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THE EURO AND THE DOLLAR

by

Robert N. McCauley

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Abstract

How will the arrival of the euro affect the dollar? This paper uses portfolio theory to analyse the likelihood and impact of shifts between the dollar and the euro by private asset managers, official reserve managers and global liability managers. It examines the effects on both the level of the dollar and its volatility in three periods: the period before the euro's introduction; the interval until the European Central Bank consolidates its credibility; and the approach to the steady state. While the heavy weight of the Deutsche mark in international holdings of European assets today may suggest a risk intolerance that could lead to shifts into the dollar in the near future, that weight may evidence nothing more than the mark's transactions role. After its introduction, the euro may benefit from shifts by central banks into Treasury bills issued by European governments. In the approach to the steady state, the greater depth, breadth and liquidity of the euro financial markets will attract international investment. But these features should be expected to attract increased international borrowing as well, so there is little reason to expect the dollar to fall against the euro as a result of a net portfolio shifts. There is some reason to expect that in the long run the euro will impart greater volatility to the dollar's exchange rate against all US trading partners.

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Contents

Introduction

Monetary union in Europe holds the promise of profound change in international finance. A single currency, the euro, is to circulate where powerful markets once alternated between reinforcing and opposing – and sometimes overwhelming – repeated national efforts to achieve monetary convergence. The economies sharing the euro could face the world as the largest single currency area and the largest single trading bloc.

As the deadline for this long-standing event has approached, it has gained credibility (Table 1). In 1995, the consensus drew a narrow circle around Germany's neighbours; now the circle has widened. The quotidian poll in the bond market also shows that investors expect the euro to come. That is, bond buyers have increasingly signalled their belief that some European currencies will enjoy stability against the Deutsche mark (Graph 1).[1]

Table 1

Expected participation in monetary union at the outset and sovereign credit ratings

Country	Poll taken in*				Foreign-currency rating		
	January 1996	August 1996	January 1997	August 1997	Moody's	S&P	IBCA
Germany	100	100	100	100	Aaa	AAA	AAA
France	97	100	100	100	Aaa	AAA	AAA
Netherlands	76	100	100	100	Aaa	AAA	AAA
Belgium	79	95	100	100	Aa1	AA+	AA+
Austria	79	93	97	96	Aaa	AAA	AAA
Ireland	60	82	88	96	Aa1	AA	AA+
Finland	36	48	76	91	Aa1	AA	AAA
Spain	7	7	31	90	Aa2	AA	AA
Portugal	0	4	32	84	Aa3	AA-	AA-
Italy	2	3	19	67	Aa3	AA	AA-
Denmark	50	43	25	16	Aa1	AA+	AA+
Sweden	7	13	13	4	Aa3	AA+	AA-
United Kingdom	22	8	4	1	Aaa	AAA	AAA
Greece	0	0	0	1	Baa1	BBB-	BBB-

* The polls of over 200 financial and economic forecasters indicate the percentage of respondents predicting that countries will join monetary union at the outset. Respondents' assumptions regarding the likely starting date differed. Luxembourg, rated Aaa and AAA respectively, was not included in the poll.

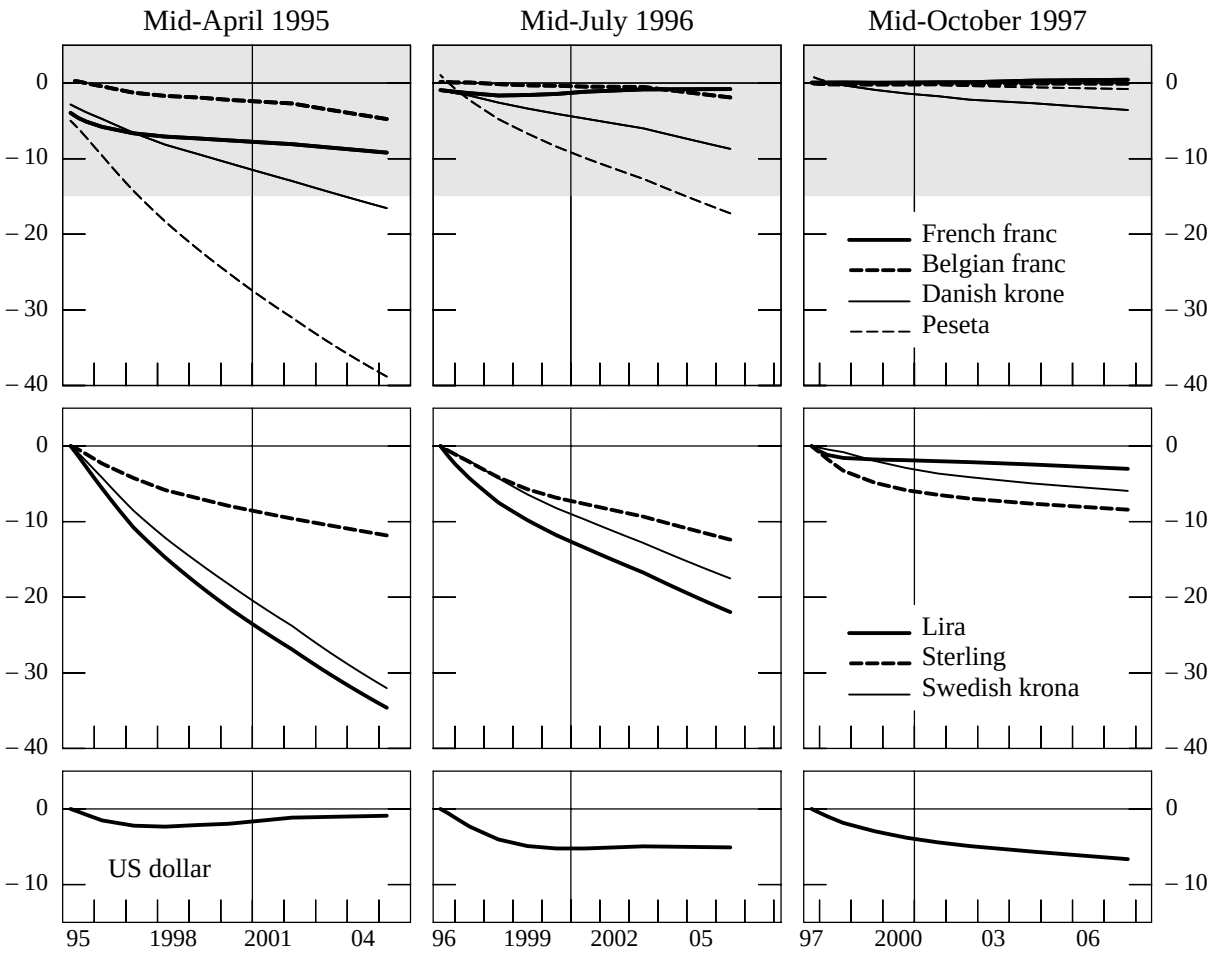
Sources: Consensus Economics, *Consensus Forecasts*, January and August 1996, and August 1997, p. 26, Moody's, Standard & Poor's and IBCA .

[1] This graph implements the Svensson (1991) test for the credibility of exchange rate bands. It uses private interest rates because, unlike government rates, they have similar default and country risk characteristics. See De Grauwe (1996a) and BIS (1996b,1997b). Lascelles (1996), p. 8, reminds us that market expectations can prove wrong.

Graph 1

Forward exchange rate changes against the mark

In percentages



Note: Forward exchange rates are derived from differentials on one-year eurodeposit interest rates and, for longer horizons, on interest rate swap (midpoint) yields in the respective currencies (for France, Belgium, Denmark and Spain, relative to their respective central rates). The lira re-entered the ERM on 25th November 1996.

Sources: Reuters and BIS calculations.

This study makes the assumption that the euro is coming and seeks to understand the implications of its arrival for the US dollar. In particular, the essay investigates the motives for, and implications of, shifts of funds by international portfolio managers in response to the euro's introduction. It suggests that private portfolio shifts are likely to prove of greater importance than the much-discussed changes in the composition of central banks' foreign exchange reserves. It maintains, moreover, that liability managers will play a generally overlooked role in determining the long-run relation of the dollar and the euro.

The burden of this essay is that the effects on the dollar of portfolio shifts in response to the arrival of the euro are easy to overstate and often overstated. Common arguments that ascribe the strength of the dollar against the mark through the summer of 1997 to the prospect of the introduction of the euro are one-sided. While it may be that the prospect of the euro has led to portfolio shifts that

have strengthened the dollar, it is certainly the case that a cyclically strong dollar has paved the way for the euro. In the early years of the euro, any previous shifts into the dollar in anticipation of the euro may reverse themselves as the European Central Bank (ECB) consolidates its credibility and as central banks find that they can invest in a deep Treasury bill market in euros. Finally, this essay argues against the widespread view that the euro will strengthen secularly against the dollar in the approach to the steady state owing to large, one-way portfolio shifts into the euro. In fact, given that international borrowers have denominated little of their debt in European currencies, shifts of these liabilities are at least as plausible as the much-discussed asset shifts. Such liability shifts would work against a trend appreciation of the euro against the dollar.

With respect to the volatility of the dollar's exchange rate, any sudden disturbance to the sanguine market outlook for monetary union carries the potential of sharp movements in the dollar/mark rate. In the steady state, the presumption that the ECB will place less weight on the exchange rate than its predecessors must be balanced against the prospect of more stable transatlantic interest rate differentials as a result of the broader domain of policy-making in Europe. In any case, monetary union can be expected to raise the volatility of the *effective* dollar owing to the uniformity of exchange rate change against a large European trading bloc; any increase in dollar/euro volatility over dollar/mark volatility would only accentuate this tendency.

Framework and toolkit

To advance the analysis of the dollar/euro exchange rate, this paper sets out a framework for thinking about the problem, unpacks a useful toolkit and suggests some forces bearing on the dollar. The direction of these forces affords some insight into tendencies of both the level of the dollar/euro rate and its volatility.

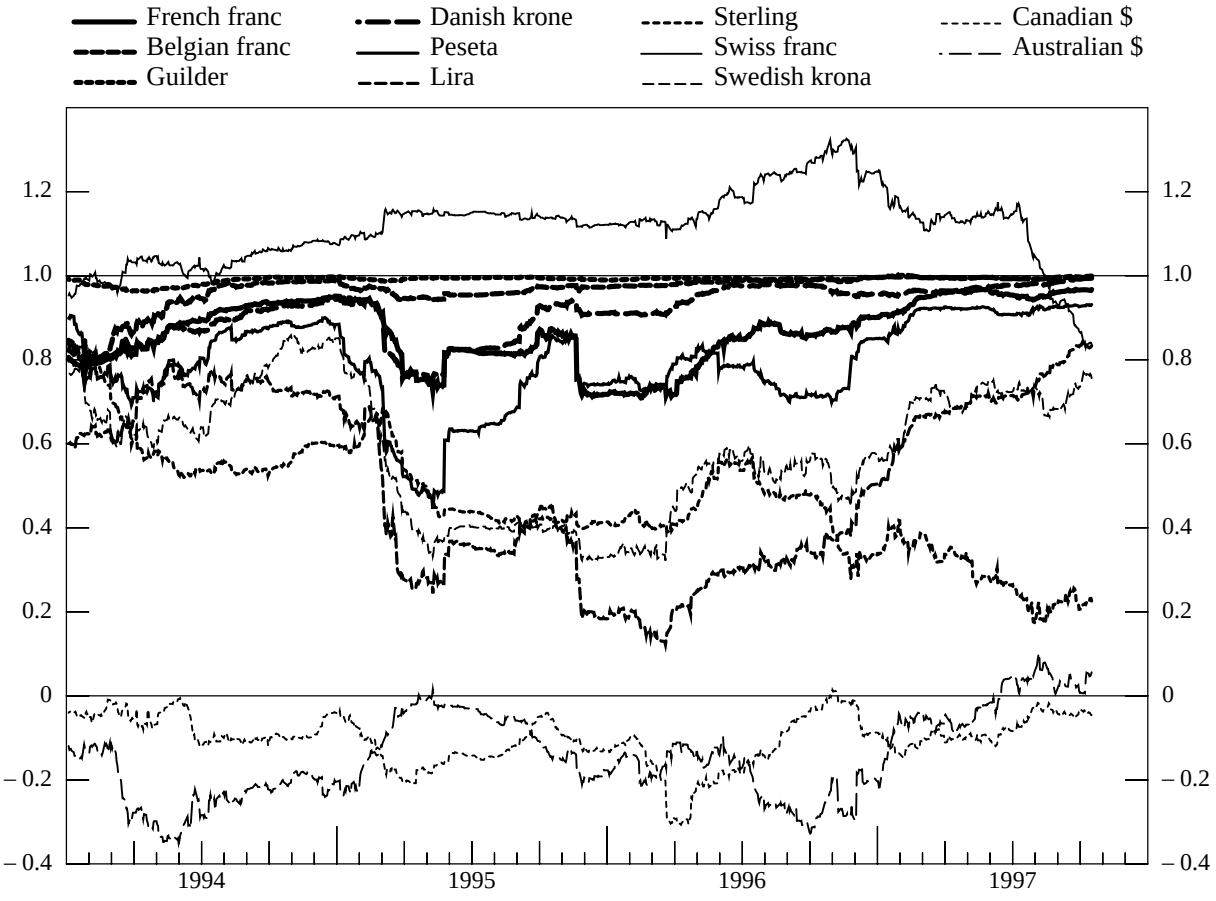
This study takes up the response of three classes of portfolio managers, official reserve asset managers, private asset managers and public and private liability managers, during (at least) three stages of monetary union – the period before the irrevocable fixing of conversion rates between existing European currencies and the euro, the period before the ECB has consolidated its credibility, and the steady state beyond union. Monetary union is itself a threefold joint event: it eliminates exchange risk, creates much broader financial markets and introduces a new central bank with credible antecedents but no independent reputation. Such a mixture, with three actors, three stages and three transformations leaves plenty of room for reasonable disagreement.

To help assess what the euro might mean for the dollar, we open a two-drawer toolkit. First, we approach the determination of the exchange rate as a price that balances the demand for and supply of financial assets denominated in different currencies (Branson and Henderson (1985)). These assets are taken to be imperfect substitutes, so that their supplies and demands affect the exchange rate. Still, the quantitative impact of substantial portfolio shifts can be fairly subtle (see Annex 1).

Another drawer in the toolkit is an empirical regularity, rather than a theory. The observation, first made in the late 1970s (Brown (1979)), is that when the Deutsche mark weakens against the dollar, most other European currencies also fall against the dollar, but strengthen a little against the mark. Conversely, when the dollar falls against the mark, it falls too against most other European currencies, but in lesser measure, so that they fall somewhat against the mark.[2] Graph 2 shows the estimated coefficients from a regression of the percentage change in the dollar exchange rates of 11 currencies on the percentage changes in the dollar/mark exchange rate, estimated in a sliding window of 125 working days. An observation near one means that a currency moves with the mark while an observation near zero means that it moves with the dollar. Typically, the currencies of Germany's neighbours – and more recently the escudo and the peseta – track the mark quite closely, while sterling, the Italian lira and the Swedish krona share half or more of the mark's movements.

Graph 2

Sensitivity to movements in the mark against the dollar



Note: Each point represents an estimated elasticity derived as the parameter, β, in the regression:
$\log X/\$_t - \log X/\$_{t-1} = \alpha + \beta(\log DM/\$_t - \log DM/\$_{t-1})$ over the current and previous 125 working days. By definition, the DM/$ sensitivity to itself is unity, and that of the dollar is zero.

[2] Subsequent observations and accounts include Frankel (1986), Giavazzi and Giovannini (1989), Group of Ten (1993), Galati (1997), and Galati and McCauley (1997). The Swiss franc, by contrast, tends to amplify the Deutsche mark's movements against the dollar, falling against the mark as the mark weakens against the dollar, and, conversely, appreciating against the mark as the mark rises against the dollar, as in 1995. See Ettlin (1996).

Baselines and caveats

Two caveats are in order at the outset. First, even as profound a development as monetary union will make itself felt against a background of cyclical and secular forces bearing on exchange rates. Any baseline outlook for the dollar's exchange rate against European currencies must reflect the relationship between the business cycle in Europe and in North America and associated interest rate movements. Thus, the recovery of the dollar in the two years after its trough in spring 1995 must be ascribed first and foremost to the contrast between the US "hare" and the European "tortoise". By the same token, an upswing in the European economy in 1999 accompanied by a sluggish US economy would make for European currency strength regardless of monetary union. Similarly, the long-standing US current account deficit and the consequent cumulative erosion of the US international asset position will continue to weigh on the dollar's value irrespective of monetary union. Therefore, the effects of monetary union discussed in this essay should be understood as deviations from a baseline set by such cyclical and secular factors. In addition, markets may spring surprises that might reinforce or counteract the effects set out here.

Secondly, this essay musters and relies upon evidence on the currency composition of asset stocks, including official reserves, private assets and international debts. These stocks will not remain unchanged in the years leading up to monetary union. In particular, the amount and composition of official reserves may change markedly if exchange rates move sharply. Inferences from such cash positions are risky, moreover, because off-balance-sheet positions can transform exposures (Garber (1996), pp. 9-11). Finally, the necessary division of the future into distinct periods may prove artificial. If market participants become convinced of a long-term outcome, prices in an intermediate stage will incorporate this conviction, as demonstrated by the narrowing of interest differentials in European bond markets. The force of this last caveat will remain limited, however, as long as market commentary on the euro continues to be diverse and even contradictory.

