

Abstract

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The paper presents a historical analysis of the ECU market. The ECU is widely accepted to have developed its currency status and gained popularity for several reasons in the early 1970s. The most important reason was that it offered a simple, easy and inexpensive way to hedge currency risk. In the 1980s, the main driving force was the expectation of a European Economic and Monetary Union with the ECU as the common currency. The crisis in 1992 caused severe uncertainty about the future of the ECU and the ECU market suffered a sharp decline.

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Because the monetary union is a key element of the functioning of the European Monetary System (EMS), a credit union and of related EMS exchange rate is considered. The results suggest that the EMS achieved inflation rate convergence and that the EMS is a stable system. However, a decision is also important to avoid inflation rate convergence or perhaps leaving the system, uncertainty of the future of the EMS is spread. This, in turn, is reflected in the use of the ECU. Hence, the creditworthiness of the ECU is dependent on the credibility of the EMS arrangements.

## The ECU as the Future Currency of Financial Transactions

Finally, future prospects for the ECU are discussed. The main point is that in the short-term, some preconditions for the efficient use of the ECU must be fulfilled. Firstly, the Maastricht Treaty must be ratified and the EMS put back on track. Secondly, remaining legal obstacles to ECU usage must be removed. Thirdly, the ECU payment systems must be reinforced. Fourthly, governments must set an example in using the ECU as money. Only then will investors realize that the way has been cleared for the ECU to become the single currency of the EC. In the long term, in fact, only the EMU will make the ECU a major world currency.



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## Abstract

The paper presents the development of the role of the ECU in the financial markets. The ECU is the only currency basket to have developed as a currency. It has gained popularity for several reasons. In the early 1980s, the most important reason was that it offered a simple, easy and inexpensive way to diversify exchange rate risk. In the 1990s, the main driving force was the expectation of a European Economic and Monetary Union with the ECU as the single currency. However, the crisis in 1992 caused severe uncertainty about the future of the monetary union. As a consequence, the ECU market suffered, and the risk diversifying properties of the ECU have regained importance.

Because the monetary union depends to a large extent on the functioning of the European Monetary System (EMS), a credibility test of selected EMS exchange rates is conducted. The results suggest that, despite of achieved inflation rate convergence, the stability of the EMS is not self-evident. The (political) willingness of the participating countries to follow an anti-inflationary policy during a recession is also important. If one of the countries gives signs of devaluating or perhaps leaving the system, uncertainty of the future of the EMS is quickly spread. This, in turn, is reflected in the use of the ECU. Hence, the creditworthiness of the ECU is dependent on the credibility of the EMS as a system.

Finally, future prospects for the ECU are discussed. The main point is that in the short term, some preconditions for the efficient use of the ECU must be fulfilled. Firstly, the Maastricht Treaty must be ratified and the EMU put back on track. Secondly, remaining legal obstacles to ECU usage must be removed. Thirdly, the ECU payment systems must be reinforced. Finally, governments must set an example in using the ECU as money. Only then will investors realize that the way has been cleared for the ECU to become the single currency of the EC. In the long term, in turn, only the EMU will make the ECU a major world currency.



## Tiivistelmä

Tässä työssä käydään läpi ECU:n kehitystä kansainvälisenä sijoitusvaluuttana. ECU on ainoa valuuttakori, joka on saavuttanut kansainvälisillä rahoitusmarkkinoilla muihin valuuttoihin verrattavan aseman. 1980-luvun alkupuolella tärkein syy ECU:n käytölle oli sen suoma tehokas, helppo ja halpa suoja korko- ja valuuttakurssiheilauksia vastaan. 1990-luvulla pääasiallisena ECU:n suosion syynä voidaan pitää myönteisiä odotuksia Euroopan talous- ja valuuttaliitosta (EMU). EMU:n toteutuessa ECUSTA tulisi EY-maiden yhteinen valuutta. Vuonna 1992 Euroopan valuuttamarkkinoita heiluttanut kriisi aiheutti kuitenkin epävarmuutta EMU:n kohtalosta. ECU-markkinat kärsivät tästä häiriöstä, mikä näkyi ECU:n käytön vähenemisenä ja ECU-korkojen nousuna.

Koska EMU riippuu paljolti Euroopan valuuttajärjestelmän (EMS) kitkatomasta toiminnasta, on aiheellista analysoida myös EMS:n uskottavuutta. Raportissa testataan ns. target zone -teoriaan nojautuen muutamien bilateraalisten EMS-valuuttakurssien uskottavuutta. Havaitaan, että inflaatiovauhtien konvergenssista huolimatta ei valuuttakurssien uskottavuus ole pitkällä tähtäimellä parantunut. Osasyys esitetään sitä, että joidenkin maiden poliittisesta halukkuudesta sitoutua EMS:n edellyttämään tiukkaan rahapolitiikkaan myös laskusuhdanteen aikana ei voida olla varmoja. Jos markkinoille leviää käsitys, että joku valuutta voidaan irrottaa järjestelmästä, vaarantuu samalla myös EMU:n ja sitä kautta ECU:n tulevaisuus.

Selvityksen lopussa esitetään näkökohtia ECU:n käytöstä tulevaisuudessa. Todetaan, että ECU:n käyttöle kansainvälisenä sijoitusvaluuttana on tiettyjä ehtoja. Lyhyellä aikavälillä olisi Maastrichtin sopimus ratifioitava kaikissa EY-maissa. Se loisi optimismia EMU:n toteutumisen suhteen. Myös kaikki lailliset esteet ECU:n käytölle on poistettava. EY:n instituutioiden tehtävänä olisi rohkaista ECU:n käyttöä, ennen kaikkea laskemalla liikkeeseen ECU-lainoja. Vain näillä toimilla voidaan rahoitusmarkkinoiden tekijät vakuttaa siitä, että ECUSTA on tulossa EY-maiden USD:n ja DEM:n kilpailija maailmanlaajuisesti.

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# 1 Introduction

The ECU is the only currency basket to have developed as a currency, with significant markets in many financial instruments. The ECU has gained popularity for the following reasons. Firstly, the drive to create a zone of monetary stability in Europe has made EMS countries more reluctant to countenance fluctuations in exchange rates, and they have sought to build up their reserves. Secondly, the ECU offers a simple, easy and inexpensive way to diversify exchange rate risk. Thirdly, markets in ECUs have become much wider and deeper over the course of time.

This article is organized as follows. In section 2 ECU is defined. Section 3 describes the development of the ECU markets. In section 4, the attractiveness of ECU assets is discussed. In section 5, a credibility test of the EMS exchange rates is conducted. Finally, section 6 discusses the future prospects of the ECU.



## 2. The ECU

### 2.1. The ECU - EC in Average

The European Currency Unit (ECU) is actually much older than most people realize. It was originally born in 1974 as an accounting unit for the European Development Fund. It was called the European Unit of Account (EUA). The idea behind it was that it should represent an average of European currencies. The weights for the national currencies are consequently chosen so as to reflect the relative economic size of the corresponding country<sup>1</sup>.

The name was changed to ECU in 1979 with the creation of the European Monetary System (EMS). All EC currencies were included, and the idea of having the weights of the individual currencies represent the relative economic strengths of the participating countries was retained.

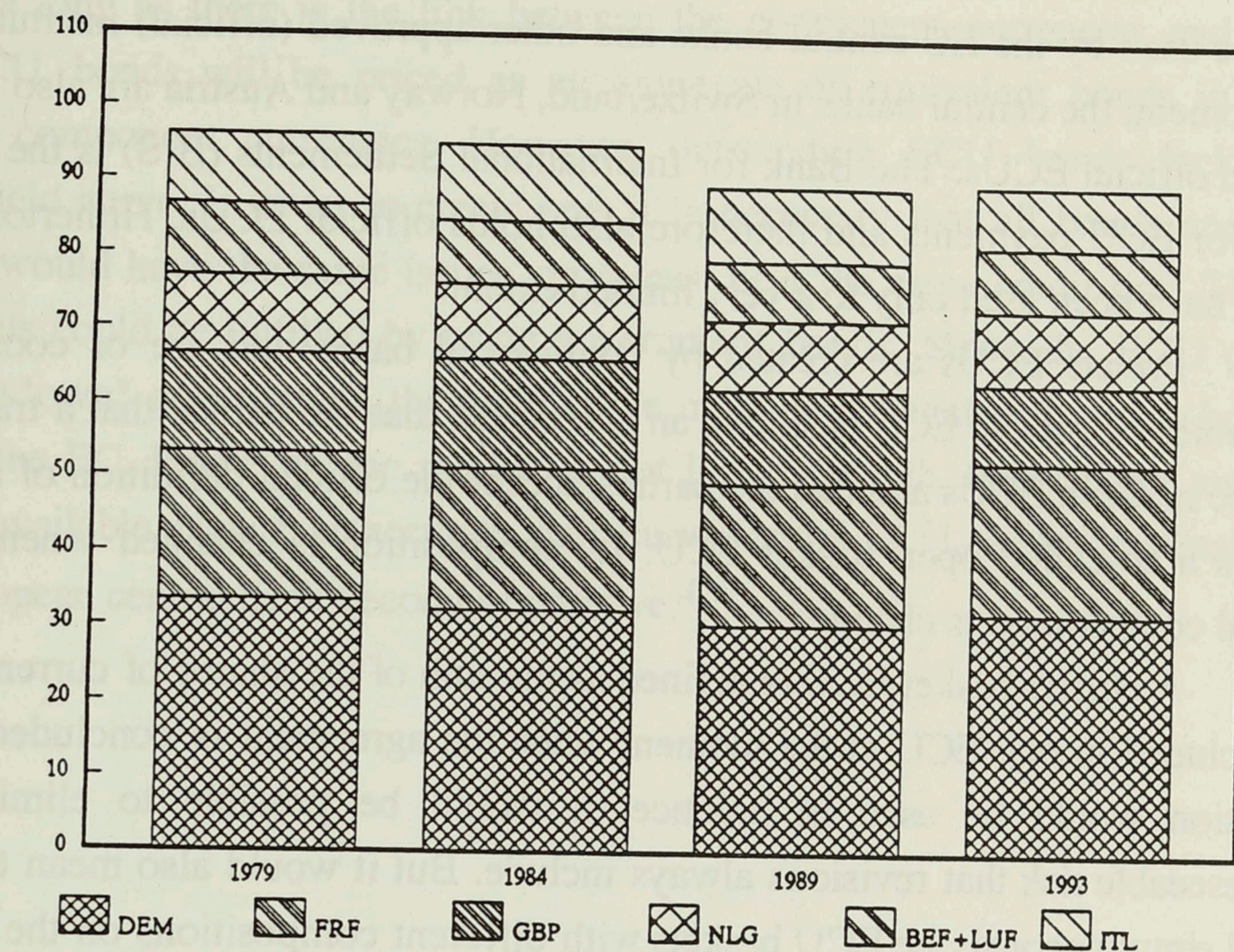
Thus, the ECU consists of fixed shares of the twelve current EC currencies. The composition of the ECU is revised every fifth year or more frequently, if the GDP in any of the participating countries changes by more than 25%. In 1984, when the GRD was added to the basket, and in 1989, when the ESB and the PTE were added, certain judgemental adjustments were made. The next revision of composition will be in 1994. As *figure 1* shows, the shares of the individual currencies have changed only slightly over the years. From the investors point of view, it is important to note that a change in the composition of the ECU affects the redemption value of the ECU instrument. In adjusting the composition, weaker currencies are given greater weight, which decreases the redemption value of outstanding ECU instruments. If the change in composition is unexpected, holders of outstanding ECU assets suffer immediate capital losses. But if the markets have correctly anticipated the change, the initial price of the ECU instrument will have been discounted, implying an initially higher ECU market interest rate.<sup>2</sup>

