings of the MPC in a non-voting capacity. The Treasury Representative speaks and listens. He does not attempt to exercise pressure or twist arms. We receive regular briefings and other updates on budgetary issues and prospects that are relevant to the monetary policy decision. The Governor meets regularly with the Chancellor. The notion that either party is unaware of what the other party knows and thinks, is wrong.

It is true that, even if there is no conflict of objectives, and even if there is no uncertainty about what the other party knows or believes about the common policy environment, there may be ‘strategic uncertainty’ about how one party would respond to an action of the other party. The analogy here is with a rugby team. All players on the team have the same objective: to annihilate

the opposition. They all share the same information about playing conditions and the opposition.<sup>6</sup> The players on each team must, however, play cooperatively in order to be effective. They must make binding commitments to make certain joint contingent moves, if they are to achieve the shared team objective.

There is no formal mechanism that allows the MPC and the Treasury to act ‘cooperatively’ in the way game theorists use that concept, that is, to make binding commitments about current and future policy actions or decision rules. The policy game, however, is a repeated game. Our monthly interest rate round has, thus far, been repeated 30 times. For practical purposes, we can view the interaction of the Treasury and the MPC as an ‘infinitely repeated game’. As time passes, repetition and reputation make it possible to achieve outcomes very close to what can be achieved in a formal cooperative arrangement. Lack of coordination of monetary and fiscal policy simply is not an issue.

### **III. Misconceptions about the transmission mechanism**

#### **IIIA. The New Paradigm: over-hyped and misunderstood as regards its implications for monetary policy**

Whenever words like ‘New Paradigm’ are in the air, extreme caution is required. There are a few thoughtful, well-informed and eloquent proponents of the view that recent and likely future ‘supply side’ developments have shifted the path of future potential output, and may have invalidated the old empirical relationships between real economic performance and inflation. I

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<sup>6</sup> Of course, the game with their opponents is (meant to be) non-cooperative; no binding agreements can (should?) be made.



am fortunate in having a colleague on the MPC, DeAnne Julius, who is one of these few, and who has greatly added to my understanding of how the evolving international environment impacts on our inflation target.<sup>7</sup> Another independent member of the MPC, Sushil Wadhvani, has contributed important insights on structural changes in the labour market, and related changes in the product markets, and their implications for monetary policy.

Unfortunately, the ‘New Paradigm’ label has been much abused by professional hype merchants, financial quacks and peddlers of economic snake oil. Every age appears to have a deep psychological need to be unique, revolutionary and paradigm-shattering. I am sure that, after Prometheus gave fire to mankind, financial analysts in ancient Greece had some pretty lurid new paradigm write-ups in their brochures. The same must have happened following the invention of animal husbandry, agricultural crop growing, the wheel, the spinning wheel, the steam engine, the railways, the internal combustion engine, the chemical and electrical revolutions and the paper clip. Sometimes the hype was justified. Often it was not.

Stripped of the razzamatazz surrounding it, the ‘New Paradigm’ can be summarized as follows. First, increasing and unprecedented *globalisation*, driven partly by technological change and partly by the deliberate removal of government-created barriers to the international movement of goods, services, people, financial capital, enterprises and ideas, has transformed the international and domestic competitive environments. Second, *information technology*, the marriage of cheap and near universally available digital computing power and telecommunications, is transforming the global economy and the way we work, shop and live. The Internet is the most visible expression of this: e-commerce, e-shopping and e-business are becoming as common as e-coli. New products, new processes, new forms of organisation, new ways of trading and exchanging information, in brief, new ways of doing old things and new

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<sup>7</sup> See e.g Julius [1999].

ways of doing previously unheard of and unthought of things, are made possible by the new information networks that are sprouting everywhere, courtesy of ‘Moore’s Law’ and broadband technology.

There are huge microeconomic and regulatory challenges here, and economists have to rethink the meaning of competition, which is Schumpeterian rather than Arrow-Debreu. ‘Information goods’, with their public good properties of non-rivalness (associated with indivisibility, high (and sunk) fixed costs or start-up costs and low marginal costs) and non-excludability or inappropriability, are destructive of the conventional competitive paradigm. The fact that, when we trade or exchange information, we don’t really know what we are getting until we have had a chance to use the information (information goods are ‘experience goods’) further undermines the conventional view of how markets and competition work.<sup>8</sup> More visibly than ever before, competition, in the presence of indivisibility, inappropriability and uncertainty about what one is buying or selling, is seen to be a process of creative destruction, of rivalry between alternating or succeeding monopolies, not the peaceful price-taking behaviour of the old textbooks. The rewards for being first with a new product or process are larger than ever before, as are the penalties for being pipped at the post - a winner-take-all economy.

The new economy creates huge challenges for measurement and for the interpretation of data. Even with traditional, tangible goods, allowing for new products and for quality change creates daunting conceptual and practical problems for statisticians. Measuring output in the traditional service sectors has always been problematic, even when the services were marketed. For the 20 to 30% of GDP produced by the public sector, most of it non-marketed, the national

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<sup>8</sup> See e.g. Giordano [1999]. The term ‘experience goods’ is due to De Long and Froomkin [1998]. The formalisation of the concept goes back, at least, to Arrow [1962].

income accountants have traditionally admitted defeat and measured output by input<sup>9</sup>. In recent years, attempts are being made in the UK to measure productivity changes in the public sector, an important but extremely complicated exercise. The new weightless and intangible sectors make it ever more difficult to measure both inputs and outputs. Extracting reasonable estimates for productivity growth when neither inputs nor outputs are measured reliably is a statistical nightmare. While, in principle, valuing Microsoft is no different from valuing a steel company - the fundamental valuation for both is the (risk-adjusted) present discounted value of future profits - predicting future profits and determining the appropriate risk premium are both exercises in subjectivity and inaccuracy.

Globalisation and information technology are not independent. New developments in information technology are among the technological forces driving globalisation.

Globalisation and the spread of information technology pose two key questions for monetary policy makers. First, how unique are these processes, and what is the magnitude of the 'supply-side transformation' that is underway as a result of these changes? Second, given one's best guess about the quantitative significance of these supply side changes, what do they imply for the conduction of monetary policy?

Globalisation is not something new. The current wave of globalisation started in the immediate post World War II period. A highly globalised economy existed also in the second half of the 19<sup>th</sup> century, until World War I and the interwar crises caused the fragmentation of the global capitalist system (see Bordo, Eichengreen and Kim [1998] and Bordo, Eichengreen and

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<sup>9</sup> Much of what is classified as general government GDP, should probably not be counted as GDP at all. GDP is supposed to represent final output, value added in consumption and investment. Public administration, including law and order and defence, represents, functionally, intermediate public goods and services. Their contribution to national value added is measured in the value of those goods and services (private and public) that are actually consumed or added to the capital stock. Current practice is a classic case of double counting.

Irwin [1999]). There are important differences between the globalised economy of the gold standard days as the current phase. Information flows much more freely, swiftly and universally today. The range of financial instruments that is traded across national borders is much wider than it was in the 19<sup>th</sup> century. Against that, labour mobility under the gold standard was much less restricted by the nation state than it is today.

Technological revolutions also did not start with the ‘information age’. The industrial revolution gave us, more than 200 years ago, the systematic application of science and engineering to production, distribution and exchange. The beginning of the 19<sup>th</sup> century, witnessed the coal and iron (later steel) age, with the widespread use of the steam engine and of mechanized weaving. Towards the middle of the 19<sup>th</sup> century came the railway age, followed by the telegraph, photography and cement. Mass production, based on mechanised assembly lines, transformed the production of tangible goods. Around the turn of the 20<sup>th</sup> century arrived electrification, the chemical industry, the automobile and aluminium. The 1950s brought synthetic fibres, nuclear energy, electronics and the space age. More recently, microelectronics, optical fibres, laser technology and biotechnology give ever greater weight to the ‘weightless’ economy.

The information revolution pre-dates the industrial revolution. It started with the invention of the printing press and accelerated with the arrival of the telegraph, photography, the telephone, radio and television.<sup>10</sup> Recognisable computers are almost 50 years old. The microchip and the Internet are the latest exciting chapter in a very old story indeed.

It all sounds impressive, and some of it certainly is. But a sense of proportion is essential.

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<sup>10</sup> The first known printed book, using block printing, came from China (AD 868). Block printing appeared in Europe during the late 1300’s. Movable type using clay was invented in China during the 1000’s. Koreans invented movable type in the 1300’s. Europeans reinvented this particular wheel in the mid 1400’s.

The failure of many of the evangelists of the new information age to distinguish between data and information is a serious obstacle to sensible discussion. It is possible (and in my experience quite common) to have data coming out of one's ears, yet to have very little useful information. Those who confuse data with information may be the victims of the lingering influence of the old 'cybernetic' definitions of information, which treated numbers of bits and bytes, the units in which data are stored digitally, as a reasonable proxy for the content and quality of information.

The key question raised by the "New Paradigm" for the Monetary Policy Committee is: what are its implications for the way we set about pursuing our mandate?

The New Paradigm (Globalisation and IT) could, directly or indirectly, have any or all of the following six implications for the real economy of the UK.

