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On the International Use of Currencies: The Case of the Deutsche Mark

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Abstract

This paper assesses the role of the deutsche mark as a key international currency. It first investigates the theoretical basis underlying the international use of a currency. Theoretical considerations indicate that several factors relating to the issuing country--including inflation performance, openness of financial markets, and trade patterns--combine to propagate the international use of its currency. The paper then discusses these factors as they relate to the deutsche mark and identifies trends in several of these determinants of international currency use that presage an expanding role for the mark. Finally, data are presented on the extent of the internalization of the deutsche mark during the 1980s which corroborate the theoretical findings.

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Summary

This paper investigates the theoretical determinants of the international use of a currency, examines recent developments in those determinants that pertain to the deutsche mark, and presents data on the extent of the internationalization of the deutsche mark during the 1980s. Theoretical considerations indicate that several factors are necessary for a currency to be used internationally. These include relatively low levels of inflation and of inflation variability, which in turn contribute to a stable external value of a currency, and deep, open, and broad financial markets. The paper also analyzes patterns of invoicing between exporters and importers and draws inferences regarding supplementary conditions that contribute to the emergence of dominant international currencies, including a country's share of world exports and the share of its exports comprising differentiated manufactured goods.

The paper next assesses the Federal Republic of Germany's historical record on inflation, institutional characteristics of German financial markets, and relevant patterns of German foreign trade. As an assessment of the influence of these factors depends upon comparisons with other major countries, the discussion considers--to the extent feasible--the position of Germany relative to other major industrial countries. The evolution of the determinants of key currencies over time is shown to presage an expanding role for the deutsche mark.

The paper then presents available evidence from the 1980s on the extent of the use of the deutsche mark as an international unit of account, medium of exchange, and store of value. The data confirm the move to a multicurrency international monetary system and the emergence of the deutsche mark as an essential component of that system, owing to a significant extent to the mark's increasing importance as a key currency within Europe.

I. Introduction

Since the move to a managed floating exchange rate regime, the international monetary order has progressed gradually toward a multicurrency system. To be sure, the system continues to be dominated by the U.S. dollar. But other currencies--particularly the deutsche mark, the Japanese yen, and the Swiss franc--are being employed internationally with increased regularity.

Despite the emergence of a multicurrency system, comprehensive and systematic discussions of the factors underlying the international use of a currency--and of recent empirical trends in that direction--have not been very prevalent. 1/ Instead, most recent work has focused on individual aspects of international currency use. For example, work on the deutsche mark has consisted of a series of informative studies published by the Bundesbank dealing with the mark as an international investment currency (Bundesbank, 1979, 1984, 1987); an article by Neumann (1986) on the internationalization of German banking and finance; a study by Rieke (1982) analyzing the role of the deutsche mark as a reserve asset; and a presentation by Scharrer (1980) of the currency invoicing practices of German firms in their foreign trade dealings. These discussions have been primarily descriptive; they have not provided systematic theoretical analyses with regard to their respective areas of inquiry nor have they dealt with the interrelationships underlying the various uses of an international currency.

This paper attempts to fill this gap in the literature on the role of the deutsche mark as an international currency. It analyzes both theoretical aspects of external currency usage and recent empirical developments relating to the internationalization of the mark. The paper is divided into five sections, including this introduction. Section II deals with the theoretical foundations underlying the emergence of an international currency. Specifically, theoretical considerations suggest that several important factors contribute to a currency's international use. The evolution of these factors over time influences the extent to which a currency is used internationally. Section III discusses these factors as they relate to the deutsche mark and identifies trends in several of these determinants of international currency use that presage an expanding role for the mark. Section IV describes recent empirical developments which illustrate the growing international role of the deutsche mark during the 1980s. Concluding comments are provided in Section V.

1/ A recent exception is Ozeki's (1989) study on the Japanese yen.

II. The Choice of International Currency: Theoretical Considerations

1. Overview

The theory of international currency seeks to identify the factors that underlie the use of national monies as domestic financial instruments by nonresidents and offshore financial instruments by both nonresidents and residents. 1/ In contrast to conventional definitions of domestic money, which typically focus on short-term financial liabilities of the banking system and the monetary authorities, the definition of international currency encompasses a broad spectrum of financial instruments. In addition, the theory of international currency attempts to explain the behavior of both private and official economic agents.

An international currency fulfills three basic functions in the international monetary system--it serves as a medium of exchange, unit of account, and store of value (Cohen (1971), Kenen (1983), and Krugman (1984)). As a medium of exchange, private agents use international currency in direct exchange and as a vehicle--i.e., in indirect exchange between two other currencies--in foreign trade and international capital transactions. Official agents use international currencies as vehicles for intervention and for balance-of-payments financing. As a unit of account, an international currency is used for invoicing merchandise trade and for denominating financial transactions. International currencies are also used by official agents in defining exchange rate parities. As a store of value, private agents hold international currencies as financial assets (e.g., in the form of bonds held by nonresidents). Similarly, official agents hold international currencies and financial assets denominated in such currencies as reserve assets.

What factors contribute to the use of national monies as international currencies? Why was the pound sterling the dominant international currency for so long in the past, and why was sterling's position subsequently supplanted by the U.S. dollar? Before addressing these issues, several observations are in order. First, there is no comprehensive and rigorous theory that can accurately predict whether, say, the dollar's position as the dominant international currency will

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1/ Discussions of the factors that contribute to international currency use include Williams (1968), Swoboda (1969), McKinnon (1969; 1979), Cohen (1971), Carse and Wood (1979), Magee and Rao (1980), Page (1981), Kindleberger (1981), Krugman (1980; 1984), Fratianni (1982), Kenen (1983; 1988, Chapter 5), Bilson (1983; 1987), Chrystal (1984), Dorrow (1987), Black (1989), Frankel (1989), Klump (1989), and Ozeki (1989).

soon be replaced by another currency. The applicability of theoretical discussions of international currency use is made difficult by the fact that--unlike the theory of money in a domestic context where money is determined by government fiat--the choice of currencies to be used for international transactions is predominantly "the result of 'invisible hand' processes ratified more than guided by international agreements" (Krugman, 1984, p. 261). As a result, the analysis of international currency usage has to account for the decisions of several distinct groups of economic agents whose motivations for transacting in a particular currency can be quite diverse. For example, expectations that a particular currency, say the U.S. dollar, will depreciate in value might prompt private agents to sell assets denominated in dollars from their portfolios. However, at the same time central banks could be enlarging their reserve holdings of dollars as a result of a coordinated effort by monetary authorities to support the value of the dollar. Second, theoretical investigations of international-currency use are complicated also by geopolitical factors underlying the choice of such currencies. Specifically, movements into or out of a currency stemming from safe-haven considerations are not easily amenable to formal economic analysis.

For these reasons, the point of departure of the following discussion is to set forth two sets of conditions that are generally shared by those national monies that are used as international currencies. The coexistence of these two conditions appears to be necessary for a currency's international use. Next, a more specific set of supplementary conditions is derived by investigating the determinants of the use of currencies as vehicles. Given the coexistence of the necessary conditions, the specific factors reinforce the choice of a currency for international use, effectively determining the relative use of international currencies.

The procedure adopted in this section differs from much of the previous analytic work on this topic. Specifically, the following discussion explains international currency use as the outcome of dynamic processes that depend upon the presence of several--necessary and reinforcing--factors. In contrast, previous work has often adopted a taxonomic approach by describing international currency use by function (medium of exchange, etc.) and by agent (private or official), enumerating separately the factors that influence each cross-specification but providing little motivation for the interconnections (i.e., dynamics) involved (e.g., Cohen (1971); Magee and Rao (1980); Fratianni (1982); Horii (1986)).

2. General considerations

Two sets of factors are essential if a currency is to be used internationally. First, there needs to be confidence in the value of the currency and in the political stability of the issuing country.

Specifically, relatively high rates of inflation and/or variability of inflation add to the costs of an international currency in its various uses. High and variable inflation rates--relative to those of other countries--generate nominal exchange rate depreciation and variability. These factors increase the costs of ascertaining information and performing efficient calculations about the prices bid and offered for tradeable goods and capital assets, thereby undermining the uses of a currency as an international unit of account, store of value, and medium of exchange. 1/ Further, inflation increases the costs of holding a currency by eroding its purchasing power, debasing the currency as an international store of value and medium of exchange (as international transactions often entail a lapse of time between the initiation of a transaction and the final settlement). 2/

Consequently, in the competitive environment that characterizes the choice of international currencies, economic agents prefer currencies with relatively low inflation costs. As Kenen (1988, p. 64) has observed, one of the key factors underlying the emergence of the U.S. dollar as the dominant international currency was "the strength of the dollar in terms of other currencies, backed by comparative price stability in the United States." 3/ In turn, a protracted record of relatively-low levels of inflation and of inflation variability depends

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1/ A number of recent studies have examined the costs of exchange rate variability on the allocation of resources. For overviews of the literature, see Bailey and Tavlas (1988; 1990) and Williamson (1985).

2/ Laidler (1988) and Goodhart (1989) provide discussions concerning the role of money in lowering the costs of generating and processing information in a domestic economy setting. They also discuss the effect of inflation on such costs. Surprisingly, much of the theoretical literature completely overlooks the role played by inflation in contributing to international currency use. Thus Krugman--one of the few writers who has attempted to provide systematic theoretical discussions of international currency use (see Krugman 1980; 1984)--omits all mention of the roles of relative inflation rates and credible government policies.

3/ Kouri and Macedo (1978) demonstrate formally the importance of comparative price stability. They show that the optimal currency composition of a portfolio depends upon the risk aversion of the investor and the variance and covariance of currencies' purchasing power. By incorporating purchasing power indices in their model, they conclude: "The safest currency for all investors, regardless of their country, is the currency of the country with the least unpredictable inflation. In the absence of capital controls and restrictions on the use of foreign currencies, we would expect the safe currency to gain increasingly widespread use as the unit of denomination of financial instruments." (Kouri and Macedo 1978, p. 125).

importantly on stable and consistent government policies. 1/ In this connection, a track record of sustained current account deficits in excess of normal private capital inflows--i.e., those capital inflows that exist in the absence of undue restrictions on trade or special incentives to incoming or outgoing capital--can lead to continuous exchange rate depreciation, eroding confidence in the currency. 2/

Second, a country should possess financial markets that are substantially free of controls (such as trade restrictions and capital controls), broad (e.g., contain a large assortment of financial instruments), and deep (e.g., existence of well-developed secondary markets). It should also possess financial institutions that are sophisticated and competitive in offshore financial centers. In general, just as relatively low levels of inflation and inflation variability contribute to the demand for international currencies, well-developed financial markets facilitate the supply (as well as the demand) of such assets. Thus, the large financial markets of New York and London contribute to the use of the U.S. dollar and sterling, respectively, as international currencies. 3/ On the other hand, the Tokyo financial market was, until recently, rather tightly regulated, inhibiting the use of the yen as an international currency. Similarly, restrictions aimed at discouraging the use of the deutsche mark as a reserve currency for many years restrained the international use of the mark (see below).

The absence of financial-market controls contributes to lower costs of transacting in a currency than would otherwise be the case. For example, restrictions on the convertibility of a currency result in higher transfer costs (e.g., a greater likelihood of illiquidity), impeding the use of a national money as an international currency. Correspondingly, a country that possesses financial markets that are

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1/ In addition, governments that establish a record of economic policies--particularly monetary policy--aimed at stabilizing inflation at a low level are able to acquire credibility for those policies.

2/ There is, of course, considerable difficulty in defining such terms as "normal" capital flows and "undue" restrictions. See Bailey and Tavlas (1988) for a discussion.

3/ As Williams has observed regarding sterling's earlier dominance as an international currency: "It was the international banking system centered in London which provided the heart of the operation of the sterling system of the pre-1914 decades" (1968, p. 270). Correspondingly, as Kenen has noted with respect to the emergence of the U.S. dollar as the key international currency after World War II: "U.S. financial markets were not fenced off by capital controls, so foreigners could lend and borrow freely. Therefore the dollar was an attractive reserve asset for official institutions and a convenient store of value for other foreign asset holders" (1988, pp. 63-64).

broad and deep is in a position to serve as an international banking center. Specifically, such a country can be expected to provide a high degree of efficiency in international liquidity transformation by accepting short-term, liquid liabilities denominated in its own currency while making long-term, less liquid loans abroad (Williams (1968); Kindleberger (1981); Klump (1989)).

The view that a country with broad and deep financial markets has a comparative advantage in serving as an international banking center draws attention to the solvency risks incurred by a key-currency country when it undertakes the functions of an international bank (Klump (1989, pp. 387-92)). In particular, such factors as the external current account position and the net-debtor position of a country are important to the extent that they can affect confidence in a currency, increasing solvency risks and jeopardizing the functioning of a financial market as an international banking center.

