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Northern Light: Does Optimal Currency Area Criteria Explain Nordic Reluctance to Join EMU?

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NORTHERN LIGHT: DOES OPTIMAL CURRENCY AREA CRITERIA EXPLAIN NORDIC RELUCTANCE TO JOIN EMU?

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INTRODUCTION

Finland was the only Nordic country to join the European Monetary Union (EMU) when it began on January 1, 1999. In the autumn of 1994, the voters of Sweden and Finland decided to join the European Union (EU), while those in Norway decided to remain outside. In Denmark, the voters had earlier decided not to join the single currency area but othewise remain a fully-integrated member of the EU. Denmark, however, maintains the option of having another voter referendum. The government of Sweden decided on a similar course, in essence reneging on the commitment made when voters accepted the Maastricht Treaty, by announcing in Spring 1997 that it would not be among the first group of EU countries forming monetary union.[1] Only Finland committed to EMU membership at the outset.

What explains the Nordic reluctance to join EMU in 1999? All of the other small EU countries elected to join EMU at the onset--Greece did not meet the entrance criteria--so Denmark and Sweden stood out by their lack of enthusiasm for monetary union in Europe. And Norway's reluctance to join the EU may also be partly attributable to concerns about EMU membership which formed a central part of the Maastricht Treaty.

Economists usually evaluate the desirability of entry into a monetary union by the perceived benefits and costs. Using the standard economic criteria of these costs and benefits, this article examines whether economic rationale helps to explain the initial reluctance of Nordic countries to join EMU. The benefits of monetary unification and the establishment of a single currency area are generally identified as lower transactions costs associated with the elimination of national currencies, increased

[*] We thank conference participants and especially our discussant, Torben Andersen, for helpful comments.

[1] In making this decision the Swedish government decided not to follow the advice of the Riksbank's (Sweden's central bank) governing board which had recommended that Sweden be among the first group of countries forming EMU. In late1999, the Swedish Prime Minister stated the intention of Sweden to join EMU.

credibility of participating governments' commitment to price stability, and greater efficiency of resource allocation through the elimination of exchange rate-related uncertainty.[2]

The main costs of a single currency area, on the other hand, are giving up the value of changing the exchange rate when desired and, more broadly, losing the option of following an independent monetary policy. When labor is relatively immobile, and wages and prices are rigid, nationally-independent demand management policies play an important stabilization role. This option is especially important if (i) countries are facing asymmetric shocks, in which case exchange rate adjustments and separate monetary policies could help to stabilize nation-specific aggregate fluctuations, or (ii) countries have substantially different preferences over the relative desirability of output versus inflation stability.[3]

More generally, countries with strong trade and financial ties are usually identified as good candidates for monetary union. Since even idiosyncratic shocks in this case would be rapidly transmitted to other member countries, they effectively become "common" shocks.[4]

The early literature suggests that an important criterion for the desirability of joining monetary union would be that countries face similar types of disturbances and have similar economic structures (Mundell (1961), McKinnon (1964), Kenen (1969), Tower and Willett (1970)).

A large literature attempts to evaluate empirically the relative costs and benefits of European Monetary Union (EMU) and which countries appear to be ideal candidates for membership. Recent contributions include Artis and Zhang (1996, 1997a, 1997b), Bayoumi and Eichengreen (1993a, 1993b, 1994), Bergman (1996a), Demertzis, Hughes Hallett and Rummel (1997a, 1997b), Bergman, Hutchison and Cheung (1997), and Whitt (1993). This literature attempts to measure economic "disturbances" and economic structure from historical data to infer which European countries are similar enough to warrant entry into EMU. Countries are often divided into two major groupings: "core" EU with highly similar economic disturbances and structures, and "periphery" countries with asymmetric shocks and structure.

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[2] Eichengreen (1992) uses these categories in discussing the potential benefits of a European monetary union. He concludes that, in principle, the benefits are small, meaning that maintenance of firmly fixed exchange rates between distinct national currencies would reap most of the benefits. However, he suggests that the special circumstances allowing governments to commit to fixed exchange rates are not present in Europe today. The *One Market, One Money* report by the Commision of the European Communities (1990) is more optimistic over the benefits of monetary union.

[3] See De Grauwe (1992) for a comprehensive non—technical discussion of the economics of monetary unification and a critique of the optimal currency area literature. Fratianni and von Hagen (1992) systematically investigate issues of a European monetary union using a three country game-theoretic model. They employ model simulations to determine the welfare effects of various disturbances. See Wihlborg and Willett (1991) for a comprehensive discussion of the optimal currency area literature.

[4] By contrast, a small degree of linkage with other countries would tend to ``bottle up" idiosyncratic disturbances, making their impact on the domestic economy relatively large. Linkage allows the transmission of disturbances, partly absorbing the effect on the domestic economy.

Countries identified as core members are expected to benefit from joining EMU --- the similarity in shocks and economic structure will allow a common union–wide monetary policy to be followed without sacrificing national macroeconomic stabilization objectives or placing a large burden on national fiscal policy to fill the stabilization role. On the other hand, countries identified as in the periphery are not expected to gain from immediate entry into EMU.

These studies vary widely in their classification of the Nordic countries-- in either the core or the periphery -- on the basis on common shocks and linkages with Germany. Further, they do not directly address the issue of differences in preferences over the relative value of output versus inflation stabilization as a policy objective and, hence, over the appropriate design and institutional structure of the European System of Central Banks. We address both of these issues in this article, and critically examine the applicability of the conventional optimal currency area literature as a political economy guide helping to explain the lack of Nordic support for EMU when it formally started operations on January 1, 1999. This discussion is buttressed by empirical evidence from 13 European countries.

The concern over the loss of stabilization policy instruments has direct policy implications. For example, the Swedish Government Commission on EMU recommended that Sweden not join EMU in 1999 in large part because of their concern that employment volatility would rise. The first reason given in the press release announcing this negative recommendation stated that, if Sweden were to join EMU, "...the probability of large variations in employment will increase. This is a strongly negative factor when the level of unemployment is unacceptably high at the outset." (Swedish Government Commission on EMU Press Release, 1996; p. 4). Our interest is on differences in policy preferences among the European countries with respect to the relative values placed on employment stabilization and inflation stabilization. Even if the European countries were to face similar disturbances and had similar economic structures, differences in preferences over stabilization policy alone might nonetheless impose significant costs for some potential members of EMU. In principle, the optimal degree of "conservatism" of a central bank is related to society's preferences over stabilization policy as well as economic factors. Delegation of monetary policy to a European Central Bank (ECB) is unlikely to match the degree of conservatism which would be preferred on the basis of domestic considerations alone.