The fixed-basket definition has the drawback that in times of high inflation it creates a need for periodic revision if the basket is to continue to reflect the average performance. Thus, the share of the strong currencies, DEM and NLG, are larger than relative economic size would imply. This means that the share of the

<sup>1</sup> More accurately, the weights are determined by a combination of economic criteria and other more subjective considerations. The official economic criteria are: share of the country in GDP, its share in intra-EC trade and its share in the EMS financial support system.

<sup>2</sup> Allen (1990) notes that such effects of changes in composition on the redemption value of ECU instruments (exchange rate effects) are particularly strong for short-term ECU instruments.

Figure 1. Currency Weights in the ECU Basket, 1979 - 1993.



weaker currencies must correspondingly be smaller. Hence in practice, we have an ECU that is actually stronger than the theoretical average.

The fixity of the shares in the ECU gives rise to a problem in that if there are substantial changes in exchange rates, the ECU basket will no longer represent the average. In such a case, the weights of the stronger currencies increase automatically, whereas the weights of the weaker currencies diminish. From a macroeconomic point of view, this may be good, because if a country with a weak currency does not change its economic policy, its currency will disappear from the ECU basket. Hence, in a sense, the ECU is better than the average.

### 2.2. Official and Private ECUs

There are actually two different ECUs—official and private. The official ECU is defined as a currency basket composed of specific amounts of the currencies of the EC member states. Official ECUs are created only when the central banks of the EC countries deposit 20% of their gold and dollar reserves in the European Monetary Cooperation Fund (EMCF). In exchange, they receive an equal amount of official



ECUs. The official ECU unit is used to express the central exchange rate of ERM currencies, to denominate certain claims and liabilities, and as a reserve instrument.

Official ECUs cannot be traded in the market like a true currency. They can only be used by the EC central banks and other approved (official) institutions. At the moment, the central banks in Switzerland, Norway and Austria are also entitled to hold official ECUs. The Bank for International Settlements (BIS) is the clearing bank for ECU payments and therefore also holds official ECUs. Hitherto, official ECUs have been used only to a very limited extent.

Private ECUs are created by commercial banks and are of concern to companies. A private ECU is simply an agreement that the parties that a transaction shall be made in ECUs and that the parties accept the official definition of an ECU. This is a so-called open basket ECU. Its composition is changed whenever the official composition is changed.

A closed-basket ECU is defined as the sum of the shares of currencies that are included in one ECU at the moment when the agreement is concluded. If this definition would be used in practice, it would be possible to eliminate the unforeseeable risk that revisions always include. But it would also mean that there would simultaneously be ECU baskets with different compositions on the markets. Therefore, in practice, the open basket ECU is used.

Due to the difference in definitions, the official and private ECU differ also in value. The value of the official ECU is simply the exchange rate or interest rate, which can be obtained by summing up the market values of the individual currencies with the weights defined by the composition of the ECU basket. The official spot exchange rates for the ECU are calculated by the EC on the basis of the relevant USD exchange rates. The private ECU exchange rate is, on the contrary, a market rate, determined in the foreign exchange markets as with any currency. Today's value of the private ECU is determined by expectations that a European monetary authority will at some future date declare itself willing to convert the private ECU into the official basket at par.<sup>3</sup> Private banks peg the market exchange rate of the private ECU to the official basket exchange rate through their willingness at any time to supply an ECU demand deposit in exchange for the component currencies (bundling the ECU) or to supply the component currencies in exchange for an ECU demand deposit (unbundling the ECU). Although there never has existed any official mechanism or guarantee to convert private ECUs one for one into official ECUs, the value of the private ECU was, until November 1988, fixed in terms of the official basket by a group of major European banks that stood ready to convert private ECUs into official ECUs at par. However, as the net ECU exposure of these institutions grew, they stopped fixing the market ECU/official

<sup>3</sup> For a detailed derivation of the value of the ECU, see **Folkerts-Landau & Garber (1992)**. The pricing of the official and private ECUs is also discussed in **Gros & Thygesen (1992)**.

ECU exchange rate and hence began the era of the floating market ECU exchange rate. Thus, private ECUs can be traded at market-clearing rates.

As long as there is the link between the component currencies and the private ECU, bonds will be priced as an aggregate of equivalent bonds in the individual component currencies. However, outstanding ECU bonds lack an ordinary yield curve. In order to create one, it is necessary that all bonds and all maturities would have the same issuer, or at least bear the same credit risk. These requirements could be fulfilled by using government bonds. Since the ECU does not have its "own" government, the yield curve must be calculated by using bonds issued by the EC. However, the market is not liquid enough, and neither are all maturities available. Hence, an accurate yield curve for the ECU cannot be obtained until a European central bank becomes operative.<sup>4</sup>

<sup>4</sup> This issue is further discussed in e.g. **Nilsson (1991)**.



### 3. Development of the ECU Markets

The private use of the ECU took off after the creation of the EMS. The (private) ECU market is being used on a significant and growing scale by public authorities and by the private sector. Hitherto, the most important use of the private ECU has been in financial transactions; its use as an invoicing currency and as a means for settlement of non-financial transactions remains very limited.

#### 3.1 Bond Markets

The first ECU bank deposit and the first ECU bond were issued in 1981. Initially, all ECU issuances were Eurobonds, and the volumes were modest. Political support for the EMS and thus also for the ECU contributed to a rapid expansion of the market, which developed quickly from almost nothing to one of the largest financial markets in the world.

Since 1985, growth has been more irregular and less spectacular in relative terms. In 1985, the growth was especially strong. However, that year turned out to be an exception; in 1986 and 1987 issuing activity receded. Since then, activity has again increased, mainly due to the fact that many of the EC states started to use the ECU as the currency of denomination. A breakthrough occurred in 1988, as Great Britain started to issue government bonds denominated in ECU. Italy has been another frequent ECU-issuer, and since 1989 France also has regularly issued 10-15 % of its total bond volume in ECU. In the beginning of 1991, large volumes were issued, which raised the share of ECU on the international bond markets to 8% from 6.8% at the end of 1990 (straight fixed rate issues). In 1992, the share declined to 7.6%, due to the dramatic decline in net issues in the second half of the year. This decline can be attributed to the turbulence in the European foreign exchange markets and to the uncertainty regarding the future of the EMU. In early 1993, however, the EC in particular issued large ECU bonds. This should promote the recovery of the ECU bond market. Furthermore, there is a sizeable market in short-term ECU securities, both in the form of Treasury bills and commercial papers.

