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Abstract

The paper analyses some of the arguments put forward in the Chancellor's "Five Tests" for joining the EMU. It emphasizes that economic analysis provides a cost-benefit framework, whilst recognizing that EMU is a political enterprise. A positive decision on entry to EMU could be accompanied by some attempts to mitigate the economic costs, thus enhancing the net benefits of membership.

1 Introduction

What is the proper role of an economist in a debate about such a politically charged decision as that of the potential entry of the UK into EMU? Fortunately economics itself provides a discipline-neutral framework of analysis in the form of the cost-benefit approach. That approach allows 'non-economic' factors to be admitted. If, as many probably think, the balance of purely economic factors is negative or uncertain, it may still be quite reasonable to see positive political benefits justifying entry. It still remains important to examine the economic factors carefully and to think of ways in which costs can be minimized.

This paper proceeds in that spirit. First, we recall the cost-benefit framework explicitly, as it was put forward by Krugman (1990), building on the insights afforded by the conventional economic theory of optimum currency areas. In the following section, we recognize in the "Chancellor's Five Tests", some of these same considerations and we go on to spell out how they apply to the UK. One of the Chancellor's "Five Tests" appears to appeal to a special interest group, the City of London. In the next section we ask whether this is a proper entry in the national calculus and what developments might sustain it. Then we consider the way forward, reviewing three scenarios, a "Canada scenario", in which the UK does not join EMU; a "Join now" scenario and a "Join later" scenario. The paper argues that the latter is the most realistic scenario and discusses some things that need to be done to ensure its successful implementation. There are three appendices that discuss in more detail some of the aspects economists have explored in relation to the questions addressed. Thus Appendix A introduces additional material on the issue of asymmetric shocks whilst Appendix B introduces additional material on asynchronous business cycles. Appendix C considers differences in the transmission mechanism of monetary policy.

2 Optimum Currency Area Theory

Traditionally it is the theory of optimal currency areas that has been used as a guide by economists in making sense of these issues. As is well-known, the lineage of authorship in this area goes back to Mundell (1961), McKinnon (1963) and Kenen (1969). Much more recently Krugman (1990) set out the theory in terms of a cost-benefit framework, which has the added benefit that it can also be made, heuristically, to encompass costs and benefits not accounted for in traditional economic analysis. Figure 1 reproduces Krugman's suggestion.
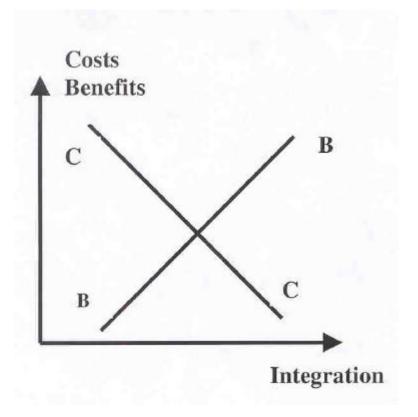
Figure 1: Costs and Benefits of Monetary Union

The Figure analyses the situation of a country contemplating a currency union with a partner or partner-group of countries. Along the horizontal axis is a measure of 'integration' - perhaps the economists' traditional measure

$$(X_{ij} + M_{ij}) \, / \, 2Y_i$$

where X_{ij}, M_{ij} denote, respectively, exports from i to j and imports to i from j and Y_i is a measure of economic activity in country i. Along the vertical are measured costs and benefits to i from the currency union with j. The upward slope of the benefit line (BB) suggests that benefits rise with the amount of intra-trade, essentially because the currency union arrangement offers the prospect of freedom from exchange costs. To these, nowadays, observers might add the competitive advantages of increased 'transparency' of relative prices, the locational-efficiency benefits of a fixed exchange rate and, in the European context, the preservation of the gains from "1992". The extent of intra-trade is a plausible measure of the potential extent of all these benefits. Other benefits, not related to the extent of intra-trade, can be accommodated simply by shifts in the BB schedule.

The CC schedule is drawn as downward-sloping in the Figure. The reason for this is the suggestion that the value of an independent monetary policy and flexible exchange rate (the loss of which is the 'cost' of currency union) declines with the openness of an economy. The reason for this (McKinnon (1963)) is that the larger the share of tradable goods in the consumer basket the less money illusion there will be in wage-setting behaviour and the less powerful, therefore, the effect of nominal exchange rate changes on the real exchange rate. The value of an independent monetary policy, however, is seen in this approach as stemming from its use as a stabilization tool. If a great deal of stabilization needs to be done, then the CC schedule should be relatively high. If there is little need, then the schedule should be relatively low - other things equal. How much stabilization needs to be done depends on the size, nature and frequency of asymmetric shocks. Where there is a high degree of asymmetry in demand shocks, with which monetary policy might be particularly good at coping, then the CC schedule should be conceived of as cutting the BB curve relatively far to the right; if the degree of asymmetry is low, then the reverse should hold[1]. The traditional approach also stresses that a high degree of labour mobility or in more contemporary terms 1abour market flexibility" constitute alternative ways of solving the problem: in the first instance, labour would migrate from the country suffering the 'bad' shock to the one suffering the 'good' shock; in the second case, labour market flexibility would help absorb the shock by inducing a relative fall in real wages in the country suffering the bad shock. Further, a federal fiscal arrangement could offer an alternative 'buffering' function, with fiscal transfers going from the country with the good shock to the one with the bad shock.

The Figure says, obviously, that a currency union yields net benefits when, for given CC and BB schedules, the degree of integration exceeds that corresponding to the intersection of the two schedules, since then benefits exceed costs. It is obvious that the framework can accommodate a variety of circumstances; in particular, perhaps, it suggests that a high level of intra-trade may not always be a good indicator of the optimality of a currency union. This will depend also on how symmetric are the shocks hitting the candidate countries.

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[1] The theory assumes that monetary policy is, or could be, the 'first best' stabilization instrument and indeed that the second best such instrument (fiscal policy?) is a very poor substitute for it. But these assumptions can be questioned. Canzoneri et al. (1996) find that real exchange rates do not respond appropriately. Erkel-Rousse and Melitz (1995) find monetary policy working as a stabilizer though fiscal policy is useful.

The OCA approach has come in for a variety of criticisms that must be mentioned. First, it omits any serious mention of inflation, yet counter-inflationary properties appear to be a leading criterion for the practical desirability of a currency union. The Treaty of Maastricht lists criteria, for example, which can be read as simply a variety of ways of measuring "counter-inflationary commitment". Second, it treats as exogenous what might be endogenous -namely, the asymmetry (or otherwise) of shocks. Third, it proffers a framework which promises to deliver a quantitative verdict in a common numeraire - a figure of net benefit or net cost, which it cannot in fact provide. These criticisms may not be as damning as they sound. First, counter-inflationary commitment can simply be added in where appropriate. Second, the issue of endogeneity can be tested for - we note below the "state of the art" in this respect and we conclude that a clear result has not yet been established. Third, whilst it is not possible to measure a net benefit or cost, it is possible to quantify quite a lot and thus to make informative comparisons between countries.

3 How do the OCA Criteria Apply to EMU and the UK?

The UK government's "five tests" (HM Treasury, 1997) are as follows:

- "Whether there can be sustainable convergence between Britain and the economies of a single currency.
- Whether there is sufficient flexibility to cope with economic change.
- The effect on investment.
- The impact on our financial services industry.
- Whether it is good for employment."