(1) The UK economy could become more open. This could manifest itself in trade in real goods and services, trade in financial claims and international movements of real factors of production, including labour, physical capital, corporate headquarters and other organisations. Knowhow and technology also become more footloose. Finally, persons can move more freely across national boundaries in any or all of their capacities: as workers, consumers and shoppers, as portfolio holders and as tax payers or subsidy/benefit seekers. Tax avoidance and evasion and benefit seeking through international mobility can of course be undertaken (or used as a threat) by any entity with legal personality, not just by natural persons. This threatens national tax bases and puts upward pressure on national public spending programmes. It also creates incentives for intergovernmental cooperation and harmonization of tax and benefit regimes.

(2) Global inflation could be lower. This may apply just to commodity price inflation or to the prices of all internationally traded goods and services.

(3) There could be a permanent reduction in profit margins or mark-ups in many sectors.

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(5) The NAIRU (the equilibrium or natural rate of unemployment) could be lower than before.

(6) The underlying rate of growth of productivity could be higher than before. This would raise the sustainable growth rate of potential and actual real output.

As regards increased international openness, it seems likely that there is more to come. For trade in goods and services, we are unlikely to see growth of the kind seen in the sixties and seventies, but a more gradual increase in import and export shares in GDP is on the cards. Exports and imports as shares of UK GDP, are still about 5 percentage points below their pre-World War I peak. International trade in financial claims is spectacular for a rather limited range of financial instruments. In the years to come, we are likely to see both an extension of this range of international financial instruments and a gradual erosion of the ‘home bias’ in the portfolio allocations of UK financial institutions, including pension funds and insurance companies. Labour mobility is likely to increase, but will remain small in relation to the UK labour force. Enterprises will become more footloose, with corporate headquarters, back office operations and R&D establishments following in the wake of manufacturing assembly plants and call centres. FDI flows, bundling finance, technical expertise and managerial skills are likely to become more significant. The traffic will be two-way.

The greater scope for tax payers and benefit seekers to move to jurisdictions with lower tax rates or more relaxed enforcement, and to jurisdictions with higher benefits and easier eligibility, will put increasing strains on the public finances everywhere. Unless more effective ways are found to link liability for tax payments in a given jurisdiction to eligibility for benefits from public spending in that same jurisdiction, the threat of mobility of tax payers and benefit recipients will severely constrain the fiscal authorities. This can have a significant influence on effective marginal tax rates and effective benefit and subsidy eligibility, even if little actual

movement is observed, and lead to suboptimally low levels of public spending and taxation.<sup>11</sup> Turning taxes into user charges for public expenditure benefits is both technically and politically difficult. Mrs Thatcher's attempt to sell the Community Charge (the so-called poll tax) to the British people as a payment for local public services was a political disaster.

National governments will be torn between tax and benefit competition and attempts at greater cooperation and harmonisation. It is difficult to predict the ultimate outcome of this process.

As regards the scope for lower global inflation, it is important to distinguish between short-term cyclical patterns and long-run trends. The long-run trend in global inflation will be determined by the weighted sum of the various national inflation objectives, adjusted for the degree of seriousness with which they are pursued. There is no evidence that the rest of the world is likely, on balance, to pursue inflation objectives and to achieve inflation outcomes, that are significantly different from those pursued and achieved in the UK.

We cannot be confident that the relative prices of commodities, hard or soft, to other internationally traded goods and services will have any clear trend. Even if they did, there are no obvious implications of a change in the relative prices of commodities for the global inflation that is relevant to the UK's domestic inflation objective.

In the short run, global inflation can be viewed as being driven in part by the global output gap, just as domestic inflation is driven, in part, by the domestic output gap. Commodity price inflation is more responsive than inflation in more broadly based indices of internationally traded goods and services to supply constraints in the producer nations and to changes in global

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<sup>11</sup> It may be the case that, because of domestic political distortions, the level of public spending and taxation would be suboptimally high in a closed economic system. In that case, openness and the threat of tax and benefit competition may result in a level of public expenditure and taxation that is lower than the closed economy level and closer to the optimal level.

economic activity. As long as a global output gap persists, we can expect to see continued downward pressure on world inflation. Global output is likely to be below global capacity for a while yet. Even in the US, capacity utilisation ratios are not reported to be unusually high, although unemployment has fallen to a very low level. The euro area is recovering, but overall should still have some margin of spare capacity. Japan continues to be very depressed. South East Asia is recovering rapidly, but from a very low level.

It should be clear that (3), reduced margins, and (4), unusually strong stock market valuations, are unlikely to be both correct, at any rate if we limit the discussion to stock market valuations warranted by fundamentals, that is, by risk-adjusted discounted future profit streams. Speculative bubbles can, for a while, support any and all stock market valuations. Equation (1) is a fairly standard representation of stock market valuation, involving only minor hand waving. The real value of the stock market index is denoted  $q$ , the stream of future profits  $\theta$ , the risk-free real interest rate  $r$ , and the equity risk premium  $\rho^q$ .  $E_t$  is the expectation operator conditional on information available at time  $t$ .  $B$  is the speculative bubble component in stock market valuation.<sup>12</sup> The first term on the RHS of (1) is the fundamental valuation of the stock market.<sup>13</sup>

$$q_t = E_t \sum_{j=0}^{\infty} \left( \frac{1}{\prod_{k=0}^j (1+r_{t+k})(1+\rho_{t+k}^q)} \right) \theta_{t+j} + B_t \quad (1)$$

If  $\mu$  is the mark-up of price on unit labour cost, and  $Y$  is real GDP, then (ignoring profit

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<sup>12</sup> Rational speculative bubbles, that is, bubbles that do not violate the no-arbitrage assumption of technically efficient financial markets would have to satisfy

$E_t B_{t+1} = (1 + r_t)(1 + \rho_t^q)B_t$ . Irrational speculative bubbles could do just about anything.

<sup>13</sup> Hall [1999] argues that this fundamental valuation should include not just the physical capital stock, but also ‘intangible capital’ or organisational capital. His empirical investigation does not, however, consider the possibility of persistent and significant monopoly rents.



taxes)

$$\theta = \left( \frac{\mu}{1+\mu} \right) Y \quad (2)$$

I believe that recent developments in IT are, by and large, making markets more competitive and more contestable. Entry and exit in many industries is easier than before. This is good news for consumers, for productivity and efficiency and quite possibly for human happiness, but it is bad news for profits. In terms of equations (1) and (2), the New Paradigm will boost the future path of real GDP, which is, other things being equal, good for profits, but it will lower margins, that is, lower  $\mu$ , which is, other things being equal, bad for profits.

Profits consist of two components: the competitive rental rate on capital and monopoly rents. You do not get a stock market boom out of competitive capital rental rates. Booming stock markets are produced by current and anticipated future rents. Rents rely on the absence, at least temporarily, of effective competition. If the New Paradigm is correct, rents in many sectors will be competed away more swiftly and effectively than ever before. Bad news for profits should mean bad news for the discounted stream of future profits, that is, bad news for stock market valuations. There are exceptions. If a private company manages to establish a monopoly around a product with strong network externalities which effectively becomes an industry standard, entry becomes very difficult and very large rents can be extracted. There are, however, very few Microsofts. The stock market glory of a very few will be balanced by the stock market debacles of many.<sup>14</sup>

What do the supply side developments captured under items (1), (2), (3), (5) and (6) imply for monetary policy in the UK? I assume in what follows that our symmetric inflation target is

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<sup>14</sup> For a less bearish view, see Keating and Wilmot [1999].

unchanged. I measure the stance of monetary policy through the behaviour over time of our main policy instrument, the short risk-free nominal rate of interest. Throughout it is important to distinguish between short-term changes in the path of short nominal interest rates consistent with the inflation target, and long-term changes. We must also distinguish between ‘time series’ comparisons - will rates be different in the future from what they were in the past - , and ‘counterfactual’ comparisons - will rates be different from what they would have been in some alternative, counterfactual, state of the world.

Let us, for the sake of argument, grant the proposition that the UK economy will become increasingly open, that the world rate of inflation will be lower than in the recent past, that the equilibrium rate of unemployment is lower than before, that the underlying rate of growth of productivity is higher than before and that a sustained reduction in reduction in profit margins or mark-ups is underway. Even if we accept this qualitatively, the actual magnitudes are, of course, extremely uncertain.

All five developments, increasing openness, lower world inflation, the lower equilibrium unemployment rate, the higher rate of growth of potential output and the lower profit margins are *real* phenomena. There is many a slip between the cup of real, structural change and the lip of inflation. One of the key insights that macroeconomists and monetary economists can bring to the New Paradigm debate is the recognition that relative price changes, distributional changes and other structural changes have no straightforward, obvious implications for inflation or for the path of interest rates that supports a given inflation target.

### **IIIA1. Increasing openness and UK monetary policy**

Increasing openness of the UK will not have clear implications for the average level of interest rates that support the inflation target, in the short run or in the long run. Increasing openness to trade in goods and services implies that monetary policy, to the extent that it works

through the exchange rate, will have a more powerful effect on the price level and a weaker effect on the real economy. The reason is that, through a variety of behavioural mechanisms, greater trade openness increases the responsiveness of domestic nominal costs and prices to the exchange rate. Increasing financial openness will tend to make the exchange rate more volatile, and this may be reflected in greater interest rate volatility. There is no clear link to the average level of rates, however.

