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Franz Seitz\*

# How Many Deutschmarks are Held Abroad?

*The German currency is held and used abroad because of its liquidity and stability relative to most of the world's currencies. DM banknotes are used as a transactions medium and as a store of value. The number of these which are held abroad is of interest to policy-makers for various reasons, but is rather difficult to estimate.*

*Professor Seitz outlines the results of several estimation methods and discusses the monetary policy consequences.*

Many people travelling abroad have experienced the foreign use of Deutschmarks (DM), for both legal and illegal purposes. DM are used abroad as a unit of account, a store of value and as a transactions medium. One famous recent example of the attractiveness of the DM outside the borders of Germany was the official declaration of the Republic of Bosnia-Herzegovina that it would use the Deutschmark as the common unit of account and as a transactions medium for clearing transactions between the different payments systems of the two areas in the federation – the Bosnian-majority area and the Croat-majority area. Furthermore the federation accepted the private use of the Deutschmark as a parallel currency alongside the Bosnian Dinar and the Croat Kuna. It is also presumed that DM play an important role in illegal international transactions such as money laundering and drug trafficking.

One problem with this foreign phenomenon is that the Deutsche Bundesbank only knows the total circulation of DM outside the German banking system. Neither are the amounts held within Germany and in foreign countries known nor does the Bundesbank have information as to the amount of Deutschmark held by residents and non-residents respectively.<sup>1</sup> But policymakers would find it useful to have a clear idea of how much of the German currency is in circulation outside Germany. First, foreign demand for DM is often unrelated to domestic spending and will complicate the analysis of the different monetary aggregates. Second, a reliable

figure could improve the meaningfulness of international transaction accounts (e.g. Germany's external asset position, the balance of payments statistics). Third, foreign holdings of DM contribute to the seigniorage earned by Germany (which could be interpreted as a saving for taxpayers). And fourth, the planning of the need for currency (Euros) in the future European Monetary Union depends to a large extent on the size of the foreign component of the German currency figures.

In principle, one could conduct a census in Germany to determine the domestic stock of currency and assume the rest to be abroad.<sup>2</sup> However, such a census would be invasive, prohibitively costly, and unlikely to yield reliable results. Thus, the amount of currency held abroad can only be estimated, and then mostly only from indirect evidence about DM flowing across German borders.<sup>3</sup> In what follows mainly the results of these estimates will be presented.

## Some Stylized Currency Facts

Before coming to the estimation part proper, let us first look at certain conspicuous and specific features of DM currency in circulation outside the German banking system during the past few decades.

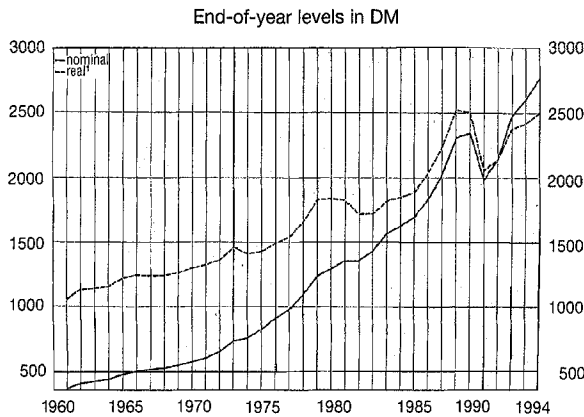
<sup>1</sup> As far as deposits are concerned the banking statistics give the necessary information to the authorities.

<sup>2</sup> For efforts in this direction, cf. R. B. Avery, G. E. Elliehausen, A. B. Kennickell, P. A. Spindt: The Use of Cash and Transaction Accounts by American Families, in: Federal Reserve Bulletin, 1986, Vol. 72, pp. 87 ff.; cf. R. B. Avery, G. E. Elliehausen, A. B. Kennickell, P. A. Spindt: Changes in the Use of Transaction Accounts and Cash from 1984 to 1986, in: Federal Reserve Bulletin, 1987, Vol. 73, pp. 179 ff.; W. Boeschoten: Currency Use and Payments Patterns, Dordrecht 1992.