Of these tests, the first two are clearly related to the OCA approach. The third and fifth tests have no clear economic theory framework in which they can be answered if they are not already covered under the first two heads, and we shall set them on one side here. The fourth test is something we discuss a little further later on.

Where does the UK stand in relation to quantitative measures of OCA criteria, supplemented where appropriate by an inflation criterion? In this section we refer to studies based on measures of asymmetry of shocks and to more comprehensive studies of the application of the OCA criteria. In all these the UK appears as a less obvious candidate than some other countries for membership of a European Monetary Union. But this conclusion is not the same as saying 'the

UK should not join'. We do not measure all the benefits (nor all the costs). The tests are not Pass/Fail.

3.0.1 Asymmetric Shocks

Possibly the most elusive of the OCA criteria is that pertaining to asymmetric shocks. Two methods, broadly, have been pursued in this regard. The first, pioneered by Bayourni and Eichengreen (1993), attempts to isolate shocks from a "structural" VAR. The second, of which an example is Artis and Zhang (1997), attempts to isolate the business cycle and thence views measures of business cycle synchronization as corresponding to the desired identification of the symmetry of shocks. Both methods have advantages and disadvantages.

Table 1: Shock correlations with Germany 1960-95

	supply	demand
EU15 (EU)	0.37	0.57
Germany (BD)	1	1
France (FR)	0.40	0.28
Denmark (DK)	0.46	0.25
UK	0.24	0.14
Italy (IT)	0.25	0.29
Netherlands (NL)	0.34	0.18
Belgium (BG)	0.53	0.28
Austria (OE)	0.39	0.32
Spain (ES)	0.24	-0.03
Portugal (PT)	0.20	0.16
Greece (GR)	0.04	0.09
US	-0.01	-0.22
Canada (CN)	0.19	0.03
Norway (NW)	0.24	0.22
Sweden (SD)	0.19	0.19
Finland (FL)	0.19	0.02

IMF-codes of countries are given in parantheses and are used as labels in some of the subsequent graphs

According to the former method, the initiating shock is separated from the transmission process which, incorporating some policy response, mediates the passage of the shock through the economy. This separation, however, can only be achieved at the cost of imposing some restrictions on the estimation of the VAR. Bayoumi and Eichengreen (1993) chose restrictions which correspond to the basic assumptions of the simplest neoclassical model: in particular, only 'real' ('supply') shocks have a long-run impact on output; nominal ('demand') shocks

are restricted to have a zero long-run effect. In Appendix A we discuss formally a replication of Bayoumi and Eichengreen's estimates and what happens
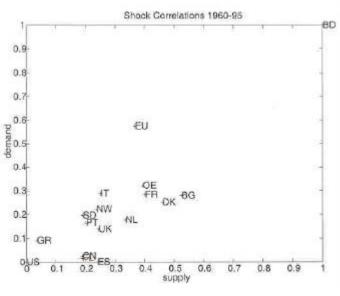

Figure 2:

when the sample period is extended; in addition we examine the effects of using alternative measures of prices and output.. The replication and re-estimation are reported in Table 1 here, for all the EU economies (Luxembourg being merged with Belgium) together with the US and Canada. As in the original Bayourni-Eichengreen paper, we report the value of the correlations of the shocks with those affecting the Germany economy, on the assumption that Germany should be regarded as the 'centre' of the EMU. The cross- correlations are also reported, graphically, in Figure 2. The general run of positive correlations is lower than in the sample period originally studied by Bayoumi and Eichengreen but it remains true, as in the original study, that a core and a periphery can be identified[2]. France, Denmark, Austria and Belgium are clearly in the core, the Netherlands and Italy being less obviously well identified. The UK appears to be less strongly attached and to that extent belongs to a "peripheral group".

3.1 Asynchronous Business Cycles

The alternative approach, focusing on business cycle correlations, is also treated more formally here in an appendix (Appendix B) since there has now grown up quite a large literature on business cycle affiliation and whether there now exists a "European Business cycle"; this literature encompasses a number of technical issues. Among them are issues as to the most appropriate way to identify cycles,

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[2] In their subsequent replications of their original Bayourni and Eichengreen (1996) noted this general decline in the correlations, attributing it in part to the impact of German unification.

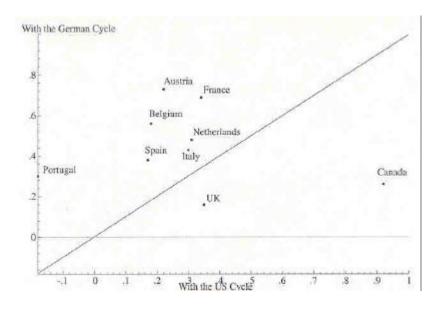and the correspondence of the synchronization (or otherwise) of cycles to the notion of symmetric (or otherwise) shocks. In particular, if the cycle itself is conceived as the outcome of a "shock plus transmission process", then policies which are idiosyncratic before EMU may both create idiosyncratic shocks and affect the transmission process, perhaps producing the impression of wider divergence in underlying stochastic experience than is really warranted or than will appear in the common monetary policy framework of an EMU. On the other hand, differences in the transmission process between countries - whether related to underlying behavioural relationships or to the policy transmission mechanism - could imply different cyclical responses even to identical shocks; Appendix C collects together a brief review of this latter aspect.

Table 2 and Figure 3 reproduce and extend the findings reported in Artis and Zhang (1997). The popular Hodrick-Prescott filter has been used to isolate the cyclical component. The dampening parameter in this filter can be set at different levels (zero corresponding to the linear trend case) and in this case is set to 50,000. Results are reported for a preERM and an ERM period, as in the original study. The extended period results largely confirm the findings of that original study. In particular, in the pre-ERM period, there is a broadly-defined 'world business cycle': cross-correlations with Germany and the US are relatively similar; after it, Germany emerges as an alternative 'attractor' for most of the European economies with the notable exception of the UK. Whereas the cross-correlations of the ERM countries with Germany generally increase between the periods, that for the UK falls sharply; and, whilst the UK's "affiliation" with the US cycle remains strong, that of the ERM countries declines.

Table 2: the U.S. and Germany as a benchmark

	Pre-ERM		ERM Period	
	D	**USA**	**D**	**USA**
Canada	0.51	0.86	0.26	0.92
France	0.65	0.72	0.69	0.34
Italy	0.37	0.58	0.43	0.30
NL0.79	0.43	0.48	0.31	
Austria	0.63	0.44	0.73	0.22
Belgium	0.69	0.63	0.56	0.18
Spain	0.48	0.64	0.38	0.17
Portugal	0.41	0.52	0.30	-0.18
UK	0.64	0.75	0.16	0.35

Figure 3A

Figure 3B

3.1.1 Endogeneity of the Shock Criterion?

The suggestion that a 'European' cycle may have emerged in the ERM period is consistent with the hypothesis that the criterion may be 'endogenous'. Frankel and Rose (1997, 1998) have been the most eloquent advocates of this view. At first blush, as Krugman (1990) has stressed, the formation of a currency union has ambiguous effects on the asymmetry of shocks between the member states. If the union stimulates more inter-industry trade, it may stimulate more specialization producing a propensity to greater asymmetry; alternatively, the new

trade generated may be predominantly intra-industry trade, leading to greater symmetry. The replacement of idiosyncratic monetary policies by a common monetary policy, on the other hand, eliminates one source of business cycle difference (idiosyncratic policy shocks), though transmission mechanism differences may still lead to wide, possibly even bigger, business cycle differences.

