

Mongelli, Francesco Paolo

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"New" views on the optimum currency area theory: what is EMU telling us?

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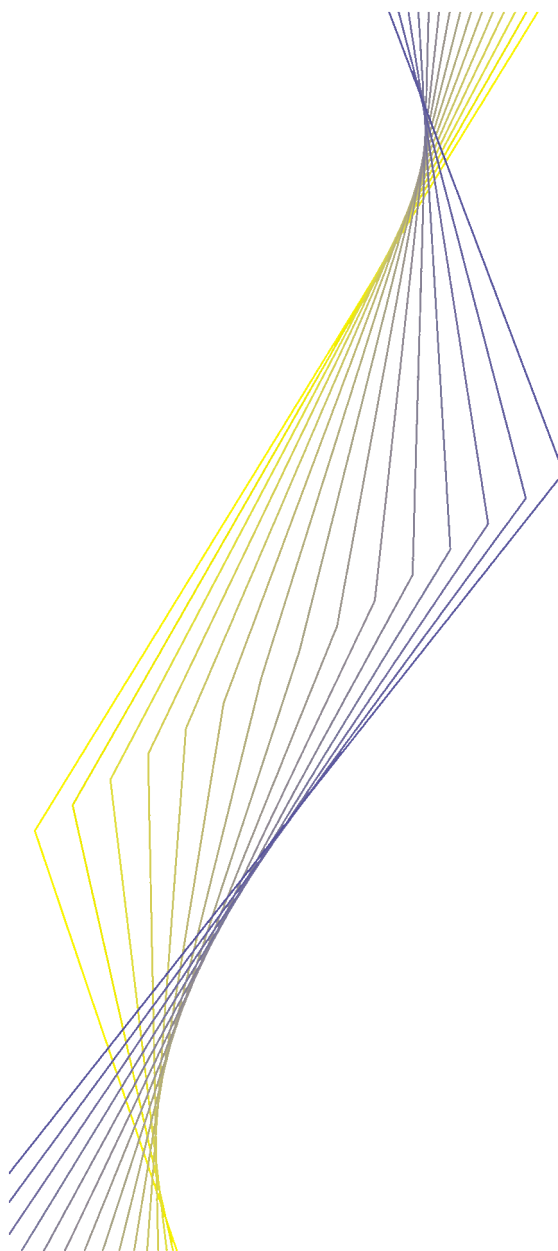
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AREA THEORY: WHAT IS
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Address	Kaiserstrasse 29 D-60311 Frankfurt am Main Germany
Postal address	Postfach 16 03 19 D-60066 Frankfurt am Main Germany
Telephone	+49 69 1344 0
Internet	http://www.ecb.int
Fax	+49 69 1344 6000
Telex	411 144 ecb d

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Abstract

This paper surveys the optimum currency area (OCA) literature. It is organised into four phases: the “*pioneering phase*” which put forward the OCA theory and its properties, the “*reconciliation phase*” when its diverse facets were combined, the “*reassessment phase*” that led to the “new OCA theory,” and the “*empirical phase*” during which the theory was subject to due empirical scrutiny. We make systematic reference to the European economic and monetary union (EMU) to which the OCA theory has been most frequently applied. All pioneering contributions are still relevant. Several early weaknesses have now been amended. Meanwhile, the balance of judgements has shifted in favour of currency unions. They are now deemed to generate fewer costs in terms of the loss of autonomy of domestic macroeconomic policies, and there is greater emphasis on the benefits. Looking ahead we are confronted with two distinct paradigms -- specialisation versus “endogeneity of OCA.”

JEL classification: *E42, F15, F33 and F41.*

Keyword: Optimum Currency Area, Economic and Monetary Integration, International Monetary Arrangements, and EMU

Non-Technical Summary

This paper surveys the literature on the optimum currency area (OCA) theory. It is organised into four main phases. The first is the “*pioneering phase*” from the early 1960s to the early 1970s. The achievement of this phase was to put forward the *OCA properties*, start the debate on the borders of a currency area, and initiate the analysis of the benefits and costs from monetary integration. The OCA properties include: the mobility of labour and other factors of production, price and wage flexibility, economic openness, and diversification in production and consumption, similarity in inflation rates, fiscal integration and political integration. The similarity of shock and correlation of incomes was added later. *Sharing* these properties reduces the usefulness of nominal exchange rate adjustments within the currency area. The main drawback of the pioneering phase was that it was difficult to weigh and reconcile the diverse OCA properties as a unifying framework was missing. Also most OCA properties had no clear empirical content yet.

In the “*reconciliation phase*” during the 1970s, a second set of contributions jointly examined the OCA properties. This represented an important advancement as properties started to be analysed and weighed with one another to gauge their relative importance. This phase also provided several new insights, a new “meta-property”(i.e., the similarity of shocks), and gave more structure to the analysis of the costs and benefits. However, most OCA properties continued to lack an empirical content.

After these two phases, the development of the OCA theory lost some momentum. In particular, there were a problem of inconclusiveness, as OCA properties may point in different directions, a weakening of the analytical framework behind the OCA theory thus far, and a slow-down in the process of European monetary integration. However, gradually several theoretical and empirical advancements lead to a reassessment of the OCA theory and of the main benefits and costs from monetary unification. The balance of judgements shifted in favour of currency unions. Association to a currency union is now deemed to generate fewer costs in terms of the loss of autonomy of domestic macroeconomic policies. There is now also more emphasis on the benefits of currency areas. Some OCA properties were reinterpreted. This “*reassessment phase*” of the 1980s and early 1990s led to the “new theory of optimum currency area.”

In the second half of the 1980s interest in monetary integration was rekindled and the members of the European Union faced an “EMU question,” concerning the timing and modalities of implementing a currency union once the political decisions to create one has been taken. This question was brought out forcefully by the “One Market, One Money” Report. The authors of the report looked at the OCA theory but could not find clear answers. They proceeded instead by using, but also extending, the elements of the “new theory of OCA.” They also discussed the main desirable institutional features of EMU.

The fourth phase is the “*empirical phase*” that spans over the last 15-20 years. All OCA properties are reviewed in great detail to find out how their interpretation has changed. This discussion shows that the pioneering intuitions of the OCA theory were remarkably strong. In fact, we still discuss all OCA properties.

Have all the theoretical and empirical advancements of the last 20 years rendered the OCA theory any simpler? Yes and no. There is still no simple OCA-test with a clear-cut scoring card although several authors have “operationalised” several OCA properties. On the one hand, we are in a *better position* now than ever before in many respects. All OCA properties can now be discussed in much greater detail. Studies of OCA properties have become very comprehensive and articulated. This makes it possible to assess to what extent, and why, certain properties are shared, or not shared, by partner countries. On the other hand,

we are in a somewhat *harder position* now because the response of agents to economic changes and the policy regime -- and EMU represents in some respects a structural break -- is conditioned in a complex way by the environment in which they operate. However, in any case important insights can be gained by studying all OCA properties in great detail for any group of countries envisaging monetary unification.

Most studies investigating OCA properties are by necessity backward looking and would not reflect a change in policy preferences, or a switch in policy regime. However, as already said, EMU represent a structural break. A question naturally arises: *what type of forces might monetary unification unleash?* Looking ahead, we may be confronted with two distinct paradigms -- specialisation versus “endogeneity of OCA” -- which have different implications on the benefits and costs from a single currency. National specialisation may lead to a decline in diversification and in income correlation. In this case the cost from loosing direct control over national monetary policy -- e.g., to undertake business-cycle stabilisation -- may be higher.

Some authors believe instead that the OCA test could be satisfied *ex post* even if it is not fully satisfied *ex ante*: this is the “endogeneity of OCA” paradigm. The borders of new currency unions could be drawn larger in expectation that trade integration and income correlation will augment once a currency union is created. This paradigm is causing both excitement and scepticism. On the one hand, there is compelling empirical evidence that removing “borders” broadly intended as impediments to trade (as with the creation of a free trade zone, a custom union and a common market) and sharing a single currency (as national currencies also represent an impediment to trade) is a powerful magnet for deeper trade and overall integration. On the other hand, could any set of partner countries form a currency union and just wait for the deeper integration to occur almost automatically and thereby inevitably reap net benefits from a single currency? Is there a critical lower threshold in the mix of OCA properties beyond which the “endogeneity of OCA” types of effects could manifest themselves? The forces behind both paradigms and their relative importance and effects need to be better understood. Do countries form currency unions because they trade a lot, or start trading more because they form a currency union? Could both the specialisation and endogeneity of OCA paradigms be reconciled?

1. Introduction

This paper surveys the literature on optimum currency area (OCA) through its main phases. We make also systematic reference to the European experience with economic and monetary union (EMU), which is the most important example of recently established currency unions and the one to which the OCA theory has been most frequently applied.

An optimum currency area (OCA) is defined here as the optimal geographic domain of a single currency, or of several currencies, whose exchange rates are irrevocably pegged and might be unified. The single currency, or the pegged currencies, can fluctuate only in unison against the rest of the world. The *domain* of an OCA is given by the sovereign countries choosing to adopt a single currency or to irrevocably peg their exchange rates. *Optimality* is defined in terms of several *OCA properties*, including the mobility of labour and other factors of production, price and wage flexibility, economic openness, diversification in production and consumption, similarity in inflation rates, fiscal integration and political integration. *Sharing* the above properties reduces the usefulness of nominal exchange rate adjustments within the currency area by fostering internal and external balance, reducing the impact of some types of shocks or facilitating the adjustment thereafter. Countries would form a currency area in expectation that current and future benefits exceed costs.

The start of the OCA theory are the seminal contributions by Mundell (1961), McKinnon (1963), and Kenen (1969) although some insights were present already in Friedman (1953) and Meade (1957). The *goal* of this paper is to trace the evolution of the OCA theory. The European experience is, in some sense, providing a “laboratory” to assess each OCA property and how their interpretation has changed over time.¹ At the same time, a variety of studies - such as on the similarity of shocks, the “endogeneity of OCA,” and the effects of monetary integration on specialisation - is making reference to the OCA theory. This paper intends to find some common threads across these OCA-related studies. The paper does not put the final word on the OCA theory, far from that. Neither it tries to assess the euro area as an OCA. Rather it presents a set of thoughts and questions for further consideration.

We recognise four main phases of the optimum currency area theory. Each of these phases has provided its own distinct contributions. The first is the “*pioneering phase*” from the early 1960s to the early 1970s. The enormous merit of this phase, discussed in Section 2, was to bring out the OCA properties, that are still discussed today, to start the debate on the borders of a currency area, and to initiate the analysis on the resulting benefits and costs. The main drawback of this phase was that it was difficult to reconcile the OCA properties as a unifying framework was missing, and most properties had no clear empirical content.

In the “*reconciliation phase*” during the 1970s, a second set of contributions jointly examined the OCA properties. This phase, examined in Section 3, represented an important advancement as properties started to be analysed, and weighed with one another to gauge their relative importance. This provided several new insights, brought a new “meta-property,” the similarity of shocks, and gave more structure to the analysis of the cost and benefit. However, most OCA properties continued to lack an empirical content.

After these two phases, the OCA theory lost some momentum. In particular, there was a problem of inconclusiveness, as OCA properties may point in different directions, and a

¹ The main steps of European integration include the Treaty of Rome of 1957, the adoption of a common agricultural policy in 1965, the custom union established in 1968, the Single Market Programme launched in 1985, the Single European Act of 1986, the increase of shared competencies, the centralisation of several regulatory functions, the setting up of the European System of Central Banks with the ECB at its centre in June 1998 and the launch of the single currency in January 1999 (see Vanthoor (1999), Smets, Maes and Michielsen (2000), and Maes (2000)).

problem of inconsistency, as some countries may seem suitable to fix their exchange rate with their main partners according to some of their characteristics but not according to others. There was also a weakening of the analytical framework behind the OCA theory thus far, and a slow-down in the process of European monetary integration.

However, gradually several theoretical and empirical advancements lead to a reassessment of the main benefits and costs from monetary unification. The balance of judgements shifted in favour of currency unions. Association to a currency union is now deemed to generate fewer costs in terms of the loss of autonomy of domestic macroeconomic policies. There is now also more emphasis on the benefits of currency areas. Some OCA properties were reinterpreted. This “*reassessment phase of OCA*” of the 1980s and early 1990s led to the “new theory of optimum currency area” that is discussed in Section 4.

In the second half of the 1980s interest in monetary integration rekindled and the members of the European Union faced an “EMU question,” concerning the timing and modalities of implementing a currency union once the political decisions to create one has been taken.² This question was brought out forcefully by the “One Market, One Money” report (Emerson et al. (1992)). The authors of the report looked at the OCA theory but could not find clear answers.³ They proceeded instead by using, but also extending, the elements of the “new theory of OCA.”

The fourth phase is the “*empirical phase*” that spans over the last 15-20 years and is examined in Section 5. We focus here mostly on Europe because there is now a wealth of data, research and other information available on Europe. All OCA properties are reviewed in great detail to find out how their interpretation has changed. However, most studies investigating OCA properties are by necessity backward looking. But monetary integration would represent a structural break for any group of countries adopting a new single currency. Several authors are asking what type of forces monetary integration might unleash. Looking ahead, we may be confronted with two distinct paradigms -- specialisation versus endogeneity of OCA -- that have different implications on the benefits and costs from a single currency, as discussed in Section 6. Each section presents some observations, and Section 7 provides some conclusions. Appendix 1 lists the main benefits and costs associated with currency union.

2. The “pioneering Phase:” from the Early 1960s to the Early 1970s

The early 1960s were characterised by the Bretton Wood exchange rate regime, capital controls in many countries, and the incipient process of European integration. The OCA theory emerged from the debate on the merits of fixed versus flexible exchange rate regimes, and the comparison of several features of the US and European economies. Various OCA properties – that are also called “prerequisites,” “characteristics,” or “criteria” for monetary integration by some authors -- emerged from this debate.

a. Price and wage flexibility. When nominal prices and wages are flexible between and within countries contemplating a single currency, the transition towards adjustment following a disturbance (in this paper the terms shocks and disturbance are used interchangeably) is less

² The “OCA question” aims instead at defining the optimal geographic domain of a single currency: the set of countries in this domain is in principle unknown a priori. It will depend on the OCA properties.

