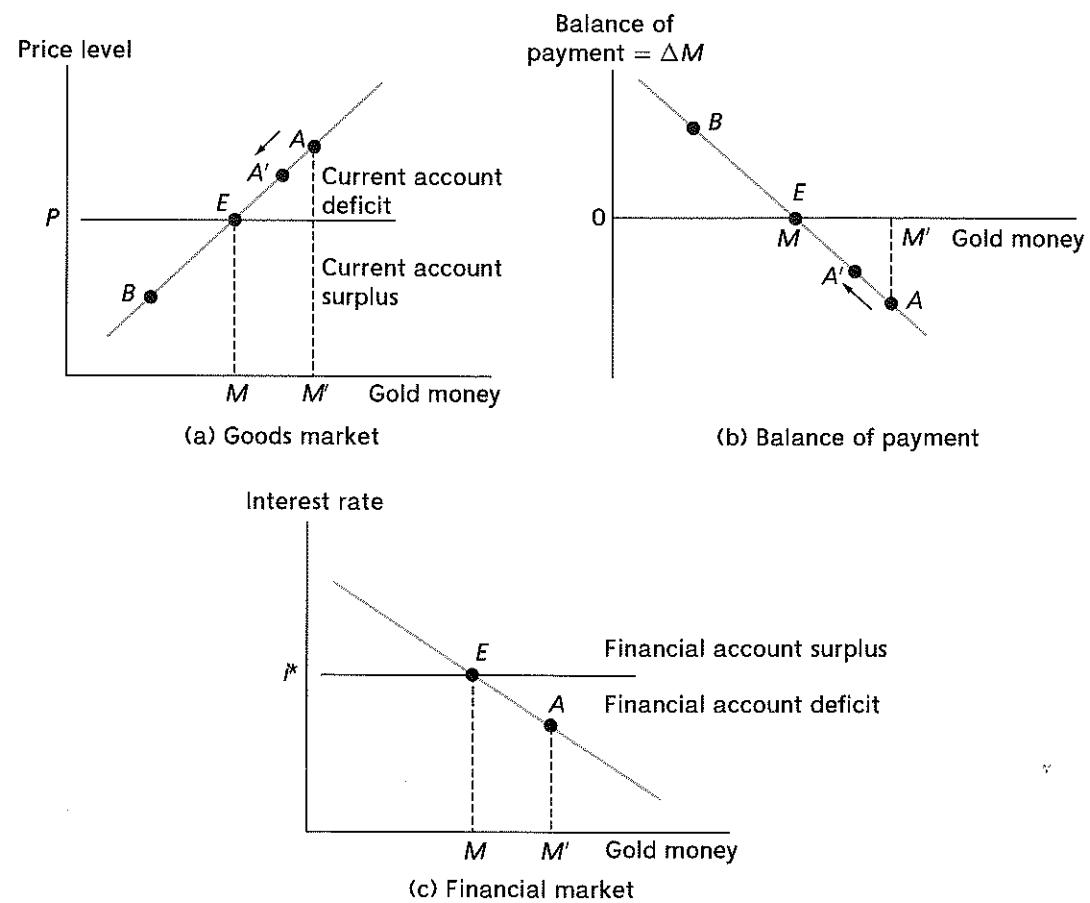


Figure A14.1 Hume's price-specie mechanism



Note: The exchange rate is expressed as the number of francs needed to buy one mark. An increase in the rate represents a mark appreciation or a franc depreciation.

when the stock of gold money is  $M$ . If the stock of gold exceeds  $M$ , the interest rate is lower than  $i^*$ , capital flows out, gold is shipped abroad and the money supply contracts back to the equilibrium level  $M$ .

Overall, starting at point  $A$  in all three panels, where the money stock  $M'$  exceeds the long-run equilibrium level  $M$ , both components of the balance of payments – the current and the financial accounts – are in deficit. The overall deficit means that gold is flowing out. As the money supply shrinks, over time the price level declines and the interest rate rises. The capital flow route is very fast while the trade route is slower. Panel (b) of Figure A14.1 accounts for both channels. The key result is that they both work towards eliminating the external deficit. Likewise, they would eliminate a surplus if it arose.

## Chapter

*The European countries could agree on a common piece of paper ... they could then set up a European monetary authority or central bank ... This is a possible solution, perhaps it is even an ideal solution. But it is politically very complicated, almost utopian.*

**Robert Mundell (1973)**

# Optimum currency areas

## Chapter Contents

15.1	The question, the problem and the short answer	350
15.2	Benefits of a currency area	352
15.3	Costs of a currency area	356
15.4	The optimum currency area criteria	361
15.5	Endogenous criteria?	367
15.6	Is Europe an optimum currency area?	369
15.7	Is Europe becoming an optimum currency area?	376
15.8	Summary	379
	Annex: Aggregate demand and aggregate supply	384

## Introduction

This chapter presents the optimum currency area theory, a systematic way of trying to decide whether it makes sense for a group of countries to abandon their national currencies. The theory develops a battery of economic and political criteria that recognize that the real economic cost of giving up the exchange rate instrument arises in the presence of asymmetric shocks – shocks that do not affect all currency union member countries. The chapter then examines whether Europe passes these tests. The conclusion is that Europe is not really an optimum currency area, but it does not fail all the tests either. A further consideration is that the adoption of the euro may change the situation. Over time, Europe may eventually satisfy all or most of the criteria.

### 15.1 The question, the problem and the short answer

It is usually taken for granted that each country has its own currency. After all, like the flag or the national anthem, a currency is a symbol of statehood. National heroes or rulers are proudly displayed on coins and banknotes, much as kings, emperors and feudal lords had their faces stamped on gold and silver coins. And yet, it is worth asking whether it makes good economic sense for each country to have its own currency.

This chapter provides answers to a simple question: If we forget about nations and focus purely on economic relations, how would we redraw the map of the world? To start with, does the world need more than one currency? Could Zimbabwe, Peru and China share the same currency? Probably not. At the other extreme, should each city have its own currency, as was sometimes the case just a few centuries ago? No, of course not. These answers seem obvious, but exactly why? Box 15.1 presents an example that is suggestive of the issues involved.

#### 15.1.1 Why is a large currency area desirable?

Money is one of humanity's great inventions. Economics textbooks tell you that its key feature is to avoid achieving the 'double coincidence of wants', i.e. barter. With money, you can buy what you want without

#### Box 15.1 The case for a Michigan dollar

Michigan is home to Chrysler, Ford and General Motors. For decades, it benefitted enormously from being the motor industry state. It drew workers from around the USA, attracted by secure and well-paid jobs. However, for some time now, the US motor industry has not been doing so well and Michigan has suffered alongside it. As can be seen in Figure 15.1, its annual growth rate has underperformed relative to the USA as a whole. In the wake of the global financial crisis, GDP plunged by more than 8 per cent. Chrysler was sold to Fiat and both GM and the city of Detroit, the state capital, went bankrupt. Factories were closed and tens of thousands of people left, fleeing high unemployment.

Now imagine that the state of Michigan had its own currency. With a battered economy, the Michigan dollar would most likely have depreciated, and significantly so. Cars made in Michigan would have become cheaper to US and foreign customers and, quite possibly, the US motor industry would have been much better able to fend off competition from Japanese, European and Korean manufacturers. But, although its economy differs from that of most other US states, Michigan cannot use the exchange rate to compete. The cost has been huge, earning the state the unfortunate nickname the 'rust belt of the USA'.

Yet, no one in Michigan has seriously proposed a monetary secession. It is not because the Michigan economy is too small to justify a separate currency. Its GDP approximately equals that of Iran, South Africa and Denmark. Somehow, Michigan citizens consider that belonging to the US dollar currency area provides benefits that far outweigh the costs. Or, maybe, no one really asks the question because most assume that one country means one currency.

Figure 15.1 GDP growth rates in Michigan and the USA, 1998–2013



Source: Bureau of Economic Analysis, US Department of Commerce

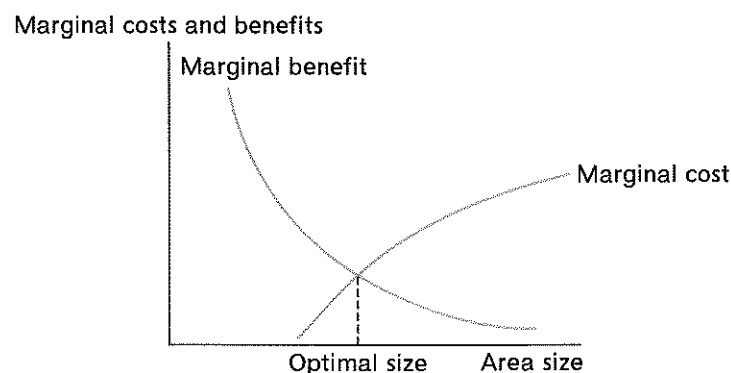
needing to simultaneously sell something else. Money is useful because it both makes commercial and financial transactions much easier than barter and is immediately recognizable. The more people accept a currency, the more useful it is.<sup>1</sup>

In that sense, the world would benefit from having just one currency. There would be no need to exchange money when travelling, exporting or importing. Exchanging currency is not just bothersome – how many unspent foreign coins lie in one of your drawers? – it is also costly. Indeed, if you buy a foreign currency and re-sell it immediately, you are likely to lose 10 per cent or much more. This is how currency dealers and credit card companies get paid for the service that they provide; however, this service would be unnecessary if just one currency existed. In addition, currency transactions are risky as exchange rates fluctuate and seem always to go against you! This is why small currency areas – geographic zones that share the same currency – are clearly not optimal. A currency that is used in a small area is just not very useful.

<sup>1</sup> Technically, money is said to generate network externalities. Network externalities are studied in Chapter 18.

The marginal benefit curve in Figure 15.2 symbolically represents this idea. It measures the added advantage of increasing a currency area by one unit, for example one unit of GDP or one more country. Since the usefulness of a currency area grows with the size of the area within which it is being used, its marginal benefit is positive. Yet, it is declining as the area expands because the extra benefit from adding one more country to an already large currency area is smaller than when the initial area was small.

Figure 15.2 The logic of the optimum currency area theory



If the marginal benefit is always positive, is the world the optimal currency area? It would be if there were no costs. What can these costs be? As a currency area grows larger, it becomes more diverse – in standards of living, for instance. If more diversity means more costs when sharing a common currency, the marginal costs are positive and rising with the size of the area. This idea is depicted in Figure 15.2 by the upward-sloping marginal cost schedule. The figure reveals the existence of a trade-off: a large currency area is desirable because it enhances the usefulness of money, but it has drawbacks. The optimal currency area corresponds to the situation whereby the marginal costs and benefits from sharing the same currency balance each other out, as shown in Figure 15.2.<sup>2</sup> The figure is highly symbolic and there should be no pretence that we can actually draw these schedules. Yet, it summarizes what this chapter is about.

## 15.2 Benefits of a currency area

### 15.2.1 Transaction costs

With the creation of the euro, Austrian exporters can ship goods to Finland and be paid in their own currency, because that is also the currency of their customers. Before the euro, the exporters and their customers had to negotiate which currency would be used. The exporter much preferred the Austrian schilling, because that is what she uses every day and she would not have to pay a fee to her bank to exchange Finnish markkas for schillings. Of course, the Finnish customer had the exact opposite preference. No matter what, in the end someone would have to bear the transaction costs. This may seem trivial, but it is not. In a famous example, the European Commission looked at what happened when one started with one EU currency – say, 100 worth of it – and exchanged it successively in all the currencies of the EU before returning to the initial currency. The result was that less than 50 of the initial 100 would be left. Of course, no one would ever do that – except maybe teenagers roaming Europe with an InterRail pass – but the point was that transaction costs are not trivial. Unfortunately, we do not have estimates of how big these effects are.

<sup>2</sup> We use marginal, and not total, benefits because the highest net benefits (benefits less costs) occur where marginal benefits and costs are equal. Mathematically, net benefits are  $NC = B - C$ , where  $B$  and  $C$  represent, respectively, benefits and costs. The maximum value of  $NC$  occurs where  $dNC = 0$ ; that is, when  $dB = dC$ , where  $d$  is the differentiation operator so that  $dB$  and  $dC$  are the marginal benefits and costs, respectively. This assumes that  $dB > dC$  below the maximum point.

### 15.2.2 Price transparency

Another important benefit is that goods prices become directly comparable across countries that are part of a monetary union. Along with reduced transaction costs, this allows for more competition. Stronger competition in turn is expected to benefit consumers and to encourage producers to keep improving their offerings. There is evidence that the adoption of the euro has led small and medium-sized firms to engage in exporting throughout the area. Opening up trade opportunities to the large number of firms that were previously unable to deal with or intimidated by the challenge of exporting can be a very large benefit.

Transparency and competition also affect wage-setting. In most countries, wages are set collectively, either at the national or industry level. It is natural for trade unions to seek wage increases. If the increases are too large, however, firms lose their competitiveness. In effect, workers in different countries compete against each other via exports. When the exchange rate can be changed, either because it is floating or because it is fixed but adjustable, the tendency is to raise wages, and then prices, and then to depreciate the exchange rate to recover competitiveness. This is one source of rampant inflation, but not an efficient one since a depreciation raises the price of imports; along with higher domestic prices, the result is that the purchasing power of wages declines, which calls for another round of wage increases, and so on. Resisting such vicious circles is politically and socially difficult. Closing down the depreciation door makes it clear that any lapse in wage-setting will have to be clawed back through subsequent wage moderation.

Bringing more economic logic to setting wages stands to be another important benefit from being part of a currency area. This requires, however, deep changes in a process that is politically and socially complex. This effect is likely to take a very long time to take hold. The Eurozone crisis is an indication that it requires fairly traumatic conditions to occur, although it is too early to know whether the effects (see Chapter 19) will be lasting.