In the discussion that follows, the first organising principle is time. A separate section for each of the three periods assesses the effect of the behaviour of private investors and central banks (and global liability managers in the steady state) on the level of the dollar, and then takes up the question of the volatility of exchange rates in each phase.

1. The transition period

The basic question in the months remaining before the introduction of the euro is how portfolio managers will react to the change in currency management in Europe. The ECB will be able to claim a strong lineage but uncertainties necessarily accompany its approach. Will investors sell European assets and buy dollars?

1.1 Private asset managers

Market participants accept monetary union as increasingly likely but still ask questions. Which countries will participate? How will parities be determined? What will be the background and character of the ECB's policy-making body? What will be the ECB's objectives and instruments? What will be its foreign exchange policy? What will be the form of any exchange rate arrangement (ERM II) with currencies not participating at the outset? Portfolio shifts in response to these uncertainties can affect the *level* of the dollar.

For private investors *inside* the prospective currency area, the effects of such uncertainties could offset one another in the area as a whole. While residents of countries with the best inflation records may seek to move assets out of their home currencies, those of countries with less good records may feel reassured and move assets into their home currencies. To get a net outflow from the euro area would require a situation in which the uncertainties attached to the prospective new currency range well beyond questions about the future behaviour of the ECB relative to the recent behaviour of its constituent central banks.[3]

Private investors *outside* the euro area, however, might be led by these uncertainties to take defensive positions by shifting their assets into dollars or Swiss francs (at given interest rate differentials). This possibility gains plausibility from the defensive character of current foreign investment in European fixed income assets. Holders of bank deposits denominated in European currencies show a strong bias towards the "core" European currencies, regardless of the residence of the holders of the deposits (Table 2).[4] There appears to be almost as marked a preference in international holdings of securities (Table 3). Recall that French franc deposits have consistently yielded more than mark deposits for over a decade in which the franc has reverted to its central rate after every depreciation. International investment looks to be managed with an eye to preserving capital rather than achieving high returns. The portfolio bias towards the mark thus suggests an aversion to risk that could lead to net shifts out of core European currencies in the face of the above-mentioned uncertainties.[5] One case in point is that of Japanese life insurers (see the box).

Another way of looking at the distribution of international deposits in European currencies, however, is that they merely reflect the role of the Deutsche mark as an international currency. That is, rather than reflecting risk aversion, international holdings of marks, particularly

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3 Something along these lines drew the attention of an official Swiss commission charged with assessing the implication of the euro for the Swiss franc. It considered the possibility that portfolio outflows from the euro area might reach such a volume as to call for a policy of (temporarily) pegging the franc to the euro (Commission (1996)).

4 For the recent growth of cross-border deposits in Europe, see Monticelli and Papi (1996), Chapter 3.

5 The Bundesbank (1997) recently drew attention to the foreign holdings of marks in order to warn that the transition to the euro must be handled with care to ensure that the high degree of confidence in the mark is sustained and passed on to the euro. The Bundesbank measured foreign holdings at DM 1.4 trillion (about $800 billion) at end-1996, excluding trade credits and direct investment in Germany. The Bundesbank (p. 30) characterised the "outstanding international role of the Deutsche Mark [as] ... undoubtedly a considerable challenge to the planned single European currency – the euro."

Table 2
Foreign holdings of bank deposits
In billions of US dollars and percentages, at end-1996

Currency	Residence of holder			
	European countries		Rest of the world	Total
	Core	Other		
Deutsche mark	98.0	53.1	77.7	228.8
	64%	*57%*	*51%*	*57%*
French franc	18.2	15.0	30.0	63.2
	12%	*16%*	*20%*	*16%*
Dutch guilder	16.6	7.7	16.9	41.2
	11%	*8%*	*11%*	*10%*
Belgian/Luxembourg franc	12.3	8.9	16.4	37.6
	8%	*10%*	*11%*	*9%*
Austrian schilling	1.2	0.6	1.5	3.2
	1%	*1%*	*1%*	*1%*
ECU	7.4	7.5	9.9	24.8
	5%	*8%*	*6%*	*6%*
Subtotal: core EU currencies	153.7	92.8	152.4	398.8
	100%	*100%*	*100%*	*100%*
Italian lira	15.4	16.1	14.1	45.6
	10%	*17%*	*9%*	*11%*
Pound sterling	17.2	5.9	83.8	106.9
	11%	*6%*	*55%*	*27%*
Other currencies*	7.8	13.0	9.2	30.0
	5%	*14%*	*6%*	*8%*
Subtotal: other EU currencies	40.4	35.0	107.1	182.5
	26%	*38%*	*70%*	*46%*
Total: EU currencies	194.1	127.8	259.5	581.3
	126%	*138%*	*170%*	*146%*
US dollar	109.2	200.1	340.6	649.9
	71%	*216%*	*224%*	*163%*
Yen	12.1	19.5	26.4	58.0
	8%	*21%*	*17%*	*15%*
Swiss franc	16.8	13.3	32.8	62.9
	11%	*14%*	*22%*	*16%*
Grand total	332.1	360.7	659.3	1,352
	216%	*389%*	*433%*	*339%*

Note: Non-banks' holdings only; holdings abroad of a given currency by residents of the country of issue excluded (e.g. German residents' Deutsche mark holdings abroad excluded). Only the cross-border position in domestic currency is available for Austria, Denmark, Finland, Ireland, Spain and Sweden.

* Danish krone, Finnish markka, Irish pound, Spanish peseta and Swedish krona.

Source: BIS.

bank deposits, may result from nothing more than the close substitutability of the mark with other European currencies and the ease with which it can be transformed into any one of them. On the latter point, not only is dollar/mark trading far larger than the trading of any other European currency against the dollar, the mark is also the interbank vehicle for almost all trading among Continental currencies. When a bank exchanges a customer's French francs for Italian lire, it will typically transact a pair of exchanges in the interbank market: marks against lire and francs against marks. Of an estimated $150 billion of transactions among European Union (EU) currencies in April 1995 (shown

Box: Case study of Japanese life insurers

Another indication of a strong, albeit recent, bias in private portfolios toward Deutsche mark assets is the distribution of foreign assets of Japanese life insurance companies. We examine the distribution of bond holdings because Japanese insurers' bank deposits in Europe have been minimal (with the exception of Swiss franc deposits in 1995-97). This evidence is worth consulting because there are few reliable breakdowns of the bond holdings of any important class of internationally active institutional investor. These mostly mutual life insurance companies represent the largest single group of institutional investors in the world's largest creditor country, but no claim is made of their representativeness. The earliest detail on their portfolios shows them to have favoured higher interest rate investments in Europe, that is, these portfolios were strongly tilted away from the Deutsche mark: in September 1991 they had only 3% of their bond portfolio in German bonds and 24% in other European bonds (box table). Against a background of overall shrinkage of these institutions' foreign bond holdings, and the increasing weight within their foreign bond holdings placed on euro-yen bonds (McCauley and Yeaple (1994), pp. 19-33), these portfolios seem never to have recovered from the shock of the ERM crises of 1992-93. By September 1995, 7% of their foreign bond portfolio was invested in German bonds, and only 3% in French bonds and only 1% in ECU bonds.

Foreign fixed-income portfolio of Japanese life insurers

In percentages

Currency	1991		1992		1993		1994		1995		1997	
	Bonds	Bank claims	Bonds	Bank claims	Bonds	Bank claims	Bonds	Bank claims	Bonds	Bank claims	Bonds	Bank claims
European	27	16	23	8	30	2	19	1	13	30	11	28
Deutsche mark	3	1	6	1	11	1	6	0	7	0	5	0
French franc	9	0	7	0	12	1	9	0	3	0	1	0
ECU[1]	6	4	4	0	2	0	2	0	1	0	1	0
Spanish peseta	1	1	1	0	0	0	0	0	0	0	0	0
Sterling	5	10	3	7	4	1	1	0	1	0	3	0
Swiss franc	0	0	0	0	0	0	0	0	0	30	0	28
Other	3	0	2	0	1	0	0	0	1	0	1	0
Dollar bloc	63	83	69	91	61	97	52	98	43	70	58	71
US	32	71	35	83	38	94	39	97	37	69	54	71
Canadian	21	6	24	5	17	2	8	1	5	1	3	0
Australian	10	7	10	3	7	1	5	0	1	0	1	0
Other[2]	11	0	9	0	8	0	30	0	44	0	31	0
Total[3]	11.5	5.3	10.6	5.2	7.9	6.9	5.1	6.4	6.5	5.2	13.2	3.6
Memo item: Ratio of Deutsche mark bonds to total of Deutsche mark, French franc and ECU bonds												
	0.15		*0.30*		*0.44*		*0.30*		*0.63*		*0.76*	

Note: Data are for September except for 1997 (March) and may not add to 100 owing to rounding. Not shown are the distribution of 6.5 trillion yen in external loans, 97% of which are yen-denominated and the distribution of a 4.9 trillion yen residual, including investments in equities, mortgage-backed securities and foreign investment affiliates.

[1] European Currency Unit. [2] Mostly Euroyen bonds. [3] In trillions of yen.

Sources: Richard C. Koo, "Japan and International Capital Flows", Nomura Research Institute, April 1992, 1993, 1994, 1995 and 1996, and personal communication for 1997 data.

Table 3

International holdings of securities denominated in core European currencies

In billions of US dollars, at end-1996

Currency	Bank holdings				Non-resident holdings of government bonds	International securities[3] outstanding
	Total	European banks		Rest of the world		
		Core[1]	Other[2]			
Deutsche mark	233.0	144.7	59.2	29.1	308.5[4]	349.8
French franc	38.7	25.4	6.2	7.1	79.9	168.7
Dutch guilder	15.0	8.3	3.6	3.1		95.9
Belgian/Luxem-bourg franc	10.0	8.4	1.4	0.2		56.3
Austrian schilling	0	0	0	0		3.7
ECU	33.3	18.3	13.9	1.1		74.7
Total	330.0	205.1	84.3	40.6		749.1

[1] Banks located in Austria, Belgium, France, Germany, Luxembourg and the Netherlands. [2] Banks located in Denmark, Finland, Ireland, Italy, Spain, Sweden and the United Kingdom. [3] Includes international bonds and euro-medium-term notes. [4] End-June 1996.

Sources: National data and BIS.

with double-counting in Table 4 as $300 billion), the mark was on one side of the transaction in over $140 billion.

Under these conditions, a European corporate treasury trying to minimise its transactions costs while reducing its working capital would centralise its bank deposits in European currencies in mark accounts. On this reading of the evidence, the distribution of asset stocks across currencies in Table 2 reflects the manner in which market participants have already exploited the mark's vehicle property in order to economise on their holdings of bank deposits in different European currencies. An important implication is that, after monetary union, these international bank deposits might not decline as one might imagine.[6] That is, to the extent that mark deposits are already held to make payments at one remove either in Dutch guilders or in French francs, then the arrival of the euro may not much shrink the demand for the participating currencies. I return to this point in the next section.

What does the evidence show? To some analysts, the prospective movement of private investors out of the Deutsche mark is already a reality. A Swiss commission (Commission (1996), p. 2) examining Swiss policy options in the face of monetary union claimed:

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[6] Consider an implication of Baumol's (1952) argument that the transactions demand for money rises with the square root of spending: when a variety of currencies merge into one currency, transactions balances at banks will decline. See Honohan (1984) for the opposite case, when sterling bifurcated into the British and the Irish pounds.

Table 4

European monetary union and foreign exchange turnover

In billions of US dollars and percentages[1]

Currency	Turnover in April 1995						
	Actual					Under the hypothesis of monetary union (total less EMS)	
	Total[2]		versus:				
			dollar[2]	EMS[3] total	of which: mark[2]		
US dollar	1,313	84%	-	714	365	1,313	92%
EU currencies/euro	**1,099**	**70%**	**714**	***300***	**140**	***799***	***56%***
Deutsche mark	584		365	140	-	(443)	
French franc	127		72	*53*	50	*(74)*	
Dutch guilder	*27*		*18*	*9*	*7*	*(18)*	
ECU	35		25	*11*	10	*(25)*	
Belgian/Luxembourg franc	*29*		*20*	*9*	*8*	*(20)*	
Austrian schilling	*8*		*5*	*3*	*3*	*(5)*	
Irish pound	*3*		*2*	*1*	*0*	*(2)*	
Finnish markka	*5*		*3*	*2*	*2*	*(3)*	
Spanish peseta	*33*		*25*	*8*	*8*	*(25)*	
Portuguese escudo	*4*		*2*	*2*	*1*	*(2)*	
Italian lira	*49*		*39*	*10*	*9*	*(39)*	
Danish krone	*23*		*17*	*6*	*5*	*(17)*	
Swedish krona	*26*		*15*	*10*	*9*	*(15)*	
Pound sterling	140		103	*32*	29	*(108)*	
Greek drachma	*4*		*2*	*2*	*1*	*(2)*	
Japanese yen	371	24%	329		33	371	*26%*
Swiss franc	116		86		26	116	
Canadian dollar	50		49		1	50	
Australian dollar	40		39			40	
Emerging currencies	25		23			25	
Hong Kong dollar	15		14			15	
Singapore dollar	6		5			6	
South African rand	4		4			4	
Other reporting countries and unallocated	130		71		18	130	
Grand total	1,572	100%	1,313	1,099	584	*1,422*	100%

Note: Estimates shown in italics; contribution of EU currencies to euro turnover shown in brackets.

[1] Turnover, net of local inter-dealer double-counting. This table reports the turnover in which a given currency appears on one side of a transaction; consequently, each transaction is counted twice. To take this into account, the grand total is divided by two and set to 100%. Components may not add to totals owing to rounding. EU currencies (excluding the ECU) are ordered according to poll respondents' views on the probability of their joining monetary union at the outset (*Consensus Forecasts*, August 1997). Some transactions between EMS currencies that currently take place using the US dollar as a vehicle would disappear under the assumption of monetary union. Therefore, the currency shares shown in the last column overstate the importance of the euro, understate the importance of the yen and correctly represent the importance of the dollar. [2] Decompositions are available only for the mark, French franc, ECU and sterling; the decomposition of aggregated "other EMS currencies" in the central bank survey ($212 billion for the grand total, $148 billion against the dollar and $53 billion against the mark in Tables 1-D, 1-E and 1-F) is estimated using each currency's local currency trading as a proportion of such trading for all other EMS currencies (Table 1-G). [3] The French franc (sterling) EMS total is estimated as the franc (sterling) total less the sum of franc (sterling)/dollar trading, Tokyo trading of the franc (sterling) vis-à-vis the yen, Zurich trading of the franc (sterling) vis-à-vis the Swiss franc and Paris (London) trading of the franc (sterling) vis-à-vis the yen, Swiss franc, Canadian dollar and Australian dollar. The EMS total for every other EU currency is estimated as its total less its dollar trading (local trading of these currencies against the yen, Swiss franc and others is negligible).

Sources: Consensus Economics, *Consensus Forecasts*, August 1997, p.26, *Central Bank Survey of Foreign Exchange and Derivatives Market Activity 1995* and BIS calculations.

> The fear that the future single currency does not have the quality of the DM or other currencies belonging to the DM-group, induces investors to exchange these currencies, in particular the DM, into other strong international currencies, among others into the Swiss franc. As a result, there are strong tendencies for the Swiss franc to increase in value.

A variant is the observation that mark bonds, especially ones maturing in the next century, yield a high interest rate because of uncertainty regarding the euro. The claimed effect of such shifts is summarised in the provocative statement that "The euro ... is already ... a weak currency" (Persaud (1996), p. 3). That is, events that make the euro more or less likely are seen to weaken or strengthen the mark against the dollar.

All of these claims can be and have been disputed. Thus the Bundesbank (1997, p. 30), notes that "the available data on the currency structure of international assets (even when interpreted with caution) argue against the supposition of 'a flight out of the Deutsche Mark'". Indeed, Table 2 was originally assembled with end-1995 data, and they were not very different from the end-1996 data. Quite apart from any flight from the mark, non-German European investors may shift their marks into Swiss francs to balance the risk of their dollar holdings (Annex 2). As for the effect of the prospect of monetary union on German bond yields, an IMF study (Zettelmeyer (1996)) looked in vain at scores of monetary union events for evidence of systematic effects on German and other European bond yields.[7] Moreover, a variety of analysts marshalled evidence to suggest that the slope of the German yield curve was no steeper than one would expect, given the unprecedently low short-term rates and the historical relation between those rates and the yield curve slope (King (1996), p. 12). As for the relation between the dollar/mark exchange rate and measures of the likelihood of monetary union (Persaud (1996a)), recall the long-standing association of a strong dollar and strong European currencies against the mark. While conceding grounds for both readings, the relationship is perhaps better read left-to-right rather than right-to-left: While brighter prospects for broad monetary union may have tended to strengthen the dollar, a cyclically strong dollar has surely paved the way for monetary union.

1.2 Central banks

The question of how the prospect and introduction of the euro might affect central banks' management of their official reserves has attracted a great deal of market comment (see, in chronological order, O'Neill, Bevan and Brookes (1996), Keating (1996), Ruskin (1996), Owens (1996), Persaud and Dambassinas (1996), Brookes (1996), Parsons (1996), Golden (1996), Adler and Chang (1996), Lipsky et al. (1996), Bulchandani (1997), Deutsch (1997), Alzola (1997), and Hoffman and Schröder (1997)). It needs to be stressed at the outset that official reserves at the end of 1996,

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[7] But one's confidence in the null finding was undermined by the coding of the events around 20th September 1995 as "ambiguous", when the clearly dominant event was official German questioning of the policy fitness of certain aspiring countries for monetary union; see BIS (1996a), pp. 101, 103. Zettelmeyer measures that day's effect on bond yields as a decline in German rates of 6 basis points and a rise in Italian rates of 10 basis points.