³ “The question of whether Europe is an optimum currency area is not one, unfortunately, which can be answered with a simple yes or no. The OCA literature does not provide a formal test through whose application the hypothesis can be accepted or rejected” according to Eichengreen (1990). In fact, frustration about the normative implications of the OCA theory has led some authors to define alternative notions such as “feasible currency area” (Corden (1972)), “advantageous monetary area” (Emerson et al (1992)), “viable currency area,” and other hybrid concepts.

likely to be associated with sustained unemployment in one country and/or inflation in another. This will in turn diminish the need for nominal exchange rate adjustments (Friedman (1953)). Alternatively, if nominal prices and wages are downward rigid some measure of real flexibility could be achieved by means of exchange rate adjustments. In this case the loss of direct control over the nominal exchange rate instrument represents a cost (Kawai (1987)). Price and wage flexibility are particularly important in the very short run to facilitate the adjustment process following a shock. Permanent shocks will in turn entail permanent changes in real prices and wages.

b. Mobility of factors of production including labour. High factor market integration within a group of partner countries can reduce the need to alter real factor prices, and the nominal exchange rate, between countries in response to disturbances (Mundell (1961)). Trade theory has long established that the mobility of factors of production allows their reallocation across a free-trade zone, and is efficiency and welfare enhancing for the zone as a whole. Such mobility is likely to be modest in the very short run and could display its effect over time. The mobility of physical factors of production (i.e., “capital”) is limited by the pace at which direct investment can be generated by one country and absorbed by another. Labour mobility is likely to be low in the very short run, due to some costs, such as migration and retraining costs (that could be quite significant). It could possibly be higher in the medium and long-run, easing the adjustment to permanent shocks (Corden (1972)).

c. Financial market integration. Ingram (1962) noted that financial integration can reduce the need for exchange rate adjustments. It permits, amongst others, to cushion temporary adverse disturbances through capital inflows -- e.g. by borrowing from surplus areas or decumulating net foreign assets that can be reverted when the shock is over. Under a high degree of financial integration even modest changes in interest rates would elicit equilibrating capital movements across partner countries. This would reduce differences in long-term interest rates, easing the financing of external imbalances but also fostering an efficient allocation of resources. Financial integration is not a substitute for a permanent adjustment when necessary: in this case, it can only smoothen the long-term adjustment process.

d. The degree of economic openness. The higher the degree of openness, the more changes in international prices of tradables are likely to be transmitted to the domestic cost of living. This would in turn reduce the potential for money and/or exchange rate illusion by wage earners (McKinnon (1963)): the higher is openness the more changes in international prices would directly and indirectly impact on domestic prices. Also a devaluation would be more rapidly transmitted to the price of tradables and the cost of living, negating its intended effects. Hence, the nominal exchange rate would be less useful as an adjustment instrument. Economic openness has various dimensions including the degree of trade integration (i.e., the ratio of reciprocal exports plus imports over GDP) with the partner countries, the share of tradables versus non-tradable goods and services in production and consumption; the marginal propensity to import; and international capital mobility. These concepts overlap but are not necessarily synonymous. An economy could display a high share of tradables but have low imports and exports (and exhibit a low foreign trade multiplier).

e. The diversification in production and consumption. A high diversification in production and consumption, i.e., in the “portfolio of jobs”, and correspondingly in imports and exports, dilutes the possible impact of shocks specific to any particular sector. Therefore diversification reduces the need for changes in the terms of trade via the nominal exchange rate and provides “insulation” against a variety of disturbances (Kenen (1969)). More diversified partner countries are more likely to endure small costs from forsaking nominal exchange rate changes amongst them and find a single currency beneficial.

f. Similarities of inflation rates. External imbalances can arise from persistent differences in national inflation rates resulting, inter alia, from: disparities in structural

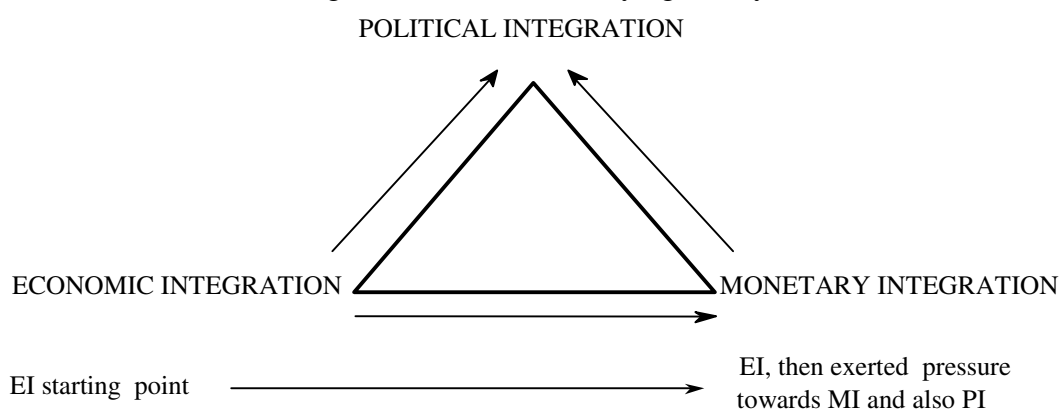
developments, diversities in labour market institutions, differences in economic policies, and diverse social preferences (such as inflation aversion). Fleming (1971) notes that when inflation rates between countries are [low and] similar over time, terms of trade will also remain fairly stable. This will in turn foster more equilibrated current account transactions and trade, and reduce the need for nominal exchange rate adjustments. On the other hand, not all inflation differentials are necessarily problematic. Some “catching up” process by less developed countries could lead to “Balassa-Samuelson” types of effects until the process is completed. Some authors propose instead that it is the terms of trade (i.e., the real exchange rate) that should exhibit narrow fluctuations between countries (Eichengreen (1990)).

g. Fiscal integration. Countries sharing a supra-national fiscal transfer system that would allow them to redistribute funds to a member country affected by an adverse asymmetric shock would also be facilitated in the adjustment to such shocks and might require less nominal exchange rate adjustments (Kenen (1969)). However, such a property would require an advanced degree of political integration and willingness to undertake such risk sharing.

h. Political integration. The political will to integrate is regarded by some as the single most important condition for adopting a common currency (Mintz (1970)). Political will fosters, amongst others, compliance with joint commitments, sustains co-operation on various economic policies, and encourages more institutional linkages. Haberler (1970) stresses that similarity of policy attitudes among partner countries is relevant in turning a group of countries into a successful currency area. Tower and Willett (1976) add that a successful currency area needs a reasonable degree of compatibility in preferences toward growth, inflation, and unemployment and significant ability by policy-makers in trading-off between objectives.

There has also been a debate about the links between political, economic and monetary integration. The European process of integration has privileged economic integration. From the Treaty of Rome (1957) onward, the bulk of the institutional steps toward integration has been aimed at creating a free trade zone, a custom union, a common market, and an economic union over time. Hence, in Europe a ‘functional’ integration process has prevailed (Figure 1) with economic integration as its starting point and as its driving force and spurring over time monetary and some forms of political integration (Issing (2001)).

Figure 1. A View of Economic, Monetary and Political Integration
 “Functional” Integration Process Underlying Treaty of Rome (1957)



Over the years the OCA theory has also been accompanied by a rich debate on the institutional features and setting of a monetary union (see for example Kenen (1969 and 1992), Corden (1972 and 1993), and Allen (1976)), and the “impossible trinity:” i.e., the impossibility to reconcile free trade and capital mobility, monetary autonomy, and fixed exchange rates (see Padoa-Schioppa (1990)).

Some observations on the “pioneering phase”

The pioneering authors also initiated a debate on the benefits and costs from adopting a single currency. This debate that is continuing to these days has important implications on the motivation to form a currency area among a group of partner countries.

Several OCA properties still needed to be spelled out and analysed in some detail. Robson (1987) observes that several properties are difficult to measure unambiguously and evaluate against each other. Also the pioneering phase as a whole lacked a unifying framework. One could still end up drawing different borders for a currency area by referring to different OCA properties. Tavlas (1994) calls this the “*problem of inconclusiveness*,” as OCA properties may point in different directions: for example, a country might be quite open in terms of reciprocal trade with a group of partner countries indicating the preferability of a fixed exchange rate regime, or even monetary integration, with its main trading partners. However, the same country might display low mobility of factors of production and labour vis-à-vis these trading partners suggesting instead that a flexible exchange rate arrangement might be desirable in order to cope with shocks originating from outside this group.

Tavlas (1994) also observes that there can be a “*problem of inconsistency*.” For example, small economies, that are generally more open, should preferably adopt a fixed exchange rate, or even integrate monetarily, with their main partners following the openness property. However, the same small economies are more likely to be less differentiated in production than larger ones. In this case they would be better candidates for flexible exchange rates according to the diversification in production property. Conversely, McKinnon (1969) notes that more differentiated economies are generally larger and have smaller trade sector.

How would OCA properties in any case be ranked? Price and wage flexibility, and the mobility of factors of production including labour, had a prominent role in the debate. Financial market integration was deemed to be very relevant. However, at least until the mid-1980s for several European countries full capital mobility and convertibility was still the exception rather than the rule. Inflation differentials were still relatively small but not negligible until the oil shocks (at least compared with the differentials of the subsequent periods). Economic openness and the diversification in production and consumption tended to display their effects through product and labour markets. The political will to integrate was understood to be a crucial prerequisite to pursue integration in most of the other areas.

3. The “Reconciliation Phase:” the 1970s

The debate on the OCA properties and the benefits and costs received an impetus from a second wave of contributions including Corden (1972), Mundell (1973), Ishiyama (1975), and Tower and Willet (1976). The merit of these authors was to jointly interpret the diverse properties. This reconciliation strengthened the interpretation of some properties and led to diverse new insights such as the role of similarity in shocks.

Corden (1972) points out that forming a currency area with a group of partner countries entails a loss of direct control over the national monetary policy and the exchange rate. This entails forsaking national *expenditure switching policies* implying a cost to the extent that nominal prices and wages are downward rigid.⁴ In a currency area, a country

⁴ For example, a country faced with an adverse demand shock to its exports would not be able to devalue its currency and regain some of its lost exports. This country has then fewer policy options at its disposal in the currency area rather than with a different regime. It would need to endure either a bout of unemployment or let its real prices and wages fall. Behind this cost there is a stabilisation framework, and the belief that at least in the short run, monetary policy is an effective policy

facing an adverse demand shock to its exports will need to resort instead to *expenditure absorption policies* -- such as a fiscal tightening or expansion -- to restore its external balance. At the same time, it would also need to rely on changes in its real exchange rate. Flexibility in nominal prices and wages can bring about real exchange rate flexibility in the wake of some shocks or in the presence of some imbalances. This could in turn reduce the amount of absorption policy that is needed. In fact, there is a trade-off between real exchange rate flexibility, that is market-based and could operate quite rapidly, and the amount of expenditure absorption policy, which is less rapid.

Ishiyama (1975) recognises the limitations of defining OCAs based on a single property and postulates that each country should evaluate the costs and benefits of participating in a currency area from the *point of view of its own self-interest and welfare* (“...if the pros outweigh the cons...”). Ishiyama also points out that differences in inflation rates and wage increase resulting from different social preferences, and conflicting national demand management policies overwhelm in importance several other OCA properties (including differences in exposure to micro-shocks most of which are likely to be temporary).

Tower and Willett (1976) illustrate with a graphical apparatus the diverse OCA-properties and the trade-offs they entail vis-à-vis alternative exchange rate regimes. They show, amongst others, that joining a currency area enhances the usefulness of money the more open a country is, but it constrains the use of discretionary macroeconomic policies to achieve internal balance due to the external constraint for the area as a whole. The total cost of adjustment hinges upon the sources, type and strength of external disturbances. Such costs are a decreasing function of openness. In the end, they argue, that there is no general agreement on the quantitative importance of any OCA property, and highlight the need for more empirical research. However, the OCA theory has thus far been a catalyser for new research on alternative exchange rate regimes leading to valuable new insights.

The merit for a currency area rests also on the type, and similarity, of shocks that a country, and its envisaged monetary partners, face. There is an important difference between foreign versus domestically generated shocks. McKinnon (1963) postulates that, for example, Country A has to decide whether to integrate monetarily with Country B that displays very stable domestic prices and factor costs (i.e., it is a low inflation country). Instead, country A is prone to some micro shocks such as domestic shifts in demand and supply. By fixing its exchange rate with Country B the latter will safeguard the stability of prices of foreign goods (i.e. of tradables), retain the benefits from deeper trade integration and investment flows, and prop up the usefulness of money (by maintaining its value in terms of foreign goods). Obviously, the domestic micro shocks in Country A would still impinge on its domestic prices of non-tradables. But, the alternative of maintaining a flexible exchange rate arrangement would be certainly inferior, as there would be price instability in terms of both domestic and foreign prices entailing higher costs as well as lower benefits. It is noteworthy that this argument also anticipates the issue of a “nominal anchor.”

Some years later, following the demise of Bretton Wood, and with a higher inflation climate world-wide, a rather different challenge arose. Corden (1972) noted that nominal exchange rate changes may have an insulating role with respect to price changes originating abroad. If Country A now endured uncertain foreign prices (such as higher energy prices) originating in Country C (that is an oil exporter), it would be better off by insulating itself, to the extent possible, by undertaking an exchange rate appreciation: i.e., Country A could be protecting itself from inflation imported from Country C. Evidently, in this latter example Countries A and C would not be suitable candidates to form a monetary union. Countries A

instrument and, jointly with flexible exchange rates, it could facilitate the adjustment of relative wages and prices in the wake of some types of shocks (“fine-tuning”). This would provide a less costly adjustment than having to endure some unemployment to facilitate a real adjustment.

and B could, eventually. As Tavlas (1994) points out a group of countries with similar characteristics and that respond in similar ways to shocks will require less exchange rate adjustment between them. This group would form a feasible currency area (Corden (1972)).

During the reconciliation phase, the analysis of the OCA properties and of the cost and benefit acquired more structure. Several authors assign a high prominence to the analysis of the benefits and costs from participating in a currency area. After all, the prospects of a positive balance between benefits and costs is the principal reason for contemplating monetary integration with one or more partner countries. A few authors separate between the analysis of OCA properties, that may be rather inconclusive, and the analysis of the main benefits and costs, that has its own merits irrespective of the OCA theory (Ishiyama (1975)).

Benefits result principally from the increased usefulness of money, greater price transparency that will foster competition, the disappearance of intra-area nominal exchange rate uncertainty that will strengthen the internal market, foster trade, lower investment risks, and promote cross-area foreign direct investments (FDI) and enhance resource allocation (see Appendix 1 for a more extensive discussion). Other benefits will result from more transparent and deeper financial markets, savings on transaction costs, and a wider international circulation of the single currency. On the other side there are changeover costs from switching to a new currency, increased administrative costs due to the creation of a supranational institution, and national government will be prevented from equalising the marginal cost from taxation and inflation. Membership in a currency area narrows the menu of policy instruments directly available to national governments.

McKinnon (2001) “rediscovers” a second seminal contribution by Mundell (1973). This contribution discusses the role of financial integration, in the form of cross-country asset holding, for international risk sharing. Countries sharing a single currency can mitigate the effects of asymmetric shocks among them through the diversification of their income sources, by adjusting its wealth portfolio, and by pooling their foreign exchange reserves.⁵ A corollary of this argument is that similarity of shocks is not a strict prerequisite for sharing a single currency if all members of the currency area are financially integrated and hold claims on each others output. This point has important implications on the debate about the size of a single currency area. A common currency could be shared by countries subject to idiosyncratic shocks as long as they “insure” one another through private financial markets.

Some observations on the “reconciliation phase”

This phase has the merit of having brought together the main OCA properties and discussed the narrower policy options under direct control of national governments. A new “meta-property” was advanced: i.e., the similarity of shocks. The analysis of the cost and benefit associated with a currency area acquired more structure. However, most OCA properties still lacked an empirical content. The weaknesses in the analytical framework started to emerge more clearly and are discussed in the next section.

The ranking of OCA properties also changed somewhat. Corden holds that price and wage flexibility rank the highest and can permit rapid responses to disturbances. Openness and similarity in shocks are also important. But Mundell (1973) argues that if members of a

⁵ The international diversification of income sources can operate through *income insurance* when residents of a country hold claims to dividends, interests and rental revenue in other countries. Such ex-ante insurance allows the smoothing of both temporary and permanent shocks as long as output is imperfectly correlated. But a country’s residents can *adjust their wealth portfolio* in response to income fluctuations by buying and selling assets and borrowing and lending on international credit markets. Such ex-post adjustment allows the smoothing of transitory shocks (see Kalemli-Ozcan, Sørensen and Yosha (2001) and references therein).

currency area are financially integrated, a high similarity of shocks among them, although desirable, is no longer a strict prerequisite. This has relevant implications for the debate about the size of a currency area. The mobility of factors of production and labour is highly desirable but also entails some costs and cannot effectively cope with disturbances in the very short-term. For Ishiyama, similarity in price and wage inflation ranks the highest. Tower and Willett are instead more agnostic. Corden also postulates that short-term capital movements can contribute to easing the adjustment process, and that the flexibility of fiscal policy should be raised to undertake expenditure absorption policies if needed.

4. The “Reassessment Phase:” the 1980s and Early 1990s

A period in which “the subject [i.e., the OCA theory] was for years consigned to intellectual limbo” (Tavlas (1993)) followed the above contributions. The analytical framework behind the OCA theory thus far started to weaken. Some authors noted that this pause is also explained by the loss of momentum toward monetary integration. When interest in European monetary integration re-emerged in the mid 1980s, both economists and policy-makers looked back at the OCA theory, but could not find clear answers to the question whether Europe should proceed toward complete monetary integration.

The “One Market, One Money” Report by Emerson et al. (1992) point out that “there is no ready-to-use theory for assessing the costs and benefits of economic and monetary union (EMU).” The optimum currency area theory has, in their view, provided important early insights but provides only a narrow and outdated analytical framework to define the optimum economic and monetary competencies of a given geographic domain (i.e., a “region” such as the EU). The latter *EMU question* is, possibly, more complex than the *OCA question*.

We review here several fields in which the analytical framework behind the OCA theory thus far underwent a revision. These revisions are important for the normative implications from the OCA theory. This reassessment led in fact to a reconsideration of the effective costs and benefits from monetary integration. This has in turn a bearing on the debate on the size (i.e., borders) and timing of currency areas. At the end of this reassessment phase a “new” OCA theory starts emerging vis-à-vis the “old” OCA theory (Tavlas (1993)).

