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Mundell, the Euro, and Optimum Currency Areas

by

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Robert Mundell was recently awarded the 1999 Nobel Prize in economics for path-breaking theoretical contributions published in the 1960s on the ways monetary and fiscal policies work in open economies. His ideas are deeply embedded in textbooks on how the foreign exchanges constrain national macroeconomic policies.

But does Mundell deserve the additional sobriquet of “intellectual father of the euro”? Since 1970, he has enthusiastically advocated European monetary unification (EMU), and seems vindicated by the formal advent of the euro on January 1, 1999.

Therein lies a paradox. For more than a decade before EMU’s advent, the fierce debate on whether a one-size-fits-all European monetary policy was appropriate for a diverse set of European countries pitted politicians, who on the continent were mainly in favor, against economists who generally were much more doubtful. And the doubters who opposed EMU used arguments drawn from Mundell’s own work! Specifically, Mundell’s earlier classic article, “The Theory of Optimum Currency Areas” published in 1961 in the *American Economic Review* comes down against a common monetary policy—and seems to argue in favor of making currency areas smaller rather than larger.

This paradox, where Mundell seems to be on both sides of the debate over European monetary unification and on the adoption of common monetary standards in other parts of the world, can be resolved by noting that there are *two* Mundell models—earlier and later. In two important papers written in 1970, but not published in an obscure conference volume until 1973, Mundell presented a different—and surprisingly modern—analytical perspective. If a common money can be managed so that its general purchasing power remains stable, then the larger the currency area—even one encompassing diverse regions or nations subject to “asymmetric shocks”—the better.

Let us consider each Mundell model in turn.

The Earlier Mundell with Stationary Expectations

Like most macro economists in 1961, Mundell still had a postwar Keynesian mindset in believing that national monetary and fiscal policies could successfully fine tune aggregate demand to offset private sector shocks on the supply or demand sides.

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Underpinning this belief was the assumption of stationary expectations. As a modeling strategy, he assumed that people took the current domestic price level, interest rate, and exchange rate (even when the exchange rate was floating) as holding indefinitely. Not only in his theory of optimum currency areas (1961), but stationary expectations underlies the standard textbook Mundell-Fleming model (Mundell 1963) of how monetary and fiscal policy work themselves out in an open economy. In several of his influential collected essays as of 1968, Mundell showed how the principle of effective market classification could optimally assign monetary, fiscal, or exchange rate instruments to maintain full employment while balancing international payments. He presumed that agents in the private sector did not try to anticipate future movements in the price level, interest rates, the exchange rate, or in government policy itself.

In addition to stationary expectations, Mundell (1961) posited that labor mobility was restricted to fairly small national, or even regional, domains, as in Western Europe or across developing countries. And these smallish domains could well experience macroeconomic shocks differentially, i.e., “asymmetrically” in the jargon of the current literature, from their neighbors. In these special circumstances, Mundell illustrated the advantages of exchange rate flexibility in what has now become the standard textbook paradigm:

Consider a simple model of two entities (regions or countries), initially in full employment and balance of payments equilibrium, and see what happens when the equilibrium is disturbed by a shift in demand from the goods in entity B to the goods in entity A. Assume that money wages and prices cannot be reduced in the short run without causing unemployment, and that monetary authorities act to prevent inflation.....

The existence of more than one (optimum) currency area in the world implies variable exchange rates..... If demand shifts from the products of country B to the products of Country A, a depreciation by country B or an appreciation by country A would correct the external imbalance and also relieve unemployment in country B and restrain inflation in country A. This is the most favorable case for flexible exchange rates based on national currencies.

[Robert Mundell, 1961. pp. 510-11]

True, Mundell carefully hedged his argument by giving examples of countries which were not optimum currency areas—as when the main terms of trade shocks occurred across regions within a single country—rather than between countries. And he also worried about monetary “balkanization” into numerous small currency domains which might destroy the liquidity properties of the monies involved. Nevertheless, our economics profession enthusiastically embraced the above delightfully simple paradigm, often without Mundell’s own caveats. Textbooks took existing nation states as natural currency areas, and argued that a one-size-fits-all monetary policy can’t be right when (1) labor markets are somewhat segmented internationally, and (2) when the composition of output varies from one country to the next—leading them to experience terms-of-trade shocks differentially.

Thus, as the earlier Mundell had been commonly (and still is) interpreted, having an independent national monetary policy with exchange rate flexibility is the most efficient way to deal with asymmetric shocks. Even for fairly smallish countries, better macroeconomic control—in the Keynesian sense of an activist government standing ready to offset demand or supply shocks—would outweigh the greater costs of money changing as goods crossed international borders.