Table 5

Composition of non-industrial country reserves

In billions of US dollars and percentages, at end-1996

Currency	Developing countries	*of which: Taiwan*	Eastern Europe	Total	*Memo item: global total*
US dollar	531.9	*50.6*	34.1	566.0	*1,041.5*
	71.5%	*57.5%*	*51.0%*	*69.8%*	*68.6%*
Japanese yen	60.8	*13.0*	0.0	60.8	*105.3*
	8.2%	*14.8%*	*0.0%*	*7.5%*	*6.9%*
Core EU currencies	101.0	*20.3*	31.2	132.2	*303.6*
of which:	*13.6%*	*23.1%*	*46.7%*	*16.3%*	*20.0%*
Deutsche mark	*87.1*	*20.3*	*30.5*	*117.6*	*246.1*
	11.7%	*23.1%*	*45.6%*	*14.5%*	*16.2%*
French franc	*10.1*	*0.0*	*0.7*	*10.8*	*23.2*
	1.4%	*0.0%*	*1.1%*	*1.3%*	*1.5%*
Dutch guilder	*3.8*	*0.0*	*0.0*	*3.8*	*5.1*
	0.5%	*0.0%*	*0.0%*	*0.5%*	*0.3%*
Pound sterling	36.4	*0.0*	0.9	37.3	*52.1*
	4.9%	*0.0%*	*1.3%*	*4.6%*	*3.4%*
Swiss franc	13.9	*4.0*	0.7	14.6	*15.4*
	1.9%	*4.6%*	*1.1%*	*1.8%*	*1.0%*
Total	744.0	*88.0*	67.0	810.9	*1,517.8*
	100.0%	*100.0%*	*100.0%*	*100.0%*	*100.0%*

Note: Developing countries include Hong Kong and Taiwan. Taiwan's disclosed dollar share as of April 1996 is applied to end-1996 holdings; disclosed shares of yen, marks and Swiss francs as of August 1995 are reduced proportionately to accommodate the (higher) dollar share of April 1996. Core EU currencies include holdings of private ECUs. Dollar reserves of developing countries are reduced by the current value of the Brady bond collateral held at the Federal Reserve Bank of New York and by advance payments for US military exports as reported in the *Treasury Bulletin*. The reserve composition of Eastern European countries is estimated. The global total includes industrial countries.

Sources: Hong Kong Monetary Authority, *Annual Report 1996*, Central Bank of China as reported in *Reuters*, 6th June 1996, US Treasury *Treasury Bulletin*, March 1997, Table IFS-2, IMF, and BIS estimates.

even after a year when they grew by a record amount – $200 billion at constant exchange rates to a stock of $1.5 trillion (BIS (1997b), p. 83) – represent only a fraction of the private portfolios that may react to the introduction of the euro.[8]

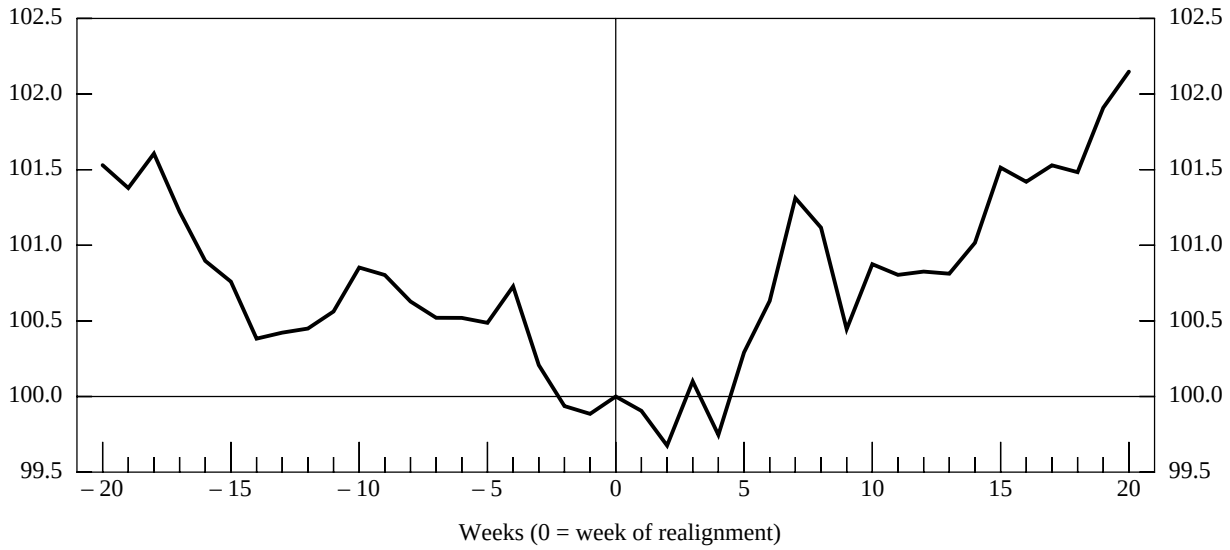
Some *central banks outside the Group of Ten* could adopt a defensive strategy in the run-up to monetary union. With $118 billion in Deutsche mark reserves out of core European reserves of

[8] For the contrast in the growth of official reserves and private international assets over a generation, see Icard (1996), p. 180.

Graph 3

Nominal effective dollar exchange rate and EMS realignments

Index, week of realignment = 100



Note: The graph shows the nominal effective dollar rate as calculated by the Federal Reserve as averages for the 20 weeks before and after the 18 EMS realignments, and normalised at 100 at the time of the realignments, which were on: 24.9.79, 30.11.79, 23.3.81, 5.10.81, 22.2.82, 14.6.82, 22.3.83, 22.7.85, 7.4.86, 4.8.86, 12.1.87, 8.1.90, 14.9.92 (the date of the flotation of the pound sterling and lira on 17.9.92 is not included), 23.11.92, 1.2.93, 14.5.93, 2.8.93 and 6.3.95.

$132 billion at end-1996, the central banks in non-industrial countries (Table 5) show a similar bias towards the Deutsche mark.[9] If this concentration of holdings reflects risk aversion, then central bank reserve managers might readily justify shifts into the dollar, the yen or the Swiss franc as a way of avoiding uncertainties.[10] In this respect, these official portfolio managers may resemble private investors.

A review of *European central banks*' reserve management (Annex 3) suggests that central banks probably will not supply a substantial net sum of marks to the foreign exchange market in preparation for the pooling of their reserves at the ECB. Some European central banks may wish to sustain their international reserve holdings by converting marks into dollars in the approach to the creation of the ECB, but others may be happy to lighten their reserve holdings by letting mark assets become euro assets. The prospect of pooling ECU 50 billion of reserves with the ECB, as required by the Maastricht Treaty, does not seem likely to force any rebalancing of reserves towards the dollar. Moreover, by June 1997, no European government seemed to regard the exchange rate of the dollar as a problem, and there appeared to be no policy interest in selling marks for dollars.[11]

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9 Note that, contrary to Garber (1996), p. 6, who claims that "All studies of the currency composition of foreign exchange [reserves] depend on the data contained in the IMF's *Annual Reports*", these data include reported or estimated reserve compositions of Taiwan, Hong Kong and Eastern Europe.

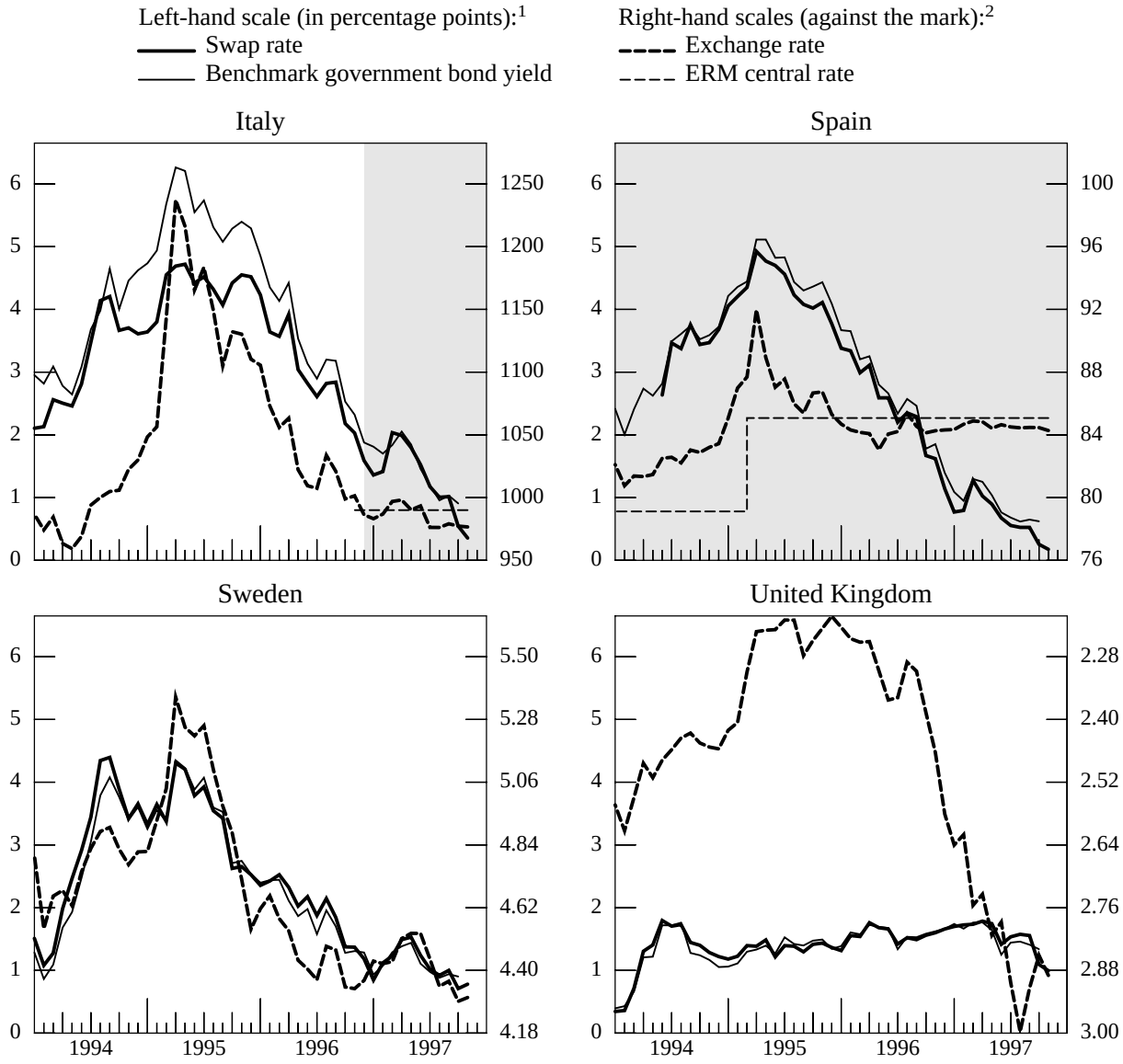
10 If most of the non-industrial country currencies trade predominantly against the dollar, then the transaction motive for the concentration of Deutsche mark holdings, as sketched above for private investors, would seem not to apply here.

11 There was considerable discussion in France about the proper exchange rate of the dollar in late 1996 and early 1997. Although the new Socialist Government in France had made a more competitive franc vis-à-vis the dollar one of its conditions for supporting monetary union (along with an "economic government for Europe", a "solidarity and growth

Graph 4

Ten-year yield differentials and European exchange rates

At end-month



Note: The shaded areas denote ERM membership.

[1] Domestic less German rate. [2] Scaled to show a 35% range of variation; for the United Kingdom, DM/£ (inverted scale). A decline indicates an appreciation of the domestic currency.

Sources: Reuters, Datastream and BIS.

A further consideration is that a weak US dollar has often accompanied strains in European exchange rates that resulted in realignments (Graph 3). But if, as considered above, the dollar benefits from defensive portfolio shifts in the run-up to monetary union, the odds rise for a prolonged virtuous circle of strong European cross rates against the Deutsche mark and convergent

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pact" and the inclusion of Spain and Italy in the first wave of participants in monetary union), the finance minister told a press conference that the "dollar has moved in such a way that the problem is not topical, at least for the moment". Quoted in "French govt has 'no problem' with dlr level - minister", *Reuters*, 16th June 1997 (16:39).

European interest rates (Graph 4). Aware of the possibility of this virtuous circle, and perhaps also anticipating a need to offset the cumulative effect of Maastricht-timed fiscal tightening in Europe, market participants expected little resistance among European policy-makers to a stronger dollar in this period. Even when the Bundesbank raised short-term interest rates in autumn of 1997, citing the dangers of import price inflation, market participants interpreted the move less as an attempt to reverse the prior dollar strength than as insurance against further large changes in the same direction.

1.3 Volatility

With respect to the *volatility* of the dollar/mark exchange rate during the transition period, should strains arise in the process of monetary union, these could not only weaken the dollar but also increase its volatility. The events of mid-September 1995, when doubts about which European countries would qualify for monetary union came to centre stage, serve as an example. While increased attention to policy performance tended to weaken European currencies against the mark, the dollar also plunged 6 pfennigs (4%) on 21st-22nd September (Graph 5). Moreover, option prices suggested that expectations of the dollar's value one month ahead became more diffuse and the odds of a sharp change – for example, of 5% or more – shifted from dollar strengthening to dollar weakening (Graph 6).[12] European events can move the dollar.[13]

If unguarded commentary two and a half years before the selection of participants in the monetary union can move intra-European exchange rates and dollar rates, what will be the consequences of an actual decision that a country will not participate in the union? Saccomanni (1996, p. 390) suggests:

> The currencies of non-participating countries may be subject to strong downward pressures, irrespective of the degree of divergence of their economies from the Treaty criteria, just because of the very decision of not having been included in the euro.[14]

The events of February-March 1997, when markets were treated to reports that a mooted deal would leave Italy out of the union initially but with the strong prospect of its joining in a year or two, suggest that non-participation itself might not make for an exchange rate shock. Rather, an overall delay not convincingly limited in time is generally judged to be the scenario that would push up the mark abruptly, not least against the dollar (King (1996) and Davies (1997); but see also Clarke and Parry (1997)).

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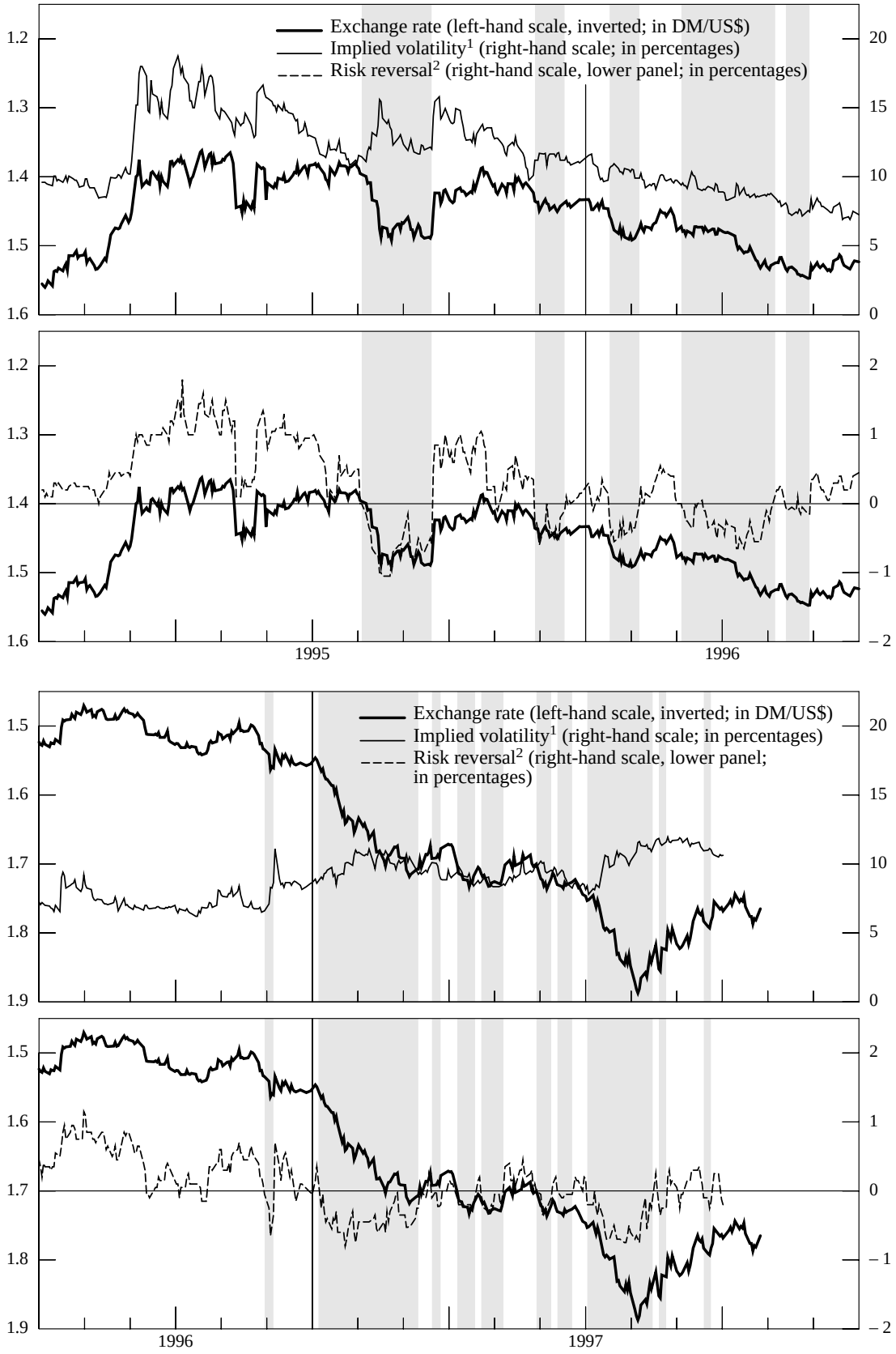
[12] See McCauley and Melick (1997).

