

[Homepage](#) [Recent Policy Essays](#)

The Euro and the Stability of the International Monetary System

Robert Mundell

Columbia University

January 1999

1. An Epoch-Making Event
2. Great International Currencies
3. Features of Great Currencies
 - Size of Transactions Domain
 - Stability of Monetary Policy
 - Absence of Controls
 - Strength and Continuity of the Central State
 - The Fall-Back Factor
4. Liquidity Effects
 - Efficiency Effect
 - Money Multiplier: Level
 - Money Multiplier: Stability
 - Redundant Reserves from Pooling
 - Automatic Credit
 - International Demand for Euros
 - Diversification Problem
5. Expansion of the Euro Area
 - EU-4
 - CEEC-5
 - CEEC-6
6. International Reactions and the Dollar-Euro Rate
7. Stability of the International Monetary System
 - Exchange Rate Volatility
 - Stability of Currency Areas
 - Dynamic Stability
8. Conclusions

References

Paper presented at a conference sponsored jointly by the Luxembourg Institute for European and International Studies and the Pierre Werner Foundation on "The euro as a stabilizer in the international economic system," December 3-4, 1998, at the European Conference Center, Luxembourg ville, the Grand Duchy of Luxembourg.

1. An Epoch-Making Event

The introduction of the euro at the beginning of 1999 promises to mark a turning point in the international monetary system. It is often compared with the transformation of the international monetary system in the early 1970s from the system of fixed exchange rates endorsed at the Bretton Woods conference to the regime of managed flexible exchange rates. But in fact its significance is deeper. The collapse of the Bretton Woods arrangements did not alter the power configuration of the international system. Both before and after the breakdown, the dollar was the dominant currency. The introduction of the euro, on the other hand, will challenge the status of the dollar and alter the power configuration of the system. For this reason the introduction of the euro may be the most important development in the international monetary system since the dollar replaced the pound sterling as the dominant international currency soon after the outbreak of World War I.⁽¹⁾

If it is true that the euro will challenge the dollar in the system, will the new international monetary system be more or less unstable? The answer to this question depends in part on the meaning attached to stability. The word as defined in the dictionary has at least three relevant meanings: (a) the state or quality of being stable, or fixed; (b) resistance to change, or permanence; or (c) the tendency of an equilibrium position to be restored after an initial displacement. All three of these meanings have relevance to the euro, as indicated by the following three questions:

- (a) Will economic variables, say exchange rates, fluctuate more or less as a result of the introduction of the euro?
- (b) Will the euro create a new configuration of currency areas that will last for, say, several decades in the 2000s?
- (c) Will the euro alter the convergence conditions of exchange rate dynamics: will it turn a stable system into an unstable one or aggravate any instability of the existing system?

These issues will be addressed in this paper. First, however, we shall try to see what history and theory says about how well the euro will stack up against the dollar. We begin by discussing the characteristics of currencies that have in the past become successful "dominant" international currencies.

2. Great International Currencies

From among the thousands of currencies ever struck or issued, economists can achieve a grand simplification by distinguishing those currencies that have had a critical systemic significance for the international economy. Today

we would be able to count on the toes of one foot the currencies besides the dollar that are in some meaningful sense critical to the functioning of the international monetary system. So it has been in every age in history since money, or at least coinage, was invented. The dollars of the twentieth century, the pounds of the nineteenth century and the livres of the eighteenth century all have their counterparts in earlier centuries. Without attempting to seek generality or completeness, Table 1 lists some of the main international currencies of earlier eras with the great powers that produced them.

GREAT CURRENCIES AND GREAT POWERS				
	PERIOD	GOLD	SILVER	PAPER
Greece	7th-3rd C. BC	stater	drachma	
Persia	6th-4th C. BC	daric	shekel	
Macedonia	4th - 2nd C. BC	stater		
Rome	2nd C. BC - 4th C.	aureus	denarius, sesterce	
Byzantium	5th - 13th C.	solidus (bezant)	siliquea	
Islam	7th - 13th C.	dinar	dirhem	
Franks	8th - 11th C.		denier	
Italian City States	13th - 16th C.	florin, sequin, ducat	grosso	
France	13th - 18th C.	denier	livre, louis d'or	
Holland	17th - 18th C.	guilder (gulden)	stiver	stivers, 1573
Germany	14th - 19th C.		thaler	
France	1803 - 1870	20-francs, 40-francs	franc	
Britain	1820 - 1914	pound or sovereign	shilling	paper pound
U.S.	1915 -	eagle	dollar	greenback
E.U.	1999 -			paper euro

A currency is "international" when it is used outside the domain in which it is legal tender, or when its fractions or multiples are imitated elsewhere. Typically even great currencies have piggybacked on the prestige of predecessors, only to usurp the latter's role. The practices of derivation and imitation have almost inadvertently provided a virtually-universal continuity to currency areas in the history of the international monetary system.

The Persian daric and the Greek stater were virtually the same coin. The Persian sigloi was modeled on the Babylonian shekel as was the Greek drachma. The Roman denarius was patterned on the drachma. The Islamic dinar was an imitation of the Roman aureus, solidus or besant; while the Islamic dirham was modeled on the Greek (and Sasanian) drachma. The Carolingian denier was modeled after the Islamic half-dirhem. The florins of Florence and sequins of Genoa were simply "light" or degraded aurei. The Dutch gulden was modeled on the Arabian maravedi. The US dollar was modeled on the Spanish dollar. Originality is not the stuff of what great international currencies are designed.

3. Features of Great International Currencies

What makes a currency important internationally? Obviously, confidence in its stability is a key characteristic. But stability depends on several factors: size of transactions domain; stability of monetary policy; absence of controls; strength and continuity of the issuing state; and fall-back value.

Size of Transactions Domain

Size in the sense of depth and breadth of the market is a measure of the degree to which a currency can exploit the economies of scale and scope inherent in money as a public good. The larger the transactions domain, the more capable a currency can act as a cushion against shocks. The larger the single-currency area, the better it can act as a cushion against shocks. If you consider a shock such as German unification, manifested in a debt-financed increase in annual government spending and transfers east of more than 150 billion DM, close to destabilizing the German economy, then think of the effect of the same shock on a smaller economy. Alternatively, think how much more easily the shock would have been handled had there been in 1992 a stable European currency!

Size feeds on itself because it produces stability and stability increases its attractiveness. The larger is the transactions domain, the more liquid the currency because the less any particular shock will depress the price. The size of a single-currency area determines its liquidity. A currency that is money for 100 million people is ten times more liquid than a currency that is money for 10 million. The most direct measure of the transactions domain is the money supply itself, but alternative surrogates, such as the GDP or magnitude of the capital market are also relevant.

