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EUROWINNERS AND EUROLOSERS:
THE DISTRIBUTION OF SEIGNIORAGE
WEALTH IN EMU

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ABSTRACT

The European Monetary Union (EMU) will involve socialization of the existing seigniorage wealth of the national central banks, because the Euro will have to be bought by these banks in exchange for assets which have been accumulated in the historical process of money creation. This socialization will create windfall gains for countries with relatively low monetary bases such as France and the UK and it will be disadvantageous for countries like Germany, the Netherlands and Spain which will suffer per capita wealth losses of between 406 and 182 ecus. This paper quantifies the gains and losses in seigniorage wealth under alternative membership and bank regulation scenarios.

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1. Introduction

The European Monetary Union (EMU) will, in all likelihood, bring growth and prosperity to the old continent. All countries joining the EMU will be winners, but some will win more than others, because they will receive a better currency than the one they lose. A good currency is highly demanded as a medium of transactions and a store of value and its wide usage creates a substantial seigniorage wealth for the issuing country. With the introduction of the Euro, national currencies will disappear and seigniorage wealth will be socialized. This paper calculates the distribution of gains and losses associated with this socialization.

At first sight, this analysis may not seem to promise important results, for, if the new central bank simply exchanged the old national currencies for Euros, how could seigniorage be affected? The national central banks would continue to collect interest on their portfolios of private and government issued assets, and, at most, future increases in the stock of money could lead to seigniorage profits for the European Central Bank (ECB) and this might then raise distributional concerns. However, the presumption underlying this reasoning is wrong. The ECB does not exchange new money for old and it does not make gifts. Instead, it sells the national central banks the right to issue the new money in exchange for the revenue from an equivalent amount of assets that retain their value after the national currencies disappear. The national central banks will have to accept what is, in effect, a socialization of that part of their treasures of bonds, international currencies, gold and similar reserves which back their monetary bases and they will have to burn the national bank notes and melt the coins which the public returns to them in exchange for the Euros.

It is true that the socialization is not a net loss for the member countries. After all, the member countries receive shares in the return generated by the assets that back the Euro's monetary base. However, the share received by a particular country is determined by the share of equity capital it contributes to the ECB, and not by its share in the wealth transfer. The equity capital is a small initial endowment which the participating country is allowed to contribute and it is negligible compared to the value of the wealth transfer (less than 1% on average). The equity capital will be

determined by the average of the country's population and GDP shares, and this average may of course differ from the share of the wealth transfer. The latter roughly equals the country's share in the joint monetary base, and it may be relatively large if this country's currency is used as an international transactions and reserve currency or if the country relies heavily on cash transactions. Countries whose share in the monetary base exceeds their GDP and population shares will lose seigniorage wealth, and countries with the opposite relationship between these values will gain such wealth.

Although negotiations about the distribution of seigniorage are now being carried out behind closed doors, the issue has thus far received hardly any public attention. We are only aware of two relevant publications. The first is an unsigned newspaper article in "Central Banking" (Vol. 7, No. 2, 1997) and the second is an article in an educational journal by Maenning and Hunger (1996). Apart from the fact that these articles are concerned with seigniorage flows rather than stocks, they differ from our study in two important respects.

The first article assumes that EMU socializes the national central bank's profits; i.e. the difference between revenue and cost. However, this will certainly not be true, as the national central banks will not cease to exist. As these central banks perform very different functions in the various EU countries and are organized in different ways, the cost of operating them will continue to be covered nationally. The Maastricht treaty requires the socialization of the return to the assets that back a country's monetary base (articles 32.2 and 32.5 of the Protocol on the "Statute of the European System of Central Banks and the ECB"), but, except for an optional clause referring to the cost of issuing bank notes and to exceptional circumstances (article 32.4), there is no provision for socializing of the cost of running the national central banks.

The second article defines seigniorage as the annual increment in the nominal stock of central bank money and analyzes how the so-defined seigniorage will be redistributed among the EMU countries. While this is a useful approach for understanding the socialization of future increases in seigniorage wealth, it completely overlooks the socialization of the initial seigniorage wealth (or the socialization of the future interest income generated by this wealth) which is brought about by the EMU. This, however, is the crucial policy issue. Many Europeans may find it appropriate in a currency union for the wealth gains, which the new money will itself be able to earn, to be distributed

according to population and GDP figures. They may find socializing the existing wealth that has been accumulated by the national central banks since their foundation to be less appropriate.

Our study is concerned with the gains and losses resulting from the socialization of existing seigniorage wealth. We try to quantify these gains and losses under alternative membership scenarios, and we discuss the policy options for reducing the amount of wealth redistribution. The information we produce may be useful for the final negotiations about EMU and they may even serve for predicting which countries are likely to join the new currency union.

2. Monetary Base, Central Bank Wealth and Seigniorage Profits

From a pure accounting perspective, no one will gain or lose from the currency conversion, because all steps in the conversion process involve equivalent exchanges of assets. However, the accounting system is not well suited to describing the phenomenon of wealth creation through printing money. The problem is that it treats a central bank's outstanding currency as a liability even though this liability incurs no obligation to pay interest or principal to the public. It is one of the basic wisdoms of monetary theory that central bank money is an asset for the private sector because it generates transactions and liquidity services, but is not a true liability for the central bank because, except for the negligible cost of printing the money, this bank incurs no other resource cost in producing it. A country's monetary base is not merely an accounting item that nets out with other items; it is a genuine asset as true and real as this country's capital stock. The producer of this real asset is the central bank which sells it to the private sector in exchange for interest bearing financial assets, gold or international currency reserves. The monetary base therefore measures the central bank's wealth from money creation.

In issuing its money the central bank uses the private banking system as an intermediary. The banking system is allowed to add self-created bank money which is a close substitute for central bank money. If it does not carry interest or if it is not destroyed through competitive rent seeking in the banking industry, even this bank money can be seen as a real asset representing a net wealth of the economy¹, but of course this type of wealth is not subject to socialization within the EMU.

¹ For a discussion of alternative views of the role of bank money see Gurley / Shaw (1960) and Patinkin (1961).

With the introduction of the EMU each member country will have to exchange its monetary base for Euros, and the right to issue Euros will come from the ECB in exchange for assets that keep their value after the conversion. From an economic perspective, the stocks of interest bearing assets, gold and international currency reserves which lie in the coffers of the national central banks and which have been accumulated gradually in the process of money creation will have to be transferred to the ECB. It is true that this transfer does not exactly satisfy the legal conditions for a full transfer of ownership rights. However, articles 32.2 and 32.5 of the Protocol on the "Statute of the European System of Central Banks and the ECB" state clearly that the return on the assets that back a country's monetary base will be distributed among the national central banks according to their respective capital shares in the ECB, and it is also clear that these assets will be included in the consolidated balance sheet of the ECB. In economic terms, this is about the same as saying that the assets themselves will be transferred to the ECB. Effectively, the community of ECB member countries will inherit that part of the wealth of the national central banks which backs the outstanding stocks of central bank money.