The long-run ineffectiveness of monetary policy

One of the main perceived costs from monetary integration is that member countries lose direct control over national monetary policy. This prevents them from undertaking business-cycle stabilisation: the cost that is represented by wider cyclical fluctuations, is more severe when shocks are asymmetric vis-à-vis the other partner countries. The monetarist critique of the short-term constant Phillips curve, underlying some of the earlier OCA literature, alters the assessment of this specific cost by noticing that labour negotiates in terms of real wages rather than nominal wages. Correspondingly, the curve needs to be augmented by expected inflation, and perfectly anticipated policy changes could exert no impact upon real variables (McCallum (1989)). The Phillips Curve was then displaced by the natural rate of unemployment (NRU). Policy makers have principally a choice of a rate of inflation rather than of a level of desired unemployment and economic activity (Artis (1991)). Hence, from this standpoint, the costs from losing direct control over national monetary policy is low.

Alesina, Barro and Tenreyro (2002) argue that countries exhibiting large co-movements of outputs and prices have the lowest costs from abandoning monetary independence vis-à-vis their partners. Calvo and Reinhart (2002) raises the issue that to the extent that monetary policy is not properly used as a stabilisation device, the loss of monetary independence is not a substantial cost.

Emerson et al. and several other authors demonstrate that, also in the long run, relatively higher inflation does not yield any macroeconomic benefits in terms of unemployment or growth. On the contrary, higher inflation is associated with higher unemployment and relatively lower levels of real per capita income. Unanticipated inflation has even stronger adverse economic effects than anticipated inflation through several channels. The costs of reducing inflation can also be quite substantial (see the discussion on credibility below). These findings have implications for the analysis of the current and future benefits and costs from currency union and the role of monetary policy (see Issing, Gaspar, Angeloni, and Tristani (2001), ECB (2001a) and references therein).

The view on the ineffectiveness of monetary policy is not undisputed though. There are potential sources of money non-neutrality (Tavlas (1993)). Melitz (1991) notes that even countries confronted with identical shocks may require different policy responses due to differences in their initial economic positions, degree of price and wage flexibility, tax structures, trade responsiveness, and preferences. Members of a currency area may have different dislikes for inflation and be worse off by sharing a single currency (De Grauwe (2000)). In more recent years several studies have also reconsidered the trade-off between low levels of inflation and unemployment (see, amongst others, Akerlof, Dickens and Perry (2000)).⁶ Goshen and Schweitzer (1999, 2000) take instead a different approach. They find that in the US higher nominal wage growth contributes to ease downward wage rigidities (“grease”). However, simultaneously, inflation also generates disruptive, unintended wage variations (“sand”) from symmetrical rigidities. These variations continue to mount long after the benefits have been exhausted. Thus, rigidities interact with levels of inflation, implying that grease-only benefit estimates exaggerate the negative impact of low inflation. In summary, the costs from losing direct control over national monetary policy seem rather low, but subject to the above qualifications.

The Credibility Issue

The ability of a country, or a group of countries, to achieve and maintain inflation low, is important in evaluating the costs from monetary integration. Some governments could have an incentive to renege on a low inflation commitment, that has been accepted at face value by the public, in order to reduce unemployment along some short-run Phillips curve (Kydland and Prescott (1977) and Barro and Gordon (1983)). But economic agents quickly learn about such a strategy. After a surge in inflation the public expects inflation to increase. Even future surges in inflation may be discounted eroding any initial short-lived gain from previous announcements of a low inflation objective. Similarly, devaluations can also engender strong and lasting expectational effects. This country may be trapped in a high inflation equilibrium at the NRU. The cost of disinflating on its own may be quite steep.

For a country with a track record of relatively higher inflation and a reputation for breaking low inflation promises, a way to immediately gain a low-inflation credibility is to ‘tie its hands’ by forsaking national monetary sovereignty and establishing a complete monetary union with a low inflation country (Giavazzi and Giovannini (1989)). An important prerequisite is that such an anchor country exists in the envisaged monetary union. This low

⁶ Akerlof, Dickens and Perry (2000) inquire how agents actually use expectations rather than how they form them. Some recent psychological studies show that people concentrate on the information that matters most to them. An economic stimulus (such as a change in the rate of inflation) must pass a certain threshold before it is even perceived. The result is that price and wage setters under-adjust for inflation when it is not very high. In fact, the cost from near-rational behaviour in terms of lost profits is negligible when rates of inflation are very low. But at successively higher rates of inflation, more and more agents and firms will fully adjust for expected inflation when setting wages and prices. There is a point of lowest sustainable unemployment that lies below the natural rate of unemployment (NRU) but above zero inflation. The result is a Phillips curve that is vertical at the NRU at both high levels of inflation and with zero inflation, but has an inflection at some moderate rate of inflation.

inflation anchor country has instead fully recognised the costs of high and variable inflation (Goodhart (1989)), has built a strong track record of low and stable inflation, and will not alter its monetary discipline after establishing the monetary union: i.e., this country can indeed provide the nominal anchor for the monetary union (Rogoff (1996) and Goodhart.

In summary, similarities of inflation rates could be a feasible outcome from participating in a monetary union but is not a necessary precondition (Gandolfo (1992)). This turns around one of the main OCA properties provided that the nominal anchor country can maintain the hegemony of the institutional setting that have preserved the low inflation environment (Tavlas (1993)). The benefits of a quick transition to low inflation -- and the absence of heavy costs of disinflation -- are of course the highest for the countries with a track record of relatively higher and variable inflation.

Are Exchange Rate Adjustments in Any Case Effective?

Are changes in nominal exchange rate actually effective? If not, the cost from losing direct control over the nominal exchange rate instrument would be as significant as previously thought. There are two differing views on this matter. The first view is that changes in nominal exchange rates do not foster adjustments of external disequilibria, as was assumed by the “old” optimum currency area theory that used a “trade-flow model” of exchange rate determination (see Krugman (1991 and 1993), De Grauwe (2000) and Tavlas (1993)). Exchange rate changes operate instead with considerable lags due to the slowness of the portfolio-balance channel (Branson (1986)). With Ricardian equivalence and perfect foresightedness by agents, changes in macroeconomic policies may not affect current exchange rate (De Grauwe (1989)). Canzoneri, Vallés and Viñals (1996) show that the cost from having no nominal exchange rate for countries joining EMU is likely to be low because movements in exchange rates are dominated by monetary and financial shocks preventing the exchange rate from performing the macroeconomic stabilisation function. Last, the ‘sunk cost’ model of Krugman and the pricing to market model, also illustrate why rational firms may not always quickly alter their export prices. This reduces therefore the effectiveness of nominal exchange rate changes.

The second view is that some episodes of nominal exchange rate adjustment have been effective. De Grauwe (2000) notes that the 1982 devaluation in Belgium has helped to “restore domestic and trade account equilibrium at a cost that was most probably lower than if it had not used the exchange rate instrument.” The French devaluation of 1982-83 also stands out (Sachs and Wyplosz (1986)). The Italian devaluation after the exit from the ERM in 1992 contributed to sustain economic activity. These and other episodes illustrate that some nominal exchange rate adjustments could be quite effective under very specific circumstances: i.e., if they are accompanied by a credible attempt to correct the sources of a disequilibrium, and if they are seen as a one-off remedy: i.e., the exchange rate instrument cannot be used systematically.⁷ Hence, according to those holding the second view, there could be some costs from losing direct control over the exchange rate instrument. This cost would actually manifest itself in more severe deflation following some shocks. The remedy is of course to enhance real exchange rate flexibility by raising price and wage flexibility.

⁷ Mike Artis noted that the suggestion that nominal exchange rate changes do not translate very durably into real exchange rate was one of the factors that helped to propel the EMU project, even though, ironically the post-1992 experience did not validate the “new” wisdom on this subject. Foreign exchange markets seem, at times, far from the paradigm where they are bound to support equilibrium results: on the contrary they seem to be open to herd behaviours, irrational fads and the like.

The Single Currency and Labour Markets

Differences in labour market institutions could lead to divergent developments in wages and prices even in the presence of similar shocks. Bruno and Sachs (1985) point out that supply shocks can have very different macroeconomic effects depending on the degree of centralisation in wage bargaining. When wage bargaining is quite centralised, the labour unions tend to internalise the inflationary effects of wage increases, changes in real wages may be contained, and the negative supply shock will have a shorter duration and be less disruptive for economic activity. Countries with strong decentralisation (e.g., with wage bargaining conducted principally at the firm level allowing the internalisation of wage claims on the competitiveness of the firm) would also fare better in the wake of a supply shocks than countries with an intermediate degree of centralisation (see Calmfors and Driffil (1988) who note that the relationship between centralisation of wage bargaining and labour market outcome is not linear). Therefore, countries with differences in labour market institutions may find it costly, from this standpoint, to form a monetary union (De Grauwe (2000)).

Some observations on the “reassessment phase”

The revisions to the analytical framework behind the “old” OCA theory lead to a “new” optimum currency area theory (Tavlas (1993)). The analytical apparatus to tackle both the OCA and the EMU question has now changed owing to new views on the short-term Phillips Curve, the credibility issue and the importance of a nominal anchor, the internalisation of the benefits of low inflation, the effects of a single currency on labour markets, and the views on the low effectiveness of exchange rate changes. An important legacy of this phase is that there are somewhat fewer costs in terms of the loss of autonomy of domestic macroeconomic policies. There are also more benefits, due to credibility gains, for countries with a track record of higher and more variable inflation (the similarity of inflation property can then be satisfied ex-post).

The “One Market, One Money” Report holds a critical view of the “old” optimum currency area theory. However, it also contributed to revitalising the interest in the debate on the OCA theory, brought together many strands of theoretical and empirical literature (directly or indirectly related to the OCA theory), and spurred a vast amount of new research. Another merit of the report was to discuss several desirable features of, and possible implications from, EMU. In the end, the “One Market, One Money” Report comes out in clear favour of proceeding toward complete monetary integration in Europe for several EU members. Emerson et al., argue that the many shortcomings of the old OCA theory are likely to bias downwards the expected net benefits from monetary integration: EMU is likely to be more beneficial than what can be presumed on the basis of the application of the OCA properties alone. For example, although labour mobility is low in Europe, the mobility of capital is instead quite high and rising. This provides an alternative adjustment channel.

5. Empirical Studies of OCA: from the 1980s to today

This section reviews several recent empirical studies on the diverse OCA properties. The flourishing of these studies is due to the theoretical innovations discussed in the previous sections, the advancements in econometric techniques, and foremost, the renovated interest toward European economic and monetary integration. These empirical studies seek to assess why specific groups of countries may form an optimum currency area by analysing and comparing a variety of OCA properties and applying several econometric techniques. Thus they aim to *operationalize the OCA theory*. The focus of this section is on Europe. The main reason for this choice is that the European process of integration started already in the 1950s.

Europe is in some sense, providing a “laboratory” to assess each OCA property and monitor the effects of deepening economic, financial and monetary integration.^{8 9}

a. Price and wage flexibility. There is broad agreement that price flexibility is low across European countries. OECD (1999) and EU Commission (1999) find that price flexibility is hampered, albeit by different degrees across the euro area, by the slow implementation of the Single Market Programme (SMP), a slow dismantling of some non-tariff internal and external trade barriers, and continuing state aid to several sectors. For example, there is relatively low market competition and monopolistic tendencies in sectors with a high concentration of state owned enterprises or of previous state monopolies.

Bayoumi and MacDonald (1998) find no evidence of mean reversion in regional relative prices in Canada and the US over the past 30 years. Instead, OECD (1999) finds that there is no empirical evidence of sustained inflation differentials leading to permanent changes in relative consumer prices between regions in Australia (during 1956-1998) and Spain (during 1978-1998). Inflation ranged from a low of 1% to a high of about 3% per year in Australia and almost 4% in Spain. Alberola and Tyrväinen (1998) extend the Belassa-Samuelson model and estimate that, based on historic trends in productivity and wages, sustained inflation differentials of up to 2 percentage points could manifest itself between the more and less advanced euro economies. De Grauwe and Venhaverbeke (1993) find that real exchange rates were significantly less variable within European countries than between them.

Low wage flexibility is also an important factor behind the lack of price flexibility. Despite significant progresses in recent years, real wages are still quite rigid across most European countries, albeit with notable differences (see also Calmfors and Driffil (1988), Calmfors (2001) and Boeri, Börsch-Supan and Tabellini (2001)). There is also a significantly slower speed of adjustment of real wages to economic shocks in continental Europe (OECD (1994)). Unemployment does eventually put some downward pressure on real wages in Europe, but a large share of the adjustment is borne by employment (OECD (1994)). But Cadiou, Guichard and Maurel (2001) find significant labour market asymmetries across EU countries and that overall the responsiveness of wages to unemployment rose in the 1990s. Several labour market institutions contribute to explain low wage flexibility including: wage bargaining arrangements, employment protection, unemployment insurance systems, and minimum wage provisions (see Blanchard (1999), Blanchard and Wolfers (2000)), EU Commission (1999), and IMF (1999)). Several studies find a wide heterogeneity of European labour market institutions (Nickell (1997), Layard and Nickell (1998), and OECD (1999)).

Several recent studies establish a significant link between product and wage markets: countries with more stringent product market regulations tend to have more restrictive employment protection legislation (OECD (2000)). Therefore, product market reforms can be a catalyst for easing restrictive employment protection legislation. Such structural reforms would enhance competition, strengthening the links between wage and price flexibility allowing prices to adjust more rapidly in the wake of shocks. Hence, the drive to continue implementing the Single Market Programme will enhance both price and wage flexibility.

⁸ There is also a rich empirical literature examining the suitability of other regions -- such as Latin America, Far East Asia, and some African regions -- to some forms of monetary integration: see diverse contributions by Alesina, Barro, Eichengreen, Bayoumi, Artis, Melitz, and other authors.

⁹ Alesina, Barro and Tenreyro (2002) as if a country is by definition an optimum currency area. In fact, several OCA properties have also been investigated at the intra-national level, i.e., of “regions” within sovereign countries: e.g., the US States, German Länders, Spanish provinces, or Italian regions, See for example, Obstfeld and Peri (1998), Boldrin and Canova (2001) and references therein. Such “regions” lack the nominal devaluation option that is a privilege of sovereign countries. This provides some information on alternative adjustment mechanisms including labour mobility and real exchange rate developments. Such studies analyse also how shocks are distributed intra- and inter-nationally.

b. Labour market integration. Labour mobility could contribute to the adjustment in case of permanent shocks and when real wages are downward rigid. However, several studies have found that this mobility was two to three times higher in the US than in Europe (OECD (1999)).¹⁰ Eichengreen (1990b) found that the variation of unemployment in Europe was twice that of the United States, while its dispersion was four times higher in Europe than in the United States. Thomas (1995) noted significant differences between Europe and the United States in their responses to the unemployment rate to employment shock. In the US unemployment shocks that result from a fall in demand for goods and services produced in a particular region are not persistent due to a high degree of interregional migration of the labour force. In Europe, however, changes in the unemployment rate tend to be persistent due to a low mobility of the labour force across countries. Bentolilla (1997) found that the probability of moving is not (or only weakly) responsive to relative unemployment. Furthermore, the OECD (1999) noted that cross-country migration is an unlikely response to economic shocks in the euro area, and instead is motivated by other factors and is permanent. The economic incentives to move have weakened even further due to high overall levels of unemployment, income convergence and reduced wage differentials across countries (OECD (1999)). The process of economic catching up with more advanced economies has in fact narrowed the gap between wages and income per capita within the EU thereby reducing the incentives to migrate (Bentolilla (1997)).

Several factors help to explain low labour mobility in most EU countries. Bertola (2000) observes that quantity and price dimensions of labour market rigidity are inter-related and that lack of employment flexibility with wage rigidity reinforce each other. But there are also some specific social, cultural, and administrative determinants behind the low geographic mobility in Europe. Braunerhjelm, Faini, Norman, Ruane, and Seabright (2000), noted inefficiencies in the inter-regional job matching process as well as high mobility costs. Blanchard questions whether the cultural and language barriers can ever disappear. Also, there are significant barriers in the housing markets across the EU. A panel of experts set up by the EU Commission in 1996 partly attributes low labour mobility to a combination of institutional and administrative factors including: limited cross border portability of social protection and supplementary pension rights; administrative difficulties and the high costs of gaining legal resident status; lack of comparability and reciprocal recognition of professional qualifications; and restrictions on public sector employment.