In general one could say that the market share of the ECU has been much more stable in terms of stocks (assets and liabilities) than in terms of flows (new issues). This can be explained by the desire of investors to hold fixed proportions

Figure 2. Stock of International Bonds, Selected Currencies

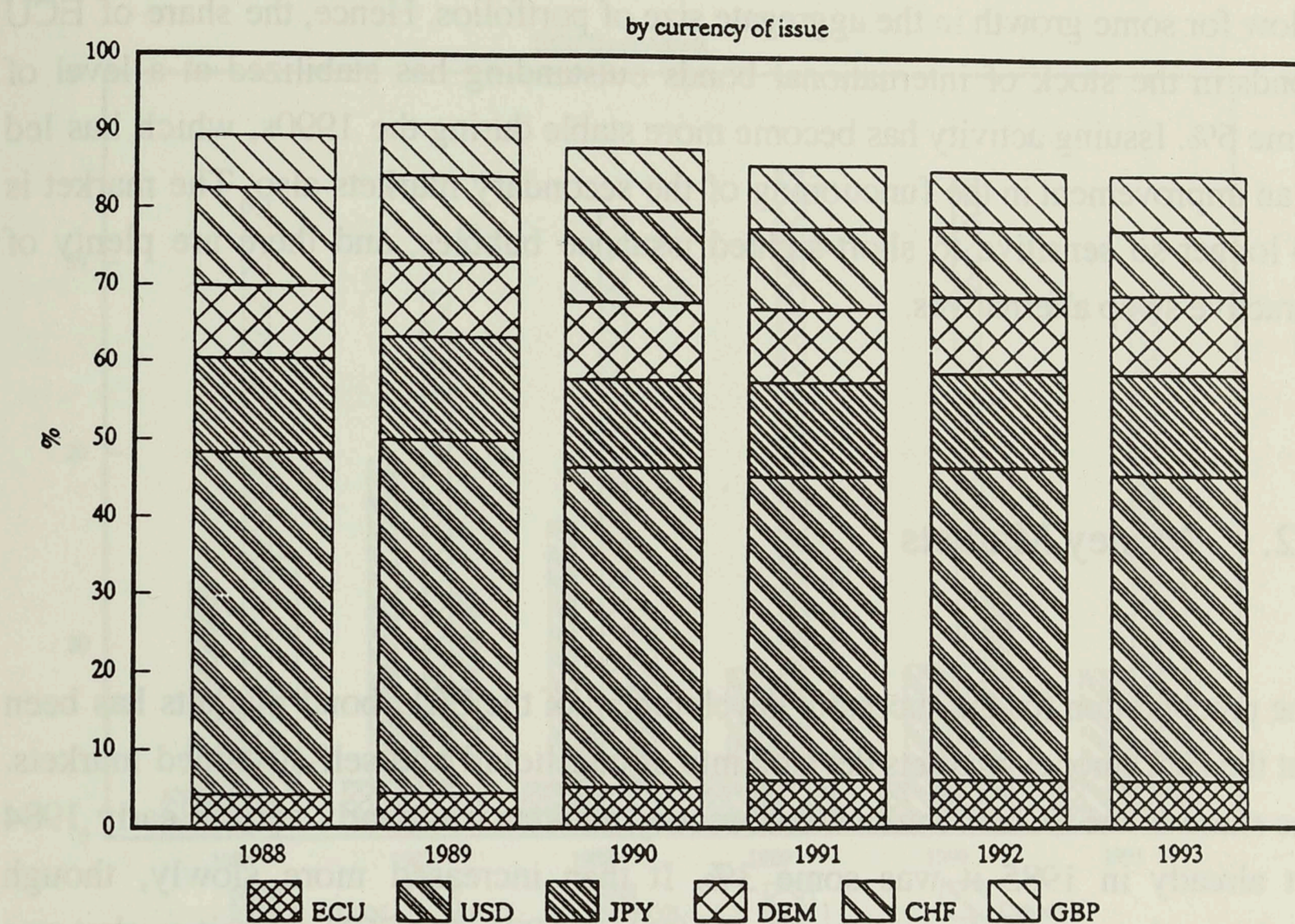
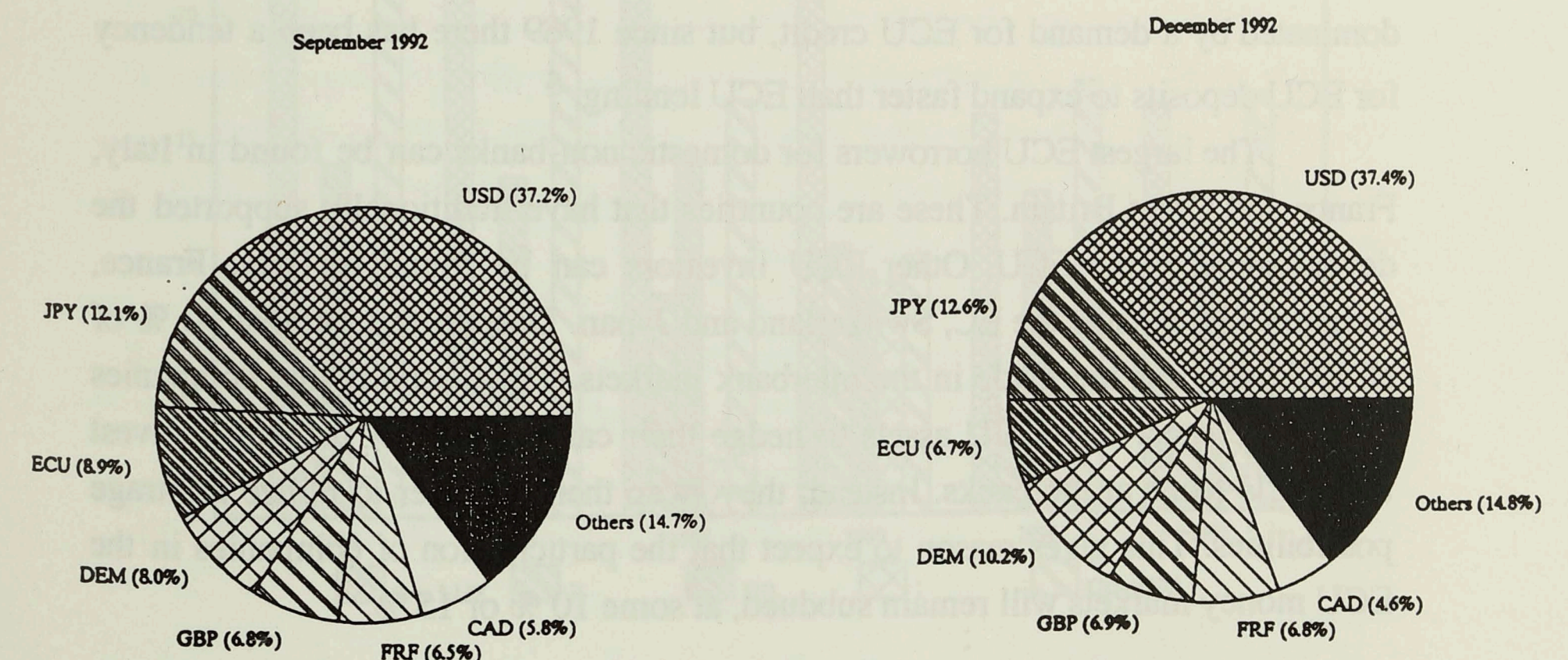


Figure 3. Total Eurobond and International Issues





of their portfolios in ECUs. Large new issues are needed initially in order to create a certain stock of ECU-denominated bonds. When such a stock has been created, the flow of new issues can fall to the level necessary to replace maturing bonds and to allow for some growth in the aggregate size of portfolios. Hence, the share of ECU bonds in the stock of international bonds outstanding has stabilized at a level of some 6%. Issuing activity has become more stable during the 1990s, which has led to an improvement in the functioning of the secondary markets also. The market is no longer so sensitive to short-sighted issuance bubbles, and there are plenty of attractive swap alternatives.

### 3.2. Money Markets

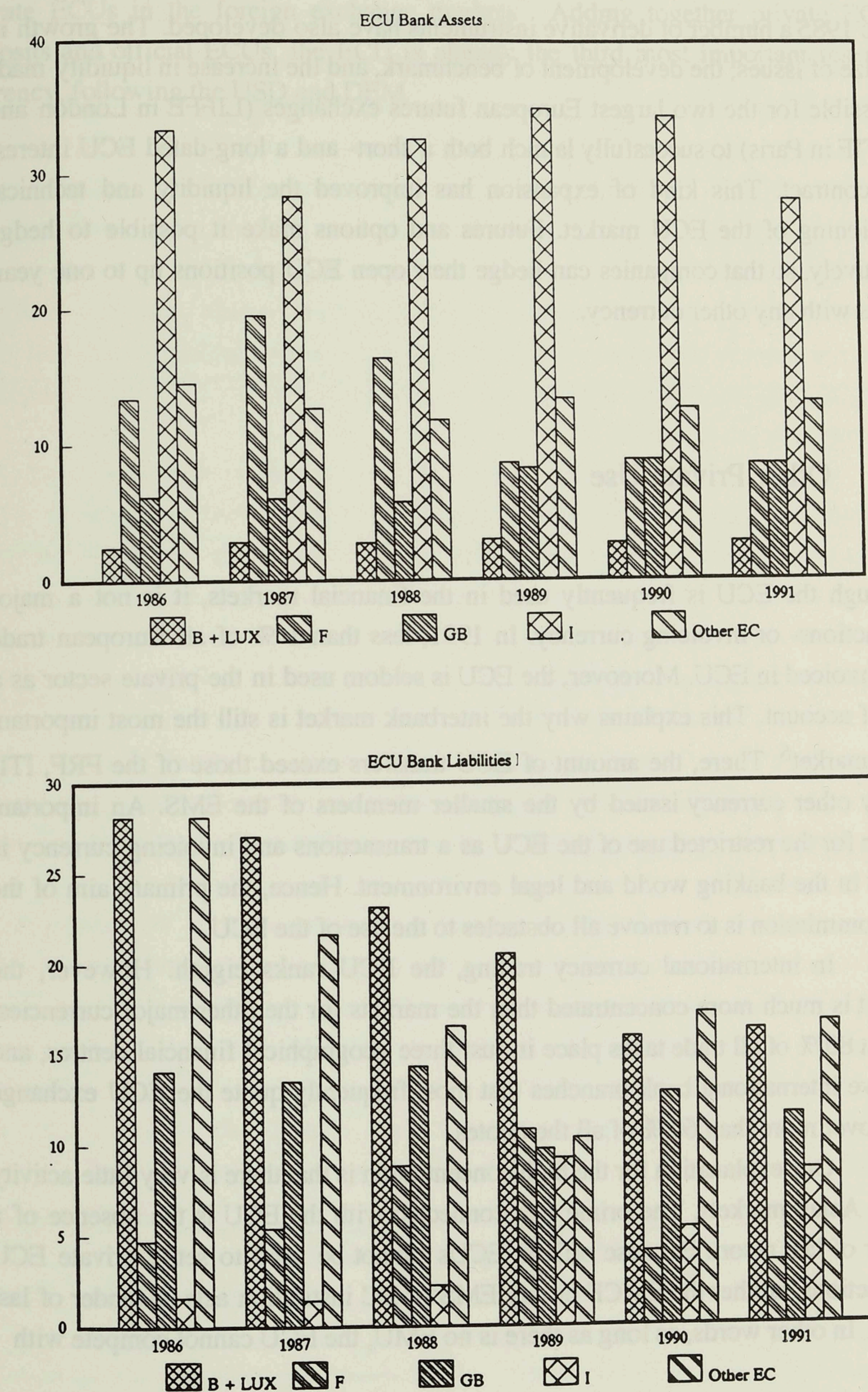
One precondition for the successful development of the ECU bond markets has been that the ECU money markets develop into strong liquid and self-sustained markets. The share of the ECU in international money markets was nearly zero in early 1984 but already in 1985 it was some 3%. It then increased more slowly, though continuously, and reached about 4% in 1990. In 1991, the ECU deposit market was the fifth largest after USD, DEM, CHF and JPY.