Apart from speculative profits, the interest income that a national central bank earns on its assets is the source of the profit which is regularly transferred to the government sector and which helps finance the public budget. In future this interest income will be distributed to the national governments according to a pattern different from the one which exists prior to monetary union. It is a matter of taste whether the redistribution effected through the Euro is calculated in terms of this interest income or in terms of the assets generating it.² In principle, the two methods are equivalent since the value of the stock of central bank wealth equals the present value of the flow of returns it generates. In this paper we have chosen a stock rather than a flow approach to the seigniorage problem.

It might be argued that the equivalence between the stock and flow approaches does not hold if some of the central bank assets do not generate interest income, and that a national central bank could avoid the conversion losses if it declared that these assets back its monetary base. However, this argument neglects the fact that non-interest bearing assets are not very important in quantitative terms and that the community of ECB member countries will object to accounting tricks that deprive

² For a useful discussion of different measures of seigniorage and their application to EMU see Gros (1993).

it of its claims on the asset returns. In addition, the argument overlooks the non-pecuniary returns which assets such as gold or international currency reserves will yield for the operations of the ECB and which are subject to socialization among the ECB member countries just as the pecuniary returns are. When the ECB optimizes its portfolio, all assets generate the same sum of marginal pecuniary and non-pecuniary services, and thus the true present value of returns will always be equal to the market value of the assets held. Calculating seigniorage stocks rather than flows helps us to bypass these problems and prevents us from getting stuck in a complicated discussion of interest differentials, portfolio structures and discounting procedures.

Our study is also not concerned with problems resulting from differences between book and market values of gold and international currency reserves. Such differences involve an obvious redistribution at the expense of countries like Germany which use low book values for precautionary reasons. We assume that the national central banks will adjust their balance sheets to the true market values before they will join EMU. Germany, for example, is preparing a new law which allows the Bundesbank to abolish the so-called "Niederstwertprinzip" before it joins EMU and gives its assets away.

There is another problem which we bypass in this paper so as to keep the analysis simple. Article 51 of the Protocol on the "Statute of the European System of Central Banks and the ECB" defines an optimal transition period for the socialization of asset returns and hence for the effective socialization of the assets themselves. In the first year after EMU is founded only 40% of the return needs to be socialized, but within a period of 5 years this percentage will increase to 100%. In our study we try to predict the gains and losses in seigniorage wealth after the socialization process has been completed.

3. The Distribution of Seigniorage Wealth before the EMU

It is a plausible assumption that the size of a country's monetary base is roughly proportional to the size of its economy as measured in terms of the size of its population or GDP. Indeed this assumption was made by the fathers of the Maastricht treaty who selected these variables as criteria for distributing the seigniorage profit among the EMU countries. However, even without going into the details of a GDP or population comparison, Figure 1 reveals very clearly how utterly wrong this

assumption is. The figure refers to all countries of the European Union and shows the magnitudes of the respective monetary bases both in absolute and relative terms.

The monetary bases can roughly be equated to the respective values of seigniorage wealth. Differences result, however, from the fact that Greece, Italy, Ireland and the Netherlands pay interest on the reserves held by the private banking system. As the interest bearing part of a country's monetary base is not part of the seigniorage wealth, Figure 1 distinguishes between monetary base and seigniorage wealth. According to article 32.4 of the Protocol on the "Statute of the European System of Central Banks and the ECB", it is the so-defined seigniorage wealth which is subject to socialization in EMU.

Figure 1: *Monetary Base and Seigniorage Wealth before EMU*

	Share of joint seigniorage wealth	Seigniorage wealth / monetary base [billion ecu]
Austria	3.3%	15.6
Belgium	2.5%	11.9
Denmark	2.1%	9.8
Finland	2.2%	10.2
France	10.2%	47.6
Germany	34.8%	163.1
Greece	1.8%	8.2 / 11.9
Ireland	0.8%	3.8 / 4.5
Italy	11.6%	54.4 / 93.0
Luxembourg	0.0%	0.1
Netherlands	4.9%	22.8 / 24.2
Portugal	1.3%	6.3
Spain	11.7%	54.8
Sweden	4.2%	19.5
United Kingdom	8.6%	40.3
Total	100.0%	468.4 / 512.8

Notes: The monetary base consists of coins and bank notes as well as central bank reserves held by the private banking system. Seigniorage wealth equals the monetary base minus those private bank reserves on which central banks pay interest. The white parts of the columns indicate the interest bearing reserves. We used the monetary base at the end of 1995 and exchange rates of April 1997. **Sources:** International Monetary Fund, International Financial Statistics, March 1997; Banca d'Italia, Bollettino Economico 28, February 1997, pp. 26a and 41a; Frankfurter Allgemeine Zeitung No. 77, April 3, 1997, pp. 27 and 30.

A priori, similar figures might have been expected for the four biggest West European countries, namely Germany, France, Italy and the United Kingdom. In fact, however, the values of the seigniorage wealth of France and the UK are surprisingly small. The joint seigniorage wealth of these two countries is about half that of Germany, which, in turn, is one third of the total. Spain, the

EU's fifth biggest country has the second biggest seigniorage wealth with a slight margin over Italy. In per capita terms, the Spanish wealth is two thirds more than the French one and twice as large as the British one.

There are a number of explanations for the striking information revealed by Figure 1. The following four points seem particularly important.

(i) The German figure is so high not only because Germany is the largest country, but also because the deutschmark is an important international transactions and reserve currency, taking second place to the dollar with a foreign circulation worth about 30-40 billion ecus.³ The Turkish coffers said to be filled with DM 1,000 bank notes provide anecdotal evidence for this phenomenon. The fall of the Iron Curtain and the traditional strength of the German export industries have both contributed to the dominant role of the deutschmark.

(ii) The high figures for the Spanish and Italian monetary bases can probably not be explained along similar lines. A large fraction of black market activities is a more plausible candidate as an explanation, for such activities require cash rather than bank transfers. According to Schneider (1994, p.199), the GDP share of black market activities is about 30 % in Italy and 23 % in Spain, while the figure for Germany is only 9.2 %. The high Italian monetary base does not translate into a high level of seigniorage wealth since, as explained, Italy pays interest on the reserves of the private banking system.

(iii) The low figures for the United Kingdom and France can partly be attributed to the highly developed banking sectors and payment habits in these countries. The UK is the country of the credit card, and France is the country of the Minitel, a forerunner of the Internet connection which has made electronic banking a favorite pastime.

(iv) The figures for France and the UK are also low because these countries have comparably liberal banking laws. France imposes a minimum reserve requirement of between 0.5 and 1 % on its banks, and the UK has no legal reserve requirement at all⁴. Germany, on the other hand, from 1950 until March 1994 required that well over 10% of a bank's demand deposits be backed by

³ See Seitz (1995), p. 54.

⁴ Other countries which do not require minimum reserves include Belgium, Denmark and Sweden. See European Monetary Institute (1995) for a more detailed account.

central bank money. Only since the latter date have minimum reserve requirements been lowered considerably, and from August 1995 they are down to 2%. A more detailed discussion of this point will follow in section 5.

