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HM TREASURY

PETER B. KENEN: WHAT WE CAN LEARN FROM THE THEORY OF OPTIMUM CURRENCY AREAS

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HM Treasury invited Peter Kenen to revisit his 1969 paper “The Theory of Optimum Currency Areas: an Eclectic View”.

INTRODUCTION

1. The theory of optimum currency areas – hereafter, OCA theory – is often deemed to provide a framework for judging whether two or more countries should form a monetary union with a single currency and single central bank. That is not true. Early OCA theory dealt with simple currency unions; it asked whether two or more countries should adopt permanently fixed exchange rates. It was thus part of a larger literature concerned with the choice between fixed and floating rates. Furthermore, OCA theory did not provide a comprehensive framework for assessing the benefits and costs of a currency union. It dealt mainly with the macroeconomic costs of fixing exchange rates and thus foregoing reliance on exchange-rate changes to offset various shocks. It said little about the microeconomic gains conferred by permanently fixed exchange rates – the effects on trade and capital flows of banishing exchange-rate risk. Nor could it assess the gains conferred by banishing conversion costs, because it did not contemplate the introduction of a new single currency.²

2. This brief paper will not trace in detail the evolution of OCA theory or provide a comprehensive framework for judging the costs and benefits of a full-fledged monetary union. Instead, it will pose and answer four questions: (1) What were the main findings of OCA theory? (2) Are they truly applicable to the analysis of a full-fledged monetary union? (3) How were those findings applied by economists trying to decide whether the European Union is an optimum currency area? (4) Might the effects of a monetary union enhance the optimality of that union? No attempt will be made to survey the enormous literature on these questions, although reference will be made to key contributions.³

THE ORIGINS AND FINDINGS OF OCA THEORY

3. The earliest version of OCA theory furnished by Robert Mundell (1961) was a by-product of Keynesian macroeconomics, which assumed that wages and prices are sticky and that international capital mobility is too low to influence the functioning of domestic policies. Under these assumptions, the nominal exchange rate determines the real rate, which affects the current-account balance. Therefore, the nominal rate can be used to maintain *external*

¹ Kenen, P. B. (1969) ‘The Theory of Optimum Currency Areas: an Eclectic View’, in Mundell and Swoboda, (eds.), *Monetary Problems of the International Economy*. Chicago: University of Chicago Press.

² Corden (1972) was among the first to distinguish between a simple currency union and a true monetary union; he described a currency union as a *pseudo-monetary union*.

³ The paper also draws on some of my own publications (Kenen 1995, 2000, 2002a and 2002b) which dwell at greater length on some of the principal issues. The paper does not deal with a related question – whether a country should adopt unilaterally some other country’s currency (i.e. *de jure* dollarization); on the issues involved see, e.g. Alesina and Barro (2002), Alesina, Barro and Tenreyro (2002), Edwards (2001) and Mendoza (2002). Finally, the paper ignores important new contributions to the debate on the choice between fixed and floating exchange rates; see, e.g. Devereux and Engel (1998), Engel (2002) and Corsetti and Pesenti (2002).

balance (i.e. the desired state of the current-account balance), while monetary and fiscal policies can be used to maintain *internal balance* (i.e. the highest levels of output and employment consistent with price stability). Using a closely related distinction, an exchange-rate change was viewed as an expenditure-switching device and thus an optimal response to an expenditure-switching shock, whereas a change in monetary or fiscal policy was viewed as an expenditure-changing device and thus an optimal response to an expenditure-changing shock. Adopting this framework, Mundell examined the macroeconomic implications of a two-country currency union – a permanent fixing of the nominal exchange rate between the countries' currencies. What were those implications?

4. Consider a currency union between countries 1 and 2:

- With an increase of expenditure in country 1, both countries' incomes will rise, but country 1's income will rise further, and it will run a current-account deficit, producing a reserve flow from country 1 to country 2. These will be 'bad things' if both countries enjoyed internal and external balance initially. But both of them can return to that initial state if country 1 adopts an expenditure-reducing policy, and there is no other way for both of them to do so.
- With a switch of expenditure from country 2's goods to country 1's goods, country 1's income will rise, country 2's income will fall, and country 2 will run a current-account deficit, producing a reserve flow from country 2 to country 1. But both countries can return to their initial state by adopting an expenditure-switching policy – a devaluation or depreciation of country 2's currency – and there is again no other way for both of them to do so.