### **IIIA2. Lower global inflation and UK monetary policy**

The rate of inflation of world prices, including commodity prices, translated into imported inflation through the nominal exchange rate, is an important component of retail price inflation in the UK. In the long run, differences between the UK's rate of inflation and the inflation rate in the rest of the world, will be reflected in nominal exchange rate depreciation or appreciation, unless sustained shifts in the structure of the world economy mandate a change in the relative price and cost configurations between the UK and its trading partners.

It is difficult to establish a clear presumption that the ratio of relative prices charged and paid by UK PLC should, on trend, rise or fall steadily. On the maintained assumption that the UK pursues an unchanged inflation target with a market-determined exchange rate, the global inflation rate, whatever it turns out to be, should therefore not have any implications for the level of UK nominal interest rates in the long run. This argument assumes that the long-run world real interest rate does not vary when the world inflation rate varies. I elaborate on this below.

In the short run, a lower global rate of inflation that does not signal a permanent reduction in the level of world prices relative to UK prices, has implications for UK nominal interest rates that are far from straightforward.

To get a benchmark, I assume that an internationally financially integrated economy like the UK, the domestic short nominal rate of interest is related to the foreign short nominal interest

rate through exchange rate expectations and a currency risk premium.<sup>15</sup> Let  $i$  be the short UK nominal interest rate,  $i^f$  the world short nominal rate,  $S$  the nominal spot exchange rate (defined as the price of foreign exchange in terms of sterling),  $\sigma_{t+1} = \frac{S_{t+1}}{S_t} - 1$  the proportional rate of depreciation of the nominal spot exchange rate and  $\rho^s$  the foreign exchange risk premium. Then, approximately<sup>16</sup>,

$$i_t = i_t^f + E_t \sigma_{t+1} + \rho_t^s \quad (3)$$

For present purposes, foreign exchange rate risk premia are not a concern, and will be ignored. Without the foreign exchange risk premium, (3) implies uncovered interest parity (*UIP*), that is, (approximately)<sup>17</sup>

$$i_t = i_t^f + E_t \sigma_{t+1} \quad (4)$$

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<sup>15</sup> For recent surveys on global financial integration, see Oxford Review of Economic Policy [1999].

<sup>16</sup> The exact expression is  $\frac{1 + i_t}{1 + i_t^f} = \frac{E_t S_{t+1}}{S_t} (1 + \rho_t^s)$

<sup>17</sup> The exact expression is  $\frac{1 + i_t}{1 + i_t^f} = \frac{E_t S_{t+1}}{S_t}$ . *UIP* is a spectacular empirical failure.

It not only predicts badly; it appears to be subject to systematic bias also. For a survey of its empirical shortcomings see Wadhvani [1999] and Cochrane [1999]. There is some evidence it may work better (in the sense of not producing systematically biased forecasts) at very long horizons (low frequencies), as argued by Meredith and Chinn [1999]. There are many potential reasons why *UIP* is outperformed, for predictive purposes and at all except the very longest horizons, by such simple rules as a constant exchange rate (the ‘random walk’ hypothesis). One is a particular form of small sample bias called the ‘peso effect’. Current expectations of the future spot rate may be influenced by a very dramatic but very low probability future contingency. This event (say a major collapse) may not (yet) have occurred in the sample period. Time-varying or random risk premia are another way to rationalise failures of *UIP*. Since predicting future risk premia is even more of an uphill task than predicting the spot exchange rate, this is not a practically useful insight for making *UIP*, augmented with time-varying risk premia, a better forecasting rule.

The UK is small in the global financial markets, so I take  $i^f$  to be exogenous. The (ex ante) domestic short real interest rate is related to the short nominal interest rate through the expected rate of inflation. I take the rate of inflation to be the rate of inflation of the retail price index, our inflation target.<sup>18</sup> Let  $\tilde{P}$  be the retail price index and  $\tilde{\pi}$  the rate of inflation of the RPI,

that is,  $\tilde{\pi}_{t+1} \equiv \frac{\tilde{P}_{t+1}}{\tilde{P}_t} - 1$ . It follows that, approximately,<sup>19</sup>

$$r_t + E_t \tilde{\pi}_{t+1} \equiv i_t \quad (5)$$

The retail price index is a weighted average of the price index of domestic value added,  $P$ , and the index of world prices,  $P^f$ , translated into domestic currency. Let the share of imports in the RPI index be  $\alpha$ . The world rate of inflation is denoted  $\pi^f$ . It follows that (approximately)<sup>20</sup>

$$\tilde{\pi}_t = (1 - \alpha)\pi_t + \alpha(\pi_t^f + \sigma_t) \quad (6)$$

The (ex-ante) world short real interest rate,  $r^f$ , is defined (approximately) as follows:

$$r_t^f \equiv i_t^f - E_t \pi_{t+1}^f \quad (7)$$

Since the UK is too small to influence the world rate of inflation, the world rate of interest too, is taken to be exogenous. Note, however, that only two out of the world real rate of interest, the world nominal rate of interest and the (expected) world rate of inflation can be fixed independently. The third is implied by the other two.

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<sup>18</sup> The distinction between RPI and RPIX does not matter for the argument under consideration.

<sup>19</sup> The exact expression is  $E_t[(1 + r_t)(1 + \tilde{\pi}_{t+1})] \equiv 1 + i_t$ .

<sup>20</sup> Strictly speaking,  $1 + \tilde{\pi}_t = (1 + \pi_t)^{1-\alpha}[(1 + \pi_t^f)(1 + \sigma_t)]^\alpha$ .

If the fall in the world expected rate of inflation is not matched by a fall in the world real interest rate, it must be matched by a fall in the world nominal interest rate. In that case, the lower world inflation would be translated into matching increase in the rate of depreciation of sterling, with no impact on short nominal rates in the UK or on the UK rate of RPI inflation, short run or long run. In the somewhat messier real world, there may of course be lags in the transmission of world price changes and exchange rate changes into sterling import prices, as well as expectation errors and changes in risk premia which upset this neat picture, but it is the obvious benchmark.

If the decline in expected world inflation is not associated with a commensurate fall in world nominal interest rates, there must have been an increase in the world real rate of interest. To determine what happens to UK nominal exchange rate depreciation, and thus to UK nominal interest rates, cannot be determined from equations (4) through (7) alone. We need a complete model (including a model of UK demand, supply, wage and price determination), in order to be able to jointly determine the responses of UK nominal rates, real rates, inflation and exchange rate depreciation. Indeed, the same factors that caused an increase in the world real interest rate and a fall in the world rate of inflation, are likely to affect the UK economy through other channels, not yet considered, such as the global demand for UK exports.

The main message is that the short-run impact on the path of UK nominal interest rates consistent with an unchanged UK inflation target, of a decline in world inflation, is not necessarily in accord with the common, instinctive presumption that UK rates can be lower without this endangering the inflation objective. In the benchmark case where the world real interest rate is unchanged, a lower world rate of inflation neither implies that UK short nominal rates can be lower than before, nor that they can be lower than they would have been without the change in the global inflation rate, if an unchanged domestic inflation objective is to be achieved.

### **IIIA3. Lower profit margins and UK monetary policy**

A reduction in profit margins, or in the mark-up on unit variable costs, can result either from intensification of product market competitive pressures (a reduction in the degree of monopoly power of a firm in the markets for its products) or from a weakening of a firm's competitive position in the market for its inputs, labour, raw materials and other. Such a change in firms' competitive position corresponds, at the level of the economy as a whole, to a distributional change, away from profits and towards labour income.

Consider the following simple example of an economy in which the markup of the GDP deflator on unit labour costs is independent of the price of imported intermediate and raw materials inputs.