Size is relative. How the euro will survive depends on the competition. Its two rivals are obviously the dollar and the yen. How such a tri-currency world would work out depends importantly on relative market sizes. From this standpoint, the outlook for the euro is very favorable. The EU-15 has a population of 375 million, and the EU-11, which includes those countries that entered EMU on the first round, contains 292 million, somewhat larger than the United States; by comparison, Japan has 125 million. At current exchange rates, the GDP of the EU-15 is running at the rate of \$8.4 trillion, that of the EU-11, at \$6.6 trillion. These compare to US GDP running at \$8.5 trillion and Japanese GDP at \$4.1 trillion. All of a sudden, with or without the four countries that will not proceed to EMU on the first round, the EU becomes a player on the same scale as the United States and Japan. Over time, as the other countries join, as the per capita incomes of the poorer members of EU catch up, and as the EU expands into the rest of Central Europe, the euro will have a substantially larger transactions domain than the dollar.

Openness also plays a role because it affects dependence. The less open, the more self-sufficient. As measured by the ratios of exports or imports to GDP, the "G-3" economies are about equally open. Of course the percentage of current exports to GDP in Europe is now around 30%, but when intra-European exports and imports are netted out, the openness figures are remarkably similar. It makes a difference of course whether openness is measured by exports or imports; economies with trade deficits will have higher import than export ratios. The US ratio of imports to GDP is the highest, at nearly 11%; the EU-15 and Japan's import ratios are substantially lower, at around 8%. With openness measured by exports, on the other hand, Japan's and the EU-15's ratios are around 9%, while the US's is a little over 8%. What emerges from these numbers is the significant fact that the three giant economies are all relatively closed, creating the risk that the monetary authorities may tend to underestimate the importance of the exchange rate and by neglect condemn the system to undesirable volatility.

Stability of Monetary Policy

The importance of the monetary policy stance scheduled for the EMU countries can hardly be underestimated. No currency has ever survived as an international currency with a high rate of inflation. Historically, the countries producing the great currencies have avoided inflation by maintaining the gold or silver content, with devaluation or debasement a comparatively infrequent phenomenon. The lower the rate of inflation, the lower the cost of holding money balances, and the more of them will be held. In addition to a low rate of inflation, a *stable* rate is also desirable; because inflation and variance go hand in hand.

Additional considerations are predictability and consistency in monetary policy. In a democracy, both are abetted by *transparency*. If the monetary authorities openly state their targets and their strategies for achieving them, the market and the critical public will be able to make its own judgement about inflation outcomes. It cannot be said, however, that policy at the ECB will be any more transparent than it is at the Federal Reserve.

From the standpoint of sound monetary policy, however, the outlook for the euro is very favorable. The Maastricht Treaty is unambiguous in making price stability the target of monetary policy. Although the European System of Central Banks (ESCB) can and should assist the monetary union in carrying out its other objectives, it is forbidden to do so if such assistance would conflict with price stability. Monetary policy will not be used to reduce unemployment by "surprise inflation" or to inflate away embarrassing public debts.

There remains considerable discretion for the independent European Central Bank (ECB). It will have to determine how price stability can best be achieved. The problem is complicated by lags in the effect of monetary policy. Because of lags, it is never certain whether price stability can best be achieved by inflation, monetary, or exchange rate (or price-of-gold) targeting. The case for exchange rate targeting is very strong for a small open economy near a very large and stable neighbor (as Austria, the Netherlands and Belgium were to Germany) but it is not so strong for the EU-11 as a whole. The only candidate for the EU-11 to target would be the US dollar, a currency with a transactions area only somewhat larger than Europe's.⁽²⁾

Monetary targeting, however, suffers from the defect that in the early stages of the transition, the liquidity properties of the euro will be subject to a wide range of error. We shall need to address this issue explicitly in a later section. In the meantime, we can anticipate a conclusion by stating that the best approach for a large economy like the EU is to target the inflation rate, formulating monetary policy actions on forecasts of inflationary pressures. Leading indicators that should always be taken into account include gold prices, other commodity prices, rates of change in the different monetary aggregates, the growth rate and bond prices. The most successful central bankers have been pragmatists. But there is no reason why an independent ECB, modeled partly after the Bundesbank, cannot be as effective a body as the Federal Reserve System in the United States or the Bank of Japan. As Otto Pöhl once said, "credibility is the capital stock of any central bank" and there is no reason why the management of the ECB should not be able to establish credibility at the outset.

Absence of Controls

It would be bad news for a would-be international currency if payments were subjected to exchange controls. The modern climate in that respect is far worse than the situation only a few centuries ago when, in the heady days of the American Revolution, George Washington, despite his position as Commander of the Revolutionary Armies, was said to be able to maintain his account at the Bank of England. That is a far cry from the modern world when, whenever sanctions are contemplated, the accounts of errant governments are blocked. In the twilight of the pound as an international currency, exchange controls in Britain were rampant and the "sterling area" came to be defined as zone of currency controls. The threat of inconvertibility and exchange controls is a factor further undermining the fall-back value of a currency.

Even the United States has used controls as an instrument of its foreign policy. From 1933 until 1975, U.S. citizens were forbidden to hold gold despite the fact that, for most of that period, the dollar was supposed to be "freely convertible into gold" along the lines of the IMF Statute, Article IV-4-b of the Bretton Woods Agreement. In the

1960s the United States restricted capital movements in the form of an "interest-equalization-tax," by imitation with the long-debunked "scientific tariff." In subsequent years, accounts of "erring" foreign governments have been blocked as part of U.S. or international sanctions. There is no question of course that the United States has a right to impose such sanctions over the use of its own currency. By the same token, however, the competition from a new European currency that is an alternative to the dollar has a chance of restoring some of the earlier laudable tenets of international economic liberalism if the current trend toward dirigism can be resisted. .

Strength and Continuity of the Central State

Monetary stability depends of course on monetary policy. But monetary policy is in turn affected by its sine qua non, political stability. Strong international currencies have always been linked to strong central states in the period of their ascendancy. The reason is not far to seek. When a state collapses, so does the stability of the currency. Examples include the hyperinflations of the defeated powers after World War I, the collapse of the rouble after the October 1917 revolution; the hyperinflation of Kuomintang China after the Communist forces of Mao-Tse-Tung crossed the Yang-Tse; and the hyperinflations in the former Yugoslavia in the 1990s. It does not bode well for its currency if a state is not powerful enough to defend itself against enemies from outside and within.

What about the euro? Is the EU a strong central state? It is here that one can see a *potential* weakness in the euro. The decision-making power of the government in Brussels is a pale shadow of that in Washington or in the capitals of the EU members. Rarely up to now has the EU been able to forge a common foreign or defense policy. The problems arising from the weakness of the central state in the EU cannot be swept under the rug. However, it should be realized that there are strong mitigating factors. The end of the Cold War and the collapse of the Soviet Union put aside what was in the post-war years the most dangerous threat to European security. A closely connected factor is NATO, the most successful alliance in history. As long as the EU is tied to NATO and the military alliance with the United States, the EU will be able to fend off enemies from without even if it is not a strong central state.