3. Vehicle currencies

As noted, private agents use a vehicle currency to denominate and execute foreign-trade and international-capital transactions that do not involve direct transactions with the issuing country. A currency is used as a vehicle when the transactions costs--e.g., costs of information, search, uncertainty, enforcement--through the vehicle are lower than transactions costs through other nonvehicle currencies. Moreover, once a currency emerges as a vehicle, economies of scale enter into play, decreasing transactions costs further and enhancing the currency's position as a vehicle. For example, the more a currency is used, the greater the familiarity with it and thus the lower the costs of information and uncertainty; likewise, the greater the probability of finding a matching transaction and thus the lower the search costs. Hence, vehicles develop as part of the innovation process in financial markets. As Levich (1987, p. 107) has noted: "A variety of powerful financial instruments exist because they can establish equivalent financial positions at lower costs than any other set of transactions."

The uses of a currency as a vehicle for both invoicing and medium-of-exchange purposes are not unrelated. In fact, to a significant extent, it is the numeraire function that determines the currency used as a means of payment. Specifically, once a contract is denominated in, say, the exporter's currency--e.g., deutsche mark--the medium-of-exchange function emerges as a by-product. Measures can be

taken to hedge foreign-exchange risk, but at the time of settlement, payment is typically made--and accepted--in deutsche mark. 1/

What specific set of influences contributes to the determination of invoicing behavior? A number of empirical studies--e.g., Grassman (1973), Page (1977; 1981), Carse et al. (1980), Scharrer (1980), and Bilson (1983; 1987)--have investigated invoicing practices between exporters and importers and have found patterns of invoicing behavior. Analyzing these patterns can shed light on the objectives that are important in decision making by firms and, more specifically, on the firms' attitudes toward foreign exchange risk. The observed patterns are as follows (see also, Bilson (1983, p. 384)):

(1) Trade between developed countries in manufactured products is likely to be invoiced in the currency of the exporter (Grassman (1973); Carse et al. (1980); Page (1981)). 2/ Note, however, that this behavioral pattern is influenced by the presence of the necessary conditions enumerated earlier. Thus the literature also points out several exceptions to this pattern. For example, throughout the 1970s a relatively small proportion of Japanese exports (particularly to the United States) was denominated in Japanese yen. This fact was attributable, in part, to "the reluctance of the Japanese government to allow the yen to become an international trading currency" (Page, 1981, p. 64).

(2) Currency hedging by importers in forward markets is not very prevalent (Carse et al. (1980); Bilson (1983, 1987)).

(3) Invoicing in the exporter's currency is more recurrent for differentiated manufactured products with long contractual lags (Page (1977; 1981); Carse et al. (1980); Scharrer (1980)).

(4) Trade between developed and less developed countries tends to be denominated in the currency of the developed country, although the U.S. dollar is also frequently used (Grassman (1973); Page (1981)).

1/ However, the relationship is not a tight one and need not hold even in the context of a domestic economy. For example, during the German hyperinflation of the 1920s gold-marks served as the unit of account but payment was often made in U.S. dollars. It should also be noted that both the unit of account and medium of exchange functions can result from a common set of factors. Thus the currency of a country that has had a history of low inflation and has well-developed financial markets is more likely to be desired as both a unit of account and medium of exchange.

2/ This pattern is known as Grassman's Law.

(5) Trade in primary products and transactions in financial instruments are usually denominated in U.S. dollars and, to a lesser extent, in sterling (Grassman (1973); Carse et al. (1980); Page (1981)).

How can these apparently rather diverse patterns of behavior be synthesized? In order to accommodate the foregoing patterns within a single framework, it is important to note that if an exporter or importer uses a foreign currency--unless he hedges--his income or costs (in terms of his domestic currency) will immediately be affected whenever the exchange rate changes. Correspondingly, if he uses his own currency, there will be no effect on his income arising from contracts that are already fixed. As Page (1981, p. 70) has observed: "Traders tend to prefer their own currency because they are adverse to risk, and particularly unwilling to engage in managing foreign exchange exposures."

If importers are risk averse, why do they, nevertheless, often refrain from currency hedging when contracts are denominated in the exporter's currency? One reason, pointed out by Bilson (1983), may be that forward markets are typically thinner than spot markets and therefore usually entail larger bid-ask spreads. Another, more compelling, reason is that invoicing in the exporter's currency provides an important hedge for the importer (McKinnon (1979); Bilson (1983)). Specifically, both the importer and the exporter consider the variance of their respective profits in making the invoicing decision. However, the covariance between revenue and costs for the importer is likely to be higher than that for the exporter--particularly an exporter of manufactured products. Such products involve costs of production that are negotiated at an early stage of the production process. Consequently, by the nature of the manufacturing process, exporters would--in response to a depreciation in their currency's exchange rate--find it difficult to cut factor payments that had been previously set via contract. Unfavorable exchange rate movements would have to be absorbed through lower profit margins. Exporters, therefore, have an incentive to invoice in their own currency. As McKinnon (1979, pp. 68-69) observed, home currency is the "preferred monetary habitat."

Exporters can hedge, of course, but the use of the forward market increases their costs. Note that the longer the contractual lag, the higher the risk that an exchange rate change will ensue and the higher also the exporters' incentive to denominate in their own currency. In addition, as McKinnon (1979) and Page (1981) have noted, producers of differentiated (if only in brand name) manufactured products often possess a degree of monopolistic power. Such producers face a downward sloping demand curve from both foreign and domestic buyers--at least in the short run. Product differentiation allows different market prices to exist for similar (though not identical) products in the relevant

market. Consequently, the share of the exporter's currency would be expected to be larger, the greater the monopoly position of the exporter and thus to vary directly with product differentiation (McKinnon (1969, p. 74); Page (1981, p. 62)).

In contrast, the market situation of the importer provides a natural hedge against some of the currency risk of contracts denominated in the exporter's currency. Specifically, the importer can often pass through the consequences of an exchange rate depreciation by charging a higher price for the product in the domestic market. This course of action is most practical in those circumstances in which a large domestic import-competing industry does not exist. Hence, small countries that are open (i.e., in the sense that they are characterized by a substantial and rapid "pass-through" effect) are more likely to use the currency of an exporter of differentiated manufactured products (Bilson, 1983).

Further to the extent that the importer does bear some risk by denominating in the currency of the exporter, the importer gains expertise in dealing with that risk. As Krugman (1984, p. 271) has stated: "the importer. . .has to deal with exchange markets as a matter of course. . . In small countries, everyone is obliged to be sophisticated about foreign exchange." Indeed, such sophistication can be turned to the importer's advantage. The fact that importers gain knowledge through trade helps them "anticipate future exchange rate movements better than the average participant in the foreign exchange market. If so, the profitability of this knowledge could offset the risk of exchange rate volatility" (Bailey and Tavlas, 1988, p. 431).

The foregoing discussion indicates that: (i) the larger a country's share of world exports, (ii) the more these exports are comprised of differentiated manufactured products, and (iii) the larger the share that are imported by developing countries, then the greater the likelihood that the currency of the exporter will be used as an invoicing vehicle. Note, however, that these generalizations need not apply symmetrically or universally. For example, as will be documented below, the United States exports a smaller share of manufactured goods (SITC single-digit categories 6 through 8) than does Germany. Nevertheless, a high proportion of exports from the United States are denominated in dollars in part because that country has a relatively large share of commodity exports and commodity prices are typically denominated in dollars. In contrast, as Germany exports a larger share of manufactured products than does the United States, a higher proportion of German exports are invoiced in deutsche mark than would be the case if Germany exported relatively more primary products. Again, the reason is that primary products are generally denominated in U.S. dollars. It should also be noted that a growing percentage of German exports are directed toward other EC countries and that these countries have in recent years increased the proportion of their

imports that are invoiced in deutsche mark (see below). Consequently, a redirection of German exports away from developing countries and to EC countries need not imply that a smaller share of German exports would be invoiced in deutsche mark.

As previously mentioned, the more a currency is used as a vehicle, the more familiar it becomes and the smaller the associated information and search costs. In light of the foregoing observations the last above-mentioned pattern of invoicing--namely, that trade in primary products and financial instruments is usually denominated in vehicle currencies--can be explained. Primary products and capital assets share several common attributes: typically, they are characterized by low levels of product differentiation and they are traded in competitive markets. In such markets, using as a numeraire a currency with which there is widespread familiarity minimizes costs of information and calculation. Use of a vehicle currency in trade of homogeneous products provides efficient communication of competitors' prices and may, therefore, be preferred by both exporters and importers. In contrast, the more differentiated a product, the less competitive the market for the good and the less important will be information about competitors' prices.

To summarize briefly, two sets of conditions are necessary for the international use of a nation's currency--confidence in the value of the currency and the presence of well-developed financial markets that are free of controls. These conditions underlie, for example, the use of the U.S. dollar as an international currency; correspondingly, the absence of the latter condition helps explain the relatively insignificant use of the Japanese yen as an international currency during the 1970s. However, by themselves these conditions do not fully explain why a currency emerges as a dominant international currency. Dominance of a nation's currency in its international role also appears to be directly related to the country's share of world exports, the proportion of its exports comprised of specialized manufactured products, and the extent of its trade with developing countries. 1/ The combination of the foregoing factors fosters vehicle use and generates familiarity and confidence that encourage formation of primary-product and financial-asset currency blocs, further lowering transactions costs and reinforcing international currency use.

The preceding analysis can help explain behavioral patterns that have been dealt with in a rather ad hoc fashion in the literature. For example, the dynamics of international currency use are often ascribed to such concepts as "hysteresis," with little motivation as to what

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1/ In view of the fact that exports from developing countries are often invoiced in U.S. dollars, the last-mentioned factor may not be as important as the others.

underlies the hysteresis process. Thus, sterling's continued use as an international currency--despite the decline in the United Kingdom's share of world trade over the years--has been attributed to "inertia" in the system (Krugman (1984, pp. 268-69); see also, Horii (1986, pp. 39-47); Frankel (1989, p. 1); and Glynn (1989, p. 163)). In a world of efficient markets, "inertia" has little to do with the process; in fact, sterling continues in international use because London is a sophisticated financial center and because the United Kingdom is the world's fifth largest supplier of merchandise exports to the world. 1/

Correspondingly, several factors combined to undermine the role of sterling as the dominant international currency. These factors include: (i) a number of episodes of sharp fluctuations in sterling's external value beginning in the late 1940s, induced in part by high inflation in the United Kingdom relative to that country's trading partners, which made it more difficult for London to attract short-term capital from the non-sterling world (McKinnon (1969, p. 169); Cohen (1971, p. 70); and Klump (1989, pp. 278-83)); (ii) the continuation of exchange and other controls which limited London's efficiency in international liquidity transformation after the Second World War in conjunction with the relative openness of the financial market in the United States (Issing (1965, p. 51); (Williams (1968, p. 294)); and (iii) the decline after the Second World War in the share of world trade accounted for by sterling-area countries (Williams (1968, pp. 293-94)).

Likewise, the foregoing analysis helps explain some inconsistencies pertaining to the factors that have previously been identified as driving international currency use. Some writers (e.g., Frankel, 1989) have argued that an important determinant of international currency use is a nation's position as a net capital exporter; specifically, large and persistent current account surpluses accompanied by capital outflows supposedly propagate the internationalization of currencies. This factor has been cited to explain the uses of the Japanese yen and the deutsche mark as international currencies. However, this explanation is inconsistent with the fact that for a number of years the United States has recorded large and persistent current account deficits; 2/ yet the dollar continues to be the

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1/ As Williams (1968, pp. 286-87) noted: "the long-term growth of 'sterling balances' after 1900 was mainly a reflection of the growth of commercial banking in the world, and the convenience of settling international debts in cash and holding surplus funds for this purpose in a money market [i.e., London] which offered a plethora of investment opportunities. These considerations still apply."

2/ Indeed, current account deficits can serve to facilitate the net supply of local currency to the rest of the world.

dominant international currency, although its share of international use has declined. By the same token, during the 1980s the Australian dollar has emerged as an international currency in that it is one of the most actively traded currencies in foreign exchange markets. Yet during this period Australia has recorded annual current account deficits equivalent to about 5 percent of GDP. Underpinning the international use of the Australian dollar has been the complete deregulation in recent years of the Australian financial system, which until 1980 had been tightly controlled. 1/ As noted, the important criterion in this regard is not whether a country records net capital inflows, but whether such inflows affect confidence in a currency, which, in turn, affects the solvency of a country and its ability to function as an international banking center. 2/

A common element underlying the external positions of Germany, Japan and the United States is not their respective current account positions. Rather, a key feature shared by these countries regarding their international transactions--irrespective of whether they happen to be running surpluses or deficits on their current accounts--is that these countries are the world's three largest suppliers of merchandise exports to the world. Further, sizable shares of their exports are directed toward developing countries and are comprised of differentiated manufactured products; this aspect of the international use of a currency is discussed in more detail below in connection with the deutsche mark.