Frankel and Rose (1998) provide an econometric test of the proposition that increasing levels of bilateral trade are associated with a reduction in asynchronous business cycles, obtaining a positive answer. The result has been questioned by Imbs (1998), however, on the grounds that the correlation of trade and business cycle synchronicity fails to control adequately for third factors that influence both variables. It is also an open question how far currency union will promote further trade and, to the extent it does so, whether the additional trade creation will be of a traditional comparative- advantage type or of the intra-industry type[3]. Thus the issue is far from closed. An important question-mark has been raised about the validity of pre-union evidence on stochastic experiences, but no clearly unambiguous answers have yet been obtained.

3.1.2 Overall OCA Assessments

Overall assessments of the optimality of EMU for its potential members virtually always place the UK in an 'outsider' category'.

Bayourni and Eichengreen (1996) drew up an informal review of the major heads of assessment suggested by OCA theory, carefully referencing the relevant quantitative studies of these various factors for the European case. In a later study (Bayourni and Eichengreen (1997)) they computed an OCA index, based on the contribution of OCA factors to the determination of bilateral exchange rates. The variables involved included: a measure of business cycle synchronization; a measure of export composition; and measures of country size and output-weighted trade intensity. Using this approach they classified a group of countries as "convergent" and most ripe for monetary union, another group as "converging" and a third one as having shown little sign of convergence. The identification of these categories, and their membership overlaps quite strongly with the categories subsequently identified by Artis and Zhang (1998a, b) as 'the

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[3] Fontagné and Freudenberg (1998) note that not all intra-industry trade leads to greater symmetry; specifically, whilst intra-trade of a horizontally integrated type could be expected so to do, intra-industry trade of vertically integrated industry, an intra-trade in varieties or qualities, is more akin to trade promoted by comparative advantage and may not induce greater symmetry in shocks.

core' and the 'Southern' and the 'Northern' periphery. (The anomalies are that Bayoumi and Eichengreen place Ireland in the category corresponding to the core and France in the category corresponding to the Northern periphery group). The UK in all three studies appears in the 'Northern periphery' group. For good or ill, the Artis-Zhang studies come as close to a comprehensive formal assessment of the optimality of EMU, and the UK's position in relation to it, as any others[4]. Thus we proceed unblushingly to discuss those studies (albeit briefly) here.
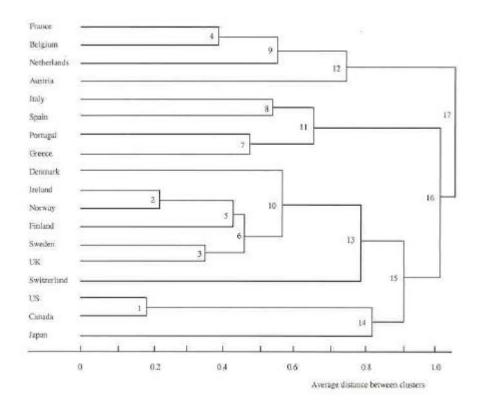

Figure 4: Merging process by group average clustering

Both studies use cluster analysis techniques, the first those of hard clustering, the later one those of 'fuzzy' or soft clustering. In each case, Germany is taken to be the 'centre' country, variables being measured, as appropriate, with respect to Germany. Data are taken for the period 1979.4-1995.10, on a monthly basis, for all EU countries (Luxembourg not separately distinguished) with, in the first study, the addition of the US, Canada, Japan and two European non-EU countries, Switzerland and Norway, as controls. The variables used are the following six: (i) the differential between a country's inflation rate and that in Germany, (ii) the volatility of a country's real exchange rate vis à vis Germany, (iii) the synchronization of a country's business cycle vis à vis Germany's, (iv) the synchronization of a country's monetary policy (measured by the cyclical

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[4] Of course, there are also many informative informal studies available - a good example being that of Taylor (1995).

component of its real interest rate) with Germany's, (v) the flexibility of a country's labour market with respect to Germany's (measured by the relative ranking of its employment protection legislation) and (vi) a country's bilateral trade intensity with Germany. The motivation for using these variables comes from OCA theory, with the addition of the inflation criterion (where actual inflation is used as a proxy for counter-inflationary commitment). Hard clustering algorithms work by minimizing the distance between objects (here, countries represented by the values of the six variables), progressively forming groups or clusters by repeating the minimization after countries join to form a group, or a country joins a pre-formed group. By construction, the groups comprise clusters of countries which are 'like each other" in respect of their relationship to Germany. Table 3 shows the results obtained, which are also represented in Figure 4 as a tree diagram. Hard clustering throws away information in the sense that every 'object' (country) has to be assigned to a cluster without regard for whether it could nearly as well belong to another cluster. Fuzzy clustering remedies this defect; in this procedure "membership coefficients" are calculated for each object (country) showing how firmly it adheres to each of the clusters nominated. Table 4 shows the membership coefficients computed for the EU-15 countries (Luxembourg merged with Belgium). The emboldened figures show the highest "degree of belongingness" of a country. It can readily be seen that the fuzzy clustering results support those of the hard clustering approach. The UK is clearly in the 'Northern periphery' group, rather far away from the core group.

Table 3. Clusters detected under hard clustering

1. Core Group:	(France, Netherlands, Belgium, Austria)	RMS: .56
2. Northern periphery:	(Denmark, Ireland, Switzerland, Sweden, Norway, Finland, UK)	RMS: .81
3. Southern periphery:	(Italy, Spain, Portugal, Greece)	RMS: .47
4. North America: (USA, Canada)		RMS:A8
5. Japan:	(Japan)	

Source: Artis and Zhang (1998a)

Table 4. Fuzzy clustering: membership coefficients

	Group I (Core)	Group 11 (Northern)	Group III (Southern)
France	**62.7**	19.9	17.4
Italy	11.6	18.5	69.9
Netherlands	**87.3**	7.0	5.7
Belgium	**87.9**	6.1	6.0
Denmark	22.8	**58.7**	18.5
Austria	**66.7**	16.2	17.1
Ireland	8.4	**75.8**	15.8
Spain	8.1	28.7	**63.2**
Portugal	2.1	4.9	**93.0**
Sweden	3.2	**86.8**	10.0
Finland	6.1	**82.5**	11.4
Greece	8.1	15.5	76.4
UK	5.3	**82.9**	**11.8**

Source: Artis and Zhang (1998b)

A conclusion can be drawn from this section: based on OCA analysis, with all its limitations, the UK is a marginal candidate for EMU. It is not in the core and in particular seems to have a different business cycle affiliation from that of the countries in the core. The limitations of OCA analysis, however, leave it open how far this distance from the core simply reflects the fact that the UK has been outside the reaches of the apprenticeship for EMU, the ERM, for most of the time; or whether, on the contrary, its absence from the ERM and its reluctance to participate in EMU jointly constitute a "rational recognition" of the underlying OCA 'facts'. In the event the latter is nearer the truth than the former, there still remains the point that OCA analysis covers only a subset of the full range of considerations.