Decressin and Fatás (1993) adapt the framework of Blanchard and Katz (1992) to study US States “regional” labour markets to Europe. They find that only 20% of changes in regional employment are common to all European regions, whereas in the US 60% of these changes are common to all US states. The dispersion of changes in employment is also lower in the US. Differences in relative unemployment rates between regions are more persistent in Europe than in the US, with regional relative unemployment rates returning to their means more rapidly in Europe than in the US. Concerning the absorption of shocks to regional labour demand, the main difference between the US and Europe stems from the different roles played by labour force participation and migration. In the US net immigration accounts for 52% of the increase in regional employment from the first year onwards, whereas in Europe it is only after the third year that immigration accounts for a similar proportion of the rise in employment. The reverse holds for labour force participation that in Europe accounts for 78% of the rise in employment in the first year and 50% in the second, whereas the respective figures for the US are respectively 18% and 17%. Hence, there is greater heterogeneity among European regions than among US states. Viñals and Jimeno (1996) estimate a model of regional unemployment in which unemployment is decomposed into region-specific

¹⁰ OECD (1999) reports that only 5.5 million European Union citizens reside in another member state out of 370 million (or about 1.5 percent of the population, and half of the proportion for non-EU citizens). This ratio was actually higher in the 1950s and 60s when 10 million people migrated from Southern to Northern Europe. Hence, in some sense labour mobility has fallen in Europe (Bertola (2000)).

constants, and regional, national and EU-wide random components. They find that regional specific factors explain almost two thirds of the conditional variance of European sub-national unemployment.

c. Factor market integration. Several studies show that cross-country foreign direct investments have become more relevant in the euro area. OECD (1999) shows that both inward and outward foreign direct investments (FDI) from other euro area countries have risen in almost all countries over the last 5 years. Also in the medium run FDI seem quite responsive to changes in regional economic conditions. Public procurement markets are still operating on a largely national basis. The EU Commission (1999) estimates that significant barriers to market access still remain in several sectors accounting for about half of EU GDP. In summary, foreign direct investment flows -- that are likely to be underestimated but are still modest in comparison with trade and other financial flows -- are on the rise and add up over time leading to an increase in the share of foreign owned assets and portfolio diversification fostering risk sharing.

d. Financial market integration. The extent by which European countries are financially integrated is evaluated from diverse complementary angles including the intensity of cross-border financial flows (quantity test), the law of one price (arbitrage test), and also the similarity in financial institutions and markets. The common view is that financial integration is lower among European countries than among US States (but that it is raising fast in several areas). Concerning the quantity test, there are several, mostly indirect, measures. Backus, Kehoe and Kydland (1992) find evidence of a low level of risk sharing by comparing cross-country GDP and consumption correlations. Sørensen and Yosha (2000) and Arreaza (1998) carry out cross-country variance decompositions of shocks to GDP and point to negligible risk sharing through cross-country ownership of assets. Tesar and Werner (1995) document a “home bias” in portfolio holdings (see also Obstfeld and Rogoff (2000)), and a host of authors have found evidence of low financial market integration in terms of cross-country ownership of assets. Bordo, Eichengreen and Kim (1998) show that the ratio of the current account balance over GDP, averaged across a number of countries, has increased somewhat since the mid-1960s but still remains below the levels seen from the mid-1870s to 1914. However, in volume terms gross financial flows are larger today than in the period before 1914. Encouragingly, Gaspar and Mongelli (2001) find that the relation between current account balances and GDP per capita has risen in recent years across European countries indicating an increased importance of net financial flows (for some qualifications see Alesina, Angeloni and Etro (2001)). Liebermann (1998) finds evidence of higher cross-country insurance via capital markets during the period 1992-97, which indicates that capital markets in Europe are integrating.

Very importantly, Atkeson and Bayoumi (1993), Bayoumi and Klein (1997) and Crucini (1999) all find that financial market integration is significantly larger within countries than across countries. This allows countries more risk sharing across their regions, than is possible internationally. Asdrubali, Sørensen and Yosha (1996) looked at channels of interstate risk sharing in the US. They focused on shocks to gross state product. They found that 39% of the shocks were smoothed through *capital markets*, 23% were smoothed through *credit markets* and 13% through the *federal government*. 25% were not smoothed. That is, financial markets and institutions in the US contribute with 62% to the absorption of state idiosyncratic shocks. The effect is five times more important than the federal budget.

Concerning the arbitrage test, there are clear indications that financial integration has risen in recent years in terms of fewer opportunities of arbitrage and smaller interest differentials. Several authors are observing an increasing degree of financial markets integration in terms of the law of one price (Issing (2000)). Money markets across the euro area integrated very rapidly after the introduction of the single currency, and yield differentials among euro area government bonds have converged markedly (see Gaspar and

Mongelli (2000) and references therein).¹¹ Chen and Knez (1995) develop an indicator which exploits the idea of absence of arbitrage opportunity to derive a necessary and sufficient condition for the law of one price to hold across two markets. Ayuso and Blanco (1999) apply a refined version of the method suggested by Chen and Knez to stock price data for the United States, Germany and Spain. Their finding suggests that, during the 1990s, there was an increase in financial market integration for these countries.

Concerning the similarity in financial structures, we can gauge some evidence from the studies of the monetary transmission mechanism (MTM) across euro area countries (Angeloni, Kashyap, Mojon, and Terlizzese (2001), Deutsche Bundesbank (2001), Cecchetti (2001), and De Bondt (2000)). Such studies analyse and compare, amongst others, the financial structures of countries.¹² They show that European countries display significant differences in terms of, amongst others, interest sensitivity of spending, maturity structure of debt, net-worth of firms and household sectors, the legal structure, contract enforcement costs, the bank lending channel and the alternatives to bank financing. Such differences are likely to diminish only gradually over time. Issing (2000) asks whether the provision of financial services is opening to competition, within the local economy and from the outside. He finds that the convergence of average bid-ask spreads on comparable financial products that is an indirect indicator of the opening of local financial markets to competition has undoubtedly risen.

To what extent do differences in economic and financial structures really matter? A second strand of the Monetary Policy Transmission literature analyses and compares the impact of monetary policies on output and inflation using a variety of methodologies. Peersman and Smets (2001) estimate a VAR system on synthetic euro area data from 1980 to 1998 to study the macroeconomic effects of a monetary policy shock in the euro area. They find that the effects of a temporary rise in nominal and real short-term interest rate on the exchange rate, output and prices is very similar -- in terms of both time profile and intensity -- for the US economy and the euro area. Angeloni, Kashyap, Mojon, and Terlizzese (2001) also find broad similarities in the monetary transmission in the euro area and the US although there are differences in the relative potencies of channels.¹³

e. The degree of economic openness. Openness as measured by the ratio of export plus import of goods and services to GDP is quite high across all European countries: it averages around 40 percent of GDP. Due to the process of price liberalisation, spurred also by the implementation of the Single Market programme, and the deepening of industry trade (that is discussed below) prices of tradables are becoming progressively more aligned across the EU (see Beck and Weber (2001)). The issue of currency union and trade (and the causality between the two) is addressed also by the “endogeneity of OCA” literature that is discussed in Section 6.

f. The diversification in production and consumption. The diversification in production is high in most EU member countries. Bini-Smaghi and Vori (1992) find that “...in

¹¹ At the same time, Bordo, Eichengreen and Kim (1998) show that co-integration in financial prices is quite high across the world and is not a European-specific phenomenon (see also Obstfeld (1994)).

¹² MTM studies investigate and compare financial structures and the relative impact of monetary policies. They provide some indirect insights also for the OCA question as differences in monetary transmission might have a bearing on the costs from sharing a single currency e.g., by engendering cyclical divergences (Clements, Kontolemis and Levy (2001)).

¹³ However, Clements, Kontolemis and Levi (2001) find significant differences in transmission across euro area countries even after correcting for differences in monetary policy reaction functions prior to EMU. ECB (2000) finds a lack of statistically significant cross-country differences in the transmission mechanisms. Kieler and Saarenheimo (1998) note that very different results can be obtained for the same country using different methodologies. These differences are often larger than the differences that emerge using a given methodology across countries. In any case these studies are still fraught with several difficulties (Guiso, Kashyap, Panetta and Terlizzese (2000)).

the manufacturing sector, on average, the difference between regional production structures [i.e., the diversification of the productive structure of each country] are much larger within the EU than within the United States.” This difference amounts to only half the size of the difference that can be observed in the twelve U.S. Federal Reserve Districts. Consistently Krugman (1993) finds that the degree of specialisation is larger in the United States than in Europe. Bini-Smaghi and Vori also find that the variance of the composition of output is twice as large in the US as that in the EU. OECD (1999) examines the degree of similarity in the structure of consumption across EU/euro area countries. An index of similarity in consumption is compiled based on the correlations of various components of real consumption in each country. For euro area countries the benchmark is the euro area average. The results show a very high similarity in most countries except Spain. Furthermore, similarity in the structure of consumption has increased in virtually all EU countries (OECD (1999)). Hence, the members of the EU are less likely to be subject to asymmetric disturbances because they are still more homogenous than the US, i.e., they all produce a bit of everything and have similar consumption structures. For this reason, EU countries tend to behave more as a group than the twelve U.S. Federal Reserve districts.

g. Similarities of inflation rates. Inflation rates have declined in all industrialised countries over the past 15-20 years, albeit at different paces. In the run up to EMU inflation differentials have narrowed down within narrow margins among all EU countries, and in particular euro area countries (EMI (1998)). However, inflation rates have since shown some national variations owing to three types of factors: statistical and erratic factors (noise); some deeper economic forces that are at work including the completion of the single market and the increase in cross-border transparency that is contributing to reducing differences in prices of traded goods, and also the Balassa-Samuelson effect; and differences in cyclical conditions and demand policies (ECB (1999)). OECD (1999) argues that sustained, but not large, differences in inflation rates are acceptable provided that they reflect a “catching-up” process.

But how significant and long lasting could differentials in price development be? Rogoff (1996) reports that real exchange rates tend toward purchasing PPP in the very long run but with quite a low speed of convergence (the half life of PPP deviations is 3 to 5 years), and that short run deviations from PPP are large and volatile. Among the culprits, the literature has cited transportation costs, market segmentation, inertia in consumer habits, large trading frictions, optimal price setting behaviour by multinational enterprises, menu and adjustment costs, expected permanence of costs, fixed entry costs and pricing to market, and the role of distribution networks (see also Caves, Frankel, and Jones (2001)). However, following Hasker and Wolf (1999) deviations from PPP may be bounded and there is threshold mean reversion ensuring that relative price remain within corridors determined by arbitrage costs. Reassuringly, OECD (1999) finds that there is no empirical evidence of sustained inflation differentials leading to permanent changes in relative consumer prices between regions in Australia (during 1956-1998) and Spain (during 1978-1998).

Beck and Weber (2001) investigate the departure from the law of one price by applying a methodology similar to Engel and Rogers (1996) to a European data set. The monthly data used cover the aggregate CPI, 7 categories of goods and 81 locations in five different euro area countries from January 1991 to June 2000. Four Swiss locations are used as controls. Focusing on the volatility of relative price changes across locations the authors find that there has been a significant decline in the cross border volatility of relative prices since January 1999: when the single currency was introduced. Border effects have been reduced to 20% of pre-EMU levels, although distance and border effects are still significant post-EMU. Hence, the arbitrage tests might bear the signs of the introduction of a single currency faster than the quantity test.

h. Fiscal integration. Fiscal integration can be looked at from several complementary angles. From the standpoint of *fiscal convergence*, one very evident achievement is that all

euro area countries have satisfied the fiscal criteria of the Maastricht Treaty (EMI (1998)) and are now complying with the Stability and Growth Pact (SGP). There is also some evidence of a deeper level of fiscal convergence. Fiscal positions are coming closer together due to economic integration that is fostering harmonisation in several areas of taxation, spending and fiscal legislation. De Bandt and Mongelli (2000) find evidence that for euro area countries cross-correlation has increased steadily over the 1970-98 period, while fiscal dispersion has been declining at a sustained pace among all countries in the sample. They also find a common euro area fiscal cycle for net lending across the euro area. However, idiosyncratic national components still contribute to a significant share of the variability of individual countries. These preliminary findings need to be qualified by the still significant differences in levels of public indebtedness and fiscal structures.

Concerning *fiscal stabilization*, the national budgets of euro area countries would be able to withstand even severe disturbances affecting economic activity and employment once they have complied with the medium-term targets of the Stability and Growth Pact (SGP) (Artis and Buti (2000)). These targets entail a balanced budget, or even a fiscal surplus, in order to satisfy the SGP “in good times and bad times” (Eichengreen and Wyplosz (1998) and Buti, Franco and Ongena (1998)). If national fiscal stabilisers work in the wake of adverse shocks, the need for other types of adjustments -- such as supranational transfers, international risk sharing through the financial system, changes in prices and wages, and/or changes in real exchange rates -- are somewhat reduced.

A third dimension of fiscal integration is the *public risk sharing facility* that might be provided by a supranational -- example given, federal -- budget. This entity can reduce its receipts from and/or increase its transfers to a region or state hit, for example, by an adverse shock and thereby absorbing a share of the “regional” shock (see Sachs and Sala-i-Martin (1991), Von Hagen (1991), Atkeson and Bayoumi (1993), and OECD (1999)). Whatever the effective magnitude of public risk sharing, such a facility takes in any case away part of the burden of counter-cyclical policies from the US State fiscal authorities. The latter is a non-negligible aspect given that most US States are subject to even tighter fiscal constraints than euro area countries (Von Hagen (1991)). The euro area is proceeding without a public risk sharing facility. Bini-Smaghi and Vori (1992) find that some smaller and more homogeneous monetary unions, such as Switzerland, Belgium, and Luxembourg, have been able to function proficiently with a very limited federal budget.

How costly could the lack of a public risk sharing facility (i.e., a federal budget) be for the euro area? Given the high degree of diversification in production and consumption and the relatively high similarity in the types of shocks faced by several European countries, this cost could be quite contained at present. In addition, euro area countries are attentive in securing fiscal discipline and the use of national fiscal stabilisers. However, if asymmetric shocks will prevail in the future, for example due to increasing specialisation (see Section 6), the lack of a supranational federal budget may entail significant costs.

i. Political integration. A strong political will has indeed supported the continuing advancement in European integration. A chronology is in Vanthoor (1999). Differences in policy preferences across EU countries -- and particularly euro area countries -- have narrowed down: Gaspar and Mongelli (2001) argue that the stabilisation of inflation, budget deficits, and exchange rates across the current euro area countries reveals a clear preference for monetary unification. Is this sufficient to claim that political integration has been achieved? A tentative answer hinges also on what we mean by political integration. At present, the single European currency is shared by a group of sovereign countries that do not form a single state. Furthermore, the euro area is not likely to become a single state in the traditional sense of the term in the very near future. This is a unique situation that requires that political integration is assessed against a different benchmark (Issing (2001) and Padoa-Schioppa (2000)). There are at least three aspects to be considered.

The first aspect is the increasing *functional political integration*. Diverse areas of government have already come closer together. The EU Council (which is an inter-governmental body) and the European Parliament are the European Union's supranational legislators. They are also fostering the harmonisation in several areas of member countries' national laws. The European Commission contributes to initiating common policies and, inter alia, vigilantes on the implementation of EU supranational laws and regulations. The European Court of Justice gives unity to European Law. There is also an enhanced system of multilateral surveillance and binding budgetary commitments. This architecture is described, amongst others, by Simon (1998). Hence, EU member countries already share some elements of a common supranational constitutional framework. The effective power that these institutions hold vis-à-vis national states is not easy to assess.¹⁴ Padoa-Schioppa (2000) observes that the European Union brings to an end the absolute economic power of the nation state, although it does not cancel its role altogether. The functions of States are also changing (Leonard (1999)). However, OECD (1999) observes that the allocation role, the income redistribution and stabilisation functions, and growth promotion and employment role have not been transferred at the supranational level. In any case, functional political integration may deepen over time as the legal and regulatory framework is harmonised further and common European views emerge in critical areas.

The second aspect is that euro area countries have *transferred sovereignty over several elements of their economic policy*. Monetary and exchange rate policies are now centralised. Monetary policy has been relinquished to the European System of Central Banks (ESCB), with the ECB at its centre. Exchange rate policy has been relinquished to the ESCB and the EU Council that jointly decide on the overall framework within which exchange rate policy must be conducted. The ECB is instead solely responsible for holding and managing foreign exchange reserves and for conducting foreign exchange operations. Microeconomic policies are also to a large extent centralised by the European Union in the areas concerning the single market, competition, and trade policies (OECD (1999)).¹⁵ All euro area countries still set their national fiscal policies, but must do so within the margins allowed by the provisions of the Stability and Growth Pact (SGP) and the Excessive Deficit Procedures therein. An annual Stability Programme, containing the budgetary objectives, must be submitted every year. National governments must also adhere to the Broad Economic Policy Guidelines (BEPG) that are endorsed annually (since 1998) by the EU Council. The BEPG also contain country-specific recommendations on both macroeconomic and structural policies.