One can view the bundle of goods and services entering the RPI, denoted  $Q$ , as being produced using labour, capital and imported inputs. Let  $W$  be the money wage,  $L$  employment,  $P_N$  the domestic currency price of imported inputs,  $N$  the quantity of imported inputs,  $\rho_K$  the nominal rental rate of capital and  $K$  the capital stock. Output is produced using a well-behaved, constant returns to scale production function,  $Q = AF(K, L, M)$ , where  $A$  is the level of total factor productivity. A monopolistically competitive firm maximizes pure profits,  $\tilde{P}Q - \rho_K K - WL - P_N N$ . Assume input markets are competitive. The first-order conditions for profit maximization are

$$AF_K \left( \frac{\varepsilon - 1}{\varepsilon} \right) = \frac{\rho_K}{\tilde{P}} \quad (8a)$$

$$AF_L \left( \frac{\varepsilon - 1}{\varepsilon} \right) = \frac{W}{\tilde{P}} \quad (8b)$$

where  $\varepsilon(Q) \equiv -\frac{\tilde{P}(Q)}{\tilde{Q}\tilde{P}'(Q)}$  is the price elasticity of demand. Nominal accounting profits,  $\Theta \equiv P\theta$ , where  $P$  is the GDP deflator, are the sum of pure profits and the rental income of capital,  $\Theta \equiv \tilde{P}A\left(F_K K + \frac{1}{\varepsilon}(F_L L + F_N N)\right)$ .

$$AF_N\left(\frac{\varepsilon - 1}{\varepsilon}\right) = \frac{P_N}{\tilde{P}} \quad (8c)$$

Value added for the domestic economy is the sum of accounting profits and wage income.

$$PY \equiv \Theta + WL \quad (9)$$

This permits us to write the value added deflator as a mark-up on unit labour cost, as follows:

$$P = (1 + \mu)\frac{WL}{Y} \quad (10)$$

The proportional mark-up on unit labour cost, denoted  $\mu$ , is given by

$$\mu = \frac{F_K \frac{K}{L} + \frac{1}{\varepsilon}(F_L + F_N \frac{N}{L})}{F_L \left(\frac{\varepsilon - 1}{\varepsilon}\right)} \quad (11)$$

With a profit-maximising monopolist,  $\varepsilon > 1$ . The mark-up is therefore positive and decreases with the elasticity of demand. In general, the markup will also depend on the input ratios. When the production function is Cobb-Douglas,  $Q = AK^\alpha L^\beta N^{1-\alpha-\beta}$ ;  $0 < \alpha, \beta, \alpha + \beta < 1$ , the



mark-up simplifies to (12), which is independent of input intensities.<sup>21</sup>

$$\mu = \frac{1 + (\varepsilon - 1)\alpha}{(\varepsilon - 1)\beta} \quad (12)$$

A decline in the mark-up,  $\mu$ , is a reduction in the *ratio* of price to unit labour cost. There is nothing in this mark-up change *per se*, that tells us anything about the behaviour of nominal prices and wages. All we know is that the nominal price level path falls relative to the path of money wages. The reduction in margins could be achieved, for a given path of money wages, through lower prices. While theoretically the lower price level could be achieved through a single, discrete drop in the price level, in practice there is likely to be a gradual approach to the new equilibrium price level path, that is, a temporary reduction in the rate of inflation. It could also be achieved, for a given path of money prices, through a higher path of money wages. In this case there would be not even a temporary effect on the rate of price inflation. Instead there would be a temporary increase in the rate of inflation of money wages. Indeed, the reduction in the mark-up could be associated with a temporary *increase* in the rate of price inflation, if it were accompanied by an even larger temporary increase in the rate of money wage inflation.

In order to determine the impact of lower margins on price inflation, we must know what happens to money wage inflation. Our instincts (which tend to be short-run Keynesian), may tell us that money wage inflation is unlikely to be affected by the a fall in margins, when this fall in margins in the result of more intense competition in the product markets (a higher value of  $\varepsilon$ , using the model of equations (11) or (12)). This gives the standard story that permanently lower margins lead to a lower path of the price level. Again, in the real world, this will show up as a

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<sup>21</sup> Note that  $\varepsilon$ , the price elasticity of demand, is unlikely to be a constant. Different models can produce either pro-cyclical or counter-cyclical behaviour of the mark-up.

temporary dip in the rate of inflation. Our instincts may be wrong. These same instincts would create a presumption that lower margins would be achieved through a temporary increase in money wage inflation with unchanged price inflation, if the lower margins are the result of increasing labour market power by the unions, or by labour in general, organised or unorganised.<sup>22</sup>

I accept the proposition that, in the case of a fall in the mark-up due to increased product market competition, money wage inflation is indeed likely to be given in the short run, predetermined by existing contracts, settlements and payments practices. This means that, in the short run, short nominal interest rates can be lower than they were before, and lower than they would have been in the absence of the fall in margins, without this endangering the inflation target.

In the medium and longer run, money wage inflation ceases to be anchored in the past. It is always influenced significantly by expected future price inflation. We cannot explain inflation with inflation. We need a further nominal anchor from outside the realm of the real economic relationships. That nominal anchor is provided by our pursuit of an unchanged inflation target. Absent further changes in the transmission mechanism that could be associated with the fall in margins, the path of nominal interest rates will return to where it would have been in the absence of the fall in margins.

It is not difficult to think of other changes in the transmission mechanism that could be the result of a change in margins. The redistribution from profits to wages, which is the other face of the fall in margins, could boost aggregate demand. This would be the case if wage earners have, on average, higher propensities to spend than the recipients of profit income. This would suggest that the output gap could widen, putting upward pressure on inflation in the medium term.

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<sup>22</sup> Our simple mark-up model could be extended to allow for monopsony power in the labour market, and in input markets generally, or could be extended to include bargaining over wages, as in Layard, Nickell and Jackman [1991].

Monetary policy might have to tighten in the medium term, not loosen as the conventional wisdom has it.

#### **IIIA4. A fall in the NAIRU and UK monetary policy**

A lower NAIRU or equilibrium rate of unemployment, likewise has no straightforward implications for the path of short nominal rates that supports an unchanged inflation target. In my view of the world, for any given path of the actual unemployment rate, a lower NAIRU will put downward pressure on the growth rate of *expected real wages*.

A simple example of such a model is an open economy adaptation of the extension by Buiter and Jewitt [1981] of the Taylor overlapping contracts model. The Buiter-Jewitt version of the Taylor model has staggered, overlapping *real* wage contracts rather than staggered overlapping *nominal* wage contracts, as in the original Taylor model. For simplicity we restrict the analysis to two-period contract.<sup>23</sup> Lower-case symbols denote the natural logarithm of the corresponding upper-case symbol;  $U$  is the actual unemployment rate and  $U^N$  the NAIRU or the natural rate of unemployment. Money contracts last for two periods. Each period, half the labour forces negotiates a new contract. The money wage contract negotiated this period,  $\omega_t$ , is chosen (or negotiated) to achieve a level of the average real contract wage over the life of the contract, that depends positively on the real contract wage negotiated last period and the real contract wage expected to be negotiated next period. Thus, in general, the current real contract wage can depend on both past and expected future real contract wages. I rule out the case where it depends only on the expected future real contract wage ( $\gamma = 1$ ). It also depends on the average unemployment rate expected over the life of the contract. Finally, it depends on an index of the target real wage,

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<sup>23</sup> For some reason, probably a combination of ignorance and inadequate acknowledgement, this model has become known as the Fuhrer-Moore model (Fuhrer and Moore [1995]).

denoted  $\bar{\tau}$ . One would expect the growth rate of the target real wage,  $\bar{g}_t \equiv \Delta\bar{\tau}_t \equiv \bar{\tau}_t - \bar{\tau}_{t-1}$ , to track, over time, the trend rate of growth of labour productivity.

$$\begin{aligned}\omega_t - 1/2(\tilde{p}_t + E_t\tilde{p}_{t+1}) - \bar{\tau}_t &= \gamma E_t[\omega_{t+1} - 1/2(\tilde{p}_{t+1} + \tilde{p}_{t+2}) - \bar{\tau}_{t+1}] + (1-\gamma)[\omega_{t-1} - 1/2(\tilde{p}_{t-1} + \tilde{p}_t) - \bar{\tau}_{t-1}] \\ &\quad - 1/2\psi(U_t + E_t U_{t+1}) \\ \psi &> 0; 0 \leq \gamma < 1\end{aligned}\tag{13}$$

We can use (13) to solve for the current real contract wage as a function of last period's real contract wage and of current and anticipated future values of the fundamental, unemployment.<sup>24</sup> There are two solutions. The sensible one is given in equation (14).<sup>25</sup>

$$\begin{aligned}\omega_t - 1/2(\tilde{p}_t + E_t\tilde{p}_{t+1}) &= \omega_{t-1} - 1/2(\tilde{p}_{t-1} + \tilde{p}_t) \\ &\quad + \bar{g}_t - \frac{\psi}{2(1-\gamma)}\left[U_t + \sum_{i=1}^{\infty} \left(\frac{\gamma}{1-\gamma}\right)^{i-1} \frac{1}{1-\gamma} E_t U_{t+i}\right]\end{aligned}\tag{14}$$

Note that this solution only makes sense when  $\gamma < 0.5$ , that is, the wage setting process

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<sup>24</sup> The method of undetermined coefficient is an easy way to derive the solution.