All in all, these aspects are so different and idiosyncratic to the European countries that the divergence in the monetary base or seigniorage wealth figures shown in Figure 1 ceases to be a miracle. The distribution of seigniorage wealth is extremely unequal, and major redistributive effects from socialization of this wealth are to be expected.

4. The Gains and Losses from an all-inclusive Monetary Union

The negotiators of the Maastricht treaty did not pay particular attention to the distribution of seigniorage wealth. Only one of the protocols⁵ to this treaty contains information from which the distribution rule can be inferred. Basically, the member countries have to provide the ECB with a *nucleus of equity capital* and the profits of this bank will then be distributed among the member countries according to the equity shares. The crucial aspect is the calculation of the equity shares.

As mentioned above, a country's equity share is calculated as the average of its population and GDP shares. Initially, these will be derived from the population figures for the year 1997 and the average of the GDP figures for the years 1992-96. Later, the equity shares will be updated every 5 years according to the economic and demographic developments, where the capital contributions are adjusted accordingly. Table 1 exemplifies the calculation of the equity shares for the currently available economic and demographic data. Germany's share will be highest with a value of over 24 %, and it will be followed by shares of 17 % for France, 15 % each for Italy and the UK, and 9 % for Spain. By their very nature, these figures are very close to the prevailing capital shares of the European Monetary Institute, but they differ significantly from the percentages indicating the respective shares in the joint volume of seigniorage wealth which are reported in Figure 1.

⁵ See articles 29, 32 and 33 of the Protocol on the "Statute of the European System of Central Banks and the ECB".

Table 1: *The Capital Shares of the EMU Countries*

	[1] Population [million people]	[2] GDP [billion ecu]	[3] Population [share in EU total]	[4] GDP	[5] Capital share in ECB
Austria	8.0	161.1	2.16%	2.64%	2.40%
Belgium	10.1	188.0	2.73%	3.08%	2.90%
Denmark	5.2	120.1	1.40%	1.97%	1.70%
Finland	5.1	82.9	1.37%	1.36%	1.35%
France	57.9	1 097.3	15.61%	17.97%	16.80%
Germany	81.4	1 680.6	21.95%	27.52%	24.75%
Greece	10.4	81.6	2.81%	1.34%	2.05%
Ireland	3.6	42.8	0.96%	0.70%	0.85%
Italy	57.2	869.6	15.42%	14.24%	14.80%
Luxembourg	0.4	10.7	0.11%	0.18%	0.15%
Netherlands	15.4	275.9	4.15%	4.52%	4.35%
Portugal	9.9	69.9	2.67%	1.14%	1.90%
Spain	39.1	421.6	10.55%	6.90%	8.70%
Sweden	8.8	173.0	2.37%	2.83%	2.60%
United Kingdom	58.4	832.5	15.74%	13.63%	14.70%
EU total	371.0	6 107.7	100.00%	100.00%	100.00%

Notes: The calculation follows Article 29.1, Statute of the European System of Central Banks and the European Central Bank, where the population data refer to the year 1994 and the GDP data to the average of the years 1992-95. The figures for Luxembourg and Portugal refer to the period 1992-94. The exchange rates taken for the currency conversions are those of the respective years. **Sources:** Statistisches Jahrbuch für das Ausland 1996, pp. 22-23; International Monetary Fund, International Financial Statistics, January 1997; OECD, National Accounts 1996, Main Aggregates, Volume 1, p. 65.

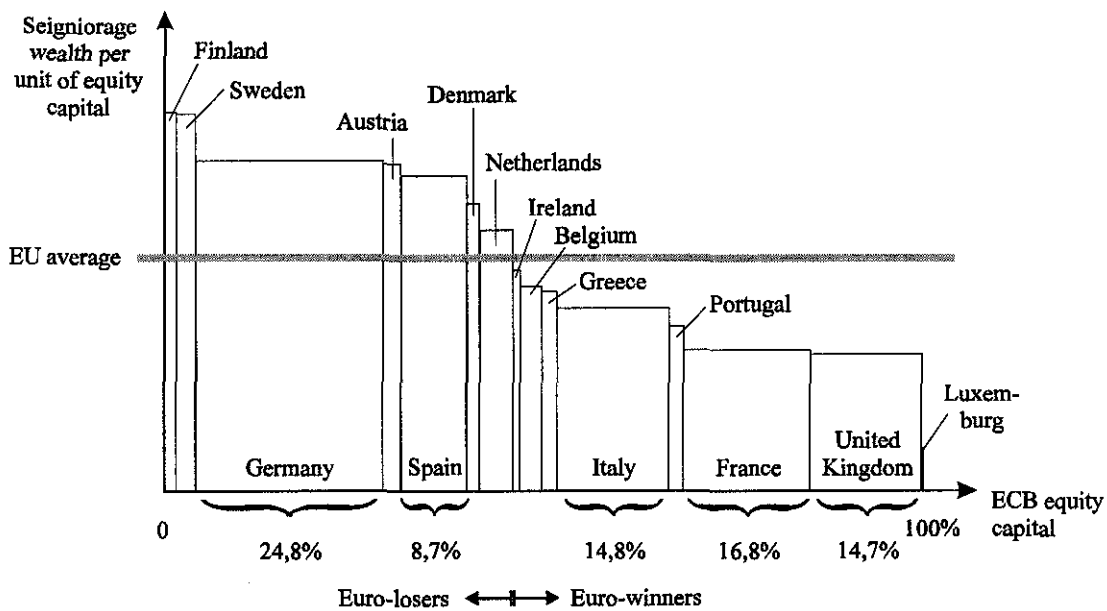
The total equity capital to be contributed will be 5 billion ecus, independent of how many countries participate. There are no direct distributional consequences with regard to this capital contribution because each country's share in the return which this capital earns equals its share contributed. However, there are indirect distributional consequences insofar as the return to the other assets which are received in exchange for Euros will also be distributed in proportion to the capital contribution. The capital share provides a claim not only on the capital contributed but also on the total stock of seigniorage wealth inherited by the ECB member countries.

If the allocation of seigniorage wealth across the European countries happened to be equal to the allocation of capital shares there would be no problem. Each unit of contributed capital would carry the same amount of seigniorage wealth and hence socialization of this seigniorage wealth among the capital units would be distributionally neutral. In fact, however, the capital units carry very different amounts of seigniorage wealth depending on where they came from.

Figure 2 reveals the differences. The columns represent the positions of the single EU countries. The width of a column measures a country's capital share which, by assumption, can be taken as an indicator of this country's size as measured by the average of its population and GDP figures. The height of a column indicates the respective seigniorage wealth per unit of capital. The area covered by a column is the total amount of seigniorage wealth contributed by a particular country. (It equals the length of the respective black column of Figure 1.) The countries are ranked by the amount of seigniorage wealth per unit of capital so as to form a Dalton's Parade which indicates the attractiveness as a member of the currency union.

Figure 2: *Seigniorage Wealth Carried by a Unit of Equity Capital.*

A Dalton's Parade of the Member Countries



Sources: See Figure 1 for monetary base and Table 1 for equity capital.