### 15.2.3 Uncertainty

Another benefit is the elimination of exchange rate risk. When exports are priced in the currency of the exporter, the importer does not know precisely what the exchange rate will be when the time comes to settle the purchase. If the price is set in the importer's currency, it is the exporter that faces the risk. Alternatively, the party facing the risk may purchase financial insurance (through forward contracts), which adds to the cost of converting currencies. This may deter trade across currency boundaries.

Another area likely to be affected by uncertainty concerns foreign direct investment (FDI), that is, investors acquiring firms, partially or completely. Benefits from FDI include transfers of technology, returns to scale, better production structures and more. Exchange rate fluctuations deter FDI because investors intending to have a presence in foreign countries for the long term may suffer losses as a result.

### 15.2.4 Trade

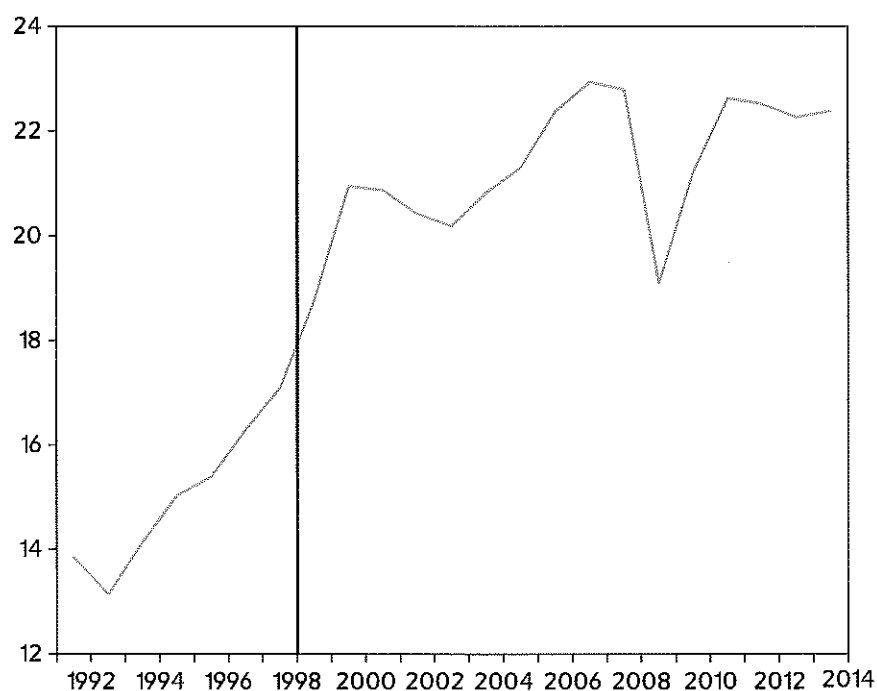
With easier and more secure payments and more competition, a common currency encourages more trade. This benefits all citizens in many ways. It provides more choice for customers and more customers for successful producers. More intense competition is bound to cut prices of producers who enjoy some degree of monopoly on their home turf. In a nutshell, a common currency eliminates a number of non-tariff barriers. Part II explains why and how this raises economic welfare.

Figure 15.3 displays the weight of exports in the GDPs of the original 12 members of the Eurozone. These are exports among the countries themselves. Trade has indeed increased, almost as much as following the implementation of the Single Act in 1992. The adoption of the euro may not be the sole factor that has increased trade, but there is other corroborating evidence that it has played a role.

### 15.2.5 Quality of monetary policy

Joining a monetary union implies a complete loss of national monetary policy autonomy. We will see that this is an important cost. On the other hand, swapping a domestic central bank for a collectively run central bank may bring benefits. This is the case if the domestic central bank lacks a tradition of administering bank policies effectively and if the collective central bank stands to do a better job. Box 15.2 presents the

Figure 15.3 Export shares of the original Eurozone countries among themselves (% of GDP)



Source: AMECO, European Commission

### Box 15.2 Essentials of central banking principles

The tools presented in Chapter 13 make it easy to understand what central banks try to achieve and how. The impossible trinity principle says that policy autonomy requires a flexible exchange rate regime. The *IS-MP-IRP* framework shows the role of monetary policy in the short run. Monetary neutrality tells us that, in the long run, these short-term effects are eroded by inflation and that, at the end of it all, inflation is directly proportional to the growth rate of the money stock. This is pretty much all that we need to know to understand central banking theory.

Because inflation is eventually driven by money growth, central banks are entrusted with the task of achieving price stability, conventionally defined as an inflation rate of 2 per cent or less – we return to this choice below. This is called inflation targeting. However, we do not live in the long run. In the shorter run, we face business cycles. These are periods of fast growth and low unemployment followed by periods of low, possibly negative, growth and high unemployment. These fluctuations, which last on average between two and five years, are painful as they hurt firms, some of which face bankruptcy, and households, threatened by job losses. Monetary policy can counteract business cycles, at least partly. This is why central banks are also tasked with the responsibility of smoothing cycles, a task captured by the *MP* curve (Section 13.1).

We can now see what central banks do. On a day-to-day basis they change the interest rate in response to economic conditions; they follow the movements of the *IS* schedule along the *MP* curve. To do so, they provide banks with liquidity and banks provide credit to their customers. The money stock is

continuously adjusted to enforce the chosen interest rate. But central banks also monitor the evolution of the money stock because they know that its evolution will eventually determine inflation. If the money stock grows too fast, they will raise the interest rate; the *MP* schedule will shift up. This is an important qualification to the framework developed in Chapter 13: the *MP* schedule is not unmovable. For most central banks, inflation is the overriding objective, because it takes time to set in and even longer to combat. When and if money grows at a rate deemed inflationary, central banks move the *MP* schedule up and, conversely, they move it down when they fear disinflation (negative inflation).

The fact that monetary neutrality only occurs in the long run has an important consequence. Central banks must anticipate future inflation because their actions have a much-delayed effect. It may happen that today's conditions call for, say, a lower interest rate as prescribed by the *MP* schedule, but that this requires inflationary money growth.

The interest rate parity condition tells us that the exchange rate will respond to monetary policy. But what if the exchange is fixed? Then the interest rate parity condition implies that the domestic interest rate is just the same as the foreign interest rate – the rate in the country to whose currency we peg – and the central bank's role is just to provide the stock of money that delivers that interest rate. In the long run, PPP says that domestic inflation will be the same as abroad. How does it come about? This is where Hume's mechanism, presented in Chapter 14, comes into play. The central bank will have to increase or reduce the money stock to uphold the declared exchange rate parity, which it will do in response to external surpluses and deficits driven by the under- or overvaluation of the real exchange rate. Thus, a fixed exchange rate regime removes central bank autonomy but the exchange rate peg provides an anchor to long-run inflation.

essentials of central banking theory, which has the following implications under a flexible exchange rate regime:

- The central bank is ultimately solely responsible for inflation. Long-run price stability – however defined (see below) – must be a key objective of monetary policy.
- Monetary policy can be used to smooth cyclical fluctuations. In the shorter run, therefore, the central bank should adjust its interest rate accordingly. This is the justification for the *MP* schedule presented in Chapter 13.
- The short- and long-term objectives can occasionally conflict with each other. The solution is for the central bank to be flexible in the short term and to set the interest rate without undue concern for the evolution of the money stock. In the long term, it must also be determined to keep the money stock growth rate in line with the inflation objective.
- This balancing act between short- and long-run imperatives can often be delicate and even confusing. A first risk is that monetary policy can be misunderstood. Firms and households may then set prices and wages that are incompatible with the objectives of monetary policy. A second risk is that financial markets may destabilize the exchange rate. The response is for the central bank to develop a clear strategy and to be as transparent as possible regarding the implementation of that strategy.

An important additional consideration concerns the relation between central banks and their governments. Money creation is obviously very lucrative as it costs very little to produce money. The resulting seigniorage profits are turned to the government for which it represents a sizeable source of income. Seigniorage is a form of taxation, but a painless one, at least as long as inflation remains low. Many governments can be tempted to raise more income through seigniorage, as a great many historical examples confirm. The result is invariably high, sometimes extremely high, inflation. But since inflation follows money growth with a long lag – at least two years, often much more – the temptation can be irresistible for hard-pressed governments. The best way to resist this temptation is to make the central bank fully independent of its government and to assign monetary policy a clear, unambiguous and legally binding price stability objective.

The upshot is that good monetary policy requires full central bank independence, along with a clear monetary policy strategy and a high degree of transparency.



Central bank independence can be achieved through adequate domestic governance, but laws can always be changed in the face of (actual or perceived) necessity. The adoption of a proper strategy requires adequate human resources and, even if the central bank is independent, old habits die hard. Political pressure and the appointment of malleable officials often prove to be enough to bend the anti-inflation resolve of a central bank. This is especially so if the public is not well informed about the source of inflation, which is often the case in countries that have not experienced price stability long enough to be convinced of the merits of monetary policy discipline.<sup>3</sup>

An important benefit of a monetary union is that a collective central bank is more likely to extract itself from government pressure simply because no government will want to see the common monetary policy used to finance other governments. In addition, central bank independence guaranteed by an international agreement is less likely to be revoked, or simply trampled upon, than in the case of a purely national central bank. In addition, the mission of the common central bank is defined through an explicit agreement, which is likely to be better formulated than often implicit and vague mission statements. This, in turn, favours transparency.

### 15.2.6 Wrap-up

The benefits from a common currency are very sizeable but diffuse and immeasurable. Some of them, like increased competition, are even politically controversial because they threaten established interest groups, including industries and trade unions. The merits of independent and well-run central banks emerge slowly over time and are often hard to comprehend by the broad public and even governments. Yet, these benefits are very real.

Importantly, the benefits grow with the size of the currency area. This is why the marginal benefits – the additional benefits – are shown as always positive in Figure 15.2, even if their size declines. It is clear as far as trade and competition is concerned: big markets allow for wider choice and larger increasing returns. In that case, the marginal benefits may not even be declining, but we do not know for sure. It also applies for the *quality* of monetary policy since central bank independence and importance grow with its size, although we will see that big currency areas can incur important policy costs. As noted above, the usefulness and convenience of a currency is deeply associated with the number of people who use it. This may seem a mundane point, but it is not. A currency is chiefly an instrument designed to carry out transactions; after all, that is why money was invented in the first place, as explained in Chapter 14. It is very easy to overlook this benefit, and others too.

## 15.3 Costs of a currency area

Intuitively, it seems obvious that bringing together into a currency area very diverse countries creates difficulties. The intuition is right. Diversity is costly because a common currency requires a single central bank, and a single monetary authority is unable to react to each and every local particularity. The optimum currency area (OCA) aims at identifying these costs more precisely. The basic idea is that diversity translates into asymmetric shocks and that the exchange rate is very useful in dealing with such shocks.

We proceed in three steps:

- 1 First, we define and examine the effects of asymmetric shocks.
- 2 Second, we study the problems that arise in the presence of asymmetric shocks in a currency area.
- 3 Finally, we ask how the effects of asymmetric shocks can be mitigated when national exchange rates are no longer available.

### 15.3.1 Shocks and the exchange rate

Imagine that the world demand for a country's exports declines because tastes change or because cheaper alternatives are developed elsewhere. This opens up a hole in the balance of trade. To re-establish its external balance, the country needs to make its exports cheaper, which calls for enhanced competitiveness.

<sup>3</sup> A quick look at Figure 14.4 readily shows that most European countries have not been particularly good at keeping inflation in check following the abandonment of the fixed exchange rate anchor provided by the Bretton Woods system. The reason is that most central banks were under the direct or indirect control of their governments, which did not resist the temptation of seigniorage.

One solution would be for prices and wages to decline; but what if they do not? In this case, a depreciation will do the trick if the country has its own currency. If, however, the country is part of a wider currency area, there is no alternative to lowering prices. Macroeconomic principles tell us that this requires that the economy slows down, deeply enough for long enough.

In order to examine the situation, we turn to a new tool, closely related to the *IS–MP–IRP* framework of Chapter 13, and developed in some detail in the Annex. World demand for our goods depends on their prices relative to those of competing goods. At the aggregate level, competitiveness is captured by the real exchange rate  $EP/P^*$ . The real exchange rate is measured along the vertical axis in Figure 15.4. The aggregate demand (*AD*) curve is downward sloping because a real exchange rate appreciation represents a loss of competitiveness, which weakens demand for domestic goods as exports decline and imports rise. Think of a leftward shift in the *IS* curve.

The aggregate supply (*AS*) curve is very different: it asks 'What will incentivize producers to provide more of the good?' Clearly, they will do so if it brings about more profit. In a nutshell, this requires that they earn more and therefore that the price level increases. Since they often import primary commodities or parts, they need for *P* to increase over and above the price of foreign goods  $P^*/E$ . In brief, a real exchange rate  $EP/P^*$  appreciation elicits more output. Conversely, a real depreciation will lead to less production. This is the *AS* curve.

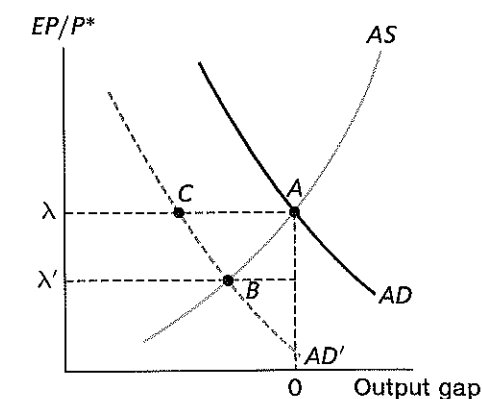
A last point. Under normal circumstances, economies tend to grow year in, year out. The existence of business cycles means that GDP fluctuates around a growing trend. Deviations from this trend are called the output gap (for one example, see Figure 13.5). This is the measure of output that is measured along the horizontal axis in Figure 15.4.