[13] The generality of such European influences on the dollar has been questioned. Johnson (1994, p. 8) found no systematic relationship between fairly long periods of high and low volatility in the French franc/Deutsche mark exchange rate, on the one hand, and the volatility of the ECU/dollar exchange rate, on the other. Still, the "September 1992 episode of extreme instability in the ERM suggests that during shorter intervals, spillover to the dollar from ERM volatility may be present".

[14] See also Arrowsmith and Taylor (1996), pp. 20-1, and De Grauwe (1996b), p. 21.

Graph 5

The mark against the dollar

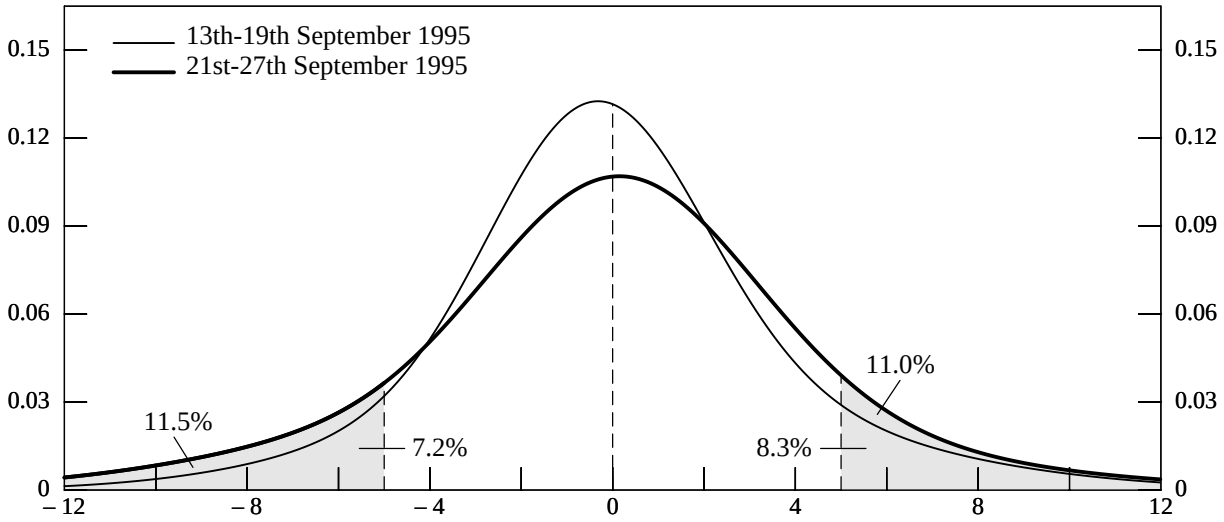


[1] One-month at the money. [2] One-month; a positive (negative) value indicates a bias towards DM (dollar) strength. The shaded areas represent periods in which risk reversals favour the dollar.

Sources: National Westminster Bank Plc and BIS.

Graph 6

Probability distribution of the mark against the dollar



Notes: Vertical lines drawn at the forward rates and 5% above and below. Average density over the period, percentage deviation from the forward rate; positive values indicate dollar appreciation.

Sources: National Westminster Bank Plc, BIS and BIS calculations.

1.4 Summary

The assessment of the risk of a shift by private portfolio managers in the lead-up to the introduction of the euro depends on one's interpretation of the bias towards the mark in their portfolios. If the heavy weight attached to mark holdings – also noticeable in reserve holdings of non-industrial countries – signals risk avoidance, then the coming months with their many uncertainties may see these funds shifted into the Swiss franc, the dollar or the yen. If the heavy weight, particularly in short-term portfolios, reflects instead the transactions-cost advantage of holding the mark as a vehicle currency for transactions across Europe, then near-term portfolio shifts seem less likely. Even less likely is any substantial shift by European official reserve managers. As for the volatility of exchange rates, the very strength of the conviction of a broad monetary union implies that any serious doubts could give rise to instability among exchange rates, including the dollar/mark rate.[15]

2. The early years of the ECB

The establishment of the ECB and the introduction of the euro should relieve some of the uncertainties cited above. As time goes by, financial market participants as well as wage and price setters will discern the ECB's character. In this second phase, extending from the inception of the euro

[15] For the linkage of the strong dollar to subdued volatility, see BIS (1997b), p. 81.

at least until the disappearance of the constituent national currencies (scheduled for 2002), the ECB will also give evidence of its exchange rate policy. Much of the discussion of this period centres on whether the ECB will pursue a tough interest rate policy or will react with unusual vigour to a weakening of the euro against the dollar. At the same time, other uncertainties could arise: interest and exchange rates could show volatility as the ECB and market participants grope for a common understanding of policy targets and instruments and their nuances.

2.1 Private asset managers

Private asset managers could shift funds into the euro upon demonstration of, or indeed in anticipation of, a firm interest rate and strong currency policy on the part of the ECB. The European Commission (1997b, p. 9) casts doubt on "an often heard argument ... that the ECB would attempt to establish early counter inflation credibility by adopting a tight monetary policy stance" on the grounds that "there is ... no reason to assume that the Bank will not enjoy counter inflation credibility from the outset". The Bundesbank's chief economist recently dismissed as a "nice idea" the notion that the new ECB would despite high unemployment in Europe, pursue a particularly restrictive policy.[16] It will probably be very difficult even after the fact to know whether the ECB has shown a bias towards firm rates.[17] With respect to exchange rate policy, one can debate how much European monetary policy will respond to exchange rate movements in the steady state, but several considerations suggest that the ECB might put considerable weight on the exchange rate in its early years. Were the euro to weaken in this period, not only financial market participants but also domestic wage and price setters would look to the ECB's reaction for evidence bearing on its credibility. Put another way, the first "referendum" on the ECB could be conducted in the foreign exchange market and the authorities might respond vigorously, whatever the cyclical circumstances.[18]

A particular dilemma could arise for the new directors of the ECB if the consolidation of credibility were to take on importance against the background of a strong US economy and a weak European economy. If some European countries were not to join monetary union from the outset but were to enter an ERM II, however, dollar weakness could also pose challenges. The tendency for most European currencies to decline against the Deutsche mark when the dollar does so could continue, with any ERM II currencies weakening against the euro when the dollar weakened against the euro. Any association of strains in ERM II with dollar weakness against the euro could put dollar weakness on the agenda at the ECB. But the salience of any dollar weakness would depend on the design of ERM II, especially its fluctuation margins and related intervention obligations (Saccomanni (1996)).

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16 Otmar Issing, speaking before the European Summer Institute, quoted in Stüdemann (1997, p.2).

17 One approach would be to look for deviations from a Taylor rule for ECB policy. See Clarida, Gali and Gertler (1997).

18 Masson and Turtelboom (1997), and Funke and Kennedy (1997) speak of the privileged policy position that the exchange rate might occupy in the euro's early days.

2.2 Central banks

The introduction of the euro will make it easier for central banks to invest in the world's second-largest reserve currency. Until recently, the Bundesbank's opposition to short-term finance has kept the German finance ministry from floating part of its debt as Treasury bills. As a result, many risk-averse central banks were denied their natural investing habitat of short-term government bills and with some discomfort had to deposit their Deutsche mark reserves with banks. Some central banks used bond futures to shorten the duration on holdings of German government bonds or currency forwards to convert US Treasury bills into synthetic Deutsche mark bills. But far from all central banks are able and willing to employ such strategies.

Whatever the debt management policy of the German Government, the other triple-A governments in the euro area will ensure a supply of euro-denominated Treasury bills that is ample enough to satisfy all central bank demands. Central banks probably should not be expected to reallocate their portfolios abruptly in January 1999, in response to this new menu item in the world's second-largest reserve currency, but it could make it easier for central banks, particularly in emerging markets, to diversify into the euro thereafter.

2.3 Volatility

In the early days of the ECB, market participants will have to discover not only the bank's objectives but also how it intends to use its policy instruments to achieve those objectives. Participants will need time to learn to read the nuances of the ECB's operations. The challenge of clearly and simultaneously signalling its intentions to market participants, given the aim of operating in a number of national markets with different structures, could make for more volatile money markets and exchange markets.

A reasonable hunch is that money market operations by the ECB need not impart much volatility to money or foreign exchange markets if European policy-makers value stability. Whatever the importance placed on one or more monetary aggregates as an intermediate target, the Bundesbank has since the bond market turbulence of 1994 relied heavily on the fixed rate tender for its operations. Rather than putting out a fixed quantity of reserves and letting the price reflect demand pressures, the fixed rate tender allows quantities to adjust. If, in the future, repurchase transactions are to be conducted simultaneously by a number of national central banks, the argument for fixing the rate could prove very convincing.

One might hope that any monetary implications of the consolidation of internationally held bank deposits denominated in a number of European currencies will be anticipated, even if not measured exactly ahead of time, and will be handled without destabilising European money markets and the foreign exchange market. Again, balances in Deutsche marks, French francs, guilders and so on needed to meet payments in those specific currencies will to some extent become unnecessarily large under the single currency. Thus adding up all the current payment flows in *n* currencies will

render transactions balances redundant. Putting aside the question of whether the concentration of deposits in the mark implies that the consolidation has already occurred to a substantial extent, there remains the question of the monetary implications of any economising on these balances. In particular, it is not clear that these balances entail much of a demand for base money. For instance, possibly reservable foreign holdings of mark bank deposits in Germany are much smaller than foreign holdings of mark bank deposits in Luxembourg, London and elsewhere abroad.[19] Again, a monetary policy that fixes the repurchase rate should permit adjustment in these balances without turmoil in the money market.

More difficult might be the market's reading of foreign exchange policy per se. It is particularly difficult to judge ahead of time how national differences in the importance attached to exchange rate stability will work out in practice. If the ECB directors are not of one mind on this matter, market expectations could be quite volatile. Moreover, there is the question of the role of the political authorities in foreign exchange rate policy.

Kenen (1995, p. 123) has argued that an ECB single-mindedly focused on domestic stability might eschew international coordination to limit dollar/euro exchange rate volatility:

> The ECB will want to earn credibility by proving its ability to maintain price stability. Hence it may resist EC involvement in any attempt at exchange rate management by the G-7 countries, especially if it were seen to require heavy intervention on the foreign exchange market.

Volatility in the early years of the ECB might arise if some countries do not join monetary union in the first round. Both De Grauwe (1996b, p. 21; 1997) and Spaventa (1996, p. 54) predict higher volatility between the euro and the excluded currencies, although Spaventa limits his prediction to the case in which some effective ERM II is not put in place. It is hard to imagine that intra-European volatility would not induce volatility in the dollar/euro exchange rate.

2.4 Summary

The early years of the ECB may see portfolio reflows towards the euro. Private market participants may anticipate a tilt towards a firmer interest rate policy and a bias against euro depreciation in a period in which the ECB is consolidating its credibility. Central banks will enjoy in short order the opportunity to invest in a liquid market for high-quality Treasury bills denominated in the euro. Monetary policy operations conducted in a variety of markets may of necessity adopt a rate-setting procedure that avoids leaving private market participants guessing at the ECB's intentions, with implications for money market volatility and knock-on effects in the bond market and foreign exchange market. Still, the inevitable process of defining the new central bank's foreign exchange policy could prove a source of market volatility.

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[19] More precisely, non-resident non-bank holdings of marks in Germany, which may require the holding of reserves, are smaller than the holdings of marks outside Germany by non-German resident non-banks ($96 billion as compared to $133 billion), see BIS (1997a), pp. 11, 13 and Table A.5.1.

3. Towards the steady state

The *steady state* role of the euro in relation to the dollar and yen is a subject that attracts more attention than it produces consensus. In the early 1970s, at the beginning of the period of general floating, Triffin (1973, p. 78) foresaw that the "Community's unit of account would also be likely to be used more and more, in lieu of the Eurodollar, in private lending and borrowing operations". But a generation later, "The surprise in this history is that ... there was no general revulsion against lending in depreciating dollars ... The world stayed with the dollar as a limping standard faute de mieux" (Kindleberger (1996), pp. 187-8).[20] The "640-billion-euro" question is whether the euro, offering a more heavy-weight alternative to the "limping standard", will attract a large net portfolio shift from the dollar.

In the steady state, four slowly evolving developments could bear on the level and volatility of the dollar. First, the size of the euro area could lead to a wider use of the euro as an anchor for the exchange rates of smaller countries. Secondly, the increase in the liquidity of the financial markets denominated in euros could affect the behaviour of private portfolio managers. Many analysts stop here and conclude that the euro will attract a large net portfolio shifts from the dollar. But more anchoring to the euro and more liquid euro financial markets can change the choice of currency denomination by debt managers, the third development discussed below. Finally, unified European exchange rates could increase *effective* dollar volatility even if the dollar/euro rate is no more volatile than the historical dollar/mark rate. Moreover, a possible waning of concern about exchange rate movements in European policy-making could raise the volatility of the dollar/euro rate relative to the historical dollar/mark rate.

3.1 The euro as an anchor currency

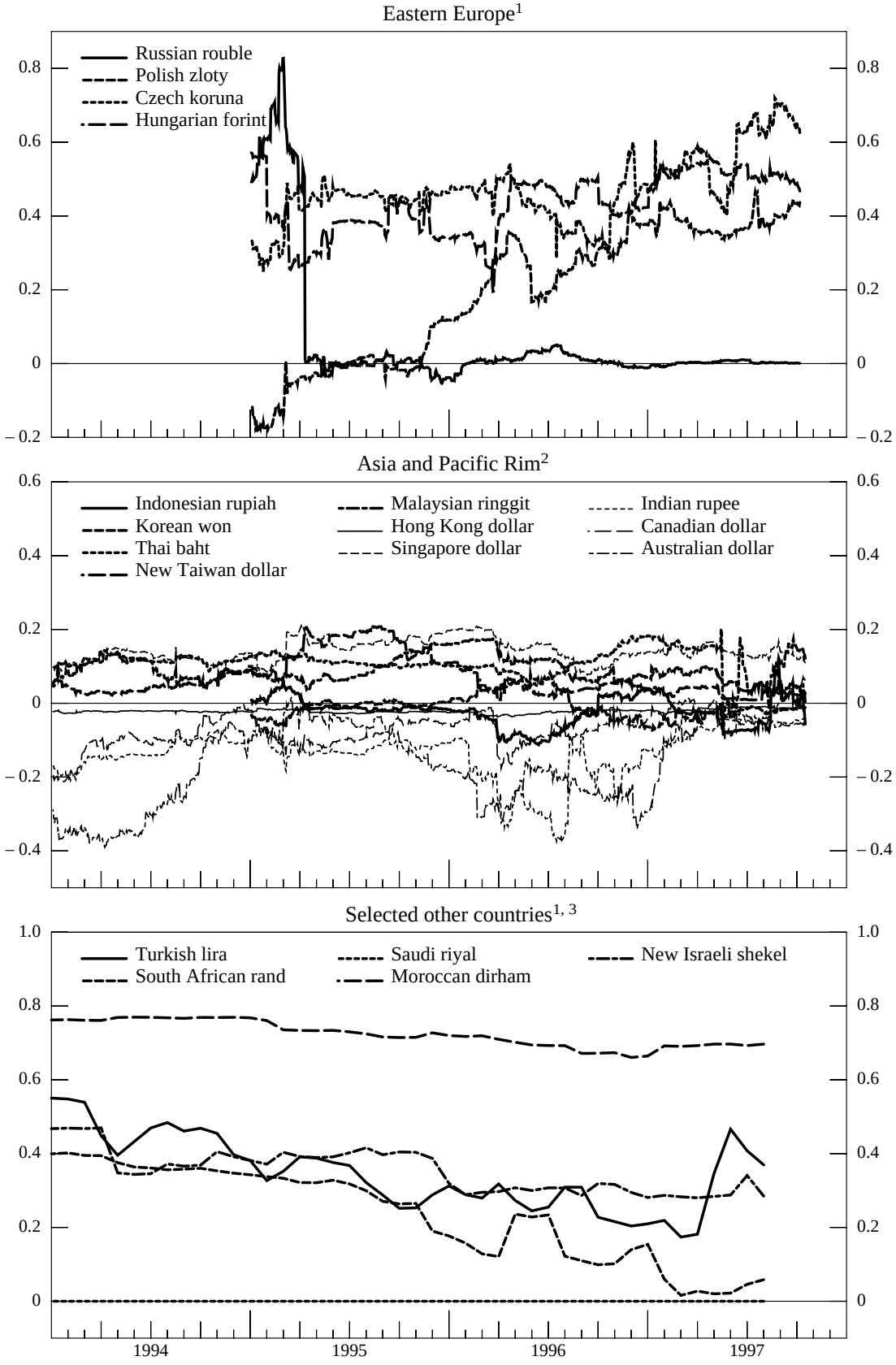
Some observers imagine that, backed by the world's largest single economy, the euro could provide an anchor for a broad range of countries outside the euro area proper. With currencies linked to the euro, private traders might increasingly denominate their transactions in the euro, a practice that would lead them to hold working balances in euros, and would ultimately reinforce any tendency for private and official portfolios to shift into the euro. Let us consider the euro as an anchor currency, starting with the countries nearest to the prospective euro area and working outwards from there.