The money market has expanded in two directions: on the one hand, the gap between short- and long-term instruments has been covered; on the other hand, the market has changed from a pure interbank market to one in which companies and governments also participate. Another feature is that the banking system has gradually reduced its net asset position and has become a net borrower of ECUs as from 1991. That is to say, in the past the growth of ECU banking business was dominated by a demand for ECU credit, but since 1989 there has been a tendency for ECU deposits to expand faster than ECU lending.<sup>5</sup>

The largest ECU borrowers for domestic non-banks can be found in Italy, France and Great Britain. These are countries that have traditionally supported the development of the ECU. Other ECU investors can be found in Italy, France, Belgium and, outside the EC, Switzerland and Japan. Despite this, almost 90% of all ECU deposits are made in the interbank markets. The reason is that companies do not use short-term ECU assets to hedge their cash flows, nor do they reinvest their ECU loans at the banks. Instead, they swap them in order to utilize arbitrage possibilities. This gives reason to expect that the participation of companies in the ECU money markets will remain subdued, at some 10% or 15%.

<sup>5</sup> The imbalance between assets and liabilities in ECU banking is discussed in e.g. Gros & Thygesen (1992) and in *Monatsberichte der Deutschen Bundesbank*, 1992.

Figure 4. Banks' ECU Assets and Liabilities by Region





### 3.3. Derivative Markets

Since 1985 a number of derivative instruments have also developed. The growth in the size of issues, the development of benchmark, and the increase in liquidity made it possible for the two largest European futures exchanges (LIFFE in London and MATIF in Paris) to successfully launch both a short- and a long-dated ECU interest rate contract. This kind of expansion has improved the liquidity and technical functioning of the ECU market. Futures and options make it possible to hedge effectively, so that companies can hedge their open ECU positions up to one year, just as with any other currency.

### 3.4. Other Private Use

Although the ECU is frequently used in the financial markets, it is not a major transactions- or invoicing currency. In 1991, less than 1 % of all European trade was invoiced in ECU. Moreover, the ECU is seldom used in the private sector as a unit of account. This explains why the interbank market is still the most important ECU market<sup>6</sup>. There, the amount of ECU transfers exceed those of the FRF, ITL or any other currency issued by the smaller members of the EMS. An important reason for the restricted use of the ECU as a transactions and invoicing currency is found in the banking world and legal environment. Hence, the primary aim of the EC Commission is to remove all obstacles to the use of the ECU.

In international currency trading, the ECU ranks eighth. However, the market is much more concentrated than the markets for the other major currencies: almost 80 % of all trade takes place in just three geographical financial centres, and the five international bank branches that most frequently quote the ECU exchange rate cover more than 60 % of all the quotes.

One explanation for the high concentration is that there is very little activity in the Asian markets. The prime risk connected with the ECU is the absence of a lender of last resort. Because official ECUs cannot be used to settle private ECU transactions, neither the EMCF or any EMS or EC institution acts as lender of last resort. In other words, as long as there is no EMU, the ECU cannot compete with

<sup>6</sup> As noted by e.g. Gros & Thygesen (1992), the dominance of interbank business is a general feature of the international banking market: a similar ratio between interbank and non-bank business applies to all currencies.

the other (non-European) major currencies, the USD and JPY as a leading world currency.

On a number of occasions central banks have undertaken intervention in private ECUs in the foreign exchange markets<sup>7</sup>. Adding together private ECU deposits and official ECUs, the ECU is already the third most important reserve currency, following the USD and DEM.

<sup>7</sup> Bingham (1992) describes the growing use of the ECU as a reserve currency.



#### 4. ECU's Attractiveness

What is it then, that makes the ECU such an attractive alternative for investors, banks and borrowers<sup>8</sup>? Since the ECU functions primarily as a denomination for financial instruments, demands for ECU assets and liabilities are essentially portfolio demands. The two most important determinants of the demand for the ECU are the transactions costs and economies of scale. If there were no transactions costs, there would be no reason to use the official definition of the ECU since each contract could be equally based on a different, tailor made, currency basket. Further, when a large number of private agents use the open-basket definition of the ECU, transactions costs decline as regular markets in ECU denominated instruments begin to appear.

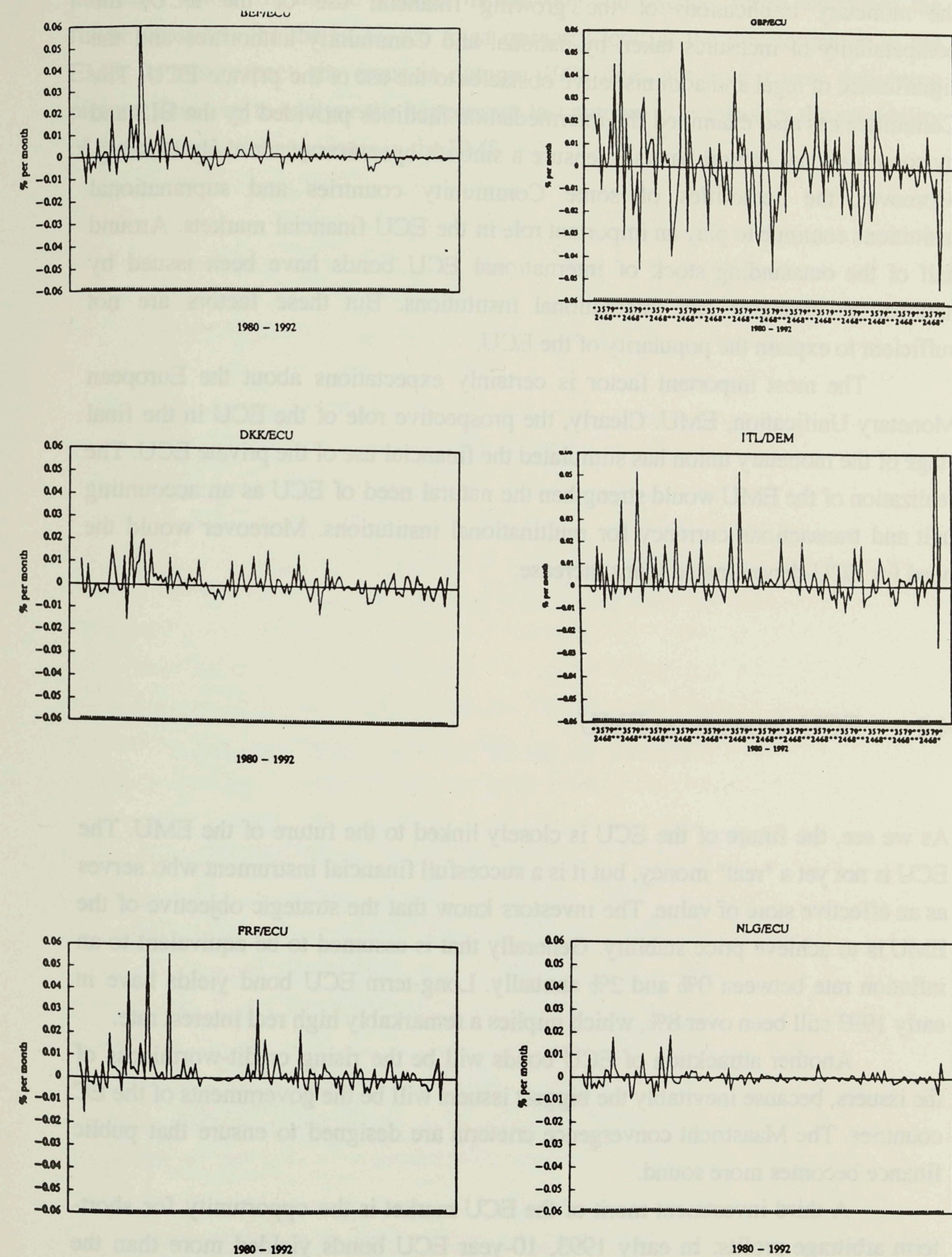
In the beginning of the 1980s the most important aspect of the ECU denomination was that it provided a simple and effective hedge against as well interest as exchange rate fluctuations. The basket characteristic implied lower risk than that of any of the component currencies. But during the years as the usage of the ECU increased most, the interest rates converged, especially in the high-interest rate Mediterranean countries. Also exchange rate fluctuations in Europe diminished. The exchange rate stability that the EMS performed during the five years period 1987-1992 reduced the exchange rate risk dramatically. As *figure 5* shows, the variability of the EMS exchange rates has diminished remarkably during the years. Hence, ECU was no longer needed to protect against risk. So there must be some other explanation.