<sup>3</sup> Probably the only other country which has a large part of its currency stock abroad is the USA; see R. D. Porter, R. A. Judson: The Location of U.S. Currency: How Much Is Abroad?, in: Federal Reserve Bulletin, 1996, Vol. 82, pp. 883 ff.; R. D. Porter, R. A. Judson: The Location of U.S. Currency: How Much Is Abroad?, Board of Governors of the Federal Reserve System, April 15, 1996.

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**Figure 1**  
**Nominal and Real per Capita Currency Holdings**  
**in Germany**



<sup>1</sup> At 1985 prices, as measured by the cost-of-living index for western Germany.

In September 1996 approximately DM 240 billion were in the hands of German non-banks and foreign banks and non-banks. Nearly 90% of this amount was made up by banknotes. A large part of this, about 38% and 33% respectively, was in DM 100 and DM 1,000 notes. Both nominal and real per capita currency holdings have increased since 1960 (see Figure 1).<sup>4</sup> In real terms they increased relatively slowly until the mid seventies, but sharply since the beginning of the 1980s.

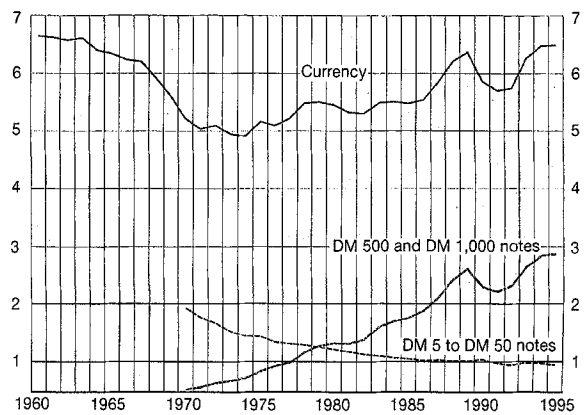
If all German currency were held in Germany, each person would have had to have held permanently nearly DM 3,000 (about US-\$ 2,000), which means a total of DM 12,000 per four-person household.<sup>5</sup> Table

**Table 1**  
**International Comparison of Per Capita**  
**Currency Holdings**  
(1994, in US\$)<sup>1</sup>

Switzerland	3,400
Japan	3,300
Germany	1,720
USA	1,400
Netherlands	1,360
Italy	1,040
Denmark	1,000
France	790
Ireland	710
Canada	598
United Kingdom	526
Portugal	486
Finland	407
Czech Republic	280
Poland	140
Turkey	56

<sup>1</sup> In interpreting the figures of this table the exchange rate relative to the US-dollar has to be taken into account.

**Figure 2**  
**Currency, in Total and in Various Denominations,**  
**Relative to GDP**  
in %



1 compares – in a statistical sense – the per capita currency holdings of different countries at the end of 1994 on a US-dollar basis. What is impressive is the relatively high figures for Germany and the USA.<sup>6</sup> Many other countries which have a similar level of development (e.g. Canada, France, the United Kingdom), but whose currencies are not held abroad, have a much lower currency endowment. In countries like Poland and Turkey which have and have had a more unstable monetary and political environment, the low currency per capita holdings are probably not attributable solely to their lower state of development, but also to the holdings of DM and US dollars.