4 The City's Interest

The Chancellor's "five tests" include a reference to the City of London's interests. That the interests of one sector of the British economy should be so elevated as to figure in a national decision in this way would seem controversial if it were not for the fact that the City of London's interests have probably been, all along, a determining factor in UK attitudes to EMU. Talani (1999) provides a thorough and provocative exposition of this idea. Given the generally positive attitude of British industry, the City's role here is reminiscent of the situation encountered by Churchill when he reviewed the enthusiasms of the City for the interwar return to gold, in contrast to the implications this had for British

industry[5]. City interests have traditionally favoured a minimum of regulation and a fear that, inside EMU, such regulation would be encountered, is a motive for keeping out; by the same token, if indeed, the EMU leads to regulation when the UK is out, the City can profit as the "off-shore banking centre": this prospect has also been cited as a motive for staying out.

The contrary fear is that by staying out, the City will fall victim, sooner or later, to some practice designed to protect Euro-zone financial activity, hence penalizing the City interest. It is not clear, either, whether there is some 'first mover' advantage which the City will forego by not being at the heart of Eurozone finance. Geographical location may not be very important; though locational agglomeration economies evidently are very important and this seems to imply that any incentives given to alternative centres within the Eurozone can indeed work to affect the City's built-in advantage of "already being there".

Initial suggestions that the continental taste for (non-interest-bearing) compulsory deposits as part of the armoury of monetary policy would be transferred to the ECB seem to have proved groundless; compulsory deposit requirements are to be part of the armoury, but they will be remunerated and thus will barely constitute a pretext for a move to offshore banking in London. This source of prospective profit to the City does not seem likely to eventuate. Equally, though, what seemed like a possibility that access to TARGET would be restricted for the UK in such a way as to inflict higher costs on UK banks doing Euro-zone business has not materialized. A source of loss has thereby been avoided.

Current indications - based on survey evidence reported in the Financial Times - are that 'City opinion' is now markedly more friendly to the EMU option than in previous periods, perhaps reflecting that there are no immediate signs of a loss to the City in joining EMU. Nevertheless, one of the Euro-zone's "black holes" remains that of financial regulation and last resort provision (Prati and Schinasi, 1998). What is determined in this area could have repercussions for City interests. Meanwhile in the Eurozone, bank mergers are taking place designed (mainly, it seems) to bolster the ability of incumbent banks to defend their positions in the face of an expected increase in competitive pressures. One of the promises of EMU is to make a single market out of the European Financial Area; remaining outside may prove a source of weakness for British financial institutions wishing to participate in this market. Whether this is so or not, City

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[5] "I would rather see Finance less proud and Industry more content" (extract of letter from Churchill to Niemeyer, 22 February 1926: see Moggridge D.E. (1972)

attitudes possibly are no longer a block on participation in EMU. We can consider now the way forward.

5 EMU and the UK: the Alternatives

What is the way forward for the UK? Economic analysis imposes no imperatives; the decision is a political one. Present government policy requires a positive decision in a referendum to be called in the next parliament. The alternatives canvassed seem to be variants on two alternatives: the "Canada solution - staying out and not trying to participate; or "joining now", presumably without a referendum.

Contrary to some present suggestions, the "Canada solution" is perfectly viable; whilst both Canada and, to take examples closer to home, Norway and Switzerland, are neighbours of large common market entities and are obliged often to accept the consequences of legislation passed in those entities without the opportunity to intervene, all three countries enjoy a degree of independence in monetary affairs. The Canadian economy is not dollarized in a way that renders the Bank of Canada ineffectual. The UK economy is bigger in relation to the Euro-zone than is Canada in relation to the US (16 per cent of GDP as opposed to 9 percent). Invoicing of imports and exports in Euro is likely to be more pervasive than was invoicing in the DM and invoicing in sterling will no doubt decline. But this is a long way from saying that the Euro will somehow subvert sterling as a domestic currency. All the evidence we have on currency substitution suggests that local currencies are extraordinarily persistent except in cases of extreme inflation or where governments take explicit action to encourage use of a foreign currency as a substitute. This said, the expectation that the UK will join the Euro-zone within a relatively short time would assist its premature replacement and current observations may be contaminated by just such an expectation; a true Canada solution would remove this incitement, however.

It is impossible to avoid the judgement at this point, however, that the full-hearted acceptance of the "Canada solution is not one that the UK can manage, if only because its political classes would find it impossible to accept. British European policy in the past has exhibited a curious cycle. New projects are viewed at first with something approaching disdain, as unworkable. But, if workable, they are seen as against the British interest and hence in the next phase there is an attempt to sabotage the initiative from within. Then, when the project finally comes to fruition, the UK first stands aside and only later participates. The cycle arises when the UK is not in charge of the agenda, when the project itself is not initiated on a British interest. It is not surprising that the transition from disdain and hostility to participation is hard to handle: it would be so even if the

disdain and the hostility were justified. If the other countries in Europe are going ahead with the project after all, then, even if it would have been better for the UK had the project never been initiated in the first place, standing aside from eventual participation may not be rational policy. The point of this detour (which in part relies on Young (1998)) is to underline that on past experience the Canada option is not one the UK is likely to be able to adopt in a full-hearted way. In the end, the UK wants to 'be in Europe'.

Clearly, if a full-hearted Canada option is not realistic and participation in EMU will come about some day, there must be merit in the Join Now option. Delay means being absent from important groundwork and institution-building, possibly quite harmful to UK interests, given that participation will occur sooner or later. There are two very practical obstacles to embracing this option, however. One is the need for a referendum; the other is the fact that the UK cannot decide simply to join. The Treaty of Maastricht sets out some requirements for participation, which the UK must meet. The requirement for a referendum seems important at two levels; first, the promise has been given and any attempt to circumvent it would be subject to severe political attack; second, the assurance that the UK is taking a full-hearted decision to participate is extremely important, not only for its own democratic merits, but also because the chances of a smooth transition to the Euro, may well depend on it.

Whilst the government's current policy path, being conditional on a positive referendum, starts with an advantage in respect of being able to assist a smooth transition it is subject to all these same obstacles and it is worth spelling them out. First, there are the obstacles in the Treaty of Maastricht. The UK can reasonably be expected to continue to meet the convergence criteria set out in the Treaty in relation to inflation, interest rates, and the fiscal criteria - and without any points being stretched, as they were in relation to the debt/GDP ratio for most of the current constituents of the Euro-zone. But the Treaty also requires that the currency of a candidate country should have been in the "normal" bands of the ERM for at least two years, should have exhibited no stress and should not have been devalued in that period. There are grounds for expecting some leeway in the interpretation placed on this clause in the Treaty. Those grounds are that neither Italy nor Finland fulfilled this criterion to the letter, since neither country's currency was in the ERM for the full two years, although the exchange rate could be judged "stable" for this period; and that there is some sign that some governments understand the British public's (presumed) exceptional sensitivity to "being in the ERM". But, it seems more than likely that, at a minimum, a requirement of exchange rate stability, somehow defined, will be made. Not only is there the Treaty requirement; there is also the well-known sensitivity of certain countries to the perception that the UK is prone to

"competitive devaluation". If there is to be an exchange rate stability requirement, possibly followed, after a favourable decision on entry, by a further period of transition before the point of fixity is reached, a question must arise as whether there will not have to be framework somewhat comparable to that of the "ERM-T" to which Denmark and Greece already adhere. The Maastricht Treaty is drafted so that the insiders may not keep out any late-joiners simply by will; countries that qualify are *obliged* to join. In respect of the exchange rate criterion, however, the interpretation of the Treaty is not straightforward and the automatic protection afforded to outsiders by the Treaty cannot be relied upon.