We report two main findings. First, countries typically identified as "core" EMU members are those that have historically quite close economic linkages with Germany, so that shocks are quickly transmitted across national borders. Denmark is the only Nordic country which clear fits into a "core" based on historical linkages with Germany. The other Nordic countries have only moderately strong trade and financial ties with Germany, compared with other small European nations. This does not make a strong case for or against EMU, however, since a consistent long--run goal of the EU has been to foster closer economic ties among its members and this process will most likely influence economic structure and the nature of business cycles in the Nordic countries. Second, we demonstrate that the argument that the

ECB structure is too "conservative" for the Nordic countries, on the logic that their preferences are for relatively greater output stabilization policy than allowed for under the statutes of the ECB, is not well founded.

It is not clear that the Nordic countries would prefer a less conservative central bank given their preferences, and there appers to be no correspondence betweeen historical inflation/output performance (levels or variances) and the decision to join EMU.

The article is structured in the following manner. Section 2 critically evaluates the optimal currency literature as a political economy guide to drawing practical inferences about the desirability of joining EMU. Section 3 presents empirical evidence demonstrating that the Nordic countries, with the exception of Denmark, are not as strongly tied to the Germany economy as many other small European nations. Section 4 considers the argument that the ECB structure may be too conservative for the Nordic countries given their policy preferences. Section 5 concludes the paper.

COMMON SHOCKS AND STRUCTURAL LINKAGES

Identifying the EMU ''Core''

A large literature attempts to evaluate empirically the relative costs and benefits of EMU and which countries appear to be ideal candidates for membership. Recent contributions include Artis and Zhang (1996, 1997a, 1997b), Bayoumi and Eichengreen (1993a, 1993b, 1994), Bergman (1996a), Bergman, Hutchison and Cheung (1997), Demertzis, Hughes Hallett and Rummel (1997a, 1997b), and Whitt (1993).

There is no consensus in this literature, however, over which countries would most likely benefit from EMU and how the Nordic countries fit into this grouping. Is the reluctance of the Nordic countries to join EMU (with the exception of Finland) related to relative lack of economic integration with Germany? Bayoumi and Eichengreen (1993a), for example, identify fundamental demand and supply disturbances for a number of European countries, and correlate these disturbances with those in Germany.[5]

They identify a "core" group of EU countries which on economic grounds make logical candidates for a common currency area. This group includes Denmark and four other countries (France, Belgium, Luxembourg, and the Netherlands). The other group, termed the "periphery," do share the same degree of commonality and are not natural candidates to join a European monetary union. This group includes the UK,

[5] This study, and most in the literature, focus on Germany as the "center" country from which the symmetry of business cycles and economic linkages are measured. An alternative would be to aggregate economies or disturbances into regional groupings such as Demertzis, et. al. (1997b).

Italy, Ireland, Greece, Portugal and Spain. Sweden's classification in this scheme is ambiguous.[6]

The economic rationale behind this classification is that the core countries have much higher supply and demand shock correlations with Germany than either the periphery group or a control group of countries (the US, Japan, Canada, Australia, New Zealand, and Iceland). This difference between groups is particularly noteworthy for supply shocks: the core countries have smaller and more highly correlated supply disturbances than the other two groups. Bayoumi and Eichengreen (1993a) are cautious in drawing definite conclusions, but note that their results are "...consonant with arguments that have been advanced for a two--speed monetary union..." (p. 223) and that "...for the time being, Germany and its immediate EC neighbors (the EC core) come much closer than the Community as a whole to representing a workable monetary union along American lines." (p. 224) Using this rationale, Denmark should apparently want to join EMU on economic grounds while Sweden's case is ambiguous. Finland and Norway were not included in the study.

Whitt (1993), however, follows a similar empirical approach but finds less evidence for a core group prepared for EMU. Demertzis, Hughes Hallett and Rummel (1997a, 1997b) extend the work of Bayoumi and Eichengreen in several directions, including the addition of a third disturbance (demand, supply and monetary shocks) and the identification of aggregate shocks by constructing weighted averages of various country groupings: the EU core (France, Germany, Benelux, Denmark and Austria), EU periphery (remaining eight EU members) and others (a control group consisting of Canada, Switzerland, Japan, New Zealand, Australia and the United States). Each country's or group's disturbances are estimated separately, and evidence on the symmetry of disturbances is provided by correlations among the disturbances. They find that symmetries in the core are only marginally stronger than for the periphery. The Whitt (1993) and Demertzis, Hughes Hallett and Rummel (1997a, 1997b) studies, since they find so little support for an EMU "core," do not provide much support for the idea that economic rationale explains countries' decisions- including the Nordic region-- to either join or stay out of EMU.

The''Core''/''Periphery'' Distinction and the Decision to Join EMU

These conflicting results, however, may be attributable to the way the empirical work is designed. In particular, as emphasized by Bergman and Hutchison (1998), most existing studies likely overestimate the degree of correlation among fundamental disturbances across countries. This is because the correlation coefficients usually reflect both fundamental disturbances and economic structure.

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[6] Supply and demand disturbances are derived from the time series of domestic output and inflation and identifying demand shocks as those having only temporary effects on real output. The shocks for each country are estimated independently of other countries. The imposition of the long--run neutrality restriction to identify structural time series models was first used by Blanchard and Quah (1989). See Hutchison and Walsh (1992) and Bergman (1996b) for a discussion of this methodology.

The core country disturbances identified by Bayoumi and Eichengreen, for example, may be highly correlated with German shocks either because of symmetry in their fundamental disturbances or because German disturbances are being transmitted to these economies. The former is the traditional indicator, while the latter captures the degree of economic linkage between countries, which in turn depends on the exchange rate regime and other factors (see Hutchison and Walsh (1992)). For example, most models predict that a German monetary shock will have the strongest output effect (positive) on those economies maintaining rigid pegs to the DM and having strong trade links with Germany. In this case, German monetary shocks will induce higher output correlations between Germany and the EMS countries than between Germany and non--EMS member states.

In this context, it is not surprising that Artis and Zhang (1997a, 1997b) find that countries in the ERM have higher correlations among business cycles (and other economic indicators) than those outside the ERM. Close exchange rate ties with Germany also helps to explain the core countries identified by Bayoumi and Eichengreen. In principle, both the degree of economic linkage as well as the symmetry of disturbances are important criteria for judging the desirability of monetary union. Separating these two components is important, however, since a main objective of the EU is to increase economic integration (financial, goods and labor) among member states. This implies that the core/periphery distinction may change markedly if economic linkage rather than commonality of disturbances is most important.