A couple of institutional aspects have certainly affected the development positively. The ECU has received preferential treatment from especially the French and the Italian authorities, which explains the early concentration of the ECU markets in France, Italy and the Benelux-countries. In Germany, ECU-accounts were allowed first in 1987. ECU denominated assets have also been officially supported by the EC. The Commission stressed in proposals to the Council of Ministers in April 1983 that the further development of the private ECU is an important ingredient in the financial integration of the EC<sup>9</sup>. In the Treaty on European Economic and Monetary Union, the strengthening of the ECU has been assigned to the European Monetary Institute (EMI). The EMI shall be established as a coordinator of monetary policies and a preparing institution for the European

<sup>8</sup> This question is also dealt with in e.g. Allen (1990) and Gros & Thygesen (1992).

<sup>9</sup> For an analysis of the financial integration in Europe, see e.g. Folkerts-Landau & Mathieson (1989).

Figure 5. Variability of Selected ERM Exchange Rates vis-à-vis the ECU.





Central Bank to be established at the beginning of the EMU. For the time being, developments in the use of the private ECU have been monitored by the Committee of Governors of the Central Banks of the EC Member States on an annual basis since 1984. On a macroeconomic level, these examinations include assessments of the monetary implications of the growing financial use of the ECU, the compatibility of measures taken by national and Community authorities and the significance of legal and administrative obstacles to the use of the private ECU. The Committee has also examined the intermediation facilities provided by the BIS and by some national central banks to ensure a smooth operation of the daily clearing. Moreover, the authorities of some Community countries and supranational institutions continue to play an important role in the ECU financial markets. Around half of the outstanding stock of international ECU bonds have been issued by national governments and international institutions. But these factors are not sufficient to explain the popularity of the ECU.

The most important factor is certainly expectations about the European Monetary Unification, EMU. Clearly, the prospective role of the ECU in the final stage of the monetary union has stimulated the financial use of the private ECU. The realization of the EMU would strengthen the natural need of ECU as an accounting unit and transactions currency for multinational institutions. Moreover, the need for ECU-denominated loans increase.

#### 4.1. ECU depends on EMU

As we see, the future of the ECU is closely linked to the future of the EMU. The ECU is not yet a "real" money, but it is a successful financial instrument which serves as an effective store of value. The investors know that the strategic objective of the EMU is to achieve price stability. Generally that is assumed to be equivalent to an inflation rate between 0% and 2% annually. Long-term ECU bond yields have in early 1993 still been over 8%, which implies a remarkably high real interest rate.

Another attraction of ECU bonds will be the rising credit-worthiness of the issuers, because inevitably the biggest issuers will be the governments of the EC countries. The Maastricht convergence criteria are designed to ensure that public finance becomes more sound.

A third investment merit of the ECU market is the opportunity for short-term arbitrage profits. In early 1993, 10-year ECU bonds yielded more than the theoretical yield on the basket of underlying currencies. As we move towards the EMU, that spread will first narrow, and then disappear. On the day of the EMU, the

yield on ECU bonds must equal that on the bonds of the currencies which are going to participate. As it is rather unlikely that all twelve member states will participate immediately, there will be further good arbitrage gains.

EMU in turn is totally built on the EMS: without exchange rate stability, a monetary union will not be possible in the long run. Hence, when we doom the future prospects for the ECU, we must primarily look at the developments in the EMS. In this respect, the crisis in autumn 1992 does not give a very delightful picture. One way to analyze the happenings last autumn is to measure the credibility of the bilateral exchange rates in the EMS



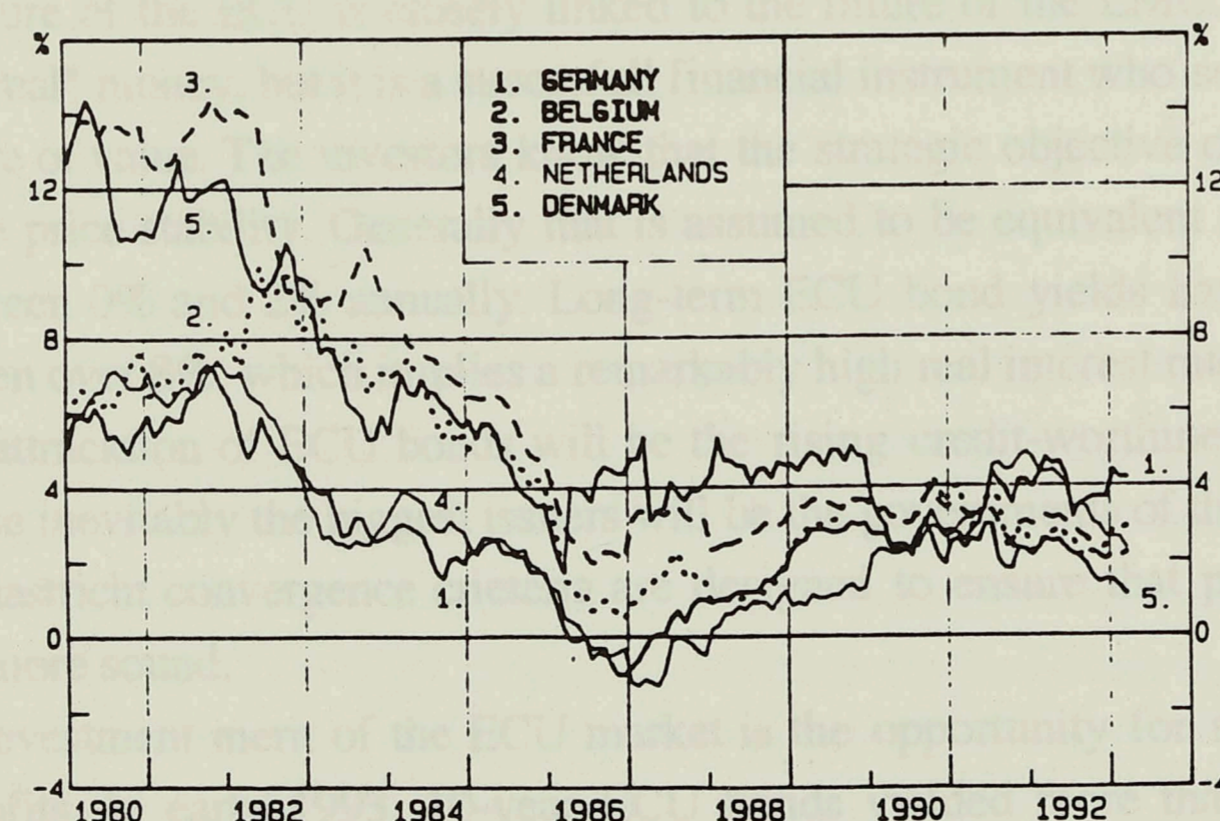
## 5. Credibility Tests: Target Zone Theory

### 5.1. Purchasing Power Parity and Fixed Exchange Rates

Basic exchange rate theory provides two parity conditions that determine the exchange rate: the interest rate parity condition (treated in the appendix) and the purchasing power parity condition. The purchasing power parity condition states that if the exchange rate is fixed, then in order to preserve the purchasing power equilibrium, prices must adjust. Hence, it is easy to start the analysis by simply looking at the inflation rate differentials in the EMS (here, we only focus on the five-year period 1987-1992).

This approach suggests that the credibility of the EMS exchange rates should have increased. *Figure 6* is a plot of the annual inflation rates in selected EMS countries starting from January 1980. As we see, convergence has increased during the EMS period, and since the beginning of 1990, inflation rates seem to have bunched together between 2% and 4%. Hence, according to the purchasing power parity theorem, the EMS should have gained credibility.

Figure 6. Inflation Rates in Selected EMS Countries.



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### 5.2. Expected Rate of Devaluation

Based on the argument above, if we then proceed to measure the credibility of the exchange rates, we should expect to see an improvement. We should further expect that the credibility has stabilized at a high level.

We calculate the expected rate of devaluation for the bilateral exchange rates vis-à-vis the DEM. The expected rate of devaluation is used as a measure of credibility. For example, an expected annual rate of depreciation of 12% means that the market expects the actual currency to be devalued once in the next year by 12%, or two times by 6% etc. Hence, the smaller the expected rate of devaluation, the more credible the exchange rate.