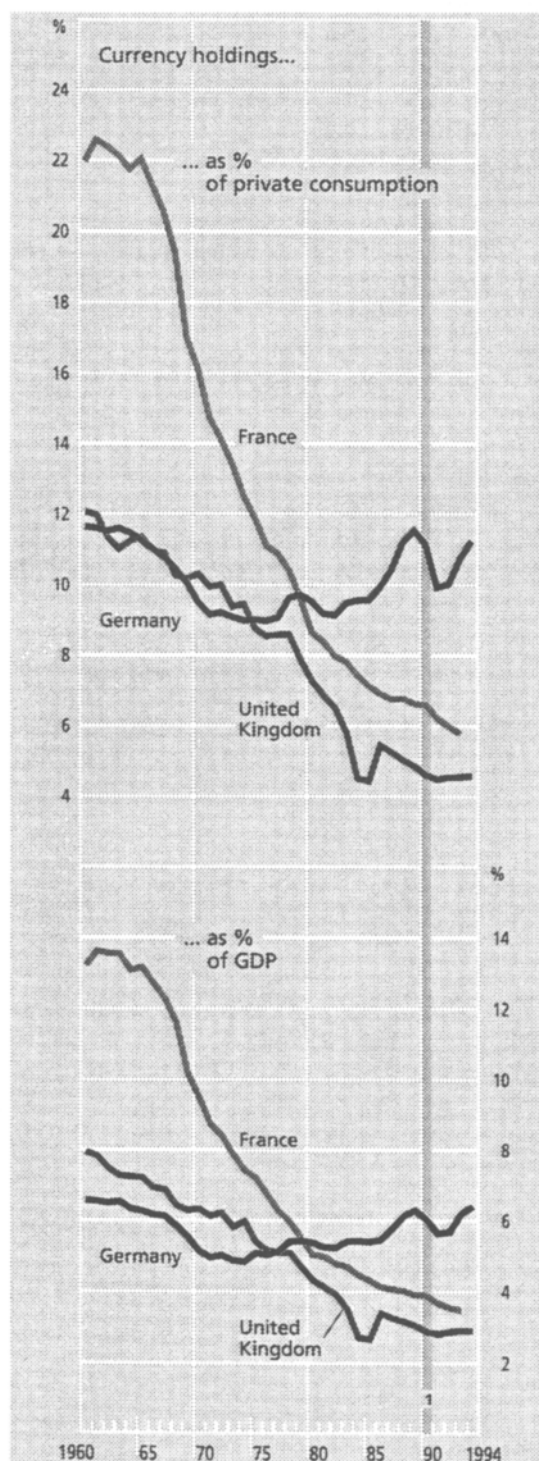
Theoretically one would expect the holdings of currency for use in transactions (measured, say, by private consumption) to decline over time as a result of cash-free payments and the tendency towards economising currency holdings. In Germany, however, nominal private consumption and nominal GDP grew on average between 1965 and the end of 1994 by about 6.5% per annum. This rate compares with a

**Table 2**  
**GDP and Currency in Germany, 1960-1995**  
(Mean year-end to year-end growth, in per cent)

Period	GDP	Currency
1960-1969	8.4	5.9
1980-1995	5.9	7.3
1985-1995	6.4	8.5
1990-1995	7.6	9.0
1965-1995	6.5	7.0

**Figure 3**

**Currency Holdings Relative to Private Consumption and Gross Domestic Product\***  
(On an annual basis)



\* Excluding credit institutions' cash holdings.

<sup>1</sup> From 1990 Germany as now territorially defined.

Source: Deutsche Bundesbank.

rate of growth of currency averaging 7%. For the periods 1980-1995, 1985-1995 and 1990-1995 the relevant figures were 7.3%, 8.5% and 9% for currency and 5.9%, 6.4% and 7.6% for GDP, i.e. the difference was even more significant (see Table 2).<sup>7</sup>

Accordingly, in the relation of currency to private consumption or GDP a rising trend has been discernible since the beginning of the seventies (see Figure 2).<sup>8</sup> Figure 2 shows also that this statement is especially true for the two larger denominations (DM 500 and DM 1,000 banknotes). In contrast, the DM 5 to DM 50 notes show a declining trend.

In France and the United Kingdom, countries with a similar level of development but virtually no foreign holdings, the relation of currency to private consumption or GDP shrank continuously in recent decades (see Figure 3).

The direction of change in the ratio of currency to M3 – the official target variable in Germany since 1987 – was generally downward until the mid to end-seventies, as one would have expected (see Figure 4). One would also expect this decline to be more pronounced since the middle of the eighties as more and more components of M3 bore market-related rates of interest. Thus, the increase in this currency ratio is a surprise, suggesting once more that explaining currency growth with domestic factors alone is problematic.

Many of the inconsistencies or "currency puzzles" described above could be explained by holdings of DM notes abroad. The basic domestic macro-economic data shown corroborate my findings that recent currency developments are not primarily driven by domestic factors. Domestic sources of the recent surge in total cash holdings are difficult to identify. First, there are no convincing reasons to ascribe large currency holdings to businesses. Second, the existing estimates of the size of the shadow or underground

<sup>4</sup> In interpreting the German figures, the "jump" caused by German unification in 1990 should always be borne in mind.

<sup>5</sup> In this statistical sense each household in Germany should also hold approximately twenty-seven DM 100 notes and two DM 1,000 notes.