Starting from point *A*, an adverse demand shock is represented by the leftward shift of the *AD* curve, from *AD* to *AD'*. If the nominal exchange rate is allowed to depreciate, or if prices are flexible, the short-run effect will be a shift from point *A* to point *B*: the real exchange rate depreciates from  $\lambda$  to  $\lambda'$ . This is a painful move, of course, but an unavoidable one given the adverse shock.

However, the outcome is even more painful if the exchange rate is fixed and prices are rigid. In that case, the economy moves to point *C*, where the output decline is even deeper. At the unchanged real exchange rate  $\lambda$ , domestic producers continue to supply the output corresponding to point *A*, but point *C* represents the new, lower, demand. The distance *AC* represents unsold goods. Obviously, domestic firms will not accumulate unsold goods forever. Something has to give and production will fall. The recession generates incentives to gradually cut prices, eventually bringing the economy to point *B*. But this is likely to be the outcome of a painful and protracted process, in contrast to a rapid exchange rate depreciation.

The example illustrates why exchange rate fixity, when combined with sticky prices, makes an already bad situation worse. In a monetary union, instead of a simple once-and-for-all change in the nominal exchange rate, a real exchange rate adjustment can only come from changes in prices and wages. If prices and wages are sticky, the adjustment can take time, creating hardship along the way. Box 15.3 tells the story of Germany.

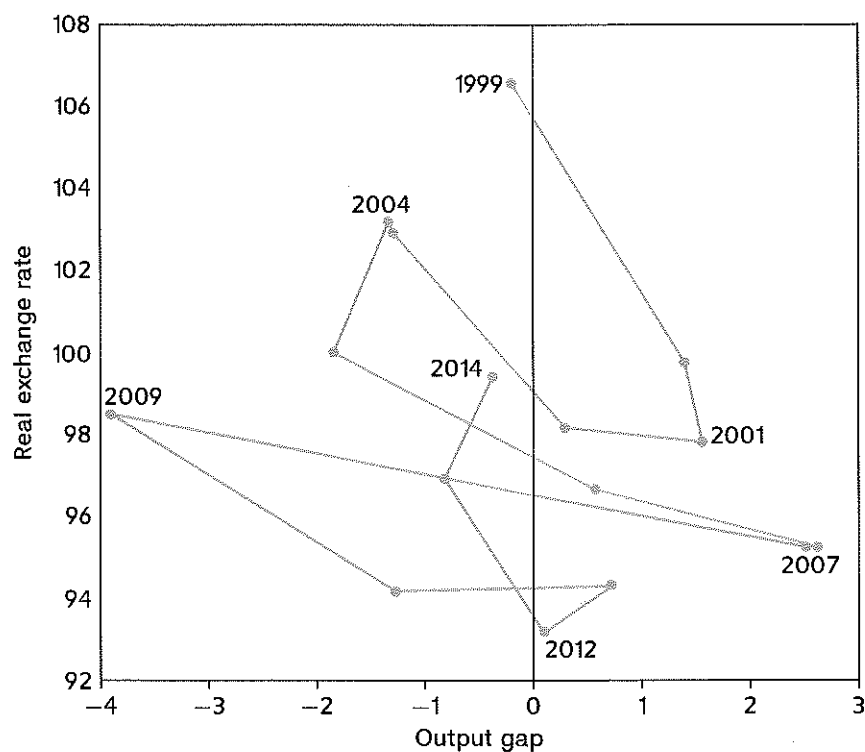
Figure 15.4 An adverse demand shock



Box 15.3 Early pain for Germany

Germany joined the Eurozone in 1999 at an overvalued exchange rate. As in Figure 15.4, the axes in Figure 15.5 represent the real exchange rate and the output gap. PPP predicts that the real exchange rate will have to depreciate. In the absence of its own exchange rate as a member of the monetary union, we expect that this will come about after a prolonged period of poor growth or, equivalently, negative output gaps. For a while, until 2001, Germany benefitted from a worldwide expansion. Once this expansion was over, it went through several years during which GDP remained below trend. This is when *The Economist* famously dubbed Germany 'the sick man of Europe'. The government pushed for a long period of wage moderation, which translated into a low inflation rate, and its real exchange rate depreciated. Germany gradually recovered competitiveness until it was pronounced healthy again in 2007. Like most other countries, following the global financial crisis, Germany underwent a deep recession in 2009 but its hard-won competitiveness bore fruit and allowed a speedy recovery. This recovery, however, generated frustration in other Eurozone countries, which did not recover or did so much more slowly. They stated that they had been unfairly undervalued, to which Germany responded: 'do like we do'. Wage moderation had come to an end by 2013 and Germany is now re-entering the fray, doing as the others do.

Figure 15.5 Germany: the real exchange rate and the output gap, 1999-2014



Note: The real exchange rate is the German price level relative to the average price level in the EU15 countries. The index takes the value of 100 in 2005. The output gap, actual less trend GDP, is expressed in percentage of trend GDP.

Source: AMECO, European Commission

15.3.2 Asymmetric shocks

So far we have thought of one country taken in isolation to set the stage. Diversity means that different countries face different shocks. The simplest case is a currency area with two member countries. We call these countries A and B and examine what difference sharing or not sharing the same currency makes. Note carefully that country A has two (nominal and real) exchange rates: one vis-à-vis country B and one vis-à-vis the rest of the world. The same applies to country B, of course.

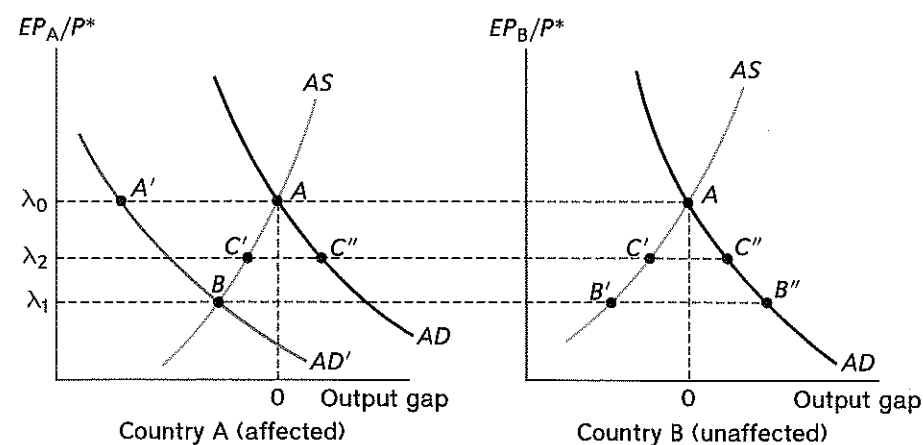
If countries A and B are hit by the same adverse shock, we know from the previous section that both have to undergo a real depreciation vis-à-vis the rest of the world. If they are similar enough, to a first approximation, there is no need for their bilateral (nominal and real) exchange rate to change. They are in the same boat facing the same headwinds. This reasoning shows that the loss of the exchange rate within a currency union is of no consequence as long as all member countries face the same shocks. In that case, the union simply adjusts its common exchange rate vis-à-vis the rest of the world and its member countries are as well off as if they had each independently changed their own exchange rate.

The situation is very different in the presence of an asymmetric shock. Assume, for instance, that country A is hit by an adverse shock, but not country B. What happens then? The situation is examined in Figure 15.6. The vertical axis measures each country's real exchange rate vis-à-vis the rest of the world:  $EP_A/P^*$  and  $EP_B/P^*$ , where  $P_A$  and  $P_B$  are the price indices in country A and country B, respectively,  $P^*$  is the price level in the rest of the world and  $E$  is the common currency's exchange rate, initially equal to  $E_0$ . Points A in both panels represent the initially nicely balanced situation, both countries having a zero output gap. Defining the price indexes such that  $P_A = P_B$ , the real exchange rates are the same in both countries:  $\lambda_0 = E_0 P_A/P^* = E_0 P_B/P^*$ . (Prices are assumed to be sticky – otherwise, the exchange rate regime does not matter, as we already noted above.)

The adverse shock that affects country A alone is represented in the left-hand chart by a downward shift of the demand schedule from  $AD$  to  $AD'$ . If country A is not part of a monetary union and can change its own nominal exchange rate, its best course of action is to let it depreciate to  $E_1$  such that the real exchange rate depreciates to  $\lambda_1 = E_1 P_A/P^*$ , as represented by the new equilibrium at point B. Country B has no reason to change its nominal and real exchange rates, which remain at  $E_0$  and  $\lambda_0$ , respectively.

Things are very different when countries A and B belong to a monetary union. They cannot have different nominal exchange rates. The now-common central bank must make a choice on their behalf. If it cares only about country A, it depreciates the common exchange rate to  $E_1$ . With sticky prices, both countries must share the same real exchange rate  $\lambda_1$ . Figure 15.6 shows that this is not good for country B, which now faces a situation of potentially inflationary excess demand (represented by the distance  $B'B''$ ).

Figure 15.6 An asymmetric shock in a currency union



If the central bank instead favours country B, it will keep the common exchange rate unchanged. Both countries retain the initial real exchange rate  $\lambda_0$ , and stay at the initial point A. This suits country B well, as it does not face any disturbance, but it means excess supply for country A (represented by the distance  $A'A$ ). Clearly, in the presence of an asymmetric shock, what suits one country hurts the other.

If the union's common external exchange rate floats freely, it will depreciate because of the adverse shock in one part of the area, but not all the way to  $E_1$ . It will decline to an intermediate level such as  $E_2$ , which corresponds to a real exchange rate  $\lambda_2 = E_2P_A/P^* = E_2P_B/P^*$ .<sup>4</sup> The outcome is a combination of excess supply in country A and excess demand in country B (both represented by  $C'C''$ ). Both countries are in disequilibrium. The new exchange rate level is 'correct' on average, but it is too strong for country A, which is in recession, and too weak for country B, which is overheating.

That there is no good outcome is the fundamental and unavoidable cost of forming a monetary union. The logic is very intuitive. With sticky prices, the nominal exchange rate is the only way of adjusting a country's competitiveness to changing conditions. If an asymmetric shock occurs, the common exchange rate cannot insulate all countries that belong to a monetary union.

Disequilibria cannot last forever. Over time, prices are flexible and will do what they are expected to do. Consider the latest case, when the common exchange rate vis-à-vis the rest of the world is  $E_2$ . It has no reason to change further since it has already done its job of taking into account the average situation in the union. Country A cannot sell all of its production, so its price level will eventually decline until the real exchange rate depreciates to  $\lambda_1$  and country A will reach its equilibrium at point B. This will require a recession – remember, country A's goods are in excess supply – and unemployment will rise, putting downward pressure on prices. The price of country A's goods will decline until it reaches level  $P'_A$  such that  $\lambda_1 = E_1P'_A/P^*$ . Country B is in the opposite situation: facing buoyant demand, the price of its goods will rise to  $P'_B$  such that its real exchange rate appreciates back to its equilibrium level, which is the original level  $\lambda_0 = E_2P'_B/P^*$ . Recession and disinflation in country A, boom and inflation in country B: these are the costs of operating a monetary union when an asymmetric shock occurs.

### 15.3.3 Symmetric shocks with asymmetric effects

The analysis has focused on asymmetric shocks, but it applies also to the case of symmetric shocks that produce asymmetric effects. There are many reasons why countries do not react in exactly the same way to the same shock: different socio-economic structures, including labour market regulations and traditions, the relative importance of industrial sectors, the role of the financial and banking sectors, the country's external indebtedness, the ability to strike agreements between firms, trade unions and the government, and so on. A good example is the case of a sudden increase in the price of oil and gas. This shock hurts oil- and gas-importing countries but benefits – or, at least, hurts less – oil- or gas-producing countries, such as the Netherlands, Norway and the UK. It is one reason why the two latter countries have not joined the European monetary union.

Another asymmetry concerns the way in which monetary policy operates. When a common central bank reacts to a symmetric shock, it is not a foregone conclusion that the effect of its action will be the same throughout the currency union. Differences in the structure of banking and financial markets or in the size of firms – and their ability to borrow – may result in asymmetric effects. Chapter 18 examines this issue.

The bottom line is that symmetric shocks can have asymmetric effects. Then the analysis carried out in the previous section fully applies. The situation is similar to the one described in Figure 15.6.

### 15.3.4 Policy preferences

Countries may disagree on how to deal with each and every possible shock. In practice, there rarely exists a 'best way' to deal with a shock. For example, should we be more concerned about inflation or unemployment? Should we favour the exporters – who wish to have weak exchange rates to buttress competitiveness – or the consumers – who wish to have strong exchange rates to raise their purchasing power? These are trade-offs, which generate the confrontation of opposing interests and are dealt with through the respective

<sup>4</sup> Where  $E_2$  exactly lies depends on a host of factors, such as the relative size of the two countries and how sensitive is their trade to changes in the real exchange rate.

influence of political parties, trade unions and lobbies. There is no reason for the resulting decision to be the same across different countries because national preferences are not necessarily homogeneous.

The result is that, traditionally, some countries demonstrate less tolerance towards inflation, budget deficits or unemployment than do others. In Germany, for instance, where the hyperinflation of the 1920s is still painfully remembered, price stability is widely seen as a top policy priority. In contrast, high unemployment and social unrest in France in the 1930s have left a lingering distaste for recessions, with relatively little concern for inflation.