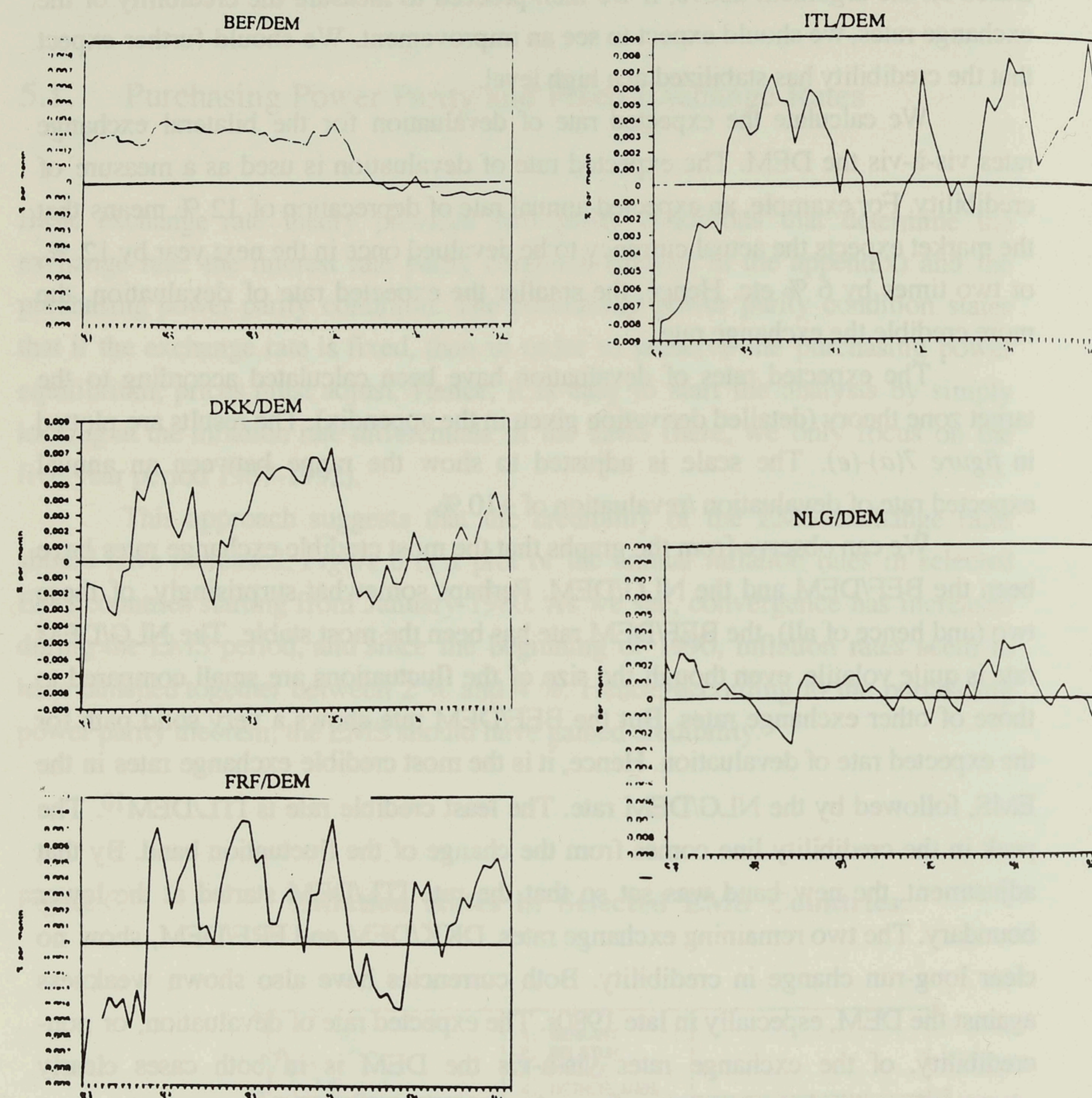
The expected rates of devaluation have been calculated according to the target zone theory (detailed derivation given in the appendix). The results are plotted in *figure 7(a)-(e)*. The scale is adjusted to show the range between an annual expected rate of devaluation/revaluation of  $\pm 10\%$ .

We can observe from the graphs that the most credible exchange rates have been the BEF/DEM and the NLG/DEM. Perhaps somewhat surprisingly, of these two (and hence of all), the BEF/DEM rate has been the most stable. The NLG/DEM rate is quite volatile, even though the size of the fluctuations are small compared to those of other exchange rates. But the BEF/DEM rate shows a very solid path for the expected rate of devaluation. Hence, it is the most credible exchange rates in the EMS, followed by the NLG/DEM rate. The least credible rate is ITL/DEM<sup>10</sup>. The peak in the credibility line comes from the change of the fluctuation band. By that adjustment, the new band was set so that the rate ITL/DEM started at the lower boundary. The two remaining exchange rates, DKK/DEM and FRF/DEM, show no clear long-run change in credibility. Both currencies have also shown weakness against the DEM, especially in late 1980s. The expected rate of devaluation, or non-credibility, of the exchange rates vis-à-vis the DEM is in both cases clearly connected to this large deviation from the central parity. However, after a long period of expected devaluation, the credibility curve suddenly turns to indicate increased credibility. However, after a period of strength — both currencies reached the central rate — the DKK and FRF started to depreciate again. In other words, the credibility of the DKK and FRF exchange rates vis-à-vis the DEM has suffered. Towards summer 1992, however, at least part of this loss of credibility was clearly affected by expectations associated with the outcome of the Danish referendum on

<sup>10</sup> Among others, Weber (1991) has examined the credibility of the EMS up to 1989. He states that all Italian EMS exchange rate commitments have been non-credible. This finding is consistent with the trend movements of most Italian bilateral exchange rates throughout the EMS period.



Figure 7. Expected Rate of Devaluation



EMU in the form set out in the Maastricht Treaty<sup>11</sup>. It was feared that a negative election result in Denmark could cause even the French people to vote against the Maastricht Treaty in their referendum, which was to follow in autumn 1992. If France had remained outside the EMU, the future of the entire EMS would have been in doubt.

At the time of German Monetary Unification (GMU), in summer 1990, all currencies gained in strength against the DEM, which showed up as increased credibility of the bilateral exchange rates. This can be associated with the GMU, which raised expectations of a devaluation of the DEM<sup>12</sup>. Since then, from summer 1990 until summer 1992, the two stable currencies, BEF and NLG, have retained this increase in credibility: they have managed to stabilize slightly below the central parity rate against the DEM. Furthermore, the expected rate of devaluation has remained very low and stable. For the other currencies, on the contrary, the improvement of credibility of the bilateral DEM exchange rate was only a temporary phenomenon. Afterwards, the expected rate of devaluation increased, though it remained at a lower level than before GMU. Only Italy has not been able to stabilize its currency; on the contrary, its devaluation risk was larger at the end of the period than at the beginning of the period under study. There are only two exceptions in which credibility has increased: when the band was narrowed, and when GMU took place.

Such results raise the question why are there such differences between these currencies. One would further want to ask what actually is "credibility" of an exchange rate. We have to come back to the very fundamentals of exchange rate determination. The asset market characteristics of the foreign exchange markets has led to the focus of current research on modelling the exchange rate with standard models suited for volatile asset prices that are strongly influenced by expectations. Underlying factors are commonly collected into a variable called "fundamentals", which is then only implicitly included in expectations<sup>13</sup>. In what follows we try to focus on what is perhaps the most crucial fundamental in studying the long run stability of the EMS: distinguishing between the credibility of a fixed exchangerate, or target zone, in a general sense and the "credibility" that has been traditionally associated with the EMS.

<sup>11</sup> Further comments can be found in Ranki (1992b).

<sup>12</sup> The effects of GMU on the EMS are dealt with in e.g. Ranki (1991, 1992a).

<sup>13</sup> This is also the practice in the target zone literature. In theoretical target zone models, the current exchange rate depends on its fundamental value and the expected future exchange rate. In empirical tests, the variable for fundamentals is dropped and is only implicitly included in the expectations term. Hence, target zone models can be classified as asset models in exchange rate theory.



### 5.3. Nominal Anchorship - Monetary Leadership

The main reason for (high-inflation) countries to join the EMS was to benefit from the low inflation in Germany. The idea was that high and unstable inflation is bad. By fixing the exchange rate of the domestic currency vis-à-vis the DEM, they were able to tie the domestic monetary policy to an anti-inflationary course. In 1979, when the EMS was established, Germany was the country with the lowest inflation. In the beginning of the 1980s, as oil prices increased dramatically, inflation rates also increased everywhere. Among the EC countries, the increase was smallest in Germany. In other words, in the early years of the EMS the inflation gaps between the participating countries were substantial, and consequently, the long run credibility of the exchange rate parities was very low. Therefore, in order to protect the parities, the other countries were forced to maintain an interest rate gap to Germany. The higher domestic interest rate compensated for the devaluation risk attached to the domestic currency.

Because of this feedback effect between the exchange rate and the domestic interest rate, the other countries benefitted from the low-inflation reputation of the anchor currency, DEM. Hence, this mechanism was thought to work well—*given that the German inflation rate remained low*. In other words, the disciplinary benefits from the EMS, when considered as a system in which the DEM is the nominal anchor, stem from the fact that Germany continues to have a low inflation rate and hence low interest rates. Only in this way can the other countries use the DEM as an anchor to hold their inflation rates down. This being the case, the exchange rates become more credible only when the other countries succeed in adjusting their economies to the German "norm". However, now the situation seems to have reversed. The credibility of the exchange rates, when measured by the interest rate credibility bands, seems to have increased not because the other countries have been approaching the German inflation rate level, but because Germany's rate has been approaching that of the other countries.

According to this view, the main idea is to have a fixed exchange rate system in order to maintain low inflation in the entire group of participating countries. In terms of *figure 7*, if the goal of the EMS is to keep the annual inflation rate bunched around, say, 2-4 %<sup>14</sup>, then the appropriateness of the DEM as an "anchor" can be questioned. What has happened now is that the initial anchor currency of the system no longer is the currency with the lowest inflation rate. If we look at *figure 7*, we see that since the beginning of 1990, when the present acceptable convergence of the inflation rates was reached, the rates in the other

<sup>14</sup> This interval can be said to represent traditional low German inflation levels.

countries have no longer decreased. Instead, the German inflation rate has increased, so that in summer 1992, Denmark and Belgium were the countries with the lowest inflation rates<sup>15</sup>. Thus, if we look not at inflation convergence as such, but at inflation convergence given the DEM as the anchor, then the credibility of the EMS—as a low-inflation system—can be said to have decreased.