The leaders of the Dalton's Parade are Finland and Sweden, followed by Germany, Austria and Spain. The taillights of the parade are Luxembourg, the United Kingdom and France. These countries have so little central bank money or seigniorage wealth relative to their size that any other country which joins them in a monetary union will suffer a seigniorage loss.

If all EU members join the currency union, the horizontal gray line of Figure 2 separates the winners from the losers. The height of the line indicates the average amount of seigniorage wealth

per unit of capital and hence the amount which everyone would own after the socialization process of an exhaustive currency union. Obviously Luxembourg, the United Kingdom, France, Portugal, Italy, Greece and Belgium would be the winners. Ireland can relax, because it happens to hold more or less the average position. Finland, Sweden, Germany, Austria, Spain, Denmark, and the Netherlands would be the losers.

Graphically, the magnitudes of the country-specific gains and losses can be found by measuring the areas between the columns and the horizontal line. For example, that part of the area of the German column that lies above this line is the German loss of seigniorage wealth, and the area below this line and above the French column measures the French gain of seigniorage wealth. By construction, the sum of all such areas above the horizontal line equals the sum of the areas below it.

More accurate information on the magnitudes of the gains and losses from an all-inclusive currency union is provided by Table 2 which combines the information from Figure 1 and Table 1. The table confirms that France and the United Kingdom would be the two big winners of EMU with gains of 31 and 29 billion ecus, respectively. The sum of these gains would be enough to build another four tunnels underneath the Channel. Italy would be another big winner with 14 billion ecus. The biggest loser would be Germany with a loss of 47 billion ecus or 90 billion deutschmarks, followed by Spain with 14 and Sweden with 7 billion ecus.

Table 2: *Gains and Losses from an all-inclusive Monetary Union*

	[1] Seigniorage wealth [billion ecu] B_i	[2] Share in seigniorage wealth $b_i = B_i / \sum B_i$	[3] Share in ECB equity capital k_i	[4] Total gains [billion ecu] $G_i = (k_i - b_i) \cdot \sum B_i$	[5] Gains per capita [ecu]
Austria	15.6	3.3%	2.4%	-4.4	-549
Belgium	11.9	2.5%	2.9%	+1.7	+165
Denmark	9.8	2.1%	1.7%	-1.8	-347
Finland	10.2	2.2%	1.4%	-3.9	-757
France	47.6	10.2%	16.8%	+31.1	+536
Germany	163.1	34.8%	24.8%	-47.1	-579
Greece	8.2	1.8%	2.1%	+1.4	+134
Ireland	3.8	0.8%	0.9%	+0.2	+62
Italy	54.4	11.6%	14.8%	+14.9	+261
Luxembourg	0.1	0.0%	0.2%	+0.6	+1,434
Netherlands	22.8	4.9%	4.4%	-2.4	-155
Portugal	6.3	1.3%	1.9%	+2.6	+263
Spain	54.8	11.7%	8.7%	-14.1	-359
Sweden	19.5	4.2%	2.6%	-7.3	-837
United Kingdom	40.3	8.6%	14.7%	+28.5	+489
Total	468.4	100.0%	100.0%	0.0	-

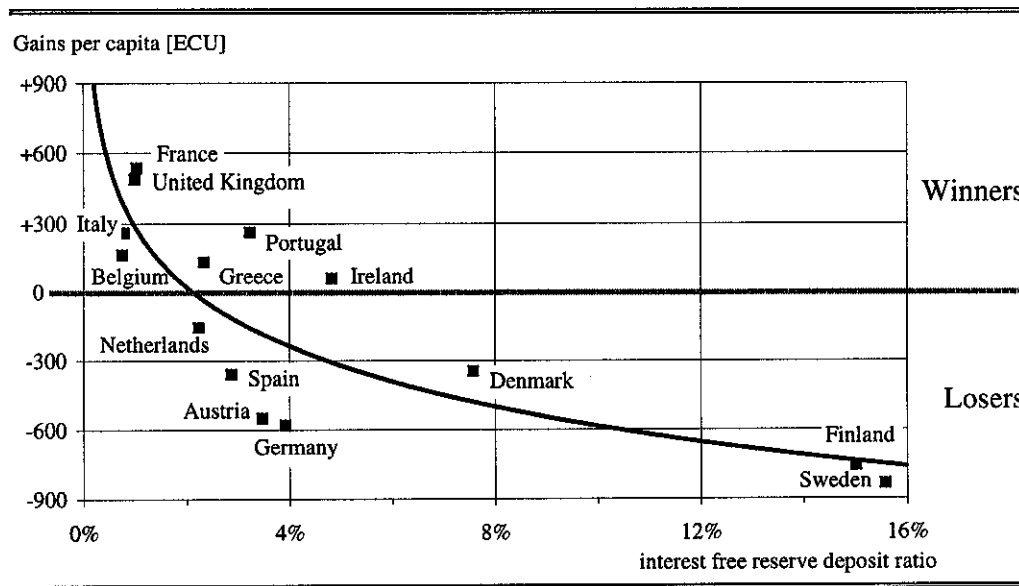
Notes: A country's gains or losses [4] are calculated by multiplying the difference between its capital [3] and monetary base [2] shares with the aggregate monetary base of all member states of the monetary union (sum over [1]). **Sources:** See Figure 1 for seigniorage wealth and Table 1 for equity capital.

It is remarkable that Sweden would be the third biggest loser from an exhaustive currency union, despite the fact that it is such a small country, hosting only 2,4% of the total EU population. A partial explanation is given by the last column of Table 2 which contains the gains and losses in per capita terms. This column shows that a typical Swede is the largest loser from such a union with a loss of 873 ecus, equivalent to 1,612 deutschmarks or 5,860 crowns. The losses imposed on other countries' citizens are also substantial. The average Finn loses 757 ecus or 3,487 finmarks, the average German loses 579 ecus or 1,115 deutschmarks, the average Austrian loses 549 ecus or 7,441 shillings, and the average Spaniard loses 359 ecus or 58,532 pesetas. Some of the winners' per capita gains are even larger than these figures. The average inhabitant of Luxembourg will experience a wealth increase of 1,434 ecus or 56,978 Belgian francs, a Frenchman gains 536 ecus or 3,476 francs, and a citizen of the UK gains 489 ecus or 343 pounds. Obviously, these are large sums of money by any standard.

5. Harmonization of Reserve Requirements

A substantial part of the redistribution effects calculated above may have resulted from differences in banking regulations. The two biggest winners, France and the United Kingdom, impose no, or only small, reserve requirements, and the other countries have not harmonized their reserve-deposit ratios. Some countries, like Greece or Italy, impose high mandatory reserve-deposit ratios, but pay interest on the reserves. Figure 3 correlates the logarithm of the actual interest free reserve-deposit ratios of the EU countries with the respective per capita seigniorage gains, with Luxembourg left out because it is only a city and has very idiosyncratic reasons for its money demand. There is a very significant negative correlation with an absolute t-value of 4.99. The mechanism behind this correlation is obvious. If a country's reserve-deposit ratio is high, the scope for creating bank money is low and the country has a large monetary base relative to its size as reflected by its capital share in EMU. Thus the socialization of the assets backing the monetary base will cause a loss for this country, and a gain for a country whose reserve-deposit ratio is low.