This means that shocks, even if symmetric, may elicit different policy responses. When monetary policy is no longer carried out at the national level, the common central bank will be asked to act differently and its managers, drawn from different countries, may find it difficult to agree. It also means that the other macroeconomic instrument, fiscal policy, may be used in different directions. These issues, long latent, have surfaced in the euro area during the financial crisis, as explained in Chapter 19.

## 15.4 The optimum currency area criteria

The optimum currency area (OCA) theory brings together the benefits (Section 15.2) and the costs (Section 15.3) to derive practical criteria that can help us answer the question asked at the outset: Which countries should share the same currency? In a way, OCA is a misnomer, for two reasons. First, because the theory does not really deal with optimality (what is best?) as it simply balances costs and benefits. Second, the theory does not even provide yes or no answers to the central question asked above. Rather, it derives criteria that make a common currency acceptable, not optimal; and the criteria are never black or white, they are more or less fulfilled. Box 15.4 provides an example of the OCA criteria at work.

There are three classic economic criteria and an additional three that are political.<sup>5</sup> The first criterion asks what characteristics make it easier to deal with asymmetric shocks within a currency area. The next two economic criteria take a different approach: they aim to identify which economic areas are less likely to be hit by asymmetric shocks or to face shocks moderate enough to be of limited concern. The last three criteria deal with political aspects; they ask whether different countries are likely to help each other when

### Box 15.4 Should Sweden adopt the euro?

Sweden has carefully debated whether to adopt the euro. The debate ended in 2003 with a referendum that rejected membership. As recalled by Jonung and Vlachos (2007):

*A Government Commission Report . . . set the stage for the ensuing discussions. . . . The economic analysis of the report was based on the traditional theory of optimum currency areas (OCAs) listing the expected benefits and costs of Swedish membership of the euro area. The main benefits were identified as the efficiency gains from a common currency, in other words the reduction in costs concerning international transactions and the elimination of uncertainty concerning fluctuating exchange rates within the monetary union, which would generate more foreign trade and more competition. The loss of monetary policy autonomy was deemed to be the main cost of full EMU membership. . . . The surrendering of monetary policy autonomy was believed to be associated with high costs for Sweden in the event of asymmetric shocks to the domestic economy. Thus, a Swedish currency with a floating exchange rate was viewed as an insurance device. . . . In its conclusions, the Commission recommended Swedish membership in the long run, but proposed that Sweden should not enter . . . in the short run.*

<sup>5</sup> The three 'political' criteria are not part of classic OCA theory. They were introduced in earlier editions of this textbook. The crisis offers a powerful demonstration of their relevance. There is also a tendency toward the proliferation of criteria. In particular, policies are added to the list while the criteria should only reflect existing structural conditions. Policies can – and should – always be adapted.

faced with asymmetric shocks. This section lists and explains the logic of the OCA criteria; Section 15.5 will examine whether they are satisfied in Europe.

### 15.4.1 Labour mobility (Mundell)

The first criterion was proposed by Robert Mundell (Box 15.5) when he first formulated the notion of an OCA. The idea is that the cost of sharing the same currency would be eliminated if the factors of production, capital and labour, were fully mobile across borders. Since it is conventionally assumed that capital is mobile, the real hurdle comes from the lack of labour mobility.

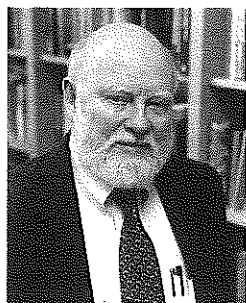
#### Mundell criterion

**Optimum currency areas are those within which people move easily.**

The reasoning behind this statement is illustrated in Figure 15.7, which is based on Figure 15.6. Remember that the adversely affected country A undergoes unemployment while non-affected country B faces inflationary pressure. Both problems could be solved by a shift of the production factors

#### Box 15.5 Founders of the optimum currency area theory

**Robert A. Mundell**, a Canadian-born economist at Columbia University, won the Nobel Prize in part for having created the OCA theory, in part for having started the field of open economy macroeconomics. The *IS-MP-IRP* framework is often referred to as the Mundell-Fleming model. (J. Marcus Fleming was an economist working at the IMF; he independently developed the same theory.) He now advocates a single worldwide currency.



Source: Stanford University

**Ronald McKinnon**, (left) from Stanford University, has made major contributions to the international monetary literature. He is known for his critical appraisal of the European monetary union.

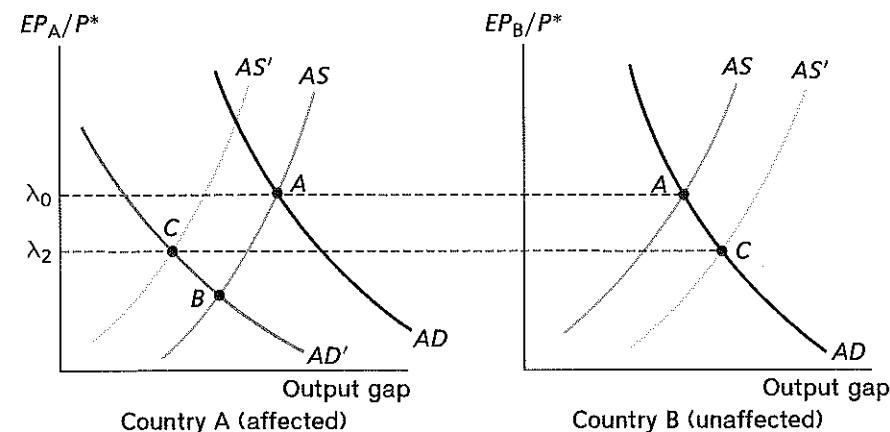
**Peter Kenen**, (right) from Princeton University, was a leading contributor to our understanding of the international monetary system and a keen observer of European monetary integration.



© Office of Communications, Princeton University

(labour and capital), which are idle in country A, to country B, where they are in short supply. This reallocation is shown as a shift of both countries' supply schedules to  $AS'$ , leftward for country A, rightward for country B. This reallocation changes trend – or potential – GDPs so that the output gap is zero at both equilibrium points C. What is remarkable is that there is no need for prices and wages to change in either country. Once the factors of production have moved, the currency area's nominal exchange rate  $E_2$  delivers the real exchange rate  $\lambda_2$  that is best for each country.

Figure 15.7 The labour mobility criterion



The Mundell criterion makes good sense: why should unemployment rise in some part of a currency area while, in other parts, firms cannot produce enough to satisfy demand? Let people and their equipment simply move!

#### Criticism

Yet, as always, things are less simple than they look. A few words of caution are warranted. We need to think a bit harder about what shifting production factors really means. First, it is no wonder that actual currency areas generally coincide with nation-states. Common culture and language, right and ease of resettling, schooling systems, retirement systems, etc. make labour mobility easier within a country than across borders. A national currency is not just a symbol of statehood, it is usually justified by labour mobility, which is precisely what the Mundell criterion asserts. Across borders, not only do cultural and linguistic differences restrain migration, but also institutional barriers further discourage labour mobility, as explained in Chapter 8. A response is to change legislation to make cross-border labour mobility easier and thus enlarge the size of optimum currency areas. Indeed, this is part of Europe's quest for closer integration.

Second, the goods produced in country A may differ from those produced in country B. It may take quite some time to retrain workers from country A to produce the goods of country B, if at all possible. If the shocks are temporary, it may not be worth the trouble of moving, retraining, etc. Labour mobility is not a panacea, just a factor that mitigates the costs of an asymmetric shock in a currency union.

Finally, labour needs equipment to be productive. What if all equipment is already in use in country B? The usual answer is that capital is mobile, but this view needs to be qualified. Financial capital can move freely and quickly, unless impeded by exchange controls. Installed physical capital (means of production such as plant and equipment) is not very mobile. Machinery can be transported but it takes time to build plants. Closing plants in country A can be done quickly – although social-political resistance may create stumbling blocks – but creating new production facilities in country B may take months, if not years. Even if labour were highly mobile, which it is not, shifting the supply curves as described in Figure 15.7 may take many years. By then, the asymmetric shock may well have evaporated or even reversed.



### 15.4.2 Production diversification (Kenen)

Asymmetric shocks are the problem within a currency area, but how frequent are they, really? If substantial asymmetric shocks happen only rarely, the costs are episodic while the benefits accrue every day. The Kenen criterion takes a first look at this question by asking what the most likely sources of substantial and long-lasting shocks are. Most of the shocks likely to be permanent are associated with shifts in spending patterns, which may be a consequence of changing tastes (e.g. German beer consumers find it more fashionable to drink French wine) or of new technology that brings about new products and makes older ones obsolete (e.g. the internet displaces faxes). Such shocks actually occur continuously, but most of them are hardly noticed outside the affected industries. To create a problem for a monetary union, a shock must be large and asymmetric.

The countries most likely to be affected by severe shocks are those that specialize in the production of a narrow range of goods. For example, many of the African countries that are part of the CFA franc zone primarily export a single agricultural product such as coffee or cacao. A decline in the demand for coffee – which may occur because new producers emerge elsewhere in the world – is an asymmetric shock because it affects some countries in the CFA franc zone and not others. Conversely, a country that produces a wide range of products will be little affected by shocks that concern any particular good because that good weighs relatively little in total production.

This explains the second criterion for an optimum currency area, initially stated by Kenen (Box 15.5): in order to reduce the likelihood of asymmetric shocks, currency area member countries ought to be well diversified and to produce similar goods. In that case, good-specific shocks are likely to be either symmetric or of little aggregate consequence, thus lessening the need for frequent exchange rate adjustments.

#### *Kenen criterion*

**Countries whose production and exports are widely diversified and of similar production structure form an optimum currency area.**

#### *Criticism*

This is a very broad statement. How much diversification is enough? When are the production structures sufficiently similar? As discussed in Box 15.1, Michigan is probably more different from Texas than Belgium and the Netherlands. The criterion provides a good sense of what is at stake, but it does not allow anyone to draw a clear delineation. One can argue that Greece, with its focus on tourism and agribusiness, is not well-adapted to sharing a currency with industrial Germany, but is that enough to draw a conclusion? Controversies abound.

### 15.4.3 Openness (McKinnon)

The next relevant question is whether the exchange rate is at all helpful in the presence of an asymmetric shock. If not, little is lost by giving it up. In the analysis so far, the distinction between ‘domestic’ and ‘foreign’ goods refers to where the goods are produced and priced. However, many standard goods, such as paper sheets or electric bulbs, although produced in different countries, are virtually identical. In that case, trade competition will ensure that their prices are the same everywhere, or nearly so, and therefore largely independent of the exchange rate. In addition, modern trade takes the form of value chains whereby finished products incorporate many parts produced literally all over the world. It becomes increasingly difficult to talk about national goods.

Consider the example of electric bulbs produced in Sweden and think of the German market. Competition forces the competing producers to set the same price in euros, say €2.5. Pricing to market, as this is called, means that if the krona's exchange rate vis-à-vis the euro changes, Swedish bulbs will still sell for €2.5 in Germany. If the krona depreciates from 9 to 9.5, the Swedish manufacturer will see its selling price rise from SKR 22.5 to SKR 23.75. If the krona appreciates from 9 to 8.5, the Swedish manufacturer will have to absorb the difference as the selling price declines from SKR 22.5 to SKR 21.25. Presumably, the same applies to German goods exported to Sweden. Losing the exchange rate, therefore, is of little consequence and the two countries can form a currency area without suffering much hardship in the presence of asymmetric shocks.

#### *McKinnon criterion*

**Countries that are very open to trade and trade heavily with each other form an optimum currency area.** The criterion can be made more precise, as follows. When two countries A and B do not share the same currency, they each have their own exchange rate vis-à-vis the rest of the world,  $E_A$  and  $E_B$ . If they are very open and trade intensively with each other, the distinction between domestic and foreign goods loses much of its significance, as competition will equalize the prices of most goods when expressed in the same currency. For example, if the price of country A's domestic goods in domestic currency is  $P_A$ , expressed in the rest of the world's currency it is  $E_A P_A$ , and similarly country B's price is  $E_B P_B$ . Competition ensures that  $E_A P_A = E_B P_B$ . Any change in one country's nominal exchange rate, say,  $E_A$ , must be immediately compensated by a change in local currency prices  $P_A$  such that the world price level  $E_A P_A$  remains unchanged. In effect,  $P_A$  and  $P_B$  are no longer sticky. In that case, the real exchange rates of both countries vis-à-vis the rest of the world are also equal:  $E_A P_A / P^* = E_B P_B / P^*$ . When prices are flexible, creating a currency union by giving up the exchange rate entails no serious loss of policy independence.

#### *Criticism*

Again, the criterion can be deceptively simple. The exchange rate does not affect competitiveness in the sense that competition forces prices to be the same. Still, the fact that the domestic price of exports (like bulbs) changes with the exchange rate may still have an impact on competitiveness, but in a different way, through profits. When the exchange rate depreciates, for instance, higher domestic-currency export prices (from SKR 22.5 to SKR 23.75 in the previous example) translate into higher profits for exporters. This may induce firms to shift their activities towards exports. Conversely, an appreciation eats into the profit margin of exporters. In that sense, exchange rate changes do affect the economy.

There is an answer to this objection. If more and more goods have little national specificity as value chains spread, a depreciation may raise profits because of higher domestic-currency prices but it also means that imported components could become more expensive because their prices are set internationally. Some gain here, some loss there; once again, we find that exchange rate changes have little or no effect.

This counter-argument is puzzling. If value chains become the dominant form of production worldwide, the McKinnon criterion implies that the whole world is an optimum currency area. The counter-counter-argument is that in most countries about half of total production concerns non-traded goods: goods that are produced and consumed locally. Examples include medical or car mechanic services, house building, public administration, and much more.