<sup>6</sup> The high figure for Japan has something to do with the denominational structure, the high figures for the Netherlands and Switzerland owe something to an internal hoarding problem in these countries. According to information from the central banks of these three countries foreign holdings of their currencies are negligible.

<sup>7</sup> In the sixties the inverse proportion held: GDP increased by 8.4% per year, currency by 5.9% per year. Only minor differences would emerge if private consumption instead of GDP were used.

<sup>8</sup> In the USA a similar development can be detected.

economy do not seem sufficient to account for the observed increase in currency holdings.<sup>9</sup> And the arguments for the intensive use of currency for tax avoidance purposes or because of its special characteristics, e.g. its anonymity, are not unique to transactions in Germany or the USA. All in all this gives us many hints that we should try to capture the holdings of currency abroad to explain movements of the Deutschmark in circulation.

### Estimates of Currency Holdings Abroad

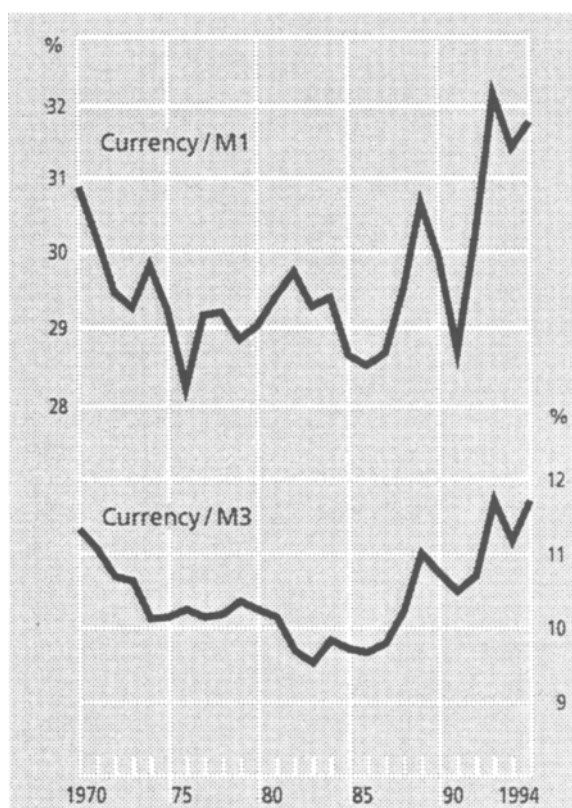
Direct methods of establishing the level of foreign holdings of Deutschmark are not very promising.<sup>10</sup> As mentioned above, one cannot expect to receive reliable answers from surveys either in Germany or abroad. And the statistically recorded banknote outflows and return flows, which are largely based on data from the banking system, presumably do not reflect the dimension of the problem in an accurate way either. This is mainly due, among other things, to the facts that the inflows and outflows are not settled exclusively through German credit institutions and that not every country in which DM are potentially held is included in the reporting system. In particular, they miss much of the cash that is hand-carried or remitted by mail. At the end of 1995, an external circulation of about DM 14 billion was recorded statistically. To summarize, there are probably no prospects of success in trying to establish the amount of DM abroad more or less directly via a census or from statistical information.

Consequently, one must resort to indirect approaches.<sup>11</sup> Seven different indirect estimation methods are presented below. With these we are either looking for variables which are affected by the foreign demand for DM or else an attempt is made to draw on

certain information on the use of DM within Germany or outside the German borders. In principle the indirect methods can be divided into two subgroups: in the first of these groups we try to draw conclusions either from an earlier period in which foreign holdings of DM were negligible or from conditions in countries which are comparable with Germany, but whose currencies are not in demand abroad. In the second subgroup econometric estimates and assessments of currency demand functions, which in some cases are linked to the first group, are involved.<sup>12</sup>

The seasonal method assumes that the seasonal pattern of DM held abroad differs from that of DM held in Germany. Hence the use of DM for transactions and hoarding purposes in other countries is probably associated with the seasonal trends in Germany to only a slight degree at most and does not show a pronounced seasonal figure. This is mainly due to the unpredictable timing of foreign and homemade major "shocks" and to the transaction costs which may discourage the returning of DM to Germany. The consequence of this different seasonal behaviour

Figure 4  
Share of Currency in M1 and M3



Source: Deutsche Bundesbank.