From this comforting postwar Keynesian perspective (to which the late Cambridge Nobel laureate, James Meade (1955), contributed), Mundell—and most other economists in the 1960s—presumed that a flexible exchange rate would be a smoothly adjusting variable for stabilizing the domestic economy. At the time, this presumption was also shared by monetarists, such as Milton Friedman (1953) or Harry Johnson (1972), who were not macro fine tuners but who wanted domestic monetary independence in order to better secure the domestic price level. Whatever policy a central bank chose, they believed a flexible exchange rate would depreciate smoothly if the bank pursued easy money, and appreciate smoothly if the bank pursued tight money. (Because economists had very little experience—except for Canada—with floating exchange rates in the 1950s and 1960s, the great volatility in generally floating exchange rates after 1971 was unanticipated.)

Thus “Optimum Currency Areas” appealed both to Monetarists and Keynesians, although for somewhat different reasons. As such, it became enormously influential as the analytical basis for much of open-economy macroeconomics, and for scholarly doubts as to whether Western Europe—with its diverse national economies and relatively immobile labor forces—was ready for a one-size-fits-all monetary policy.

In the 1990s, the outstanding scholarly skeptic, was Barry Eichengreen—whose many articles (with several co-authors) were consolidated in his book *European Monetary Unification* [1997]. He acknowledged Mundell’s influence thus

The theory of optimum currency areas, initiated by Robert Mundell (1961), is the organizing framework for the analysis. In Mundell’s paradigm, policymakers balance the saving in transactions costs from the creation of a single money against the consequences of diminished policy autonomy. The diminution of autonomy follows from the loss of the exchange rate and of an independent monetary policy as instruments of adjustment. That loss will be more costly when macroeconomic shocks are more “asymmetric” (for present purposes, more region- or country- specific), when monetary policy is a more powerful instrument for offsetting them, and when other adjustment mechanisms like relative wages and labor mobility are less effective.

Eichengreen [1997], pp.1 and 2.

Eichengreen and Bayoumi (1993) had used an elaborate econometric analysis to show this asymmetry. “A strong distinction emerges between the supply shocks affecting the countries at the center of the European Community—Germany, France, the Netherlands, and Denmark—and the very different supply shocks affecting other EC members—the United Kingdom, Italy, Spain, Portugal, Ireland and Greece.”(page 104,

Eichengreen, *op.cit.*) On the basis of such apparently powerful argumentation, the British press and many economists still argue today that a one-size-fits-all monetary policy run from Frankfurt can't be optimal for both continental Europe and Britain. After all, aren't business cycle conditions in Britain sufficiently different to warrant a separate counter-cyclical response from an independent Bank of England? But whether sophisticated or not, writers in this vein—most recently Martin Feldstein [2000] in “Europe Can't Handle the Euro”—are definitely in thrall to the earlier Mundell.

The Later Mundell and International Risk Sharing

In a not-much-later incarnation, Robert Mundell jettisoned his earlier presumption of stationary expectations to focus on how future exchange rate uncertainty could disrupt the capital market by inhibiting international portfolio diversification and risk sharing. At a 1970 Madrid conference on optimum currency areas, he presented two prescient papers on the advantages of common currencies. Perhaps in part because the conference proceedings were not published for several years, these papers have been overshadowed by his 1960s masterpieces.

The first of these papers, “Uncommon Arguments for Common Currencies”, is of great intrinsic interest because very early it emphasized the forward-looking nature of the foreign exchange market—which was later to be worked out in more analytical detail by his students: see, for example, Frenkel and Mussa (1980) . As such, it counters the idea that asymmetric shocks—i.e., those where an unexpected disturbance to national output affects one country differently from another—undermine the case for a common currency.

Instead, Mundell showed how having a common currency across countries can mitigate such shocks by better reserve pooling and portfolio diversification. A country suffering an adverse shock can better share the loss with a trading partner because both countries hold claims on each other's output in a common currency. Whereas, under a flexible exchange rate without such portfolio diversification, a country facing an adverse shock and devaluing finds that its domestic-currency assets buy less on world markets. The cost of the shock is now more bottled up in the country where the shock originated. As the later Mundell puts it.

A harvest failure, strikes, or war, in one of the countries causes a loss of real income, but the use of a common currency (or foreign exchange reserves) allows the country to run down its currency holdings and cushion the impact of the loss, drawing on the resources of the other country until the cost of the adjustment has been efficiently spread over the future. If, on the other hand, the two countries use separate monies with flexible exchange rates, the whole loss has to be borne alone; the common currency cannot serve as a shock absorber for the nation as a whole except insofar as the dumping of inconvertible currencies on foreign markets attracts a speculative capital inflow in favor of the depreciating currency.

[Mundell, 1973a, p.115].

Clearly, if interest bearing bonds were to be added to Mundell's ultra simple

theoretical model, which included only money and commodities, currency risk premia would arise naturally. (But embedding this risk reduction in a formal model is a story for another time.) Interest rates on domestic currency assets would tend to rise in those countries on the “periphery”, i.e., which just might be forced to devalue if hit by an adverse shock, relative to interest rates in some de facto safe haven or center country.