Another issue is that the commonality of fundamental "disturbances" and strength of trade and financial linkages among European economies is likely to change over time. A static approach (and using historical economic relationships) to identifying an EMU "core" in a dynamic setting may be misleading and understandably fall short in explaining countries' motivations for either joining or staying out of a common currency area. This point is a version of the Lucas critique: a new currency area in Europe will represent a significant structural break, making it difficult to base future policy on the basis of historical statistical relationships. In particular, in drawing implications over the suitability of countries to join EMU, it is standard practice to assume that underlying economic disturbances and their transmission across European countries are invariant over time and across economic regimes (exchange rate, financial and trade). There are good reasons, however, to believe that the pattern of disturbances and transmission of disturbances across European countries are likely to change substantially over time in response to the new EMU project and by lagged adjustment to the Single Market Program. Attempts to identify a core group of countries ready for monetary union based on past structure, linkages and symmetry of disturbances may be misleading during periods of rapid economic change. As a major objective of the EU is economic integration, one would anticipate that the linkages of the new EU members with Germany should strengthen over time, in turn increasing the desirability of monetary union as conventionally measured.

A number of studies make this point about economic structure and commonality of disturbances. Begg (1997), for example, notes that demand shocks are likely to become more symmetric among countries joining EMU since a common monetary policy will be imposed, fiscal coordination will be given greater import, and the stability pact will impose restrictions on how far fiscal stances can deviate. Frankel and Rose (1996) show that greater trade integration– as is likely to continue in Europe—leads to a closer relationship among countries' business cycles. The Frankel and Rose result does not appear sensitive to alternative methods of detrending output, by contrast with Canova and Dellas (1993), or the measure of bilateral trade intensity. Krugman's (1991) analysis suggests that supply shocks may also change substantially within the context of EMU. In his view, however, EMU will likely induce greater industrial specialization which would turn industry--specific supply shocks into country--specific (idiosyncratic) shocks.

What lessons can be drawn from this literature? First, there are conflicting views on which Nordic countries seem to fit into a natural EMU core, or even whether a core group exists, based on empirical work to date. Second, there are good analytical reasons to think that European economies are likely to become increasingly linked and have yet greater commonality of economic disturbances as policies already in force gradually induce closer trade and financial integration. Moreover, economic integration may be pushed further by EMU. This means that business cycles are likely to become more symmetric, making the case for entry into a monetary union stronger in a forward-looking approach to policy. Both these arguments suggest that relatively little understanding of Nordic or other countries' motivations to join or stay out of EMU can be inferred from this part of the optimal currency area literature. Decisions to join EMU may be based on existing economic linkages with the rest of Europe, especially Germany, or may be more forward-looking in nature and based on expected (or desired) economic integration.

EMPIRICAL EVIDENCE ON NORDIC LINKAGES WITH GERMANY

Section 2 makes several critical arguments and voices skepticism over the value of empirical tests of the traditional optimal currency area to judge the desirability of monetary union and from which to evaluate whether countries' choices to join EMU are guided by economic rationale. To shed some light on this part of the argument, we present results from a simple model designed to measure the structural linkages between Germany, the Nordic area (excluding Iceland), and a number of other small European economies. We seek to (i) explicitly measure how closely these countries are tied to Germany; (ii) determine whether these ties are related to how the core area is usually determined by previous research; and (iii) question whether the Nordic countries' choices over EMU are related to historical economic ties with Germany. Obviously, we have an "unbalanced" sample problem: of the Nordic countries, only Finland chose EMU; and, of the other small EU countries, only Greece is excluded from EMU (and, presumably, not by choice). Since most previous studies do not distinguish structural linkages with commonality of

disturbances, however, our empirical work is designed to shed light on whether Finland is close to the core of Europe (in terms of structural ties to Germany), and whether the linkages between Denmark and Germany (and, to a lesser extent, Sweden and Germany) are as close as some studies suggest.

The Nordic countries that we investigate are the three EU members—Denmark (joining in 1973), Finland (1995), and Sweden (1995) -- and Norway, which has elected to remain outside the EU. Of the non-Nordic countries in our sample, four are original members of the EU (Belgium, Germany, Luxembourg and the Netherlands), one joined in 1973 (Ireland), one joined in 1981 (Greece), two joined in 1986 (Spain and Portugal), and one joined in 1995 (Austria). We follow most of the existing literature by focusing on Germany as the key currency country in the EU, but differ from most other work by estimating models which explicitly incorporate structural linkages with Germany.

These economies that we consider represent a large variation in terms of their trade and exchange rate linkages with Germany, industrial structures and length of membership in the European Union and in the ERM. All of these economies are relatively small compared to Germany, and offer a wide range of sample variation in order to investigate whether linkages with Germany are an important factor helping to explain countries' decision to join EMU. Moreover, they may give some indication of whether the transmission of German shocks to each country, reflecting the degree of economic integration, is associated with past institutional arrangements (e.g. period of EU and ERM membership). Economic integration --- trade and financial --- may in turn depend on the period of membership in the EU and the ERM, amongst other considerations. Of course, other factors, such as Austria's strong historical ties to Germany, are also likely to play an important role.

Methodology

Our empirical work uses structural vector autoregression (VAR) models with cointegration restrictions to identify the linkages of each country in the sample with Germany and to identify the fundamental disturbances. A strength of this approach is that it allows us to distinguish between permanent shocks having long--lasting effects (for example, productivity or supply--side shocks) and transitory shocks having only short--term effects (for example, demand shocks). We identify four independent disturbances; domestic and German permanent and transitory shocks. We also add oil prices to the model (treating oil shocks as exogenous) to capture potentially large structural differences in energy production and dependence between the Netherlands and Norway (large natural gas and oil producers), on the one hand, and the other countries in the sample, on the other hand. The country--specific disturbances (permanent and transitory shocks) are therefore measured net of oil and German influences. Using these estimates we are able to measure the degree of structural linkage with Germany and the nature of fundamental disturbances.