<sup>25</sup> The other solution is given below.

$$\begin{aligned}\omega_t - 1/2(\tilde{p}_t + E_t\tilde{p}_{t+1}) - \bar{\tau}_t &= \left(\frac{1-\gamma}{\gamma}\right)[\omega_{t-1} - 1/2(\tilde{p}_{t-1} + \tilde{p}_t) - \bar{\tau}_{t-1}] \\ &\quad - \frac{\psi}{2\gamma}\left[U_t + 2\sum_{i=1}^{\infty} E_t U_{t+i}\right]\end{aligned}$$

It makes little economic sense, unless  $\gamma = 1$ , the purely forward-looking case, which I am not considering. When  $\gamma < 1/2$  (that is, when the model is more backward-looking than forward-looking), the real wage growth process becomes non-stationary, and it is more non-stationary, the smaller  $\gamma$ . When  $\gamma > 0.5$ , the autoregressive component in the real wage process is stationary, but the infinite sums for the forcing variables will explode, even when the forcing variables are constant.

must be mainly backward-looking.<sup>26</sup> When the unemployment rate is expected to remain constant, the equation becomes:

$$\omega_t - \frac{1}{2}(\tilde{p}_t + E_t \tilde{p}_{t+1}) = \omega_{t-1} - \frac{1}{2}(\tilde{p}_{t-1} + \tilde{p}_t) + \bar{g}_t - \frac{\Psi}{1-2\gamma} U_t \quad (15)$$

The average wage paid in period  $t$ ,  $w_t$ , is the average of the current and previous contract wage,

$$w_t = \frac{1}{2}(\omega_t + \omega_{t-1}) \quad (16)$$

Equation (10) can be rewritten as<sup>27</sup>

$$p = \mu + w + l - y \quad (17)$$

This then implies

$$p_t = \frac{1}{2}(\omega_t + \omega_{t-1}) + \mu_t + l_t - y_t \quad (18)$$

The relationship between the RPI, the domestic value added deflator and import prices can be written as

$$\tilde{p} = (1-\alpha)p + \alpha(p^f + s) \quad (19)$$

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<sup>26</sup> If  $\gamma > 0.5$ , the infinite sums in (14) would not converge, even if the target growth rate of real wages and the unemployment rate were constant.

<sup>27</sup> Equation (14) assumes that all labour has the same productivity. If workers retained the productivity level of their contracting period, equation (14) would become

$$p_t = \frac{1}{2}(\mu_t + \omega_t + l_t - y_t + \mu_{t-1} + \omega_{t-1} + l_{t-1} - y_{t-1}) \quad .$$

The simpler specification of (14) seems more plausible.

Let  $g_t \equiv y_t - y_{t-1} - (l_t - l_{t-1})$  be the growth rate of labour productivity and  $s_t \equiv s_t + p_t^f - p_t$  the real exchange rate. Equations (18) and (19) imply that

$$\tilde{\pi}_t = \frac{1}{2}\Delta\omega_t + \frac{1}{2}\Delta\omega_{t-1} + \Delta\mu_t - g_t + \Delta s_t \quad (20)$$

Since

$$\Delta\omega_t = \frac{1}{2}(E_t\tilde{\pi}_{t+1} + \tilde{\pi}_t) + \bar{g}_t - \frac{\Psi}{2(1-\gamma)}\left[U_t + \sum_{i=1}^{\infty}\left(\frac{\gamma}{1-\gamma}\right)^{i-1}\frac{1}{1-\gamma}E_tU_{t+i}\right] \quad (21)$$

this model exhibits inflation persistence, as is apparent from equation (22).<sup>28</sup>

$$\begin{aligned} \tilde{\pi}_t = & \frac{1}{4}[E_t\tilde{\pi}_{t+1} + \tilde{\pi}_t + E_{t-1}\tilde{\pi}_t + \tilde{\pi}_{t-1}] + \Delta\mu_t - g_t + \Delta s_t \\ & + \frac{1}{2}\left[\bar{g}_t - \frac{\Psi}{2(1-\gamma)}\left(U_t + \sum_{i=1}^{\infty}\left(\frac{\gamma}{1-\gamma}\right)^{i-1}\frac{1}{1-\gamma}E_tU_{t+i}\right)\right] \\ & + \frac{1}{2}\left[\bar{g}_{t-1} - \frac{\Psi}{2(1-\gamma)}\left(U_{t-1} + \sum_{i=1}^{\infty}\left(\frac{\gamma}{1-\gamma}\right)^{i-1}\frac{1}{1-\gamma}E_{t-1}U_{t-1+i}\right)\right] \end{aligned} \quad (22)$$

From (21) it is apparent that lower expected real wage growth can mean lower money

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<sup>28</sup> The economically sensible solution will have the following general structure:

$$\begin{aligned} \tilde{\pi}_t = & \tilde{\pi}_{t-1} + a_0(\Delta\mu_t - g_t - \Delta s_t) + \sum_{i=1}^{\infty} a_i E_t(\Delta\mu_{t+i} - g_{t+i} + s_{t+i}) + \sum_{i=0}^{\infty} b_i E_{t-1}(\Delta\mu_{t+i} - g_{t+i} + s_{t+i}) \\ & + c_{-1}\bar{g}_{t-1} + c_0\bar{g}_t + \sum_{i=0}^{\infty} c_i E_{t-1}\bar{g}_{t+i} + \sum_{i=1}^{\infty} d_i E_t\bar{g}_{t+i} \\ & + e_{-1}U_{t-1} + e_0U_t + \sum_{i=1}^{\infty} e_i E_{t-1}U_{t+i} + \sum_{i=1}^{\infty} f_i E_tU_{t+i} \end{aligned}$$

The determination of the undermined coefficients is left as an exercise for the reader.

wage inflation, if the expected rate of price inflation is unchanged. It can mean unchanged money wage inflation if the expected rate of price inflation falls. It is even consistent with rising money wage inflation if the expected rate of price inflation rises even more.

From equation (21), we also see how current period contract wage inflation depends on RPI inflation during the current period and on current expectations of next period's RPI inflation.

From equation (16) the current inflation rate of average money wages is a weighted average of current and last period's contract wage inflation:  $\Delta w_t = \frac{1}{2}(\Delta \omega_t + \Delta \omega_{t-1})$ . The RPI inflation

augmentation term in the equation for the inflation rate of average money wages therefore is

$$\frac{1}{4}(E_t \tilde{\pi}_{t+1} + \tilde{\pi}_t + E_{t-1} \tilde{\pi}_t + \tilde{\pi}_{t-1})$$

Note that this 'RPI inflation augmentation term' includes both past RPI inflation and past expectations of current RPI inflation (as well as current RPI inflation and current expectations of future RPI inflation).

With the RPI inflation augmentation term in the money wage equation partly predetermined (that is, inherited from the past), lower expected real wage growth is likely to mean lower money wage growth in the short run. Given an unchanged mark-up, and an unchanged growth rate of labour productivity, price inflation on the GDP deflator measure will also be lower in the short run than it would otherwise have been. Once the influence of inherited nominal contracts wears off, however, the lower NAIRU only has implications for the path of *real wages*, not for price inflation or money wage inflation separately. Monetary policy maps real wage growth into money wage growth and inflation in the long run.

There may appear to be no sign of the NAIRU in equations (21) and (22), but a long-run equilibrium unemployment rate, which depends only on long-run structural factors, is implicit in the wage and price mechanism. I define the NAIRU as that constant unemployment rate that would be consistent with a constant rate of inflation, a constant share of labour in value added (that is, a constant mark-up), a constant real exchange rate, a constant growth rate of labour productivity and a constant growth rate of target real wages. This very long-run definition of the NAIRU implies that

$$U^N \equiv \psi^{-1}(1 - 2\gamma)[\bar{g} - g] \quad (23)$$

Not surprisingly, the NAIRU increases when the target growth rate of real wages rises, when the growth rate of labour productivity falls and when the responsiveness of real wages to unemployment falls.<sup>29</sup> Substituting (23) into (15), we can write the real contract wage adjustment equation, when the actual unemployment rate is constant, as follows:<sup>30</sup>

$$v_t - \frac{1}{2}(\tilde{p}_t + E_t \tilde{p}_{t+1}) = v_{t-1} - \frac{1}{2}(\tilde{p}_{t-1} + \tilde{p}_t) + g - \frac{\Psi}{1-2\gamma}(U - U^N) \quad (24)$$

Thus, in the short run, with current contract wage inflation in part anchored in past expectations and past actual inflation, a reduction in the natural rate of unemployment will exercise downward pressure on currently negotiated money wage settlements. This means that in the short run nominal interest rates can be lower than they would have been otherwise. Over time, the actual unemployment rate will, partly through the endogenous, automatic servomechanism of a market economy and partly through deliberate policy actions, follow the

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<sup>29</sup> Remember that the solution is only well-defined if  $\gamma < 0.5$ .

<sup>30</sup> For notational simplicity, I assume that the growth rate of productivity, the target growth rate of real wages and the actual unemployment rate are all constant. The general case can be reconstructed easily from (21) or (22).



natural rate down to its new lower level. At that point, nominal interest rates will have to revert to the level where they would have been in the absence of a fall in the natural rate of unemployment, if an unchanged inflation target is to be met.

It remains true, of course, that even though nominal interest rates will, in the long run, with the actual unemployment rate down at the level of the lower natural rate, be back at the same level they would have been at without a change in the natural rate, interest rates will be at a level lower than they would have been if the unemployment rate had to be kept at the new lower level without the fall in the natural rate. Indeed, given the view of the transmission mechanism outlined here, it would not have been possible, without the fall in the natural rate, to keep unemployment permanently at the level corresponding to the new lower natural rate. Inflation would rise without bound, and nominal interest rates with it.

### **IIIA5. Higher trend productivity growth and UK monetary policy**

An increase in the growth rate of trend productivity has no straightforward implications for inflation and for the path of nominal interest rates consistent with a given inflation target, even in the short run. The common assertion that it will reduce the rate of inflation, or permits lower nominal rates without endangering the inflation target, appears to be based on one of two misguided bits of analysis.