What about instability from within? Nothing can be completely taken completely for granted. Monetary union is supposed to be irrevocable. But it might not be in the face of a violent economic crisis. A real test would be its ability to hold itself together in the face of a drastic terms-of-trade shock such as that experienced in the 1970s when oil prices quadrupled. Dealing with a major economic crisis would probably require further deepening of the integration process. At the same time, however, the process of monetary union will itself be a catalyst for closer political union, quickly bringing to common attention the most fissiparous issues. These factors will greatly mitigate what would otherwise be a dangerous weakness.

The Fall-Back Factor

Modern currencies differ from the great currencies of the past, which were all either gold or silver or convertible into one or both of those metals. These currencies had a fall-back value if the state collapsed. If enemies approached the walls of the great Italian city-states that coined the sequins, florins or ducats of the Middle Ages, the 3.5-gram gold content would still maintain its value. Metallic currencies frequently outlive the state issuing them, as the flourishing of Macedonian staters in the centuries after Alexander's death attest. A more recent example is the Maria Theresa thaler which continued to circulate in Eastern Africa long after that lady and the Austro-Hungarian Empire were no more. That does not hold for a paper currency. After the Battle of Gettysburg in the United States, Confederate notes became worthless.

Until the advent of the dollar, there is no historical record of any fiat currency achieving great international significance. Before the twentieth century all the great international currencies were metallic. The predecessor of the dollar, the pound sterling, achieved its great luster as a metallic currency. But it was phased out when it ceased to be

convertible into gold and even freely convertible into its successor, the dollar. Even so, inertia hovers over international currencies and the international stretch of the pound continued long after Britain had ceased to be a dominant power and the biggest international trader.

The dollar achieved its international importance as a gold currency. When it was selected as the unofficial anchor at Bretton Woods, it had ceased to be internally redeemable, but was still externally convertible into gold, the only such currency (apart from the Swiss franc). If the dollar is now a fiat currency, as a "ghost of gold" it is the exception that makes the rule.

The introduction of the SDR provides an illustration of the importance of the fallback factor. When first distributed in 1970, it had a gold weight guarantee confirmed in the Second Amendment to the Articles of Agreement of the IMF. The gold guarantee made it a substitute for gold rather than the dollar and, at a time when gold was underpriced, a coveted asset that was in great demand. After the dollar was taken off gold, however, the international monetary authorities reneged on the gold guarantee, and the SDR went through a series of transformations, ultimately turning into, with the birth of the euro, a four-currency basket. Had its gold guarantee been maintained, however, the SDR would have been much more important in the international monetary system and qualified as an infinitely more useful supranational unit of account. Lacking both a commodity fallback value and the backing of a strong state, the SDR fell by the wayside on the scrapheap of bureaucratic timidity.

There is in this a lesson for the euro. In any great political emergency, and especially one that threatened the durability of the EU, there would be a run on the euro that would not be mitigated by any fall-back value. A run or even the risk of a run would make it difficult to float long term securities in euros. The same strictures hold for the risks of exchange control.

It might be argued against this, that economies like Germany's thrived even when it was on the front line of the Cold War. Yet two factors need to be understood. The first was the existence of NATO, which kept Germany under the security umbrella of the United States. The second was that Germany, like most of the other countries on the European continent, did not--or only rarely--issued debt exceeding 10-15 years. The substantial quantities of really long term securities issued in Europe have been phenomena of the post-Cold War world.

It is true that such an emergency might also weaken the dollar. Total political and military security can never be assumed. Nevertheless, the U.S. situation differs in that the dollar has an established reputation. Though a federation, the United States has a strong central government; and is a military superpower. The lesson in this for the euro is that the ESCB will need larger holdings of external reserves than otherwise or than the United States, at least at first. Fortunately, the EU countries have dollars and gold in abundance and will therefore be able to meet any foreseeable contingency.

4. Liquidity Effects

There has been rather little discussion of the impact of EMU on liquidity. My own view has been that it will be substantial. It will be convenient to break the liquidity impact into six different factors: (1) the efficiency effect of the euro; (2) the change in the money multiplier; (3) excess reserves arising from reserve pooling; (4) the "exorbitant privilege" implications of the euro becoming a reserve currency; (5) foreign demand for euros; and (6) diversification from the dollar into the euro. The first four of these effects are "inflationary" whereas the last two are "deflationary."

Efficiency Effect

When the currencies of the EU-11 or EU-15 are phased out and replaced by the euro, there will be a once-for-all liquidity effect that will be the same as a sudden, once-for-all increase in the European money supply, with proportionate inflationary effects. This is because the liquidity of the euro is greater than the liquidity of the sum of its parts. When, say, 500 billion euros worth of national currencies are replaced by 500 billion euros, European liquidity will be increased just as if there had been a sudden increase in the European money supply.

A similar effect will be experienced in the bond market. Like all assets, bonds have a liquidity dimension. Liquidity is measured by the ease with which an asset can be turned into cash without loss; it is inversely related to the cost of turning a bond into cash and then requiring it. Bonds with a large market are more liquid than bonds with a small market. The redenomination of national debts and corporate bonds from local currencies to euros will all of a sudden create a vast single market in Euro-denominated bonds, a bond market of the same massive scale as that of the United States. The liquidity of this debt will be much larger than the liquidity of the combined public and corporate debts now denominated in national currencies. The redenomination of these national debts is bound to have a revolutionary effect on world capital markets.

How important is this liquidity effect likely to be? Some indication can be got by comparing the degree of securitization in Europe with that of the United States and Japan, the two countries in the world with the largest bond market. Outstanding government and corporate bonds in the Big Three markets--taking the EU-15 as a single entity--amounted to just short of \$40 trillion in 1995. Of this total, \$12.5 trillion was accounted for by the EU-15, and the remainder of \$27 trillion by the US and Japan together. The liquidity of the EU-15 debt will be greatly enhanced by the adoption of the single currency.

There is a related issue. The superiority of the new facility--the ability to issue euro-denominated debt--will make it attractive to increase the aggregate outstanding. But by how much? One heroic (or crude) way to estimating the potential increase is to compare ratios of outstanding bonds to GDP--securitization ratios--in different countries. Using the outstanding-debt figures cited above for 1995, and taking the 1995 GDPs of the EU-15, the US and Japan as \$8422 trillion, \$7265 trillion and \$5135 trillion respectively (remember these are translated into dollars at 1995 exchange rates), the securitization ratios in the EU and the US + Japan come to, respectively, 1.5 and 2.18. This is a remarkable difference and at least part of it can be attributed to the disadvantage the EU countries have up until now faced in their national-currency bond markets. No doubt there will be some shift from the other markets to the European markets and also an increase in total outstanding issues in Europe. Outstanding bonds in the EU-15 in 1995 would have had to have been an additional \$6 trillion to equal the ratio in the United States and Japan. The euro will create magnificent new openings until the market reaches maturity.