<sup>9</sup> See e.g. Werner W. Pommerehne, Gebhard Kirchgässner: Schattenwirtschaft als wirtschafts- und sozialpolitische Herausforderung, in: Das Wirtschaftsstudium, 1994, Vol. 23, pp. 848-860.

<sup>10</sup> An extensive treatment of the different estimation methods can be found in: Franz Seitz: The Circulation of Deutsche Mark Abroad, Economic Research Group of the Deutsche Bundesbank, 1995, Discussion paper 1/95, pp. 19 ff.

<sup>11</sup> See in the case of the US-dollar R. D. Porter, R. A. Judson: The Location of U.S. Currency: How Much is Abroad?, Federal Reserve Bulletin, op. cit., pp. 889 ff.; and R. A. Judson, R. A. Porter: The Location of U.S. Currency, Board of Governors of the Federal Reserve System, December 5th 1994 and April 15th, 1996. In these papers one can even find more indirect approaches than those presented here.

<sup>12</sup> The estimation methods can be applied to total currency in circulation or to the different denominations. I will only present the results for the whole aggregate. For some estimates about the denominational structure of DM circulating abroad see Franz Seitz, op. cit.

**Table 3**  
**Overview of the Results of the Indirect Approaches for 1994**

	Seasonal factors		German unification	Money demand estimates			Life
	Country comparison	Transactions variable		Best fit	Residuals	Trend	
As % of currency in circulation	30-40	35	c. 35	40	c. 40	30-45	26*
Absolute order of magnitude (DM billion)	65-85	75	70	85	c. 90	60-100	9

\* Only relative to DM 5 to DM 50 notes.

is a less erratic seasonal movement of the total Deutschmark in circulation than without foreign holdings. The amount of Deutschmark held abroad can then be estimated by making a comparison with the seasonal pattern of currency in an appropriate country without a foreign influence (e.g. the Netherlands, Austria, Belgium) or with the seasonal pattern of the determinants of currency demand in Germany (e.g. retail sales, private consumption).<sup>13</sup>

Information about foreign holdings of DM may also be inferred from the introduction of the Deutschmark in eastern Germany. Between June and August 1990 the amount of currency in circulation in Germany rose by just under DM 10 billion. If this rise is ascribed to eastern Germany alone and if the population at that time is taken to have been approximately 16 million, the per capita currency endowment of the new Länder can be calculated. Taking the differences in living standards between the eastern and the western part into account, a corresponding figure for western Germany can be derived. From this the approximate amount of currency held in Germany is easily obtained. And the foreign component is simply total currency in circulation less the home share.

An econometric estimate of currency demand functions also provides opportunities for measuring the order of magnitude of foreign holdings of DM. The first approach looks for the best fit of domestic demand for money. This is done by subtracting different assumed amounts of currency being held abroad. Another approach focuses on a period in which the foreign impact on DM currency demand was still insignificant. The sixties are perhaps a

relevant period in this respect. A currency demand function with good statistical properties is established for that period and then extrapolated into the future. Under certain conditions the amount of currency circulating abroad can then be derived from the difference between the actual and the forecasted currency trend. The third approach evaluates the currency ratio, that is to say, the amount of currency in circulation relative to a transactions variable. One can compare the trend in the currency ratio for DM with that of another country (e.g. Austria) or of earlier periods (e.g. 1960 to 1980 or 1970 to 1977). The difference between the reference trend and the German trend can once again be used to draw conclusions about foreign holdings of DM.

The final method is an analysis of the life of banknotes. The basic assumption in this procedure is that the "life" of a banknote is prolonged by its use abroad. A comparison of the actual with the normal life of banknotes makes it possible, in turn, to establish the amount of DM circulating abroad.<sup>14</sup>

Although the methods briefly described are very different and largely independent of each other, they produce fairly similar results for the level of currency holdings abroad at the end of 1994. These results show that at that time between 30% and 40% of the total amount of DM in circulation could have been held abroad. In absolute terms this would have amounted to between DM 65 billion and DM 90 billion.