The first is a labour market story. For sake of brevity, I will conduct the discussion in terms of the rate of inflation of the GDP deflator.<sup>31</sup> Using the wage-price model of the previous subsection, the rate of inflation of the value added deflator,  $\pi$ , is the growth rate of unit labour costs,  $\Delta w - g$ , plus the growth rate of margins,  $\Delta\mu$ .

Holding constant the growth rate of money wages, a higher growth rate of productivity will reduce the growth rate of unit labour costs.

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<sup>31</sup> Equivalently, I assume the real exchange rate is constant.

$$\pi = \Delta w - g + \Delta\mu \quad (25)$$

If margins do not increase, this will mean lower price inflation. The argument is absolutely correct but quite irrelevant. In general, it does not make much sense to assume that the target growth rate of real wages is constant when the growth rate of productivity increases. For a given path of unemployment, expected real wage growth can be expected to increase in line with the underlying growth rate of labour productivity. In terms of the model of the previous sub-section,  $\bar{g}$  and  $g$  can be expected to move in tandem. This need not be the case if the productivity growth reflects changes in labour market institutions and practices that weaken the bargaining strength of labour, but it is a useful benchmark.

With expected real wage growth rising in line with trend productivity growth, the effect of higher productivity growth on money wage growth depends entirely on the behaviour of expected inflation. Assume for simplicity, that the public does not make systematic errors when it forms its price inflation expectations. In that case, the behaviour of money wage inflation moves, other things being equal, one-for-one with price inflation. With price inflation moving one-for-one with wage inflation (given productivity growth and given the markup), there is no way we can explain what happens to price inflation and wage inflation individually. We know how they hang together, but we cannot tell how they hang separately. Again, we need a story about monetary policy to translate changes in expected real wage growth into paths for price inflation and money wage inflation.

The second simple productivity-growth-to-inflation nexus is based on a misinterpretation of the most basic identity in macroeconomics, the equation of exchange. Let  $M$  be the nominal stock of money and  $V$  the income velocity of circulation of money.

$$MV \equiv PY \quad (26)$$

In growth rate form this identity can be rewritten as:

$$\pi \equiv \Delta m + \Delta v - \Delta y \quad (27)$$

Those who argue that higher productivity growth means lower inflation make two implicit assumptions. First, higher productivity growth means higher output growth. The correct statement would be that, other things being equal, higher productivity growth means a higher growth rate of *potential* output. To translate potential output growth into actual output growth, the proper quantum of aggregate demand needs to be in place. Second, monetary policy somehow fixes the growth rate of nominal GDP or nominal income. Equivalently, monetary policy fixes the growth rate of the nominal money stock, corrected for changes in velocity. It is a tautology that a higher growth rate of real output will, with a constant growth rate of nominal output, mean lower inflation.

The problem with this is that the growth rate of nominal GDP is not fixed by policy. It is not even a target of monetary policy, although some, notably Sam Brittan, have argued that it should be. What kind of monetary policy rule would support a constant growth rate of nominal GDP in the face of an increase in the growth rate of potential GDP? From the equation of exchange, it is clear that changes in the growth rate of the nominal money stock would have to offset exactly any changes in the growth rate of the velocity of circulation of money.

The transitional dynamics of the velocity of circulation of money are one of the deeper mysteries of empirical monetary economics. Common models of money demand make the money-income ratio a decreasing function of the opportunity cost of money and an increasing function of the ratio of private consumption to GDP. Other variants include a wider spectrum of alternative rates of return, financial wealth, human capital and a variety of scale variables aiming to capture the transactions role of money. In what follows I interpret money narrowly, as central

bank money or base money. The opportunity cost variable for this non-interest-bearing asset is the short nominal interest rate, and wealth variables should not affect the demand for this rate-of-return-dominated asset. Let  $c$  be (the natural logarithm of) private consumption. A typical long-run money demand function would be

$$m - p - y \equiv -v = \eta_0 - \eta_1 i + \eta_2 (c - y) \quad (28)$$

$$\eta_1 > 0; \eta_2 \geq 0$$

In the long run, that is, on the new balanced growth path, velocity will be constant, albeit perhaps at a different level. Therefore, in the long run, a constant growth rate of the nominal money stock would, if associated with a higher growth rate of potential *and* actual output, produce a lower rate of inflation. If the central bank is charged with achieving an unchanged inflation target, a higher growth rate of nominal money will be consistent with that inflation target in the long run.

The growth rate of the nominal money stock is not the instrument of monetary policy, however. The operational monetary policy instrument is a short nominal interest rate, the 2-week repo rate in the UK. This matters for the long-run response of the price *level* to shocks.

When the nominal interest rate is either set exogenously, or, as in the case of the Taylor rule, is a function only of real variables (the real interest rate, the rate of inflation and the output gap, say), the behaviour of the nominal variables, that is, the price level, the money wage and the nominal money stock, is different from what it would be if the nominal money stock were the instrument of policy, even if the monetary rule targets and achieves the same inflation target, as would be the case, for instance, under the McCallum rule.

If there are no nominal rigidities, nominal interest rules result in price level or nominal

indeterminacy.<sup>32</sup> While the rate of inflation, the growth rate of the nominal money stock and all other real variables are determinate, the price level sequence and the nominal money stock sequence are not. In our neo-Keynesian model, the initial value of the price level and/or the money wage is anchored in history. There is no nominal indeterminacy, but the long-run values of the price level, the money wage and the nominal money stock are ‘hysteretic’ or path-dependent. They depend on the initial conditions. Under a nominal interest rate rule like the Taylor rule it is indeed the case that a real, structural change such as a lowering of margins, can permanently lower the path of the price level, even though it will have no permanent effect on the rate of inflation. This would not be the case under a monetary rule like the McCallum rule, or under a nominal income targeting rule that both achieve the same inflation target in the long run.

What can we expect to happen, in the long run, and on average, to the short nominal interest rate if the growth rate of potential output rises? From our earlier discussion of the international determinants of the UK interest rate, it is clear that the answer depends on what happens to the real rate of interest in the long run when the growth rate of potential output rises. Ignoring, for simplicity, term and risk premia, the expected real interest rate,  $r$ , equals the nominal interest rate,  $i$ , minus the expected rate of inflation,  $\hat{\pi}$ , that is

$$\hat{\pi} \equiv i - r \quad (29)$$

Still restricting ourselves to the long run, actual and expected inflation will not be far out of line, so in the long run

$$\pi \equiv i - r \quad (30)$$

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<sup>32</sup> This will not be the case if the nominal interest rate is made a function of some nominal variable, such as past, current or anticipate values of the nominal money stock, the price level or the money wage.

Finally, in the long run, the real interest rate in the UK will equal that in the rest of the world

$$r = r^f \quad (31)$$

If the world real rate of interest is not changed in the long run, the achievement of an unchanged inflation target will still require the same long-run path of UK nominal interest rates as before, regardless of what happens to the growth rate of UK potential output. If UK nominal rates were lower on average than before, we would see a lower long-run rate of inflation in the UK.

It is quite easy to think of circumstances where an increase in the growth rate of UK potential output is associated with an increase in the long-run global real rate of interest. This would be the case, for instance, if, New Paradigm-style, the increase in the growth rate of productivity were a world-wide phenomenon associated with an increase in the marginal real rate of return to capital investment. If the equity risk premium is unchanged, the global real rate of interest would also rise, and the UK real interest rate with it. With an unchanged inflation target, the long-run average path of the UK short nominal interest rate would have to be higher, not lower.

The short-run effect of an increase in the growth rate of potential output on the path of nominal rates that achieves an unchanged inflation target is much less clear-cut. As will be apparent by now, I favour a rather neo-Keynesian view of the short-run transmission mechanism, which attributes a significant role to short-term nominal price and wage rigidities and to the ‘output gap’, the gap between the actual level of output (which I take to be demand-determined), and potential output. In such a world, the appropriate short-term response of short nominal rates is often in the opposite direction from the intended and expected long-run change.

The Taylor rule, according to which nominal interest rates move more than one-for one with (actual and expected) inflation, and also respond positively to the output gap, is a useful example of the kind of nominal interest rule that can produce, depending on the nature of the shocks, short-term interest rate changes that are in the same direction as the long-run changes in the interest rate or in the opposite direction. Let  $\tilde{\pi}^*$  be the target inflation rate and  $\bar{Y}$  capacity output. The Taylor rule is given in (32).

$$i_t = E_t r_t + E_t \tilde{\pi}_{t+1} + \delta_1 (\tilde{\pi}_{t-1} - \tilde{\pi}^*) + \delta_2 (Y_t - \bar{Y})$$

$$\delta_1, \delta_2 > 0$$
(32)

In the long-run, with output at its capacity level, actual and expected inflation equal to the target rate of inflation and the expected real interest rate equal to the world real rate, the short nominal interest rate is given by

$$i = r^f + \tilde{\pi}^*$$
(33)

Typically, with this rule, a lower target rate of inflation requires (other things being equal) higher nominal rates in the short run, but a lower nominal interest rate in the long run. A higher short real interest rate will, other things being equal, call for higher nominal rates, both in the short run and in the long run. A lower level of the output gap today calls for a lower nominal rate in the short run. In the long-run, with the economy back at capacity, nominal interest rates are unchanged.