III. Determinants of International Currency Use: Implications for the Deutsche Mark

The discussion above has identified a number of factors that contribute to the international use of a currency. What are the implications of these factors with respect to the use of the deutsche mark as an international currency? In order to address this question, the following discussion assesses: (i) Germany's historical record on inflation; (ii) institutional characteristics of German financial

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1/ For a discussion, see Swamy and Tavlas (1989). By means of comparison, during the 1970s--when the Australian dollar exhibited virtually no signs of international use--Australian current account deficits averaged about 1 1/2 percent of GDP. In 1989 the Australian dollar was the seventh most actively traded currency in New York foreign currency trading (see Federal Reserve Bank of New York, 1989).

2/ In this connection, the rate of return on the investments for which capital inflows are used should exceed the cost of borrowing. As Frenkel and Goldstein observe, this further assumes that the order of magnitude of capital inflows is "compatible over the long run with a reasonable build-up of debt" (1986, p. 645).

markets; and (iii) relevant patterns of Germany's foreign trade. Since the influence of these factors depends upon comparisons with other major countries, the discussion considers--to the extent feasible--the position of Germany relative to other major industrial countries.

1. Inflation and the credibility of monetary policy

Since 1975 monetary policy in Germany has followed a medium-term orientation "with a view to keeping the value of money stable" (Deutsche Bundesbank, 1988, p. 22). 1/ Underlying the medium-term approach to formulating monetary policy is the view that, in the short-term, monetary growth is an important determinant of nominal income growth and the balance of payments, and that, over the medium term, its primary impact is on inflation and the nominal exchange rate (e.g., Atkinson et al. 1984). Consequently, a stable, medium-term orientation for monetary policy provides credibility, lowers inflationary expectations and contributes to a reduction in uncertainty and a climate conducive to investment.

A medium-term, anti-inflationary orientation for monetary policy was also adopted by France, Italy, Japan, Switzerland, the United Kingdom and the United States during the 1970s. 2/ The outcomes of these policies in terms of the inflation objective are reported in Table 1, which presents the average annual inflation rate (in terms of consumer prices) for these countries and Germany during 1970-88 and several subperiods. Over 1970-88 Germany experienced the lowest average inflation rate (4.0 percent) among the seven countries, followed by Switzerland (4.2 percent) and Japan (5.9 percent). The other countries reported in the table registered inflation rates between 6.4 percent (United States) and 12.6 percent (Italy). During

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1/ To this end, the Bundesbank adopted monetary targeting in 1975. However, as Lipschitz et al. (1989, p. 9) point out, "while shorter-term macroeconomic considerations are not given prominence in the framing of the target, the Bundesbank does pay attention to factors such as the domestic cyclical position, exchange rate pressures, and money market conditions in implementing monetary policy." The implementation of targeting has undergone a number of changes over the years, including a change in the monetary aggregate that is targeted. See Lipschitz et al. (1989).

2/ France instituted monetary targeting in 1977, the United Kingdom in 1976, and Switzerland and the United States in 1975. Italy and Japan have not adopted monetary targets although in Italy economic policy has been based on plans that include projections for a range of monetary and credit aggregates and since 1978 Japan has announced in the first month of each quarter a projection for the year-on-year growth of broad money measured from the same quarter of the previous year. See Isard and Rojas-Suarez (1986).

1980-88, however, Japan recorded a somewhat lower annualized inflation rate (2.6 percent) than either Germany (2.9 percent) or Switzerland (3.3 percent). Again, the inflation rates in the other countries were substantially higher.

Table 1 also reports the standard deviation of national inflation rates as a measure of inflation variability. These data tell a similar story over the period 1970-88; Germany experienced the lowest inflation variability, followed by Switzerland and Japan. However, during the interval, 1980-88, Switzerland recorded the least variability, followed by Germany and Japan.

These data indicate that relative to other major industrial countries, the medium-term orientation of Germany's monetary policy has been successful in maintaining a stable internal value of the deutsche mark. According to the Bundesbank, this success has procured credibility for Germany's monetary policy such that "within the European Monetary System [the deutsche mark] performs the function of a key currency, acting as a 'stability anchor' for the other pertinent currencies" (Bundesbank, 1988, p. 14). 1/ Similarly, Fischer (1987) describes the EMS as "an arrangement for France and Italy to purchase a commitment to low inflation by accepting German monetary policy" (see also Artis, 1987). In this context, empirical work by Giavazzi and Giovannini (1989, p. 196) has found some empirical support for the view that the "low inflation propensity of the Bundesbank [has] shifted inflation expectations downward in other countries." 2/

In fact, the willingness shown by other EC countries to pursue their monetary and exchange rate policies in terms of the example set by Germany illustrates precisely the argument made earlier regarding the factors that influence international currency use--namely, the role played by a low and stable inflation rate in propagating

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1/ Bundesbank President Karl Otto Pöhl (1988a, p. 2) has stated: "The D-mark has become the anchor of the EMS system--not because we aimed at this role but because the D-mark has been and will remain a currency which is stable, convertible and thus widely used internationally." See also Pöhl (1988b, 1989a, 1989b, 1989c).

2/ See also Melitz (1988). Even in countries that are considering EMS membership, the main advantages of membership are associated with Germany's reputation. Thus, according to the Financial Times (September 28, 1987): "In place of money supply targetry, long since discredited, we would have that unflinching guardian of monetary rectitude, the Bundesbank, standing as guarantor against Britain's endemic propensity to generate double-figure rates of inflation."

Table 1. Inflation and Inflation Variability 1/

	France	Germany	Italy	Japan	Switzerland	U.K.	U.S.
			(Average inflation rate)				
1970-74	8.1	6.2	10.1	11.5	7.9	10.4	6.2
1975-79	10.2	4.2	15.9	7.5	2.9	15.7	8.1
1970-79	9.2	5.1	13.3	9.3	5.1	13.3	7.2
1980-84	11.2	4.5	16.6	3.9	4.4	9.6	7.5
1985-88	4.4	1.2	7.1	1.1	2.1	4.7	3.5
1980-88	7.8	2.9	12.0	2.6	3.3	7.4	5.6
1970-88	8.5	4.0	12.6	5.9	4.2	10.4	6.4
			(Inflation variability)				
1970-74	3.4	0.9	6.0	7.4	1.6	3.5	3.1
1975-79	1.2	1.2	3.5	3.3	2.4	5.8	2.2
1970-79	2.6	1.5	5.6	5.9	3.2	5.6	2.8
1980-84	2.4	1.5	3.8	2.2	1.6	5.2	3.9
1985-88	2.1	1.1	2.5	1.0	1.0	1.2	1.0
1980-88	4.3	2.3	6.0	2.3	1.9	4.7	3.7
1970-88	3.6	2.2	5.8	5.8	2.8	5.9	3.4

Source: IMF, International Financial Statistics.

1/ Based on consumer price indices. Inflation variability is measured by the standard deviation using quarterly data for the indicated periods.

internationalization. 1/ Other members of the Exchange Rate Mechanism (ERM) of the EMS have effectively elected to use the deutsche mark as an official numeraire by pegging their currencies against the mark. As Kenen (1988, pp. 18-19) has observed: "By pegging their currencies to the German mark, they [i.e., members of the ERM] linked their monetary policies to those of the Bundesbank and thus borrowed some of its credibility as an implacable foe of inflation." 2/ It is for this reason that a number of writers have characterized the ERM as a "deutsche mark zone" (see, for example, Dornbusch (1986), Vinals (1988), Giavazzi and Giovannini (1989)).

In turn, Germany derives benefits from participation in the Exchange Rate Mechanism of the EMS. These include: some retention of domestic monetary independence, (Melitz (1988, p. 68) and Roubini (1988)); 3/ and decreased volatility of the nominal exchange rate against currencies of its EMS partners (Ungerer et al., (1986), Bundesbank, (1988, pp. 13-14), Giavazzi and Giovannini (1989, pp. 197-198)). 4/ To illustrate the point regarding reduced volatility of the nominal exchange rate, Table 2 reports data on the volatility of nominal effective rates for the same set of countries covered in Table 2. 5/ According to these data, over the period 1975-88 the deutsche mark's volatility was the lowest among the seven currencies. The volatility of the mark declined slightly in 1980-88 compared with 1975-79 and remained below the fluctuations experienced by the other

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1/ As Graebner (1989, p. 3) argues: "The Deutsche Bundesbank's stabilization policy has made the deutsche mark one of the world's most sought after currencies."

2/ In an interesting paper Costa (1989) discusses the EMS as a prelude to establishing a European central bank and identifies costs and benefits that can be expected by EMS countries from such a central bank.

3/ However, von Hagen (1989) argues that money growth in Germany has been significantly affected by the Bundesbank's exchange rate policy.

4/ Of course, even in the absence of the EMS, fluctuations in the external value of the currency would be less, the more credible and disciplined were economic policies. See Bundesbank (1988, pp. 13-14) and Frenkel and Goldstein (1986, pp. 638-639). Some writers have advanced the hypothesis that the ERM has resulted in a lower real exchange rate for the deutsche mark than would otherwise have been the case. According to this hypothesis, the tendency within the ERM to maintain stable nominal exchange rates while inflation rates have not yet converged implies a trendwise real depreciation for the deutsche mark (see Melitz (1988)). However, empirical support has not been provided for this hypothesis.

5/ The initial observation for the data in Table 2 is 1975; the data are based on the Fund's MERM series. These series are available only from 1975.

Table 2. Exchange-Rate Volatility 1/

	France	Germany	Italy	Japan	Switzerland	United Kingdom	United States
1975-79	1.2	1.1	1.8	2.2	1.8	1.9	1.3
1980-84	1.1	1.0	0.7	2.2	1.6	1.8	2.0
1985-88	0.7	0.7	0.7	2.1	1.2	2.1	2.2
1980-88	0.9	0.9	0.7	2.2	1.4	1.9	2.2
1975-88	1.1	1.0	1.2	2.2	1.6	1.9	2.0
Average level of real effective exchange rate in 1988 (1975 = 100)	84.8	110.1	100.9	127.5	104.6	131.7	87.9

Source: IMF, International Financial Statistics.

1/ Calculated as the standard deviation of the monthly percentage change of the nominal MERM rate.

currencies except for the French franc and the Italian lira, which also participate in the Exchange Rate Mechanism of the EMS. Moreover, in real effective terms the deutsche mark appreciated slightly (10 percent) between 1975-88 (Table 2) and displayed much less volatility than did the exchange rates for the U.S. dollar, pound sterling, and the Japanese yen (Chart 1).

The foregoing discussion suggests a number of conclusions: (i) German monetary policy, which has been formulated in a medium-term context with the aim of controlling inflation, has been relatively successful in achieving that objective. This result has enhanced the Bundesbank's credibility; (ii) Given that nominal (and real) exchange rate variability is influenced to a significant extent by government policies, the Bundesbank's success in maintaining a stable internal value of the deutsche mark has contributed substantially to a stable external value of the mark; (iii) The formation of the EMS has also contributed to a more stable external value of the mark. 1/ The willingness of other countries to participate in the Exchange Rate Mechanism of the EMS and to use the deutsche mark as an anchor (i.e., numeraire) is itself in good measure the consequence of the credibility of the Bundesbank with respect to the internal value of the deutsche mark; (iv) As the international use of a currency depends importantly on government performance vis-à-vis the inflation objective, Germany's economic policies in this regard should be expected to have contributed to an increased international role for the deutsche mark.