5. Suppose, now, that countries 1 and 2 fix their bilateral exchange rate irrevocably without adopting a single currency or replacing their national central banks with a supranational central bank. In the absence of international capital mobility, both countries can pursue independent monetary policies, at least in the short run, and can thus deal as they should with expenditure-changing shocks. But they can no longer use the nominal exchange rate – or let market forces use it – to offset expenditure-switching shocks. And they must pay attention to the current-account balance, as they cannot rely on capital flows to finance an imbalance; they must use reserves or set up reserve-credit lines to mimic the financing of interbank imbalances that occurs endogenously in a full-fledged monetary union.⁴

6. This, then, was the problem considered by Mundell: How can two such countries cope with an expenditure-switching shock once they undertake to keep their exchange rate fixed? He focused on the labor-market implications of that shock.

7. With a switch of expenditure from country 2's goods to country 1's goods, there will be excess supply in country 2's goods markets and, therefore, its labor market. Conversely, there will be excess demand in country 1's goods markets and its labor market. If prices and wages were perfectly flexible, wages would fall in country 2, reducing its goods prices, and wages would rise in country 1, raising its goods prices. The change in relative prices would reverse the switch in expenditure, restoring equilibrium in both countries' labor markets and ending the imbalance in their bilateral trade. When prices and wages are rigid, however, the two countries face an intractable problem unless there is another way to clear their labor markets – a movement of workers from country 2 to country 1. It would restore equilibrium in the countries' labor markets and also redress the imbalance in their bilateral trade. Workers who moved to country 1 would continue to consume both countries' goods, but their demand for

⁴ On the endogenous financing of imbalances in a full-fledged monetary union, see Ingram (1959, 1973).

country 1's goods would be *domesticated*, becoming part of domestic demand in country 1 and ceasing to be part of the import demand coming from country 2, and their demand for country 2's goods would be *internationalized*, becoming part of the import demand coming from country 1 and ceasing to be part of domestic demand in country 2. Therefore, Mundell concluded that the domain of labor mobility defines an optimum currency area. It can contain many countries but only one unified labor market.⁵

8. Note that Mundell's story has three special features:

- a. Because each country in his model was able to pursue an independent monetary policy, expenditure-changing shocks played no role in defining an optimum currency area, even when they were asymmetric in origin and impact. When capital mobility is high, however, the individual members of a currency union cannot pursue independent monetary policies so expenditure-changing shocks become no less important than expenditure-switching shocks.
- b. Because he dealt with a two-country currency union, the expenditure-switching shock that he studied evinced a unique *mirror-image* asymmetry; it raised output in one country and reduced it in the other. That would not be true of an expenditure-switching shock involving a currency-union country and an outside country.⁶
- c. Because of that same mirror-image asymmetry, a unified fiscal system can cushion the impact of expenditure-switching shocks with little effect on the fiscal stance of the unified system. The increase in tax revenue collected from country 1 as its output and income rise will be similar in size to the decrease in tax revenue collected from country 2 as its output and income fall.

9. Two other papers are frequently cited as early building blocks of OCA theory. Both were concerned with country size and structure.

10. McKinnon (1963) argued that a small open economy cannot use the nominal exchange rate to offset expenditure-switching shocks. A devaluation of a small country's currency will raise its domestic price level, and that can have two consequences. By reducing the real wage, it can generate pressures to raise the nominal wage, and those pressures can prevent the devaluation from affecting the real exchange rate. Furthermore, the strong link between the exchange rate and the price level can reduce the usefulness of the country's currency as a unit of account and store of value. Therefore, an optimum currency area must be big enough to produce a large body of nontraded goods, the prices of which are set in domestic currency and serve therefore to stabilize its purchasing power for the inhabitants of the area.⁷

⁵ Mundell was careful to note, however, that optimality is not uni-dimensional and that his labor-market criterion should not be applied without regard for other *desiderata*. A country containing several separate labor markets should not necessarily subdivide itself into sub-national currency areas, each with its own money. The domain of each money might then be too small for it to serve efficiently as a unit of account and medium of exchange. From a microeconomic perspective, indeed, 'the optimum currency area is the world', although it contains many separate labor markets.