Today, Latin American countries on the periphery of the world dollar standard have much higher interest rates than those in the United States; and before the advent of the euro, the weak currency countries of Italy, Spain, and so on, operated with higher interest rates—see Charts 1 and 2—and shorter-term finance than in Germany. The gains from proper risk sharing through a common currency should show up as a net reduction in risk premia in interest rates for the system as a whole. And, after the advent of the euro on January 1, 1999 charts 1 and 2 show the remarkable convergence of European interest rate at a lower average level than in the past.

An alternative way to limit this casino effect in foreign exchange markets is for governments to curtail Keynesian activism by giving each central bank a strict domestic price-level objective—where it no longer responds to output or employment fluctuations except as they might influence this inflation target. The Bank of England and the European Central Bank are more or less on such regimes. Although a big step forward in monetary management and in smoothing exchange rate movements, having separate inflation targets still does not prevent sterling’s occasionally getting uncomfortably over (or under) valued against the euro. Today, in May 2000, the consensus estimate seems to be that sterling is at least 20 percent overvalued against the euro with consequential undue stress in Britain’s tradable goods sectors. Beyond inflation targeting, the further step of Britain, Sweden, and possibly others joining the euro would seem necessary for ending intra-European exchange rate misalignments altogether.

Mundell’s second Madrid paper, “A Plan for a European Currency”, makes clear his early enthusiasm for the great European experiment. Until 1970, European countries all pegged uncertainly to the U.S. dollar in order to achieve a modicum of intra-European exchange stability. But the commitment to dollar parities was eroding, in large measure because the monetary anchor provided by the U.S was beginning to slip. So Mundell stated:

The only way to establish a unified money market is to kill the sporadic and unsettling speculation over currency prices that ravaged the European markets between 1967 and 1969, and permitted discounts and premia to develop on currency futures. The exchange rate should be taken out of both national and international politics within Europe.

Rather than moving toward more flexibility in exchange rates within Europe the economic arguments suggest less flexibility and a closer integration of capital markets. These economic arguments are supported by social arguments as well. On every occasion when a social disturbance leads to the threat of a strike, and the strike to an increase in wages unjustified by increases in productivity and thence to devaluation, the national currency becomes threatened. Long-run costs for the nation as a whole are bartered away by governments for what they presume

to be short-run political benefits. If instead, the European currencies were bound together disturbances in the country would be cushioned, with the shock weakened by capital movements. [Mundell, 1973b, pp. 147 and 150]

Mundell's plan for weaning Europe from dollar dependence began by selecting one European country's currency to provide a new numéraire to which the others would fix their exchange rates. But European countries party to the new exchange rate agreement would send representatives to sit on the numéraire country's monetary board. Although the currency of any sizable European country would do, in 1970 he suggested that the pound sterling was the best choice for the numéraire because "Britain is the largest financial power and the pound is still a world currency" (p. 158).

Instead, the more stable German monetary policy, with the D-mark as the numéraire currency, became the focal point to rebuild first exchange rate stability and then monetary unity in Europe—while Britain continues to dither. With the formal advent of the euro on January 1, 1999, the forward-looking Mundell of the Madrid papers "triumphed" over his earlier Keynesian incarnation as the originator of the theory of optimum currency areas. But he is intellectual father to both sides of the debate.

Updating Mundell

From the intellectual vantage point so nicely provided by Mundell's Madrid papers, what can we say about proper exchange rate policies in the new millenium among the United States and Europe on the one hand, and then clusters of "emerging-market" economies like those in East Asia and Latin America on the other?

The traditional role of the U.S. dollar as the world's central currency—as the invoice currency for world commodity trade, as the dominant vehicle currency in the world's spot and forward foreign exchange markets, and as the official exchange reserve asset of choice—remains, and will remain, much as it was in 1970. But America's benign neglect of fluctuations in the dollar/euro exchange rate needs to be differentiated from a more purposeful policy toward East Asia and Latin America—where much greater exchange rate stability is required.

Because the euro now establishes a large zone of monetary stability in continental western Europe and its periphery, the best near-term strategy is a hands-off, laissez-faire policy over a wide range of values for the dollar/euro exchange rate. The dollar is no longer needed as the common monetary anchor as it was in the 1960s. Although disconcerting, the euro's fall from \$1.18 in January 1999 to about \$0.89 in February 2000 is not out of line with similar fluctuations in the "synthetic euro" weighted by the importance of its constituent currencies from 1980 through mid 2000—see Chart 3. The European Central Bank and the U.S. Federal Reserve best intervene only if obvious panic develops, for example, if the euro started plunging instead of just drifting down. Even then, just nudging the euro back up—rather than pegging its dollar exchange rate—is all that would be appropriate.