2. Institutional characteristics of German financial markets: The role of government policy

a. Overview

During the period encompassing the late 1960s through the early 1980s, the Bundesbank attempted to moderate the international use of the deutsche mark. 2/ Underlying this approach--which emerged under the Bretton Woods fixed exchange rate regime--was the view that substantial swings in capital flows could impede domestic stabilization objectives. For example, in 1972 and early 1973 restrictive monetary measures aimed at lowering inflation induced capital inflows, which led to official intervention to support the U.S. dollar; these induced more

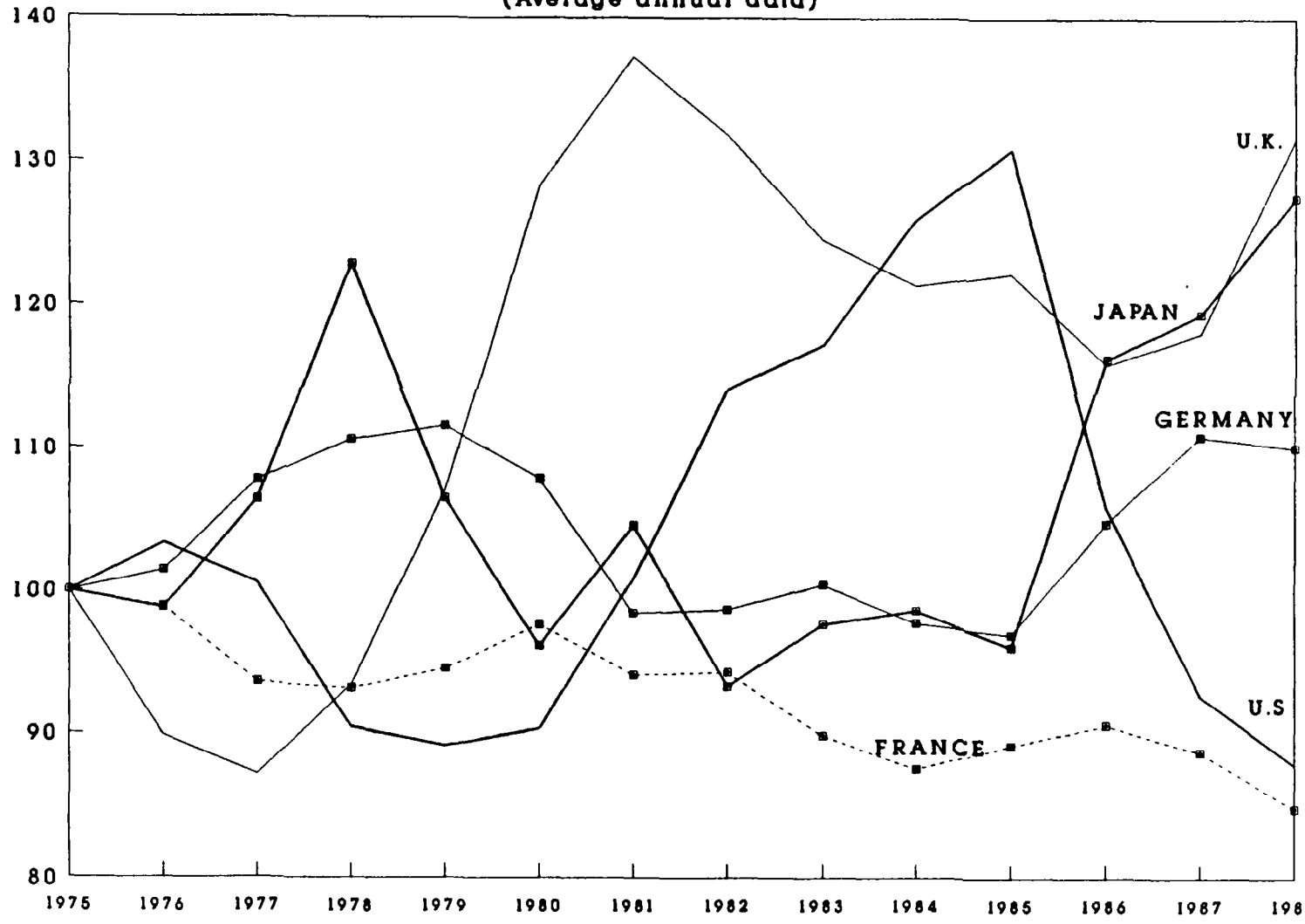
1/ For evidence, see De Grauwe and Verfaille (1988).

2/ For discussions, see Kaufmann (1985), Bundesbank (1985, 1988), Neumann (1986), and Storch (1989).

Chart 1

Real Effective Exchange Rates (1975 = 100)

(Average annual data)



Source: IMF International Financial Statistics.

restrictive monetary measures, and led to more capital inflows, etc. 1/ Consequently, in order to tighten its grip on domestic monetary conditions, the Bundesbank extended relatively firm control over both the foreign deutsche mark bond market and the international money market (Neumann, 1986, p. 110). In this context, during the early 1970s the Bundesbank imposed higher minimum reserve ratios on deposits by nonresidents than those that applied on deposits by residents. While the move to a flexible exchange rate system in 1973 increased the Bundesbank's potential control over domestic monetary conditions, the gain in control for Germany may have been less than for other large developed countries in view of the relative openness of Germany's economy (Chart 2; Table 3). 2/ In what follows, developments relating to the openness of both the international bond and money markets in Germany are discussed.

b. The deutsche mark foreign bond market

Restrictions on capital movements in Germany were directed primarily at inflows, which were relatively free compared with many other countries. Controls on capital outflows had been relaxed during the 1950s in association with the emergence of current account surpluses, steady increases in external reserves, and the settlement of German external debts (Bundesbank, 1985, p. 16). The most important restriction on inflows involved a "gentlemen's agreement" entered into by the Bundesbank and the German banks in 1968. This agreement pertained to the issuance of foreign deutsche mark bonds. These bonds had become increasingly popular in the late 1960s; however, because Germany's capital market was still very narrow, large issues of such bonds at times "had an adverse effect on the [operation of] Germany's

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1/ The example is from Goldstein (1984, p. 21), who notes that: "In February and March of 1973 alone, the Deutsche Bundesbank purchased $8.5 billion--only to succumb to floating rates the next month." See also Herring and Marston (1977) for an analysis of the channels through which foreign monetary conditions influence conditions in national financial markets under fixed exchange rates.

2/ According to the theory of optimum currency areas, exchange rate fluctuations induce larger domestic price changes in more open economies, thereby complicating the task of domestic stabilization policies and contributing to a preference for a stable exchange rate regime. See Mundell (1961), Kenen (1969), Corden (1972) and Aschheim and Park (1976).

Table 3. Exports and Imports as Shares of GDP, 1970-88 1/

	Ratios of exports to GDP					Ratios of imports to GDP					Openness 2/				
	Germany	Japan	France	United States	United Kingdom	Germany	Japan	France	United States	United Kingdom	Germany	Japan	France	United States	United Kingdom
Average															
1970-74	19.6	10.1	14.2	4.9	16.4	16.4	9.7	15.0	5.3	20.2	36.0	19.8	29.1	10.2	36.6
1975-79	22.5	11.0	16.4	6.7	20.5	19.5	10.5	17.4	8.0	23.9	42.0	21.5	35.2	14.7	44.4
1980-84	26.4	12.8	18.2	6.9	20.5	23.8	11.8	20.6	8.6	21.7	49.7	24.6	38.8	15.9	42.1
1985-88	27.5	10.9	17.8	5.7	19.9	22.0	7.3	18.8	9.3	23.4	49.6	18.4	36.5	15.1	42.7

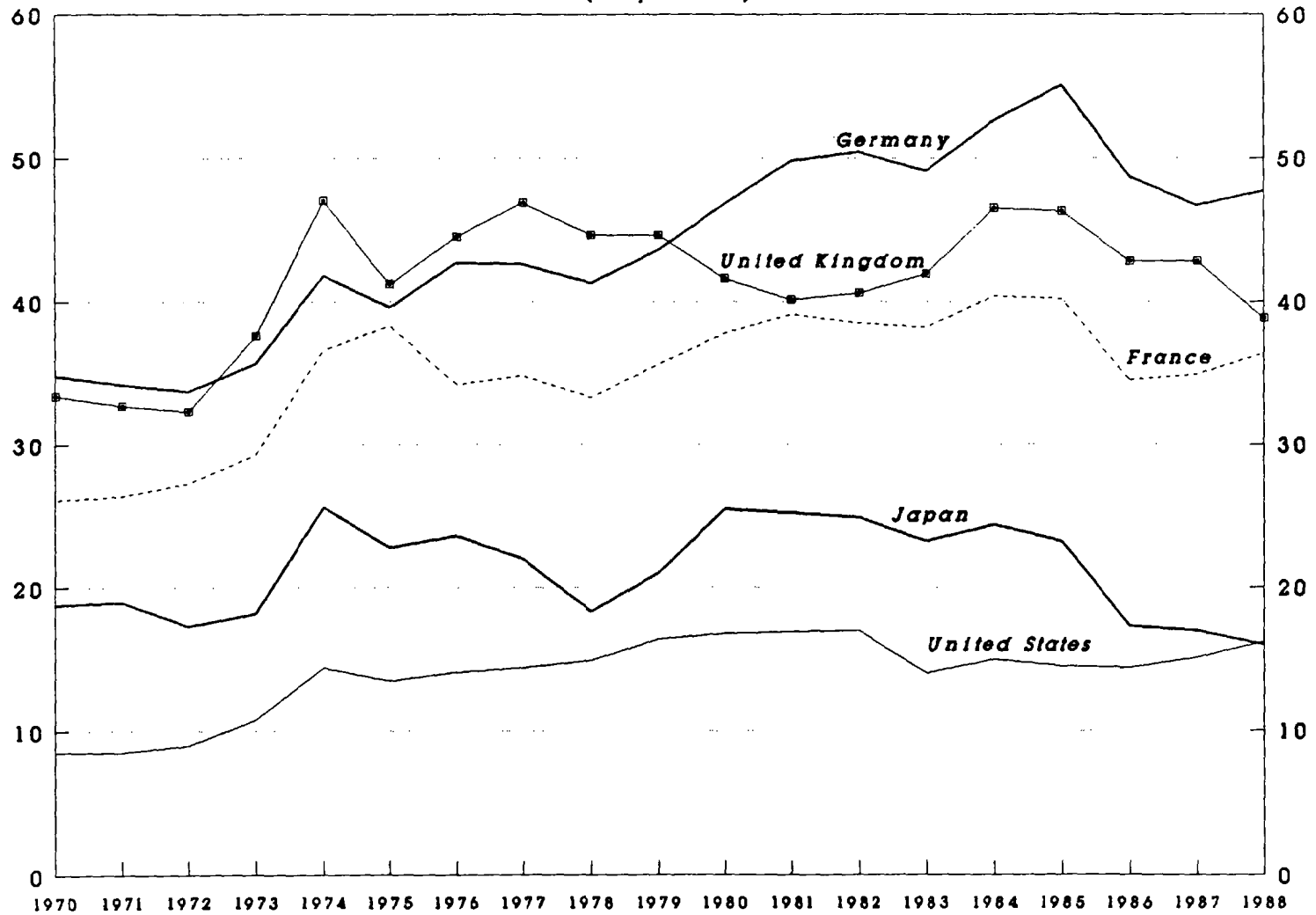
Source: IMF, International Financial Statistics.

1/ Calculated on the basis of data denominated in national currency.
2/ Sum of exports plus imports as a share of GDP.

CHART 2

Openness of Economies 1/

(In percent)



Source: IMF, International Financial Statistics

1/ Sum of Exports and Imports as a Share of GDP

capital market" (Bundesbank, 1985, p. 14). 1/ The gentlemen's agreement stipulated that only German banks could lead syndicates for deutsche-mark denominated bonds and made the volume of issues subject to the approval of a central capital-market committee (Thomas, 1986). 2/ The rationale underlying the agreement was that German banks would be more apt to follow the advice of the Bundesbank than would foreign banks and therefore could be more effectively controlled (Neumann, 1986, pp. 109-110). A second important restriction concerned the kinds of bond issues that were allowed. Only the standard fixed-rate issue was permitted. Innovative financial instruments--including floating-rate notes, zero-coupon bonds (the interest on which is paid only at maturity), and bonds linked to currency and interest rate swaps--were strictly prohibited.

These and other restrictions weakened the competitive position of German banks vis-à-vis foreign banks and led to innovations aimed at avoiding these regulations. For example, the upsurge and increased variability in inflation during the 1970s rendered fixed-rate bonds less attractive than other, more flexible instruments. Concurrently, technological improvements (e.g., in data processing) lowered transaction costs, making it easier for regulated financial institutions to innovate in order to avoid the regulations. In this environment of rapid financial innovation, the Bundesbank discovered in 1983 that a foreign deutsche mark bond issue had been used to arrange a currency swap. 3/ At that time currency swaps were fairly new and had not yet been prohibited; the Bundesbank therefore formally stepped in and restricted future use of currency swaps. Regarding the weakened position of German banks vis-à-vis foreign banks, restrictions on foreign banks led to retaliation against German banks; because of the discrimination faced by foreign banks, these banks were less likely to accept German banks as co-lead managers of other eurocurrency bond issues, effectively penalizing the German banks (Neumann, 1986).

1/ For example, a move to tighten monetary conditions by the Bundesbank could, to some degree, be circumscribed because of the availability of credit in the Euromarket. For discussions, see Bundesbank (1984) and Dudler and Herrmann (1984). Further difficulties associated with controlling Euromarket funds included the fact that they have not been subject to reserve requirements nor to Bundesbank supervision (Bundesbank, 1984).

2/ Foreign issuing houses as well as their subsidiaries in Germany were allowed to participate in deutsche mark Eurobond syndicates as co-managers, but were excluded from the more attractive role of co-lead management. See Neumann (1986).

3/ A swap is effectively the exchange of one financial claim for another. Currency swaps are often used to gain access to a currency that has been restricted.