The linkage of Central and Eastern European currencies to the euro looks likely to many observers (Alogoskoufis and Portes (1992), pp. 277-8, Arrowsmith and Taylor (1996), p. 21, Carré (1997), and Frenkel and Goldstein (1997)). Already, daily movements of the Hungarian forint, Czech koruna and Polish zloty against the dollar share about half of the Deutsche mark's movement (Graph 7). Similarly, official reserves and foreign debts appear to be divided roughly half-and-half

[20] Or, as de Boissieu (1996, p. 130) puts it: "Since the end of the 1960s ... the dollar has been challenged without being replaced."

Graph 7

The geography of exchange rate sensitivities



[1] Sensitivity to movements in the mark against the dollar (see the note to Graph 2). [2] Sensitivity to movements in the yen against the dollar (by definition, the yen/$ sensitivity to itself is unity). [3] Over the current and previous 36 months.

Sources: Bank of Japan, Bankers Trust, Datastream and IMF.

Table 6

Exchange rate regimes and policies in Central Europe

Country	Regime	Basket	Fluctuation bands	Stability
Bulgaria	currency board	DM	—	started 1st July 1997
Czech Republic	managed float (peg from January 1991 to May 1997)	DM (45% DM/12% Sch/ 7% SF/4% £/ 31% US$ from January 1991 to May 1993; 65% DM/35% US$ until May 1997)	none (±0.5% from January 1991 to February 1996; ±7.5% until May 1997)	peg successfully attacked May 1997
Hungary	crawling peg (adjustable peg before March 1995)	70% DM/30% US$ (1991 to July 1993: 50% ECU/50% US$; until August 1994: 50% DM/50% US$; until January 1997: 70% ECU/30% US$)	±2.25%	devaluations of 1.4% in January 1995, 2% in February 1995, 9% in March 1995; then automatic monthly devaluation rate of 1.9% until June 1995, 1.3% until December 1995, 1.2% in 1996, 1.1% in 1997
Poland	crawling peg (US$ peg from January 1990 to May 1991)	45% US$ 35% DM 10% £ 5% FF 5% SF	±7% (±0.5% until March 1995; ±2% until May 1995)	14% devaluation in May 1991, 11% in February 1992, 7% in August 1993; automatic monthly de-valuation of 1.8% from October 1991 to August 1993, 1.6% until September 1994, 1.5% until November 1994, 1.4% until February 1995, 1.2% until January 1996, 1% since then; in addition, 6% revaluation in December 1995
Slovak Republic	fixed peg	60% DM / 40% US$ since July 1994	±5% (±1.5% until December 1995; ±3% until July 1996)	stable against the basket since 10% devaluation in July 1993
Slovenia	managed float	—	—	depreciation against ECU by 9% between January 1995 and October 1996

Sources: Radzyner and Riesinger (1996), Backé and Lindner (1996), BIS, *Handbook on central banks (1997c)*, as extended and updated by the author.

between the two largest reserve currencies. Close trade and investment links between eastern and western Europe suggest the appropriateness of a euro anchor (Bénassy-Quéré (1996b), pp. 42-4).

Some observers suggest that the introduction of the euro and foreseeable progress on EU accession by Central European countries could lead to the pegging of the Hungarian forint, Polish zloty, Czech koruna and Slovakian koruna to the euro, perhaps as a part of some ERM II (Backé and Lindner (1996)). The Czech authorities have indicated that they plan to peg to the euro when it comes into existence, rather than to a basket of marks and dollars (Thorpe et al. (1997), p. 179).[21] Moreover, in June 1997, the Bulgarian authorities, struggling to stabilise the level, chose to peg it to the mark (at 1,000 to one, making life easy for Italian tourists in Sofia). Continuation of this trend would replace a zone of hybrid currency pegs in Central Europe with a euro-zone (Table 6).

This development could expose trade between the broad euro area and the successor states of the Soviet Union to movements of the dollar/euro exchange rate. Under these circumstances, the dollar orientation of the rouble might come into question. One could imagine the rouble following the path of the Polish zloty, which overcame very high inflation with the help of a dollar peg but then was switched to a hybrid peg in May 1991 (Radzyner and Riesinger (1996) and Koch (1997)), and may eventually be pegged to the euro. While trade with the euro area would tend to induce the Russian authorities to peg the rouble to the euro, inertia, trade with Asia and the Americas and the importance of Russia's commodity exports would all work to keep the rouble anchored to the dollar. Inertia favours the dollar because the rouble is currently managed against the dollar and tens of millions of hundred-dollar bills circulate in Russia. Trade with Asia and the Americas, presumably conducted in dollars, could prove more dynamic than trade with Europe if rapid Asian growth persists and the EU agricultural policy proves inhospitable to imports from the east.

The effective dollar anchoring of commodity prices also tends to sustain the dollar orientation of Russia and other commodity producers. Dollar commodity prices are usually more stable than commodity prices expressed in marks, so that Russian oil and gold exports would yield a more stable rouble revenue stream with a dollar anchor for the currency.[22] Certainly, the dollar price of gold shows much less sensitivity to movements in the dollar/mark rate than it did a decade and a half ago (Graph 8), perhaps because the balance of private demand for gold has tipped from European investors to nouveaux riches in dollar-linked Asia (Gold Fields Mineral Services Ltd. (1997), pp. 44-5).[23] More generally, if the sensitivity of commodity prices to the dollar's exchange rate depends on the fraction of demand outside the dollar area (Dornbusch (1985), pp. 328-34), and the dollar area is growing faster than the world in general,[24] then one may hypothesise that dollar commodity prices are

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21 Unsurprisingly, the Estonian kroon, currently worth 12.5 pfennig, is to be fixed to the euro. See John Thornhill, "Estonia Likely to Link Its Currency to Euro," *Financial Times*, 12th May, 1997, p. 3.

22 The parameter estimate of the elasticity of commodity prices with respect to the dollar's *effective* exchange rate of -0.62, as reported by Borensztein and Reinhart (1994), does not contradict this statement. An effective dollar exchange rate is correlated with, but much less variable than, the dollar/mark rate. For evidence that the price of gold is more stable in dollars, see Gold Fields Mineral Services Ltd. (1997), pp. 9-10.

23 The greater than unit elasticity of the price of gold with respect to the dollar/mark exchange rate found by Dupont and Juan-Ramon (1996) may reflect their sample period, 1972-91. See also Sjaastad and Scacciavillani (1996).

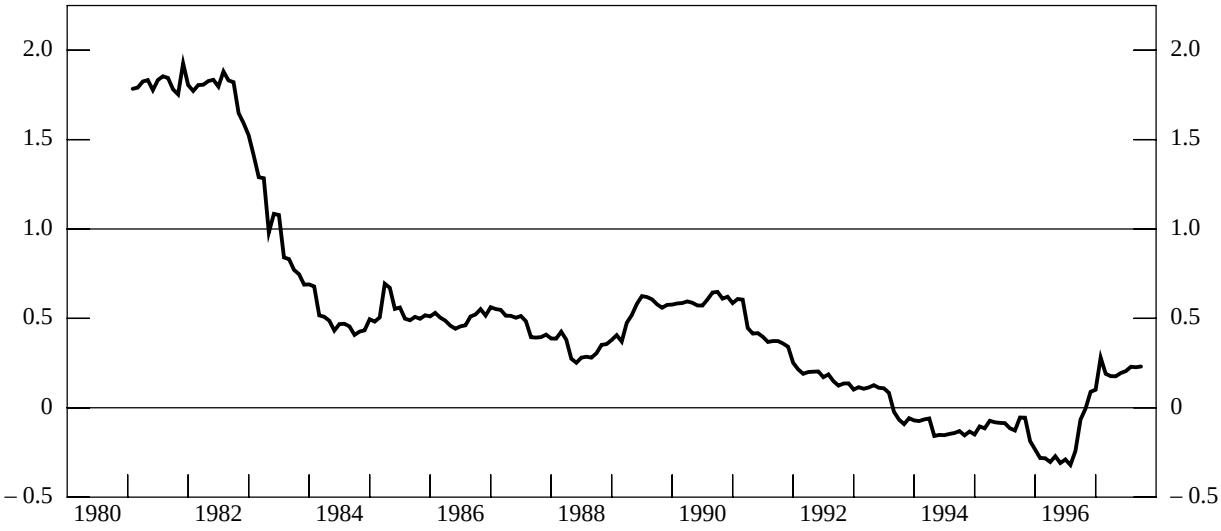
24 The International Energy Agency (1996), pp. 26-7, projects that the "rest of the world", that is, countries outside the Organisation for Economic Co-operation and Development (OECD) and the former Soviet bloc, which currently

becoming less sensitive to the dollar's exchange rate. Thus the argument for Russia's anchoring the rouble to the dollar may be getting stronger.

Graph 8

Gold price sensitivity to movements in the mark against the dollar*

Monthly averages



* Estimated, as in Graph 2, by regressing movements in the dollar price of gold on movements in the mark against the dollar over the current and previous 36 months.

Sources: BIS and BIS calculations.

The discussion of Central and Eastern Europe tends to two different conclusions. With the prospect of accession to the European Union and the possibility of joining the monetary union in the next century, Eastern Europe might well enter naturally into the euro's orbit. Russia, with its Far East and commodity trade and current dollar orientation, with regard to both exchange policy and private foreign exchange holdings, is at least a closer call.

Some Middle Eastern and North African currencies might also align themselves with the euro. As matters stand, Israel, Turkey and Morocco seem to give substantial weight to European currencies in their currency management (Graph 7); the last two countries have expressed interest in joining the European Union. The currencies of oil-producing states, the Saudi Arabian riyal, for example, serve as a fire-break to the eastward spread of the euro, however. Farther south, the South African rand, much like gold, seems to have slipped from the mark zone into the dollar zone.

Whether the euro will disturb the dollar anchoring of currencies from South and East Asia to Latin America is an important question. Going beyond a quick look at the IMF's *Exchange Rate Arrangements and Exchange Restrictions* (1997) compilation to confirm that "only a limited number of smaller countries" peg to the dollar (Krugman (1984)), several recent studies have

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consumes about 30% of world oil, will account for 70% of the increase in world oil demand between 1993 and 2010. Evidence is presented below that the fastest-growing portion of this rest of the world remains in the dollar zone.

investigated the behaviour of Asian exchange rates. These exchange rates are anchored to the dollar, whether one performs multiple regressions (Frankel and Wei (1993, 1994) and Bénassy-Quéré (1996a,b)), computes variance ratios (Bénassy-Quéré (1996a,b)), or examines bilateral elasticities (Bank for International Settlements (1997b)). All analysts agree that the yen, a more plausible anchor than the euro for some currencies in Asia, has hardly challenged the dollar as an anchor: Asian currencies show as yet only limited co-movement with the yen (Graph 7).

Even before the recent currency turbulence in Asia, many economists recommended against the linkage of Asian currencies to the dollar and looked forward to these currencies weaning themselves from it. Kwan (1994) concluded that patterns of international trade argue that the currencies of Hong Kong, Korea, Singapore and Taiwan should be pegged to the yen. Eichengreen and Bayoumi (1996) suggested that the yen is a marginally better peg than the dollar for the currencies of Indonesia, Korea and Thailand, and a not much worse peg for the currencies of several other currencies. They suggested that "Even Hong Kong, which has resisted greater flexibility to date, may have to contemplate it after the resumption of Chinese control in 1997", a notion that the Hong Kong authorities vigorously dispute.[25] This analysis, however, does not take into account the fact that other currencies, outside as well as inside Asia, are anchored to the dollar. Most Asian currencies have been almost completely surrounded by currencies anchored to the dollar. This circumstance is recognised by Williamson's (1996) proposal that Asian countries adapt a *common* currency basket for pegging, consisting of something like 40% dollar, 30% yen and 30% mark (then euro).[26] The analogy that Eichengreen and Bayoumi (1996) draw between Europe's movement away from the dollar in the 1970s and East Asia's situation today does not respect an important difference. From the outset of floating, a number of currencies in Europe aligned themselves with the mark right away, so that a currency that later moved into the mark's orbit was joining an effective mark zone larger than Germany. In Asia, by contrast, the yen bloc has just one member.

Hamada (1994, p. 330) asks whether each Asian "country was driven by a purely economic rationale in its exchange-rate policy. In practice ... political considerations may have motivated the pegging policy". This interpretation might suggest an increased willingness to anchor to the yen with the passage of time, much as Taiwan switched some of its dollar reserves into yen (Table 5). Taguchi (1994, p. 354) of the Bank of Japan elaborates on the non-economic considerations:

> To what extent, and at what pace the Japanese yen will become an anchor currency in Asia hinges on many economic and noneconomic factors: e.g., how intraregional trade and investment will develop, the future military presence of the United States in this region, whether political ties among Asian countries become close and the development of the U.S. economy...

[25] Yam (1996) termed the notion that Hong Kong will have to abandon its dollar peg "Myth Number Four."

[26] This sounds like the son of the Special Drawing Right (SDR) - the IMF's basket currency. The euro's introduction may provide the opportunity or excuse for a recasting of the SDR. At an IMF conference, Philippe Maystadt (1997) of Belgium raised the question whether the SDR should comprise only the dollar, euro and the yen. Governments propose but markets dispose, and markets have not embraced the SDR (Eichengreen and Frankel (1997)).

> [and, in particular, whether] the U.S. economy remains sound and its inflation rate low.

If there is an economic argument for putting greater weight on the yen (and the mark/euro), is the argument getting stronger? Bénassy-Quéré (1996a, p. 19) notes that "there is a trade dynamism between non-Japan, Asian countries ... and the role of Japan as a trading partner is declining for most of the other Asian countries". As long as Asian currencies apart from the yen remained anchored to the dollar, this trade dynamism implied that the tide was running against the yen in Asia. Thus, even if the scant weight put on the yen in the management of Asian currencies was out of line with current trade relations, it was becoming less so with the passage of time. Another reason for anchoring to the dollar was its long downtrend against the yen. Given this trend, stabilising against the dollar has generally served the cause of export competitiveness. By contrast, the dollar's rise against the yen from spring 1995 to spring 1997 left South-East Asian currencies linked to the dollar increasingly uncompetitive. The course of the dollar/yen rate will influence the choice of anchor in the years to come.[27]

Recent currency and banking instability in South-East Asia thus raises the question of whether the dollar anchoring is a thing of the past. When the dust settles, greater flexibility in exchange rate systems is likely. The choice of a different anchor, however, is not a foregone conclusion.[28]

China presents a particularly interesting case in view of the growth of its economy and trade and the near-term prospect for its currency to become convertible and internationally tradable. Three-tenths of its exports go to the United States, as against about a fifth to Japan and to the EU, while over a quarter of its imports come from Japan, as against a tenth from the United States and a seventh from the EU. China's exports and the peg of the Hong Kong dollar to the US dollar are cited by Hong Kong observers as reasons for the likely continuation of the anchoring of the Chinese currency to the dollar (Chen (1997)).

As for Latin America, its currencies anchor themselves to the dollar as much as ever. For some years the Chilean peso was tied to a basket that assigned the dollar a weight of less than 50%, but as experience showed that dollar import prices did not fall as the dollar rose into 1997, the basket was revised to put a more typical weight on the dollar.

In summary, the euro will not arrive admidst the chaos suggested by formal exchange rate arrangements, which make floating exchange rates the overwhelming norm. Rather, the euro will

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[27] The observation that the Thais devalued the baht in 1984 (after a period of dollar appreciation), adopted a basket peg thereafter, only sharply to reduce the weight of the yen in their basket in 1985 when the dollar started to fall against the yen is consistent with this reading of the evidence. Another consideration, pointed out by Ueda (1994), p. 356, is that a stable CPI in Japan implies a negative inflation rate for Japanese export prices, "creating strong deflationary pressure on other countries" linked to the yen. This argumentation is similar to that of Mundell (1993), p. 24, who argued that "the deflationary stance of the [European] Community ... will impose too tough a monetary standard for the countries of Eastern Europe to match. They are far more likely to adopt the easier standard that would be set by modest U.S. rates of inflation."

[28] See Ilzkovitz (1996) for a skeptical view of the prospects for the internationalisation of the yen.

come into existence surrounded by a "dollar zone, [which] far from breaking up since the collapse of the Bretton Woods system, ... now encompasses the American continent[s], Asia, the Persian Gulf, Australia and New Zealand" (Ilzkovitz (1995), p. 93). The policies of key countries now within that zone will determine the ambit of the euro.

The use of the euro as an anchor is related to its use in foreign exchange market transactions and its use as a currency of invoicing of international trade flows. Annex 4 shows that upon its introduction, the euro will be on one side of half or more foreign exchange transactions, while the dollar will be on one side of almost all transactions. Annex 5 considers trade invoicing, arguing that its importance is often misunderstood and overstated. The evidence, such as it is, suggests that the euro will start way behind the dollar as a unit of account for international trade, with little use by third parties outside the euro area. In particular, the notion that oil might be priced in euros seems to ignore the rapid growth of demand in dollar-linked emerging economies and the political developments in the 1990s.

3.2 Private asset managers

There is little disagreement that the introduction of the euro will create broader, deeper and more liquid financial markets in Europe. Observers differ, however, on the prospects for an integrated government bond market in the euro area. A full discussion of these prospects can be found in McCauley and White (1997). The briefer review given here first highlights the size of the euro money market and swap market, demonstrating that these markets in euros will bulk large in comparison with their counterparts in dollars and yen. It then summarises the evidence bearing on the prospects for a integrated government bond market in Europe.