In particular, we model the multivariate process, x_t comprised of German industrial production, y_t^g German inflation, Δp_t^g, focus--country industrial production, y_t^j where j=Austria, Belgium, Denmark, Finland, Greece, Ireland, Luxembourg, Norway, the Netherlands, Portugal, Spain and Sweden and focus--country inflation, Δp_t^j, as a vector autoregressive (VAR) process with Gaussian errors. We assume that these endogenous variables are also affected by the change in the oil price, z_t, which is determined outside the system. All variables are in logarithms. The standard VAR model is written as:

$$x_t = m + \sum_{k=1}^{p} A^{(k)} x_{t-k} + \sum_{k=1}^{p} B^{(k)} z_{t-k} + e_t \qquad (1)$$

where the vector m is a constant, A and B are 4×4 and 4×1 matrices respectively, and e_t is a four dimensional error vector. In addition we assume that x_t is nonstationary whereas the exogenous variable, the change in oil prices, is assumed to be stationary. Under these assumptions, the VAR in equation (1) can be written, using Granger's representation theorem, in a vector moving average (VMA) form. We assume that our system of variables are affected by German and focus–country permanent and transitory shocks. Following the much of the literature in this area, we interpret permanent shocks as supply disturbances and transitory shocks as demand disturbances .

After estimating the model in (1), some additional identifying restrictions on the estimated disturbance terms are necessary to calculate the structural shocks, impulse response functions and variance decompositions. Such identifying restrictions have taken a variety of forms in the recent literature. We base identification on a common trends model following King, Plosser, Stock and Watson (1991), Warne (1993) and Quah (1994). Within this approach knowledge about the cointegration space allows us to identify both permanent and transitory shocks. In our model we have assumed that focus--country and German inflation is stationary and that output levels are non—stationary but not cointegrated such that there are two cointegration vectors and, thus, two common trends in the data.[7]

Within this framework, the system may be exactly identified by two additional restrictions. One restriction is needed to distinguish between the two supply shocks and one restriction is needed to similarly disentangle the two demand shocks. To identify the supply shocks, we assume that focus--country supply shocks cannot affect German industrial production in the long--run. Although not strictly true, this identifying assumption seems reasonable since the 12 countries we examine can be regarded as small open economies relative the German economy. With no further restrictions it is possible to identify the two supply shocks affecting our system.The individual effects of the two demand shocks are distinguished by assuming that a

[7] In a note available from the authors we discuss in some detail how, in the general case, the two permanent shocks and the two transitory shocks are identified using estimates of our model.

certain innovation does not exert contemporaneous impact on one selected variable. In our particular application, we assume that focus--country demand shocks have no first period effect on German inflation.

Data

The data set consists of monthly observations on industrial production and inflation measured by the consumer price index for Austria, Belgium, Denmark, Finland, Germany, Greece, Ireland, Luxembourg, Netherlands, Norway, Portugal, Spain and Sweden. We employ industrial production data as the measure of output, rather than the broader GDP measure, since it is available monthly. All data are obtained from OECD Main Economic Indicators except industrial production in Denmark (compiled by Danmarks Nationalbank).[8]

The crude petroleum prices in dollars are obtained from the Citibase data base, converted into German Marks (at the spot exchange rate) and real values (deflated by German CPI). All variables are expressed in natural logarithms. We examine the post–Bretton Woods 1974:1--1995:12 period.[9]

Impulse Response Functions and Variance Decompositions

In this section we report our results for the linkages with Germany, expressed both in terms of variance decompositions and impulse response functions. These results are derived from the estimation of the structural VAR model (with six lags) given in equation 1 for each country separately, identified along the lines described above, whereby the four structural shocks are extracted. Preliminary work included determining the lag length of the VAR[10], and testing the restrictions imposed in our identification procedure above, i.e., that there are two cointegration vectors in the data and that inflation in both Germany and the focus country is stationary. These detailed results are presented in Bergman, Hutchison and Cheung (1997).

To examine the effect of German supply and demand shocks on smaller European economies, we compute the impulse responses of focus--country output to German shocks and their relative importance. In particular, we examine the influence of a

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[8] We thank Ninette Pilegaard Hansen at the *Economic Policy Research Unit* at the University of Copenhagen for providing the Danish data.

[9] Any decision on the sample time period is somewhat arbitrary. We choose a common sample split for all countries, providing adequate data points in each sub-sample, where the latter period reflects (the beginning of) the expansion of the EU from the five core members to the current membership. One alternative might be to change the sample period for each country depending on its entry into the EU. Another alternative might be to choose a common sample split depending on the creation of the ERM in 1979 or the "hard" ERM in 1984.

[10] Residual tests on the VAR model were undertaken (tests for autocorrelation and ARCH) to guide in the choice of lag length. These tests suggest that our model with 6 lags is reasonably well specified. The test statistics do not change dramatically when adding more lags. These results are available on request from the authors.

standardized supply shock on the evolution of focus—country output over time holding other factors constant.[11]

While the impulse response analysis provides information on the effects of standardized German supply and demand shocks during the sample periods, it does not take the actual variability of focus--country output into consideration. Whether German shocks played a larger or smaller role in determining output fluctuations in the small European economies depends on both the strength of the linkages as well as the importance of the disturbances emanating in Germany. This is investigated through variance decompositions.

German supply shocks should be interpreted as productivity developments and other factors that are standardized to effectively cause a one percent permanent rise in German output. Figure 1 shows the output response for each country to a one unit German supply shock. The EU members often identified as "core" members of a natural currency area--- Austria, Belgium, Denmark, Luxembourg and the Netherlands --- are much more influenced by German supply shocks than are the other European countries. In our sample period, long--run output in these five countries each increased by over 0.73 percent in response to a 1 unit German supply shock. These countries are probably most exposed to supply shocks emanating from Germany because of the economic structure linking their economies, which in turn leads to a strong transmission mechanism. Denmark clearly fits into the "core" group based on this criteria, though its ties to Germany are weaker than Belgium, the Netherlands and Austria.

Finland, Norway and Sweden, by contrast, have strong but substantially weaker linkages to Germany than the "core" group. In our sample period, long--run output in these five countries each increased by less than 0.50 percent in response to a 1 unit German supply shock. This middle Nordic group has linkages similar to those of Ireland, Portugal and Spain. Greece is clearly an outlier, with quite weak linkages to the German economy.

[11] We normalize the system such that a one percent supply shock leads to a one percent permanent change in German output.