However, economic stability in East Asia requires different and stronger medicine. Because no region-wide “Asian euro” exists or is in prospect, the dollar is the only plausible anchor for creating an East Asian zone of monetary stability in price levels and exchange rates [McKinnon 2000]. In order to prevent competitive devaluations and inflationary upheavals in the future, this zone would cover both the smaller East Asian countries that fell victim to the great 1997 currency crisis and China, which did not. And, post crash, the evidence is very strong that an East Asian dollar standard, with the important exception of Japan—is resurrecting itself.

The advantage to Japan of being part of the dollar zone is somewhat different. Prolonged stability in the yen/dollar exchange rate is the key to quashing the *deflationary* expectations that have gripped the Japanese economy for almost a decade [McKinnon and Ohno 1997 and forthcoming, and McKinnon 1999a].

In early May 2000, Robert Mundell did a lecture tour of Brazil expounding on the virtues of a single currency for Mercosur, the South American trade group that also includes Argentina, Uruguay, and Paraguay (*Financial Times*, May 9, 2000). As a first a first step in the process of economic convergence, he advised the regions currencies to link their currencies to the U.S. dollar. He said that “Interest rates would soon fall to close to U.S. levels. The big advantage is that it would lock in monetary stability and make it permanent”.

Contrary to today’s conventional wisdom for Latin America, Mundell did not advocate complete dollarization. Presumably a preferable “final” solution, in Mundell’s view would be a “South American euro”. Of course, without political unity and financial stability, the introduction of such a stand-alone regional currency is only a remote possibility.

But it is worth noting that the most systematic opposition to Mundell’s view came from Brazillians quoting Mundell’s earlier work. “According to Affonso Celso Pastore, a former central bank president, there is virtually no labor mobility between the Mercosur countries. As a result, region does not constitute an optimal currency area—one of Mr. Mundell’s insights” (*Financial Times op.cit.*) So the contest between the two Mundells continues.

The Dollar Versus the Euro

But here let us focus on the position of the real euro when most parts of the world are on some kind of dollar standard—if only putative. In judging the euro’s impact on the dollar, consider two competing economic interpretations of the euro’s potential future role in the world economy.

The first interpretation focuses on economic integration in goods and factor markets within Europe and with surrounding countries: an extended optimum currency area. Because of the EU’s huge economic size and far-reaching trade connections, this interpretation suggests a wider influence for the euro well beyond the current political

borders of the European Union. The EU countries will constitute an economic mass nearly as large as that of the United States itself, and European exports to the rest of the world (net of what are currently counted as intra-European exports) will be similar in magnitude to American exports. Many eastern European countries will opt to peg to the euro because they are so open to EU trade—as are many former European colonies in Africa. For both types of countries, the new euro could well dominate as an intervention and reserve currency.

The second interpretation focuses on the need for international money *beyond* that associated with unusually close trade linkages. The world economy itself needs a unit of account, means of payment, and store of value for both governments and private firms. In the absence of a generally accepted metallic money such as gold or even a dominant country like the United States, one of the national currencies would still be selected by habit or custom. Once selected, however, this national currency's role as international money becomes a natural monopoly. That is, the scope for more than one national currency to serve in a dual role as international and domestic money is limited.

In the aftermath of World War II, the United States provided the essential funding for the International Monetary Fund, the Marshall Plan, and the Dodge Plan, which jointly restored exchange and price-level stability among the industrial countries while replenishing official exchange reserves [McKinnon 1996]. The world's only capital market without exchange controls was the American. Thus, the U.S. dollar became the dominant international vehicle currency for private transacting, and the reserve currency for official interventions.

Even when the American money manager, the Federal Reserve System, was doing quite badly—as from the inflationary 1970s into the early 1980s—the dollar-based system proved surprisingly resilient. Although many other countries had by then opened their financial markets, the dollar was not significantly displaced as international money. Now that American monetary policy has been quite stable for more a decade, could the momentous advent of the euro—with an open European capital market—displace the dollar?

The Role of an International Vehicle Currency

Consider first a world of “N” national currencies without official interventions or foreign exchange targeting by governments. In organizing private interbank markets for foreign exchange, great savings in transactions costs can be had if just one national currency, the Nth, is chosen as the vehicle currency. Then all foreign exchange quotations—bids and offers—at all terms to maturity can take place against this one vehicle currency. The number of active markets can be reduced from $N(N-1)/2$ to just $N-1$. In a world of more than 150 national currencies, this is a tremendous economy of markets for the large commercial banks that make the foreign exchange market. The dollar's interbank predominance (being on one side of almost 90 percent of interbank transactions) allows banks to cover both their forward exchange and options exposures much more efficiently.