Ranging from an overnight rate, which will be strongly affected by the monetary policy operations of the ECB, to interbank rates for placements lasting from one week to one or two years, a single reference money market yield curve for euros can be expected. Its liquidity, as measured by derivatives transactions, will surpass that of the yen money market, even adopting the hypothesis of a narrow monetary union and recognising the current influence of convergence trades (Table 7). A considerable gap will remain between the $40 trillion per year turnover in euro futures and forwards and the corresponding volume of dollar transactions, which exceed $100 trillion.

At longer maturities, the most frequently used private interest rates will be the yields on the fixed rate side of interest rate swaps. These standard and liquid prime-name rates extend from two years out to ten years in maturity and already serve as the most important private reference rates in today's bond markets. The convergence among these swap yields for contracts in Belgian francs, marks, Dutch guilders and French francs over the past two years (Graph 9) underlies the forward rates displayed in Graph 2. At the introduction of the euro, the now nearly identical swap curves will

Table 7

Derivative transactions in private money market instruments in dollars, yen and euros

In trillions of US dollars per annum

	1995	1996
US dollar		
Eurodollar futures (CME, SIMEX)	104.125	97.068
Federal funds (CBOT)	3.219	3.042
Forward rate agreements[1]	4.667	n.a.
Eurodollar options (CME, SIMEX)	22.369	22.238
Japanese yen		
Euroyen futures (TIFFE, SIMEX)	45.543	34.475
Forward rate agreements[1]	2.518	n.a.
Euroyen options (TIFFE, SIMEX)	0.521	0.714
Total Deutsche mark, French franc, Italian lira		
Euro-mark/franc/lira futures	35.932	42.405
Forward rate agreements	5.244	n.a.
Euro-mark/franc/lira options	7.076	6.907
Deutsche mark		
Euromark futures (LIFFE)	17.960	24.090
Forward rate agreements[1]	2.200	n.a.
Euromark options (LIFFE)	2.392	3.251
French franc		
PIBOR[2] contracts (MATIF)	15.513	13.818
Forward rate agreements	2.593[3]	n.a.
PIBOR options (MATIF)	4.623	3.038
Italian lira		
Eurolira futures (LIFFE)	2.459	4.497
Forward rate agreements	0.451[3]	n.a.
Eurolira options (LIFFE)	0.061	0.618

Note: Japanese yen, Deutsche mark, French franc and Italian lira amounts converted at year-average exchange rates.

[1] Estimated as average daily turnover in April times 255. [2] Paris interbank offered rate. [3] Estimated as DM forward rate agreements (FRAs) times the ratio of FRA trading in Paris or Milan to FRA trading in Frankfurt.

Sources: Chicago Board of Trade (CBOT), Chicago Mercantile Exchange (CME), London International Financial Futures and Options Exchange (LIFFE), Marché à Terme Internationale de France (MATIF), Singapore International Monetary Exchange (SIMEX), Tokyo International Financial Futures Exchange (TIFFE), *Central Bank Survey of Foreign Exchange and Derivatives Market Activity 1995*, BIS and author's estimates.

collapse into one single swap curve.[29] This private capital market in euros is also likely to be a very liquid market from its inception. On current evidence, even a narrow monetary union would offer a swap market about as active as those in the dollar and yen (see Table 8). Even recognising again that convergence trades are providing a temporary boost to European transactions, the euro looks set to offer a private yield curve with world-class depth, breadth and liquidity.

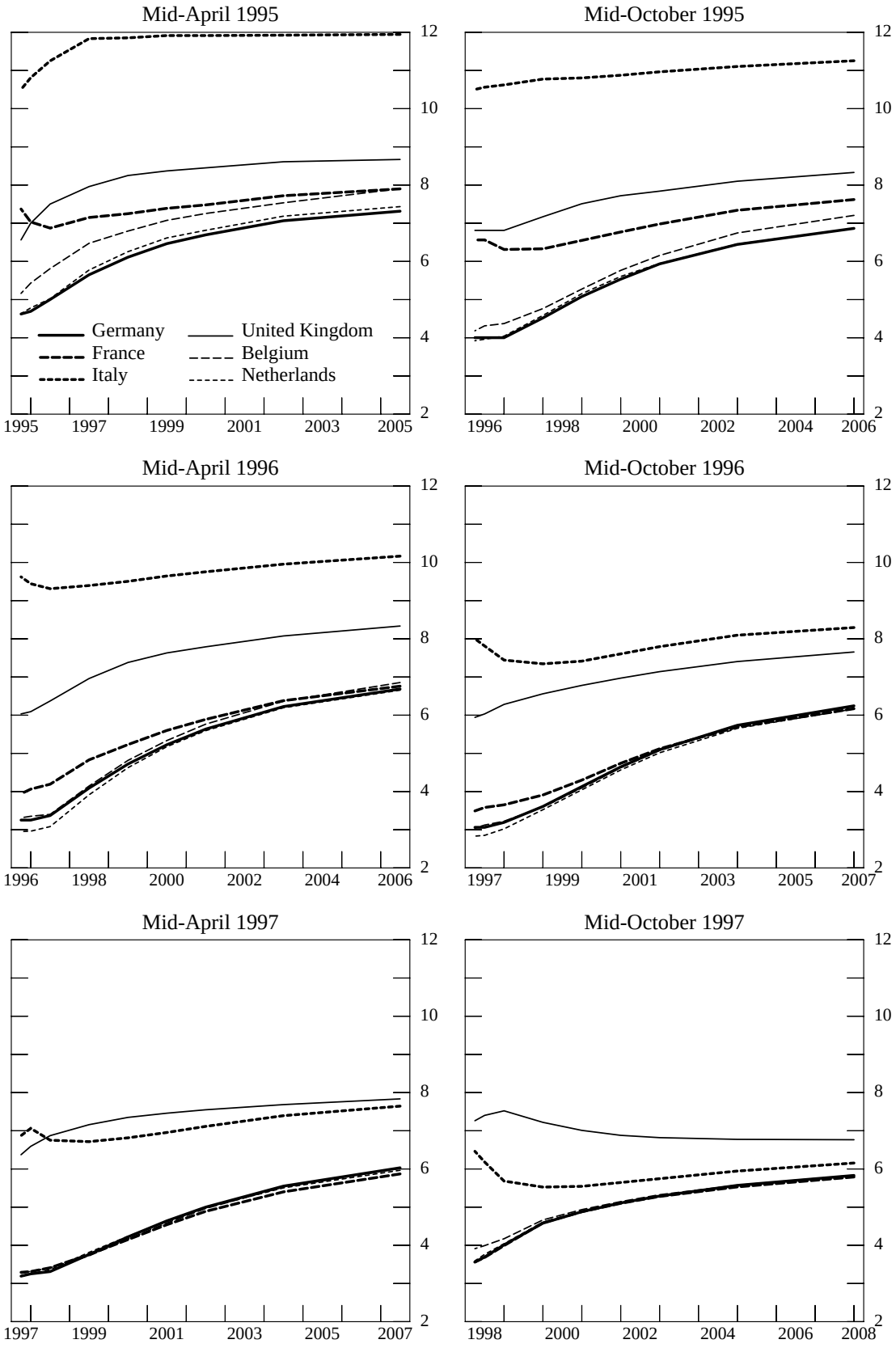
Those who argue that the government bond market in euros will be fractured point to the municipal bond market in the United States, where different states' bonds offer different yields as a

[29] Illmanen (1997) considers why French franc forward swap rates have traded below their Deutsche mark counterparts.

Graph 9

Private interest rates in Europe

In percent per annum



Note: The yield curves are based on eurodeposit rates and, for longer horizons, on swap (midpoint) yields.

Sources: Datastream, Reuters and BIS.

Table 8

Transactions in interest rate swaps and swaptions in dollars, yen and euros

In trillions of US dollars per annum

	Central bank survey[1]	International Swaps and Derivatives Association (ISDA)	
	1995		1996[2]
US dollar	5.981		
Swaps	4.283	2.856	3.690
Swaptions	1.698		
Japanese yen	4.904		
Swaps	4.378	2.259	3.128
Swaptions	0.527		
Total Deutsche mark, French franc, Italian lira	4.678		
Swaps	3.907	2.315	3.485
Swaptions	0.771		
Deutsche mark	1.948		
Swaps	1.661	0.985	1.935
Swaptions	0.287		
French franc	2.303		
Swaps	1.879[3]	1.113	1.550
Swaptions	0.424[4]		
Italian lira	0.427		
Swaps	0.367[3]	0.217	n.a.
Swaptions	0.060[4]		

[1] Estimated as average daily turnover in April times 255. [2] First half, at an annual rate. [3] Estimated as DM swaps times the ratio of ISDA-reported French franc swaps or ISDA-reported Italian lira swaps to ISDA-reported DM swaps. [4] Estimated as DM swaptions times the ratio of swaption transactions in Paris or Milan to such transactions in Frankfurt.

Sources: ISDA, *Central Bank Survey of Foreign Exchange and Derivatives Market Activity 1995*, BIS and author's estimates.

result of widely differing credit standings and tax rates.[30] Current bond market pricing and ratings, however, seem consistent with the development of nearly uniform valuations for certain European governments' bonds, which could then be interchangeably delivered into a futures contract (McCauley (1996)). At present, evidence points to very similar pricing of the creditworthiness of Dutch, French and German government bonds. In particular, the gap between the nearly identical swap rates and the respective government bond yields is nearly the same in the three markets (but different elsewhere, Graph 10). Never in the history of the swap market has this spread been so similar, for so long, across so many markets.[31] This observation suggests that the euro-denominated debt of these governments

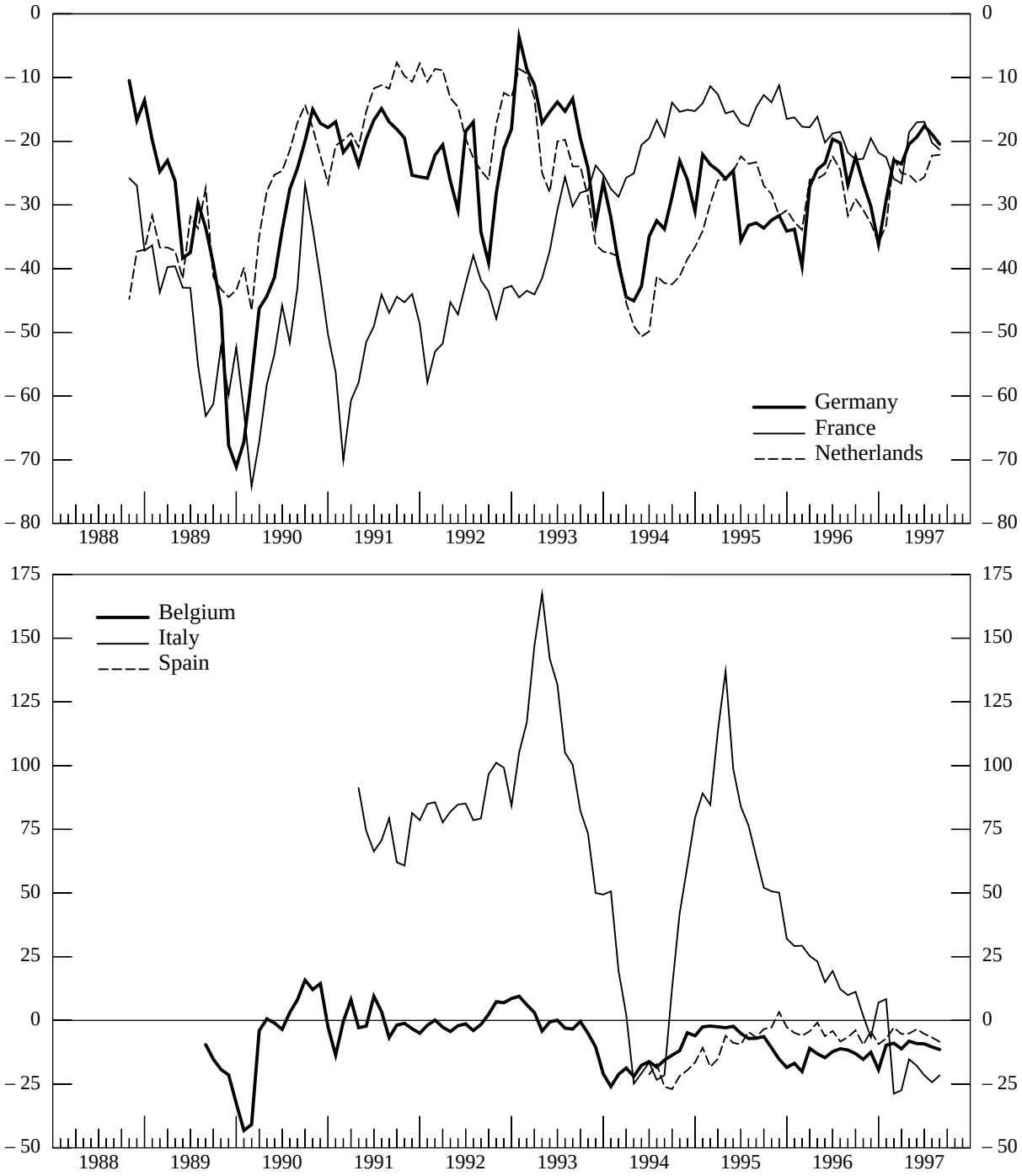
[30] The appropriateness of this analogy may be questioned in view of the strong clientele effects created by state tax codes' exclusive tax exemption for interest on home-state municipal bonds.

[31] The spread reflects not just the relative creditworthiness of the respective government, but also cyclical factors, such as the strength of construction spending (Brown (1989)).

Graph 10

Spreads of ten-year government yields over interest rate swap yields

Monthly averages, in basis points



Sources: Datastream and Reuters.

would trade with nearly identical yields. Furthermore, major rating agencies assign the same top rating to the debts of Austria, France, Germany and the Netherlands (see Table 1 and Cantor and Packer (1996)).[32] Market participants want, and thoroughgoing integration would require, European

[32] See Cantor and Packer (1996).

Table 9

Derivative transactions in long-term government securities in dollars, yen and euros

In trillions of US dollars per annum

	1995			1996		*Memo item: cash market*	
	Futures	Options		Futures	Options		
		Exchange-traded	OTC[1]		Exchange-traded	*Trading (1995)*	*Outstandings (at end-1995)*
US Treasuries	12.374	3.627	0.435	12.011	3.667	*35.843*	*2.547*
Japanese government bonds	15.956	2.163	1.539	12.262	1.824	*6.502*	*1.996*
German, French and Italian bonds	14.067	2.384	0.465	17.848	2.759	*18.225*	*1.608*
German bonds	9.090	1.274	0.173	12.388	1.550	*16.566*	*0.727*
French bonds	3.367	0.954	0.256[2]	3.452	0.869	*1.658*	*0.490*
Italian bonds	1.610	0.156	0.036	2.008	0.340	*0.420*[3]	*0.391*[4]

[1] Over-the-counter (OTC) activity estimated as average daily turnover in April times 255. [2] Estimated as OTC trading in interest rate options on traded securities in Deutsche marks times the ratio of total OTC trading in interest rate options in Paris or Milan to that in Frankfurt. [3] Euroclear and Cedel only. [4] Lira-denominated Treasury bonds only; excludes floating rate notes.

Sources: Salomon Brothers, *Central Bank Survey of Foreign Exchange and Derivatives Market Activity 1995*, various futures exchanges, national sources and BIS.

treasuries to cooperate in establishing common market practices and conventions (European Commission (1997a) and Dammers (1997)). Joint auctions would not be necessary to build large benchmark issues; instead European treasuries could simply match each other's terms, in effect "reopening" each other's issues. The potential benefit of integrated trading is evident in Table 9, which shows that the value of futures transactions in a European government bond market would compare favourably with that in Japan and would fall not far short of that of the United States.

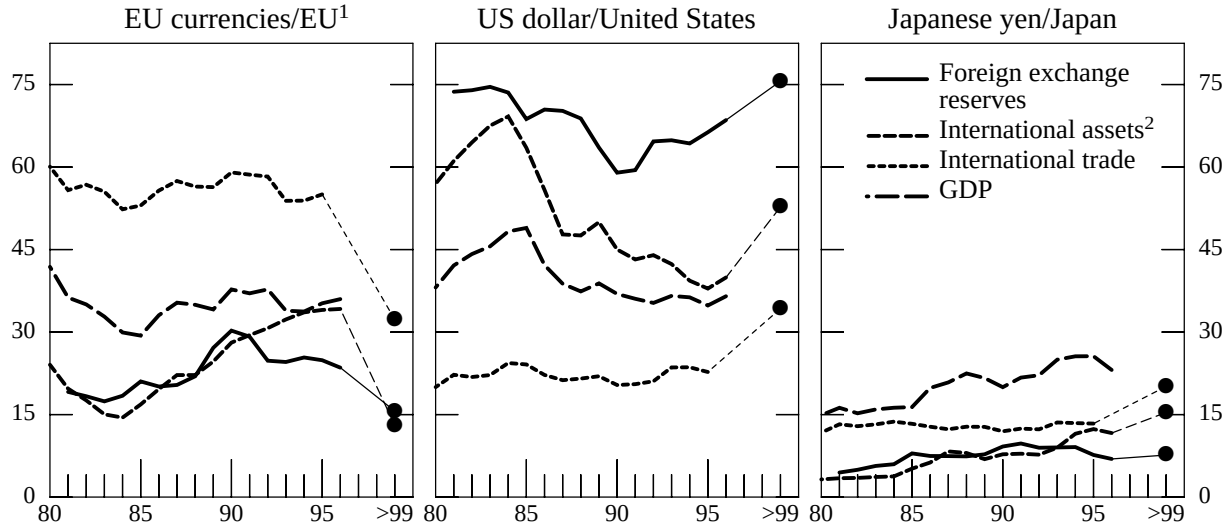
The more integrated the government bond market in euros is, the more liquidity and depth should improve. Both European residents and foreign investors could enjoy narrower bid/offer spreads, an ability to buy or sell larger amounts with no price effect, a richer array of instruments and deeper repurchase markets. The euro bond market might be served by two active futures contracts, one at the medium term and the other at the long term, as the US bond market now uniquely features (Jeanneau (1995,1996)). Foreign investors might come to enjoy trading opportunities in all major time zones, similar to those now available to holders of US Treasuries.