Figure 1:

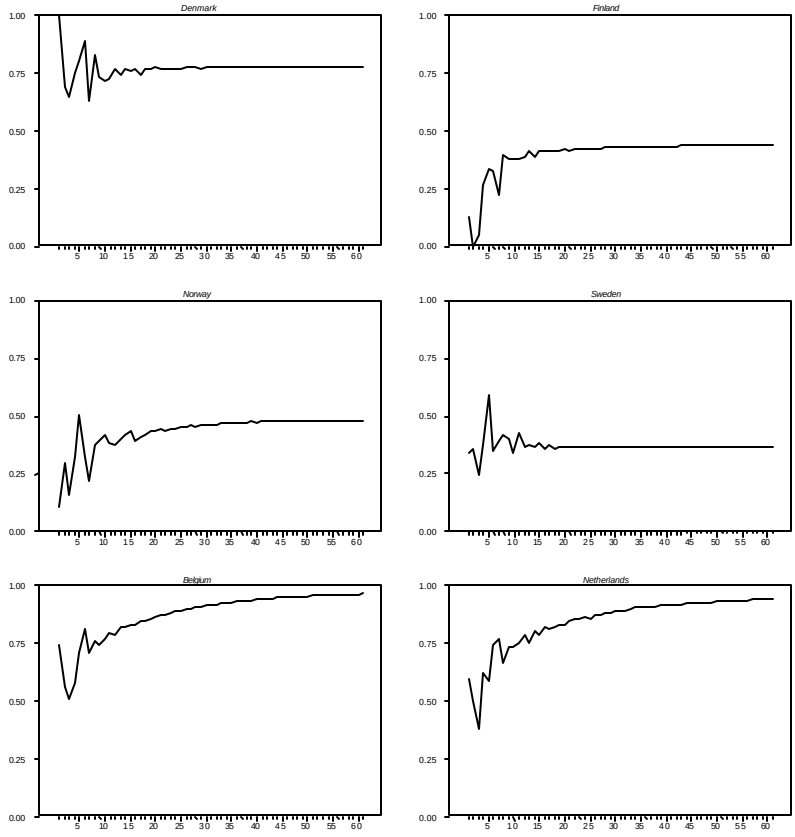
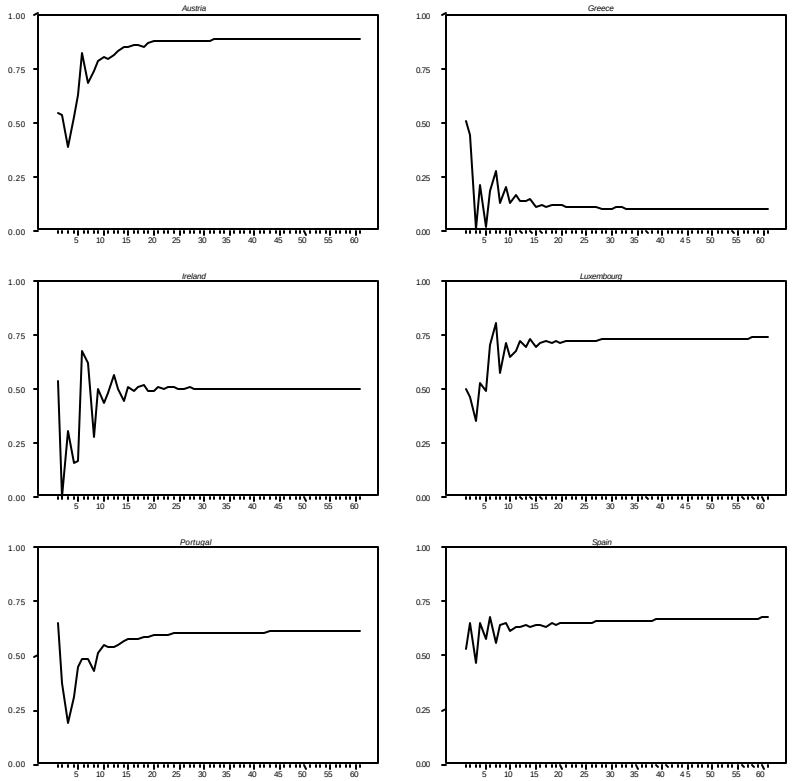

Denmark
Finland
Norway
Sweden
Belgium
Netherlands
1.00
0.75
0.50
0.25
0.00
5 10 15 20 25 30 35 40 45 50 55 60

Figure 1 (cont.)



Another way of measuring the importance of Germany on the output of the smaller European economies is to decompose the percentage of the focus–country's output forecast error variance at different horizons to that part attributable to German supply shocks, German demand shocks, and other disturbances. These variance decompositions are shown in Table 1.

Table 1: Output Variance explained by German Supply (GES) and Demand Shocks (GED) and Focus Country Supply (DS) and Demand Shocks (DD). Inflation is stationary

		Bretton Woods				Post-Bretton Woods			
		GES	GED	DS	DD	GES	GED	DS	DD
AUS	1	16.3	0.2	82.3	1.2	22.8	0.6	76.1	0.5
	6	32.6	1.4	65.2	0.8	52.2	1.5	43.5	2.8
	12	41.3	1.3	56.8	0.5	62.6	0.8	35.0	1.6
	24	46.4	0.7	52.5	0.3	69.7	0.3	29.2	0.7
	36	48.2	0.5	51.1	0.2	71.9	0.2	27.5	0.4
	1	52.1	0.0	47.9	0.0	75.5	0.0	24.4	0.0
BEL	1	1.2	7.2	89.6	2.1	24.5	19.3	53.9	2.3
	6	4.4	5.8	88.2	1.6	47.7	18.5	31.5	2.3
	12	11.6	4.2	82.2	4.2	57.0	13.9	27.3	1.6
	24	15.8	2.6	80.4	1.2	65.5	8.2	25.3	0.9
	36	17.7	1.9	79.5	0.9	68.9	5.4	25.0	0.6
	1	22.8	0.0	77.2	0.0	74.9	0.0	25.1	0.0
DEN	1					21.3	6.1	71.2	1.4
	6					33.0	7.4	58.0	1.6
	12					35.4	5.4	57.9	1.2
	24					39.0	3.3	57.0	0.7
	36					40.7	2.3	56.6	0.5
	1					44.9	0.0	55.1	0.0
FIN	1	1.6	30.4	66.4	1.6	0.6	29.1	69.0	1.3
	6	14.8	18.7	65.6	0.8	3.7	22.1	71.6	2.6
	12	19.3	10.1	70.1	0.5	6.7	15.8	76.0	1.5
	24	20.5	5.0	74.2	0.2	9.4	9.1	80.7	0.8
	36	20.9	3.3	75.6	0.1	10.3	6.1	83.1	0.5
	1	21.7	0.0	78.3	0.0	12.0	0.0	88.0	0.0
GRE	1	13.4	13.6	72.7	0.2	5.1	18.1	72.3	4.5
	6	18.0	9.3	69.3	3.4	6.2	11.9	77.9	4.0
	12	24.3	7.0	66.1	2.6	5.6	8.1	83.1	3.2
	24	31.5	3.7	63.2	1.5	4.0	4.8	89.3	1.9
	36	34.0	2.5	62.4	1.0	3.2	3.4	92.0	1.3
	1	39.2	0.0	60.8	0.0	1.3	0.0	98.7	0.0
IRL	1					4.0	0.0	93.6	2.3
	6					6.2	0.7	91.4	1.7
	12					8.6	0.6	89.8	0.9
	24					10.2	0.3	88.9	0.5
	36					10.8	0.2	88.6	0.3
	1					12.1	0.0	87.9	0.0

Table 1 (cont.)