Trade in primary commodities shows a similar pattern of using one national money as the main currency of invoice. Exports of homogeneous primary products such as oil, wheat, copper, and so on, all tend to be invoiced in dollars with worldwide price formation in a centralized exchange. Spot trading, but particularly forward contracting, is concentrated at these centralized exchanges—which are usually in American cities such as Chicago and New York, although dollar-denominated commodity exchanges do exist in London and elsewhere. In periods of reasonable confidence in American monetary policy, these *dollar* commodity prices are relatively invariant to fluctuations in the dollar's exchange rate. In contrast, if any other country allows its exchange rate to fluctuate against the dollar, its domestic currency prices of primary commodities will vary in proportion—unless its trade is restricted.

Invoicing patterns for exports of manufactured goods are more complex. Major industrial country with a strong currencies tend to invoice their exports in their home currencies. More than 75 percent German exports were invoiced in marks, more than 50 percent of French exports invoiced in francs, and so on. With the advent of EMU, continental European countries will begin invoicing their net exports outside the European Union mainly in euros.

However, Japan invoices about 36 percent of its exports in its own currency—is low by the standards of other large industrial countries, in part because the United States is its main export market. On the import side, about 70 percent of goods coming into Japan are invoiced in dollars, in part because Japan is such a heavy importer of primary products and manufactures from the United States. Thus, Japan suffers high variation in domestic yen prices, i.e., “pass-through” is high, when the yen-dollar exchange rate fluctuates.

At the other extreme, the U.S. price level is fairly immune to fluctuations in the dollar's exchange rate against other currencies because *both* its exports and imports are largely invoiced in dollars: 98 percent of American exports, of primary products and manufactures, are dollar invoiced and an amazing 88 percent or so of American imports. (For example, almost all of Japan's exports to the United States are dollar invoiced.) In addition, for trade not directly involving the United States, the dollar is heavily used as an invoice currency for manufactured (and of course primary) exports from developing and transitional economies in Asia, Latin America, and elsewhere.

Here then lies an important distinction between Euroland and East Asia. Euroland is naturally more insular in a monetary sense. It is a large integrated economy that uses its own currency for invoicing much of its foreign trade. Fluctuations in the euro/dollar exchange rate have little impact on Europe-wide price indexes; and thus, over moderate ranges, can be more or less ignored. In contrast, the price levels of all the East Asian countries—to including Japan's—to are much more affected by fluctuations in their separate exchange rates against the region's dominant trading currency, the U.S. dollar. Even more so does the dollar dominate trade in Latin America.

Once private interbank foreign exchange and commodity markets are set up with

the dollar as the vehicle and invoice currency, official interventions follow the same pattern. Governments pursue their exchange rate objectives more conveniently by intervening only in dollars (at different terms to maturity) against their domestic monies. Using only one currency for intervention prevents inconsistency in the setting of cross rates with other foreign monies.

This pattern of official intervention determines the pattern of official holdings of foreign exchange. Apart from gold, about 70 percent of official reserves held outside Europe are dollar denominated. True, the desire for safety through portfolio diversification is important. But this cuts against the convenience of holding reserves in the intervention currency, with its relative stability in real purchasing power measured against internationally traded goods. Thus governments outside Europe have preferred to hold dollars--mainly U.S. Treasury bonds. Certainly, most of these governments will want to hold euros to replace their D-mark, franc, and sterling assets as these national European currencies disappear. But it seems unlikely that any *official* demand to hold euro assets will be much greater than the former demand for reserve holdings in Europe's legacy currencies.

There is the further problem of what the benchmark euro asset will be. The EU central government itself does not have significant debt outstanding like the huge stock of U.S. treasuries. In Europe, government debt is lodged with the old national, now middle-level, governments who no longer control their own central banks. Now, default risk is not insignificant. In comparison to U.S. Treasuries, a position in euro-denominated bonds will involve some (possibly minor) default risk which differs by country. Although both U.S. Treasuries and European government bonds now denominated in euros will be subject to (differing) currency risk—i.e., concern for inflation and devaluation—European bonds will probably remain marginally less attractive to foreign governments as official reserve assets.

Portfolio Diversification, Falling Risk Premia, and the “Weak” Euro

But *within* Euroland private euro-denominated bond issues are now growing explosively. For the first half of 1999, the table shows overall euro bond issues growing by 80 percent compared with bond issues in the old legacy currencies during the first six months of 1998. Most strikingly, issues of euro-denominated *corporate* bonds are running at a rate almost four times as high in 1999 compared to 1998. Why the startling difference?

In the pre-euro regime when the D-mark was king, corporations in European countries on the German periphery—such as Italy, Portugal, and Spain—suffered currency risk relative to German issuers of mark-denominated bonds because of the existence of the lire, escudo, and peseta. The resulting risk premia, i.e. higher interest rates particularly at longer term, kept finance short term and largely bank based. In 1999, the extinction of these risky currencies has allowed previously hobbled Italian, Portuguese, Spanish (and even French?) firms to lengthen the term structure of their debts by issuing euro-denominated bonds at lower interest rates while escaping from the

clutches of their bankers. European banks, in turn, are madly consolidating—although unfortunately only at the national level.