When the risk premium due to the inflation differential disappears, a political risk premium is likely to arise, unless the system's monetary leader remains the nominal anchor. In this particular case, the GMU fuelled domestic inflationary pressure. These pressures were countered by a series of increases in German interest rates. As foreign exchange market sentiment suggested that the limits to the reduction of interest rate differentials had been reached, the increases in German interest rates were accompanied by increases in the other narrow-band countries. This, in turn, fomented uncertainty as to the willingness of the weakest countries, which were headed into a recession, to follow Germany's strict monetary policy. Since Germany no longer had the lowest inflation in the system, their gain from following the policy would have been less.

The increased importance of political risk also shows up in the speculation against the FRF/DEM exchange rate during the crisis in autumn 1992. Clearly, the FRF's difficulties did not derive from any underlying weakness in the basic structure of the French economy. Instead, the market touched upon a political problem. The Banque de France had not yet won its independence from the Treasury, and French monetary policy depended directly on the outcome of elections in March 1993. As the elections had a happy end, the market calmed down and allowed the FRF to strengthen vis-à-vis DEM and the interest rates to fall.

The conclusion of this analysis is that in order to avoid speculative attacks against ERM currencies, that are not based on economic fundamentals, a single currency should be introduced as soon as possible. This would, of course, not be a problem-free solution, but the irrevocable fixing of the exchange rates would eliminate the possibility of speculative attacks that can lead, when successful, to price inertia.<sup>16</sup>

<sup>15</sup> Weber (1991) emphasizes that after 1987 the inflation rates remained very constant and that a convergence of inflation rates between Germany and the other EMS countries is achieved by a rise of German inflation. He further notes that this implies a more stable system with less tensions but also with less inflation discipline.

<sup>16</sup> Recent support for a rapid transition to a monetary union with a single currency has been presented by deGrauwe (1992). He emphasizes that although there was a tendency for inflation rates to converge during the 1980s, systematic differences have remained between the various countries. This depends on differences in the credibility of the central banks. Divergences in expectations regarding inflation lead to divergences in the observed inflation, which raises the question of the loss of competitiveness by some countries. Consequently, a realignment would be necessary in the long term. This could be avoided if the old national currencies would disappear and so nullify the relevance of their past history.



## 6. Future Prospects for the ECU

At the end of the 1980s and up until December 1991, the EC countries were marching determinedly on their way towards the EMU. This led to the consideration of the EMS as a de facto monetary union, which naturally had a stabilizing effect on the financial markets. After the crisis in autumn, 1992, the survival of the EMS was no longer self-evident. The ECU market suffered severely from the uncertainty about whether the EMU would ever be achieved.

It is not likely that the EMS will collapse because real economic integration is so deep that this would be costly from a macroeconomic point of view. It is clear that full economic integration is impossible, or at least does not yield maximum benefits in the absence of monetary integration.

Currently, or as long as there is still no EMU, the development of the ECU market is largely self-fulfilling. If pessimism spreads, the demand for the ECU can fall dramatically. This, in turn, would make it more difficult to proceed credibly and rapidly towards EMU, which again would make the ECU less and less attractive. But the snowball can also roll in the positive direction: if investors are optimistic, the ECU market will expand, which will also make the progress towards EMU easier.

When the EMU is realized, the ECU will become a convenient instrument for exploiting a Europe-wide financial market. The use of the ECU allows participants in financial markets to reduce the transactions costs that would arise if the ECU basket had to be constructed each time on an individual basis. Also, the available range of financial instruments denominated in ECU has often been wider than that in some of the component national currencies. The supply of ECU denominated investments should also depend on intra-EC trade. Intra-EC trade as a proportion of GDP grew rapidly until 1985 and fell then sharply for two years. Since then, the growth has strengthened, and moving towards the EMU should contribute to further growth of intra-EC trade. With regard to the future, the increased integration of all European markets should lead to an increase in intra-EC trade in goods and services. This should, in turn, increase the usefulness of contracts denominated in ECUs for both debtors and creditors, since such contracts might correspond increasingly to the average trading pattern. Moreover, after EMU the ECU will be the currency of the world's largest exporter and importer. Currently, the share of European currencies in trade invoicing is smaller than the EC's share in total trade, but the EC has estimated that some 10% of EC trade could shift from USD to ECU invoicing.

In the integration process towards the EMU, the ECU will develop from a

basket currency to a currency basket. One sign of this development is that the actual ECU interest rate can deviate very much from the theoretical ECU-interest rate obtained by investing in all of the participating currencies individually. Recall from section 2.2 that uncertainty regarding the future fixing of the private ECU/official ECU will be reflected in the expectations about the future value of the ECU. As *figure 8* shows, long-term private ECU interest rates were lower than the synthetic interest rate for the official ECU from autumn 1989 until the beginning of 1991. This reflects the optimism about the EMU that followed after the Delors Plan, which was released in April 1989. However, at the end of 1991, the growing concern about the actual movement towards EMU starts to show as rising interest rates for the (private) ECU. During the turbulent year, 1992, the market interest rate was clearly above the synthetic interest rate, reflecting a great uncertainty over the creation of a single European currency. Moreover, during the last quarter of 1992, practically no major institutional borrower accumulated ECU-denominated funds<sup>17</sup>. A positive sign should be, however, that especially the long-term market interest rate has come down again in the first half of 1993, reflecting a recovery in the beliefs in the realization of the EMU and, consequently, a single European currency.

EMU will also transform the ECU into a major world currency. If the financial power of the EC as compared to the USA is measured by the size of government debt, the financial markets of the EC have a real potential to develop into the world's largest. Summing up government bonds of the EC countries gives the largest securities market in the world—once the EMU has been achieved. The future replacement of all existing EC currencies by the ECU would boost the EC share to 46% of all international bonds (31% for the USD) and 37% of all foreign exchange reserves (51% for the USD)<sup>18</sup>. This should lead to a substitution from USD into ECU. Whether such large portfolio adjustments lead to an appreciation of the ECU or not depends on the willingness and readiness of banks to supply enough and proper ECU instruments<sup>19</sup>.

Beginning in 1993, the single market investment rules will permit many financial institutions to make large scale ECU security purchases. In early 1993, some noteworthy ECU issues were launched. This should be seen as a sign of increasing confidence in the ECU. The development of the ECU markets will implicate for governments, public institutions and corporations that an expanding

<sup>17</sup> The EC launched one Euro-issue.

<sup>18</sup> These calculations have been done by the EC.

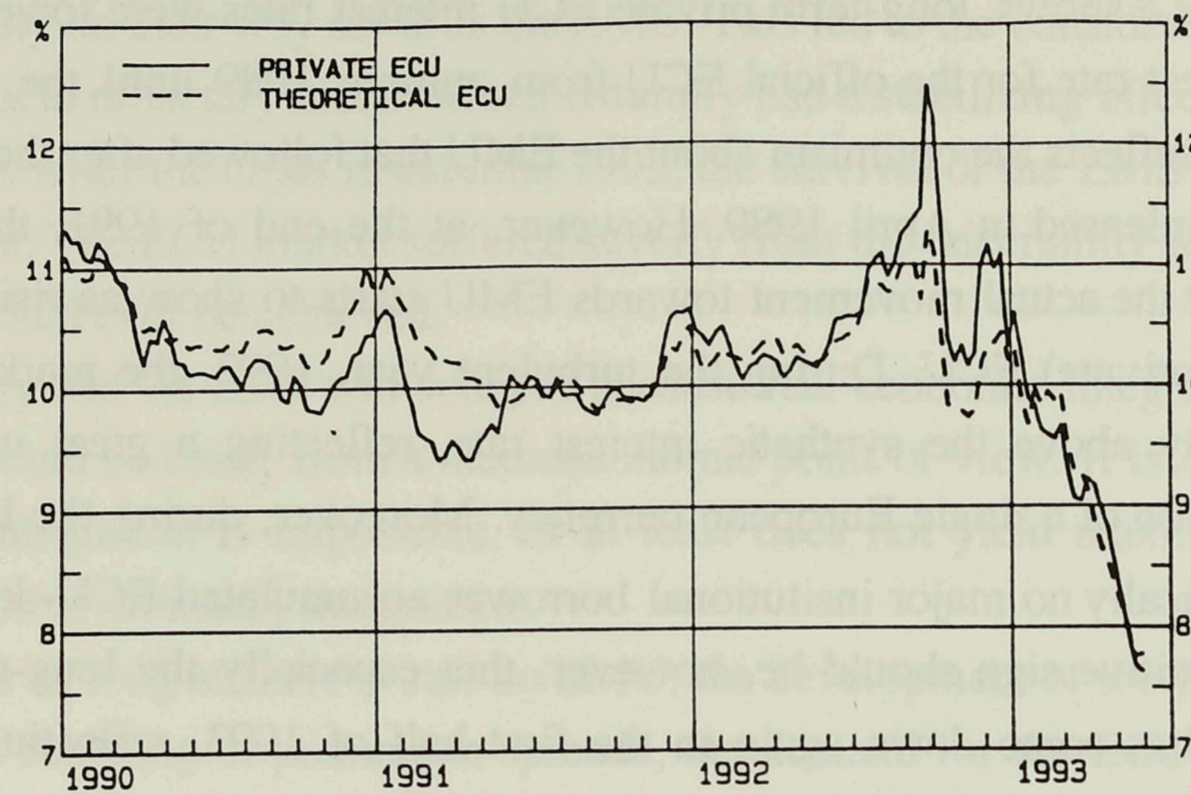
<sup>19</sup> But even if pressures to appreciate would be created upon the ECU as a consequence of its increased importance in private portfolios, this doesn't have to show in the exchange rate. It has been estimated that the EC would run an external deficit vis-à-vis the rest of the world, which in turn would create pressure to depreciate.