		Bretton Woods				Post-Bretton Woods			
		GES	GED	DS	DD	GES	GED	DS	DD
LUX	1	49.1	3.2	45.7	1.9	9.1	0.7	79.9	10.2
	6	57.4	1.1	40.7	0.8	30.4	1.3	62.6	5.6
	12	55.4	0.7	43.4	0.5	45.1	1.1	50.7	3.1
	24	55.3	0.4	44.0	0.3	54.0	0.7	43.8	1.6
	36	53.3	0.3	44.2	0.2	57.2	0.4	41.2	1.1
	1	55.1	0.0	44.9	0.0	63.9	0.0	36.1	0.0
NDL	1	52.9	1.3	44.4	1.4	14.3	20.9	60.5	4.2
	6	62.8	2.6	33.8	0.7	37.2	16.7	43.6	2.5
	12	59.3	1.9	38.3	0.5	50.7	13.1	34.6	1.6
	24	57.4	1.1	41.2	0.3	60.6	7.8	30.7	0.8
	36	56.8	0.8	42.3	0.2	64.7	5.2	29.6	0.5
	1	55.2	0.0	44.8	0.0	72.1	0.0	27.9	0.0
NOR	1	3.4	0.0	96.5	0.1	0.1	10.4	81.4	8.0
	6	6.1	0.9	92.8	0.2	4.7	11.3	78.6	5.4
	12	6.7	1.1	92.0	0.2	7.4	8.9	80.1	3.6
	24	7.0	0.7	92.1	0.1	11.1	5.8	80.9	2.2
	36	7.2	0.5	92.2	0.1	13.4	4.1	80.9	1.5
	1	7.6	0.0	92.4	0.0	20.3	0.0	79.7	0.0
POR	1	22.5	0.2	77.3	0.0	10.5	26.5	52.9	11.0
	6	38.7	0.7	59.1	1.5	14.3	15.9	62.7	7.1
	12	43.6	0.5	54.9	0.9	19.1	9.1	67.8	4.0
	24	48.5	0.3	50.7	0.5	23.0	4.4	70.7	1.9
	36	50.2	0.2	49.2	0.4	24.4	2.8	71.4	1.2
	1	54.1	0.0	45.9	0.0	27.2	0.0	72.8	0.0
SPA	1	1.6	2.5	94.2	1.7	8.4	4.1	82.3	5.2
	6	8.7	3.0	86.6	1.7	29.9	4.8	62.6	2.7
	12	13.1	1.7	84.1	1.1	36.9	4.5	56.9	1.6
	24	16.4	0.8	82.2	0.6	43.0	3.3	52.7	0.9
	36	17.5	0.6	81.5	0.4	45.8	2.5	51.1	0.6
	1	19.8	0.0	80.2	0.0	53.0	0.0	47.0	0.0
SWE	1	13.3	0.0	86.3	0.3	3.1	24.6	71.9	0.4
	6	28.7	1.8	68.2	1.2	11.7	16.0	71.2	1.1
	12	28.7	1.3	68.8	1.2	12.7	8.7	77.8	0.7
	24	29.6	0.8	68.8	0.8	12.6	4.6	82.3	0.4
	36	30.1	0.6	68.7	0.6	12.6	3.2	84.0	0.3
	1	31.3	0.0	68.7	0.0	12.4	0.0	87.6	0.0

These results are similar to the impulse response functions. A significant portion of the output (forecast error) variances of the core EU members --- Austria, Belgium, Denmark, Luxembourg and the Netherlands --- are explained by German disturbances, mainly emanating from supply--side shocks. German shocks explain 30 percent or more of the six--month ahead output variance for these countries, with Belgium at the high end (65 percent). Over the longer horizon, the percentage of total variance explained rises, with a range from 45 percent (Denmark) to 75 percent (Austria and Belgium). It is also interesting that German shocks are very important for Spain and Portugal. These countries joined EU in 1986.

By contrast, a much smaller portion of the output (forecast error) variances of the other countries in the sample -- including Finland, Norway and Sweden – are explained by German disturbances. That portion of these Nordic countries' long-run output variance explained by Germany ranged from 12 percent (Finland and Sweden) to 20 percent (Norway). Of the Nordic area, only Denmark seems a natural candidate for EMU.

IS THE ECB TOO CONSERVATIVE FOR THE NORDIC COUNTRIES?

Relinquishing the stabilization function of national monetary policy to the European Central Bank may impose costs on a number of European countries even if they are facing common shocks and economic structures are similar. The European Central Bank is largely politically independent and achievement of price stability is its primary objective. If Nordic countries' national monetary policy were delegated to a "conservative" European Central Bank of this nature, too little weight may be placed on output and employment stabilization policy and too much weight on inflation stability than would be desired. In this case, delegating monetary policy to an ECB which is "too conservative" could entail a social welfare loss: the marginal social loss associated with distortion to stabilization policy outweighs the marginal gain in lower average inflation associated with appointing a central banker who is too conservative.

The basic idea is familiar and may be illustrated in the context of a simple version of the Rogoff time inconsistency framework (Rogoff, 1985). Consider a simple Lucas supply curve with the log of real output (y) equal to the flexible price equilibrium (y_n) and a random part due to surprise inflation (p-p^e) and an stochastic disturbance (e):

$$y = y_n + a(p - p^e) + e \tag{2}$$

Inflation (p)is equal to money supply growth (Δm), set by the central bank, plus a random control error (u):

$$p = \Delta m + u \tag{3}$$

The loss function of the government is expressed as squared deviations in output from the target output level (equal to the flexible price level plus k) and inflation:

$$V = \frac{1}{2} l (y - y_n - k)^2 + \frac{1}{2} p^2 \tag{4}$$

Society's weight on output stabilization is ½λ and on inflation stabilization is ½. The discretionary or no commitment rational expectations equilibrium for this model (see, for example, Walsh, 1998), where the government chooses the money supply (conditional on the realization of and given inflationary expectations) to minimize the loss function gives the actual inflation rate (equal to expected inflation plus effects from the two shocks):

$$p(d) = \Delta m + u = a\,l\,k - \frac{a\,l}{1 + a^2\,l}e + u \tag{5}$$

Hence the inflation bias will be positively related the output objective (above the natural rate) parameter k and the preference for output stabilization λ. Rogoff (1985) shows that, if the government can not precommit to zero inflation, it would be better off to appoint an independent and conservative central bank which has a relative weight on inflation in the loss function which is greater than the government (here assumed to be ½). Assume that the weight the conservative central banker assigns to inflation is ½(1+δ). This is termed "weight conservatism" by Svensson (1997). The equilibrium inflation under discretion will then be lower the greater is the degree of central bank conservatism and equal to:

$$p^{d}(d) = \Delta m + u = \frac{a\,l\,k}{1+d} - \frac{a\,l}{1+d+a^2\,l}e + u \tag{6}$$