On the demand side, European insurance companies and pension funds had been confined to keeping the bulk of their assets denominated in domestic currency in order to better match their liabilities. But with the move to a common, and for the peripheral countries, a stronger currency, they are free to diversify and acquire assets on a Europe wide basis—and from foreigners who are willing to sell euro-denominated bonds. Thus is the term structure of corporate finance in Europe being lengthened with the lower interest rates reflecting lowered overall portfolio risk. This broader risk sharing, and thus risk reduction, in European capital markets—by eliminating fluctuating relative currency values—is precisely what the forward-looking Mundell of the Madrid papers [1973] had in mind.

Can the rapid development of a broad and deep capital market in Euro denominated assets “explain” the surprising weakness of the euro since January 1, 1999? (Although the Euro is not so weak when considered in proper historical perspective—as per Chart 3.) Foreign borrowers, e.g., American or those from developing countries, may now be tapping this large newly integrated pool of euro-denominated capital on greater scale than had previously been expected. The resulting incipient capital outflow from Euroland has become greater than its (large) current account surplus. But this one-time stock adjustment from the improved conditions in the European financial markets should not persist—and is not something to worry about.

Nevertheless, on the broader global stage, the dollar’s continued vehicle-currency role is unlikely to be displaced by the extended currency-area role for the new euro—and the growing net creditor status of Euroland as a whole. Even if the dollar's use as an international vehicle currency outside of Europe is largely unaltered by the euro's advent, eliminating currency risk within the greater European economy is a remarkable benefit—as Mundell correctly foresaw in his second incarnation.

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EUROPEAN BOND ISSUES: 1999 VERSUS 1998

Volume of euro-denominated international bonds, by issuer type 1/1-30/6/1999

	Total		
	Amt. m (US\$)		Iss.
Banks/Finance	240,209.117	66.15	597
Corporate	79,012.498	21.76	166
Utilities	16,771.171	4.62	33
Sovereign	16,130.135	4.44	38
Supranational	7,012.887	1.93	31
Others	4,005.959	1.10	30
Local authority	4,005.959	1.10	30
Total	363,141.767	100.00	895

Volume of international bonds issued in legacy currencies (include. ecu & euro), by issuer type 1/1-30/6/1998

	Total		
	Amt. m (US\$)		Iss.
Banks/Finance	131,561.740	65.85	548
Sovereign	28,462.517	14.25	49
Corporate	20,263.587	10.14	97
Supranational	11,595.437	5.80	56
Utilities	6,889.331	3.45	16
Others	1,023.143	0.51	6
Local authority	1,023.143	0.51	6
Total	199,779.755	100.00	772

Source: Capital Data, Aldwych House, London, U.K.