⁶ Faced with such a shock, a currency union can change its external exchange rate, but that will affect output elsewhere in the union. This complication led Méltiz (1995) to suggest that the optimality of a currency union is reduced when its members are differently involved with the outside world. Maloney and Macmillen (1999) make a similar point.

⁷ For this and other reasons, Tower and Willett (1976) suggested that openness is the most useful single criterion for judging whether a country should join a currency union. A highly open economy, they said, will incur larger costs and reap smaller benefits by letting its currency float rather than joining a currency union.

II. Kenen (1969) is most often cited for making two points. First, he suggested that a single fiscal system can compensate in part for the macroeconomic disadvantage of having a currency area in which labor is less than perfectly mobile – one that is not optimal in the Mundellian sense. The reason was given above. In the event of an expenditure-switching shock, higher tax payments will help to stabilize the disposable income of the country in which output is rising, lower tax payments will help to stabilize the disposable income of the country in which output is falling, and there will be little net effect on the fiscal stance of the union-wide system.⁸ Second, he argued that a well-diversified national economy will be a strong candidate for membership in a currency union, as it will not have much need to change its real exchange rate. Each of its export industries may be subject to large exogenous shocks, due to shifts in foreign demand or changes in technology, but the law of large numbers will come into play if it exports many goods and the exogenous shocks are independently distributed. Furthermore, diversification will reduce the size of the change in the real exchange rate needed to offset an exogenous shock to a single industry. In a completely specialized economy, workers who lose their jobs because of a fall in exports will have nowhere to go, and the real exchange rate must therefore depreciate by enough to reverse the whole fall in exports. In a two-product economy, with an export good and an import-competing good, the depreciation of the real rate will also stimulate the demand for its import-competing good and can therefore be smaller.⁹

FROM CURRENCY UNIONS TO MONETARY UNIONS

12. Buiters (1999) has described OCA theory as “one of the low points of post-World War II monetary economics”. By confusing transitory nominal rigidities and permanent real rigidities, he said, it gave an “overblown” account of the power of monetary policy. But that objection is overblown. One can criticize OCA theory for resting too heavily on old-fashioned assumptions about price rigidity. But it does not overly emphasize the influence of monetary policy. On the contrary, it attaches particular importance to real expenditure-switching shocks. Their effects on output and employment can, of course, be offset by monetary policy, insofar as it has any impact on aggregate demand. But when it is used to stabilize output and employment, it amplifies the trade-balance effects of an expenditure-switching shock. That was indeed the main point of Mundell’s own paper, which called for a real response to an expenditure-switching shock – a change in the real exchange rate or redistribution of labor.¹⁰

13. The main shortcoming of OCA theory lies elsewhere. Although it is commonly thought to deal with the macroeconomic effects of a monetary union, it does not really do that. It does not allow for the way in which monetary policy is conducted in a full-fledged monetary union and thus ignores its impact on the way in which various shocks affect member countries. Furthermore, OCA theory does not allow for the effect of a full-fledged monetary union on capital markets and capital movements and thus ignores the impact of a monetary union on the ability of households and others to self-insure against various shocks by holding internationally diversified portfolios.

⁸ This point was echoed by the MacDougall Report (European Commission, 1977), which argued that a move to European monetary union would have to be accompanied by a large increase in the budget of the European Community in order for it to accommodate fiscal transfers. That conclusion led thereafter to a large literature on the size and impact of interregional transfers in various federal fiscal systems and on ways to mimic such a system in the European context. On the size and effect of interregional transfers, see Sala-i-Martin and Sachs (1992), von Hagen (1992), Bayoumi and Masson (1995), Méltitz and Zumer (1998) and Fatás (1998). On proposals to mimic the effects of a federal fiscal system, see Goodhart and Smith (1993), Italianer and Vanheukelen (1993) and Obstfeld and Peri (1998).

⁹ Frankel and Rose (1996) criticize this diversification criterion in the mistaken belief that it was meant to be a distinct and decisive basis for deciding whether a country should join a currency union. But it is only a test of a country’s vulnerability to industry-specific shocks.

¹⁰ Furthermore, the best empirical work on the size and nature of shocks sought to disentangle temporary demand shocks from permanent supply shocks; see the papers by Bayoumi and Eichengreen discussed later in this survey.