Money Multiplier: Level

Another liquidity effect concerns the money multiplier. The new money multiplier will be the EU-15 money supply divided by the total supply of euro currency outstanding, with an adjustment for the proportion of currency held outside banks. One coordination problem is likely to arise because of different legal or practical reserve ratios in the different member countries. But a more serious problem is the creation of euro substitutes. Because the replacement of a national currency by the euro transfers seigniorage to the ECB, each country has an incentive to minimize the need for euros. This incentive exists even though it is weakened by the redistribution of ECB profits to the national central banks (NCBs).⁽³⁾

What if one or more of the NCBs created a lender-of-last resort facility that enabled the banks to get by on a far

smaller ratio of euros to deposit liabilities? The incentive for NCB's to do so may be eliminated for the most part by the provision by which their money incomes are earmarked for the general account and then "allocated to the national central banks in proportion to their paid-up shares in the capital of the ECB."⁽⁴⁾ There nevertheless remain opportunities for the private sector or another branch of the government to perform functions previously performed by the NCB's. The EU's money multiplier will have to be watched closely.

The ratio of reserve money to money in the EU countries, and the reciprocal of its money multiplier, has been falling since the early 1990s. The ratios for the EU-11 and EU-15 countries were, respectively, 39.5 and 31.7 in 1990, but had fallen to 31.5 and 25.8 by 1996. The latter figure contrasts with the higher ratio in the United States in 1996 of 38.4. The decline in these ratios, and the corresponding increases in the money multiplier, can be expected to increase with the introduction of the euro.

Money Multiplier: Stability

There is, however, considerable potential uncertainty about the aggregate multiplier arising because of differential multipliers in individual countries. The EU at present is still a collection of national monetary systems that have very different characteristics. One measure of different national structures is the ratio of reserve money to money plus quasi money (a broad definition of money somewhat larger than M2). See Table 2.

	1990	1996
Austria	10.5	10.2
Belgium	14.3	7.1
Denmark	9.2	15.4
Finland	11.4	12.6
France	8.4	5.8
Germany	16.4	13.9
Greece	16.4	13.9
Ireland	21.8	14.3
Italy	23.2	16.2
Luxembourg	0.9	1.1
Netherlands	10.8	8.8
Portugal	32.9	10.2
Spain	16.9	15.9
Sweden	15.2	14.2
United Kingdom	4.2	3.6
United States	16.2	15.5
Japan	9.7	10.3

Source: Calculated from *IMF International Financial Statistics* and national sources.

Two observations can be made from this table. First, leaving aside the special cases of Luxembourg,⁽⁵⁾ and Greece,⁽⁶⁾ the reserve ratios differ radically, from a low of 3.6 percent in the U.K. to a high of 16.2 percent in Spain. This means that the EU money multiplier will tend to increase or decrease respectively as balance of payments surpluses accrue to low-reserve or high-reserve countries. The other observation is that the national reserves ratios

have been declining, but at very different rates. A potentially varying money multiplier will make it riskier to rely on monetary targeting in the transition period when banking systems and reserve ratios have not yet been harmonized.

Redundant Reserves from Pooling

More well-known liquidity effects arise from the centralization of international reserves. It is convenient to divide these reserves into three types: (a) foreign exchange held in European currencies, ECU's, IMF reserve positions and SDRs; (b) foreign exchange held in non-European currencies; and (c) gold. The first category of assets (a) "may" be held and managed by the ECB. The ECB will also receive "up to an amount equivalent to" 50 billion euros. The contributions of each member state will be fixed in proportion to its share in the subscribed capital of the ECB.⁽⁷⁾

Reserve needs in Europe will be lower in Europe on two counts. First, with the formation of the EMU, intra-union deficits and surpluses will be netted out and reserve needs for the union as a whole will be considerably smaller than the sum of the reserve needs of individual members. If external (mainly dollar) reserves were at an appropriate level before the union, they would be excessive after it. The same holds for gold reserves, of which the EU countries account for almost half the world's monetary stock--although here gold reserves could partially compensate for the weakness created by the absence of the strong central state. Any immediate action to dispose of the part of these reserves that are considered excessive would be damaging to exchange rate stability

Second, and in the long run much more important, the ESCB's need for foreign exchange reserves will decline drastically once the euro is successfully launched. The euro will then become a reserve currency of choice for many countries around the world. Reserve currencies have less need for reserves--especially if there is confidence in its monetary policy--because its own currency is liquid internationally; reserve currency status is a widow's curse that keeps the owner in perpetual liquidity.

Apart from IMF positions and SDRs, EU-15 reserves at the end of 1996 amounted to 350.6 million ounces of gold (to which could be added 92.0 million held by the FMI). The other big holders were the United States with 261.7 million ounces, Switzerland with 83.3 million ounces, and the IMF with 103.4 million. These countries and institutions thus hold 891 million ounces or 80 per cent of the world total of 1,108.1 million ounces. Pooling all foreign exchange would give the ECB \$387 billion, or 25.9 per cent of the world total of \$1,498 at the end of 1996. This compared with the holdings of \$209 billion in foreign exchange in Japan or about \$300 billion in "Greater China" (China, Taiwan and Hong Kong).

Automatic Credit

The foreign exchange reserves would not seem so excessive (at least compared to the Asian holdings) were it not for the fact that the euro, as already mentioned, will itself become a widely-used international currency, conferring on the EU the "exorbitant privilege" to run a "deficit without tears"--to use the phrases of Charles De Gaulle and Jacques Rueff in their pungent attacks on the role of the dollar as a reserve currency in the 1960s. Non-reserve currency countries have "hard" balance-of-payments constraint. Reserve currency countries, by contrast, have a "soft" balance of payments constraint insofar as they can allow euro liabilities to accumulate rather than use gold or foreign exchange assets. The importance of this factor can easily be assessed by noting the extremely low level of foreign exchange holdings of the principal reserve center, the United States, which is the largest economy in the world and its largest importer and exporter.

International Demand for Euros

How large will the international demand for euros be? Some guesses can be made based on the growth of demand for reserves as a whole. World GDP figures are notoriously subject to error due to factors arising from imperfect measurement and the variability of exchange rates. Nevertheless, in round numbers let us assume that nominal GDP grows over the next dozen years at a 6 per cent per annum. In this case, world GDP will double in the twelve years between 1998 and 2010, proportioned among the U.S., the EU and the rest of the world as follows:

Table 3. US, EU, and World GDPs, 1998 and 2010, Trillions of US dollars		
	1998	2010
United States	9	18
European Union	9	18
Rest of the World	12	24
TOTAL	30	60

Holdings of international reserves, including foreign exchange, gold valued at market prices, and IMF Drawing Rights, totaled about \$2.0 trillion in 1998, about 1/15 of GDP. The situation for 1998 and that assumed for 2010 is shown in Table 4:

Table 4. Reserves and GDP, 1998 and 2010, Trillions of US Dollars		
	1998	2010
GDP	30.0	60.0
Reserves	2.0	4.0
Foreign Exchange	1.6	3.2
Gold	0.3 (@ \$300/oz.)	0.6 (@ \$600/oz.)
IMF Money	0.1	0.2
Ratio	1/15	1/15