A second requirement of the Treaty, which the UK currently does not meet, is that in respect of Central Bank independence. The independence granted to the Bank of England is instrument-independence; goal- independence has been withheld. A Maastricht-compatible independence will require both forms of independence and perhaps some other changes to the legislation in addition.

Aside from meeting the Treaty's requirements, it would also be desirable for the UK to develop means of minimizing the net costs of EMU participation, in the sense of finding an alternative source of stabilization. The Chancellor's "Five Tests" refer to labour market flexibility and it is true that more labour market flexibility could serve as a substitute. But there are objections to looking only in this direction; first, the UK already is, by most measures, the economy with the most 'flexible' labour market in Europe. Second, further labour market reforms are likely to encounter political resistance. Third, flexible labour markets are not pleasant for many participants and, especially for temporary shocks, fiscal policy intervention may be regarded as a superior solution.

What needs to be done to fiscal policy in this context may well appear inimical to the trend in fiscal policy presentation adopted by the present government. What is needed, after all, is flexibility and discretion: flexibility to match the needs of the stabilization objective; and discretion to choose the particular type of fiscal intervention appropriate to the precise stabilization problem at hand. For example, variations in payroll taxes (national insurance benefits) seem like a proxy for exchange rate changes, whilst fiscal intervention to prick an asset price bubble might need to target transactions costs. The return to centre stage of policies of the 1960s - stamp duties, 'regulator' tax changes and the ghost of SET and the REP -is an unexpected, but logically plausible, consequence of entering a monetary union with larger and more cohesive

partners whose policy interests will dominate and are likely on present evidence to respond to a different business cycle rhythm[6].

6 Conclusions

The evidence reviewed in this paper suggests no "strong" economic case for participation in the EMU. If anything, the organizing framework of the OCA approach suggests that the UK might be right to stay outside; in particular its stochastic experience is different from that of the "core group" within the Euro-zone and on these grounds the UK will need a stabilizing policy instrument. Membership of EMU would remove the possibility of using monetary policy and a floating (or adjustable) exchange rate in that role. Reliance on labour-market flexibility alone is unlikely to be enough and, in the event of joining, there will be a premium on fiscal policy flexibility. The limitations of OCA analysis are several, however; and, besides the room that this gives to "other factors" , including political ones, in making the participation decision, there is always the issue of the extent to which past patterns of behaviour will continue to hold in the future. Whilst we reject the position occupied by some analysts that the worse the problem identified the more likely it is to yield to a nice solution (the "ever-optimistic Lucas Critique) , it has to be admitted that the power of economic analysis alone, based on past behaviour, to identify the net benefits of a participation decision is limited.

Michael J. Artis
RSCAS-EUI
Florence

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[6] 1t is tempting to limit the enjoyment of this spectacle to the few who now recall the 1960s by failing to define the SET (Selective Employment Tax)and REP (Regional Employment Premium)! This would not be fair, however. The SET and REP were brainchildren of Nicholas Kaldor's. His aim was to tax labour used in services and to subsidize labour used in depressed regions.

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Appendix A

In this appendix, we report on a re-estimation and extension of the simple structural econometric model previously used by Bayoumi and Eichengreen (1993).

The idea is to consider a bivariate system of output and prices, $X'_t = [y_t p_t]$ that is then modelled by means of a vectorautoregression:

$$X_t = \sum_{i=1}^{p} A_i X_{t-i} + \varepsilon_t \qquad (1)$$

where the A_i are 2 x 2-matrices and ε_t is a 2 x 1 vector of i.i.d. disturbances with covariance matrix **W.**

Bayoumi and Eichengreen conjectured that the dynamics of the process X_t are driven by two types of structural shocks, supply and demand. Let $e'_t = [e^r \; e^n]_t$ be the vector of structural disturbances that are assumed to be mutually uncorrelated. Bayourni and Eichengreen further assume that the reduced-form innovations, ε_t, are just a linear combination of the structural shocks, i.e.

$$\varepsilon_t =: \mathbf{S} e_t \qquad (2)$$

with some non-singular matrix S.

These assumptions impose three restrictions on the model. To identify the structural shocks, one further assumption is needed, however. As in BE, we require that only aggregrate supply shocks have an impact on output in the long run whereas aggregate demand shocks are forced to be long-run neutral. This amounts to imposing a lower-triangular structure on the long-run impact matrix of the moving average representation:

$$A(1)^{-1} = \left[I_2 - \sum_{i=1}^{p} A_i \right]^{-1} = \begin{bmatrix} * & 0 \\ * & * \end{bmatrix}$$

From this, aggregate supply and demand disturbances can be recovered uniquely.

Following BE, we initially used annual data for the period 1960-88, where output is measured by real CDP and prices by the CDP deflator. The VARs

were restricted to two lags throughout following the Schwarzand Hannan-Quinn information criteria and in accordance with BE.

Table 1 gives the correlations between supply and demand disturbances. Of course, data revisions mean that the numbers are slightly different from the BE estimates, but their main result comes through clearly: there is a core of European economies, comprising Germany, Austria, the Netherlands, Belgium, France and also Denmark that share by and large the same structural shocks whereas there is a periphery that clearly comprises, Italy, Portugal, Spain, Greece, Sweden, Norway and Finland and also the UK. Figure AI gives a synopsis of the information in Table Al.

Table Al: Shock correlations with Germany 1960-88

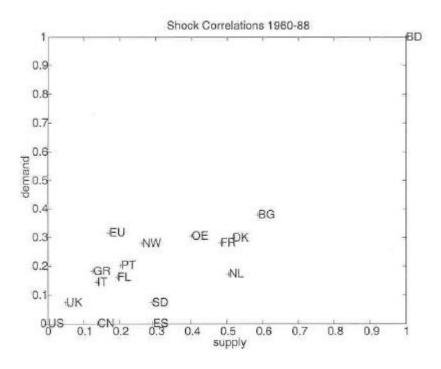|	supply	demand
EU15	0.1709	0.3157
Germany	1	1
France	0.4818	0.2811
Denmark	0.5159	0.2985
UK	0.05187	0.07324
Italy	0.1373	0.1438
Netherland	0.5055	0.1726
Belgium	0.5881	0.3794
Austria	0.4018	0.3046
Spain	0.2932	-0.06786
Portugal	0.2041	0.2023
Greece	0.1268	0.1824
US	-0.07801	-0.2051
Canada	0.1388	-0.04971
Norway	0.2628	0.2789
Sweden	0.2907	0.07349
Finland	0.1935	0.1613

Figure A1: Shock Correlations from the BE Re-Run 1960-88

We then extended the sample period to 1995 to see in which respect macroeconomic affiliation has changed since the late eighties. Table A2, identical with Table 1 in the main text, gives the results and, again, Figure A2 presents a synopsis.