By the mid-1980s, the Bundesbank's position had been modified substantially. In particular, the Bundesbank acknowledged the difficulty of inhibiting the operation of market forces underlying the demand for deutsche mark-denominated assets. In its Monthly Report of July 1985, the Bundesbank stated: "In view of the international role of the deutsche mark, Germany cannot shut itself off from the trend which is now under way, since the deutsche mark must remain competitive against [other] international investment currencies" (Bundesbank, 1985, p. 14). 1/ Also, by the mid-1980s German financial markets had developed markedly, providing a greater degree of insulation from external disturbances. Consequently, in recent years most restrictions on the issuance of foreign deutsche mark bonds have been lifted. Among the major changes that have been implemented are the following: (i) foreign banks are permitted to lead foreign deutsche mark issues through their German-based subsidiaries; (ii) deutsche mark floating-rate, zero-coupon bonds, dual-currency bonds, and the linking of new issues with currency and interest rate swaps are now allowed; (iii) the coupon tax (i.e., the withholding tax on interest income from non-residents' domestic bonds) has been abolished. Thus, the former division of issues into bonds that were primarily bought by residents and those that were primarily bought by nonresidents no longer exists. The market is now unified, creating greater market depth and strengthening the secondary market for foreign deutsche mark bonds (Bundesbank, 1985, p. 15); and (iv) the abolition of required reserves on most foreign-currency liabilities to nonresidents, thus improving the competitiveness of German financial institutions in the euromarkets. These and other major liberalizing measures that have been implemented during 1970-89 with respect to capital imports are reported in Table 4.

While most restrictions pertaining to the issuance of foreign deutsche mark bonds have been lifted--the main remaining restriction is that deutsche mark issues must be made in Germany--the breadth and depth of German financial markets have lagged behind other large financial centers, most notably those of London and New York, in several areas (Storch (1989)). In this regard, a turnover tax on all secondary market dealings in bonds and equities has prevented the establishment of a market in short-term commercial paper and encouraged the switching of secondary trading in deutsche-mark denominated paper to financial centers outside of Germany (Thomas (1986);

1/ A recurrent theme in recent presentations made by Bundesbank President Pöhl has been the increasing international use of the deutsche mark. For example, he recently noted that "After the U.S. dollar the deutsche mark has become by far the most important international currency" (Pöhl, 1989b, p. 1).

Table 4. Measures for Controlling Capital Inflows into Germany, 1970-89

Date	Measure
May 1971	At the beginning of the "dollar crisis," reintroduction of the authorization requirement for sale of domestic money market paper to non-residents and for the payment of interest on foreign deposits with domestic banks.
March 1972	Introduction of the cash deposit requirement for borrowings abroad. Exceptions are, in particular, credits in connection with the use of customary terms of payment and credits related to specific goods and services supplied. The cash deposit ratio is initially 40 percent with an exemption limit of DM 2 million.
June 1972	Introduction of the authorization requirement for non-residents' purchases of domestic bonds from residents.
July 1972	Raising of the cash deposit ratio to 50 percent and reduction of the cash deposit exemption limit to DM 500,000.
January 1973	Reduction of the cash deposit exemption limit to DM 50,000.
February 1973	Extension of the authorization requirement for the purchase of domestic securities by non-residents to equities. Introduction of the authorization requirement for residents' borrowing abroad.
June 1973	Introduction of the authorization requirement for the assignment of domestic claims to non-residents.
February 1974	Raising of the cash deposit exemption limit to DM 100,000 and reduction of the cash deposit ratio to 20 percent. Restriction of the authorization requirement for the sale of domestic securities to non-residents to bonds with (remaining) maturities of up to four years and removal of the authorization requirement for residents' borrowing abroad.
September 1974	Removal of the cash deposit requirement and the authorization requirement for the assignment of domestic claims to non-residents.
September 1975	Removal of the authorization requirement for the payment of interest on non-residents' deposits with domestic banks and further relaxation of the authorization requirement for the purchase of domestic bonds by non-residents.
March 1980	Allowance of the possibility of assigning official borrowers' notes to non-residents. Authorizations for the purchase of domestic bonds with (remaining) maturities of more than two years are normally granted.
November 1980	Authorizations for the purchase of domestic bonds with (remaining) maturities of more than one year are normally granted.
March 1981	The purchase of any domestic bonds and money market paper by non-residents is normally approved
August 1981	Removal of the existing authorization restrictions on the purchase of domestic bonds and money market paper by non-residents.
December 1984	Act governing the abolition of coupon tax on interest received by non-residents from domestic bonds, with retroactive effect from August 1984.
May 1985	With effect from May 1, resident foreign-owned banks were allowed to lead-manage issues of foreign DM bonds (subject to the restriction that similar privileges were granted to German-owned banks resident in the home country of the foreign bank in question).
May 1985	The Bundesbank permitted the introduction of zero coupon bonds, floating rate notes, and swap-related bonds in the capital market.
May 1986	Foreign banks were admitted to an enlarged Federal Bond Consortium. 1/ Required reserves of most foreign currency liabilities to non-residents were abolished.
July 1989	The Bundesbank allowed an across-the-board reduction of the minimum maturities to two years for public offerings and public placements.

Sources: Deutsche Bundesbank, Monthly Report, various issues.

1/ A consortium of banks which, together with the government, helps supervise new issues of bonds.

Lipschitz et al. (1989); Graebner (1989); Pöhl (1989b)). 1/ The turnover tax, in addition, discriminates in favor of public sector bonds, which are exempt from the tax, and has contributed to a narrow, public-sector dominated, bond market. Thus, the discriminatory nature of the tax, together with complicated authorization procedures for issuing private bond issues, has resulted in a situation in which domestic issues of bonds by private industry are almost nonexistent, accounting for less than one percent of the outstanding volume of total German bonds in circulation as of 1988 (Graedner (1989)). Also, the equity market is thin and trading is narrow; issuing shares is said to be relatively expensive as there is apparently a lack of competition in underwriting activity, and private pension plans are less active in the stock market than in some other countries reflecting in part the comprehensive nature of the social security system. Finally, Germany has lagged behind other financial countries with regard to futures trading; such trading has not been allowed with the result that futures activity involving German firms has been directed to London and Paris as both these centers offer deutsche-mark futures contracts (Storch (1989, p. 9)).

Measures have been taken to enhance Germany's competitiveness in these areas. For example, it was announced in late 1989 that the turnover tax would be revoked in 1991. Similarly, futures trading in Frankfurt was allowed beginning in early 1990. Nevertheless, the fact that Germany has lagged other financial centers in several important areas has restricted Germany's relative efficiency in the process of international liquidity transformation.

c. International banking

During the 1970s and 1980s, there occurred a sharp increase in the number of German banks operating in foreign countries and in foreign banks operating in Germany. 2/ Initially, the internationalization of German banks involved the establishment of consortium banks (i.e, joint ventures with foreign banks). Consortium banking afforded the opportunity of going international with limited investment. However, conflicts among member banks over the consortium's policies

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1/ Another factor which for a time inhibited competitiveness was a withholding tax on interest income, including interest income earned by foreigners who could not take advantage of exemptions under tax treaties. The withholding tax--which was announced in late 1987--took effect from January 1989; however, it was abolished as of July 1989.

2/ In the 1960s most representative offices of German banks were located in developing countries. Neumann (1986, p. 75) observes that "the main function of those offices was to collect special information, to assist the banks' German customers in their business, and to build goodwill."

led to increased internationalization via foreign branches and subsidiaries.

Several developments contributed to the internationalization of the German banking industry (see Neumann (1986, pp. 75-81)). First, the expansion of the German export sector resulted in a situation where "the larger export companies and their foreign affiliates had a demand for a service and financial assistance which in principle could be more cheaply provided by their German bankers, on the consideration that the latter had an information cost advantage over foreign banks" (Neumann, 1986, p. 76). Second, the emergence of the eurodollar market posed a competitive threat to the German banks and contributed to their expansion into foreign financial centers. Similarly, the lifting of restrictions on foreign branches operating in Germany--including those prohibitions relating to interest payments on foreign deposits and the sale of domestic money market paper to nonresidents--was conducive to the increased presence of foreign banks in Germany.

Recent trends in the internationalization of German banking are reported in Table 5. As shown, the number of foreign subsidiaries and branches of German banks rose from only 8 in 1970 to 186 as of 1989. Correspondingly, the number of branches of foreign banks operating in Germany rose from 25 in 1970 to 58 in 1988. 1/

3. Trade patterns

Data pertaining to trade patterns during the 1980s for major countries are reported in Tables 6, 7 and 8. Table 6 provides data on export market shares for five countries--France, Germany, Japan, the United Kingdom, and the United States--defined as exports relative to area imports. 2/ As Table 6 shows, between 1980 and 1988 world export market shares rose substantially for Japan (2.8 percentage points) and Germany (1.7 percentage points), slightly for the United States (0.7 percentage point), remained the same for France, and declined (0.5 percentage point) for the United Kingdom. The data also show that in recent years Germany has become the world's largest supplier of exports to the world surpassing the United States beginning in 1986. Since a country's share in world exports has been found to be an important determinant of invoicing behavior, the potential of the deutsche mark and the Japanese yen as invoicing vehicles appears to have been enhanced during the 1980s.

1/ However, there was virtually no change in the number of foreign banks between 1980-88.

2/ This definition is used in the IMF's International Financial Statistics.

Table 5. Internationalization of German Banking 1/

	1970	1975	1980	1985	1988
Foreign subsidiaries and branches of German banks					
Subsidiaries	3	34	52	67	78
Branches	5	34	74	99	108
Total	8	68	126	166	186
Branches of foreign banks in Germany	25	49	56	63	58

Sources: Neumann (1986); Deutsche Bundesbank, Monthly Report, various issues.

1/ End-of-year data.

Table 6. Market Shares 1/

(Exports as a percent of area imports)

	1980	1981	1982	1983	1984	1985	1986	1987	1988
France									
World	6.0	5.5	5.4	5.5	5.3	5.4	6.0	6.1	6.0
Industrial Countries	5.5	5.1	5.0	5.1	4.9	5.1	5.8	6.1	6.1
Developing Countries	5.7	5.4	5.2	5.1	5.0	4.9	5.3	5.2	4.4
Germany									
World	9.9	9.2	9.8	9.8	9.3	9.7	11.7	12.2	11.6
Industrial Countries	10.5	9.7	10.6	10.5	10.0	10.5	12.7	13.3	13.2
Developing Countries	7.5	7.2	7.4	7.1	6.6	6.8	7.9	8.0	6.9
Japan									
World	6.7	7.9	7.7	8.5	9.2	9.4	10.2	9.6	9.5
Industrial Countries	4.3	5.4	5.4	6.2	7.2	7.5	8.5	7.9	7.8
Developing Countries	11.0	11.6	11.4	12.3	12.7	12.9	13.1	12.6	13.5
United Kingdom									
World	5.7	5.3	5.4	5.3	5.1	5.4	5.2	5.4	5.2
Industrial Countries	5.6	5.5	5.6	5.6	5.4	5.7	5.3	5.6	5.5
Developing Countries	5.6	4.9	4.9	4.5	4.2	4.3	4.5	4.8	4.1
United States									
World	11.3	12.2	11.8	11.6	11.8	11.3	10.5	10.4	11.5
Industrial Countries	9.2	10.0	9.6	9.8	10.0	9.5	9.0	8.8	9.8
Developing Countries	15.7	15.8	15.7	14.7	15.2	14.8	13.9	14.0	15.6

Source: IMF, International Financial Statistics, Supplement on Trade Statistics, 1988 and staff calculations.

1/ Computed from data expressed in U.S. dollars.

Table 7. Trade Shares by Major Country Groupings 1/

(Percent of total)

	1980	1981	1982	1983	1984	1985	1986	1987	1988
France									
Exports									
Industrial Countries	65.0	62.1	63.2	64.9	66.3	68.4	71.2	73.8	74.5
Developing Countries	35.0	37.9	36.8	35.1	33.7	31.6	28.8	26.2	25.5
Imports									
Industrial Countries	65.9	64.9	67.8	70.3	70.7	72.6	77.4	78.5	77.8
Developing Countries	34.1	35.1	32.2	29.7	28.3	27.4	22.6	21.5	22.2
Germany									
Exports									
Industrial Countries	74.4	71.7	73.0	74.3	76.4	77.7	79.9	81.0	81.3
Developing Countries	25.6	28.3	27.0	25.7	23.6	22.3	20.1	19.0	18.7
Imports									
Industrial Countries	71.3	72.2	72.9	74.8	74.3	75.1	77.9	78.7	78.6
Developing Countries	28.7	27.8	27.1	25.2	25.7	24.9	22.1	21.3	21.4
Japan									
Exports									
Industrial Countries	45.3	46.4	47.3	50.4	55.3	57.6	61.5	61.2	60.1
Developing Countries	54.7	44.6	42.7	49.6	44.7	44.7	42.4	38.5	38.8
Imports									
Industrial Countries	33.6	34.6	35.2	37.7	38.8	39.9	47.3	46.2	49.3
Developing Countries	66.4	65.4	64.8	62.3	61.2	60.1	52.7	53.8	51.7
United Kingdom									
Exports									
Industrial Countries	69.6	69.4	70.5	73.2	75.0	76.9	75.7	76.7	76.5
Developing Countries	30.4	30.6	29.5	26.8	25.0	23.1	24.3	23.3	23.5
Imports									
Industrial Countries	75.0	77.2	78.4	80.6	80.4	81.4	82.3	82.8	83.0
Developing Countries	25.0	22.8	21.6	19.4	19.6	18.6	17.7	17.2	27.0
United States									
Exports									
Industrial Countries	56.8	55.5	55.2	58.7	59.9	60.8	63.2	63.3	62.1
Developing Countries	43.2	44.5	44.8	41.3	40.1	39.2	36.8	36.7	37.9
Imports									
Industrial Countries	49.2	52.4	56.4	57.2	59.8	63.0	64.6	61.5	61.3
Developing Countries	50.8	47.6	43.6	42.8	40.2	37.0	35.4	38.5	38.7

Source: IMF International Financial Statistics, Supplement on Trade Statistics, 1988 and staff calculations.