### 15.4.4 Fiscal transfers<sup>6</sup>

An important aspect of the analysis in Section 15.3 is that country B suffers – some inflationary pressure – from the adverse shock that hits country A if they share the same currency. It is therefore in the interest of country B to help alleviate the impact of the shock. One possibility is for country B to compensate country A financially. Such a transfer mitigates both the recession in country A, which receives the transfer, and the boom in country B, which pays out the transfer. This allows time for the shock to disappear if it is temporary, or to work its effects through prices if it is longer lasting. If shocks occur randomly, the country that pays out a transfer today will be tomorrow's beneficiary. In effect, such transfers work like a common insurance against bad shocks.

#### *Transfer criterion*

**Countries that agree to compensate each other for adverse shocks form an optimum currency area.** Transfer schemes of this kind exist across regions in every country. Sometimes they are explicit; most often they are implicit. For example, if a particular region suffers an asymmetric shock, then, as income declines, so do tax payments, while welfare support – chiefly unemployment benefits – rises. This is how the region receives transfers from the rest of the country. These transfers are often implicit, part-and-parcel of the redistributive mechanism at work in the country. Some federal countries, such as Germany and Switzerland, additionally operate explicit transfer systems.

<sup>6</sup> This criterion was also developed initially by Peter Kenen.

### Criticism

The debt crisis has brought forward the issue of transfers. They are properly seen as a form of insurance against asymmetric shocks. Insurance works if, indeed, shocks are random. If it is always the same countries that suffer from adverse shocks, the other countries might see it as a costly undertaking. Why could that be the case? Because any insurance involves a moral hazard: the possibility of courting adverse shocks to elicit transfer payments. A car driver may be more reckless if he knows that his insurance will pay for all the accidents that he provokes than if he were not insured. This is why car insurance involves deductibles – you pay for some part of the costs – and experience-rated – you pay a higher premium if you are often involved in accidents. Applied to a currency union, countries may take fewer precautions to avoid frequent shocks if they expect transfers. For instance, they may remain too specialized, or too dependent on imports, or they may nurture rigid labour markets that make adjustments long and painful. We will see the importance of this criticism in Chapter 19.

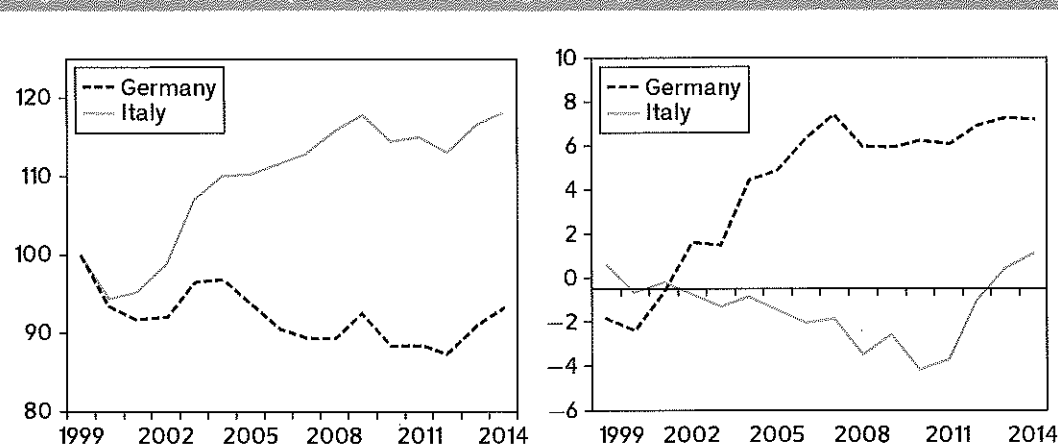
### 15.4.5 Homogeneous preferences

Political conditions matter even for symmetric shocks. Section 15.3.2 shows that symmetric shocks do not pose any problem as long as each country reacts in the same way to the shock. But Section 15.3.4 explains how symmetric shocks can have polarizing effects akin to asymmetric shocks when currency area member countries do not share the same preferences regarding policy responses. Under such circumstances, whatever the central bank chooses to do will be controversial and will leave some, possibly all, countries

#### Box 15.6 Germany and Italy: a difficult relationship

The OCA theory starts and ends with the idea that, once a country joins a monetary union, external competitiveness must be maintained the hard way – keeping costs and prices low – rather than through recurrent devaluations. Figure 15.8 makes it clear that Germany worked hard on that (see Box 15.3) while Italy, well, let its competitiveness slip away. Unsurprisingly, Germany's current account accrued a strong surplus while Italy's experienced increasing deficits. Italians called upon the ECB to adopt a policy stance that would prevent the euro from being overvalued. German public opinion did not conceal its annoyance with Italy, insisting that a strong euro is what the monetary union is all about.

Figure 15.8 External competitiveness of Germany and Italy, 1999–2014



Note: The real exchange compares unit labour costs ( $EW/W^*$ , where  $W$  is the country's unit labour cost and  $W^*$  is the average of unit labour costs in 35 industrial countries).

Source: AMECO, European Commission

unhappy. At best, there will be resentment; at worst, the currency union may not survive. Box 15.6 provides a classic example of this kind of tension.

### Homogeneity of preferences criterion

**Currency union member countries must reach consensus on the best way to deal with shocks.**

#### Criticism

Once again, this is a very broad statement that cannot lead to a precise assessment. Within each country, political parties usually disagree on policies and the official view changes when power changes hand. The criterion must refer to shared values that are not the same from one country to another, which is even harder to pinpoint.

In addition, views and values may change over time. Deep economic crises leave an imprint that can last a very long time. In that sense, lessons can be drawn about which policies work and which do not. Furthermore, it is not just history that matters but also political and social institutions. For example, we have seen that the degree of price and wage flexibility matters a great deal in the presence of shocks, and that identical shocks may have widely different effects. Wage flexibility, in particular, depends on bargaining structures.

### 15.4.6 Solidarity vs. nationalism

The final criterion goes deeper into political considerations. Since none of the previous criteria is likely to be fully satisfied, no currency area is ever optimum. This is even true for individual countries, which unknowingly operate as currency areas. One consequence is that shocks generate political disagreements regarding the proper response. Such disagreements are a familiar feature in any country. They may be more delicate if asymmetric shocks generate disagreements across regions. In individual countries, the eventual resolution of such debates is usually accepted as the price to pay for living together – the natural consequence of statehood. The outcome is ultimately seen as acceptable because citizens of the same country readily accept some degree of solidarity with one another.

When separate countries contemplate the formation of a currency area, they need to realize that there will be times when disagreements will occur and that these disagreements may follow national lines, especially if the shocks are asymmetric or produce asymmetric effects. For such disagreements to be tolerated, the people who form the currency union must accept that they will be living together and extend their sense of solidarity to the whole union. In short, they must have a shared sense of common destiny that outweighs the nationalist tendencies that would otherwise call for intransigent reactions.

#### Solidarity criterion

**When the common monetary policy gives rise to conflicts of national interest, the countries that form a currency area need to accept the costs in the name of a common destiny.**

#### Criticism

In a way, this is obvious. A currency union is not a free ride and costs are bound to arise now and then, when asymmetric shocks occur. One reason to accept these occasional costs is that, over time, they are more than compensated for by the benefits; this is the essence of OCA theory. Another reason is that solidarity makes some sacrifices acceptable for the better common good. When the benefits are too diffuse to be fully felt, solidarity becomes essential. This supports the view that a monetary union can only come about after a political union. A political union, it is asserted, creates the necessary sense of solidarity. However, a deeper question is whether this sense of solidarity can only be the outcome of a political union. The next section presents an alternative view.

### 15.5 Endogenous criteria?

The six criteria presented above refer to country characteristics, but these characteristics may change over time. A puzzling question is whether they can change because of membership of a currency area. Put differently, can an area that is not an optimum currency area become one as a consequence of being one? This possibility is called the endogeneity of the OCA criteria.

As we examine each criterion, this is a very logical possibility. The fact that some criteria are not well satisfied implies that asymmetric shocks will be painful. The pain itself may change countries and people.

### The six criteria

The following sections describe the possible effects of an asymmetric shock when the six criteria are not fully satisfied.

#### *Labour mobility*

The Mundell criterion emphasizes labour mobility. When country A has a high level of unemployment and country B faces labour shortages, the incentive for citizens to move becomes more urgent. A shock may therefore encourage labour mobility in situations where exchange rate adjustments made it previously unnecessary.

#### *Diversification*

A high degree of specialization implies that some countries will be especially hard hit when they are affected by specific shocks. As a consequence, many firms will disappear. The displaced managers and employees will undoubtedly seek other ways of gaining a living. They will form new firms in new lines of business, which will reduce the extent of specialization.

#### *Openness*

This criterion really refers to the impact of exchange rate changes on economic activity. As noted above, the evolution of trade toward value chains is gradually making this criterion less relevant. This is not endogeneity because the changes occur not as a response to the presence of a monetary union, but to technological changes.

#### *Homogeneous preferences*

Experimentation is a great way of learning. As countries deal with similar difficulties, they can learn from each other. For that to happen they must be aware of what others do and they have to be convinced that successful foreign experiments can be applied at home. This process is very much alive in federations where states, provinces, Länder or cantons, whatever they are called, indeed continuously learn from each other. Within a currency area, transparency is a benefit because it enhances competition. It also makes comparisons easier and more convincing. This is particularly the case with a symmetric shock that produces asymmetric effects. Why is it happening? Which country deals better with the shock? What should we change to deal with a shock better in future? In this spirit, shocks reveal underlying weaknesses and they may trigger Darwinian responses.

#### *Transfers*

In existing federations, transfers between the centre (the federal government) and the sub-central level(s) are commonplace, as mentioned above. They are intimately related to the structure of taxation, since sub-central authorities may have limited tax or tax collection authority. They also correspond to the co-insurance motive mentioned earlier. This second motivation is directly linked to the risk of asymmetric shocks. Insurance may merely be convenient but in most countries it is justified by either of two issues. The first is solidarity, which is related to the common destiny criterion; the second is common interest: when one country suffers an asymmetric shock and sees its GDP decline, imports from other countries are reduced and thus the shock spreads. Reducing this effect is therefore in every country's interest. Inasmuch as a common currency leads to tighter economic integration, co-insurance is likely to become more appealing. This source of endogeneity is magnified if one country's crisis could be contagious, as happened in the Eurozone after 2010.

#### *Common destiny*

The question here is whether living with the same currency increases the sense of common destiny among sovereign countries. The answer can only be speculative because historically the adoption of a

common currency has followed the creation of a common state. There seem to be two opposing forces at work. The first is that, indeed, people who share the same currency feel closer to each other, if only because their countries become more economically and financially integrated. The second is that this greater interdependence is seen as a threat because one country's troubles can be costly to the others. In that case, a common currency undermines the sense of common destiny. Much is likely to depend on political considerations.

### 15.6 Is Europe an optimum currency area?

In principle, the OCA theory should tell us whether it did make sense to establish a monetary union in Europe. As already noted, the answer is most unlikely to be black and white. The benefits are hard to quantify, as are the six OCA criteria, which may be only partly fulfilled. This section distils that rich and unending debate. Box 15.7 reports on the conclusions reached in May 2003 by the British Chancellor of the Exchequer on the basis of five tests inspired by the OCA theory.

#### Box 15.7 Why Britain is not yet ready for the euro (in 2003)

When he was appointed Chancellor of the Exchequer in 1997, Gordon Brown awarded himself the right to veto the highly political decision of British Eurozone membership. He announced that he would reach a verdict on the basis of five economic tests:

- 1 *Convergence.* Are business cycles and economic structures compatible so that we and others could live comfortably with euro interest rates on a permanent basis?
- 2 *Flexibility.* If problems emerge, is there sufficient flexibility to deal with them?
- 3 *Investment.* Would joining the EMU create better conditions for firms making long-term decisions to invest in the UK?
- 4 *Financial services.* What impact would entry into the EMU have on the competitive position of the UK's financial services industry, particularly the City's wholesale markets?
- 5 *Growth, stability and employment.* In summary, will joining the EMU promote higher growth, stability and a lasting increase in jobs?

In May 2003, the Chancellor released his first assessment. He found that the convergence and flexibility tests were not met, that the investment and financial services tests were met, and the fifth test would be met when the first two were met. From this, he concluded that the UK was not yet ready, adding: 'We will report on progress in the Budget next year. We can then consider the extent of progress and determine whether on the basis of it we make a further Treasury assessment of the five tests which – if positive next year – would allow us at that time to put the issue before the British people in a referendum.'<sup>1</sup> There has been no further assessment of this sort.

Two characteristics of this procedure are striking. First, the heavy and explicit use of OCA economic principles. Test 1 deals with the presence of asymmetric shocks, test 2 with the ability to cope with asymmetric shocks, with heavy emphasis on labour markets, while test 3 looks at capital mobility. Test 5 summarizes the OCA approach. Test 4 is specific to the UK's specialization in financial services. Second, the tests are specified in an obviously intended vague way, leaving the Chancellor free to implicitly weigh the political aspects of the undertaking.

<sup>1</sup>The various documents are available on [www.hm-treasury.gov.uk/](http://www.hm-treasury.gov.uk/). They include a large number of specially commissioned studies that are well worth reading.

### 15.6.1 Labour mobility

There are always people who move, but do they move enough and as the Mundell criterion wants them to, in response to asymmetric shocks? Do they promptly take advantage of any difference in earnings, and move to where they can earn more? Is moving better than being unemployed? There are many impediments to migration.