The results are interesting: the correlations of the core economies with Germany are somewhat lower than in the earlier period and the ones of Italy and the UK somewhat higher. Still, there prevails a dichotomy between the core and the periphery. The case of the Netherlands is interesting as well: its (in particular) supply correlations with Germany drop dramatically, from around 0.5 to 0.3. These results are similar to the ones established by Bayourni and Eichengreen (1996), in a re-run of their method on an extended data set. A possible explanation for these results- besides that of ongoing economic integration that deemphasizes the dichotomy of core and periphery - is the event of German reunification which took place in 1990.

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Table A2: Shock correlations with Germany 1960-95

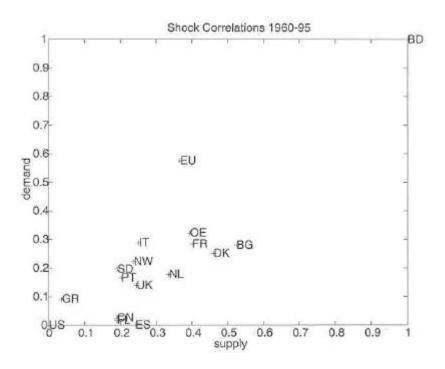|	*supply*	*demand*
EU15	0.3673	0.5743
Germany	1	1
France	0.4013	0.2834
Denmark	0.4606	0.2515
UK	0.2444	0.1394
Italy	0.2513	0.2881
Netherlands	0.3353	0.1769
Belgium	0.5254	0.28
Austria	0.3947	0.3218
Spain	0.2411	-0.0327
Portugal	0.2023	0.1647
Greece	0.03655	0.09167
US	-0.01292	-0.2153
Canada	0.1895	0.02518
Norway	0.2369	0.2223
Sweden	0.1911	0.1963
Finland	0.1895	0.01667

Figure A2: Shock Correlations w.r.t. Germany for the extended sample period 1960-95.

While BE's core-periphery result is by now a classic, the attention of the empirical literature has recently shifted to the endogeneity of the OCA-criteria:

will countries converge to the 'core' once they are in EMU? Or should they be in EMU only if they are in the core?

Frankel and Rose (1998) demonstrated that trade linkages are a good indicator of the strength of business cycle affiliation across countries. A single currency makes prices more transparent by eliminating exchange rate risk, hence also leading to increased locational efficiency. A monetary union is therefore likely to redirect trade flows among its member states and to alter the business cycle affiliation of the participating economies. This may imply that seemingly 'peripheral' countries could converge by sheer virtue of being EMU members.

It is possible to shed some light on this issue withinin the framework of the present model: up to now we have used GDP and its deflator as measures of output and prices. But GDP contains a large share of non-tradable goods and services and our view of European monetary unification might change once we focus attention on macroeconomic fluctuations in tradables output and prices. Industrial production can be regarded as a good approximation for tradables output. The price level is now measured by the CPI (the PPI would be preferable here, but even though data is available for all countries in our panel, it is in some cases reported only from the 1970s or later onwards). Instead, with the CP1 as the price index, we can use annual data from 1963-95. Denmark is excluded from the panel since no annual IP-data were available. The results for all other countries are given in Table A3 and in Figure A3:

The shock correlations vis-a-vis Germany are now generally higher than for the GDP-based system, in particular for the demand disturbances. Also, in terms of this 'tradables'- based model, the UK seems much closer to the core, even though this is largely due to the demand correlations only; in terms of supply shock correlation the UK stays further away from the core.

Figure A4 puts the demand correlations in relation to the trade shares (with Germany) that prevailed in 1995 (source: IMF, Directions of Trade Statistics). Figure A5 does the same for the supply correlations.

The results are quite striking: there seems to be a clear positive correlation between the strength of trade linkages and the correlation of the underlying shocks. This relation is particularly strong for demand shocks. It seems plausible that a regression line would be almost parallel to the 45-degree line that is drawn in the figures. Looking at the supply shock, it is apparent that the UK, Canada and the U.S. do not quite conform with the overall impression of a simple linear relationship between bilateral trade intensity and the shock correlation. Still, if we limit attention to the European core economies, again we would find a linear relationship aprallel to the 45-degree line.

Table A3: Shock correlations for the 'tradable' system 1963-95

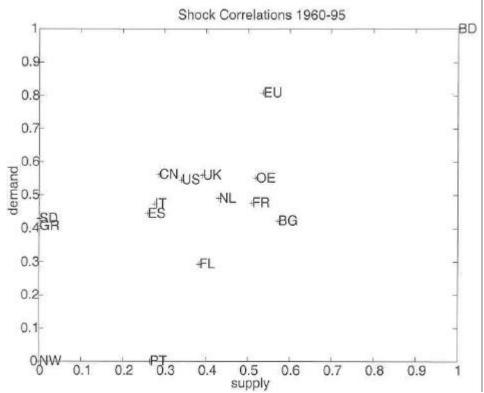|	*supply*	*demand*
EU15	0.5364	0.8078
Germany	1	1
France	0.5097	0.4761
UK	0.3919	0.5593
Italy	0.276	0.4731
Netherlands	0.43	0.4897
Belgium	0.5726	0.4222
Austria	0.5192	0.5498
Spain	0.2597	0.4441
Portugal	0.2652	-0.07299
Greece	-0.06753	0.4068
U.S.	0.3404	0.5446
Canada	0.2867	0.5604
Norway	-0.0004886	-0.123
Sweden	-0.08572	0.4299
Finland	0.3835	0.2933

Figure A3: Shock correlations for the tradables system, 1960-95
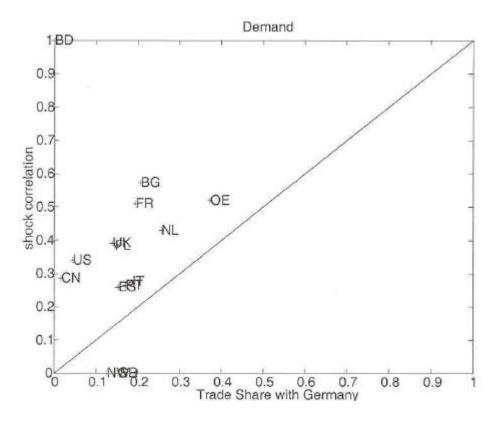
Figure A4: Demand shock correlations and trade shares in the 'tradables' model, 1960-95
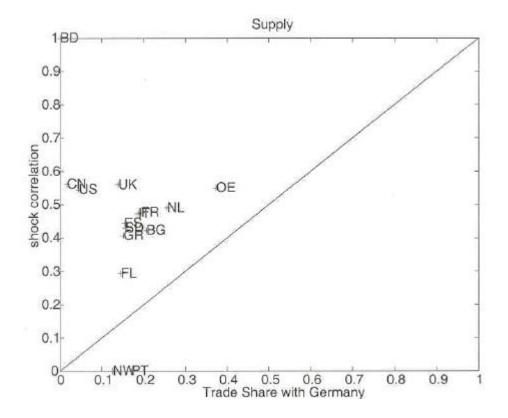**(w.r.t. Germany)**

Figure A5: Supply shocks and trade shares in the 'tradables' system, 1960-95
(w.r.t. Germany)

Appendix B.