1/ Trade with the IMF's industrial country and developing country groups expressed as a share of a country's total exports and imports. Developing-country grouping includes IMF "other countries" classification.

Table 8. Share by Product Category in Exports of Germany, Japan, and the United States

	1980	1981	1982	1983	1984	1985	1986	1987	1988
Food and live animals: beverages and tobacco									
Germany	5.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Japan	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
United States	15.0	16.0	16.0	16.0	16.0	14.0	14.0	15.0	14.0
Crude materials									
Germany	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Japan	2.0	1.0	2.0	1.0	1.0	1.0	1.0	1.0	1.0
United States	12.0	11.0	12.0	12.0	12.0	11.0	12.0	11.0	10.0
Mineral fuels									
Germany	3.0	3.0	3.0	3.0	3.0	3.0	2.0	2.0	2.0
Japan	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0	0.0
United States	4.0	5.0	6.0	6.0	5.0	6.0	7.0	5.0	5.0
Animal and vegetable oils									
Germany	0.0	1.0	1.0	0.0	1.0	1.0	1.0	0.0	0.0
Japan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
United States	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Chemicals and related products									
Germany	13.0	13.0	13.0	15.0	15.0	14.0	14.0	13.0	12.0
Japan	5.0	4.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
United States	10.0	10.0	10.0	11.0	11.0	11.0	12.0	11.0	10.0
Manufactured goods									
Germany	19.0	18.0	18.0	18.0	19.0	19.0	18.0	18.0	17.0
Japan	22.0	20.0	21.0	20.0	18.0	17.0	15.0	14.0	13.0
United States	10.0	9.0	8.0	7.0	7.0	7.0	7.0	7.0	8.0
Machinery and transport equipment									
Germany	45.0	44.0	45.0	44.0	43.0	43.0	45.0	47.0	48.0
Japan	60.0	62.0	61.0	63.0	66.0	66.0	69.0	70.0	71.0
United States	39.0	41.0	39.0	40.0	41.0	42.0	42.0	43.0	46.0
Miscellaneous manufactured articles									
Germany	12.0	11.0	10.0	11.0	11.0	11.0	11.0	11.0	12.0
Japan	10.0	10.0	9.0	9.0	9.0	9.0	9.0	8.0	8.0
United States	9.0	8.0	8.0	7.0	7.0	7.0	7.0	7.0	7.0

Source: Data Resources Inc.

Another factor influencing invoicing practices is the extent of trade with developing countries. In this regard, Table 6 also reports several factors that--in the absence of Germany's growing share of total world trade--would indicate a smaller use of the deutsche mark as an invoicing vehicle. First, Germany's developing-country market share declined between 1980 and 1988 from 7.5 percent to 6.9 percent. Second, over the same period Japan's developing-country market share rose from 11.0 percent to 13.5 percent. Finally, while the developing-country share of imports from the United States has been virtually unchanged, that country remains the world's largest exporter to developing countries with a 15.6 percent market share.

Table 7 reports direction of trade statistics for the same set of countries; trade with the IMF's industrial-country and developing-countries groups are expressed as a share of a country's total exports and imports. These data show that in all but one instance both exports to and imports from developing countries declined for the five industrial countries considered. 1/ Note that in 1988, Germany's export and import trade with developing countries, relative to the country's total trade, was the lowest of the five countries.

The final factor found to influence invoicing behavior is the share of a country's exports comprised of differentiated manufactured products. Table 8 presents data on exports by product group for Germany, Japan, and the United States, with SITC single-digit categories 0 through 8 reported as shares of total exports for these countries. 2/ Of the SITC categories presented in the table, the one that contains specialized manufactured goods with long production lags is SITC 7--machinery and transport equipment. Between 1980 and 1988, while the share of such products in relation to total German exports rose from 45 percent to 48 percent, Japan and the United States recorded larger increases. In 1988, almost half of German and U.S. exports were comprised of specialized manufactured products. In contrast, nearly three-fourths of Japan's total exports were made up of such products.

To summarize, several factors have been identified that together imply a growing role for the deutsche mark as an international currency. These factors are: (i) Germany's performance with respect to inflation, the credibility of German monetary policy, and the associated stability (in relative terms) of the deutsche mark's external value, all of which have increased the importance of the mark within Europe; (ii) the lifting of the remaining controls on German

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1/ The one exception was the share of developing country imports of the United Kingdom.

2/ SITC digit codes 0 and 1 have been combined into a single category--food and live animals, beverages and tobacco.

capital imports and the availability of a wider menu of financial instruments denominated in deutsche mark; and (iii) Germany's emergence as the world's largest supplier of merchandise exports. On the other hand, several of these attributes have also been characteristic of other countries. For example, Japan and Switzerland have experienced relatively low inflation rates and inflation variability while Japan has in recent years implemented wide-ranging financial-market deregulation. Further, the competitiveness of the German financial market remains restricted in several areas--most notably, there is no market for short-term commercial paper, the equity market is extremely narrow, and futures trading has lagged behind developments in other major financial centers. Finally, although the proportion of Germany's exports comprised of differentiated manufactured products has risen, corresponding increases were also registered by Japan and the United States.

IV. Recent Empirical Trends

The preceding discussion suggests that, in general, the determinants of international currency use imply an expanding international role for the deutsche mark. In order to determine how these various factors have combined to influence the internationalization of the deutsche mark, the following discussion presents data pertaining to the use of the mark as a unit of account, medium of exchange and store of value.

1. Currency invoicing patterns

The currency-invoicing patterns of German exports and imports during the 1980s are provided in Table 9. The data indicate that there has been little change in the currency denomination of German exports over 1980-87; specifically, the share of Germany's exports invoiced in deutsche mark has remained about 82 percent. There has occurred, however, a substantial rise (about 10 percentage points) in the share of German imports denominated in deutsche mark during 1980-88: this change has been mainly at the expense of U.S. dollar-denominated imports. Several points are worth making in this regard. First, the fact that a declining proportion of German imports has been from developing countries would--according to the inference drawn from the observed patterns of invoicing behavior--imply a corresponding decrease in imports denominated in deutsche mark. However, to the extent that developing-country exports (i.e., mainly primary products) are denominated in U.S. dollars, the decline that took place in U.S. dollar import-invoicing is at least partly explainable by this fact. Second, the redirection that has taken place with regard to German trade has involved a higher proportion of trade with European countries. In this context, about 70 percent of German imports were from EC countries in

Table 9. Currency Invoicing of German Foreign Trade 1/

(In percent)

	1980	1981	1982	1983	1984	1985	1986	1987	1988
					Exports				
Deutsche mark	82.5	82.2	83.2	82.6	79.4	79.5	81.5	81.5	n.a.
U.S. dollar	7.2	7.8	6.7	7.0	9.7	9.5	7.7	7.4	n.a.
Pound sterling	1.4	1.3	1.3	1.5	1.7	1.8	1.7	1.8	n.a.
French franc	2.8	2.8	2.8	2.8	2.8	2.7	2.7	2.5	n.a.
Swiss franc	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6	n.a.
Japanese yen	--	--	--	--	0.3	0.4	0.4	0.5	n.a.
Other	5.6	5.6	5.5	5.8	5.7	5.7	5.5	5.7	n.a.
					Imports				
Deutsche mark	43.0	43.0	44.6	46.1	47.0	47.8	51.7	52.7	52.6
U.S. dollar	32.3	32.3	31.3	28.8	29.2	28.1	23.1	22.0	21.6
Pound sterling	3.4	3.7	2.5	2.7	2.4	3.0	2.3	2.5	2.4
French franc	3.3	3.0	3.4	3.5	3.6	3.8	4.1	3.9	3.6
Swiss franc	1.6	1.6	1.6	1.5	1.5	1.5	1.7	1.8	1.7
Japanese yen	--	--	--	--	--	1.8	2.6	2.5	2.5
Other 2/	15.4	16.4	16.6	17.4	16.5	14.0	14.5	14.9	15.6

Source: Deutsche Bundesbank.

1/ Sum may not add to 100 due to rounding.
2/ Includes trade invoiced in ECUs, the share of which was less than 0.1 percent of total imports in each year.

1988, compared with 62 percent in 1980. 1/ Given that the EC countries have in recent years invoiced a growing proportion of their exports in terms of the deutsche mark, this also helps explain the increase that has taken place in the deutsche mark denomination of German imports 2/ and illustrates a regional process underlying the increased use of the mark. In particular, increased use of the deutsche mark as an international currency has been due in good measure to the importance of the mark as a key currency within Europe. In this regard, recent actions taken to open trade and financial connections between Western and Eastern Europe should contribute to wider use of the deutsche mark. For example, effective January 1, 1990 the Yugoslav dinar was pegged to the deutsche mark.

Data pertaining to world invoicing patterns are presented in Tables 10 and 11. The tables utilize data available in Page (1981) and Black (1989) relating the currency composition of exports and imports of each of the six largest industrial countries and of OPEC. However, Page and Black present data for 1980 and 1987, respectively, on the proportion of a country's exports and imports invoiced in a certain currency. Tables 10 and 11 adjust these proportions by incorporating a country's share of world trade. This adjustment is made in the case of Germany, for example, by noting that in 1987, 82 percent of German exports were denominated in deutsche mark while the share of world exports provided by Germany was 12.5 percent; multiplying these two numbers together indicates that 10.2 percent of world exports in 1987 were denominated in deutsche mark on account of Germany's contribution alone.

Performing similar calculations for the other countries and for OPEC yields the following results. In 1980, at least 34.5 percent of world exports were denominated in U.S. dollars on account of the invoicing practices of the six largest industrial countries and of OPEC. 3/ Correspondingly, at least 10.2 percent of world exports was denominated in deutsche mark reflecting the invoicing practices of the six largest industrial countries and of OPEC. In 1987, the respective numbers were: 24.8 percent of world exports were denominated in U.S. dollars on account of these countries and 12.4 percent of world exports were in deutsche mark on account of the invoicing behavior and trade

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1/ These data are from Data Resources Incorporated's World Trade Model. I am grateful to David Blond for making these data available to me.

2/ In 1980, 9 percent of French exports were denominated in deutsche mark; in 1987 the deutsche-mark share was 10 percent. For Italy, the share of deutsche-mark denominated exports rose from 14 percent in 1980 to 18 percent in 1987. These data are from Black (1989).

3/ Together, the six largest industrial countries and OPEC accounted for 60.5 percent of world exports in 1980 and 55.2 percent in 1987.

Table 10. Currency Denomination of World Exports Accounted For
By the Six Largest Industrial Countries and OPEC

(In Percent)

	1980						1987					
	U.S. dollar	Deutsche mark	Japanese yen	Pound sterling	French franc	Italian lira	U.S. dollar	Deutsche mark	Japanese yen	Pound sterling	French franc	Italian lira
United States	11.3	0.1	--	0.1	0.1	--	10.2 1/	0.2 1/	0.1 1/	0.1 1/	0.1 1/	0.1 1/
Germany	0.7	8.4	--	0.2	0.3	--	0.9	10.2	0.1	0.2	0.3	0.2
Japan	4.5	0.1	2.0	0.1	--	--	6.2	0.2	3.3	0.1	0.1	--
United Kingdom	1.0	0.2	--	4.4	0.1	--	0.9	0.2	--	4.3	0.1	--
France	0.8	0.6	--	0.2	3.5	--	0.7	0.6	--	0.2	3.9	0.3
Italy	1.2	0.6	--	0.3	1.5	--	1.0	0.9	--	--	0.4	1.9
OPEC	15.0	0.2	--	0.2	0.2	0.2	4.9 1/	0.1 1/	--	0.1 1/	0.1 1/	0.1 1/
Total	34.5	10.2	2.0	5.1	4.8	1.7	24.8	12.4	3.5	5.0	5.4	2.6

Source: Page (1981); Black (1989); IMF, Direction of Trade Statistics, Yearbook 1989; Ministries of Finance of Germany, France, Italy, and Japan.