Rogoff's contribution demonstrated that the optimal value of d is positive and between [0, ∞]. It is not optimal to be "too conservative" since two effects are at work: a higher value of d lowers inflation bias (the first term on the right-hand-side of equation (6)), and decreases the social loss function. But the value on stabilization policy is also reduced (the coefficient on e in the second term of the rhs of (6)) and distorted (too little stabilization policy is undertaken), which increases the social loss function. This is because the variance of output, $s_y^2 = \left(\frac{1+d}{1+d+a^2\,l}\right)^2 s_e^2 + a^2 s_u^2$, is an increasing function of d.

The optimal degree of central bank "conservatism" may be determined by minimizing the government's loss function (assuming the public knows δ in forming its expectations):

$$\begin{aligned} E[V] = \frac{1}{2}\left[l\,k^2 + l\left(\frac{1+d}{1+d+a^2\,l}\right)^2 s_e^2 + a^2\,l\,s_u^2 \right] + \\ \frac{1}{2}\left[\left(\frac{a\,l\,k}{1+d}\right)^2 + \left(\frac{a\,l}{1+d+a^2\,l}\right)^2 s_e^2 + s_u^2 \right] \end{aligned} \tag{7}$$

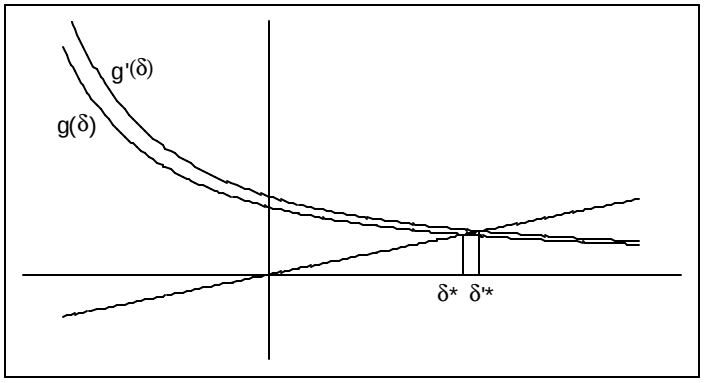
with respect to d. Eijffinger, et al. (1995) and Walsh (1998) show that the following condition must be satisfied by the optimal value of d:

$$d = \frac{k^2}{s_e^2}\left(\frac{1+d+a^2\,l}{1+d}\right)^3 \equiv g(d) \tag{8}$$

The optimal point, d^*, is shown in Figure 2 at the intersection of the 45 degree line and the function $g(d)$, which is greater than zero but less than infinity. The optimal value of conservatism is that point such that the additional benefit of lower average

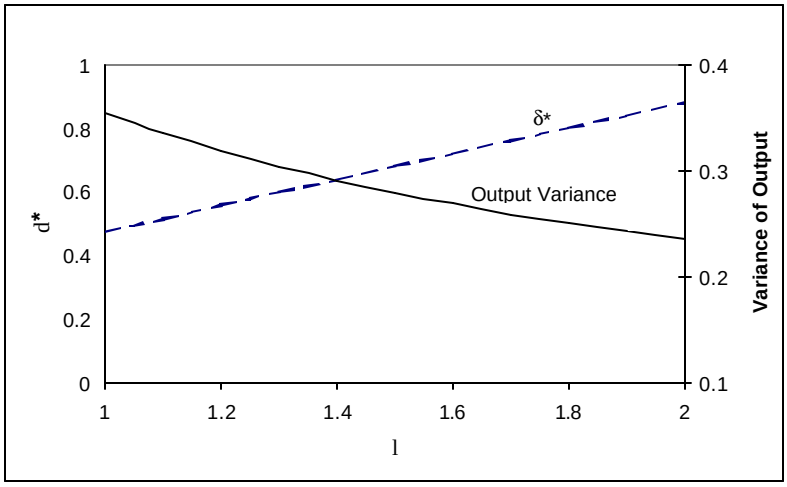
inflation given by increasing *d* is just matched by the cost of increasing output variance.

Figure 2: Optimal Degree of Central Bank "Conservatism": Effect of Increasing the Policy Preference for Output Stabilization



Now consider a group of countries -- presumably the Nordic region—which place a relatively high value on output and employment stabilization (λ**) relative to the weight underlying the preferences reflected by the weight in the ECB's loss function (λ*). The Nordic group, given a value a high value of λ, would in fact choose a very conservative central bank. That is, a rise from λ* to λ** shifts *g(*δ) to *g'(d)*, and indicates that a more conservative central banker would be desirable (shown in Figure 2). This is because higher values of λ lead to greater inflation bias, and delegation to a more conservative central banker would be optimal. Nonetheless, on net balance (combining the exogenous value of λ** with the endogenous value of δ**), inflation and the desired degree of stabilization policy is larger in the Nordic area than in the monetary union covered by the ECB. This relationship is shown in Figure 3, which shows how higher values of λ lead to higher optimal values of δ but, at the same time, a higher optimal degree of output stabilization policy (illustrated in the figure in that the variance of output is decreasing in δ).

Figure 3:



This is the central dilemma. In the face of supply shocks, a central bank must choose between output stability and inflation stability. Is it possible that the ECB is too conservative for Nordic country preferences -- at least Denmark, Norway and Sweden-- and this accounted for their reluctance to join EMU at the outset?