Asymmetries in the EU Business Cycle[7]

A popular means of quantifying the OCA "shock" criterion has been to measure the synchronicity of business cycles in the countries under consideration as candidates for currency union membership. This requires as a first step the identification of the cycle, involving a detrending procedure of some kind; what procedure to use is a matter of some controversy. Baxter and King (1995) provide an informative review of some of the most commonly used methods. Those we focus on here involve three alternative methods of smoothing. A somewhat different methodology is then explored, a Markov-switching model based on the example of Hamilton (1994). This latter method is then extended to explore the idea that there is a common 'European' cycle underlying national stochastic experience.

The growth cycle:

Our main interest is in the growth cycle definition of the business cycle, or fluctuations around a trend and whether there has been an increased synchronization of the business cycle in the European countries, moving away from the USA business cycle, as seemed apparent in the Artis-Zhang (1997, 1998) studies. In order to investigate this hypothesis Germany and USA are taken as benchmarks and comovements of the rate of growth are analyzed with respect to these countries. The series are first corrected for outliers and then smoothed in order to reduce the importance of short run erratic fluctuations. Three different smoothing techniques are used: a centered seven-term moving average, the Hodrick - Prescott filter (dampening parameter $\lambda = 50000$) and an unobserved component (uc) model based on the decomposition of the series into an irregular component and a trend component. Results from all of them are presented in Tables A1 and A2 below to show their robustness to the smoothing technique used. Two different sample periods are analyzed, one corresponding to 1965:5 - 1979:3 or the pre-ERM period, and a second period that goes from 1979:4 to 1997:6, or post-ERM period. In order to analyze the degree of synchronization of the business cycle we first obtain cross-correlations at displacement zero for the two different sample periods.

Relative to the advice given by Baxter and King (1995) we may note that the centering of the seventh-order moving average ensures that the smoothing does not create a change in phase. The Hodrick-Prescott (HP) filter derives the

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[7] This appendix draws heavily on parts of Artis et al. (1999).

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trend component y_t of a univariate time series y_t as the result of the following algorithm:

$$\{\bar{y}_t\}_{t=1}^T = \arg\min \sum_{t=1}^T (y_t - \bar{y}_t)^2 + \lambda \sum_{t=2}^{T-1} (\Delta\bar{y}_{t+1} - \Delta\bar{y}_t)^2, \qquad (4)$$

where $\Delta\bar{y}_t = \bar{y}_t - \bar{y}_{t-1}$. The FOC for $\bar{y}_t, 2 < t < T-2$ associated with the optimization problem (4) is given by

$$(y_t - \bar{y}_t) = \lambda\left\{(\bar{y}_{t+2} - 2\bar{y}_{t+1} + \bar{y}_t) - 2(\bar{y}_{t+1} - 2\bar{y}_t + \bar{y}_{t-1}) + (\bar{y}_t - 2\bar{y}_{t-1} + \bar{y}_{t-2})\right\}$$

which can be simplified to the following inhomogeneous difference equation:

$$\lambda\bar{y}_{t+2} - 4\lambda\bar{y}_{t+1} + (1+6)\bar{y}_t - 4\lambda\bar{y}_{t-1} + \lambda\bar{y}_{t-2} = y_t.$$

The choice of dampening parameter in the Hodrick-Prescott application ($\lambda = 50, 000$) is based on the prior finding by Artis and Zhang (1997) that this value produces a cyclical series which closely resembles the trade cycle series produced by the OECD using traditional methods, which find some favour with Baxter and King. The methods are applied to industrial production data at monthly frequency.

Table 1: Cross correlation at displacement zero for the sample period 1965:5-1979:3

	Germany			USA		
	HP-filter	7-MA	U.C.	HP-filter	7-MA	U.C.
France	0.49	0.65	0.64	0.41	0.72	0.61
Italy	0.30	0.37	0.35	0.39	0.58	0.52
NL	0.71	0.79	0.71	0.34	0.43	0.39
Austria	0.47	0.63	0.54	0.27	0.44	0.34
Belgium	0.59	0.69	0.63	0.43	0.63	0.52
Spain	0.42	0.48	0.38	0.38	0.64	0.45
Portugal	0.28	0.41	0.23	0.15	0.52	0.24
UK	0.40	0.64	0.56	0.32	0.75	0.58

The application of these three alternative forms of detrending produces cyclical components the cross correlations among which are taken as measures of synchronicity. Inspection of the results suggests that the main features are in fact robust across the detrending methods used. In particular, there appears to be a general increase in the degree of synchronization with the German cycle relative to that with the US between the pre-ERM and ERM periods, with the exception of the UK.

The Markov-switching autoregressive(MS-AR) time series model has become increasingly popular since Hamilton's application of it to the

Table 2: Cross correlation at displacement zero for the sample period 1979:4-1997:6

	Germany			USA		
	U.C.	*HP-filter*	*7-MA*	*U.C.*	*HP-filter*	*7-MA*
France	0.57	0.69	0.62	0.17	0.34	0.29
Italy	0.25	0.43	0.40	0.24	0.30	0.23
NL	0.36	0.48	0.34	0.17	0.31	0.25
Austria	0.54	0.73	0.57	0.07	0.22	0.11
Belgium	0.48	0.56	0.46	0.07	0.18	0.15
Spain	0.49	0.38	0.32	0.19	0.17	0.14
Portugal	0.26	0.30	0.25	-0.12	-0.18	-0.13
UK		0.32	0.16	0.26	0.24	0.35	0.36

US business cycle (Hamilton 1994). Contractions and expansions are modelled as switching regimes of the stochastic process generating the growth rate of real GNP Δy_t:

$$\Delta y_t - \mu (S_t) = \alpha_1 (\Delta y_{t-1} - \mu (S_t-1)) + \ldots + \alpha_4 (\Delta y_{t-4} - \mu (S_{t-4})) + U_t. \qquad (5)$$

The regimes are associated with different conditional distributions of the growth rate of real GNP, where the mean μ_1, is positive in the first regime ('expansion') and negative in the second regime ('contraction'), $\mu_2 < 0$.

The general idea behind this class of regime-switching models is that the parameters of a VAR depend upon a stochastic, unobservable regime variable $S_t \in \{1, \ldots, M\}$ The stochastic process for generating the unobservable regimes is an ergodic Markov chain defined by the transition probabilities:

$$p_{ij} = \Pr(s_{t+1} = j | s_t = i), \quad \sum_{j=1}^{M} p_{ij} = 1 \quad \forall i, j \in \{1, \ldots, M\}. \qquad (6)$$

By inferring the probabilities of the unobserved regimes conditional on an available information set, it is then possible to reconstruct the regimes[8]. The data are seasonally adjusted monthly industrial production indices for the eight economies from 1970:1 to 1996:12, drawn from the OECD database. For synchronicity, we here use the cross-correlation at displacement zero of the smoothed probabilities of recession. These data are shown in Table B3, for the whole span of the data. These smoothed probabilities are obtained from fitting univariate MS-AR to each individual countries. The relatively much weaker correlation of the UK with Germany, relative to other countries, is again evident. The frequency of relatively high cross-correlation coefficients in the matrix suggests that the notion of a "European cycle" , a common cycle driving the national cycles, might be correct.