1/ Based on estimates of currency denomination made by Black (1989).

Table 11. Currency Denomination of World Imports Accounted For By the Six Largest Industrial Countries and OPEC

(In percent)

	1980						1987					
	U.S. dollar	Deutsche mark	Japanese yen	Pound sterling	French franc	Italian lira	U.S. dollar	Deutsche mark	Japanese yen	Pound sterling	French franc	Italian lira
United States	11.2	0.5	--	0.2	0.1	0.1	13.8 1/	1.4 1/	0.3 1/	0.5 1/	0.3 1/	0.3 1/
Germany	3.2	4.2	0.2	0.3	0.3	--	2.1	5.0	0.2	0.3	0.4	0.2
Japan	6.8	0.1	0.2	0.1	--	--	5.3 1/	0.1 1/	0.7 1/	0.1 1/	0.1 1/	-- 1/
United Kingdom	1.7	0.5	--	2.2	0.3	--	1.3 1/	1.0 1/	0.1 1/	2.4 1/	0.5 1/	0.1 1/
France	2.3	0.9	0.1	0.3	2.4	0.2	1.2	1.1	0.1	0.2	3.1	0.3
Italy	2.3	0.7	--	0.3	0.5	0.8 1/	1.5	1.0	--	0.3	0.5	1.4
OPEC	3.4	0.7	--	0.5	0.5	--	1.5 1/	0.8 1/	0.4 1/	0.3 1/	0.3 1/	-- 1/
Total	30.9	7.7	0.5	3.9	4.1	1.0	26.7	10.4	1.8	4.5	5.2	2.3

Source: Page (1981); Black (1989); IMF, Direction of Trade Statistics, Yearbook 1989; Ministries of Finance of Germany, France, Italy, and Japan.

1/ Based on estimates of currency denomination made by Black (1989).

involving these countries. In the absence of other relevant invoicing data and assuming that the export-invoicing behavior of the rest of the world remained unchanged between 1980 and 1987, these numbers suggest that the share of world exports denominated in U.S. dollars fell by 9.7 percentage points over this period while the shares denominated in deutsche mark and in yen rose by 2.2 percentage points and 1.5 percentage points, respectively.

Similar results apply with respect to imports, as reported in Table 11. Assuming the import-invoicing behavior of the rest of the world was unchanged, the share of world imports denominated in U.S. dollars fell by 4.2 percentage points (from 30.9 percent to 26.7 percent) between 1980 and 1987, while the shares denominated in deutsche mark and Japanese yen rose by 2.7 percentage points and 1.3 percentage points, respectively. There were also substantial increases in the shares of imports denominated in Italian lira and French franc. Thus, on the basis of the invoicing practices of the six largest industrial countries and OPEC and their respective shares in world trade, between 1980 and 1987 there seems to have occurred a decline in the share of world trade denominated in U.S. dollars and increases in the shares denominated in deutsche mark and Japanese yen.

2. The deutsche mark as a medium-of-exchange vehicle

Developments regarding the volume of currencies traded on foreign exchange markets are suggestive of the relative importance of currencies as unit-of-account and medium-of-exchange vehicles. 1/ Data on the currency turnover in the interbank markets is available from surveys conducted by central banks in New York, London and Tokyo in March 1986, April 1989, and at earlier dates in New York. These data are summarized in Table 12. The data indicate that the interbank markets continued to be dominated by transactions involving the U.S. dollar. The share of the deutsche mark has been rather stable--for example, at about 17 percent in New York 2/--while the share of the Japanese yen has increased.

Another measure of a currency's role as an international medium of exchange is its use in exchange market intervention by central banks. In this connection, Table 13 provides data on the use of the deutsche mark as an intervention vehicle within the EMS from 1979 through 1988; both obligatory and intramarginal interventions are

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1/ Since foreign exchange turnover also reflects speculation, such turnover is also indicative of the asset demand for currencies.

2/ Since the total value of the turnover for all other currencies (except cross currency) necessarily equals that of the U.S. dollar, the relative importance of the individual currencies other than the U.S. dollar is one-half of the shares shown in the table.

Table 12. The Currency Composition of Turnover in Major Foreign Exchange Markets

(In percent)

	New York				London		Tokyo	
	March 1980	April 1983	March 1986	April 1989	March 1986	April 1989	March 1986	April 1989
Deutsche mark 1/	31.8	32.5	34.2	32.9	28.0	22.0	10.4	9.7
Japanese yen 1/	10.2	22.0	23.0	25.2	14.0	25.0	77.0	72.1
Pound sterling 1/	22.7	16.6	18.6	14.6	30.0	27.0	3.0	4.3
Swiss franc 1/	10.1	12.2	9.7	11.8	9.0	10.0	5.6	4.4
Canadian dollar 1/	12.2	7.5	5.2	4.0	2.0	2.0	--	--
French franc 1/	6.9	4.4	3.6	3.2	4.0	4.0	0.3	0.2
Cross-currency	n.a.	0.2	n.a.	n.a.	3.0	9.0	--	6.1
Of which: Sterling/DM					(1.0)	(1.0)		
Other 1/	6.1	4.6	5.8	8.3	10.0	11.0	3.3	3.2

Source: Federal Reserve Bank of New York, Bank of England, and Bank of Japan.

1/ Against the U.S. dollar.

Table 13. Intervention in Deutsche Mark in the EMS

(In billions of deutsche mark)

		Obligatory	Intramarginal	Total
1979 1/	Purchases	--	2.7	2.7
	Sales	3.6	8.1	11.7
1980	Purchases	5.9	5.9	11.8
	Sales	--	1.0	1.0
1981	Purchases	2.3	8.1	10.4
	Sales	17.3	12.8	30.1
1982	Purchases	--	9.4	9.4
	Sales	3.0	12.8	15.8
1983	Purchases	16.7	19.1	35.8
	Sales	8.3	12.9	21.2
1984	Purchases	--	30.2	30.2
	Sales	4.7	7.6	12.3
1985	Purchases	--	29.6	29.6
	Sales	0.4	30.8	31.1
1986	Purchases	19.0	33.6	52.6
	Sales	4.1	76.0	80.1
1987	Purchases	--	48.1	48.1
	Sales	15.0	62.7	77.7
1988	Purchases	--	28.2	28.2
	Sales	--	16.8	16.8

Source: Deutsche Bundesbank, Annual Report, various issues.

1/ From March 1979.

reported. The data show that a substantial increase in the level of deutsche mark intervention has occurred.

While these data show an increase in the absolute amount of deutsche mark intervention in the EMS, they do not provide information on the share of deutsche mark intervention. Table 14 reports data on the currency distribution of foreign exchange intervention in the EMS. The data are in part from Mastropasqua et al. (1988), who report the currency distributions of EMS intervention in three categories: U.S. dollars, EMS currencies, and other currencies; however, intervention in deutsche mark is not broken out separately. Mastropasqua et al. present intervention data for three periods: March 1979 through 1982, 1983 through 1985, and 1986 through the first half of 1987. Their data show that the share of U.S. dollar intervention declined from 71.5 percent in the first period to 26.3 percent in the third period. 1/

In order to obtain a measure of the role of deutsche mark intervention within the EMS, the following procedure was adopted. Data pertaining to the periods used by Mastropasqua et al. were obtained from various issues of the Bundesbank's Monthly Reports (see Table 13). These data are available only in terms of deutsche mark denomination while Mastropasqua et al. report figures in terms of U.S. dollars. Consequently, the Bundesbank's figures were converted into U.S. dollars by using the average DM/$ exchange rate for each subperiod. 2/ On this basis the share of intervention in deutsche mark was estimated. As appears from in Table 14, the decline in the share of U.S. dollar intervention in the EMS was largely the counterpart of a substantial increase--from 23.7 percent in 1979-82 to 59 percent in 1986-87--in the share of deutsche mark intervention. Again, the data underscore the intra-European nature of the process contributing to the increased use of the deutsche mark.

Finally, Table 14 also reports the currency distribution of intervention by the U.S. Federal Reserve and the U.S. Treasury over three periods: 1979-82, 1983-85, 1986-88. All intervention by the U.S. authorities has been in terms of either the deutsche mark or the Japanese yen. Although the data show a decline in the deutsche mark's

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1/ Some of this decline could be due to valuation effects resulting from exchange rate changes. Nevertheless, these data are indicative of longer-term trends. This also applies with respect to data on the investment uses of currencies presented below.

2/ For example, the Bundesbank reports deutsche mark interventions amounting to DM 24.6 billion in the first half of 1987. This was converted into U.S. dollars by using the average exchange rate for this period.

Table 14. Currency Distribution of Foreign Exchange Intervention in the EMS and by the U.S. Federal Reserve and Treasury 1/

(In percent)

	EMS		
	1979-82 2/	1983-85	1986-87 3/
U.S. dollars	71.5	53.7	26.3
EMS currencies	27.2	43.5	71.7
Of which:			
Deutsche mark	(23.7)	(39.4)	(59.0)
Others 4/	1.3	2.8	2.0
	United States		
	1979-82	1983-85	1986-88
Deutsche mark	89.7	67.9	57.5
Japanese yen	12.3	22.1	42.5

Sources: Mastropasqua et al (1988), Deutsche Bundesbank, Annual Report, various issues, and Federal Reserve Bank of New York, Quarterly Bullentin, various issues.

1/ Total intervention includes both purchases and sales.
2/ From March 1979.
3/ Up to June 1987.
4/ From 1985 onwards, the figures include intervention in private ECUs.

share, the mark nevertheless accounted for more than half of this intervention during 1986-88.

3. The deutsche mark as an investment currency

For purposes of exposition, foreign deutsche mark claims can be classified into three broad categories: 1/ (i) claims held in Germany by nonresidents. These claims can be on German banks, enterprises, or the public sector, and can be short- or long-term; (ii) claims held outside Germany by nonresidents in the form of euro-deutsche mark (short-term) deposits. The borrowers of such funds are typically foreign offices or subsidiaries of German banks; and (iii) claims held outside Germany by nonresidents in the form of euro-deutsche mark (long-term) bonds.

Data pertaining to each of these categories (denominated in deutsche mark) over the period 1980 through the first half of 1989 are presented in Table 15. As reported in the table, deutsche mark claims in Germany held by nonresidents more than doubled between 1980 and 1986, rising by DM 302 billion. 2/ Approximately half of the increase (i.e., DM 149 billion) took place in 1985 and 1986. This large increase has been attributed in part to the measures taken to deregulate the financial system at the end of 1984 and in 1985 (Reinhold and Oldenbourg (1986), Bundesbank (1987), and Thomas (1987)). In particular, the abolition of the coupon tax on interest income received by nonresidents from domestic bonds and the introduction of more flexible financial instruments in the capital market increased the attractiveness of investing in the German financial system to foreigners. In this context, net foreign purchases of domestic bonds by nonresidents rose from DM 13.8 billion in 1984 to DM 59.1 billion in 1986 (see memorandum item in Table 15).

External deutsche mark claims held by foreigners also rose between 1980 and 1986 but at a considerably slower rate (50 percent) than claims held in Germany (Table 15). In fact, whereas in 1980 total external claims (euromoney market claims and external deutsche mark bonds) amounted to about 1 1/2 times foreign claims held in Germany, by 1986 the amount of foreign claims held in Germany had surpassed external claims. This development is also explained in part by the

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1/ This categorization is used by the Bundesbank (1987). The Bundesbank defines deutsche mark claims held outside Germany narrowly and excludes claims outside Germany held by German residents. This definition differs from that used by the Bank for International Settlements (see below).

2/ Deutsche mark-denominated claims accounted for about 60 percent of total claims in Germany by nonresidents at the end of 1987 (Fröhlich 1988).

Table 15. Foreign Deutsche Mark Claims 1/
(In billions of deutsche mark)

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
Deutsche mark claims in										
Germany held by foreigners: total 2/	206	268	292	320	359	437	508	497	536	585
Of which:										
Percent long-term	(61.8)	(60.5)	(60.3)	(64.5)	(64.2)	(70.1)	(75.7)	(75.4)	(75.0)	(72.0)
Percent short-term	(38.2)	(39.5)	(39.7)	(35.3)	(35.8)	(29.9)	(24.3)	(24.6)	(25.0)	(28.0)
Held on:										
German banking system	(106)	(121)	(121)	(125)	(143)	(159)	(178)	(184)	(195)	(222)
Enterprises and individuals 3/	(69)	(86)	(86)	(96)	(107)	(149)	(164)	(127)	(149)	(165)
Public sector 4/	(31)	(61)	(85)	(99)	(109)	(128)	(166)	(186)	(192)	(198)
External deutsche mark claims held by foreigners 5/										
Euro-money markets	266	288	303	337	376	398	383	460	516	599
as percent of all euro-dollar, euro-yen, and euro-deutsche mark deposits 6/	(N.A.)	(N.A.)	(12.3)	(11.8)	(10.8)	(12.5)	(12.3)	(14.6)	(13.7)	(14.2)
External deutsche mark bonds 7/	57	57	61	64	71	85	102	107	124	128
Memorandum item:										
Net purchases (+) or sales (-) of domestic bonds by foreigners	0.3	-1.5	2.3	10.8	13.8	31.5	59.1	35.0	2.1	0.7

Sources: Bundesbank Monthly Report, various issues and H.P. Fröhlich, "Weltwährung Deutsche Mark" (1988).