Figure 3: *Per Capita Seigniorage Gains and Banking Regulation*



Notes: The interest free reserve-deposit ratio is calculated by dividing non-interest bearing reserves, which private banks hold at the central bank, by deposits, which customers hold at the private banks. The trend line follows the regression equation $y = -378.79 \ln x - 1457.06$ ($t = -4.99$). Gains per capita were calculated as described in Table 2, using data as stated in Figure 1 and Table 1. Concerning reserves and deposits, we also used IMF data of 1995 for all countries except Italy where only original data from Banca d'Italia were available. The exchange rates for currency conversions are those of April 1997.

To counter a redistributive loss, a country with a high interest free reserve-deposit ratio could liberalize its banking regulations. The payment of interest on private bank reserves, or a reduction in the required reserve-deposit ratio which is accompanied by a contraction of the monetary base to eliminate the resulting excess reserves, would leave the overall M1 money supply constant and would privatize part of the seigniorage wealth, protecting it against socialization in the EMU. Indeed, much deregulation of this kind is likely to happen in a competitive environment where a single country determines its banking regulations independently of others aiming at maximizing national welfare. There would be a competition of laxity among the countries of Europe with an equilibrium in the neighborhood of a zero interest free reserve-deposit ratio.

However, the equilibrium would not necessarily be a good one because there is much to be said in favor of substantial interest free reserve requirements. Reserve requirements stabilize the supply of money, because the deposit money banks need the central bank if they wish to enlarge their credit volumes. Without a minimum reserve requirement, the supply of deposit money could easily escape public control and create dangerous inflation and trade cycle risks. A minimum interest free reserve requirement may also serve as a tax on deposit money, which seems justified as the price for the right to create deposit money, and for the services which the central bank offers to the private banks.

In the light of this, harmonization of the mandatory interest free reserve-deposit ratios seems plausible. Harmonization would avoid the competition of laxity and eliminate one of the reasons for the redistribution of seigniorage wealth.

Table 3 compares the redistributive implications of alternative harmonization scenarios⁶. We distinguish between a high, a low, and a no regulation scenario. In the high regulation scenario the actual interest free reserve-deposit ratio is 4 % which was roughly Germany's ratio at the end of 1995⁷, whereas in the low regulation scenario the actual interest free reserve-deposit ratio is 2%. In the no regulation scenario the ratio is zero, so that currency is the only source of central bank

⁶ It would be interesting to study the repercussions of these scenarios on the inflation rate in the EMU. See Sibert (1994) and Tori (1997) for theoretical discussions of the relationship between the distribution of seigniorage and the equilibrium inflation rate.

⁷ In the discussion that follows we refer to actual rather than mandatory interest free reserve-deposit ratios, assuming that the preferred actual ratios can be achieved by a suitable choice of the mandatory ratios or other aspects of banking regulation.

seigniorage wealth. This scenario is equivalent to one where there is a positive mandatory reserve-deposit ratio but where the ECB pays interest on all reserves. The no regulation scenario may also approximate the outcome of a competitive process where the national states chose their mandatory reserve-deposit ratios independently of one another.

Table 3: *Seigniorage Gains and Losses under Alternative Harmonization Scenarios*

	Status quo			High reserve: 4%		Low reserve: 2%		No reserve	
	[1] Actual interest free reserve deposit ratio	[2] Seigniorage wealth [billion ecu]	[3] Gains [billion ecu] [ecu p.c.]	[4] Seigniorage wealth [billion ecu]	[5] Gains [billion ecu] [ecu p.c.]	[6] Seigniorage wealth [billion ecu]	[7] Gains [billion ecu] [ecu p.c.]	[8] Seigniorage wealth [billion ecu]	[9] Gains [billion ecu] [ecu p.c.]
Austria	3.5%	15.6	-4.4 -549	16.4	-3.6 -447	13.5	-2.7 -342	10.5	-1.9 -238
Belgium	0.8%	11.9	+1.7 +165	16.9	-1.3 -132	13.8	-0.9 -86	10.8	-0.4 -40
Denmark	7.6%	9.8	-1.8 -347	7.1	+2.0 +379	5.6	+1.9 +373	4.2	+1.9 +367
Finland	15.0%	10.2	-3.9 -757	4.3	+2.9 +576	3.2	+2.8 +550	2.2	+2.7 +524
France	1.0%	47.6	+31.1 +536	70.2	+19.8 +341	55.0	+20.0 +346	39.8	+20.3 +351
Germany	3.9%	163.1	-47.1 -579	163.9	-31.4 -386	143.6	-33.1 -406	123.3	-34.8 -427
Greece	2.3%	8.2	+1.4 +134	8.8	+2.2 +213	8.1	+1.1 +102	7.4	-0.1 -9
Ireland	4.8%	3.8	+0.2 +62	3.6	+1.0 +277	3.1	+0.7 +203	2.6	+0.5 +129
Italy	0.8%	54.4	+14.9 +261	70.1	+9.2 +160	60.3	+5.8 +101	50.6	+2.4 +41
Luxembourg	0.0%	0.1	+0.6 +1,434	0.8	+0.0 +38	0.5	+0.2 +530	0.1	+0.4 +1,023
Netherlands	2.2%	22.8	-2.4 -155	26.8	-3.5 -230	22.2	-2.8 -182	17.6	-2.1 -135
Portugal	3.2%	6.3	+2.6 +263	6.8	+3.4 +344	5.6	+2.9 +295	4.3	+2.4 +247
Spain	2.9%	54.8	-14.1 -359	58.2	-11.6 -298	52.2	-13.4 -342	46.2	-15.1 -386
Sweden	15.6%	19.5	-7.3 -837	10.8	+3.1 +350	9.3	+2.3 +258	7.8	+1.5 +166
United Kingdom	1.0%	40.3	+28.5 +489	70.7	+8.0 +137	50.5	+15.2 +260	30.3	+22.3 +382
EU total	Ø=2.5%	Σ=468.4	σ=18.0 σ=595	Σ=535.4	σ=11.1 σ=315	Σ=446.5	σ=11.9 σ=314	Σ=357.6	σ=13.0 σ=375

Notes: The gains [3], [5], [7] and [9] were calculated as described in Table 2, using sources as stated below Figure 1, Table 1 and Figure 3. In each field, the upper figure is the total gain in billions of ecus, and the lower figure is the per capita gain in ecus.