World holdings of foreign exchange reserves, measured in dollars, quadrupled over the last dozen years, from \$382.1 billion at the end of 1985 to \$1,599.9 at the end of 1997,⁽⁸⁾ an increase which exaggerates the real increase because of the high dollar in 1985. I shall assume that world reserves between 1998 and 2010 will only double, taking into account an assumed lower rate of inflation and reduced need for reserves in Europe. The estimates for reserve holdings will thus probably err on the conservative side (and therefore reinforce rather than weaken my conclusions). Taking foreign exchange holdings at \$1.6 trillion in 1998, of which perhaps three-quarters are in dollars, world reserves in 2010 will be \$3.2 trillion. I shall assume that by this date the world community will want to divide its foreign exchange reserves equally between dollars and euros. As a consequence, demand

	1998	2010	CHANGE
Dollar Balances	1.2	1.2	--
Euros	---	1.2	1.2
Other	0.4	0.8	0.4
TOTAL	1.6	3.2	1.6

for dollar reserves will stagnate, while the demand for euro reserves will increase by as much as \$1.2 trillion, an annual average of \$100 billion a year. Unless this massive shift were offset by increasing lending by Europe and increased borrowing by the United States, it would mean a massive shift in current account balances, with that of Europe's turning strongly negative and that of the United States moving in a positive direction. The 'exorbitant privilege' effect represents in the short run a tremendous increase in power but in the long run it presents the temptation, if it is not accompanied by fiscal discipline, that it will be used as a way of building up in the long run a substantial increase in indebtedness.

Diversification Problem

One of the problems associated with the movement toward an international monetary system dominated by euros as well as dollars lies in the difficulty of the transition. Weakness in the euro would imply appreciation of the dollar. More probably, however, the main danger is in a prospective appreciation of the euro. If we assume, as we did in the previous section, that steady-state equilibrium growth will involve approximately equal demand for euros and dollars on the part of central banks by the year 2010, the best solution would be for a steady increase in euro holdings as increased reserves are needed without any direct diversification from the dollar. However, it is much more likely that once confidence has been established in the euro, several countries will want to exchange euros for dollars, threatening sweeping changes in the dollar-euro rate. The mere expectation that other countries were considering diversification would provoke expectations of dollar weakness and massive shifts of the type that occurred in the late 1970s.

The danger point will come when US growth slows and the US expansion ends. The pattern over two centuries of recessions in the United States is for the balance of payments to worsen under the gold standard or fixed exchange rates, and for the dollar to depreciate against foreign currencies when it is flexible. This is because the net capital outflow during recessions typically exceeds the improvement in the trade balance arising from falling imports. There is no reason to think that any weakening of growth in the US economy in 1999 or 2000 will be any different. The dollar will therefore depreciate. What will be different, however, is the existence of the euro. In the past when the dollar has depreciated, there has been diversification out of the dollar. But the thinness of the markets for "strong" currencies like the yen, mark and the Swiss franc quickly puts a floor to the falling dollar. The situation with the euro will be quite different, taking into account both the large size of its transactions domain and the reserve demand for it and for eurobonds as a new investment vehicle. Some degree of management of the rate will become imperative..

5. Expansion of the Euro Area

Eleven members of the EU entered monetary union on January 1, 1999. Bilateral exchange rates among these countries were locked on July 1, 1998, and rates against the ecu were fixed on January 1, 1999. The replacement of

currency notes and coins will commence on January 1, 2002 and must be completed by June 30 of that year, after which the EMU will have been completed. What are the prospects for expansion of the EU-11?

The EU-4

The four members of the EU that did not enter in 1999 are the U.K., Sweden, Denmark and Greece. Greece failed to make the convergence requirements but, after a 14 per cent devaluation of the drachma in May 1998, is on track to enter by 2002 at a rate against it of 357 drachmas. The three northern countries satisfied the convergence requirements but their populations were not yet prepared to take the plunge. Of crucial importance is the U.K., partly because it has the largest economy but because its example would most likely be followed by the other two.

Britain's hesitation is no surprise. European integration has always posed a problem for Britain which, historically, has seen its political role in keeping the Continent divided on balance-of-power grounds. With the emergence of the U.S. as a superpower, however, that role became obsolete. Britain's reluctance to join the Economic Community in the late 1950s put Britain on the periphery of the integration movement and her hesitation about EMU threatens to repeat the situation. Two questions might be separated: (1) Is Britain benefitted or weakened by EMU? And (2) given EMU, is Britain better off in or out?

The first question is difficult to answer because it involves the scrapping of the pound, a currency of great international importance in the nineteenth century, and also in effect the end of the "balance-of-power game" that Britain has played in Europe since the 12th century. Britain was a late and reluctant entrant into the EU and the factors that have fed Britain's resistance to increased deepening of integration continue to exist.

Nevertheless, given the *fait accompli* of EMU and the euro, there are high costs to Britain staying out. One is the loss of sovereignty. Macroeconomic policy will increasingly be in the hands of the EU-11. The non-members will be subject to Europe-wide decisions in which they play no or little part. More important perhaps are some practical reasons. EMU will foster the reorganization of the money and banking industry in Europe, which will give an advantage to countries in EMU. It is true that Britain has in the past managed to use outside currencies like the euro-dollar and could do the same for the euro. But the fact will become increasingly clear that the pound sterling will become increasingly unnecessary. London can certainly expect to remain perhaps one of the two or three most important financial centers in the world, but its position would be enhanced if Britain entered EMU and somewhat diminished if it did not join. All the arguments for a European country joining EMU apply to Britain and in the long run.

Britain's entry will depend on the outcome of a referendum. The Labor Party will probably support it; and the Conservative Party, with be split, with its leader leading the opposition. Whatever the opinion at the moment, my own view is that British opinion will swing toward a pro-EMU position, and that Britain, as well as Sweden and Denmark will be committed to join EMU by the year 2002, as indicated in Table 6.

Table 6. Timetable for Expansion of the EU Area

Group	Probable Date of Entry	Country	Recent Population	1998 GDP (billions of US dollars)
		Austria	8.0	209.8

EU-11	1999	Belgium	10.2	253.9
		Finland	5.2	119.3
		France	58.7	1,420.8
		Germany	82.4	2,125.8
		Ireland	3.6	76.0
		Italy	57.4	1,171.2
		Netherlands	15.7	371.7
		Portugal	10.0	100.2
		Spain	39.3	548.7
		TOTAL	290.5	6,397.5
EU-3	2002	Britain	59.2	1,325.1
	2002	Sweden	9.0	333.4
	2002	Denmark	5.3	177.3
EU-1	2002	Greece	10.5	110.0
		CUMULATIVE TOTAL	374.5	8,243.3
CEEEC-5	2005	Slovenia	2.0	15.0
		Czech Republic	10.3	54.0
		Poland	38.7	140.0
		Hungary	10.2	50.0
		Estonia	1.5	7.0
		CUMULATIVE TOTAL	437.2	8,509.3
CEEEC-6	2010	Slovakia	5.4	20.0
	2010	Croatia	4.8	20.0
	2010	Lithuania	3.7	11.0
	2010	Latvia	2.5	5.0
	2010	Romania	22.6	38.0
	2010	Bulgaria	8.3	10.0
		CUMULATIVE TOTAL	485.5	8,513.5

Sources: *IMF International Financial Statistics*; *WEFA World Outlook, 1998*; *WEFA EURASIA 1998*.