The appropriate short-run response of short-term nominal interest rates to an increase in the *trend rate of growth* of productive potential depends on how the short and medium-term balance of aggregate demand and aggregate supply is affected by this ‘supply-side’ improvement.

I assume that the real interest rate and the target inflation rate are unchanged. Productive potential, in our set-up is given by the real value added that would be produced if employment were at its equilibrium level. Since there is no evidence of significant intertemporal substitution in labour supply, equilibrium employment can be written as  $\bar{L}(1 - U^N)$ , where  $\bar{L}$  is the exogenous labour force. Potential output is therefore given by

$$\bar{Y} = AF(K, \bar{L}(1 - U^N), N) - \frac{P^N}{P}N \quad (34)$$

So-called ‘supply side’ shocks or supply side improvements almost always have direct and indirect effects on aggregate demand as well. It is clear that, even with an unchanged path of nominal interest rates, aggregate demand is likely to be boosted by the kind of structural changes that boost the trend growth rate of productive potential, which we can represent here as an increase in the growth rate of total factor productivity,  $A$ .

Aggregate demand is the sum of private consumption,  $C$ , private investment,  $I$ , government exhaustive spending,  $G$ , and net exports,  $X$ .<sup>33</sup>

$$Y = C + I + G + X \quad (35)$$

Private consumption depends on permanent after-tax labour income, current after-tax labour income and real financial wealth. It may also depend, through the intertemporal substitution channel, on the path of current and anticipated future real interest rates, although the empirical evidence does not support a strong effect. Risk and attitudes towards risk are also important. Consumption can be affected both by rate of return uncertainty and by uncertainty about

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<sup>33</sup> For reasons of space, I lump inventory investment in with aggregate investment.



the stream of future after-tax labour income. 'Confidence effects' influence investment as well as consumption. Private financial wealth is the sum of real stock market wealth,  $q$ , real housing wealth, the real value of the stock of base money, the real value of the public debt and the real value of net claims on the rest of the world. Private investment can be viewed as driven by  $q$ , by confidence effects and by corporate cash-flow, liquidity and balance sheet strength. Net exports depend negatively on domestic demand and positively on real competitiveness and on demand in the rest of the world.

Higher growth of potential output can affect aggregate demand through a variety of channels. Households' perceptions of their permanent incomes are likely to be boosted, even if their current incomes do not rise immediately (they may well do so). If any part of the productivity gains is appropriated by the owners of capital, stock market valuations will rise and household financial wealth with it. This will boost consumption. Even if the valuation of existing capital is not boosted (for the reasons mentioned earlier, that the technical progress cannibalises the old capital stock and reduces profit margins), the return to investment in the appropriate new sectors could be very high. Tobin's 'average  $q$ ' could be depressed, yet his 'marginal  $q$ ' could be very high. Intangibles like household and business confidence may be boosted. All this will stimulate private consumption and private investment. It is not at all inconceivable, that aggregate demand is, in the short and medium term, boosted by more than potential output. This would call for a higher path of nominal interest rates in order to achieve an unchanged inflation target, not a lower one. In the long run, if the real interest rate and the inflation target are unchanged, higher productivity growth will have no effect on the path of nominal interest rates. It remains true, of course, that the higher growth rate of actual output could not have been sustained with the same level of nominal rates if there had not been a matching increase in the growth rate of potential output.

All this is a long, some might say, long-winded, way of saying that inflation is a monetary phenomenon. It is important to remind oneself of that old truth however, lest one gets carried away on a wave of supply side euphoria.

Clearly, knowledge of supply-side developments, including, where empirically relevant, those of the New Paradigm, are essential for the proper formulation of monetary policy. When we see the unemployment rate at 5.9%, we clearly worry rather less about excessive tightness in the labour market if we believe the NAIRU is 5.0% than we would if we were to believe it to be 7.0%. The implications for monetary policy of uncertainty about the NAIRU or about the output gap is an important, but as yet unresolved issue (see e.g. Orphanides [1999]). Real final demand growth and GDP growth at 3.5% worry us rather less if we believe the trend rate of growth of potential GDP to be 3.0% than if we believe it to be 2.25%. In an economy undergoing structural change, past empirical regularities may be even worse guides to the future than usual.

For what it is worth, I certainly believe that the natural rate of unemployment in the UK is lower in 1999 than it was in 1979. Whether its level, however, is closer to 7.0 percent than to 5.0 percent is something no one can be confident about. I am also happy to take seriously the proposition that a combination of privatisation, deregulation, globalisation and technological change are making for a sustained decline in the equilibrium mark-up on normal unit variable cost. The magnitude of this is, again, quite up in the air.

It is even possible that the trend rate of growth of potential output in the UK has gone up by 0.25% or 0.50% per annum or so. There are some indications that the growth rate of the labour force may be picking up relative to its behaviour in the recent past. Working age population is expected to grow by an average 0.4 percent per annum until 2005. This rate is somewhat faster than the average 0.3 percent per annum experienced during the 1990s but slightly lower than that in the 1980s. In addition, the employment rate in the next five years or so may be rising

(reflecting reductions in inactivity), in contrast to the declining employment rate of the 1990s.<sup>34</sup> Unlike the US, however, there is no evidence whatsoever as yet in the aggregate data of an increase in the trend growth rate of total factor productivity.<sup>35</sup>

Whatever the plausibility and quantitative significance of these supply-side improvements, whether part of the New Paradigm or not, it is vitally important that we recognise that their implications for monetary policy, given an unchanged inflation target, are by no means straightforward. The view that a sustained reduction in the natural rate of unemployment, a sustained fall in margins or a sustained increase in the rate of growth of productivity all unambiguously imply that the path of short term nominal interest rates can be lower than it would otherwise have been, without this posing a threat to the inflation target, is almost certainly mistaken.

## **IIIB. The ‘death of inflation’**

The reports of the death of inflation are distinctly exaggerated and premature. Inflation is not dead. This particular parrot is not even stunned or sleeping. It is under control, no more or less than that. In a world in which the monetary standard ultimately rests on state-issued fiat money, inflation is, ultimately, a political choice. It is under control because across the world, the popular and political consensus turned against inflation and because this inflation aversion was expressed in the form of more effective institutions for conducting monetary and fiscal policy.

Low inflation was the outcome of a similar political choice even during the era of very low

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<sup>34</sup> See e.g. HM Treasury [1999].

<sup>35</sup> See e.g. O’Mahony and Wagner [1996], McKinsey Global Institute [1998], Baily [1999], Gordon [1999a, b], Murray and Smithers [1999]

(albeit volatile) average inflation that lasted for much of the world from the end of the Napoleonic Wars until the beginning of World War I. During the later part of this period, many of the leading nations of the world were on the gold standard. Gold is a commodity money, whose production is governed by mining technology, the cost of contributing inputs and the non-monetary demand for the commodity. If this were the only kind of money, and if there are no effective private or public money substitutes, there can be no political control over the price level.

However, during the 19<sup>th</sup> century, government-issued fiat money and private fiat monies often coexisted with gold as means of payment and stores of value. Convertibility, and the price at which convertibility takes place, is always a political choice in the case of government fiat money. In the case of private fiat money, convertibility, to the extent that it was not legally required and enforceable, was again a choice, informed this time by private profit-maximising considerations. The unregulated, competitive issuance of private money in an exclusively private money economy, can not only be associated with inflation, it is likely to be associated with price level indeterminacy.

The adoption by many 19<sup>th</sup> century nations of the Gold Standard was a political choice. There were alternatives, from bimetallism to fiat money without any link to commodity money. During earlier periods of commodity money, going back to the Roman empire and earlier, debasing the coinage was a popular means of financing the budget deficit of the sovereign. The political choice to adopt the gold standard and to abide by its rules, gave us a long spell of low average inflation in the 19<sup>th</sup> century. Modern societies have made the choice to invest political capital in the adoption of price stability objectives, often supported by operationally independent central banks. The UK is a fully signed-up member of this happy band. However, the price of price stability is eternal vigilance. Anything that can be done politically can be undone politically.

Inflation can only die when money dies. The day the last bank note is put out of business by new electronic means of payment and funds transfer and the day the private sector can create liquidity that is as unchallengeable under any circumstances as the liquidity provided today by the central bank, is the day inflation of the state-provided monetary standard dies. That is still some way off.

Even if the state is out of the money business, there may continue to be private monies (media of exchange and means of payment). The risk of inflation (indeed of price level indeterminacy) of the private monetary medium or media will continue to exist. Only when the world reverts to a high-tech form of barter, in which ‘money’ (or monies) exist only as a numéraire, will inflation be truly dead.

### **IIIC. The ‘end of ‘boom and bust’**

If the ‘end of boom and bust’ is interpreted as the end of the business cycle, it is an illusion. Capitalist economies are inherently cyclical. When I first studied economics as an undergraduate in Cambridge between 1968 and 1971, bookshelves were groaning under the weight of learned treatises announcing the death of the business cycle. We all know what happened since then. If the ‘end of boom and bust’ means anything, it is that policy no longer amplifies and exaggerates the inherent cyclical swings of activity in capitalist economies.