1/ End of year data except for 1980, 1981, and 1989 which are mid-year
2/ Excluding direct investment, other equity holdings, and real estate transactions. Does not include foreign claims in instruments denominated in other currencies.
3/ Includes bond issues of the Federal Railways and Federal Post Office.
4/ Includes deutsche mark notes held by foreigners (estimated).
5/ Banks in the European reporting area, and in Canada and Japan.
6/ Dollar liabilities in the European reporting area (here including Germany), Japan and Canada, as well as of International Banking Facilities and certain offshore branches of US banks to depositors outside the United States, yen liabilities of banks in the European reporting area to depositors outside Japan and deutsche mark liabilities of banks outside Germany to non-German depositors.
7/ Computed on the basis of data on the total outstanding (face value) and estimated domestic holdings.

liberalization measures introduced in 1984 and 1985 which made foreign investment in Germany more attractive. As a result, there was a substitution of foreign lending toward deutsche mark investments in Germany; thus between 1984 and 1986 total external claims rose by only 8 1/2 percent whereas foreign claims in Germany increased by 41 1/2 percent.

The announcement of the withholding tax in the fourth quarter of 1987 contributed to a substitution of foreign deutsche mark lending toward external investments and away from claims in Germany. As noted by Lipschitz et al. (1989, p. 48), it appeared that the major part of the proposed withholding tax was reflected in the relative yields of foreign and domestic deutsche mark bonds. Specifically, the withholding tax decreased the demand for domestic instruments, thereby lowering the price of such instruments and raising their yields. 1/ Whereas the average yield on German public authority bonds was over 50 basis points lower than the average on issues by foreign public bodies in the first nine months of 1987, following the announcement of the withholding tax this differential almost entirely disappeared and by August 1988 foreign issues were trading about 1/4 of 1 percentage point lower than German issues (Lipschitz et al., 1989, pp. 48-49). Consequently, in 1987 external deutsche mark claims held by nonresidents rose sharply (by 17 percent) while foreign claims held in Germany declined. 2/ Similarly, net purchases of domestic bonds by foreigners fell to DM 35.0 billion in 1987 from DM 59.1 billion in 1986.

In turn, the announcement of the abolition of the withholding tax in April 1989 contributed to a sharp increase in foreign deutsche mark claims held in Germany during the first half of 1989. 3/ During the same period, there occurred a further substantial rise in external deutsche mark claims held by foreigners. Taking the entire period 1980 through the first half of 1989, the attractiveness of deutsche mark claims to nonresidents is evident, as such nonresident claims held in Germany increased by over 180 percent and those held externally rose by 125 percent.

1/ Lipschitz et al. note that the "withholding tax may also have pushed down yields on foreign deutsche mark bonds in light of the higher demand for such bonds as a result of the withholding tax" (1989, p. 49).

2/ Although the announcement of the withholding tax did not occur until the fourth quarter of 1987, the announcement had a marked impact on foreign claims held in Germany. Thus, such claims rose from DM 508 billion in December 1986 to DM 539 billion in June 1987; however they fell to DM 497 billion in December 1987.

3/ The increase amounted to over 15 percent compared with the corresponding period in 1988.

Table 15 also reports data on the shares of deutsche-mark claims in Germany held by nonresidents comprised of long-term and short-term claims. As the data show, claims by nonresidents have been predominantly long-term. Further, the share of long-term claims rose during the 1980s; whereas the share of long-term claims approximated 60 percent in the early 1980s, the share of such claims rose to over 70 percent in the late 1980s. This reflects in part Germany's comparative disadvantage with regard to short-term financial instruments which, in turn, restricts the efficiency of the Germany financial market in international liquidity transformation.

In order to assess the performance of the deutsche mark vis-à-vis other currencies in international capital markets, Table 16 presents data on the use of the deutsche mark and other currencies as a store of value and unit of account in such markets over the period 1981 through 1988. The data in the table classify the uses of currencies into three types of instruments: (i) external bank loans, which include foreign and international bank loans; (ii) external bond issues, which include foreign and international issues and special placements, and (iii) eurocurrency deposits. These data have been compiled by the Bank for International Settlements (BIS); they differ from the data presented in Table 15 in that the BIS data include resident holdings in the definitions of external bond issues and eurocurrency deposits.

With regard to external bank loans, the share of the deutsche mark has increased but nevertheless remained small, averaging 2.4 percent in 1985-88 compared with 1.7 percent in 1981-84. The share of the U.S. dollar declined sharply in the period 1985-88 compared with the period 1981-84, while the shares of the Japanese yen and the pound sterling rose substantially. Regarding external bond issues, the share of the deutsche mark rose about 2 1/2 percentage points in the period 1985-88 compared with 1981-84. 1/ Large increases were also recorded by the Japanese yen (4.7 percentage points), the pound sterling (2.9 percentage points), the ECU (2.4 percentage points) and the Australian dollar (2.8 percentage points). On the other hand, the shares of the U.S. dollar and the Swiss franc declined by 16.1 percentage points and 3.1 percentage points, respectively. Finally, the share of the deutsche mark in the denomination of eurocurrency deposits rose by 1.5 percentage points during the 1985-88 period compared with 1981-84. A large upward jump in the share of deutsche mark holdings occurred in 1987; in 1988 the share of deutsche mark holdings eased

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1/ The upward jump in deutsche mark bond issues that occurred in 1988 reflects the announcement of the withholding tax at the end of 1987.

Table 16. Relative Shares Based on External Capital Market Data

(In percent)

	1981-84 1/ average	1985	1986	1987	1988	1985-88 average
1. Currency denomination of external bank loans 2/						
U.S. dollar	83.3	62.5	67.0	65.1	70.7	66.3
Pound sterling	3.1	3.4	6.4	14.7	14.0	9.6
Japanese yen	5.9	18.5	16.1	10.8	5.4	12.7
ECU	1.3	7.1	2.2	2.4	2.7	3.6
Deutsche mark	1.7	2.1	3.0	2.4	2.2	2.4
Swiss franc	1.2	3.0	2.1	0.7	0.2	1.5
Other	3.5	3.4	3.2	3.9	4.8	3.9
Total	100.0	100.0	100.0	100.0	100.0	100.0
2. Currency denomination of external bond issues 3/						
U.S. dollar	63.2	54.0	53.9	38.8	41.7	47.1
Swiss franc	14.7	11.3	10.7	12.9	11.4	11.6
Deutsche mark	6.3	8.5	8.0	8.0	10.2	8.7
Pound sterling	3.4	4.0	4.6	7.8	8.6	6.3
Japanese yen	5.7	9.1	10.4	13.7	8.4	10.4
Canadian dollar	1.6	1.6	2.3	3.4	5.6	3.2
ECU	1.7	5.2	3.4	4.0	4.9	4.4
Australian dollar	--	1.6	1.5	4.9	3.3	2.8
French franc	--	1.1	1.7	1.3	1.3	1.3
Dutch guilder	1.8	1.3	1.3	1.1	1.3	1.2
Other	1.6	2.3	2.2	4.1	3.3	3.0
Total	100.0	100.0	100.0	100.0	100.0	100.0
3. Currency denomination of Eurocurrency deposits						
U.S. dollar	74.0	67.9	63.5	58.2	60.1	62.4
Deutsche mark	11.4	11.4	12.8	14.2	13.3	12.9
Swiss franc	5.8	6.4	7.2	7.7	5.4	6.7
Japanese yen	1.8	3.4	4.5	5.8	5.5	4.8
Pound sterling	1.4	2.0	2.1	2.8	3.4	2.6
French franc	0.9	1.2	1.2	1.4	1.3	1.3
ECU	0.5 4/	2.6	2.6	2.8	3.0	2.8
Other 5/	4.3	5.0	6.0	7.0	7.9	6.5
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: Financial Market Trends, OECD, No. 30, No. 42, International Banking and Financial Market Developments, BIS, various issues.

1/ The average of 1981-84 data are used since the 1980 data are not consistent with the 1981-84 data.

2/ Foreign and international bank loans, excluding loan renegotiations.

3/ Includes international issues, foreign issues, and special placements.

4/ Included in other category prior to 1983.

5/ Includes foreign currency position of banks in the United States for which no currency breakdown in available.

back to a trend level. 1/ The share of the Japanese yen rose by 3 percentage points and increases were also recorded for the other currencies reported in the table, except for the U.S. dollar, whose share declined sharply.

The importance of currencies as international units of account and stores of value can also be gauged from their use as official reserves. In this regard, Table 17 reports currency shares of official holdings of foreign exchange from 1980 through 1988. Comparing the average holdings in 1980-83 with the period 1985-88, the data show that the largest gains in shares were registered by the Japanese yen (2.9 percentage points) and the deutsche mark (2.3 percentage points). On the other hand, the shares of the U.S. dollar and Swiss franc fell by 5.4 percent and 1.0 percent, respectively.

V. Conclusions

This paper has investigated the theoretical factors underlying the international use of a currency, examined recent developments in those factors pertaining to the deutsche mark, and presented data on the extent of the internationalization of the deutsche mark that occurred during the 1980s. The main findings of the paper are as follows. Theoretical considerations indicate that several factors combine to propagate the internationalization of a currency: relatively low levels of inflation and of inflation variability, which are predominantly the result of credible government policies, and a relatively stable external value of a currency; open, deep, and broad financial markets; and a country's share of world exports, the share of its merchandise exports comprised of differentiated manufactured goods, and (to a lesser extent) its developing-country trade links. In general, recent developments in the various factors with respect to Germany were found to presage an expanding role for the deutsche mark as an international currency stemming in substantial measure from the mark's importance as the key currency within Europe.

The data corroborated this expectation. The available evidence indicates that there has been some increase in the proportion of world trade denominated in deutsche mark. Contributing to this outcome has been the emergence of Germany as the world's largest supplier of exports; this development, together with an increase in deutsche mark invoicing by European countries, has more than offset any lessening of

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1/ Tables 15 and 16 show that the announcement of the withholding tax contributed to upward spikes in external deutsche mark claims held in Euromoney markets and those held as bonds. The fact that the former claims experienced an upward spike sooner (i.e. in 1987) reflects the short-term (i.e., liquid) nature of such funds.

Table 17. Official Holdings of Foreign Exchange, 1980-88 1/

(In percent)

	1980-83 average	1980	1981	1982	1983	1984	1985	1986	1987	1988	1985-88 average
U.S. dollar	70.5	68.6	71.5	70.5	71.2	69.4	64.2	66.0	66.8	63.3	65.1
Pound sterling	2.5	2.9	2.1	2.4	2.6	3.0	3.1	2.8	2.7	3.1	2.9
Deutsche mark	12.9	14.9	12.8	12.3	11.6	12.3	14.9	14.9	14.7	16.2	15.2
French franc	1.3	1.7	1.3	1.2	1.0	1.0	1.3	1.2	1.2	1.7	1.4
Swiss franc	2.8	3.2	2.7	2.8	2.4	2.1	2.3	1.9	1.6	1.5	1.8
Netherlands guilder	1.1	1.3	1.1	1.1	0.8	0.8	1.0	1.1	1.2	1.1	1.1
Japanese yen	4.5	4.3	4.0	4.7	4.9	5.6	7.8	7.6	7.1	7.2	7.4
Unspecified currencies	4.5	3.1	4.4	5.0	5.5	5.8	5.4	4.4	4.7	6.0	5.1
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: IMF Annual Report, 1989.

1/ End-of-year data.

deutsche mark invoicing that may have resulted from the declining share of Germany's trade conducted with developing countries. Regarding the role of the deutsche mark as medium-of-exchange vehicle, usage of the deutsche mark in interbank trading has remained rather steady. The dollar continues to dominate the interbank market, but the deutsche mark and the Japanese yen are the currencies that are traded most against the dollar. In addition, a striking increase has occurred in the use of the deutsche mark as an intervention vehicle within the EMS. Indeed, the role of German monetary policy has effectively led to the use of the deutsche mark as an official currency peg within the EMS. Moreover, the deutsche mark together with the Japanese yen are the two currencies used as intervention vehicles by the United States. Finally, an increase in the role of the deutsche mark has taken place with regard to its use in international capital markets and in official foreign exchange holdings. Corresponding increases were registered by a number of other currencies--most notably the Japanese yen--at the expense of the U.S. dollar. In sum, the findings confirm the move to a multicurrency international monetary system and the deutsche mark's emergence as a key component of that system.

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