Table 3 shows that harmonization of the reserve-deposit ratios will substantially reduce the redistribution of seigniorage wealth in EMU. In the high regulation scenario (4 %), France would remain the largest winner, but its gain would be reduced from 31.1 to 19.8 billion ecus. British gains would be cut from 28.5 to 8.0 billion ecus, which represents the largest swing in absolute terms of all countries. The Italian gain would fall from 14.9 to 9.2 billion ecus. Harmonization would be good for Germany whose losses would decline from 47.1 to 31.4 billion ecus, and Denmark, Finland, and Sweden would even switch from being losers to being winners. Belgium would become a loser. The largest swings in per capita terms are experienced by Luxembourg and Finland. Harmonization of the reserve-deposit ratios would cost an inhabitant of Luxembourg 1,396 ecus, but a Finn would enjoy a differential gain of 1,333 ecus, which is significantly more than the Swedish differential gain of 1,187 ecus per capita.

In the low regulation scenario (2 %), France would still be the largest winner with 20.0 billion ecus, and the United Kingdom would continue to keep the second position with 15.2 billion ecus. German losses would increase slightly from 31.4 to 33.1 billion ecus.

In the no regulation scenario, with an interest free reserve-deposit ratio of zero, the United Kingdom would be the biggest winner of EMU with 22.3 billion ecus. The French gain would be a little smaller, and Italy's gain would be 2.4 billion ecus. Germany would lose 34.8 billion ecus, Spain 15.1 billion ecus. Recall that the no regulation scenario is equivalent to one with a mandatory reserve-deposit ratio where the central bank pays interest on the reserves.

All in all, there is no strong relationship between the level of the harmonized interest free reserve-deposit ratio and the amount of redistribution. Deregulation will only slightly increase the standard deviations of the absolute and per capita gains (last line of Table 3). However, the harmonization as such will substantially reduce the amount of redistribution in seigniorage wealth. The standard deviation of absolute gains declines from 18 billion ecus to about 12 billion ecus in the low regulation scenario, and the standard deviation of per capita gains is cut in half, from about 600 to 300 ecus.

6. Marginal Gains and Losses

Suppose a country is the last one to join an all inclusive EMU with harmonized banking regulations. Table 3 implicitly shows the marginal redistributive effect between this country and the sum of all other countries that results from this membership decision. What it does not show is how this effect breaks down to marginal gains received by, and losses imposed on, other countries. What, for example, will Germany gain or lose if Britain joins the EMU?

The answer to this and similar questions is provided in the distribution matrix of Table 4, which refers to the low reserve scenario (2% reserve-deposit ratio) of Table 3. A column of this table reveals the implications of a marginal membership decision of the country indicated at the top of the column on all other countries, and a row shows how much the country indicated at the left margin receives if alternative countries join and complete the union. The table refers to both absolute and per capita gains. Germany's loss from Britain's joining the union, for example, is 4.4 billion ecus in absolute terms or 54 ecus for each German citizen. And if Spain joins the union, Germany will gain 3.6 billion ecus in total or 45 ecus per capita.

Table 4: *The Distribution Matrix [billion ecu/ecu per capita]*

- *With a Harmonized Reserve-deposit Ratio of 2%* -

		Marginal membership decision by...														
		AT	BE	DK	FI	FR	DE	GR	IE	IT	LU	NL	PT	ES	SE	UK
Marginal gains received by...	AT		+02	-05	-07	-58	+1.1	-03	-02	-16	-01	+07	-07	+35	-06	-.43
			+3	-6	-8	-72	+131	-3	-2	-20	-1	+9	-9	+44	-7	-.53
	BE	+08		-06	-08	-70	+1.3	-03	-02	-20	-01	+08	-09	+42	-07	-.52
		+8		-6	-8	-69	+126	-3	-2	-19	-1	+8	-9	+42	-7	-.51
	DK	+05	+02		-05	-41	+75	-02	-01	-12	-00	+05	-05	+25	-04	-.30
		+9	+3		-9	-79	+144	-4	-2	-22	-1	+10	-10	+48	-8	-.58
	FI	+04	+01	-03		-33	+59	-01	-01	-09	-00	+04	-04	+20	-03	-.24
		+7	+2	-5		-64	+117	-3	-2	-18	-1	+8	-8	+39	-6	-.47
	FR	+47	+15	-33	-48		+7.4	-18	-12	-1.1	-04	+49	-50	+2.5	-39	-3.0
		+8	+3	-6	-8		+128	-3	-2	-20	-1	+9	-9	+42	-7	-.52
	DE	+70	+22	-49	-70	-6.0		-27	-18	-1.7	-05	+73	-74	+3.6	-58	-4.4
		+9	+3	-6	-9	-73		-3	-2	-21	-1	+9	-9	+45	-7	-.54
	GR	+06	+02	-04	-06	-49	+90		-01	-14	-00	+06	-06	+30	-05	-.36
		+6	+2	-4	-6	-47	+86		-1	-13	-0	+6	-6	+29	-5	-.35
	IE	+02	+01	-02	-02	-20	+37	-01		-06	-00	+02	-03	+12	-02	-.15
		+7	+2	-5	-7	-57	+105	-3		-16	-1	+7	-7	+35	-6	-.42
IT	+42	+13	-29	-42	-3.6	+6.5	-16	-11		-03	+43	-44	+2.2	-34	-2.6	
	+7	+2	-5	-7	-62	+114	-3	-2		-1	+8	-8	+38	-6	-.46	
LU	+00	+00	-00	-00	-04	+07	-00	-00	-01		+00	-00	+02	-00	-.03	
	+10	+3	-7	-11	-89	+163	-4	-3	-25		+11	-11	+54	-9	-.66	
NL	+12	+04	-09	-12	-1.0	+1.9	-05	-03	-29	-01		-13	+64	-10	-.77	
	+8	+3	-6	-8	-68	+124	-3	-2	-19	-1		-8	+41	-7	-.50	
PT	+05	+02	-04	-05	-46	+84	-02	-01	-13	-00	+06		+28	-04	-.34	
	+5	+2	-4	-5	-46	+84	-2	-1	-13	-0	+6		+28	-4	-.34	
ES	+25	+08	-17	-25	-2.1	+3.8	-09	-06	-59	-02	+25	-26		-20	-1.5	
	+6	+2	-4	-6	-54	+98	-2	-2	-15	-0	+7	-7		-5	-.40	
SE	+07	+02	-05	-07	-63	+1.1	-03	-02	-18	-01	+08	-08	+38		-.46	
	+8	+3	-6	-8	-71	+130	-3	-2	-20	-1	+9	-9	+43		-.53	
UK	+41	+13	-29	-42	-3.5	+6.5	-16	-11	-1.0	-03	+43	-44	+2.2	-34		
	+7	+2	-5	-7	-61	+111	-3	-2	-17	-1	+7	-8	+37	-6		
EU total	+2.7	+87	-1.9	-2.8	-20.0	+33.1	-1.1	-.72	-5.8	-.21	+2.8	-2.9	+13.4	-2.3	-15.2	
EU Ø	+8	+2	-5	-8	-64	+114	-3	-2	-18	-1	+8	-8	+40	-6	-.49	

Notes: A column shows how much alternative countries gain or lose if the country indicated at the top of the column is the last to join the monetary union. A row shows how much the country indicated at the left margin gains or loses if alternative countries join and complete the union. In each field, the upper figure is the total gain in billions of ecus, and the lower figure is the per capita gain in ecus. The gains are calculated as described in Table 2, and the data used are as stated in Figure 1 and Table 1. The table refers to the low regulation scenario of Table 3.