Too often, during the post World War II era, ‘stabilisation’ policy has been destabilising, feeding booms and reinforcing cyclical contractions. An independent central bank and a framework for medium and long-term fiscal stability should stop us shooting ourselves in that particular foot. That is the most we can hope for. Ambitions beyond that will be self-defeating.

### **IIID. Neanderthal Keynesian fallacies**

It is essential that we be clear about what monetary policy can and cannot deliver. Monetary policy can provide the public good of macroeconomic stability: sustained low inflation and moderate economic fluctuations. It can also help reduce the risk of financial crises and prevent them from developing into economic calamities on the scale of the Great Depression of the 1930s. It cannot do more than that.

There is a view that a policy of sustained, systematic depreciation of the *nominal* exchange rate can produce a sustained weakening of the *real* exchange rate, a lasting improvement in international competitiveness and a permanently lower rate of unemployment or even a permanent increase in the growth rate of real GDP (see e.g. Mills and Mitchell [1999]). I regret to say that this is a delusion. Nominal exchange rate depreciations engineered by expansionary monetary policy have a temporary effect on international competitiveness. These transitory real effects are then eroded by higher domestic cost and price inflation. Any real effects are smaller and shorter-lived when the use of the exchange rate as an instrument in the pursuit of international competitive advantage becomes systematic and predictable.

Any temporary effects from expansionary monetary policy on the real exchange rate are desirable and welcome, when they correct an existing overvaluation. Under these circumstances they expedite and facilitate a necessary correction of international relative costs and prices that would otherwise have to occur through differential rates of price and cost inflation between the UK and its overseas competitors. Temporary real exchange rate effects of monetary policy are undesirable and unwelcome when they cause a departure from a balanced international price and cost configuration, and *a fortiori* when they reinforce an existing undervaluation.

A related fallacy starts from the correct observation that our monetary instrument, a short nominal interest rate, has a direct effect on the RPI, through the mortgage interest component of that index. The fallacy is the conclusion that interest rate increases raise the cost of living and the

rate of inflation, and that the way to reduce inflation therefore is to cut interest rates.

There are two distinct rebuttals to this fallacy. The first is the observation that inclusion of nominal mortgage interest payments in the RPI makes no sense if the RPI is to approximate a proper cost of living index. The housing cost component that should be in the cost of living index is the actual or imputed rental cost of housing. This depends positively on the nominal interest rate, the housing stock depreciation rate and the current price of housing, but negatively on the expected future price of housing. Including nominal interest rates, and current housing prices, but excluding capital gains on housing, as is the current RPIX practice, makes no economic sense.<sup>36</sup> The proper interest rate in the cost of housing services is the "own real interest rate" for housing, that is, the nominal interest rate corrected for the expected proportional rate of increase in the price of housing.

The second rebuttal accepts, regrettably, that the RPI is what it is, warts and all, and that this distorted index may play a role in the price and wage-setting process, if only because those bargaining over real wages do believe it to be a reliable cost of living index. The further fallacy

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<sup>36</sup> Let  $\rho^H$  be the nominal rental cost of housing,  $P^H$  the nominal house price and  $\delta^H$  the housing depreciation rate. Then (ignoring risk premia) the following relationship holds

$$\rho_t^H = (1 + i_t)P_t^H - (1 - \delta^H)E_t P_{t+1}^H$$

This can be rewritten as

$$\rho_t^H = \left( i_t - E_t \left( \frac{P_{t+1}^H - P_t^H}{P_t^H} \right) \right) P_t^H + \delta^H E_t P_{t+1}^H$$

Thus, the appropriate interest rate term in the true cost of housing services is a real "own interest rate" for housing.

then is, that the RPI exclusive of mortgage interest, RPIX, is viewed as independent of what happens to interest rates. When we raise rates, a larger mortgage interest bill is therefore added to a constant interest-exclusive price index. Inflation (or rather the price *level*) rises. This is a fallacy, because, over time, higher interest rates depress RPIX by more than they raise X. It is true that, if wage bargains are influenced significantly by the RPI, attempts to control inflation by changing rates will be slower and more costly, in terms of output and employment foregone, than they would otherwise have been. The longer-run effectiveness of interest rate policy is not impaired by this, however.

### **III.E. The fine tuning fallacy**

To recognize that expansionary monetary policy does have an effect, albeit transitory, on international competitiveness and other real magnitudes, is not the same as arguing that monetary policy can be used to fine tune the international competitive position or eliminate the business cycle altogether. For that to be the case, we not only have to know the *sign* of these effects, but also their *timing* and *magnitude*. It is one of the oldest shibboleths of macroeconomics, that the lags in the transmission of monetary policy are long, variable and uncertain. Unfortunately, this shibboleth is true. This irreducible uncertainty about the magnitude and the timing of the effects of monetary policy on the real economy, including competitiveness, output and employment, means that monetary policy has but a very limited role as an instrument for dampening the national business cycle.<sup>37</sup>

Scholarly research sometimes encourages the fine tuning fallacy. A typical recent example is the study by Brigden and Nolan [1999] of the cost to the UK of joining a monetary

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<sup>37</sup> Similar views have been advanced by Friedman [1968], King [1997] and Viñals and Vallés [1999].



union. Their analytical framework is a very sparse model of a multi-country economy. Each country is fully characterised by four parameters: two ‘structural’ parameters, the slope of the short-run Phillips curve and the correlation coefficient between domestic and foreign supply shocks; and two policy parameters, the relative weight placed on inflation as opposed to output stabilisation by the national monetary authority and the weight accorded to individual countries in the European monetary authority’s loss function.

There is assumed to be only one kind of shock, a national aggregate supply shock. The national monetary authority is assumed to observe the national supply shock immediately and perfectly. It then sets national monetary policy instantaneously and optimally to cope with this shock. The authority knows the true structure of the economy (not too hard, in the exercise under consideration, but rather harder in the real world) and this structure of the economy makes certainty equivalent strategies optimal: the only random shocks are the perfectly observed additive random (supply) shocks, the model is linear and the objective functions are quadratic. The domestic authority is assumed to be able to control the domestic rate of inflation directly and exactly (wish it were so). As a result, it makes no difference at all to their framework whether the national economies are financially isolated or fully integrated into the global financial system. Indeed, a remarkable implication of this set-up is that, in a paper investigating the consequences for the UK of adopting an alternative exchange rate regime, the exchange rate itself does not appear at all. The authors attempt to add empirical content by ‘calibrating’ the model with quasi-real world estimates of the four key country-specific parameters, thus further contributing to the confusion of the unwary.<sup>38</sup>

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<sup>38</sup> A further serious flaw in this study is that the numerical estimates of the correlation between the supply shocks faced by the UK and other nations, rely on supply shock estimates that are almost surely misidentified. The supply shock time series on which these numerical estimates are based are from Bayoumi and Eichengreen [1994]. Bayoumi and Eichengreen identify supply shocks through the restriction that only permanent supply shocks have

While heroic oversimplification and the cavalier use of numerical calibration are common and innocuous in four-finger classroom exercises, they are rather serious shortcomings in a study that purports to be a serious empirical assessment of (part of) the costs of the UK joining the Economic and Monetary Union.

Without any uncertainty about the transmission mechanism (the magnitude and timing of the response of the economy to changes in the policy instrument), and with only a single, perfectly observed nation-specific shock, national monetary policy can, not surprisingly, do rather well as regards improving the trade-off between inflation and output variability. As a guide to policy, or as a contribution to the pros and cons of monetary union and the cost-benefit analysis of the abandonment of the national monetary instrument, this study is uninformative at best. At worst, it feeds the monetary fine tuning illusion.

## **IV. Conclusion**

It is our job to listen and to learn. And we do both. Some of the most enriching and informative experiences of my professional life have been the regional visits, organised by our regional agents, that have exposed me directly to the views, often firmly held and robustly expressed, of those who create the wealth that ultimately sustains us all, and who view themselves to be adversely affected by our actions. This information, and all the other evolving facts and

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permanent real effects. As pointed out, for instance, in Buitert [1997], such an identifying restriction is incorrect in virtually any modern macroeconomic model. Permanent real shocks to aggregate demand (that is, all shocks other than shocks to the demand for or supply of money) will, in general, have permanent real effects. Fiscal policy shocks, time preference shocks and other IS shocks are examples. The Bayoumi-Eichengreen framework completely fails to distinguish between LM shocks and IS shocks. It also completely fails to even consider the possibility of shocks originating in the foreign exchange markets, e.g. foreign exchange risk premium shocks and speculative bubbles originating in the foreign exchange markets.

insights that we are exposed to on a daily basis, form the foundation of the monthly judgment that each of us makes on rate setting days.

It is also part of our job to point out and correct common misperceptions about the monetary policy process and about the monetary transmission mechanism. Monetary policy works best when policy makers, the markets, and the economy at large, have a common, and preferably not too wildly incorrect, view of how monetary policy works.

Our government-mandated objectives are clear. How best to achieve them is, unfortunately, less than perfectly clear even at the best of times. I am convinced, however, that our current monetary policy framework and our current procedures are well-designed to allow us to make the best of this rather difficult job.

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