14. The first point can be illustrated using a stylized representation of the monetary policy pursued by the European Central Bank (ECB), which aims at maintaining price stability in the euro zone as a whole. Consider a two-country model of the euro zone, and suppose that the ECB maintains price stability by using interest-rate policy to keep the growth rate of euro-zone output equal to a target rate that precludes any change in the overall output gap of the euro zone. How will an expenditure-raising shock in country 1 – an increase in the growth rate of aggregate demand – affect the two countries individually? If nothing were done to offset it, it would raise the growth rate of country 1's output and, via country 1's import demand, would raise the growth rate of country 2's output by a smaller amount. The ECB must therefore tighten its monetary policy by enough to offset the sum of those growth-raising effects. It is easy to show that the requisite tightening of monetary policy will leave the growth rate of country 1's output above what it was before the shock and leave the growth rate of country 2's output below what it was before the shock.¹¹ The ECB's policy response will cause the effects of an expenditure-changing shock to resemble the effects of an expenditure-switching shock. They will display mirror-image asymmetry.

15. By implication, the sharp distinction drawn by Mundell between the two types of shocks breaks down in full-fledged monetary union. Both types of shocks will lead to intractable problems for individual members of the monetary union, no matter how they are manifest – whether in the form of slower growth and unemployment in the country experiencing a slower growth rate of output, or in the form of higher inflation in the other country. Put differently, the one-sized monetary policy of a full-fledged monetary union will *never* fit all of its members' needs, except in the case of a uniform union-wide expenditure-changing shock.¹²

16. The second effect of a full-fledged monetary union – its contribution to the unification of financial markets – has been stressed strongly in the recent literature, especially by McKinnon.¹³ First, a full-fledged monetary union banishes exchange-rate risk completely. Second, it relaxes the effect of regulations restricting the ability of financial institutions to hold foreign-currency assets. Third, it catalyzes reforms of the sort now underway in Europe,

¹¹ The change in the growth rate of aggregate output in a two-country union can be written as

$$(Y_1 + Y_2)dy = Y_1(dy_1 + dy^*) + Y_2(\lambda dy_1 + dy^*)$$

where Y_1 and Y_2 are the two countries' outputs; dy is the change in the growth rate of aggregate output; dy_1 is the change in the growth rate of country 1's output due to an expenditure-raising shock originating in that country;

λ represents the effect of that shock on the growth rate of country 2's output; and dy^* is the (common) effect of the change in the ECB's monetary policy on the growth rates of output in each country. Setting $dy = 0$ and solving for dy^* ,

$$dy^* = -[\delta + \lambda(1 - \delta)]dy_1$$

where $\delta = Y_1/(Y_1 + Y_2)$. Solving for the resulting change in each country's growth rate,

$$dy_1^t = (1 - \delta)(1 - \lambda)dy_1, \text{ and } dy_2^t = -\delta(1 - \lambda)dy_1$$

Country 1's growth rises and country 2's growth rate falls. If $\delta = 2$, of course, the changes in their growth rates are equal absolutely but opposite in sign.

¹² This conclusion strengthens the case for relying on built-in fiscal stabilizers and, in extreme cases, discretionary changes in fiscal policy, to offset shocks that have asymmetric effects in a monetary union. But it does not necessarily imply that a monetary union requires the creation of a unified fiscal system. The need for such a system arises only when national fiscal policies are sharply constrained by balanced-budget rules or when their debt-creating effects reduce their effectiveness by causing households to cut back their spending in anticipation of higher future taxes. For a rigorous treatment of the difference between union-wide and national fiscal stabilizers in the presence of these so-called Ricardian effects, see Kletzer (1997); for empirical evidence concerning the strength of those effects, see Bayoumi and Masson (1998).

¹³ See, in particular, McKinnon (2002), where he ascribes the point to Mundell (1973). But there is no capital mobility in Mundell's paper; like his earlier OCA paper, it is concerned with a currency union, not a monetary union, and it assumes that there is no capital mobility. In fact, the argument in Mundell (1973) rests strongly on that supposition; it argues that currency unions are superior to floating exchange rates because, in the absence of capital mobility, the current account must be balanced continuously under a floating rate, precluding intertemporal trade, whereas reserve movements in a currency union permit and finance intertemporal trade, raising economic welfare.

aimed at removing obstacles to the cross-border issuance and trading of securities. Several empirical papers have shown that interregional capital flows within a single country play a large role in smoothing the output and income effects of asymmetric shocks, whereas capital flows between countries play a smaller role.¹⁴ By helping to unify the capital markets of its member countries, a monetary union can make those countries more like regions and thus reduce the impact of asymmetric shocks.