The results of the indirect approaches dealt with are summarised in Table 3. However, the calculation methods used do not enable the temporal trend in the currency holdings abroad in the past to be

<sup>13</sup> If foreign holdings exhibit seasonality similar to that of domestic holdings, e.g. currency transactions made abroad in the context of foreign travel, the estimates generally provide a lower bound on the share of currency held abroad.

<sup>14</sup> Formulas for calculating the average life of banknotes have been devised at the Banknote Printers' Conference and in several central banks.

established with clarity and uniformity. In Figures 5 and 6, the dynamic results of one econometric method (Figure 5) and one seasonal method (Figure 6) are presented. The temporal pattern shown there can be easily explained in both cases. In Figure 5 the difference between the "actual values" and the "predicted values" are the amounts held abroad. These amounts are negligible until the mid 70s but since then have risen sharply. In the 1990s the increase was overproportional, perhaps due to the opening-up of eastern Europe. Figure 6 shows a slightly different pattern. According to this figure the holdings of DM abroad also rose sharply until the end of the 1980s, but afterwards decreases were detectable. This could be explained in terms of the stabilization successes of some eastern European countries.

The result of the analysis above was that between 30% and 40% of the total DM in circulation is likely to be abroad. A major part of the high currency figures in Germany is therefore due to foreign countries. This constitutes an important part of the monetary seigniorage of Germany. With the beginning of Stage

III of EMU the foreign impact should reduce the seigniorage earnings of Germany. This is due to the fact that the contribution of each country participating in the EMU to the overall profits of the ESCB mainly depends on the national currency issued. About 33% of the EU-wide currency in circulation consists of Deutschmark. But the distribution of the overall profit depends on the capital share of each country. And this, in turn, depends on the national population and GDP, i.e. Germany's share is at most 25%.<sup>15</sup> In other words, seigniorage is reduced because Germany's share of the EU-wide monetary base is greater than its share in the horizontal distribution of profits. With the beginning of Stage IIIb of EMU (the year 2002) the DM loses its function as legal tender or official medium of exchange. Sooner or later it is to be expected that the "foreign Deutschmark" will flow back to the Bundesbank.<sup>16</sup> This should further reduce the monetary seigniorage independently of the concrete currency exchange of the foreign holders (i.e. whether the DM

<sup>15</sup> Both percentages also depend on the number of countries participating in Stage III of EMU.

Benedikt Bödding

## Die europarechtlichen Instrumentarien der Sozialpartner

Initially, European Social Policy has given rise to much controversy. Following the Agreement on social policy (Maastricht Treaty), European Social Policy has reached a new dimension. The social partners now have at their disposal a number of consultation and participation rights and have the capacity to act on their own initiative.

Both, the importance and the effects of these instruments remain, for the time being, uncertain and the social partners are only starting to make use of them.

The author examines the scope of these instruments in relation to Community law before as well as after the adoption of the Agreement on social policy of the Maastricht Treaty. He analyses the systematic teamwork between social partners and the European Community Institutions.

This monograph is addressed to persons interested in Labour law.

The author was a scientific collaborator at the University of Münster in the Institute for Labour, Social and Economic Law.

1996, 181 S., brosch., 58,- DM, 423,- öS, 52,50 sFr, ISBN 3-7890-4392-3  
(Studies on Foreign, International and Comparative Law, Vol. 3)



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are exchanged for Euros or other currencies, e.g. the US \$, or interest-bearing assets).

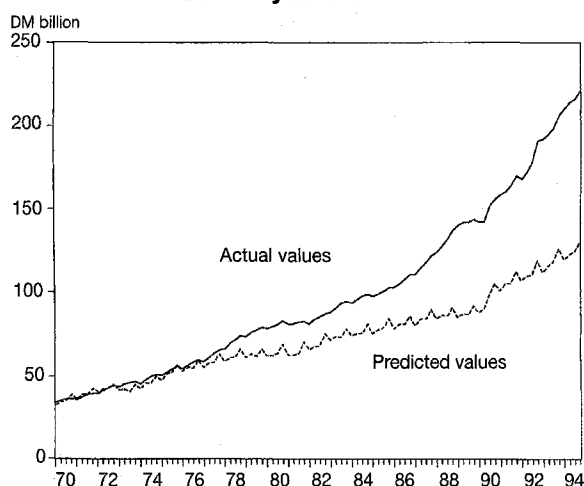
### Summary and Conclusion

At the end of 1994 an order of magnitude of about DM 65 to at most 90 billion were held abroad. German per capita currency holdings, adjusted for these figures, would then amount to between DM 1,400 and nearly DM 1,900. Making such an adjustment also for the USA, a cross-country analysis of per capita currency holdings shows that the resulting differences between comparable industrial countries can be fully explained by the usual determinants of currency holdings – interest rates, inflation, and spending – and by differences in payment systems and practices, the levels of crime and taxation, the availability of ATM machines, the denominational structure and the