The third aspect of political integration pertains to the *increased need for policy co-ordination* that is justified on the basis of increasing policy spillovers between countries, the presence of economies of scale and indivisibilities for some functions, and the possible welfare benefits from risk pooling. The challenge in the EU/EMU context emanates from the institutional set-up of a single euro area monetary policy and of several national non-monetary policies which have in turn a problem of co-ordination between themselves (Bini Smaghi and Casini). The commitment problem is solved in terms of pre-commitments

¹⁴ The new literature on political economics, see Persson and Tabellini (2000), is highlighting the role of incentives and trade-offs for economic agents and politicians in the formation of policies and the working of political institutions. In the end it must be the voters and the politicians who will need to take a pan-European view of economic policies.

¹⁵ There are also targeted structural initiatives, such as, the EU-wide benchmarking of industrial performance and the co-ordination of several research efforts. The Luxembourg Process (1997) on employment policies envisages the adoption of Employment Guidelines by the EU, and the submission of National Action Plans for employment by the member states. The Cardiff Process (1998) on structural reforms envisages annual reports on reforms in products and capital markets. The Cologne Process (1999) envisages a macroeconomic dialogue aimed at the reduction of unemployment. The Lisbon strategy (2000) is aimed at economic and social reforms. Immigration, health protection, some cultural matters, environmental issues, and security matters are also areas in which some form of harmonisation or common initiative have been undertaken.

strategies that attribute clear objectives to the monetary and fiscal authorities (Persson and Tabellini (1995)). Co-ordination across the EU/euro area include multilateral surveillance and frequent exchange of views on country specific and euro area developments and policies in the context of several supranational forums including ECOFIN, the EFC and the EPC (Bini Smaghi and Casini (2000) and ECB (2000)). There are also frequent consultations and mutual participation in the working of the main supranational institutions of the EU, and various forms of collaboration on specific initiatives and joint rule making.

Hence, euro area countries have transferred a significant share of their national sovereignty to the EU supranational bodies and to inter-governmental forums. They also gained a better view, and could have a bigger say, in the policies undertaken by their partners. Padoa-Schioppa (2000) maintains that the current policy architecture of the EU and the European System of Central Banks possesses many elements of state-formation and amounts to a partial political union. Partial due to the inability of setting competencies and defining the political agenda particularly in the area of internal and external security, the limited application of the majority principle, and the lack of a significant European “federal” budget similar to the one in places in the US to help cushioning State-specific shocks. The current lack of a supranational federal risk-sharing arrangement across the euro area is mitigated by the proclivity to symmetric shocks and the strengthening of financial integration.

j. Similarity of shocks. The similarity of shocks, and policy responses to shocks, is almost a “catch all” OCA property, or “*meta*” property, capturing the interaction between several properties (see also Masson and Taylor (1993)).¹⁶ The intuition is that if the incidence of supply and demand shocks and the speed with which the economy adjusts -- taking into consideration also the policy responses to shocks -- are similar across partner countries, then the need for policy autonomy is reduced and the net benefits from adopting a single currency might be higher. In the late 1980s and early 1990s, these studies acquired more prominence due to advancements in econometric techniques.¹⁷

Bayoumi and Eichengreen (1996) find a positive correlation between the fundamental shocks in Austria, Germany, Denmark, France, the Benelux countries and Switzerland. The correlation of shocks between these “core” countries is higher than with the southern countries, but is still below that between the eight Bureau of Economic Analysis regions of the US. Funke (2000) finds significantly higher correlation among supply disturbances to German Länders than to the above “core” European countries. Demertzis, Hughes and Rummel (2000) find some evidence of overall symmetry of shocks between European countries. However, the correlation of shocks is stronger within a core group (including Austria, France, Germany, Belgium, the Netherlands, Denmark and Luxembourg) and a

¹⁶ For example: differentiated and open economies are likely to endure more differentiated and, possibly, smaller unit shocks; to the extent that shocks do strike, price and wage flexibility could immediately ease adjustment; if the above flexibility is not sufficient and resources are still left idle after the shock, a high mobility of factors of production (including labour) also eases the adjustment process (but would require some more time); while the economy is on the path to a new equilibrium (if the shock is long-lasting) a high degree of financial market integration can foster the private wealth channel and smooth the adjustment process (but not replace it), all along national economic policies which also play a role in responding to shocks (e.g. through the fiscal lever) but could greatly differ across countries in terms of timing, strength and execution. This could in turn produce dissimilar responses to shocks even if the original shock was identical across partner countries. A detailed taxonomy of shocks is in Emerson et al (1992), OECD (1999) and De Grauwe (2000).

¹⁷ Blanchard and Quah (1989) specified a SVAR approach to identify aggregate supply and demand shocks and distinguish them from subsequent policy responses. This permits to measure and compare asymmetric shocks across countries. Bayoumi and Eichengreen (1992, 1994 and 1996) proposed instead bivariate auto-regressions for output and prices restricting demand shocks to effect only prices in the long run while allowing supply shocks to have long-run effects on both prices and output. A discussion on the use of stochastic simulations using macroeconomic models is in Tavlas (1994).

periphery group (including the UK, Greece, Ireland, Portugal, Spain, Italy, Finland and Sweden). Furthermore, there is more symmetry on the demand side -- due largely to policy interventions -- than on the supply side or for the “monetary shocks.” The authors also find that few policies have been directed to the supply side and that country-specific shocks have dissimilar sizes. The observed symmetry is largely attributable to demand policies -- rather than to a convergence in the underlying economic structures. Hence, Demertzis, Hallett and Rummel conclude that “EMU” seems to be held together largely by policy makers. In summary, the diverse “shocking studies of OCA” would have led to the drawing of narrower borders for European monetary integration, i.e., the “core group,” than other type of studies.

Decressin and Fatás (1993) show that shocks are distributed less symmetrically in Europe with a higher proportion of region-specific shocks. Forni and Reichlin (1997) apply an unobserved index model to detect the role of EU, national and regional factors in the fluctuation of regional growth of real output. Regional shocks are found to play a significant role in Europe, albeit smaller than in Viñals’ and Jimeno’s (1996) study of regional unemployment. An interesting finding by Forni and Reichlin is that when they search for a European “core” -- i.e. a group of regions in which at least 70% of output variance stems from EU factors -- all major countries have regions outside of it. Spain and Italy, that are deemed to be peripheral countries, have instead important regions in the European core.

Tavlas (1994) notes that the results of the studies of similarity of shocks are ambiguous and often in conflict. There is no concurrence on the theoretical underpinning of the tests, e.g., on the relationship between exchange rate variability, trade and investment, and there is no account of the Lucas critique. Despite their limitations, shocking studies of OCA do provide a benchmark of comparisons across many countries whose economic and financial structures would be otherwise difficult to summarise.

Some observations on the empirical phase

The analysis of most OCA properties now goes deep into the features of the economy, as well as, the institutions of each country and the preferences and behaviours of economic agents. The assessment of some OCA properties has now become more articulated than ever before. We can now pretty much tell to what extent, and why, certain properties are shared, or not shared by partner countries.

When shocks occur in Europe, inter-regional migration, both within and between countries, is not substantial, particularly in the short run. Even worse, labour mobility has fallen in Europe with respect to the 1950s and 60s. Very importantly, integration is proceeding at a high pace between some bordering regions of different European countries. The most industrialised regions of France, Germany, Italy, Spain, and northern Europe in general, enjoy a high level of reciprocal trade in goods and services, and high factor market integration.

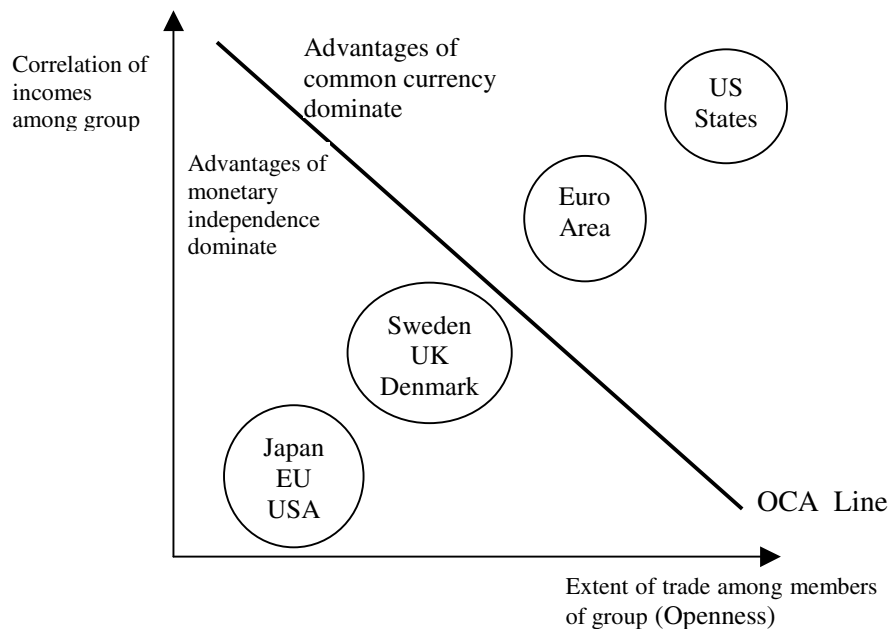
How do OCA properties rank for EMU after a discussion of the available broad-based empirical studies? Price and wage flexibility would be most crucial to cope with disturbances in the very short-term. Deeper financial integration might also play an increasingly important role in the adjustment to both short-term and long-term shocks, particularly if they are asymmetric (and to the extent that individuals protect themselves from regional fluctuations through geographic diversification of their investments and income (Atkeson and Bayoumi (1993)). Fiscal discipline plays an important role to allow some automatic stabilisation and permits national government to undertake some expenditure absorption policies if needed. While labour mobility could ease the adjustment to permanent shocks, EMU will not be able to significantly benefit from this attribute in the immediate future. Labour mobility is low across countries but also within most European countries. In any case, labour mobility is no panacea either as it entails high costs. Factor market integration can best cope with permanent shocks.

Due to the need for relatively long time series for the econometric tests, studies investigating OCA properties are by necessity backward looking. Such studies cannot reflect a change in policy preferences, or a switch in policy regime. In fact, monetary integration would represent a structural break for any group of countries adopting a new single currency. A question naturally arises: *what type of forces might monetary integration unleash?* Looking ahead, we may be confronted with two distinct paradigms -- specialisation versus endogeneity of OCA -- which have different implications on the benefits and costs from a single currency.

6. A Tale of Two Paradigms: Specialisation versus “Endogeneity of OCA”

Frankel (1999) singles out two OCA properties as crucial in assessing the net benefits from currency union: their degree of openness, i.e., the extent of reciprocal trade among a group of partner countries, and their correlation of incomes (capturing over time diverse other properties). Countries sharing a high level of either openness or income correlation, but preferably both properties, will find it beneficial to share a single currency as illustrated in Figure 2. Their trade-off is illustrated by the downward sloping “OCA line” that shows the combination of openness and correlation of incomes beyond which the advantages from a common currency would dominate for a group of partner countries. To the left of the OCA line instead the advantages from monetary independence dominate. The US States and the current members of the euro area (according to us) are located on the right of the OCA line: i.e., they draw net benefits from respectively the US dollar and the euro. Among a group formed by the US, Japan and Europe the advantages from monetary independence would instead dominate: these countries as a group lie instead on the left of the OCA line.

Figure 2. Two Key Optimum Currency Area Properties

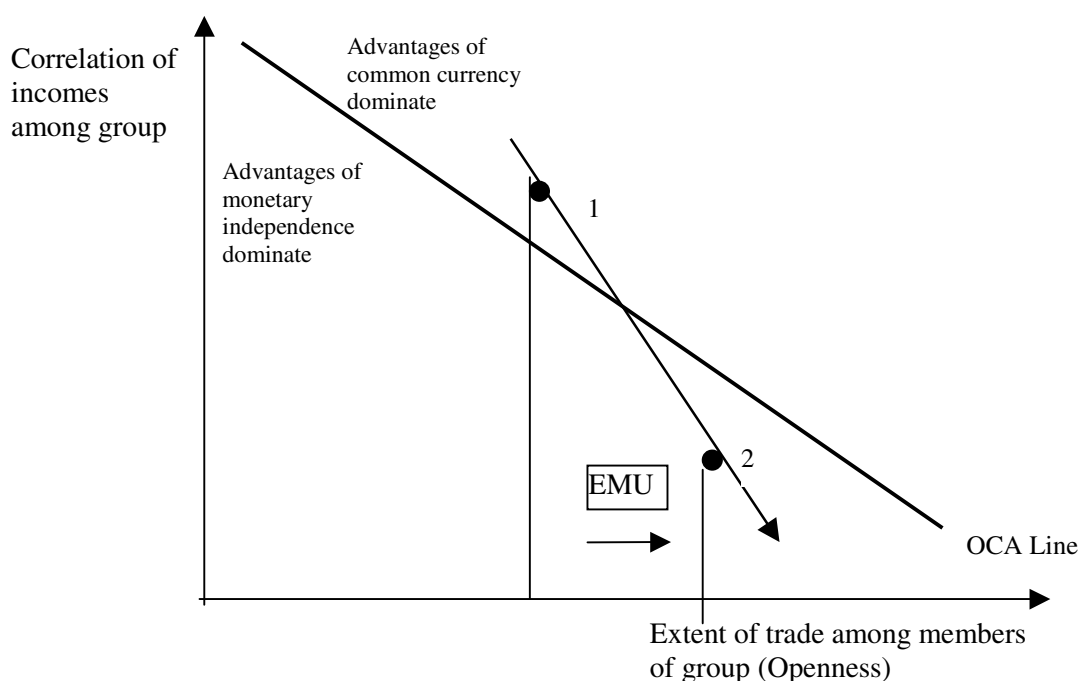


Frankel also notes that the optimum currency area properties evolve over time. Most authors agree that reciprocal trade and openness increase among countries sharing a single currency and a common monetary policy in response to a decline in transportation costs and a more stable exchange rate regime. A case in point are the members of the European Union that have removed all trade and financial barriers among each other and share a single market. Reciprocal trade has constantly risen among these countries. Statistical estimates using gravity model of bilateral trade suggest that membership in the EU increases trade with its members by over 60 percent (Frankel and Wei (1998)). There is disagreement though concerning the extent by which income correlation rises or falls following monetary

integration and the effective increase in reciprocal trade. Two opposite paradigms with different implications have been put forward.

The first paradigm is the “*Krugman specialisation hypothesis*” that is based upon the “Lessons of Massachusetts” i.e., the economic developments experienced by the US over the last century (Krugman (1993) and Krugman and Venables (1996)). This hypothesis is rooted in trade theory and increasing returns to scale as the single currency removes some obstacles to trade and encourages economies of scale.¹⁸ It postulates that as countries become more integrated (and their reciprocal openness rises) they will also specialise in the production of those goods and services for which they have a comparative advantage (see Bertola (1993), Rauch (1994), and Eichengreen and Bayoumi (1996)). Members of a currency area would become less diversified and more vulnerable to supply shocks. Correspondingly their incomes will become less correlated. Kalemli-Ozcan, Sørensen and Yosha (2001) provide empirical evidence that financial integration (risk sharing) enhances specialisation in production. An increase in integration would move a country away from the OCA line, e.g., from point 1 to point 2 (more openness and less correlation) in Figure 3. Frankel notes an apparent paradox of the argument that higher integration leads to increasing specialisation, that lowers diversification, and in turn makes countries worse currency area partners. If the crucial aspect is diversification then the problem may be solved by drawing larger OCA borders as larger geographical entities are more diversified. If instead a group of countries is not sufficiently diversified then these countries should not share a single currency and should instead break up into smaller currency units whose exchange rate floats against each other’s. But these smaller units will be even less diversified and will break up into yet smaller entities, and so on. This process of dissolution will continue until the world is down to the level of a fully specialised individual. Hence, Frankel concludes, the system is unstable and there exist no interior solution: a paradox as this is not what is observed in reality.