Looking at the table by columns shows that the most expensive member of the union is France. If this country is the last to join the monetary union, all other countries lose 20.0 billion ecus which is 64 ecus for their average inhabitant. The per capita loss from a French membership would be highest for the inhabitants of Luxembourg with 89 ecus. Similarly, French membership costs a Danish citizen 79 ecus, a German one 73 ecus, and an Austrian one 72 ecus. As stated in the

example above, the United Kingdom would be little cheaper, costing the average non UK EU citizen 49 ecus.

Spain, on the other hand, would create windfall gains of 40 ecus for a typical citizen from other EU countries. The most beloved country should be Germany. It carries a gift of 114 ecus for each non-German EU citizen, or 33.1 billion ecus for all, of which 7.4 billion ecus would accrue to France, 6.5 each to Italy and the UK, and 3.8 to Spain.

Looking at the table by rows gives the perspective of a single country which has to decide whether to vote for or against a particular other country joining the union. France, for example, would gain 2.5 billion ecus if Spain completed the union, and 500 million ecus if Austria or the Netherlands did so, but it would lose 3.0 billion ecus if the UK came in.

The distribution matrix was calculated under the assumption that the joining country completes the currency union. The marginal gains and losses resulting from this exercise are not identical with those marginal gains and losses that would result if one country were added to a smaller group of existing member countries. While it would be cumbersome to repeat the calculations for all feasible scenarios, the next section tries to shed some light on some plausible cases.

7. Alternative Membership Scenarios

At the time of writing, which countries will participate in the EMU is an open question, but it is very unlikely that all countries will join the union in 1999. After all, according to the Maastricht treaty, the currencies of joining countries must have been stayed within the normal margins of the exchange rate mechanism (ERM) for two years. This condition is not met by Greece, Sweden and the United Kingdom. There is also the barrier of the other criteria which have to be met before joining, including the two debt criteria. Except for Luxembourg, hardly any country will meet all these criteria, but article 104 c of the Maastricht treaty allows substantial scope for interpretation which makes it unclear which countries will join and which will have to stay out.

Because of this uncertainty, this section considers the low regulation case with alternative membership scenarios among which there may be one which approximates the ultimate realization. To distinguish between these scenarios we have clustered the EU countries into five groups with

similar membership conditions. The membership has to be decided with a qualified majority of 70 % of the Council, which is 62 out of 87 votes. The votes commanded by the five groups are indicated in the top line of the table. Each of the five groups is too small to block EMU if it wished to do so, but any two of them would be sufficiently strong for that purpose. It is possible that only a minority of countries will participate in the union provided that a qualified majority agrees. The first of the five groups consists of Austria, Germany and the Netherlands, countries which have already been an extremely firm monetary coalition for many years. The second group includes Belgium, France and Luxembourg, the francophone bloc. The third group is a Mediterranean bloc with Italy, Spain and Portugal, and the fourth group consists of Denmark, Finland and Ireland. If this group joins, the European Monetary Union comprises all states which were EMS members during the two years preceding its foundation. The fifth group brings in Sweden, the UK and Greece, the three countries that cannot join in 1999 if the Maastricht treaty is respected.

Table 5: *Gains and Losses under Alternative Membership Scenarios*
 - With a Harmonized Reserve-deposit Ratio of 2% -

Scenarios Countries Votes (87)	[1] Monetary core (AT, DE, NL) 19		[2] + Francophone (+ BE, FR, LU) 17		[3] + "Club Med" (+ IT, PT, ES) 23		[4] all EMS members (+ DK, FI, IE) 9		[5] all EU members (+ GR, SE, UK) 19	
	total gains	per capita gains	total gains	per capita gains	total gains	per capita gains	total gains	per capita gains	total gains	per capita gains
Austria	+0.2	+24	-1.8	-230	-2.0	-249	-2.2	-274	-2.7	-342
Belgium	-	-	+0.2	+22	+0.0	+4	-0.2	-20	-0.9	-86
Denmark	-	-	-	-	-	-	+2.3	+448	+1.9	+373
Finland	-	-	-	-	-	-	+3.1	+611	+2.8	+550
France	-	-	+26.3	+455	+25.3	+436	+23.9	+412	+20.0	+346
Germany	-2.7	-34	-23.8	-292	-25.4	-312	-27.4	-337	-33.1	-406
Greece	-	-	-	-	-	-	-	-	+1.1	+102
Ireland	-	-	-	-	-	-	+0.9	+257	+0.7	+203
Italy	-	-	-	-	+10.4	+182	+9.2	+160	+5.8	+101
Luxemburg	-	-	+0.3	+669	+0.3	+646	+0.2	+615	+0.2	+530
Netherlands	+2.5	+165	-1.2	-76	-1.4	-94	-1.8	-117	-2.8	-182
Portugal	-	-	-	-	+3.5	+355	+3.4	+339	+2.9	+295
Spain	-	-	-	-	-10.7	-272	-11.4	-291	-13.4	-342
Sweden	-	-	-	-	-	-	-	-	+2.3	+258
United Kingdom	-	-	-	-	-	-	-	-	+15.2	+260

Notes: Votes refer to the European Council which, meeting in its composition of Heads of State or of Government, will decide which member states fulfill the necessary conditions for the adoption of a single currency; cf. Article 109j (3), Treaty on the European Union. The gains were calculated as described in Table 2, and the data used are as stated in Figure 1 and Table 1. The table refers to the low regulation scenario of Table 3.

If only the first group, the nucleus around Germany, forms the currency union, there is roughly a redistribution of 2.5 billion ecus from Germany to the Netherlands, while Austria will hardly be affected. This constellation is possible if the other countries agree to stay out, but this is not very plausible, to say the least.

A more plausible scenario is that the francophone group [2] will also join. France, after all, has been pushing harder than any other country for the monetary union. This will have dramatic consequences for seigniorage wealth. Germany now loses 23 billion ecus, and France gains 26 billion ecus. Part of the French gain will come from Austria which loses 1.8 billion ecus, and even the Netherlands will have to make a net contribution of 1.2 billion ecus. Belgium and Luxembourg will be among the winners. In per capita terms the gains and losses from such a union are truly large. A German inhabitant will lose 292 ecus or 562 deutschmarks, and a French one will gain 661 ecus or 4,287 francs. A citizen of Luxembourg will be subsidized with 669 ecus and a Belgian citizen with 22 ecus. It is tempting, though speculative, to believe that the francophone gains may have contributed to the French interest in a currency union with Germany.