Chart 1
Short-term Treasury Rates - EMU

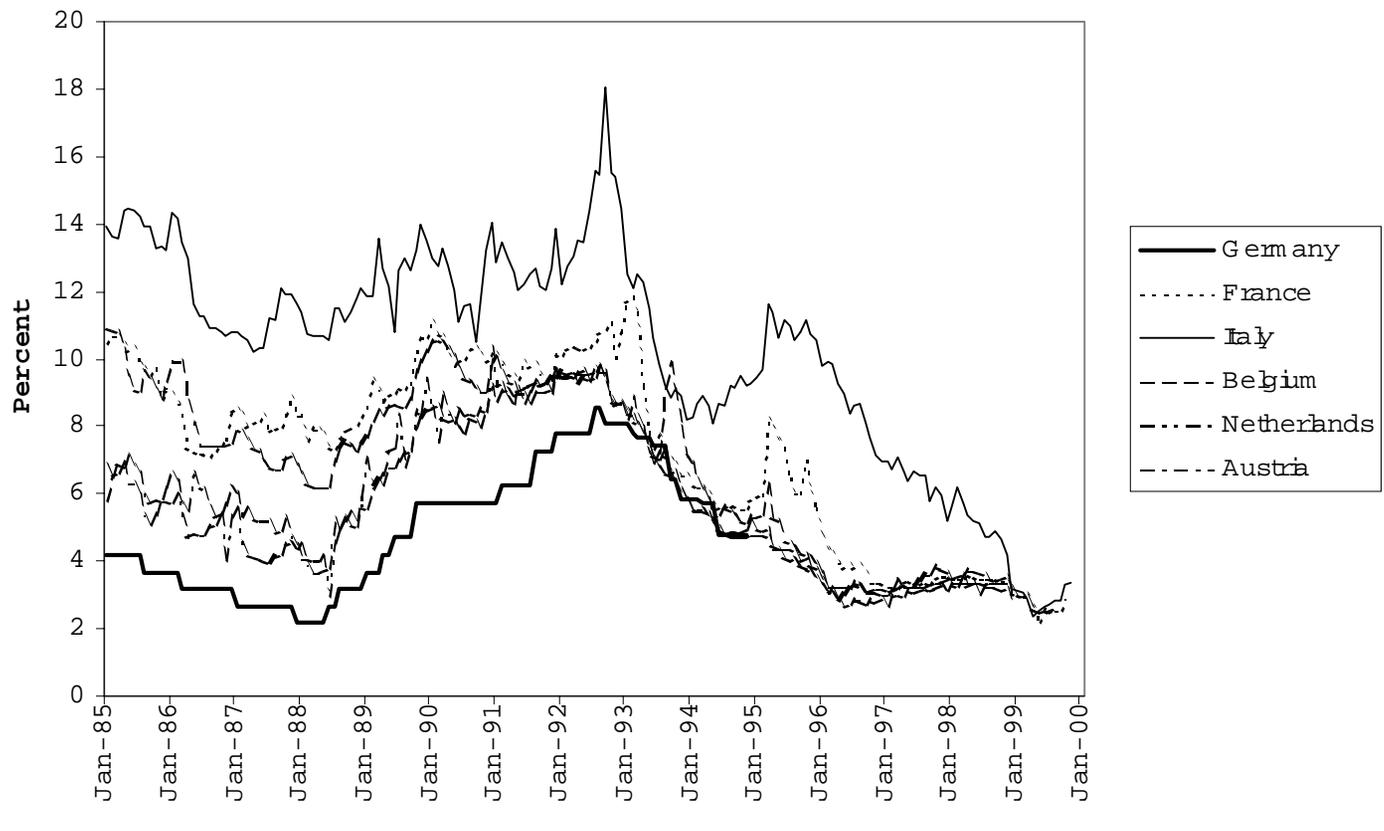


Chart 2
10-yr Benchmark Bond Yields - EMU

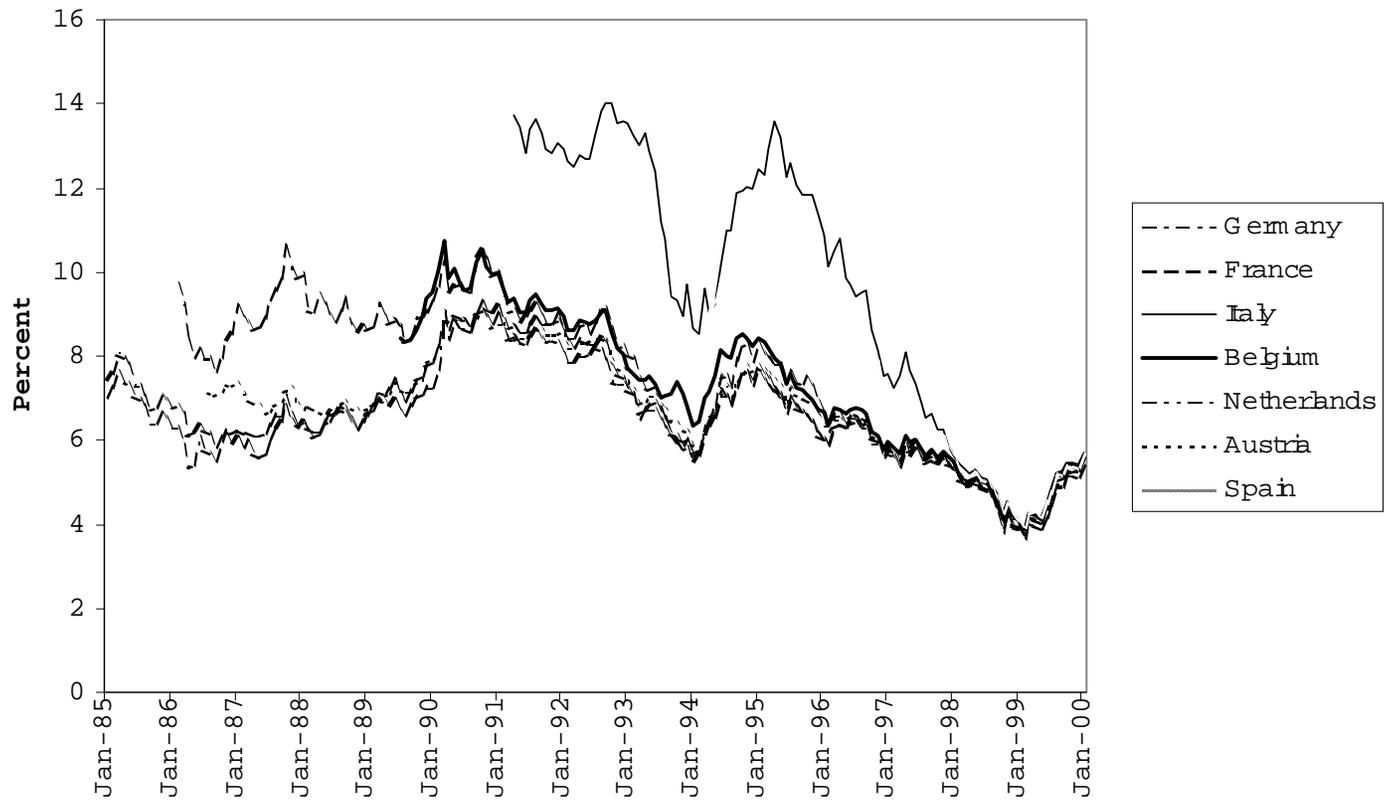
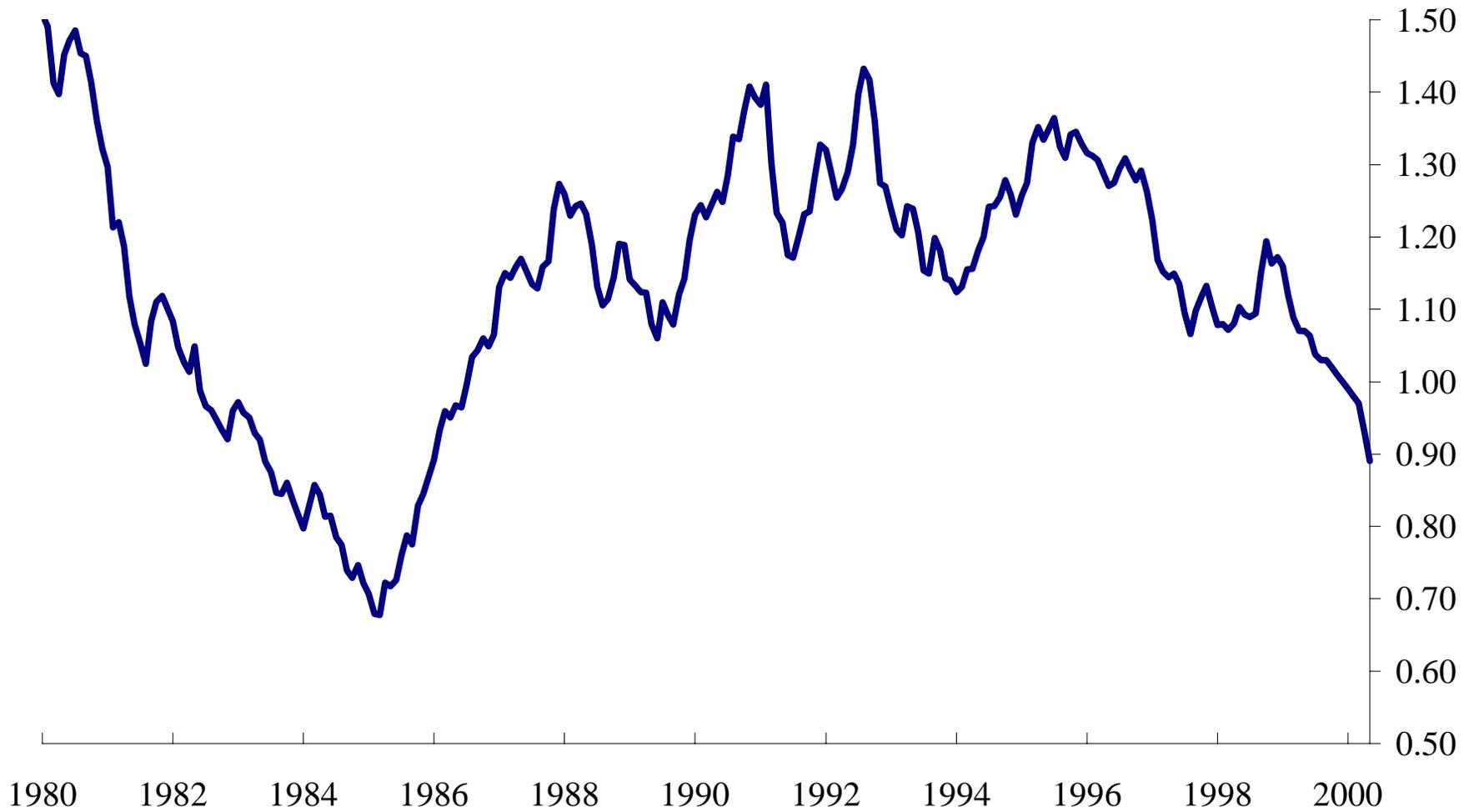


Chart 3
Euro-\$ (January 1980 - May 2000)



Euro-\$ = Dollars per Synthetic Euro, derived from a weighted-average of the 11 component currencies (IMF weights)

Source: Bank of England.