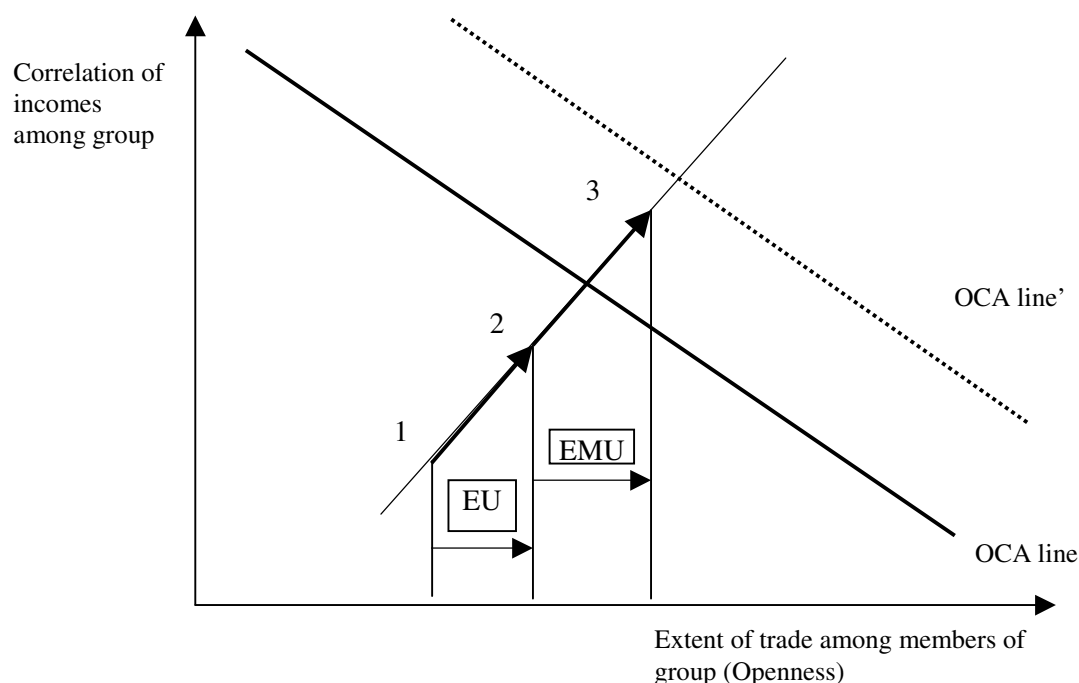
Figure 3. Specialisation Increases and Correlation of Incomes Falls



¹⁸ The literature on economic geography postulates a U-shaped relation between integration and concentration (Ricci (1999) and Wolfmayr-Schnitzer (1999)): very high and low trading costs favour dispersion of production. The introduction of the single currency will contribute to reduce trading costs both directly and indirectly: e.g., by removing exchange rate risks (and the cost of hedging) and cutting information costs. It will also speed up the implementation of the Single Market Programme, spur transparency and competition, lessen segmentation, and hence reduce transportation and transaction costs. Other trading costs (e.g., differences in languages and legal systems) will not be affected.

The second paradigm is the “*endogeneity of OCA*” hypothesis that postulates a positive link between income correlation and trade integration. The basic intuition behind this hypothesis is that monetary integration reduces trading costs beyond the elimination of the costs from exchange rate volatility. A common currency among partner countries is seen as “a much more serious and durable commitment” (McCallum (1995)). Amongst others, it precludes future competitive devaluation, facilitates foreign direct investment and the building of long-term relationships, and might over time encourage forms of political integration. This will in turn promote reciprocal trade, economic and financial integration and business cycle synchronisation among the countries sharing a single currency. This could result from the increasing propensity of partner countries to import from each other, from productivity shocks spilling over via trade, or the disciplining effect of a monetary or exchange rate arrangement. Frankel and Rose present the following example. They start postulating that there is a group of countries which is initially at point 1 in Figure 4. These countries are initially on the left of the OCA line. If these countries join together and form a “union,” such as the European Union (EU), both trade integration and income correlation within the group will rise: i.e., they will gradually move to point 2. If the same countries were to start a currency area -- e.g., EMU -- the degree of trade integration and income correlation within this group would rise even further and the group would subsequently find itself on the right of the OCA line. This point carries important implications. A country’s suitability for entry into a currency union may have to be reconsidered if satisfaction of OCA properties is endogenous or “countries which join EMU, no matter what their motivation may be, may satisfy OCA properties ex-post even if they do not ex-ante!” (Frankel and Rose 1997). Hence, one of the criteria for judging the suitability of countries for EMU is turned around.

Figure 4. A Country Joins the EU and then EMU and the “Endogeneity” of OCA Dominates



Let’s postulate two different scenarios. In the first scenario a group of countries envisaging monetary unification are fairly diversified and share similar shocks, are quite open, share similar preferences for low inflation, share high price and wage flexibility and labour mobility, and share some forms of fiscal integration along the lines discussed in Section 5. For this group of countries both income correlation and openness are very likely to increase further upon monetary unification. The OCA line is the continuous line in Figure 4 and net positive benefits can be expected from EMU. In the second scenario there is a different group of countries that scores poorly under the above OCA properties. For this

group of countries the OCA line may well be further to the left: i.e., the dotted line OCA line'. In this case this group should wait before monetary unification.

What does the empirical evidence tell us about specialisation and endogeneity of OCA?

Concerning the *specialisation* paradigm? Eichengreen (1996) compares the developments of 8 industrial sectors across Europe and the US States and reports an increase in specialisation in Europe and a fall in specialisation in the US. The EU Commission (1999) finds in its report on the competitiveness of European industries that there is evidence of rising specialisation but declining concentration. EU countries are becoming more specialised by focusing on the activities in which they are comparatively stronger, while industries are becoming less concentrated, i.e., more distributed across countries because the smaller countries (which tend to account for the smaller share in any particular industry) have grown more rapidly than the larger countries. Nevertheless the EU Commission (1999) notes the short time period of its study (1988-98) and the need to complement these preliminary findings by some further analysis. Furthermore, the above type of specialisation would apply to manufacturing, and the economic role of the latter is receding in every industrialised country due to a growing role of services that are less prone to specialisation.

The estimates of the trade gains from monetary integration -- i.e., the strength of the *endogeneity of OCA paradigm* -- shows large variations across studies. Rose (2000) finds a large positive effect of a currency union on international trade. By using a gravity model on a panel covering 186 countries during 1970-1990, Rose finds that countries sharing the same currency trade three times as much as they would with different currencies. Frankel and Rose (2000) extend the framework of Rose (2000) and use a panel covering 200 countries plus dependencies. Their main findings are that: currency union more than triples trade among partner countries. These findings are robust to the inclusion of linguistic, historical and political links. Rose and Van Wincoop (2001) postulate instead that EMU would spur intra euro area trade by more than 50%, a considerably smaller estimate. Recent research by Melitz (2001) and Persson (2001) argues for even lower estimates. The minimum point estimate from Persson is a 13 per cent increase in trade from currency unification with a preferred estimate of around 40 per cent. Melitz's estimates are higher.¹⁹ Alesina, Barro and Tenreyro (2002) apply a different methodology than the gravity models and find that currency unions are likely to increase comovements of prices and, perhaps, of output.

Hence, there are different views concerning the size of the possible trade gains following monetary unification. Whatever these estimates, the additional gains for European countries would be in any case very significant. It would have to be added to the trade deepening that has already occurred prior to EMU (bringing openness to around 40 percent of GDP). In fact, Fontagné and Freudenberg (1999) find that the elimination of exchange rate variability has fostered product differentiation in European trade: i.e., intra-industry trade is occurring more in horizontally differentiated goods (two-way trade in varieties) than in vertically differentiated goods (two-way trade in qualities).

Some observations on specialisation versus “endogeneity of OCA” paradigms

The “Krugman specialisation hypothesis” has a bearing on the costs from monetary integration. If countries become more specialised and vulnerable to asymmetric shocks, and their correlation of outputs declines, then each member country might feel a higher cost from

¹⁹ There are some qualifications. Commenting on Frankel and Rose, Quah (2000) notes that the partition in the sample is skewed against the hypotheses being tested: less than 1 % of the total sample is in the single-currency group. Hence, inferences are made on the basis of very few observations that are unrepresentative of most of the real-world economies. According to van Wincoop (2000) these results are exaggerated as they focus on trade flows from the viewpoint of the smaller economy.

the loss of the direct control over its nominal exchange rate and national monetary policy. However, at present the “core” of Europe seem not to be strengthening at the expense of the “periphery.” If we actually believe in the U-shaped relationship between integration and geographic concentration, the EU Commission (1999) report postulates that the future may be brighter for peripheral countries with the periphery catching up in several indicators (such as exports and research-intensive industries).

The findings of the endogeneity literature are quite significant and seemingly robust to various sensitivity analyses, and yet we know little about their causality. Frankel and Rose, as well as several other authors, including Rodrik (1994), Helpman and Elhanen (1988) and Bradford and Chekwin (1993) raise the issue of simultaneity between trade and growth, and argue that causality may run from investment to growth and then to exports, rather than the other way around. Frankel and Rose see this problem as largely an intractable one from the standpoint of the analytical framework adopted in their paper. *A relevant question at present is whether countries are in a currency union because they trade a lot, or start trading more because they form a currency union.*

We think that the “endogeneity of OCA” paradigm should be interpreted in a broader sense. Endogeneity is in fact associated with a large amount of progress under many OCA properties that are indispensable to sustain monetary unification. Such progress does not always seem linear and is often the “crowning” of previous stages. Hence, the endogeneity of OCA debate should not be confined to just trade integration and income correlation. For example, several authors -- including Artis and Zhang (1997 and 1998) and Buti and Suardi (2000) -- argue that the European process of economic and monetary integration has had a significant “*disciplining effect*” on participating countries which has gone together with an increasing business cycles synchronisation. The same has happened for inflation in countries with a poor track record in maintaining low inflation after “anchoring” themselves to low inflation countries. Issing (2001) flags the *endogeneity of political integration*, and Blanchard and Wolfers (2000) discuss the *endogeneity of labour market institutions*.

7. Some Concluding Remarks

This paper has provided an excursion in what we deem to be the four main phases of the OCA theory. In addition to the observations at the end of each section, we have the following remarks. 40 years have passed since the founding of the optimum currency area theory. Its basic pioneering intuitions were remarkably strong. In fact, we still discuss all OCA properties including price and wage flexibility, labour mobility, factor market and financial integration, similar inflation and shock, and economic openness and diversification.

Have all the theoretical and empirical advancements of the last 20 years rendered the OCA theory any simpler? Yes and no. There is still no simple OCA-test with a clear-cut scoring card although several authors have “operationalised” several OCA properties. On the one hand, we are in a *better position* now than ever before in many respects. All OCA properties can now be discussed in much greater detail. Studies of OCA properties have become very comprehensive and articulated. This permits to tell to what extent, and why, certain properties are shared, or not shared, by partner countries. On the other hand, we are in a somewhat *harder position* now because the response of agents to economic changes and the policy regime -- and EMU is a major change in regime -- is conditioned in a complex way by the environment in which they operate. We can gain some important insights by studying the OCA properties in great detail. But it is still difficult to weigh and reconcile all OCA properties: i.e., we might still face a problem of inconclusiveness or of inconsistency.

Several weaknesses of the analytical framework behind the “pioneering” OCA theory have now been amended. The balance of judgements seems to have shifted in favour of currency unions. Association to a currency union is now deemed to generate fewer costs in

terms of the loss of autonomy of domestic macroeconomic policies. There is now also more emphasis on the benefits of currency areas. Correspondingly monetary integration is likely to produce more net benefits for a larger group of countries scoring highly under most OCA properties: this may explain why the euro area now has more members than would have seemed possible 10-15 years ago.

A feature of most OCA studies is that they are mainly backward looking. Some authors believe instead that the OCA test could be satisfied *ex post* even if it is not fully satisfied *ex ante*: this is the “endogeneity of OCA” paradigm. The borders of new currency unions could be drawn larger in expectation that trade integration and income correlation will augment once a currency union is created. This paradigm is causing both excitement and scepticism. *On the one hand*, there is compelling empirical evidence that removing “borders” broadly intended as impediments to trade (as with the creation of a free trade zone, a custom union and a common market) and sharing a single currency (as national currencies also represent an impediment to trade) is a powerful magnet for deeper trade and integration. *On the other hand*, could any set of partner countries form a currency union and just wait for the deeper integration to occur almost automatically and thereby inevitably reap net benefits from a single currency? Is there a critical lower threshold in the mix of OCA properties beyond which the “endogeneity of OCA” types of effects could manifest themselves?

The European experience with integration started in the 1950s and shows that all OCA properties play a role as they interact. Removing “borders” and embracing deeper forms of monetary co-ordination -- that has now culminated with EMU -- has led, and is continuing to lead, to deeper economic and financial integration. For the group of countries now forming the euro area this has brought considerable benefits but has also required a long period, although some countries that joined the process later than the others caught up very rapidly with the rest. The progress did not always seem linear and several stages of European integration were often the “crowning” of previous stages. The euro area is now a good currency area by many accounts. However, this has required some time as the European experience shows that the heterogeneity of, amongst others, policy preferences, institutions and economic structures diminish only gradually.

According to some other authors, national specialisation may prevail in a currency union leading to a decline in diversification and in income correlation. This latter paradigm has also strong theoretical and empirical support. The forces behind both paradigms and their relative importance and effects need to be better understood. Do countries form currency unions because they trade a lot, or start trading more because they form a currency union? Could both the specialisation and endogeneity of OCA paradigms be reconciled?

The above discussion also shows that, over time, the emphasis has shifted from: (a) the OCA theory and the analysis and weighing of the diverse OCA properties, that are at times difficult to reconcile; (b) to a more varied analysis of the costs and benefits from association in a currency union, an approach that was brought out forcefully by the “One Market, One Money” report of the early 1990s and other contemporary contributions; and (c) now to the investigation of the effects of currency unions on specialisation as opposed to the deepening of trade links and output comovements, which is the “endogeneity of OCA” paradigm brought out in the “One Money, One Market” type of studies.

All in all, there has been a tremendous complementarity between the three approaches. The OCA theory has provided an underpinning for the latter two, but it cannot answer their questions completely. That because the “One Market, One Money” and “One Money, One Market” approaches deal also with the timing and the modalities of implementing a currency union once the political decision to create one has been taken. Hence, European integration has been a catalyst for new research and has clearly highlighted the great merits, but also the limitations, of the OCA theory.

Appendix 1. The Main Benefits and Costs Associated with a Currency Area²⁰

The OCA literature has examined both one-off and permanent benefits and costs from participating in a currency area. Most benefits and costs cannot be judged statically as they can take different profiles over time -- i.e., in the early stages of a currency area vis-à-vis when the new single currency can fully display its benefits both domestically and internationally. Most benefits and costs can also take a different profile across participating countries -- e.g., between small and large countries, or for countries with a track record of relatively high inflation in the past. Admittedly the perspective of these costs and benefits is “euro-centric.” We can classify the main benefits as follows:

Benefits from improvements in microeconomic efficiency result principally from the increased usefulness of money -- i.e., the liquidity services provided by a single currency circulating over a wider area -- as a unit of account, medium of exchange, standard for deferred payments, and store of value. The latter benefit is subject to a “network externality” i.e., the broader the circulation of a currency, the greater this benefits. There will be greater price transparency that will discourage price discrimination, decrease market segmentation, and foster competition. Intra-area nominal exchange rate uncertainty will disappear (and correspondingly intra-area exchange rate risk) leading to savings in transaction and hedging costs. The more concentrated trade is in a currency area, the greater the savings in transaction costs are likely to be (for a qualification see Fratianni and Von Hagen (1990)). This will strengthen the internal market for goods and services, foster trade, lower investment risks, and promote cross-area foreign direct investments (FDI) and enhance resource allocation.

Benefits from increased macroeconomic stability (and growth) resulting from: improved overall price stability, the access to broader and more transparent financial markets increasing the availability of external financing; reputational gains for those members with a history of higher inflation that benefit from an anti-inflationary anchor; the reduction of some types of fluctuations of output and employment across the currency area due, possibly, to different economic policies. However, the single currency does not safeguard the members of the currency area from the effects of real economic shocks.

Benefits from positive external effects resulting principally from: savings on transaction costs resulting from a wider international circulation of the single currency, revenues from international seignorage, the reduced need for foreign exchange reserves; and simplified international co-ordination.