Table 3: Cross correlation at displacement zero of the smoothed probability of being in a recession for the sample period 1970:1-1996:7

	Germany	France	Italy	NL	Austria	Belgium	Spain	Port.ugal	UK
Germany	1.00								
France	0.54	1.00							
Italy	0.46	0.49	1.00						
NL		0.73	0.53	0.55	1.00				
Austria	0.61	0.73	0.64	0.70	1.00				
Belgium	0.55	0.82	0.40	0.59	0.65	1.00			
Spain	0.53	0.34	0.28	0.45	0.39	0.35	1.00		
Portugal	0.54	0.72	0.29	0.34	0.56	0.53	0.40	1.00	
UK		0.34	0.29	0.21	0.25	0.12	0.39	0.55	0.34
	1.00								

The European BusMess Cycle

The high cross-correlation of the smoothed probabilities from the univariate MS-AR suggests the existence of a European Business Cycle. In order to test for the existence of such a common cycle in this framework we consider a three-regime Markov-switching vector autoregression (MS-VAR) with regime-dependent covariances:

$$\Delta y_t = v\,(s_t) + A_1,\, \Delta y_{t-1} + A_7 \Delta y_{t-7} + u_t, \quad u_t \,|\, s_t \sim NID\,(0,\, \Sigma(s_t)), \qquad (7)$$

---

[8] Maximum likelihood (ML) estimation of the model is based on a version of the Expectation-Maximization (EM) algorithm. All the computations reported in this paper were carried out in Ox 1.20a..

where Δy_t is the vector of growth rates (first differences smoothed by taking seven-month moving averages and controlled for outliers). Three vectors ν_1, ν_2, ν_3 of regime-conditional mean growth rates of Δy_t are distinguished.
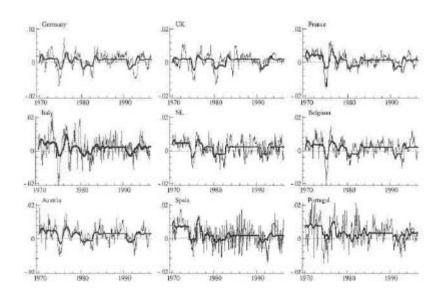

Figure BI: The Contribution of the European Business Cycle
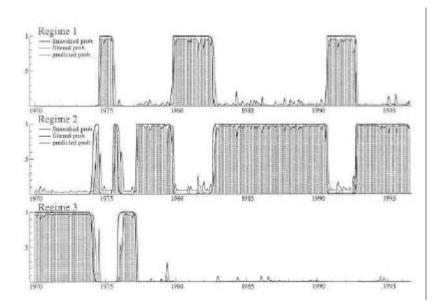

Figure B2: The European Business Cycle

The contribution of the European business cycle to the process of economic growth in the nine European countries is depicted in Figure BL The lightly-shaded dashed lines represent the national fluctuations and the heavily-shaded solid line is the European cycle contribution in each case. The presence of the third regime in this growth model of the European business cycle

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reflects the catching-up process of some of the countries. Figure B2 shows the time-distribution of the three regimes of the European cycle; region 1 is the recession regime, region 2 is a growth regime and region 3 a 'high growth' regime. This reflects basically the experience of the Southern countries at this time. This latter regime dominates only in the early part of the sample. Later on, the oil shocks show up in the mid 70s and early 80s and the recession of the early nineties is well detected.

Appendix C. Differences in transmission mechanisrns

Studies of the monetary policy transmission mechanism in the European countries have proliferated in recent years. The two principal approaches employed to illuminate the issue are: simulations on multicountry econometric models (or numerical simulation models) and SVAR studies in which the impulse response functions are compared.

With respect to the position of the UK in these comparative studies, a strong prior was developed in the wake of the 1992 ERM crisis. Explaining the difficulty for the UK of undertaking further interest rate increases at that time, observers pointed to the much greater extent of floating rate consumer debt in the UK, and the special role of housing finance within it. Maclennan et al. (1988) have recently extended the discussion of the latter point. The presumption was established that the monetary transmission mechanism for the UK would be distinctive in the large size of its effects on output and the comparative rapidity with which a monetary policy intervention would have its effects. From this standpoint it seemed easy to appreciate that the imposition of a common monetary policy might itself lead, not to a greater symmetry of the UK cycle to the cycle in continental Europe, but quite possibly to the opposite effect.

The presumption that the transmission process of monetary policy was different for the UK in the way described was borne out in an early multi-country model exercise by Mean (1994). An exercise conducted at the BIS by Smets (1995) using the domestic models employed by Central Banks also confirmed "a British difference " (though much larger differences were reported here between some non-European countries and the Europeans as a group). A more recent model-based study from the Bank of England (Britton and Whitley 1997), however, found no large differences between the economies under study (France, Germany and the UK) whilst the analysis due to Dornbusch et al. (1998) suggests that monetary policy effects in the UK might, if anything, be smaller than elsewhere in Europe.

There is a variety of studies employing some kind of SVAR estimation and the approach itself remains controversial. By analysing the effects of innovations to the interest rate (monetary policy) process the approach seeks to purge the estimate of monetary policy effects of contamination from the effects of the economy on monetary policy. A problem of interpretation is then whether the estimates represent accurately the effects of 'normal' monetary policy. In addition, especially in early versions of the approach, the results yielded a series of "puzzles" - notably the "price puzzle" where restrictive monetary policy is shown as leading to inflation and the "exchange rate puzzle" where restrictive monetary policy is shown as leading to an exchange rate depreciation. These puzzles have been eliminated in later work by a more appropriate choice of information variables and identification restrictions. But the approach still remains controversial: Cochrane (1998) provides a recent critique. The study by Gerlach and Smets (1995) was an early and influential example of the genre; it suggested no large differences in the transmission mechanisms of monetary policy among the C-7. Ramaswarny and Sloek (1998) find the UK to be in a group of countries where monetary policy is more powerful than it is in a second group. Ehrmann (1998) is among the latest in this line; it detects the most powerful effects to be those attaching to Germany's transmission mechanisms, though the UK is something of an outlier in relation to the persistence of output effects and their time profile.

Will arbitrage reduce the differences?

It is plausible that some of the differences in monetary policy transmission will be arbitraged away. Interest rates on securitized loans will be brought into line by arbitrage. But does this mean that, for example, the differences that exist between countries in the relationship between Central Bank intervention ("policy") rates and bank base rates (Borio and Fritz, 1995) will disappear? Most bank lending is done in the framework of a banker-client relationship, where anonymity is denied. Arbitrage is consequently inhibited. But EMU is widely expected to 'complete' the European Financial Area. Bank mergers, cross-border tie-ups and arbitrage in the more footloose corporate market can be expected to lend in time to greater homogenization of practices. Studies of what this might mean are few and far between: Dornbusch et al. (1998) is one exception. An interesting study from the US (Carlino and Fina, 1998) points out that considerable differences persist across the States of the U.S., even if much of these differences can be explained by differences in the industrial composition, size mix and so on of the banks' clientele in each State.