Migrants have to consider many economic issues, such as:

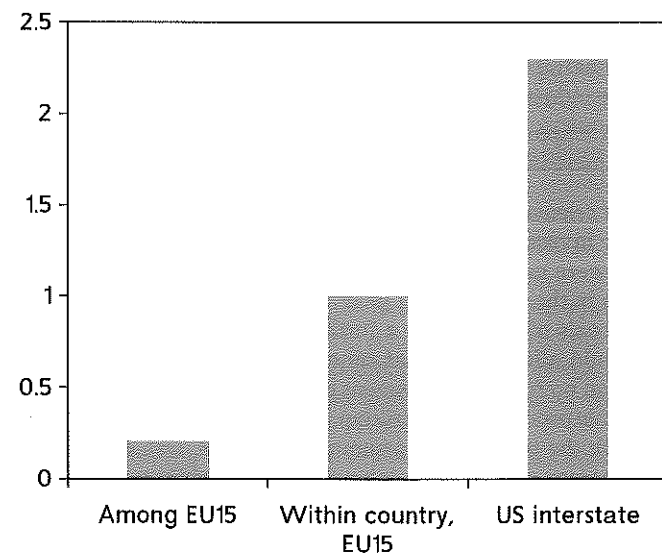
- the cost of moving, possibly including the selling and buying of dwellings;
- the prospect of becoming unemployed, both in the country of origin and in the country of immigration;
- career opportunities, which means not only current but also future earnings;
- family career prospects, including the spouse and children and sometimes even more distant relatives;
- social benefits, including unemployment, health and retirement;
- taxation of earnings from both labour and savings.

Labour mobility is also subject to non-economic incentives, such as:

- cultural differences (language, religion, traditions, possibly racism and xenophobia) in the country considered for immigration;
- family and friendship links that can be weakened;
- commitment to one's country of origin (nationalism).

For these reasons, labour mobility can only be limited. A natural approach is to compare Europe with existing, well-functioning currency areas, such as the USA. Figure 15.9 shows that mobility across countries is considerably lower in Europe than in the USA. This is not really surprising; moving across countries entails many of the difficulties listed above. What is more telling is to observe that mobility within countries remains much smaller in Europe.

Figure 15.9 Labour mobility in Europe and the USA, 2008



Note: Mobility is measured as the proportion of the population that has moved from another country in Europe, from another state in the USA. The EU15 refers to the 15 members of the Eurozone in 2008.

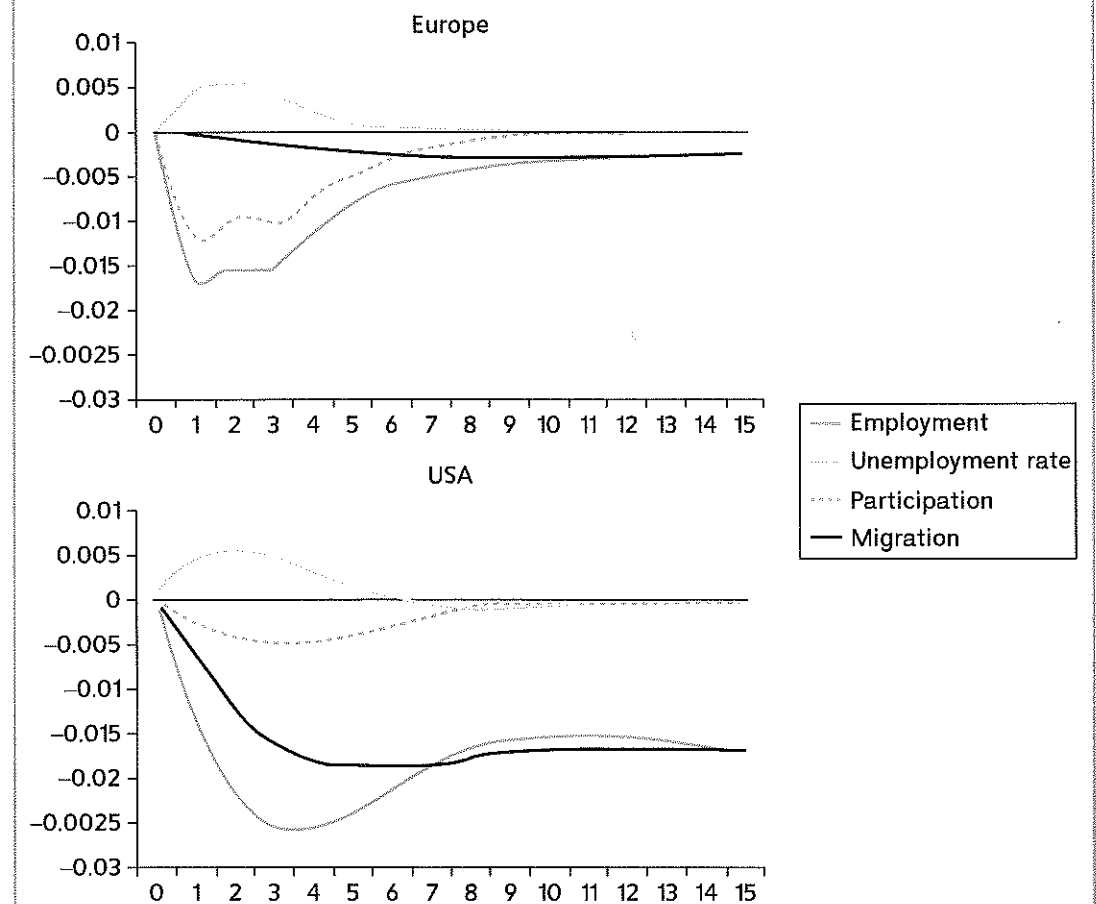
Source: European Commission, *Geographic Mobility in the European Union*, Directorate for Employment, Social Affairs and Equal Opportunities, April 2008

Why do Europeans move so little? Across countries, there are many reasons, some obvious such as language and tradition, others less well appreciated, such as health insurance, retirement pension systems or the fact that housing tends to be more expensive and the housing market less fluid in Europe than in the USA. But within countries? Cultural issues and welfare protection – which alleviates the pain of unemployment – seem to matter.

### Box 15.8 The effects of asymmetric shocks in Europe and the USA

How does Europe's low labour mobility affect the response to an asymmetric shock? A study by Fatás (2000) compares Europe and the USA. Fatás looks at 51 regions in the USA (the 50 states and the District of Columbia) and at 54 regions in Europe (a decomposition of 14 countries, all EU countries with the exception of Luxembourg). He asks what happens when an adverse asymmetric shock occurs, i.e. when it affects just one region. Figure 15.10 shows the result. The figure depicts the joint behaviour of total

Figure 15.10 Labour market responses



Source: Fatás (2000)



employment, unemployment and the participation rate in each region (all compared with the overall situation in the USA and Europe, respectively).<sup>1</sup> Obviously, employment declines and, for the same shock size, the effect is quantitatively similar in Europe and the USA. The difference lies elsewhere. In the USA, most of the drop in employment is met by regional emigration; people move to more fortunate parts of the country. In Europe, instead, most of the drop in employment is met by a fall in the participation rate; people withdraw from the labour force and stay at home. Interestingly, in the long run, in the USA those who leave do not return, and in Europe those who stop working remain inactive.

This study corroborates a key element of OCA theory: labour mobility crucially affects the response to asymmetric shocks. The twist is that, with low European labour mobility, following an adverse shock, people become unemployed and many others simply give up the hope of working.

<sup>1</sup> Box 8.1 defines employment, unemployment and participation rates.

Low migration by European nationals could be compensated by immigration from outside the EU.<sup>7</sup> If immigrant workers were to move to where job offers exceed supply, some of the costs of a monetary union would be reduced. Even viewed this way, immigration – a big political issue in Europe – is relatively limited in Europe, as shown in Chapter 8.

In summary, Europe is far from fulfilling the labour mobility criterion. An important implication is that asymmetric shocks, when they occur, are likely to be met by unemployment in countries facing a loss of competitiveness. Box 15.8 reports that, indeed, when asymmetric shocks occur, migration plays a smaller role in Europe than in the USA, with the unfortunate result that employment takes most of the burden.

### 15.6.2 Diversification and trade dissimilarity

The Kenen criterion rests on the idea that asymmetric shocks are less likely among countries that share similar production patterns and whose trade is diversified. Figure 15.11 presents an index of dissimilarity within European trade. The index looks at how each country's trade structure differs from the situation in Germany (old members) or the Eurozone (new members). The index is based on the decomposition of trade into three classes of goods: agriculture, minerals and manufacturing.

Dissimilarity is highest for Latvia and Denmark, two countries that have not joined the Eurozone, but it is also low for non-member countries such as the Czech Republic, the UK and Hungary. Of interest is the case of the Netherlands, a natural gas exporter that sets it apart and yet it is an enthusiastic member of the Eurozone. The Dutch authorities must believe that the costs are outweighed by the benefits since their economy is deeply integrated with the European economy and they wish to be deeply involved in European integration.

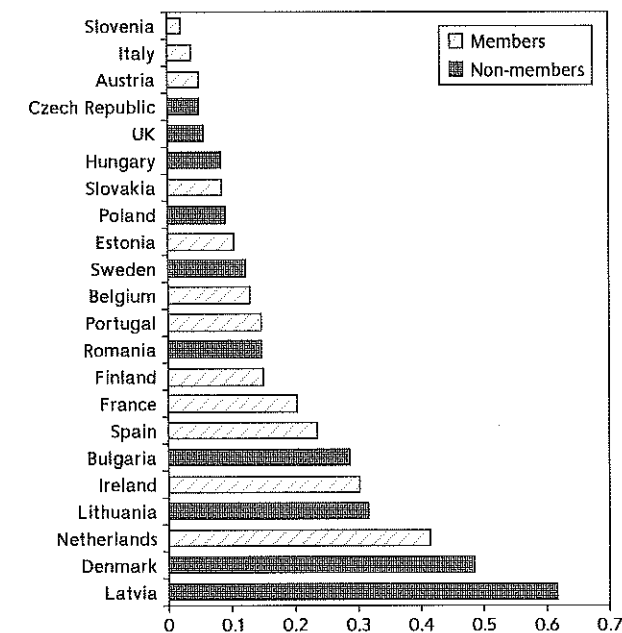
### 15.6.3 Openness

Openness, which may reduce the usefulness of an independent exchange rate, is usually defined as the share of economic activity devoted to international trade. The ratio of exports to GDP measures the proportion of domestic production that is exported. The ratio of imports to GDP measures the proportion of domestic spending that falls on imports. The openness index presented in Figure 15.12 sums up both (and can go beyond 100 per cent). Most European countries are very open, the more so the smaller they are, which explains why the smaller countries have traditionally been the most enthusiastic supporters of the monetary union. This applies to both old and new EU member countries.

As far as the McKinnon criterion is concerned, most EU economies qualify for joining a monetary union. They are very open and well-integrated within Europe.

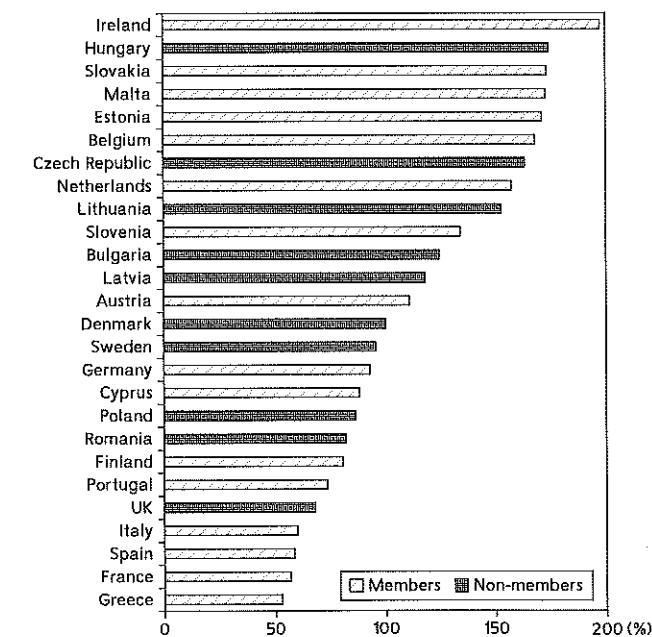
<sup>7</sup> See Chapter 8 for an analysis of immigration.

Figure 15.11 Trade dissimilarity index



Note: The index measures the difference between individual countries' trade structures and those of its partners.  
Source: Horváth (2007)

Figure 15.12 Openness to trade, 2011



Note: The index is the ratio of the sum of exports and imports to GDP.  
Source: AMECO, European Commission

### 15.6.4 Fiscal transfers

Up until the debt crisis, there was no cyclical transfer system in the EU. The EU budget is small, slightly above 1 per cent of GDP, and almost entirely spent on three items: the Commission's operating expenses, the Common Agricultural Policy and the Structural Funds which support the poorer regions irrespective of whether they are hit by shocks. The crisis has led to the creation of the European Financial Stability Facility (EFSF), transformed into the European Stability Mechanism (ESM), as explained in Chapter 19. Initially designed specifically to deal with public debt crises, the ESM can also be used for bank recapitalization. It may evolve over time to deal with a wider set of disturbances. On this criterion, Europe is definitely not an optimum monetary union, although a first small step has been taken.

### 15.6.5 Homogeneous preferences

Do all countries share similar views about the use of monetary policy? On the basis of past inflation rates, this does not seem to be the case. Low-inflation Germany and formerly high-inflation Italy or Greece have very little in common. Similarly, looking at public debt (Chapter 18), a gulf separates European countries' approaches to fiscal policy. So, is the verdict negative? It may be too early to tell but the crisis shows that these concerns are real.

Why has the quality of macroeconomic policies been so diverse in Europe? Is it in the genes? Medical research has not yet revealed any clues! But economic research has a lot to say about the incentives facing policy makers. Broadly defined, political institutions shape their reactions to various events, and policy-making institutions differ from one country to another. This includes the respective roles of the executive and the parliament, the number of political parties and trade unions, the role of ideology and much more.