The CEEEC-5

Five Central European and Eastern European countries—the CEEC-5—were invited to make an application to join the EU in 1998. There were no surprises in the choice of Slovenia, the Czech Republic, Hungary or Poland, but Estonia was a surprise, the only Baltic state. Apart from the political support of Sweden, Estonia had the advantage of a currency-board type monetary policy linked to the mark. If these countries all established early currency boards, and thus chose the best alternative route to convergence, there is every possibility that they could be admitted to EU membership by the year 2005.

The CEEEC-6

Other candidates in Central and Eastern Europe include Slovakia, Croatia, Lithuania, Latvia, Romania and Bulgaria. In some of these countries the main problem is political: poor records on human and civil rights; in others it is economic; and in few it is both economic and political. There is nevertheless a possibility that many of these countries would be ready for admittance in 2010.

The euro area, however, will certainly extend beyond Europe. The CFA franc countries, which currently fix the CFA franc to the French franc at $100 \text{ CFA F} = 1 \text{ FF}$, have transferred to the euro at the corresponding FF rate. Countries in the north of Africa and the Middle East are likely to find their interests in stabilizing to the euro bloc. The more countries that enter it, the more attractive it will be. Success snowballs.

6. International Reactions and the Euro-Dollar Rate

It should not be thought that a change as momentous as the introduction of the euro promises to be will leave "other things constant." The only constant is the law of change, governed by competition and self-interest. After the euro is launched, it will be adopted, as already argued, by the remaining four members of the EU, including, importantly, Britain. It may further be assumed that it will be adopted as a kind of currency-board peg by several of the states lining up for entry into EU. When that occurs, the "weight" of the euro-bloc will exceed that of the dollar area. It would be an illusion to suppose that the expansion of the euro area will not provoke countervailing expansion of the dollar area. Like the merger movements going on in industry and banking. Bigness begets bigness.

Expansion of the dollar area is likely in Latin America. After decades of monetary instability, a growing number of countries in Latin America are perceiving the benefits of stable prices and exchange rates. If there were a large stable country in Latin America, it might be attractive to envisage a system of stable exchange rates anchored on that country. There is not, however, and at the present time the most attractive anchor for stability is the dollar. Among the larger countries, Argentina has taken the lead with a new (and weaker) variant on the currency board idea. It is conceivable that Mexico, at last on the road to recovery from its 1994-95 fiasco, and Brazil, currently in the throes of an all-too-similar trauma, will see a solution along the same lines as Argentina. If so, we could see in the next decade as an expansion of the dollar area throughout much of Latin America.

What about Asia? It is tempting to think that Asia might go the way of Europe, with its own currency area. However, this misses a fundamental point. Europe's currency area would have been dead in the water in the inter-war period or even before 1914 when the Franco-German conflict was unresolved. It is unlikely that an Asian

currency area could contain simultaneously powers with such diverse interests as Japan and China. It seems much more likely that for the next two decades the dollar will be the main default international currency. Under certain circumstances, one could even imagine the formation of a yen-dollar bloc.

Whatever the currency area formation, one thing is certain. The dollar-euro rate will become a matter of great concern to Europe, the United States and the rest of the world. Diversification from the dollar into the euro would create the threat of a soaring euro and play havoc with the sensitive issues of competitiveness and unemployment in Europe. The alternative of a falling euro on the other hand would raise the specter of an outbreak of inflation that would necessitate deflationary policies. It would be a grave mistake to believe that the closed nature of the three big blocs, would make exchange rates less important or that the dollar-euro rate can be treated with "benign neglect."

The most urgent focus for management will be on the dollar-euro rate. As the world moves from monetary unilateralism to bilateralism, policy coordination will become more important. Under unilateralism, other countries were comparatively free to fix or change their currencies against the dollar, with a kind of benign neglect of exchange rate on the part of the United States. That will no longer be possible with the euro. If intervention is required it will have to be cooperative. In view of the long period of transition from a mainly dollar world to a world in which the dollar and euro vie on equal terms, it may be necessary to develop the infrastructure capable of dealing with the problem.

International management of the dollar-euro rate will not be easy. Suppose the dollar is depreciating against the euro and it is agreed that intervention is desirable. Where should the responsibility for intervention lie? Should the U.S. support the dollar by selling reserves, or should Europe support the dollar by buying reserves? Action by the U.S., taken alone, without sterilization, is deflationary for the world economy; action by Europe is inflationary. Obviously action by the US would be desirable if there were excess inflation in the world economy, whereas action by Europe would be desirable if there were excess deflation. The division of responsibility would have to be determined by an inflation index for the world economy.⁽⁹⁾ If gold were stable in terms of commodities the price of gold would itself serve as a satisfactory index.⁽¹⁰⁾

7. The "Stability" of the International Monetary System

The ground has now been prepared for a discussion of the questions posed about the stability of the international monetary system. We shall take up the subject in terms of the three concepts of the word stability noted in the introduction.

The second is whether the new pattern of currency areas will tend to persist. The third question concerns any change in the mathematical structure of the system that would make it explosive rather than convergent.

Exchange Rate Volatility

The first is whether variables in the system will fluctuate more or less as a result of the introduction of the euro. Will exchange rate or balance-of-payments fluctuations be larger or smaller as a result of the introduction of the euro. The initial presumption must be that they will be smaller. Exchange rate fluctuations among the EU-11 will disappear completely as the eleven currencies are replaced by the euro. As long as the union is considered to be irrevocable, forward margins will also disappear and interest rates will converge completely, except for residual tax differences or differentials in default risk. The EU-11 will represent a new and large zone of exchange stability of a size only somewhat smaller than the dollar itself. As more countries enter EMU the zone of exchange rate stability will represent a larger economic area than the United States.

Will balance-of-payments fluctuations be increased or diminished as a result of the single-currency EU? The answer here is not completely unambiguous but there is a strong presumption that balance of payments are smaller and fluctuate less under a common currency than under flexible exchange rates? Two sources of instability will be removed. The first is that with the removal of exchange rate fluctuations as an incentive for capital flows, speculative capital movements will be eliminated or reduced. The second source of instability is monetary policy, especially the disequilibrium practice of sterilizing the monetary effects of capital flows. Under a common currency capital movements will conform to those that would prevail under a well-functioning currency board. "The money goes where the action is." Rapidly-growing regions will have surpluses and slow-growing smaller surpluses or deficits.⁽¹¹⁾ Surpluses greater or less than desired levels will be automatically corrected by the expenditure-specie-flow mechanism of the balance of payments. Intra-EU balances of payments will continue to exist, correction of excess balances will become automatic and unobservable if not relatively painless.