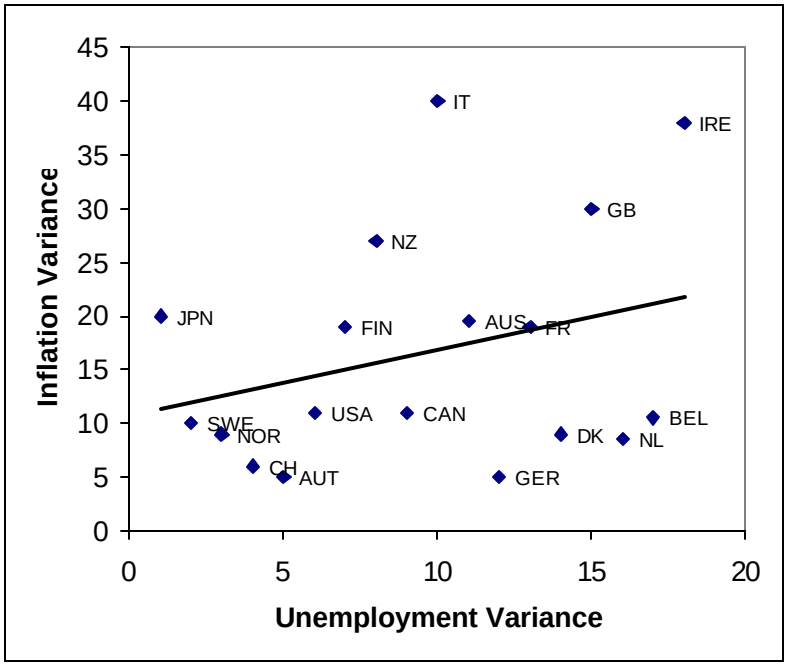
Does the Story fit the Nordic Area?

This part of the optimal currency literature is elegant from a theoretical standpoint, but difficult to test. Policy preferences are not directly observable-- Are Nordic preferences over stabilization policy really that different from other European countries or those of ECB policymakers? Central bank institutional structures -- in either the Nordic area or the ECB – are not designed "optimally" but are the outcome of imperfect political processes and historical accidents (e.g. influential example of an independent Bundesbank successfully pursuing low inflation policies for most of the postwar period). Moreover, there is only weak evidence that central bank structures are related to inflation performance (e.g. Cargill, Ito and Hutchison, 1997).

On the empirical side, there does not appear to be a simple negative trade-off between unemployment and inflation stabilization. Figure 4 plots the variance in unemployment and variance in inflation for a sample of industrial countries. A positive relationship is suggested, indicating that countries experiencing macroeconomic instability (stability) usually see it reflected in both high (low) unemployment and inflation variance. This probably reflects underlying differences

across countries in the variances of the disturbances, and that demand shocks were also contributing to volatility.

Figure 4: Inflation and Unemployment Variance 1960-1989



Among the Nordic countries, Sweden and Norway stand out by quite low unemployment variance (on a par with Switzerland and Austria) and moderate inflation variance from an historical perspective. No clear trade-off between inflation and output variance is suggested and, at least through the 1980s-- they both had comparatively low average levels and variance of unemployment combined with moderate levels and variance of inflation. In the 1990s, however, unemployment rates rose dramatically in Sweden, while they remained low in Norway. Average unemployment in Sweden during 1990-95 was approaching the European average. By contrast, Finland and Denmark appear to fit a more conventional trade-off picture: Finland experienced fairly high inflation variance (up through the end of 1989), but fairly low unemployment variance. Denmark, on the other hand, experienced rather low inflation variance and high unemployment variance.

It is not plausible, however, that Finland's relatively high inflation variance was a conscious policy trade-off for low unemployment variance. And even if this were a

policy choice, and preferences remain unchanged, it does not explain why Finland would choose to enter into an EMU dominated by a conservative ECB which puts so much weight on inflation stabilization. It appears that the Danish experience would better fit the policy responses predicted for the ECB-- not surprisingly given her strong trade, financial and exchange rate ties with Germany (with its Bundesbank model for the ECB). Yet Denmark chose to stay out of EMU. And Sweden, although recently introducing reforms giving the Riksbank much more weight on inflation Stabilization along the lines envisaged for the ECB, also remains outside EMU.

On balance, there appears little evidence to support the view that differences in "policy preferences" explain decisions to join EMU. Nonetheless, there is a strong sense in many European countries, even at the present business cycle juncture, that the new ECB may prove to be much more conservative than their own national central banks would have been if allowed to operate independently. This could be an effort to establish the reputation of a "tough" central bank or simply reflect the preferences of conservative policymakers delegated decision-making power in an independent ECB.

CONCLUSION

Decisions on whether to join EMU at the beginning of operations in 1999 do not appear to fit the political economy rationale suggested by the optimal currency area literature. We argue that only limited information on the costs and benefits of participating in a new monetary union may be inferred from historical economic linkages among the countries and from differences in policy preferences. Losing national monetary policy as an instrument for stabilization purposes is traditionally seen as a primary cost of EMU. However, since a major objective of the EU is to foster stronger economic ties among members, one would expect that this process itself will reinforce a European-wide business cycle and increase the degree of compatibility for a common currency area. In this circumstance, the cost of losing the monetary instrument may not be as large as some studies based on historical relationships have indicated.

That European economic structures change in response to important policy developments such as EMU has been suggested by many authors (e.g. Frankel and Rose (1996, 1997)). We also find that the core group identified by Bayoumi and Eichengreen (1993a, 1993b) is noteworthy by their strong trade and financial linkages with Germany. This leads to a rapid and powerful transmission of German shocks to the economies of the core group, which in turn may be misleadingly interpreted as "common" disturbances. Denmark clearly fits into the core group, while the case for Sweden is ambiguous. Finland and Norway are not closely linked to Germany by comparison with many other small European economies. But historical linkages should presumably not dominate a forward-looking view of an optimal currency area grouping. Attempts to identify a core group of countries ready for monetary union based on past structure, linkages and symmetry of disturbances may be misleading during periods of rapid economic change. In this sense, perhaps

it is not surprisingly that Finland-- with an economy with the weakest links to Germany (in the Nordic area)-- is the only Nordic country joining EMU at the outset.

Moreover, significant differences in policy preferences do not seem to correspond with Nordic countries' reluctance to join EMU. Despite concern among many Europeans that the new ECB might have been too intent on fighting inflation, with corresponding little weight on output stabilization, this factor was not able to explain the initial reluctance of the Nordic countries to join EMU. On this criteria, Denmark again would have been the most likely Nordic country to welcome membership in EMU and Finland the least likely candidate. In a forward-looking policy perspective, perhaps this is not surprising. The workings of the ECB may not prove as conservative in practice as is suggested by its formal institutional structure. Institutional arrangements, as well as economic trade and financial structures, are partly endogenous and change over time in response to economic and political pressure.

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