OCA THEORY AND EMU

17. Although the 1970 Werner Report inspired a flurry of interest in European monetary integration, there were few contributions to OCA theory in the 1970s. The 1988 Delors Report revived interest in the subject, but most of the new work thereafter adopted the analytical framework produced by Mundell and others in the 1960s. There was a rush to measurement – an attempt to decide whether Europe comes close to being an optimum currency area – instead of an effort to update that framework by taking account of innovations in open-economy macroeconomics.

18. The empirical work of the 1990s dealt with three issues: the cost to European countries of adopting a single currency and thus forgoing exchange-rate changes in the future; the role of labor mobility in international and interregional adjustment; and the impact of monetary union itself on the size and nature of exogenous shocks, the extent of labor mobility, and so on. Limitations of space preclude a comprehensive survey, but it is worth drawing attention to the conceptual problems involved and to unanswered questions.

19. Work on the cost of adopting a single currency focused on the measurement of shocks and the extent to which European countries and subsets of those countries are subject to symmetric or asymmetric shocks. The earliest work on this subject looked mainly at the cross-country co-variation of changes in GDP or real exchange rates.¹⁵ But these are endogenous variables, and their cross-country co-variation depends on the co-variation of the truly exogenous shocks, the endogenous and policy-induced responses to those shocks, and the ‘thickness’ of the various channels through which shocks travel from country to country.

20. Bayoumi and Eichengreen (1993) sought to address these problems by adapting a technique devised by Blanchard and Quah (1989). It allows one to disentangle exogenous shocks from their effects on endogenous variables and, by imposing appropriate restrictions, to distinguish between ‘supply’ shocks, which have permanent output effects, and ‘demand’ shocks, which do not. Having thus identified the shocks experienced by various countries, Bayoumi and Eichengreen computed cross-country correlations so as to measure the extent

¹⁴ See Asdrubali, Sørensen and Yosha (1996), Sørensen and Yosha (1998), Helliwell and McKittrik (1998), and Mélitz and Zumer (1999). Melitz and Zumer find, however, that portfolio diversification and capital flows were more important for risk sharing within Europe, even before monetary union, than within the larger group of OECD countries.

Kalemli-Ozcan, Sørensen, and Yosha (1999) extend this literature in a way that bears on an issue raised later in this paper – the effect of a monetary union on industrial specialization. They show that regions engaged intensively in risk sharing via portfolio diversification tend to be more specialized, and they find that causation runs from risk sharing to specialization. They conclude that the financial integration induced by a monetary union will intensify industrial specialization but that it will also shield the participants from the resulting increase in their vulnerability to industry-specific shocks.

¹⁵ See, e.g. Cohen and Wyplosz (1989), Weber (1991) and De Grauwe and Vanhaverbeke (1993).

¹⁶ But their use of single-country vector autoregressions to extract the shocks prevented them from distinguishing fully between shocks originating in a particular country and shocks imported from other countries. The thicker the channels of transmission, the greater the risk that an asymmetric shock will show up as a common shock in a cross-country correlation.

to which individual country pairs have experienced common shocks and asymmetric shocks.¹⁶ Working with data for US regions and European countries, they found that US regions experienced smaller supply shocks and larger demand shocks than did European countries. They also found, however, that the cross-region correlations for both types of shocks were larger than the cross-country correlations, implying that the US regions were closer to being an optimum currency area than were the European countries.¹⁷

21. A number of studies examined a closely related question – whether European countries differ from US regions in the degree of domestic diversification. The earliest work was done by Bini-Smaghi and Vori (1992) and Krugman (1993), who found that European countries are less specialized than US regions and, by implication, less vulnerable to industry-specific shocks. Subsequent work, however, tended to downplay the importance of industry-specific shocks. Examining fluctuations in US output growth, Bayoumi and Prasad (1997) found that country-wide shocks account for a slightly larger share of the overall variability in output growth than do industry-specific shocks and that the same ordering is manifest in Europe. Using a different methodology to decompose output changes in OECD countries, Funke, Hall and Ruhwedel (1999) found that country-specific shocks have been far more important than common international shocks or industry-specific shocks, although international shocks have grown in importance.