We can classify the main costs as follows:

Costs from the deterioration in microeconomic efficiency. There are changeover costs from switching to a new currency. These costs include administrative, legal and hardware costs such as re-denominating contracts and adapting vending machines. There is also the psychological costs resulting from a new numéraire. With boundedly rational individuals such costs will fade out very slowly. Furthermore, if a country chooses the wrong nominal exchange rate parity at the onset of a currency area, this country may be too competitive or not competitive at all with respect to the other members. The imbalance in the

²⁰ An extensive examination of the benefits and costs of monetary integration is in the report “*One Market, One Money*” by Emerson, Gros, Italianer, Pisani-Ferry, and Reichenbach (1992) and in De Grauwe (2000). Several benefits and costs are discussed, amongst others, by Corden (1972, 1985 and 1993), Ishiyama (1975), Tower and Willet (1976), Tavlas (1993 and 1997), Masson and Taylor (1993), Artis (1991), Eichengreen (1990 a and b, and 1994), Buiters (2000), Portes (1993 and 2000), Mongelli (1996), Dowd and Greenaway (1993), Alogoskoufis and Portes (1990), Fratianni and von Hagen (1990), Allen (1976), Alesina and Barro (2002), Alesina, Barro and Tenreyro (2002), and Canzoneri, Vallés and Viñals (1996).

external accounts will likely persist until the structure of prices and wages, as well as the level of economic activity, adjusts to those prevailing in the other members. With the introduction of a single currency a supranational institution is needed. This will result in increased administrative costs for each member country that could be offset by a fall in size of some national institutions due to a redistribution, and sharing of functions. A neo-classical optimal public finance argument against relinquishing monetary sovereignty is that joining a monetary union prevents a national government from equalising the marginal cost from taxation and inflation (i.e., losing control over the “inflation tax”). But such a scheme may conflict with the price stability objective.

Costs from decreased macroeconomic stability. Membership in a currency area narrows the menu of policy instruments directly available to national governments. As the responsibility for setting monetary policy and exchange rates is transferred to a supranational central bank, no country can pursue some real adjustment in the wake of asymmetric disturbances (and if its prices and wages are downward sticky). Furthermore, when a member country exhibits higher nominal price and wage rigidities than the other partner countries in the currency union, the lower inflation rate in the area can increase its frictional unemployment (until its nominal rigidities are reduced by means of structural reforms). This may eventually lead to more pronounced short-term output and employment fluctuations in the “rigid countries.” Direct control of part of the foreign exchange reserves and other assets is also transferred to the supranational central bank. National governments also forsake the option of “inflating away” their national debt in the future. In addition, common fiscal restraints (as is the case with the Stability and Growth Pact and its Excessive Deficit Procedure) may be superimposed to reduce the ability of national governments to conduct possibly unsustainable national fiscal policies. These restraints may be relatively more binding for countries with relatively higher public debt and/or high budget deficits. In addition, the EMU will lack a supranational risk sharing arrangement that may assist its members in coping with asymmetric economic shocks. National governments also lose the option of “inflating away” their national debt. Any future “gradual default” by means of unanticipated inflation during exceptional times is also precluded.

Costs from negative external effects. If one, or more, member countries were to run sizeable and protracted budget deficits, accumulating an unsustainable public debt, eventually some pecuniary externalities might ripple through the currency area. For example, the fear could rise that such debt might have to be monetised. This might pose a strain on the interest rate of the currency union. International confidence in the single currency may even plummet. Every member country would suffer in this scenario, particularly those that previously had stable currencies.

References

- Akerlof, G., W. Dickens, and G. Perry (2000), "Near-Rational Wage and Price Setting and the Long Run Phillips Curve," *Brookings Paper on Economic Activity*, Vol. 1, pp. 1-60.
- Alberola, E. and T. Tyrväinen (1998), "Is There Scope for Inflation Differentials in EMU?" An Empirical Evaluation of the Balassa-Samuelson Model in EMU Countries", Bank of Finland, Discussion Paper No. 15.
- Alesina, Alberto and Robert J. Barro (September 2000), "Currency Unions", NBER, Working Paper Series no. 7927.
- and Silvana Tenreyro (2002), "Optimal Currency Area," Harvard University, mimeo.
- , Spolaore and Wacziarg (2000), "Economic Integration and Political Disintegration," forthcoming in *American Economic Review*.
- , I. Angleoni and F. Etro (2001) "The Political Economy of International Unions," NBER Working Paper 8645, December.
- Allen, P. R. (1976), "Organization and Administration of a Monetary Union," *International Finance Section*, No. 38. Princeton, New Jersey: Department of Economics, Princeton University.
- Alogoskoufis, G., and Richard Portes (June 1990), "International Costs and Benefits from EMU," NBER Working Paper No. 3384. Cambridge, Mass.: National Bureau of Economic Research.
- Amiti, M. (1998), "Inter-Industry Trade in Manufactures: Does Country Size Matter?," Journal of International Economics, Vol. 44, pp. 231-255.
- Anderson, J. and E. van Wincoop (2001a), "Gravity with Gravitas: a Solution to the Border Puzzle," NBER WP 8079, January.
- (2001b), "Borders, Trade and Welfare," NBER WP 8515, October.
- Anderton, Robert, and Frauke Skudelny (2001), "The Impact of Extra- and Intra-Area Exchange Rate Volatility on Euro Area Imports," *European central Bank*, Working Paper Series, No. 64, May.
- Angeloni I., A., Kashyap, B., Mojon, and D. Terlizzese (2001) "Monetary Transmission in the Euro Area: where do we stand?" ECB working paper no. 114. Prepared for the Conference: Monetary Policy Transmission in the Euro Area, ECB, Frankfurt am Main, 18-19 December 2001.
- Arreaza, A. (1998), "Consumption Smoothing, Capital Flows and Fiscal Policy in Latin American Countries", (mimeo), Central Bank of Venezuela.
- Artis, M. J. (1991), "One Market, One Money: An Evaluation of the Potential Benefits and Costs of Forming an Economic and Monetary Union", Open Economies Review 2, pp. 315-321.
- , and W. Zhang (1998), "The Linkage of Interest Rates within the EMS" Weltwirtschaftliche Archiv, vol. 132(1), pp. 117-132.
- , (1997), "International Business Cycles and the ERM: Is There a European Business Cycle?" International Journal of Finance and Economics, Vol. 2, pp. 1-16.

- Artis and Buti (2000) "Close-to-Balance or in Surplus: a Policy-Maker's Guide to the Implementation of the Stability and Growth Pact," Journal of Common Market Studies, Vol. 38(4), November, pp. 563-92.
- Atkeson, A., and Tamim Bayoumi (1993), "Do Private Capital Markets Insure Regional Risks? Evidence from the United States and Europe." Open Economies Review, 4, pp. 303-324.
- Ayuso, J., and R. Blanco (1999), "Has financial market integration increased during the nineties?" Banco de España, documento de trabajo no. 9923.
- Backus, D., Kehoe, P. and Kydland, F. (1992), "International Real Business Cycles", Journal of Political Economy 100, pp745-775.
- Barro, R., and D.B. Gordon (1983) "Rules, Discretion and Reputation in a Model of Monetary Policy," Journal of Monetary Economics, 12, pp. 101-21.
- Bayomi, T. and Barry Eichengreen (1997), "Ever Closer to Heaven? An Optimum-Currency-Area Index for European Countries", European Economic Review 41, 761-770.
- , (1993), "Shocking Aspects of European Monetary Integration", in Torres, F. and Giavazzi, F. (eds.), Adjustment and Growth in the European Monetary Union, Cambridge University Press, New York
- , (1993), "Fiscal Flows in the United States and Canada. Lessons for Monetary Union in Europe", European Economic Review, Vol. 39, No. 2.
- Bayoumi T., and B. Eichengreen (1994) "Economic Performance under Alternative Exchange Rate Regimes: Some Historical Evidence," in The international monetary system, Bayoumi, T., Eichengreen, B., Kenen, P., Papadia, F., and Saccomanni, Fabrizio (eds), Cambridge University Press, Cambridge, pp.257-97.
- , (1996), "Operationalising the Theory of Optimum Currency Areas," paper presented at the CEPR's conference on Regional Integration in La Coruna, Spain.
- , and M. Klein (1997), "A Provincial View of Economic Integration," IMF Staff Papers, 44 (4), December: 534-556.
- Beck, G. and A. Weber (2001), "How Wide are European Borders? New Evidence on the Integration Effects of Monetary Unions", work done in the context of the CEPR Research and Training Network, The Analysis of International Capital Markets: Understanding Europe's Role in the Global Economy.Mimeo, University of Frankfurt.
- Bentolilla Samuel (1997) "Sticky Labor in Spanish Regions," European Economic Review, Vol. 41(3-5), April, pp. 591-98.
- Bertola Giuseppe (1993), "Models of Economic Integration and Localized Growth" in Adjustment and Growth in the European Monetary Union, (eds) Francisco Torres and Francesco Giavazzi, Cambridge University Press.
- (2000) "Labor Markets in the European Union," Ifo-Studien; 46(1), pp. 99-122.
- Bini-Smaghi, L. and Silvia Vori (1992), "Rating the EC As an Optimal Currency Area: Is It Worse Than The US?," Mimeo. Roma: Banca d'Italia.

- , and Claudio Casini (2000), "Monetary and Fiscal Policy Co-operation: Institutions and Procedures in EMU," forthcoming in Journal of Common Market Studies.
- Blanchard, O. (1999), "European unemployment: the role of shocks and institutions" Baffi Lecture, Banca d'Italia, Rome.
- , and D. Quah (1989), "Dynamic Effects of Aggregate Demand and Supply Disturbances", American Economic Review 79, pp.655-673
- , and L. F. Katz (1992), "Regional Evolutions" Brookings Papers on Economic Activity, Washington D.C.
- , and Justin Wolfers (2000), "The role of shocks and institutions in the rise of European unemployment: The aggregate evidence", The Economic Journal, March, pp. C1-33.
- Boeri, T., A. Börsch-Supan and G. Tabellini (2001), "Would you Like to Shrink the Welfare State? The Opinion of European Citizens," forthcoming in Economic Policy.
- Boltho A. (1990), "Why has Europe not Co-Ordinated its Fiscal Policies?" International Review of Applied Economics, Vol. 4(2), June, p. 166-181.
- Boone, L. (1997), "Symmetry and Asymmetry of Supply and Demand Shocks in the European Union: A Dynamic Analysis", Document de travail CPII, pp. 97-03.
- Bordo, M., B. Eichengreen and J. Kim (1998), "Was there really an earlier period of international financial integration comparable to today?", NBER working paper no. 6738, September.
- Branson, W. (1990), "Financial Market Integration and Monetary Policy in 1992," Centre for Economic Policy Research Discussion Paper: 385, March.
- Braunerhjelm, P., Riccardo Faini, Victor Norman, Frances Ruane and Paul Seabright (February 2000), "Integration and the Regions of Europe: How the Right Policies can Prevent Polarization", Monitoring European Integration 10, CEPR.
- Bruno M. and J. Sachs (1985) Economics of Worldwide Stagflation, Basil Blackwell, Oxford, U.K.
- Buiter, Willem H. (2000), "Optimal Currency Areas: Why Does the Exchange Rate Regime Matter", Centre for Economic Policy research (CEPR), Discussion Paper Series No. 2366.
- , (1999) "Alice in Euroland," Journal of Common Market Studies, Vol. 37(2), June, pp. 181-209.
- Buti, M., and Suardi Massimo (March 2000), "Cyclical Convergence or Differentiation?", Revue de la Banque/Bank- en Financiewezen.
- , D. Franco. and H. Ongena (1998), "Fiscal discipline and flexibility in EMU: the implementation of the Stability and Growth Pact", Oxford Review of Economic Policy, Vol. 14.3
- , and Andre Sapir (eds.) (1998), Economic Policy in EMU: A Study by the European Commission Services, Oxford University Press.
- Cadiou, L, Stéphanie Guichard, and Mathilde Maurel (2001) Labour market asymmetries and EMU, CEPII, Paris, Mimeo

- Calmfors, L. and Driffil, J. (1988) "Bargaining Structure, Corporatism and Macroeconomic Performance," *Economic Policy*, Vol. 6, pp. 13-61.
- Calvo Guillermo and Carmen Reinhart (2000) "Fear Of Floating," University of Maryland, mimeo.
- Canzoneri, Matthew, Javier Vallés, and José Viñals (1996) "Do Exchange Rate Move to Address International Macroeconomic Imbalances?" CEPR Discussion Paper no. 1498, October.
- Caves, Richard E., Jeffrey A. Frankel, Ronald W. Jones (2001) *World Trade and Payments: an Introduction*, 9th Edition; Reading, MA, US, Addison-Wesley
- Cecchetti, S. G. (2001), "Legal Structure, Financial Structure and the Monetary Policy - Transmission Mechanism" *The Monetary Transmission Process, Recent Developments and Lessons for Europe*, edited by the Deutsche Bundesbank.
- Chen, Z., and P. Knez (1995), "Measurement of market integration and arbitrage", *Review of financial studies*, vol. 8, no. 2, pp. 287-325.
- Clements, B, Kontolemis, Z, and Levy, J. (2001) "Monetary Policy Under EMU: Differences in the Transmission Mechanism?" IMF WP/2001/102.
- Cohen, Benjamin (1993), "Beyond EMU: The Problem of Sustainability", *Economic and Politics*, 5, pp. 187-202.
- Cohen, Daniel, and Charles Wyplosz (1989), "The European Monetary Union: An Agnostic Evaluation," CEPR Discussion Paper, No. 4306. London.
- , (1989), "The European Monetary Union: An Agnostic Evaluation", *CEPR Discussion Paper*, No. 306.
- Corden, W. M. (1972), "Monetary Integration, Essays in International Finance," *International Finance Section No. 93*, Princeton University, Department of Economics.
- , (1985), *Inflation, Exchange Rates, and the World Economy: Lectures on International Monetary Economics*, 3rd ed. Oxford: Clarendon.
- , (1993), "The Theory of Monetary Integration Revisited," *Greek Economic Review*, Vol. 15, No. 1 pp. 15-30.
- Crucini, M.J. (1999), "On International and national Dimensions of Risk Sharing," *Review of Economics and Statistics*, LXXXI, 1, February, 73-84.
- De Bandt, O., and Francesco Paolo Mongelli (May 2000), "Convergence of Fiscal Policies in the Euro Area", ECB Working Paper No. 20.
- De Bondt, Gabe J. (2000), *Financial Structure and Monetary Transmission in Europe: a Cross-Country Study*, Edward Elgar, Cheltenham, UK.
- Decressin, J and A.Fatás ((1995) *Regional Labour Market Dynamics in Europe*,: European Economic Review.
- De Grauwe, Paul (2000), "*Economics of Monetary Union*", Oxford University Press, Fourth Edition.

- (1993), "Is Europe an Optimum Currency Area? Evidence from Regional Data", in Masson, P. and Taylor, M. (eds.), Policy Issues in the Operation of Currency Unions, Cambridge University Press, New York.
- , (1994), The Economics of Monetary Integration. Oxford University Press, Oxford.
- Delors Report (1989), (Committee for the Study of Economic and Monetary Union). Report on Economic and Monetary Union in the European Community. Luxembourg: Office for Official Publications of the EC.
- Demertzis, M., A. Hughes, and O. Rummel (2000), "Is the European Union a Natural Currency Area, or is it Held Together by Policy Makers?" *Weltwirtschaftliches Archiv*, Vol. 136 (4), pp. 657-79.
- Deutsche Bundesbank (2001) The Monetary Transmission Process: Recent Developments and Lessons for Europe, Palgrave Publishers, Chippenham, Wiltshire, U.K.
- Dornbusch, R., C. Favero and F. Giavazzi (1998) "A Red Letter Day?" Centre for Economic Policy Research, Discussion Paper: 1804, February.
- Dowd K. and D. Greenaway (1993) "Currency Competition, Network Externalities and Switching Costs: Towards an Alternative View of Optimum Currency Areas," *Economic-Journal*, Vol. 103 (420), September, pp. 1180-89.
- Eichengreen, Barry (1990a), "One Money for Europe? Lessons from The U. S. Currency Union," Economic Policy: a European Forum, Vol. 5, No. 1 pp. 118-187, April.
- (1990b), "Is Europe an Optimum Currency Area?" CEPR Discussion Paper No. 478.
- , (1994), "Fiscal Policy and EMU." In Eichengreen Barry, and Jeffrey Frieden (eds.) The Political Economy of European Monetary Unification. Boulder, Colorado: Westview Press.
- , Barry, (1997) European Monetary Unification: Theory, Practice, and Analysis, The MIT Press, Cambridge Mass.
- , (1996) Globalizing Capital: a History of the International Monetary System, Princeton University Press, Princeton.
- , and Jeffrey Frieden J. (eds.) (1994b), The Political Economy of European Monetary Unification. Boulder, Colorado: Westview Press.
- , and Charles Wyplosz (1998), "The Stability Pact: More than a Minor Nuisance?" in Economic Policy Vol 26, pp. 65-113.
- Emerson, M., D. Gros, A. Italianer, J. Pisani-Ferry and H. Reichenbach (1992), One Market, One Money: An Evaluation of the Potential Benefits and Costs of Forming an Economic and Monetary Union, Oxford; New York; Toronto and Melbourne Oxford University Press, p. 354.
- , Michel Aujean, Michel Catinat, Philippe Goybet, and Alexis Jacquemin (1988), The Economics of 1992: The EC Commission's Assessment of the Economic Effects of Completing the Internal Market. New York: Oxford University Press.
- Engel, Charles and John, Rogers (1996), How Wide is the Border? *American Economic Review*, 86 (5): 1113-1125.