The solution has been to accompany integration steps with the setting up of common institutions. In fact, one reason why the inflation-prone countries have been eager to join the monetary union is that it provides for a degree of monetary policy discipline that has been elusive in the past. As far as the single currency is concerned, Chapter 17 shows that a key preoccupation has been to guarantee macroeconomic stability. The European Central Bank is strongly independent and constitutionally committed to price stability. National deficits are bound by an excessive deficit procedure. Still, although all countries are increasingly operating under common institutions, they do not fully share the same views on each and every issue that arises.

The result is occasional friction among governments and a sense of estrangement expressed in public opinion, which was particularly visible when the Constitution was rejected in the spring of 2005. More seriously, these divergences have been on public display during the debt crisis. As recounted in Chapter 19, they explain the inadequacy of policy responses.

We can conclude that there remains some heterogeneity among national preferences. This criterion is only partly fulfilled.

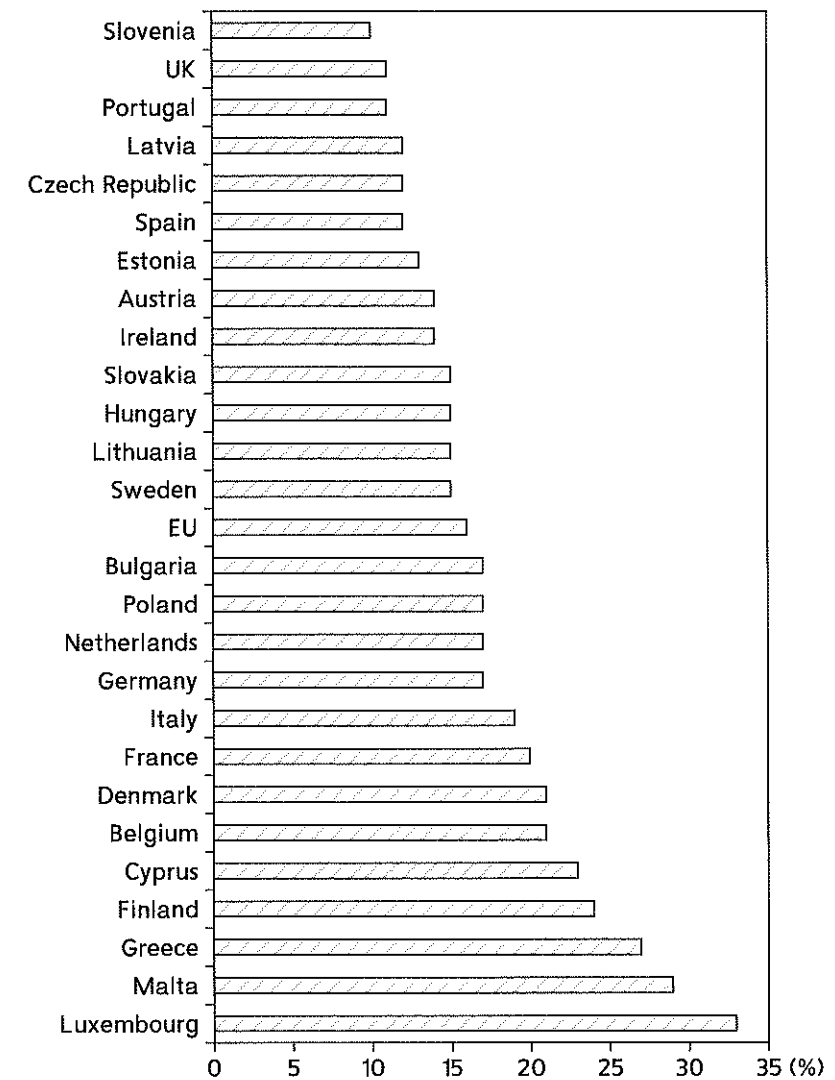
### 15.6.6 Solidarity vs. nationalism

How deeply do European citizens feel a sense of solidarity? Put differently, to what extent are they willing to give up elements of national sovereignty in the pursuit of common interest? There is no simple, uncontroversial way to measure the willingness of European citizens. An indication is given in Figure 15.13, however, based on the results of an opinion poll conducted in 2006 that asked respondents whether they felt European.<sup>8</sup> On average, 16 per cent said they 'often' felt that way; 43 per cent said 'never'; and 38 per cent said 'sometimes'. The figure shows the 'often' answer for each country. Clearly, European citizenship is not a widely-felt sentiment. On the other hand, less than half of Europeans never feel European, although this is the case for two-thirds of British citizens! Clearly, the glass is half full or half empty!

The European debt crisis offers a real-life test of this question. As Chapter 19 explains, the initial reaction to the Greek debt crisis was to extend collective support, very explicitly in the name of solidarity. As the crisis deepened, however, nationalistic sentiments started to be expressed. According to Reuters,

<sup>8</sup> This is the most recent poll conducted on on this issue. Tellingly perhaps, the question has not been asked since.

Figure 15.13 Feeling European?



Note: Percentage of people who respond 'often' when asked: 'Do you ever think of yourself as not only (nationality), but also European? Does this happen often, sometimes or never?'

Source: Eurobarometer ([http://ec.europa.eu/public\\_opinion/cf/index.cfm](http://ec.europa.eu/public_opinion/cf/index.cfm))

the German newspaper *Bild* 'lambasted Greece as a nation of lazy cheats who should be "thrown out of the euro on their ear"'. To which slur some Greek deputies responded: 'By their statements, German politicians and German financial institutions play a leading role in a wretched game of profiteering at the expense of the Greek people.'<sup>9</sup>

All in all, Europe is not scoring very highly on this criterion; neither, however, is it failing badly.

<sup>9</sup> <http://www.reuters.com/article/2010/02/18/greece-germany-idUSLDE61H11Z20100218>.

### 15.6.7 So, is Europe an optimum currency area?

In the end, most European countries do well on openness and diversification, two of the three classic economic OCA criteria, and fail on the third, labour mobility. Europe also fails on fiscal transfers, with an unclear verdict on the remaining two political criteria. Table 15.1 summarizes this appraisal. The mixed performance that it reveals can be interpreted in two ways.

Table 15.1 OCA scorecard

Criterion	Satisfied?
Labour mobility	No
Trade openness	Yes
Product diversification	Yes
Fiscal transfers	No
Homogeneity of preferences	Partly
Commonality of destiny	?

First, the table explains why the single currency project has been and remains controversial. Neither the supporters nor the opponents have been able to produce an overwhelming case. That was only to be expected, however. A monetary union entails costs and benefits, neither of which can be measured nor even compared. The OCA criteria themselves are not black or white, entirely satisfied or entirely violated. Ultimately, the economic case is undecided, and the decision to create the monetary union must rest on political considerations.

Second, the partial fulfilment of the OCA criteria implies that, given that the decision to go ahead has been taken, costs will be involved. The OCA theory identifies these costs and suggests two main conclusions: the costs will mainly arise in the labour markets and fiscal transfers will have to be rethought. It is often argued that the Eurozone crisis is a proof that Europe is not an optimum currency area. That, we knew. The crisis simply reminds us that asymmetric shocks do happen and that they can be painful. This is the fate of every large monetary union, as Box 15.1 reminds us.

## 15.7 Is Europe becoming an optimum currency area?

The endogeneity hypothesis presented in Section 15.5 is puzzling. More than 15 years after the creation of the euro, are there any signs of endogeneity? Much has changed regarding the political criteria, as explained in Chapter 19. Here, we take a brief look at the three economic criteria.

### 15.7.1 Effects on trade

Many European policy makers strongly believe that stable exchange rates promote trade integration. Indeed, as explained in Chapter 14, this conviction coupled with the impossible trinity principle has driven the process of monetary integration. As time passes, we can start evaluating the impact of the single currency on intra-Eurozone trade.

When the monetary project was initially mooted, this issue was intensely debated. Policy-makers were understandably keen to believe that intra-Eurozone trade would quickly deepen, and they may well have oversold the case. A body of economic research, reviewed in Box 15.9, backed this view.

### 15.7.2 Effects on specialization

More trade integration within the Eurozone may have a disquieting effect, however. If trade leads to more specialization as each country or region focuses on its comparative advantage, then the Kenen

### Box 15.9 The Rose and border effects

Andrew Rose, from the University of California at Berkeley, initially found that trade within a pair of countries that belong to a currency area is three times larger than trade within otherwise similar countries (2000). Another approach has been to look at trade in border areas. Engel and Rogers (1996) focused on the border between the USA and Canada. They observed that the prices of the same goods in different cities become increasingly different the further apart are the cities. Their calculations imply that just crossing the border has the same effect as travelling 3000 km within the same country. Further work has shown that, among the various reasons why borders matter, the fact that currencies differ plays a powerful role.

These effects are huge, so huge that they are unbelievable. A large literature has explored the robustness of these results. Reviewing the Rose effect, Baldwin et al. (2008) conclude that, so far, the euro has probably increased trade by some 5 per cent. This is much smaller than initially found, yet it remains a significant effect and the process is likely not to be complete. The same study also attributes to the common currency an increase in cross-border investments and mergers and acquisitions. This means that firms increasingly operate by assembling parts manufactured in different countries.

diversification criterion may become less fulfilled as time goes by. If, instead, trade integration takes the form of intra-industry trade, then diversification will increase. This would occur if exports and imports include increasingly similar goods. In that case, every country produces the whole range of goods, simply with different brands, offering customers more choice. The jury is still out, but the evidence accumulated so far seems to support the view that diversification increases with trade integration. In that case, the Eurozone is becoming more of an OCA.

### 15.7.3 Effects on labour markets

European labour mobility is low and few expect it to increase dramatically in the near future. An alternative to mobility is flexibility, and the argument runs as follows. European labour markets are noticeably less flexible than their US counterparts. For example, in the USA firms are quite free to fire workers when economic conditions worsen, whereas in Europe firing is costly because it entails severance pay and adherence to numerous regulations. In addition, US unemployed workers receive less generous welfare support, which encourages them to find and accept another job as soon as possible, sometimes elsewhere in the country, possibly less well paid and in a different activity. Can the loss of the exchange rate encourage reforms in this area?

One possibility is that the single currency increases the costs involved in the 'European way' and reduces opposition to measures that aim at making labour markets more flexible. When each country had its own currency, workers advocated using monetary policy and the exchange rate to boost the economy. This is now impossible, at least at the national level, and to date there are no pan-European trade unions. In addition, the increasing transparency in goods prices should benefit countries where labour markets are more flexible. Thus, it is believed, economic competition will indirectly lead to competition among individual countries' welfare programmes, which will shift the trade-off between economic performance and labour protection. The opposite, a hardening of labour market rigidities, is possible too. This possibility is based on an increasing emphasis on 'Social Europe'. Advocates of a high degree of labour protection understand well the risk of competition among welfare programmes and have successfully called for the adoption of Union-wide minimum standards.

There is no clear evidence yet of where things are going. The European crisis may act as a trigger. Under heavy pressure, the Greek and Irish governments have pushed forward wage cuts in the public sector. If this is confirmed, it would be an illustration of how OCA principles operate. Non-fulfilment of a criterion makes the common currency difficult and costly, possibly leading to a crisis situation. The crisis in turn breaks down barriers to reform. Of course, an alternative scenario is that it is the common currency that breaks down. At the time of writing, both outcomes are plausible.

### 15.7.4 Fiscal transfers

Much the same applies to fiscal transfers. In a previous edition of this book we wrote: 'There is at present no political support for established extensive and automatic intra-European transfers, but proposals regularly surface. ... It is reasonably certain that, in the not-too-distant future, Europe will have adopted some form of transfer scheme.' Some schemes are currently being hotly debated. They are examined in Chapter 19.

### 15.7.5 Beyond the OCA criteria: politics

We have reached two important conclusions. First, Europe is not exactly an optimum currency area; it does well on some but not all of the criteria. Second, it is not merely labour mobility that is insufficient; more generally, the labour markets display significant rigidity, especially in the large countries. In these countries, the monetary union may worsen an already painful situation of high unemployment.

It is natural therefore to ask why the European heads of state and government who gathered in Maastricht in 1991 still decided to take the risk and set up a monetary union. The answer is: politics.<sup>10</sup> Interestingly enough, Harvard economist Martin Feldstein, a sharp critic of the single currency, sees it as a source of conflict:

*Political leaders in Europe seem to be prepared to ignore these adverse consequences because they see EMU as a way of furthering the political agenda of a federalist European political union. ... The adverse economic effects of EMU and the broader political disagreements will nevertheless induce some countries to ask whether they have made a mistake in joining. Although a sovereign country could in principle withdraw from the EMU, the potential trade sanctions and other pressures on such a country are likely to make membership in EMU irreversible unless there is widespread economic dislocation in Europe or, more generally, a collapse of peaceful coexistence within Europe.*

Feldstein, 1997, p. 41

In Feldstein's view, the euro is not only unjustified on economic grounds (it is not an OCA)<sup>10</sup> but its survival will require a major step towards a federal Europe, including common defence and foreign policies as well as a generalized harmonization of taxation and labour market regulations. In every member country of the Union, a large number of people share this view and are adamant in their desire to preserve the nation-state.

Indeed, political considerations have been paramount in launching the euro. It is fair to say that the political leaders who agreed on the monetary union did not consider the OCA theory at all (see Box 15.10). They were largely focusing on the symbolic nature of the undertaking. Precisely because money and statehood are intertwined, their intention was to move one step further in the direction of an 'ever-closer union'.