22. What about labor mobility? Does it give promise of compensating for the size and frequency of asymmetric shocks? In their well-known study of regional adjustment in the United States, Blanchard and Katz (1992) found that interregional labor mobility plays a crucial role in shaping responses to shocks:

‘A negative shock to employment leads initially to an increase in unemployment and a small decline in participation. Over time, the effect on employment increases, but the effect on unemployment and participation disappear after approximately five to seven years. Put another way, a state typically returns to normal after an adverse shock not because employment picks up but because workers leave the state’ (Blanchard and Katz 1992, p. 3).

23. Turning to the roles of wages and prices, Blanchard and Katz found that nominal wages fall strongly after an adverse shock and take some ten years to return to normal. The fall in nominal wages contributes to the gradual recovery of employment, but not by enough to offset fully the initial shock. Furthermore, consumption wages do not decline very much, because housing prices respond strongly to employment shocks. Hence, Blanchard and Katz conclude that the outward migration of labor, which takes up the remaining slack, must be ascribed to the lack of job opportunities – to unemployment itself – rather than the influence of relative consumption wages.

¹⁷ In the case of supply shocks, the correlations of European countries’ shocks with those in Germany averaged only 0.33, whereas the correlations of US regions’ shocks with those in the mid-eastern region averaged 0.46. In the case of demand shocks, the average correlation was only 0.18 for the European countries, compared with 0.37 for the US regions. These results are reported in Eichengreen (1992). Using the same technique to compare shocks affecting German regions with those affecting European countries, Funke (1997) obtained similar results; the correlations for both types of shocks were higher across German regions than across European countries. For an application to other groups of countries, see Bayoumi and Eichengreen (1994).

¹⁸ See Eichengreen (1993), who shows that changes in wages and unemployment have larger effects on labor movements in the United States than in Britain or Italy. On the persistence of labor-market shocks, see Obstfeld and Peri (1998), who provide a review and critique of other studies, including the one by Décessin and Fatás (1995), who apply the Blanchard-Katz methodology to European countries, ascribe a large role to labor mobility, and find that labor-market shocks are not more persistent in Europe.

24. It is, of course, impossible to know what would happen if labor were less mobile in the United States – whether we would see longer-lasting increases in unemployment rates or larger changes in consumption wages. We do know, however, that labor mobility is lower in Europe and that labor-market shocks tend therefore to last longer than in the United States.¹⁸

THE ENDOGENEITY OF OPTIMALITY

25. How might a monetary union affect the extent to which its members' satisfy the economic *desiderata* featured in OCA theory? We have already mentioned one possibility. By fostering the integration of capital markets, a monetary union will enhance the ability and willingness of households to diversify their holdings of financial assets and thereby self-insure against asymmetric shocks. But it can have two other effects. First, it can stimulate trade among its member countries and can thus thicken the channels through which the effects of various shocks travel from country to country. Second, it can affect the character of its members' trade and thus can affect their vulnerability to industry-specific shocks.

26. Because a monetary union banishes exchange-rate risk, one would expect it to stimulate trade among its member countries. Until recently, however, there was little evidence to this effect. Using conventional measures of exchange-rate risk, economists were unable to show that it had strong trade-depressing effects.¹⁹ But recent research has reopened the subject. Several papers have shown that the regions of a single country trade far more intensively with each other than with comparable regions of another country – that there is a strong 'border' effect that may reflect in part the use of a single currency within a single country.²⁰ Finally and most importantly, Rose (2000) has found that the members of currency unions trade much more intensively with each other than do other pairs of countries. Using a so-called gravity model, which allows for the influence of country size, income, distance, and many other variables affecting bilateral trade, Rose shows that the volume of trade between currency-union country pairs is more than twice as large as the volume of trade between other country pairs.²¹ Most of the currency unions included in Rose's sample involve small developing countries, and Rose himself was careful to warn against drawing any strong inference about the trade-raising effects of EMU. Yet Micco, Stein and Ordoñez (2002) show that EMU has already had a large trade-promoting effect, raising the trade of the euro-zone countries by about 15 percent.