- European Central Bank (1999), "Possible effect of EMU on the EU banking systems in the medium to long term", ECB, February 1999 issue.
- European Central Bank (1999), "Inflation Differentials in a Monetary Union," European Central Bank, Frankfurt Germany, Monthly Bulletin, October.
- (2000a), "Monetary policy transmission in the euro area", ECB Monthly Bulletin, July 2000 issue.
- (2001a), The Monetary Policy of the ECB, European Central Bank, Frankfurt.
- (2001b), "Euro Money Market," July 2001
- European Economy (1991) The Economics of EMU, Background Studies for European Economy No. 44 "One Market, One Money,"
- EU Commission (1999), "The Competition of European Industry", 1999 Report, Bruxelles.
- Fatas, A. (1997), "EMU: Countries or Regions? Lessons from the EMS Experience", European Economic Review, Vol. 41, No. 3-5.
- Fidrmuc Jarko (2001) "The Endogeneity of Optimum Currency Area Criteria, Intraindustry Trade and EMU Enlargement," Bank of Finland, Discussion Paper No.8.
- Fleming, J. Marcus., (1971) "On Exchange Rate Unification," The Economic Journal, Vol. 81, pp. 467-88.
- Fontagne L., and M. Freudenberg (1999) "Endogenous Symmetry of Shocks in a Monetary Union," Open Economies Review, Vol. 10 no.3, July, pp. 263-87.
- Forni, M., and L. Reichlin (1997), "National Policies and Local Economies: Europe and the United States", CEPR Discussion Paper, No. 1632.
- , (1999), "Risk and Potential Insurance in Europe", European Economic Review 43, pp. 1237-1256.
- Frankel, J. A. (August 1999), "No Single Currency Regime is Right for All Countries or at All Times", Essays in International Finance, Princeton University.
- , and S-J. Wei (1998), "Trade Blocs and Currency Blocs" NBER Working Paper No. 4335, published in G. de la Dehaza et al. (eds), The Monetary Future of Europe, CEPR, London.
- , and Andrew K. Rose (2000), "An Estimate of the Effects of Currency Unions on Trade and Growth", Rose's web site. First Draft May 1; revised June 10, 2000.
- (1997) "The Endogeneity of the Optimum Currency Area Criteria", Centre for Economic Policy Research, Discussion Paper Series No. 1473.
- , and David Romer (1999), "Does Trade Cause Growth?", American Economic Review, 89(3), pp. 379-399.
- Fratianni, M., and Jurgen Von Hagen (1993), "On the Road to EMU," in M. Baldassarri and R. Mundell (eds) Building a New Europe. Volume 1. The Single Market and Monetary Unification. New York, St. Martin's Press.

- , (1990a), "The European Monetary System Ten Years After", Carnegie-Rochester Conference Series on Public Policy 32, pp. 173-241.
- , (1990b), "Public Choice Aspects of European Monetary Unification," Discussion Paper, No. 33, Indiana Center for Global Business, Indiana University.
- , (1992), "The European Monetary System and European Monetary Union, Boulder, Colorado: West New Press.
- Friedman M. (1953), Essays in Positive Economics, University of Chicago Press.
- Funke, M. (2000), "Macroeconomic Shocks in Euroland versus the UK: Supply, Demand, or Nominal?" Hamburg University, mimeo.
- Gaspar, Vitor , G. Perez-Quiros and Jorge Sicilia (2001), "The ECB Monetary Policy Strategy and the Money Market," ECB Working Paper 69, July.
- , F.P. Mongelli (2001), "Monetary Unification and the Single Market," ECB, mimeo.
- Gandolfo, G. (1992), "Monetary Unions" in The New Palgrave Dictionary of Money and Finance 2, P. Newman, M. Milgate and J. Eatwell (eds.), (London, Macmillan), pp. 765-770.
- Giavazzi Francesco and Alberto Giovannini (1989) Limiting Exchange Rate Flexibility: the European Monetary System, The MIT Press, Cambridge, Massachusetts.
- Goodhart, C.A.E. (1989), "Money, Information and Uncertainty", Cambridge, Mass.: MIT Press.
- Groschen, Erica L. and Mark E. Schweitzer (2000), "The Effects of Inflation on Wage Adjustments in Firm-Level Data: Grease or Sand?," ECB Labour Market Workshop, December 2000.
- Haberler, Gottfried (1970) "The International Monetary System: Some recent Developments and Discussions," in Approaches to Greater Flexibility in Exchange Rates, edited by George Halm, Princeton University Press, pp. 115-23.
- Hasker, J., and Holger Wolf (1999), "Why Does the "Law of One Price" Fail? A Case Study," Centre for Economic Policy research (CEPR), Discussion Paper no. 2187, July.
- Helliwell, J.F. (1998), "How Much Do National Borders Matter?", Brookings, WashingtonD.C.
- Helpman, and Elhanen (1988), "Growth, Technological Progress, and Trade" National Bureau of Economic Research Reprint no. 1145.
- Ingram, J.C. (April 1973), "The Case for the European Monetary Integration." Princeton University, Essays in International Finance, No. 98.
- , (1962), "Regional Payments Mechanisms: The Case of Puerto Rico University of North Carolina Press
- International Monetary Fund (1999), Annexes to Autumn 1999 World Economic Outlook, Washington, D.C. USA.
- Ishiyama, I. (1975), "The Theory of Optimum Currency Areas: A Survey" Staff Papers, International Monetary Fund, 22, 344-383
- Issing, Otmar (2000), "The Globalisation of Financial Markets" European Central Bank, www.ecb.int.

- , (2001), "Economic and Monetary Union in Europe: political priority versus economic integration?" Paper for the Conference 2001 of the European Society for the History of Economic Thought, February 2001.
- , V. Gaspar, I. Angeloni, and O. Tristani (2001) Monetary Policy in the Euro Area, Strategy and Decision-Making at the European Central Bank, Cambridge University Press.
- Kalemli-Ozcan, S., Sørensen, B. E. and Yosha, O. (2001), "Economic Integration, Industrial Specialization, and the Asymmetry of Macroeconomic Fluctuations," Journal of International Economics (October).
- Kawai, M. (1987), "Optimum Currency Areas." In The New Palgrave: A Dictionary of Economics. New York: Stockton Press.
- Kenen, Peter B. (1969), "The Optimum Currency Area: An Eclectic View", In Mundell and Swoboda, (eds.), Monetary Problems of the International Economy, Chicago: University of Chicago Press.
- Kieler, M. and Tuomas Saarenheimo (1998), "Differences in Monetary Policy Transmission? A Case not Closed" European Commission Economic Review, 81, 819-40.
- Krugman, P. (1991), "Increasing Returns and Economic Geography." Journal of Political Economy, Vol. 99, No. 3, pp. 483-499.
- , (1993), "Lessons of Massachusetts for EMU." In Francisco Torres, and Francesco Giavazzi (eds.) Adjustment and Growth in the European Monetary Union, pp. 241-269.
- , and M. Obstfeld (2000), "International Economics, Theory and Policy" fifth edition.
- , and Anthony J. Venables (1996), "Integration, Specialization, and Adjustment", European Economic Review, Vol. 40 pp. 959-967.
- Kydland, F.E. and E.C. Prescott (1977) "Rules Rather than Discretion: the Inconsistency of Optimal Plans," Journal of Political Economy, 85, pp. 473-91.
- Leonard Mark (1999), "Network Europe: the New Case for Europe," The Foreign Policy Centre, London.
- Liebermann, J. (1999) "Channels of Risk Sharing in the European Union," MA Thesis, ECARE, Brussels.
- Maes Ivo (2000) "Economic Thought and the Making of the European Economic Community," National Bank of Belgium, Mimeo, September
- Masson, P. R., and Mark P. Taylor (1993), "Policy Issues in the Operation of Currency Unions", Cambridge University Press.
- McCallum, J. (1995), "National Borders Matter: Canada – US Regional Trade Patterns", American Economic Review, 85(3), 615-623.
- McKinnon, Ronald I. (September 1963), "Optimum Currency Areas." American Economic Review, Vol. 52 pp. 717-725.
- , (1993), "Common Monetary Standard or a Common Currency"? Rivista di Politica Economica, Vol. 83, pp. 151-59.

- , (2001) "Optimum Currency Areas Revisited," Stanford University, mimeo.
- Meade, J.E., (1957) "The Balance of Payments Problems of a European Free Trade Area," The Economic Journal, Vol. 67, pp. 379-96.
- Méltiz, J. (1996), "The Theory of Optimum Currency Areas, Trade and Adjustment and Trade", Open Economies Review 7(2), 99-116.
- (2001), "Geography, Trade and Currency Union," CEPR Discussion Paper 2987.
- Méltiz, J. and Zumer, F., "Interregional and International Risk Sharing and Lessons for EMU", EUI Working Papers, RSC No 2000/2, European University Institute, San Domenico, Italy (2000).
- Meltzer, A.H. (2001), "The transmission process", The Monetary Transmission Process, Recent Developments and Lessons for Europe, edited by the Deutsche Bundesbank.
- Mintz, N. N. (April 1970), "Monetary Union and Economic Integration", The Bulletin, New York University.
- Mongelli, F. P. (1996), "I Benefici ed i Costi della Partecipazione nell'EMU: una Estensione" [Benefits and Costs of Participating in EMU: An Extension], Rivista di Politica Economica, Vol. 2.
- Mundell, Robert A. (1961), "A Theory of Optimum Currency Areas." American Economic Review, Vol. 51, pp. 657-665.
- , (1973) "Uncommon Arguments for Common Currencies", in H.G. Johnson and A.K. Swoboda, The Economics of Common Currencies, Allen and Unwin, pp.114-32.
- Nickell, S (1997), "Unemployment and labour market rigidities: Europe versus North America", Journal of Economic Perspectives, vol. 11(3), pp. 55-74
- Nickell, S. and Layard, R. (1998), "Labour market institutions and economic performance", CEP Discussion Paper 407 (forthcoming, Handbook of Labor Economics).
- Obstfeld, M. (1994), "International capital mobility in the 1990s", CEPR discussion paper no. 902.
- , (1994a), "Risk Taking, Global Diversification, and Growth", American Economic Review 84, pp1310-1329.
- , and Giovanni Peri (1998) "Regional Non-Adjustment and Fiscal Policy," Economic Policy, Vol. 26 pp. 205-260.
- Obstfeld M., and Kenneth Rogoff (2000), "Do We Really Need a New International Monetary Compact", NBER, Working Paper Series no. 7864, August.
- OECD (1994 and subsequent years) "Employment Outlook", Organisation for Economic Co-operation and development, Paris, France.
- , (1999) "EMU: Facts, Challenges and Policies", Organisation for Economic Co-operation and development, Paris, France.
- , (2000) "Emu One Year On," Organisation for Economic Co-operation and development, Paris, France.

- Padoa-Schioppa, Tommaso (1990), "Financial and Monetary Integration in Europe: 1990, 1992 and Beyond," Occasional Paper, No. 28. Washington, D.C.: Group of Thirty.
- , (2000), "The European Union and the Nation State," The Hume Lecture 2000, Hume Occasional Paper no. 58.
- Peersman, G. and F. Smets (2001), "The monetary transmission mechanism in the euro area: more evidence from VAR analysis", mimeo, ECB.
- Persson T. (2001), "Currency Unions and Trade: How Large is the Treatment Effect?" Economic Policy, October.
- Persson T., and G. Tabellini (1995), "Double-Edged Incentives: Institutions and Policy Coordination," in Grossman G., and Rogoff K. (eds) Handbook of International Economics Vol. III, Amsterdam, New Holland.
- , (2000), Political Economics: Explaining Economic Policy, The MIT Press, Cambridge, Massachusetts).
- Portes Richard (2001) "The Euro and the International Financial System," paper presented at the Royal Economic Society Annual Conference, University of Durham, April 9-11.
- Quah Dennis (2000) "One Money, One Market: The Effect of Common Currencies," Economic Policy, Vol.30, April, pp. 35-38.
- Rauch J. (1994), "Bureaucracy, Infrastructure, and Economic Growth: Evidence from U.S. Cities During the Progressive Era," National Bureau of Economic Research, WP series no. 4973.
- Ricci, L.A. (1999), "Economic Geography and Comparative Advantage: Agglomeration versus Specialization", European Economic Review, Vol 43 pp. 357-377.
- Robson. P (1987) The Economics of International Integration, London, Allen and Unwin.
- Rodrik, D. (1994b), "Getting Interventions Rights: How South Korea and Taiwan Grew Rich", 20th Panel Meeting of Economic Policy; NBER Working Paper No. 4964.
- Rogoff Kenneth (1996), "The Purchasing Power Parity Puzzle," The Journal of Economic Literature, Vol. 34 no.2, pp. 647-668.
- Rose Andrew (2000) "One Money, One Market: Estimating the Effect of Common Currencies on Trade," Economic Policy, vol. 30, pp. 9-45.
- , and Charles Engel (2001), "Currency Unions and International Integration," CEPR DP 2659, January.
- , and van Wincoop (2001), National Money as a barrier to trade: the real case for currency union, American Economic Review (Papers and Proceedings), 91:2, May, 386-390.
- Sachs, J., and Xavier Sala-i-Martin (1991), "Fiscal Federalism and Optimum Currency Areas: Evidence for Europe from the United States," NBER Working Paper, No. 3855. Cambridge, Mass.: National Bureau of Economic Research, October.
- Salvatore, D. (2000), "International Economics" 7th Edition, John Wiley & Sons.

- Simon Hix (1998) The Political System of the European Union, The European Union Series, Macmillan, Hampshire, U.K.
- Smets Jan, Ivo Maes and Jan Michielsen (2000) "EMU from an Historical Perspective," in The Economic and Business Consequences of the EMU, Voghe H., et al (eds), Kluwer, Boston.
- Swann, D., The Economics of Europe: from Common Market to European Union, Penguin Books, Harmondsworth, Middlesex (1970, 9th edition 2000).
- Sørensen, B. E. and Yosha, O. (2000), "Is Risk Sharing in the United States a Regional Phenomenon?", Federal Reserve Bank of Kansas City Economic Review 85, pp33-47.
- Tavlas, G. S. (1993), "The 'New' Theory of Optimum Currency Areas", The World Economy, pp 663-685.
- (1994), "The Theory of Monetary Integration," Open Economies Review, Vol. 5 no. 2, pp 211-230.
- (1997), "International Use of the US Dollar," The World Economy, Vol. 20 No.6 pp 709-47.
- Tesar, Linda. (1995), "Evaluating the Gains from International Risk Sharing", Carnegie-Rochester Conference Series on Public Policy 42, pp95-143.
- and Werner, I. (1995), "Home Bias and High Turnover", Journal of International Money and Finance 14, pp467-492.
- Thomas, A. (1993), "Saving, Investment, and the Regional Current Account: An Analysis of Canadian, British, and German Regions," IMF Working Paper, WP/93/62. Washington, D.C.: International Monetary Fund, August.
- Tower, E., and Thomas Willet (1976), "The Theory of Optimum Currency Areas and Exchange Rate Flexibility," International Finance Section, No. 11, Princeton University.
- Vantoor, W. F. V. (1999), A Chronological History of the European Union, 1946-1998, Edward Elgar, Cheltenham.
- Vaubel, R. (1978), "Real Exchange Rate Changes in the European Community. A New Approach to the Determination of Optimum Currency Areas", Journal of International Economies 8, 319-339.
- Viñals, J., and J. F. Jimeno (1996), "Monetary Union and European Unemployment, Banco de Espana, Working Paper, No. 9624.
- Von Hagen, J. (March 1991a), "Fiscal Arrangements in a Monetary Union: Evidence from the US," Indiana University Discussion Paper, No. 58.
- , and Michele Fratianni (1994), "The Transition to European Monetary Union and the European Monetary Institute." In Eichengreen Barry, and Jeffrey Frieden (eds.). The Political Economy of European Monetary Unification. Boulder, Colorado: Westview Press.
- Wolfmayr-Schnitzer, Y. (1999), "Economic Integration, Specialisation and the Location of Industries: A Survey of the Theoretical Literature", Mimeo, EU Commission.
- Wyplosz, C. (January 1991), "Monetary Union and Fiscal Policy Discipline," CEPR Discussion Paper, No. 488, London: Centre for Economic Policy Research.

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