Another issue concerns the volatility of the euro against other currencies. A case could be made that the erection of a zone of stability in Europe will increase the volatility of the exchange rates of those countries that did not enter EMU, including the pound sterling, the Swiss franc, and the Swedish and Danish crowns. That instability could be reduced or eliminated if those countries joined the new ERM or adopted ERM-like policies. The drachma-euro rate, for example, can be expected to hover around its central parity against the euro as long as its economic reform package proceeds on schedule. A similar argument holds for the prospective members of EU in Central and Eastern Europe.

What about the dollar-euro rate? This will become the most important price in the world. It might be thought that because the EU economy is more closed than its national components, the dollar-euro rate will fluctuate more than its most important predecessor, the dollar-DM rate. This proposition, however, is not strictly correct. Long before the introduction of the euro, the ERM of the EMS already exhibited many of the monetary characteristics of a common currency. It is not the ratio of imports or exports to GDP that determines exchange rates but the whole pattern of the balance of payments including especially capital movements. Once speculation over entry into EMU is settled, there will no longer be destabilizing shifts from the 'weaker' members into the stronger currencies.

Nevertheless instability could arise from another source. The mark-dollar has gone from an average of DM 4.0 in 1968 to DM 1.82 in 1980 to DM 2.94 in 1985 to DM 1.56 in 1992 to DM 1.43 in 1995 to DM 1.73 in 1997. Under equilibrium circumstances, it is hard to imagine that the dollar-euro rate will be more unstable than the dollar-mark rate has been. However, once the euro has been established the reserve-configuration of the payments system will no longer be in equilibrium. Diversification will mean a tendency for the euro to appreciate against the dollar. There is no reason to expect that the appreciation would be steady and smooth. More likely it would be erratic. This seems to be a case where international management of the rate will become necessary. .

Stability of Currency Areas

Will the euro create a new equilibrium configuration of currency areas that will be quasi-permanent, in the sense that they will survive for, say several decades? The answer, I believe, is yes. The creation of the euro will automatically carry with it the development of a substantial euro area, comprising countries that elect to stabilize their currencies to the euro and use the EU capital markets. The Mecca for the euro will be in Africa and Eastern Europe. At the same time, the expanding euro area will provoke explicit attention to the dollar area, involving most of Latin America and perhaps a considerable part of Asia. The competing dollar and euro areas will be features of the international monetary landscape for a long time to come-barring another great war or unforeseeable acts of God, perhaps another century. The great uncertainty lies not with these two currency areas, but the nature of the

structure that will develop in Asia. As already noted, unlike Europe, Asia does not have the political structure to create a unified currency area. For the next few decades, it seems likely that the dollar will remain the dominant outside currency in Asia with the yen independently floating or attaching itself, depending partly on political considerations, more to the dollar or the euro area.

Dynamic Stability

Will the euro create a situation that will alter the convergence conditions of exchange rate dynamics, i.e., will it turn a stable system into an unstable one or aggravate any instability of the existing exchange rate system? The answer to this question requires a comparison of the stability conditions of a decentralized currency system with that of system in which some of the countries combine into a new currency area. There is implicit in this question a general mathematical problem: How are convergence conditions of dynamic stability altered by collapsing several balance-of-payments equations into one. How is stability of a system altered by economic union? More generally how is the dynamic stability of an equilibrium affected by choices of currency area?

There is not to my knowledge any answer to this question in the economics literature.⁽¹²⁾ One could presume that integration in special cases would work in one way or another. For example, the integration of a small unstable country with a large stable one would probably improve the stability characteristics of the system as a whole. It seems on balance likely that the removal of the currencies of formerly weak economies from the European system, assuming that they are not large enough to destabilize the large stable countries will tend to strengthen rather weaken the stability characteristics of the system.

It is also true that the elimination of intra-European exchange rate fluctuations should reduce the frequently-reversible capital flows that have been a source of instability in the past.

8. Conclusions

The euro should stand up very well. It has two great strengths: a large and expanding transactions size; and a culture of stability surrounding the ECB in Frankfurt. Initially, the EU-11 will be smaller than the dollar area, but as other members enter, as the EU expands, and as the poorer countries catch up, the euro area will eventually be larger than the dollar area. From the standpoint of monetary policies, there is also not much to choose between the two areas. Information is globally mobile and there is no reason why the ECB should not become as efficient as the Federal Reserve System in the United States.

The euro also has also two weaknesses: it is not backed by a central state, and it has no fallback value. In an unstable world, these weaknesses would be fatal. But the present environment is far from unstable. The Pax Americana has been just as efficient in preventing major conflicts as the Pax Britannica and the Pax Romana of earlier eras. If, as one should expect, NATO survives in a post-euro world, the stability of the next decades should be as assured as the past four decades. Coupled with very substantial EU gold and currency reserves, which could be centralized or ear-marked for the ECB if the need arises, membership in NATO suffices to mitigate the weakness of the EU central government. Provided political coordination proceeds in the direction of integration, and important conflicts of conceit and nationalism are resolved, the euro should be able to maintain itself on an even keel with the dollar.

Changes can be expected in the liquidity position of Europe when the euro is introduced. Four effects can be expected to aggravate inflationary pressure: the replacement of national currencies with a more efficient euro; the increase in the money multiplier (it will also be more unstable); the pooling of reserves; and the reduction of fiscal

discipline arising from the general acceptance of the euro as a means of payment. These tendencies will have to be carefully monitored in the early stages of the transition.

Against these potentially inflationary effects, there will be two not unrelated factors that will promote an appreciation of the euro and hence be potentially deflationary. One is the fact that the rest of the world (including the United States) will want to hold part of its reserves in euros. On the assumption that after twelve years the world will want to hold half its reserves in dollars and half in euros, there would be a buildup of euros averaging \$100 billion a year, leading to a massive change in either trade balances and capital movements. To the extent that this demand materializes, the ECB will have to follow a looser monetary policy to provide the high-powered reserves that will be needed to back up these euro balances (most of which will be held in bank deposits). The other factor is that which will arise from diversification. The buildup of euros is not likely to be smooth. Once a cycle starts in which the dollar starts to depreciate against the euro, speculation will make the cycle self-reinforcing. This presents a potential danger point for the international monetary system which will have to be managed internationally.