27. One must, of course, attach great weight to this trade-promoting effect when weighing the overall benefits and costs of a monetary union. It says that a currency union permits its member countries to realize more fully the welfare-raising gains from trade, and it should also promote growth.²² Furthermore, it has strong implications for the functioning of a monetary union. It is easily shown that a thickening of the trade channels between the members of a monetary union reduces the extent to which the single monetary policy of the monetary union transforms an expenditure-raising shock into something resembling an expenditure-switching shock. Therefore, it improves the 'fit' of the single monetary policy.²³

¹⁹ Papers that found small but significant trade depressing effects on industrial-country trade include Kenen and Rodrik (1986), De Grauwe (1988) and Savvides (1992). Larger effects have been found for developing-country trade.

²⁰ See McCallum (1995), Engel and Rogers (1996) and Helliwell (1996).

²¹ See also Glick and Rose (2002) and the studies cited in Rose (2002).

²² On the implications for economic growth, see Frankel and Rose (2002).

²³ In footnote 11, above, the asymmetric effects of the single monetary policy (dy_1^\dagger and dy_2^\dagger) approach zero as λ approaches unity, and λ is bound to rise as the trade channels thicken. Frankel and Rose (1998) provide empirical evidence to this same effect; they show that there is a strong positive correlation between the volume of trade between two industrial countries and the size of the time-series correlation between the detrended fluctuations in those countries' output levels. (Frankel and Rose draw a stronger conclusion from this same finding; it is discussed below.)

28. There is another way in which the trade-promoting effects of a monetary union could affect the optimality of that monetary union. If it caused an intensification of inter-industry specialization and thus reduced the diversification of each country's output, it could enlarge the impact of industry-specific shocks and thereby diminish the optimality of the monetary union. That possibility was raised by Krugman (1993).²⁴ But Frankel and Rose (1998) take the opposite tack. The growth of trade, they argue, reflects an intensification of intra-industry specialization, which tends to diversify each country's output, reduces the impact of industry-specific shocks and thereby enhances the optimality of a monetary union. They base their conclusion on their finding that the correlation between two countries' output fluctuations is itself positively correlated with the volume of trade between them. In and of itself, however, this finding says nothing about the nature or size of the shocks producing the output fluctuations. It may merely reflect the thickening of the trade channels between the two countries. Other empirical evidence, moreover, tends to support Krugman's conjecture. Midelfart-Knarvik *et al.* (2000) examined trends in the location of European industry from 1970-73 to 1994-97. These were their main findings:

'Most European industries showed significant convergence of their industrial structure during the 1970s, but this trend was reversed in the early 1980s. There has been substantial divergence from the early 1980s onward, as countries have become more different ... from most of their EU partners.'

'The most dramatic changes in industry structure have been the expansion of relatively high technology and high skill industries in Ireland and in Finland. However, the specialization process has occurred more generally, with nearly all countries showing increasing differences from the early 1980s onward,' (Midelfart-Knarvik *et al.*, 2000).

29. These trends, however, may not be too worrisome. Studies cited earlier in this paper suggest that industry-specific shocks have not been the main cause of output fluctuations, nor have they varied hugely in relative importance. When asking how the trade-promoting effects of a monetary union are likely to affect the optimality of that union, we should attach primary importance to the simple thickening of the trade channels, which tends to improve the 'fit' of the single monetary policy. The implications of the trade-promoting effects for the size and frequency of industry-specific shocks are at best ambiguous.

CONCLUSION

30. In its original form, OCA theory does not tell us much about the macroeconomic costs of entering into a monetary union. That is because it dealt chiefly with the effects of entering into a simple currency union under conditions of low capital mobility and was, in that context, rightly concerned with the costs of forgoing recourse to exchange-rate changes as the first-best way to deal with expenditure-switching shocks – those we would describe today as asymmetric industry-specific shocks. It paid no attention whatsoever to the most prominent feature of a full-fledged monetary union – the introduction of a single monetary policy. Although we need still to worry about the ability of individual countries to cope with structural change, we no longer count on exchange-rate changes to facilitate that process. Instead, we stress the need for more flexible labor markets within individual countries and for improving the quality of the labor force itself.

²⁴ See also De la Dehesa and Krugman (1993).

31. When assessing the optimality of a full-fledged monetary union, we do need to worry about the impact of its monetary policy on individual countries and, for that reason, the likelihood that some members of the union will experience large expenditure-changing shocks. But the trade-promoting effects of the union will mitigate the consequences of those shocks – their interaction with the single monetary policy. It can ‘fit’ its members well, even in the presence of such shocks, if they are closely linked by trade. In that crucial sense, EMU is not far from being an optimum currency area.

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