There was a time when a small currency union consisting of the first two groups seemed likely. This was the time when it seemed easy to satisfy the debt criteria strictly so that they could have been used to separate the "good" countries from the "bad" ones. In addition, the Scandinavian countries had strongly overvalued currencies and Italy seemed hopeless since it had been forced to leave the EMS and was miles away from meeting the deficit criterion. In the meantime all this has changed. The debt criteria will no longer be able to serve as a screening device since even Germany violates them and the Scandinavian countries have devalued, moving their currencies into the neighborhood of the respective purchasing power parities⁸. Italy has joined the EMS in due time and is even trying to satisfy the deficit criterion by introducing special taxes in the examination year of 1997. Given these new developments, a more extended union is a plausible, if not a likely, possibility.

One extension beyond the Franco-Germanic bloc could be the inclusion of the Mediterranean countries, our group number [3]. This extension is problematic because of the high debt/GDP ratios which these countries have and because of the fact that their currencies are strongly undervalued when judged by the OECD PPP criterion. Still, given their strong preference for joining the EMU

⁸ See Sinn (1996).

and given their voting power, it is not unlikely that they will be able to squeeze in. The three countries together have 23 votes in the Council of Ministers. It should not be difficult to log roll for the additional 3 votes which they need to block the union. For example, the five Greek votes or the three Danish votes would be enough to achieve this goal.

If the Mediterranean group joins, the French seigniorage gain will decrease by a billion ecus and the German loss will grow by 1.6 billion ecus. President Chirac and Chancellor Kohl will have to make up their minds whether their reluctant populations are ready to invite the inflation prone countries of southern Europe, given that they will have to pay for them as well.

However, the Mediterranean extension is not expensive. It costs only 3.2 billion ecus for the Franco-Germanic bloc. The reason is that the Spanish loss of 10.7 billion ecus will roughly compensate for the Italian gain of 10.3 billion ecus. Only Portugal's participation would involve a net loss for Franco-Germanic bloc.

A further extension could bring in Denmark, Finland and Ireland, group number [4]. This would form a monetary union from the former EMS countries. All three countries would gain by joining this union, and all incumbent countries would encounter seigniorage losses. While the gains of the new entrants would total 6.3 billion ecus, the French gain would decline from 25.3 to 23.9 billion ecus, and the German loss would rise from 25.4 to 27.4 billion ecus.

A final extension would involve the United Kingdom, Sweden and Greece. As explained above this is *unlikely to come about in 1999, but it could well happen with a delay of a few years*. If it happens, the distribution of gains and losses will be the one already reported in Table 3. The result is repeated in the last column of Table 5. The United Kingdom will be able to collect the sum of 15.2 billion ecus from the other members, which is 260 ecus for each British citizen, and each Swede would collect about the same amount (258 ecus). The Greek gains are 1.1 billion ecus in total or 102 ecus per capita. Again, all incumbent countries will experience losses as a result of the extension. The total cost of the extension would be 18.6 billion ecus which is more than five times the cost of the Mediterranean extension. Germany would have to bear the lion's share of this cost. Its seigniorage loss would increase by 5.7 billion ecus to a record level of 33.1 billion ecus.

It is tempting to make some guesses on the basis of these considerations as to which countries are likely to form the currency union. From Germany's isolated perspective, it might be

best to realize a mini-union with the Netherlands, Austria and perhaps some other smaller countries. However, this would be very likely to destroy the European Community since France would never be willing to accept this. Thus the reasonable assumption for a minimal EMU would be the Franco-Germanic bloc. This bloc will already be so large and dominant in economic terms that eventually all other countries will be willing to join, even though they may have to pay for this in terms of seigniorage wealth. With every further extension, the group of new entrants would be net winners and the incumbents would be net losers. An extension to the Mediterranean group seems likely since Italian and Portuguese gains would nearly be outweighed by Spanish losses. But each country which joins the union in the next two expansion steps would cause losses to the incumbents. The costs of Denmark, Finland, and Ireland are small, but the United Kingdom, Sweden and Greece are so expensive for the others that one may wonder whether the other countries would wholeheartedly welcome them. These three countries have 7 votes less than they need for a blocking coalition, and they would cause seigniorage losses to all other member countries, which would average 87 ecus per capita.

8. Concluding Remarks

It has often been argued that the European Monetary Union will mean socialization of the European currencies and that the outcome will be a new currency with an average quality and an average reputation. Typically, the quality of monetary policy, the inflation-proofness, or the use as an international transactions currency are thought of in this context. In this paper we have analyzed a much more straightforward aspect of this socialization process, which has found little public attention: the redistribution of seigniorage wealth which results from the particular way in which the currency conversion is conducted.

Our analysis shows that, if the treaty of Maastricht is respected, the EMU will bring about huge wealth transfers between the European countries. An all inclusive union could cost Germany 47.1 billion ecus or 90.7 billion deutschmarks, whereas France could gain 31.1 billion ecus or 201 billion francs and the United Kingdom could gain 28.5 billion ecus or 20.0 billion pounds. If banking regulation is harmonized with a reserve-deposit ratio of 2% the redistribution would be smaller, but remain substantial. Germany would lose 33.1 billion ecus, France would gain 20.0 billion ecus and

the UK would gain 15.2 billion ecus. Italy would gain 5.8 billion ecus and Spain would lose 13.4 billion ecus. In terms of per capita losses, Germany, Austria and Spain would be the main losers with losses of 406 ecus, 342 ecus and again 342 ecus, respectively. An inhabitant of Luxembourg, on the other hand, would enjoy a windfall gain of 530 ecus and an average Finn would gain 550 ecus.

The redistribution could easily have been avoided by specifying the conversion process differently. An obvious possibility would have been an allocation of the initial capital shares of the ECB, not according to population and GDP figures, but in proportion to the magnitudes of the respective monetary bases. This method would have ensured that ownership shares in the ECB matched the shares of seigniorage wealth subjected to the socialization process.

Another possibility would have been the creation of non-interest bearing bonds issued by the national central banks for the purpose of buying the right to issue the Euros. If the ECB accepted these bonds as a back up for the monetary base, there would be no real wealth transfer at the expense of the national central banks. The self-issued bonds would not be the same as other non-interest bearing assets like international currencies and gold, for the latter could always be exchanged for real goods or interest bearing assets, while the former would have no value outside the EMU. The self-issued bonds would be little more than accounting positions which help to balance the ECB budget. Perhaps the negotiators of the final round before the EMU is enacted will find a possibility for realizing a last minute solution of this type.

It has been argued that the redistribution of seigniorage is not a problem, because it will merely affect the future flow of central bank profits. This, it is maintained, is not the same as a redistribution of current wealth and has to be accepted as a natural consequence of EMU. This line of argument is not acceptable, because current wealth ownership is always the same as an entitlement to the future return that this wealth generates. If future central bank profits can be attributed to the assets transferred upon the act of currency conversion, a redistribution of seigniorage claims is the same as a redistribution of current wealth.

Things are different with those future central bank profits which will result from an expansion of the monetary base due to economic growth or due to an increasing use of the Euro as an international transactions currency. Many Europeans may find distributing these profits according to population and GDP figures legitimate, because they do not result from national efforts but are

rather the outcome of a joint European endeavor to make the Euro an attractive and stable currency. We hope and expect that such an endeavor will be successful, despite the problems discussed in this paper.

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