In considering the potential for shifts by private portfolio managers into the euro, a difficult question arises as to whether interest rates in a large euro bond market might show a smaller

Graph 11

The international role of the euro, dollar and yen

Currency and country shares, in percentages



Note: Hypothetical shares beyond 1999 are computed by netting out from most recent observations, respectively: EU holdings of EU currency reserves; EU holdings of EU currency bank assets and EU issuers' bonds/notes in G-10 EU currencies; and G-10 EU trade with EU countries. Total reserves, assets and G-10 GDP were $1.52 (1.38), 5.1 (3.9) and 19.9 trillion respectively in 1996; G-10 trade was $5.8 (3.9) trillion in 1995 (consolidated totals in brackets).

[1] G-10 EU countries only. [2] Includes international bonds, cross-border bank liabilities to non-banks, foreign currency liabilities to domestic non-banks (from 1984) and euronotes (from 1989).

Sources: IMF, OECD, BIS and national data.

correlation with US bond yields than current European government bond rates display.[33] This is an interesting question because private portfolio managers would find the euro bond market particularly attractive if it were to offer diversification benefits superior to anything available in the constituent bond markets. Large size and investor diversity could provide ballast to a European bond market now exposed to spillovers from New York ((Borio and McCauley (1996a,b), and (Domanski and Neuhaus (1996)).[34] However, the trend towards higher correlations across European bond markets in recent years has not to date brought any diminution of the correlation between the German and US markets.

Greater liquidity and depth could increase demand for bonds denominated in euros relative to the total demand for bonds in the constituent currencies, but the scope for a potential reallocation of private portfolios from the dollar to the euro is necessarily extremely conjectural. One

[33] See also European Commission (1997b). Masson and Turtelboom (1997) simulate the change in the correlation of returns on short-term instruments only, deriving ambiguous results depending on the ECB's intermediate target. But it is well known that returns on short-term instruments are much less correlated than returns on bonds, so the interesting question remains wide open.

[34] A contrary view is expressed by Thygesen et al. (1995), p. 126: "Confidence in the insulating properties of flexible exchange rates was shattered from the first half of 1994 by the transmission of higher US interest rates to Europe at a time when such a linkage seemed inappropriate because of different positions in the business cycle on the two sides of the Atlantic. At a time of high uncertainty in the foreign exchange markets investors appear to compare national interest rates more directly, discounting anticipated, but very uncertain exchange rate changes strongly in comparing the yield on assets denominated in different currencies ... A larger market share of the ECU [euro] in international financial portfolios and hence more symmetry between the dollar and the ECU [euro] would not really mitigate the problem."

starting-point is provided by the shares across G-10 currencies of GDP, trade, foreign exchange reserves and international assets, including both international bank deposits and international bonds (Graph 11). The G-10 members of the European Union produce about one-third of G-10 output and would show a slightly smaller share of international trade net of their EU trade. After a similar consolidation, however, the share of international assets denominated in euros would be only about one-eighth of the G-10 total. For the euro share to match the output and trade shares of the G-10 members of the European Union would require a shift of some $0.7 trillion. This figure should not be taken too seriously; the calculation ignores the non-resident holdings of one-quarter of US Treasury securities and also the non-resident holdings of about a third of German public bonds. The figure serves to make the important point that shifts in private portfolios could prove to be much larger than any possible shifts in official reserves. Similar figures are produced on the back of different envelopes by Bergsten (1997) and Thygesen et al. (1995, p. 135).

3.3 Central banks

Two hypotheses about the diversification of official reserves away from the dollar by *non-industrial countries* may provide an indicative range. If developing countries – admittedly a heterogeneous group, but the lack of available data constrains the discussion here – were to follow Taiwan's example in its diversification of the last ten years[35] by increasing their portfolio weight on core Europe to 25%, about $85 billion could be shifted out of the dollar and into the euro. Were all non-industrial countries to put equal weight on the euro and the dollar, some $200 billion could be shifted. This latter scenario ignores the potential for reserve diversification by Asian central banks into the yen, however.

Even as such figures are contemplated, recall that official reserve status and currency strength are far from necessary companions. The Swiss franc has tended to appreciate in real terms in recent years and Switzerland has the dubious distinction of serving the most expensive McDonald's hamburgers in the world. Yet the fraction of the Swiss franc in official reserve portfolios has fallen from a peak near 3% in 1980 to 1% in 1996.

3.4 Global liability managers

Many analysts foresee that portfolio shifts by private investors and official reserve managers from the dollar and into the euro will drive up the euro against the dollar and push the euro area from a current account surplus into a current account deficit (Bergsten (1997), and Alogoskoufis and Portes (1997)). This argument resembles that of Triffin (1958), who observed that the growth of world trade meant a growing demand for dollar-denominated bank accounts with which to settle the

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[35] Taiwan's reserves as recently as end-1986 were 95% dollars. See Seth and McCauley (1987), p. 37. Tavlas and Ozeki (1992), p. 40, report that even as Taiwan was diversifying away from the dollar "selected [unnamed, unnumbered] Asian countries," presumably not including Taiwan, were raising their holdings of dollars from 48% in 1986 to 63% in 1990, at the expense of the yen and European currencies.

transactions.[36] If the only way for these dollars to reach the hands of traders outside the United States were for the latter to run deficits, Triffin argued, then the necessary succession of deficits would undermine the credibility of the link between the dollar and gold. Take away the problem of the gold link, and the line of reasoning put forward by Bergsten and Alogoskoufis and Portes is very Triffinesque: a portfolio shift into the euro entails deficits for the euro area.

Kindleberger (1965) and Despres, Kindleberger and Salant (1966) denied Triffin's claim that the United States had to run deficits in any reasonable sense of the word in order to provide the world with dollar balances. If the US banking system were to extend long-term credits to foreign companies and governments, and the funds were to accumulate as short-term bank deposits, then the needs of trade could be met.[37] In application to the present case, the shift of private asset managers and official reserve managers into the euro need not pressure the euro upwards in the exchange market or push the euro area into current account deficit if willing borrowers of euros come forward.

This is likely because, in addition to having strong attractions for asset managers, a more integrated bond market in Europe would also attract debt managers in the steady state. (Debt management does not fit into the above sections because the arguments apply to both official and private debt managers.) The development of a broad and deep euro bond market could potentially affect debt management more strongly than asset management, and the greater supply of euro-denominated assets could place downward pressure on the euro.

It may seem strange that something as welcome as the development of broad, deep and liquid markets could adversely affect the currency concerned, but portfolio theory holds that the shift of funding from one currency to another will result in some combination of a higher interest rate and a lower exchange rate in the currency experiencing the increase in asset supply. For instance, were Korea to issue new Deutsche mark securities and to use the proceeds to buy in all its dollar debt, private investors would need to be induced to hold more Deutsche mark and fewer dollar assets. Depending on the size of the operation, some combination of higher mark interest rates and a lower mark exchange rate might be required to make the investors willing to hold newly supplied Deutsche mark securities. A flow model of exchange rate determination agrees with the result: as the Koreans exchanged the newly borrowed Deutsche marks for the dollars required to pay off their outstanding dollar debts, the demand for dollars would rise. The current choice of currency for large issues by global debt managers and the current financing habitat of emerging economies make the prospect of heavier use of the euro by debt managers plausible.

The relation of the size of international bond issues to the choice of currency denomination suggests that more liquid European bond markets might attract more borrowing. As

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[36] I am indebted for this parallel to Paul De Grauwe, commenting at a CEPR seminar on exchange rate policy for the euro.

[37] While it is tempting to say that "Triffin had the better of the argument", (Garber (1996), p. 2), it is fairer to say that "the cogency of that position [of Despres-Kindleberger-Salant] has been thoroughly undermined by the fact that the United States has now developed a real [that is, a current account] deficit" (Kindleberger (1985), p. 295).

Table 10

International security issues by size and currency

In billions of US dollars, 1990-95

Currency of denomination, by region	Size of issue		Total
	< $1.0 bn	≥ $1.0 bn	
Developing countries	141.7	10.5	152.2
US dollar	96.8	7.4	104.2
EU currencies	17.6	0.0	17.6
Japanese yen	27.3	3.2	30.5
Developed countries	1,555.7	209.1	1,764.8
US dollar	554.9	119.5	674.4
EU currencies	660.1	58.9	719.0
Japanese yen	340.8	30.6	371.4
International institutions	117.1	39.9	216.9
US dollar	34.1	15.0	49.1
EU currencies	113.9	15.3	129.3
Japanese yen	29.1	9.5	38.6
Total	1,874.5	259.5	2,134.0
US dollar	685.8	141.9	827.7
EU currencies	791.6	74.3	865.9
Japanese yen	397.1	43.3	440.4
Grand total, including offshore centres	2,078.6	276.9	2,355.5

Note: Including bonds and medium-term notes.

Sources: Euromoney Bondware and BIS.

things stand, international bond issuers favour the dollar for large deals (Table 10). If an underwriter of a large bond in euros could more easily hedge against movements in the underlying euro yields by shorting large blocks of European government bonds, issuing costs might fall, eliminating this bias, and inducing more issuance in euros. While there is no guarantee that borrowers do not offset any constraint on their choice of currency for large debt issues by appropriately managing their other liabilities and assets, including those off balance sheet, the evidence suggests that market fragmentation in Europe might be diverting debt from the euro's predecessor currencies.

With a broader, deeper and more liquid bond market in Europe, moreover debt managers outside Europe could be interested in increasing the proportion of their debt that is denominated in euros. The estimated currency composition of international debt (Table 11) owed by countries in Asia and Latin America shows a very low share of European currencies.[38] Even if the euro does not displace the dollar – or in Asia, the yen – as a reserve currency, there is great scope for additional

[38] Compare Bénassy-Quéré (1996a, b), who relies on World Bank data alone.

Table 11

Currency composition of developing country debt

In billions of US dollars and percentages, at end-1996

Obligor	Currency				Total
	US dollar	Japanese yen	EU currencies	Other[1]	
Latin America	421.1	66.0	72.0	65.2	624.3
	67.4%	*10.6%*	*11.5%*	*10.4%*	*100.0%*
Banks[2]	100.3	2.2	7.1	4.2	113.7
World Bank[3]	320.8	63.8	65.0	61.0	510.7
Asia	344.7	243.4	71.7	85.4	745.1
	46.3%	*32.7%*	*9.6%*	*11.5%*	*100.0%*
Banks[2]	135.7	80.1	10.6	16.9	243.3
World Bank[4]	209.0	163.3	61.1	68.5	501.9
Eastern Europe	138.0	42.6	101.9	90.9	373.4
	37.0%	*11.4%*	*27.3%*	*24.3%*	*100.0%*
Banks[2, 5]	7.3	0.5	14.3	5.3	27.4
World Bank[6]	130.8	42.2	87.5	85.6	346.1
Total[7]	1,044.5	377.1	329.4	331.4	2,082.5
	50.2%	*18.1%*	*15.8%*	*15.9%*	*100.0%*
Banks[2]	245.0	73.9	32.9	22.3	374.1
World Bank	799.5	303.2	296.6	309.1	1,708.4

Note: Obligor total includes other developing countries. World Bank figures for 1996 are preliminary and refer to debt maturity greater than one year. Multiple-currency debt reported by the World Bank is distributed among underlying currencies according to the composition of the World Bank currency pool. Figures may not add due to rounding.

[1] Including unidentified. [2] Excludes bank claims of more than one-year maturity, including medium-term debt with remaining maturity of less than one year. Semi-annual maturity distribution applied to quarterly currency distribution. Includes author's estimates of currency breakdown of debt to banks in offshore centres and other debt to banks for which no official currency breakdown is available. [3] World Bank subtotal for Latin America and the Caribbean. [4] Comprises World Bank subtotals for East Asia and Pacific and South Asia. [5] Includes former Yugoslavia. [6] Comprises World Bank subtotals for Europe and Central Asia. [7] Includes Africa.

Sources: World Bank and BIS.

borrowing in euros.[39] Currently, the weight of the European currencies in the reserves of non-industrial countries (Table 5) is noticeably heavier than in the debt of those countries.

It is thus possible that a larger supply of euro-denominated assets, which on portfolio balance reasoning would push down the value of the euro, could outweigh a larger demand, which

[39] Small EU countries such as Ireland and Portugal may be tempted to borrow exclusively in the broad and deep euro market, instead of using local currencies, marks, dollars and other currencies. (For some EU countries, such a policy might miss an opportunity to use debt management as a substitute for exchange rate flexibility. If a country has larger than EU-average trade shares with the dollar area, it is more exposed to a loss of exports resulting from a dollar depreciation. Whereas, before, the tendency of the currency to fall against the mark served to buffer the economy against dollar depreciation, going forward, the economy could benefit from the interest savings on dollar-denominated debt in the event of dollar depreciation.) Working in the opposite direction, it must be admitted, is the new World Bank policy of offering its borrowers a choice in the denomination of credits. Previously, the World Bank mixed a currency cocktail, heavily weighted towards low-interest-rate currencies in Europe and the yen, and gave its borrowers no choice but to accept the cocktail. Evidently, the World Bank will be lending a higher share of dollars under the new policy. I am indebted to Jeffrey Shafer for pointing out this "dollar-negative" factor to me.

would push it up.[40] At any rate, one should not attempt to calculate the effects of the greater attraction of the euro for official and private asset managers without considering that it might exert a similar attraction for debt managers.

3.5 Volatility

The question of the long-run effect of monetary union on the volatility of the dollar breaks into two issues: the volatility of the bilateral dollar/euro rate – as compared with the historical volatility of the dollar/mark rate – and the volatility of the effective dollar rate, that is, the average volatility of the dollar against the currencies of US trading partners, each weighted by the importance of its trade.[41]

An often-heard view is that altered constraints on European monetary policy will leave the dollar more volatile against the euro than it has been against the mark. That is, many observers predict that, in the long run, the ECB will attach little importance to stabilising the euro's exchange rate, pursuing, instead, a policy sometimes called "benign neglect". The argument starts with the observation that the euro area will be more closed than its constituent national economies, with a ratio of imports to domestic product in the neighbourhood of one-tenth, as in the United States and Japan. Prices in the large euro area, potentially including currencies pegged to the euro, will therefore be less influenced by foreign prices as translated by the exchange rate. As a result, a given appreciation or depreciation of the euro will exert a less deflationary or inflationary force, and the need to adjust interest rates to counter such forces will be reduced accordingly (Kenen (1995), pp. 122-3, and Begg, Giavazzi and Wyplosz (1996, p. 15)).[42]

This argument in its bald form ignores the considerable cohesion of European currencies in the face of dollar movements, which means that the single currency result has already been approached in varying degrees. When that cohesion was severely strained in 1995, however, the dollar's depreciation passed through to an unusual extent into an effective appreciation of the mark, with unusually powerful effects on German exports and investment spending. Not just a weak dollar but also weak European currencies against the mark dampened activity in Germany and prompted interest rate cuts.

The benign neglect story might therefore be better phrased in the following fashion: monetary union might reduce the policy salience of the exchange rate because dollar weakness will no longer be associated with European currency strains. Indeed, a weakening dollar has generally

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[40] See Alogoskoufis et al. (1997) for the argument that the shift of assets into the euro should be expected to occur faster than the offsetting shift of liabilities. Their argument, however, ignores the importance of short-term international debt (as Thailand's difficulties remind us), the capacity of currency swaps to transform extant exposures and the euro's stimulus to short-term securities markets in Europe.

[41] An intermediate question is how dollar/euro volatility might compare with dollar/ecu volatility. Thygesen et al. (1995, p. 129) suggest that volatility and cycles in the former will be larger than volatility and cycles in the latter, but their reasoning is not clear.

[42] See Martin (1997) for a treatment of this argument in the context of two countries with interacting policies.