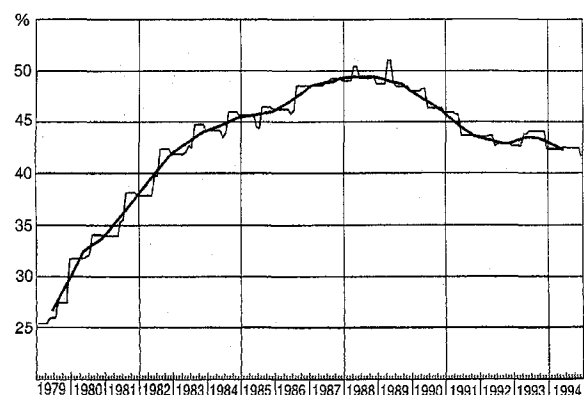
strictness of the regulations regarding currency usage.<sup>17</sup>

The German currency is held and used abroad because of its liquidity and stability relative to most of the world's currencies. In this respect the DM sometimes even has advantages over the US-dollar. It has to be repeated, in particular, that the foreign demand for DM refers to large and small banknotes. They are used both as a transactions medium and as a store of value. And the entire complex of problems can be adequately dealt with only if the analysis is not confined to the past few years and to eastern Europe alone, but instead covers the entire period since the DM came into existence and all unstable countries. It has also to take into account the possible reasons for DM holdings abroad by German residents and the incentives for the use of DM in illegal international activities.<sup>18</sup>

**Figure 5**  
**Actual and Forecasted Movements**  
**of Currency in Circulation**



**Figure 6**  
**Share of Deutschmark Currency Abroad,**  
**Reference Country: Belgium**



Note: Smoothing with a non-centred moving average.

What are the monetary policy consequences of the DM holdings abroad? In the first place an increased currency demand (irrespective of where it originates) strengthens the ties of the commercial banks with the Bundesbank, which potentially increases the impact of the Bundesbank's interest rate policy. It further increases (up to the present) the seigniorage, and thus the Bundesbank profit. With the beginning of Stage III of EMU this is turned the other way round. However, no major impairment of monetary targeting based on a broad monetary aggregate such as M3 is to be expected. The share of currency in M3 currently amounts to only 12%. Problems might arise only if the foreign holdings are subject to major annual fluctuations. Owing to various uncertainties and problems, however, a correcting factor for the money stock should not be used.

<sup>16</sup> This could well take a long time as we can see in the German case, where the old notes in circulation, which ceased to be legal tender in July 1995, still amounted to nearly DM 8 billion at the end of 1995. Why this can happen and what this implies for the counterfeiting of DM notes is analyzed by Green and Weber; see: E. J. Green, W. E. Weber: Will the New \$100 Bill Decrease Counterfeiting?, in: Federal Reserve Bank of Minneapolis, Quarterly Review, Vol. 20, summer 1996, pp. 3 ff.

<sup>17</sup> See R. D. Porter, R. A. Judson: The Location of U.S. Currency: How Much is Abroad?, Federal Reserve Bulletin, p. 898; in the case of the US-dollar Porter and Judson have estimated that between 55% and 70% is currently held outside the USA. This means that the adjusted per capita currency holdings of about US-dollars 650 move to the low end of the international scale at the end of 1995. It is roughly equal to the per capita levels of the UK, Finland or Canada, countries without significant external holdings of their currencies.

<sup>18</sup> These considerations may have consequences for the denominational structure of the future European currency Euro, see e.g. L. van Hove, J. Vuchelen: Who Needs High-Denomination Euro Banknotes? A Note on the Proposed Denominational Structure of the Euro, Free University of Brussels, 1995.