Figure 8.

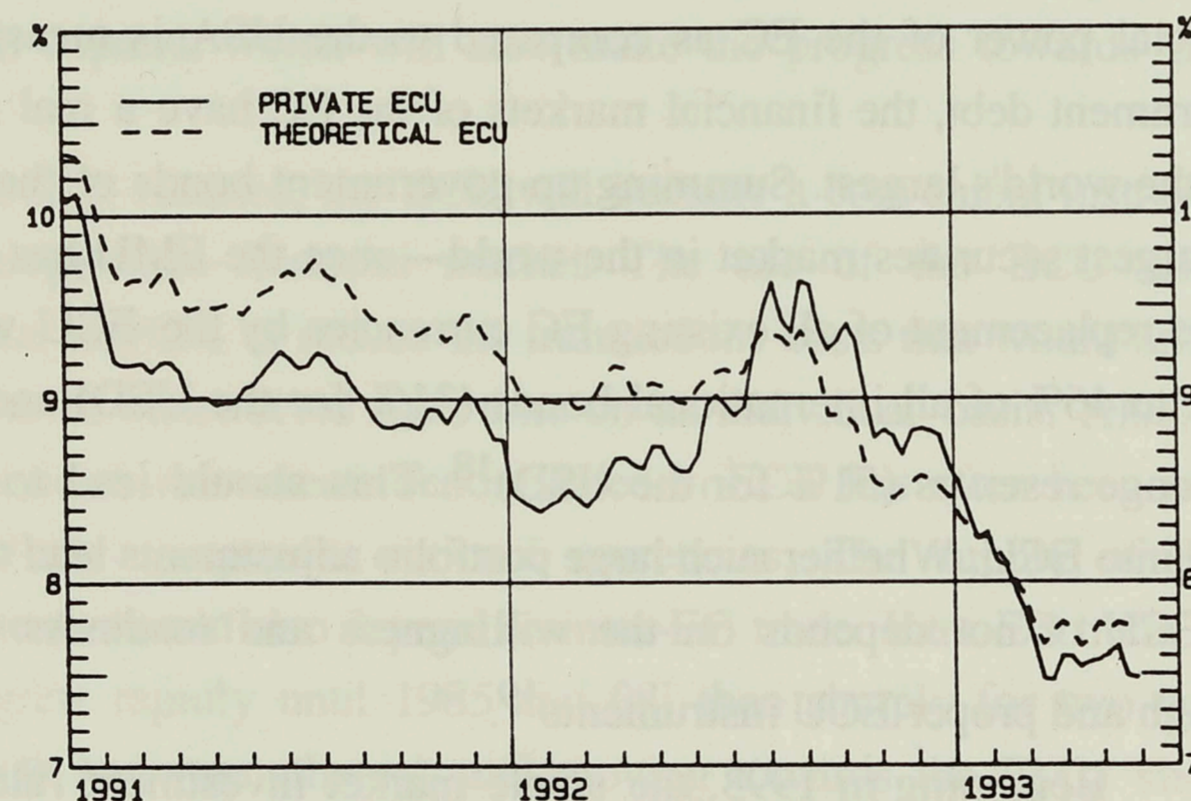
**Short and Long Term ECU Interest Rates for the Theoretical and Market ECU**

SHORT-TERM INTEREST RATES (3 month)



03-Jun-93

LONG-TERM INTEREST RATES (10 yrs)



and low-risk financial market will stand for their use<sup>20</sup>. If we look at the ECU exchange rates, we could say that the ECU seems to have regained popularity after the crisis in 1992. For the finance units this should be good news. However, there

<sup>20</sup> Bishop (1991) has calculated that at the end of 1990, the ECU financial system encompassed deposits and liquid bonds amounting to about 5% of EC bonds and bank deposits. This is at least the equivalent of a small EC member state. As an example, he mentioned Denmark.

are certain preconditions for a recovery in the ECU markets. Firstly, the Maastricht Treaty must be ratified<sup>21</sup> and the EMU put back on track. Secondly, remaining legal obstacles to ECU usage must be removed. Thirdly, the ECU payment systems must be reinforced. Finally, governments must (continue to) set an example in using the ECU as money. The credibility of the ECU markets depends especially on the recovery of its most developed and best organized sector, the bond market. Once investors can see that these preconditions have been fulfilled, they will realize that the way has been cleared for the ECU to become the single currency of the EC. Thus, if the EMU does become a certainty and appears likely to be successful, then the implication is that there will be a sustained bull market in ECU bonds. In other words, the EMU will, without doubt, make the ECU a major world currency.

<sup>21</sup> By June 1993, the Maastricht Treaty had been ratified by all EC countries except Denmark and Great Britain.



Appendix Derivation of the Expected Rate of Devaluation

The idea in the target zone literature is that the existence of fluctuation bands is an important source of information. Because this information is known on the foreign exchange markets and affects the behavior of agents, the presence of the band affects the expectations about future exchange rates. It is known that the central bank intervenes in order to manipulate the exchange rate. Due to the interventions, the expected exchange rate follows a different path, depending on its position in the target zone.

One of the very recent developments in the target zone literature is the finding that the interest rate differential as such, as a measure of expected realignment is imprecise. A pioneer work to model the devaluation risk in a target zone has been presented in Bertola & Svensson (1990) and Svensson (1990, 1991). They found mean reversion in the exchange rate within the band and showed that therefore, the expected rate of devaluation is rather equal to the interest rate differential adjusted for the expected depreciation within the band.

A problem with measuring the credibility is that the "raw" interest rate differential is affected not only by the possibility of a realignment but also by the possibility of exchange rate movements within the bilateral ERM bands. Hence, it is necessary to adjust the interest rate differentials to obtain reliable measures of devaluation expectations.

Let us write the uncovered exchange rate parity as follows<sup>22</sup>:

$$(r - r^*)_t = E_t[\Delta s_{t+j} | I_t] / j \quad [A1]$$

This says that, for two identical investment alternatives, the interest rate differential equals the for a given information set at time  $t$  expected (average) rate of depreciation of the domestic currency relative to the DEM during the time interval corresponding to the maturity. The expected rate of depreciation can be decomposed into two parts: the expected depreciation within the band, and the expected rate of devaluation. Hence, we can write:

$$(r - r^*) = \Delta s^e + \rho + \delta \quad [A2]$$

where  $\rho$  is the exchange rate risk premium and  $\delta$  is the devaluation risk premium. If the exchange rate band was completely credible,  $\delta$  would be equal to zero, and the

<sup>22</sup> A detailed derivation of the equations can be found in e.g. Svensson (1991). See also Rose & Svensson (1991) for more discussion, and Ranki (1992) for a complete testing procedure.

interest rate differential be maximum 2.25%. In that case, the method of studying the interest rate credibility bands could be applied without further adjustments.

Equation [A2] also shows that in order to find out the devaluation expectations, the interest rate differential has to be adjusted for the expected exchange rate movements within the band:

$$\delta = (r - r^*) - (\Delta s^e + \rho) \quad [A3]$$

The difficulty is, of course, finding a value for the sum  $\Delta s^e + \rho$ . This is a problem that hasn't been completely solved in the research yet. Here, the method suggested in Lindberg, Svensson & Söderlind (1991) and Rose & Svensson (1991) has been used. Their results combined indicate that a simple linear regression of realized rates of depreciation within the band on the current exchange rate consistently generates sensible results. Consequently we shall use the simple linear regression here. The expected rate of depreciation is estimated by linear regression of the equation

$$s_t^e = \alpha + \beta s_{t-1} \quad [A4]$$

This regression is run separately for each of the six DEM exchange rates. The results are presented in table A1.<sup>23</sup>

Table A1. Expected Future Exchange Rate within the Band.

exchange rate	$\alpha$	$\beta$	exchange rate	$\alpha$	$\beta$
BEF/DEM	.38	.88	ITL/DEM	.22	.67
DKK/DEM	.49	.63	NLG/DEM	.07	.44
FRF/DEM	.64	.48			

<sup>23</sup> The data are compiled as follows. The end-of-month spot exchange rates are from the International Financial Statistics, the three-month interest rates are from the OECD. The period covered is January, 1987, through June, 1992.



In order to estimate the expected rates of devaluation the interest rate differentials should be adjusted for the estimated expected rates of depreciation within the band. Hence, the results obtained from the estimation of the expected exchange rate change within the band are inserted in [A4] to calculate the expected devaluation,  $d$ . We will assume an insignificant foreign exchange risk premium<sup>24</sup> and hence, set  $r = 0$ . The resulting time-series of estimated expected rates of devaluation<sup>25</sup> are those displayed in figures 7(a)-(e). The scale is the same for all exchange rates and constructed so that the bounds correspond to an annual (expected) devaluation rate of approximately 10 %. (For the ITL/DEM, the plot would have extended beyond the top edge of the graph. Therefore, the scale in panel (d) is extended.)

<sup>24</sup> Svensson (1991) mentions how the method can be modified to incorporate a non-zero foreign exchange risk premium.

<sup>25</sup> The expected rate of devaluation is the product of the frequency of realignment and the expected conditional devaluation size (conditional upon a realignment). The expected conditional devaluation size, in turn, is the sum of the expected conditional realignment size and the difference between the expected exchange rate at maturity conditional upon a realignment and the expected exchange rate at maturity conditional upon no realignment. For derivation, see Svensson (1991).

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