The EU-11 or even the EU-15 will not be the end of the euro area. It is highly probable that if the euro is successful in the early stages that the three northern members will see it in their interest also to join. Expansion will also proceed to several of the countries in Central and Eastern Europe, with as many as five new entrants by 2005 and eleven by 2010. The CFA franc countries will also be associated directly with the euro, and their example will probably be followed by other countries in Africa or the Middle East. The best approach to convergence for these countries is to establish currency boards with the euro-or alternatively an ERM solution with very small or zero exchange rate margins and the cessation of changes in holdings of domestic assets. Because a currency board mimics the monetary policy that is automatic under a common currency, it is the best mechanism for establishing convergence. If a country cannot do a currency board, it cannot do monetary union!

It should not be thought that a change as momentous as the introduction of the euro promises to be will leave "other things constant." The only thing that will remain constant are the laws of change, which include competition and expansion. By 2010 if not before the euro area will be larger than the transactions area of the United States and competition will probably provoke policy reactions in the United States and other countries. It may further be assumed--because it is in their self-interest--that the euro will be adopted as a kind of currency-board anchor by several of the states lining up for entry into the EU. When that occurs, the "weight" of the euro-bloc will begin to exceed that of the dollar area. Countervailing steps will then be taken by the United States, including perhaps an expansion of the dollar area into Latin America and/or Asia, and even the formation of a yen-dollar bloc, a G-2 counterpoise to the Euro-bloc.

Whatever the prognosis, the dollar-euro rate will become a matter of great concern to Europe, the United States and the rest of the world. Diversification from the dollar into the euro would create the threat of a soaring euro which would play havoc with the sensitive issue of unemployment in Europe. The alternative of a falling euro would raise the specter of an outbreak of inflation that would necessitate deflationary policies. It would be a grave mistake to believe that the closed nature of the three big blocs, would make exchange rates less important.

The most urgent focus of management will be on the dollar-euro rate. As the world moves from monetary unilateralism to monetary bilateralism, policy coordination will become more important. Under unilateralism, other countries were comparatively free to fix or change their currencies against the dollar, with a kind of benign neglect of exchange rate on the part of the United States. That will no longer be possible with the euro. If intervention is required it will have to be cooperative. In view of the long period of transition from a mainly dollar world to a world in which the dollar and euro are quasi-equal partners, it may be necessary to develop new institutions capable of dealing with the problem.

References

Metzler, Lloyd A. 1951. "A Multiple-Country Theory of Income Transfers," *Journal of Political Economy* 59: 14-29 (February).

Mundell, Robert A. 1961. "A Theory of Optimum Currency Areas," *American Economic Review* 51: 657-65 (March).

-----1965. *The International Monetary System: Conflict and Reform*. Montreal: Private Planning Association of Canada

----- 1968. "Hicksian Stability, Currency Markets and the Theory of Economic Policy," *Value, Capital and Growth*, (ed. J. N. Wolfe). Chicago: Edinburgh University Press. 445-466

----- "Updating the Agenda for Monetary Reform" in *Optimum Currency Areas* (Mario I. Blejer, Jacob A. Frenkel, Leonardo Leiderman, and Assaf Razin, in cooperation with David M. Cheney, eds.). Washington, DC: International Monetary Fund. 1997: 29-48. Proceedings of a Festschrift Conference Sponsored by the IMF, the Central Bank of Israel, Tel Aviv University and the Hebrew University in honor of R. A. Mundell.

-----1998. "The Euro and International Monetary Reform," in *Entgrenzung als Erkenntnis und Gestaltungsaufgabe: Festschrift für Reimut Jochimsen zum 65. Geburtstag*. (Ulrich Heilemann, Dietmar Kath, Norbert Klotten, eds.). Berlin: Duncker & Humblot. 331-44.

Endnotes

1. It could be argued that replacement of the pound sterling by the dollar after 1914 was not a fundamental change in the system insofar as the U.S. had already become the largest economy in the world with a GDP more than thrice its rivals in Britain and Germany; the future of the dollar as the principal international currency of the twentieth century was therefore already assured. If so, the introduction of the euro could have more lasting importance than any event since the breakdown of bimetallism and the transition to the international gold standard in the early 1870s.
2. Whereas a small country can target the currency of a large country without seriously disrupting the latter's policy, the same cannot be said of two areas of comparable size. A one-side arrangement would run into prestige problems, and a shared arrangement presents complications that would make it difficult to negotiate.
3. Article 33 (1.b) of the Protocols and Declarations annexed to the Treaty provides for the transfer of ECB's net profits (except for a maximum of 20% transferred to the general reserve fund) to the shareholders of the ECB (i.e., the NCB's) in proportion to their paid-up shares.
4. Article 32.5 of *Protocols and Declarations...* [<http://europa.eu.int/euro/en/pap7/pap716.asp?nav=en>].
5. Luxembourg is a special case because of its monetary union with Belgium; the Belgian franc provides the bulk of the reserve money in Luxembourg.
6. Greece is a special case because it is still a low-income developing country and has only recently made serious attempts to establish monetary stability. Generally speaking the reserve ratio in question will be lowest in countries that have a history of monetary stability and a high level of financial development, a factor closely associated with per capita income.
7. See *Compilation of Community Legislation* [<http://europa.eu.int/euro/en/pag716>].
8. *IMF International Financial Statistics Yearbook*, 1998: 66-67. The IMF calculates reserves in US dollars, then

translates them into SDRs at the official exchange rate for publication in the *I/S*. The above figures for foreign exchange reserves were 347.9 SDRs in 1985 and 1,185.7 SDRs in 1997 which, converted at the \$/SDR exchange rate of \$1.0984 at the end of 1985 and 1.3493 at the end of 1997, gives the figures used above.

9. This was the situation arrived at the June 1987 G-7 summit meeting following the Louvre Accord, when it was judged desirable to prevent further depreciation of the dollar against the yen and European currencies. The stumbling block was creating the appropriate index. Quite a furor was created when, at the September 1997 IMF meetings, Secretary James Baker III announced that the index should "include gold." Search for the appropriate index ended shortly after the stock market crash in October of that year and the strained relations between the United States and West Germany as a consequence of disagreement over the dollar/DM rate.

10. Gold has unfortunately been rendered more unstable as a consequence of drastic fluctuations in the rate of inflation and the tendency of central banks and the international institutions to sell when the market is declining.

11. The conventional definition of the balance of payments, reflected in inflows or outflows of outside money, is not well adapted to growing economies. Under a well-functioning monetary union (like that of the United States) in which all countries are growing, all regions may experience "balance-of-payments surpluses" and in general there will be an excess of surpluses over deficits by the amount of the increase in the money supply of the union as a whole. In a growing economy it would be more meaningful, if more complicated and less operational, to define the balance of payments surplus as reserve inflows in excess of the desired amount, as suggested in Mundell (1965).

12. Metzler (1951) analyzed the question of stability in his study of the multiple-country transfer problem and considered the question of integration in the matrix-multiplier model but with no reference to exchange rates or monetary conditions. In Mundell (1968) I analyzed the dynamics of currency markets in a general equilibrium system and paid special attention to the formation of alternative currency areas and the stability of systems with different pivot currencies; the latter essay is reproduced on my web site <http://www.columbia.edu/~ram15..>