#### Box 15.10 The return of the OCA theory

The negotiators who prepared the Maastricht Treaty did not pay attention to the OCA theory. They were first and foremost heeding the impossible trinity principle, focusing on the need to preserve exchange rate stability in the wake of full capital movement liberalization. They were also concerned that the new currency be as strong as the Deutschmark, hence the tough entry conditions detailed in Chapter 16. Overall they believed that, if the countries allowed into the monetary union had sufficiently converged, and if the new central bank was well protected from political interference, then the undertaking would work.

<sup>10</sup> For a detailed discussion, see the exchange between Feldstein and Wyplosz in the *Journal of Economic Perspectives*, 11(4): 3-42, 1997.



European Central Bank, 17 June 2005. Left to right: Charles Wyplosz, Adam Posen (IIE, Washington), Robert Mundell, Ronald McKinnon, Vitor Gaspar (then at the Bank of Portugal) and Otmar Issing (then Chief Economist of the ECB)

This view was at variance with the opinion of many economists that the OCA criteria were more important and that due account should be paid to the difficulties that would inevitably arise because the Mundell criterion was not satisfied. The authorities are now rediscovering the importance of the OCA theory; for instance, the European Central Bank had already convened a conference, in June 2005 – where both authors of this text were asked to present their views – which paid tribute to the OCA theory and its inventors. The photograph shows the panel of the concluding session.

The Eurozone crisis has served as a profound revelator of the dangers of overlooking the OCA principles when forming a monetary union. Labour mobility has increased, but it has affected Greek doctors and Spanish engineers, who were snapped up

in Germany. Unqualified workers were left out in the cold. Crucially, political criteria have suddenly taken centre stage. Crisis-hit countries have clamoured for transfers, but the better-off countries have offered only loans that add to existing debts. Solidarity has not done well either: countries have not been reticent in criticizing each other, sometimes fiercely. This has led to open debate about whether Europe really has a *common* destiny; the popularity of anti-Europe parties has surged in virtually every country, even those outside the Eurozone such as the UK and Hungary.

### 15.8 Summary

The OCA theory seeks to determine over what geographic area it is desirable to establish a single currency. The key insight is that the usefulness of money grows with the size of the area but costs arise when the area becomes too diverse.

Diversity matters mostly because it is a source of asymmetric shocks. In the presence of price and wage rigidity, however, the exchange rate can be a powerful instrument to deal with shocks. This is why giving up the exchange rate can be costly. The OCA theory asks what characteristics may either reduce the incidence of asymmetric shocks or take the edge off them.

The logic of OCA theory is summarized in Figure 15.14. The first question is whether asymmetric shocks are likely to occur often enough, and strongly enough, to be a serious concern. If the answer is negative, the cost of adopting a common currency is low. The McKinnon and Kenen criteria provide the answer. The McKinnon criterion says that the exchange rate is of limited use if the countries are very open. The Kenen criterion concludes that countries that produce and trade a wide range of similar goods are unlikely to face asymmetric shocks on a frequent basis.

If these criteria are not well satisfied, asymmetric shocks should be expected and the next question is whether the area is well equipped to deal with them. The Mundell criterion says that, in the absence of wage and price flexibility, labour mobility provides a way of cushioning the impact of asymmetric shocks. In the absence of labour mobility, asymmetric shocks will be costly.

The next question is whether there is a way of compensating for these shocks. It takes us to the political criteria. An obvious compensation takes the form of financial transfers. Transfers offer an insurance mechanism; a country will receive transfers when adversely hit, and will support other member countries when they face a shock. These transfers can be automatic, via taxes and welfare payments, or explicit, based on formal sharing rules.

In the presence of asymmetric shocks, the common central bank will have to make hard choices. It must decide how it caters to the varied needs of individual member countries. This is bound to be a controversial



- What impact would entry into the EMU have on the competitive position of the UK's financial services industry, particularly the City's wholesale markets?
- In summary, will joining the EMU promote higher growth, stability and a lasting increase in jobs?

Evaluate these tests.

- 6 Would the European Monetary Union benefit from British or Swedish membership?
- 7 Write a fictional story in which the European monetary union is dissolved. Carefully explain each step in the process.
- 8 Imagine that you are the governor of the central bank of Poland (or Hungary or the Czech Republic). Would you be for or against your country adopting the euro?

### Further reading: the aficionado's corner

Is Europe an OCA?

In May 2003, the UK government undertook a study on EMU membership, in fact closely following the OCA criteria. This study represents an excellent way of putting to work the material presented in this chapter:

**HM Treasury** (2003) *UK Membership of the Single Currency*, HMSO, Norwich. Also available, with additional detailed studies, at [www.hm-treasury.gov.uk](http://www.hm-treasury.gov.uk).

The central bank of Poland went through a similar exercise:

**National Bank of Poland** (2004) *A Report on the Costs and Benefits of Poland's Adoption of the Euro*, [http://www.nbp.pl/en/publikacje/e\\_a/euro\\_adoption.pdf](http://www.nbp.pl/en/publikacje/e_a/euro_adoption.pdf).

A concise summary of the debates throughout Europe before the adoption of the euro can be found in:

**Wyplosz, C.** (1997) 'EMU: why and how it might happen', *Journal of Economic Perspectives*, 11(4): 3–22.

The three classic OCA criteria:

**Kenen, P.** (1969) 'The theory of optimum currency areas', in R. Mundell and A. Swoboda (eds) *Monetary Problems of the International Economy*, Chicago University Press, Chicago.

**McKinnon, R.** (1962) 'Optimum currency areas', *American Economic Review*, 53: 717–25.

**Mundell, R.** (1961) 'A theory of optimum currency areas', *American Economic Review*, 51: 657–65.

An advanced treatment of the OCA theory:

**De Grauwe, P.** (2009) *Economics of Monetary Union*, Oxford University Press, Oxford.

A detailed review of OCA theory and evidence:

**Mongelli, F.P.** (2002) *New Views on the Optimum Currency Area Theory: What is EMU Telling Us?*, Working Paper 138, ECB, April, <https://www.ecb.europa.eu/pub/pdf/scpwp/cebwp138.pdf>.

A post-crisis vindication of OCA theory to prove that Europe was wrong to adopt the common currency by an early critic:

**Krugman, P.** (2012) 'Revenge of the optimum currency area', <http://krugman.blogs.nytimes.com/2012/06/24/revenge-of-the-optimum-currency-area/>.

A post-crisis vindication of OCA that argues that the crisis was to be expected:

**Pasimeni, P.** (2014) 'An optimum currency crisis', <http://mpira.ub.uni-muenchen.de/53506/>.

Labour mobility, an update on Box 15.8:

**Dao, M., D. Furceri and P. Loungani** (2013) 'Moving closer? Changing patterns of labour mobility in Europe and the US', VoxEU, <http://www.voxeu.org/article/labour-mobility-europe-and-us>.

Price convergence:

**Cavallo, A., B. Neiman and R. Rigobon** (2013) 'The euro and price convergence: you wanted it ... you got it!', Vox EU, <http://www.voxeu.org/article/euro-and-price-convergence>.

The Hume mechanism at work:

**Auer, R.** (2013) 'Rapid current-account rebalancing in the southern Eurozone', Vox EU, <http://www.voxeu.org/article/rapid-current-account-rebalancing-southern-eurozone>.

### References

- Baldwin, R., V. DiNino, L. Fontagné, R. De Santis and D. Taglioni** (2008) *Study on the Impact of the Euro on Trade and Foreign Direct Investment*, European Economy – Economic Papers 321, European Commission.
- Engel, C. and J. Rogers** (1996) 'How wide is the border?', *American Economic Review*, 86 (December): 1112–25.
- Fatás, A.** (2000) 'Intranational migration: business cycles and growth', in E. van Wincoop and G. Hess (eds) *Intranational Macroeconomics*, Cambridge University Press, Cambridge.
- Feldstein, M.** (1997) 'The political economy of the European Economic and Monetary Union: political sources of an economic liability', *Journal of Economic Perspectives*, 11(4): 23–42.
- Horváth, R.** (2007) 'Ready for euro? Evidence on EU new member states', *Applied Economics Letters*, 14(14): 1083–36.
- Jonung, L. and J. Vlachos** (2007) *The Euro – What's in it for me? An Economic Analysis of the Swedish Euro Referendum of 2003*, European Economy – Economic Papers 296, Directorate General Economic and Monetary Affairs, European Commission.
- Mundell, R.** (1973) 'A plan for a European currency', in H. Johnson and A. Swoboda (eds) *The Economics of Common Currencies*, George Allen & Unwin, London.
- Rose, A.** (2000) 'One money, one market: the effects of common currencies on trade', *Economic Policy*, 30: 7–46.

## Annex: Aggregate demand and aggregate supply

This annex presents an extended explanation of why the  $AD$  curve is downward sloping and the  $AS$  curve is upward sloping.

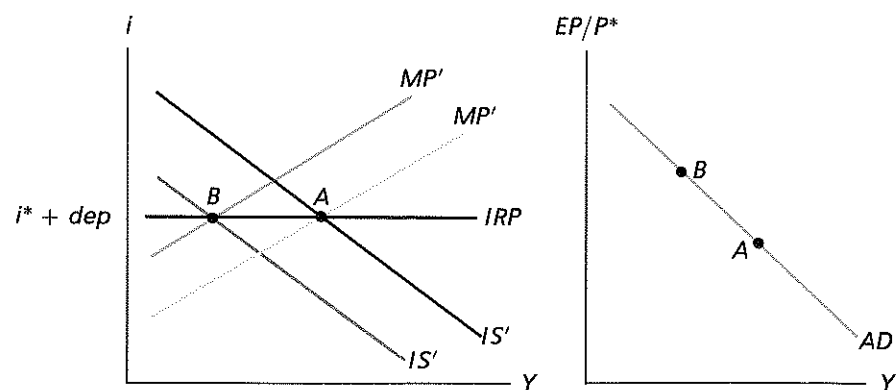
### A15.1 Aggregate demand

Aggregate demand is directly related to the  $IS-MP-IRP$  framework developed in Chapter 13. Looking at Figure A15.1, we ask what happens when the real exchange rate  $EP/P^*$  appreciates, which reduces demand for our good. As we do so, we assume that it is  $P$  that rises, not  $P^*$  that declines because we take the rest of the world 'as given'. As for the nominal exchange rate  $E$ , it is either left to float, and its evolution is part of the analysis, or fixed. Starting from point  $A$  in the left-hand chart of Figure 15.6, the  $IS$  schedule shifts to the left, to the  $IS'$  position. What happens next depends on the exchange rate regime.

When the exchange rate is fixed, the  $MP$  schedule is irrelevant because the central bank has lost its autonomy. The economy moves to point  $B$ : as expected, the loss of competitiveness leads to a fall in demand. The effect is shown in the right-hand chart: a real appreciation takes the economy from point  $A$  to point  $B$ . The  $AD$  schedule is indeed downward sloping.

When the exchange rate is flexible, the  $IS$  schedule moves passively to meet the intersection of the  $MP$  and  $IRP$  schedules. However, the central bank is now autonomous. As explained in Box 15.2, central banks are committed to price stability. As the price level  $P$  has increased, the central bank will typically want to counteract this change. To do so, it will raise its interest rate over and above what is warranted by the activity level. This is captured by an upward shift of the  $MP$  schedule, to  $MP'$  in the left-hand chart of Figure 15.6. The economy moves to point  $B$ . (To keep the chart clean, we assume that  $MP'$  goes through point  $B$ , but that does not have to be the case; anyhow, it will intersect the  $IRP$  line to the left of point  $A$ , which is what matters.) Note that the  $IS$  curve will meet the two other schedules at point  $B$  by moving left, as the monetary policy tightening triggers capital inflows, which lead to a nominal exchange rate appreciation, further raising the real exchange rate. Transposing this result to the right-hand chart delivers the downward-sloping schedule  $AD$ .

Figure A15.1 The aggregate demand schedule



### A15.2 Aggregate supply

We have looked so far at what customers – domestic and foreign households, firms and governments – intend to buy. This is why we refer to the above curve as representing aggregate demand. But how do we know that the producers are ready to supply this exact quantity of goods? Each firm has equipment and a workforce in place. It is set up to produce the corresponding quantity of goods. But if demand is weak, it will obviously produce less, keeping workers idle or working shorter hours and possibly even firing some of them. If demand is strong, it can increase output by hiring more workers or asking for extra hours. In responding to demand, firms look at their profitability: when is it worth changing the level of activity?

A key profitability criterion is the price at which it sells goods. If the price rises, it is worthwhile facing the added costs and producing more. When the price declines, the firm needs to make savings, which means producing less with fewer workers. This is why the aggregate supply ( $AS$ ) schedule, which represents all the production of all the domestic firms, is shown as upward sloping in Figure A15.2.

A little detail is important: in Figure A15.2, the vertical axis displays the real exchange rate  $EP/P^*$ , not just the domestic price level  $P$ . The reason is that the production of most goods (and services) involves the use of imported goods, such as parts, energy based on imported oil or gas, possibly licences, etc. For domestic producers, these are costs, measured in domestic currency as  $P^*/E$ . If they rise, and  $EP/P^*$  declines, profitability declines and firms will reduce the supply. Once again, the relevant measure of external competitiveness is  $EP/P^*$ , the ratio of the domestic price level  $P$  to the foreign price level  $P^*/E$ , both expressed in the domestic currency.

### A15.3 General equilibrium with the real exchange rate

We are now equipped with an analysis of aggregate demand  $AD$ , derived from the results from Section 15.3, and with the aggregate supply schedule  $AS$ . General equilibrium occurs when demand and supply are equal, given equilibrium conditions in the goods market ( $IS$ ) and in the financial markets ( $IRP$ ). This is shown in Figure A15.2 as the intersection of  $AD$  and  $AS$ .

Figure A15.2 Aggregate supply