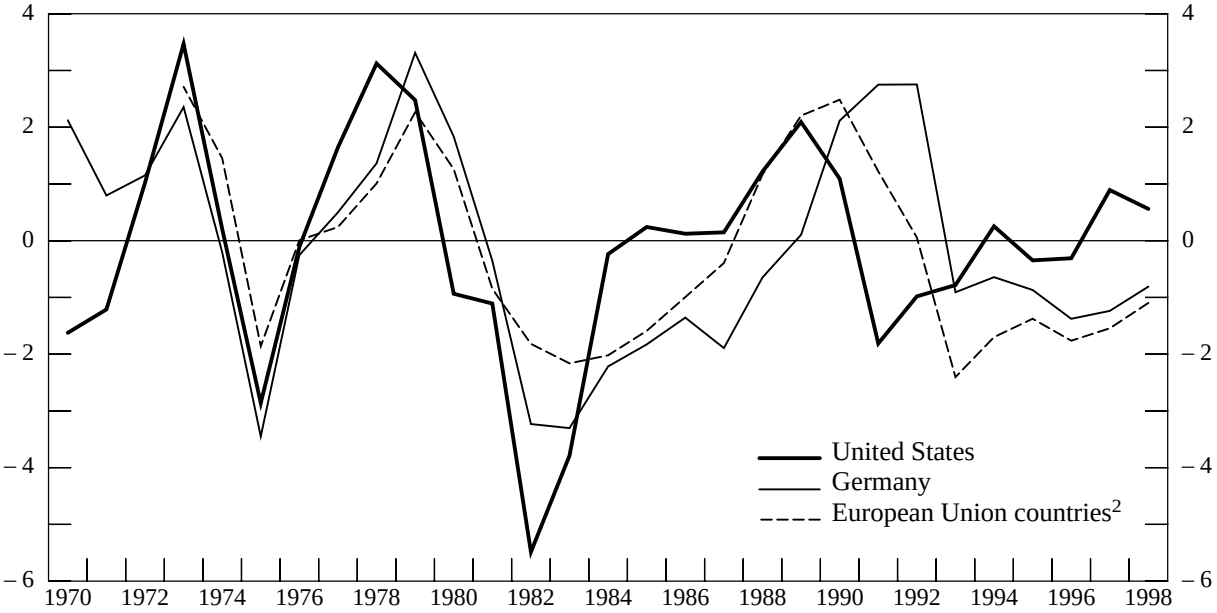
preceded realignments within Europe (Graph 3),[43] most spectacularly but by no means uniquely in 1992 when the German economy needed the cooling-off of a strong mark, while the British and Italian economies did not. With monetary union, European central bankers might spend fewer weekends worrying about the dollar's exchange rate.

Two policy counter-arguments point in the opposite direction, however, suggesting that a dollar/euro exchange rate may be less volatile than the dollar/mark rate has been. The first is the implication of the wider domain of monetary policy-making in Europe after currency union (Kenen (1997), Dornbusch, Favero and Giavazzi (1997)). Interest rate policy under the single currency will presumably respond not to business conditions in one country, but rather to conditions in a larger, possibly more heterogeneous, euro area. Whereas demand pressures in Germany might call for a sharp change in interest rates, conditions elsewhere might require no change at all. Recall the case of German reunification. Had the ECB been in existence, interest rates would not have gone so high (quite apart from any national differences in the tolerance of inflation). Given policy set with an eye to stabilising activity in the euro area as a whole, the amplitude of European interest rate swings from the trough to the peak of the European business cycle can be expected to be smaller.[44] In fact, before

Graph 12

Output gaps[1]

In percentages



[1] Deviations of actual GDP from potential GDP as a percentage of the latter. [2] Weighted by central banks' shares of the EMI's financial resources.

Sources: OECD *Economic Outlook*, June 1997 and EMI *Annual Report*, 1994.

[43] Graph 3 transforms the chart of Giavazzi and Giannini (1987), recently updated by Buiter et al. (1997) into a "spider" diagram.

[44] See Masson and Turtelboom (1997) for a simulation with a very strong result in this direction. Artus (1996) argues that monetary policy will have to be more restrictive to respond to a given inflationary threat, however, because, given the size of the euro area, the effect of a stronger euro on domestic prices will be weaker than the effect of a stronger mark on German prices.

the 1990s, the output gap of the EU as a whole swung less widely than did the output gap for Germany, suggesting the potential for a more stable European interest rate policy than the observed German policy (Graph 12).[45] Since the EU cycles and the US cycles were no more out of synchronicity than the German and US cycles, there is reason to expect the dollar/euro rate to prove more stable than the dollar/mark rate.

Another policy argument posits a difference in policy preferences reflected in membership of the ECB's board. If national preferences for effective exchange rate stability differ, the collective determination of European monetary policy in the ECB could increase the policy weight placed on exchange rate stability Although the core European countries as a group have shown quite stable effective exchange rates, the Deutsche mark has displayed somewhat higher volatility than its neighbouring currencies (Table 12). If this record manifests policy preferences, rather than merely size differences, then the euro's managers might be expected to try harder to stabilise the euro, and might even succeed.

Table 12

Volatility of nominal effective exchange rates[1]

Annual averages, in percentages

Country	1983[2]-96	1993-94	1995-96
Belgium	2.5	3.0	2.6
Netherlands	2.8	2.6	3.0
France	2.9	2.8	3.0
Denmark	3.0	3.2	2.7
Spain	3.3	4.6	3.1
Germany	3.4	3.7	3.9
Canada	3.5	4.4	4.1
Italy	3.7	5.4	6.3
Sweden	3.9	6.8	5.6
United States	4.7	4.2	3.8
United Kingdom	5.2	4.9	4.3
Japan	6.4	7.2	7.4
Australia	7.5	8.0	7.1

[1] Volatility is measured as the annualised standard deviation of daily percentage changes in nominal effective exchange rates calculated over a calendar month. Nominal effective exchange rates are based on trade flows in manufactured goods between 25 countries. [2] October-December.

Source: BIS.

Without taking a view on the balance of these conflicting opinions about the way in which dollar/euro volatility will compare with dollar/mark volatility, it is still possible to come to a presumption regarding the volatility of the effective dollar rate, which represents at the same time a

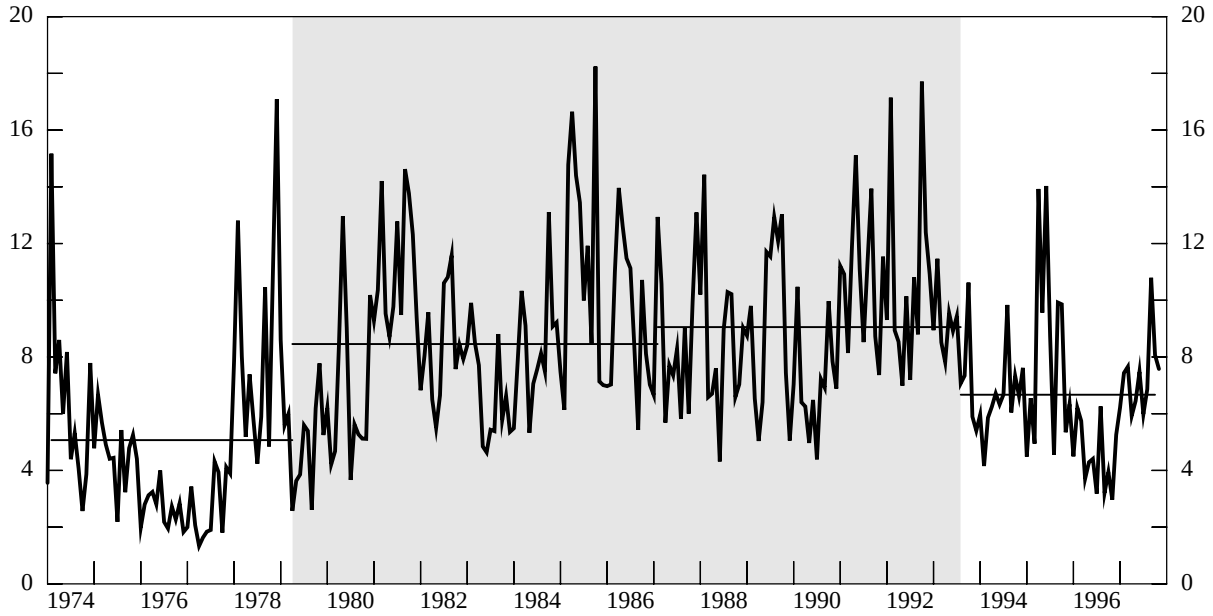
[45] For evidence of central bank responses to the output gap, see Clarida et al. (1997).

presumption regarding the volatility of the effective euro. The effective dollar rate has tended to be much less volatile than either the dollar/mark or the dollar/yen exchange rate. This relative stability has resulted from the comparatively low volatility of currencies in the large area over which the dollar is used as an anchor, including parts of Asia, but it also derives from the less than perfect correlation of European exchange rates against the dollar (Graph 2). It follows that monetary union in Europe, which will effectively raise the correlations of a group of dollar exchange rates to unity, will render the effective dollar rate more volatile, *other things being equal.*[46] If the dollar/euro exchange rate is no less volatile than the dollar/mark exchange rate has been, it is fairly likely that the effective dollar rate will be more volatile with a single currency in Europe. This statement is close to a tautology but it gains some support from observations of the dollar's effective volatility over the last generation.

Graph 13

Effective dollar volatility and European currency cohesion

In percentages



Notes: Volatility is measured as the annualised standard deviation of daily percentage changes during calendar months in the Federal Reserve index of the dollar's effective exchange rate. The weight of the European currencies in the dollar index is 77.3%. The horizontal lines indicate the average volatility for the periods January 1974-February 1979, March 1979-December 1986, January 1987-July 1993 (excluding September 1992) and August 1993-September 1997. The shaded area represents the period during which narrow ERM bands of fluctuation prevailed (March 1979-July 1993).

Going beyond theoretical analyses of the prospective volatility of the euro (Cohen (1997) and Bénassy-Quéré et al. (1997)), consider the "natural experiment" represented by observations of the volatility of the effective dollar rate in periods defined by the different degrees of cohesion among European currencies. The effective dollar rate has generally been more volatile since European

[46] Thus, a conclusion that the European Monetary System had no effect on the dollar's volatility cannot be drawn by examining the volatility of the bilateral exchange rates between the dollar and each European currency without regard to the covariances. See Kole and Edison (1994).

currencies moved into the Deutsche mark's orbit in the late 1970s.[47] The effective dollar's volatility averaged about 9% during the narrow-band period 1979-92 and reached even higher levels during the "hard" ERM period 1987-92. Since September 1992, this volatility has tended to fall and has averaged about 7% since the widening of the ERM bands in the summer of 1993 (Graph 13). In short, the volatility of the effective dollar was highest when European rates were most cohesive, is middling now with wide bands, and was lowest before the ERM.[48] Looking forward, monetary union is likely to take the dollar's effective volatility back up to the levels of the 1980s.[49]

3.6 Summary

There is no immediate prospect for the euro's use as an anchor currency outside Central Europe and the Mediterranean. Still, a successful euro could deepen Europe's financial markets and conceivably make the evolution of European bond prices more independent of developments in New York. Both greater depth and better diversification possibilities could attract more international investment to the euro. The prospect of substantial portfolio shifts into the euro, however, does not by itself justify forecasts that the new currency will appreciate against the dollar over an extended period. Liability managers outside the euro area should also find the enhanced liquidity and improved diversification possibilities of euro-denominated debt attractive. Thus, in response to a shift in demand, global financial markets are capable of producing euro-denominated assets by changes in the currency habitats of international borrowers. Even if there are net (ex ante) shifts into the euro, their impact on the exchange rate could be less than generally believed (see Annex 1).

With respect to volatility, there are grounds for expecting a more volatile effective exchange rate for the dollar. In the absence of the buffering effect of the systematic tendency of European exchange rates to weaken against the mark when the dollar does so, the dollar is likely to move more widely against the weighted average of US trading partners' currencies.

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47 Padoa-Schioppa (1985), demonstrating that the European Monetary System had succeeded in mapping out a zone of monetary stability, showed that European currencies experienced lower volatility in the period March 1979-March 1984 than they had in the period March 1973-March 1979, while the dollar, pound and yen all experienced higher volatility. Padoa-Schioppa did not entertain the possibility that the cohesion of the European currencies might be connected to the higher volatility of the other currencies.

48 These observations need not contradict the cross-sectional result of Martin (1997), p. 8, who finds that "EMS currencies have a lower volatility with currencies not in the EMS".

49 In all likelihood, the larger the euro area, the higher the dollar volatility. See Ghironi and Giavazzi (1997) for implications of size of the euro area.

Conclusions

Broad monetary union in Europe would introduce a euro that would generally carry more weight as an international money than the mark carries but less weight than currently adheres to the sum of the euro's constituent currencies. In the foreign exchange market, the euro is likely to be on one side of 50 to 60% of all transactions, more than the mark's 37% share but less than the 70% share of all EU currencies at present. In the invoicing of international trade, the euro is likely to denominate something like one-quarter of world trade, more than the mark's sixth, but less than the combined EU currencies' third. As a reserve currency, the euro is likely to claim a share of about one-sixth, much the same as the mark, and lower than the one-fifth claimed by all EU currencies (including sterling). In terms of international private assets, the euro's likely share of one-seventh would be no higher than the mark's current share and would be half of EU currencies' joint share. When one compares the euro's prospective role to the one-third share of EU G-10 countries in G-10 GDP or international trade, one can readily conclude that the new currency's economic base would support a larger role of the euro as an international money. Add to these comparisons an increase in the breadth, depth and liquidity of the European financial markets, with the possible implication of greater independence of returns in European fixed income markets from those in New York, and the potential for the euro as an international money comes into view.

But the very act of union will tend to push up the dollar's share on all these measures (Table 13). In the foreign exchange market, 92% of transactions would have the dollar on one side. In trade invoicing, the dollar would serve as the currency of contract for 59% of all transactions. As a reserve currency, the dollar would represent three-quarters of all holdings. And among international private assets, the dollar's share would rise to 50%. From one perspective, the prospective rise of the dollar on these measures is uninteresting, reflecting as it does the merely arithmetic effect of treating the EU as a single monetary area. After all, although intra-European foreign exchange transactions will indeed disappear – to the considerable benefit of Europeans (Emerson et al. (1992)) – a Martian would discern no visible change in economic activity: European trade would continue, and might grow faster; European central banks would have domestic assets instead of foreign assets; and European borrowers would continue to sell their bonds to Europeans in other countries, even if no longer denominated in a foreign currency. But from another perspective, the rise of the dollar's share on these measures points to the limited, regional success of the mark as a vehicle currency in transactions and trade denomination, as an official reserve currency and as a standard of deferred payment. In a world of unbalanced growth, this regional focus of the mark as an international money has consequences for the prospective role of the euro.

The rapid growth of output and international trade in Asia, its spread to the larger economies of the region, and the general dollar orientation of Asian exchange rate policies imply that the dollar area has been growing faster that the world economy as a whole. (If the US economy continues to grow faster than the rest of the G-10 economies, the pattern of growth across the G-10

Table 13

International uses of major currencies before and after the introduction of the euro

In percentages

Use	Currency	Before	After
Official reserves[1]	EU currencies/euro	24	16
	US dollar	69	76
	Japanese yen	7	8
International assets	EU currencies/euro	34	13
	US dollar	40	53
	Japanese yen	12	15
Foreign exchange market transactions[2]	EU currencies/euro	70	56
	US dollar	84	92
	Japanese yen	24	26
Denomination of trade	EU currencies/euro	34	22
	US dollar	48	59
	Japanese yen	5	6
Memorandum items:			
GDP as a percentage of total G-10 GDP	*Euro area G-10*	36	36
	United States	37	37
	Japan	23	23
International trade as a percentage of G-10 trade	*Euro area G-10*	55	32
	United States	23	34
	Japan	13	20

[1] Components sum to 100% despite the Swiss franc's 1% share owing to rounding. [2] These figures represent the turnover in which a given currency appears on one side of a transaction; consequently the percentages sum to 200% (including currencies not shown).

Sources: *Central Bank Survey of Foreign Exchange and Derivatives Market Activity 1995*, Hartmann (1996), p. 7 (citing Ilzkovitz (1995)), United Nations, IMF, BIS and author's estimates.

countries will only reinforce the faster growth of the dollar area.) To be sure, the introduction of the euro will effectively enlarge the European currency zone by eliminating the gravitational effects of the dollar on the economies at the edges of Europe (Graph 2). But this enlargement, which may occur in several stages and eventually include the countries of central Europe, is contrary to general movement in the opposite direction produced by faster growth in economies more oriented toward the dollar. Dollar Telephone and Telegraph is installing many new lines in young countries while Euro Telephone and Telegraph will not on current trends enjoy such customer growth after it has finished rewiring Central Europe.

Some analysts have therefore discerned signs of a levelling-off or even reversal in the 1990s of the long decline in the dollar's role (Oppers (1995), Frankel (1995), and Eichengreen and Frankel (1997)), which in any case was subject to overstatement (Kenen (1983)). Changing the metaphor, the plate tectonics of the global economy, adding to the economic mass of parts of the

world where wealth is still measured in dollars, may serve to sustain and even to increase the dollar's role.

Looking further ahead, there is no guarantee that the dollar area will continue to grow more rapidly than the world as a whole on the basis of rapidly growing Asian economies linked to the dollar. By mid-1997, growth prospects had darkened for some of the fast-growing countries of Asia. The depreciation of Asian exchange rates in the summer of 1997, moreover, put their dollar anchoring in question and may give rise to a larger role for the yen and the euro.

What needs to be borne in mind, though, is the ambiguity of the relationship between the respective international roles of the euro and the dollar, on the one hand, and the exchange rate between them, on the other. Were the euro to figure more importantly in the management of industrialising economies currently anchored to the dollar, asset managers *and* liability managers there would be more likely to shift their portfolios towards the euro. Since these countries are generally running current account deficits and thereby accumulating international debt, however, such a portfolio shift from the dollar to the euro would tend to produce a lower exchange rate of the euro against the dollar.

Thus, however the euro, dollar and yen stand in relation to each other as international moneys a generation from now, the best prediction is that the exchange rate between the dollar and euro will reflect inflation outcomes, growth performance and long-term developments in net foreign asset positions on either side of the Atlantic. Over shorter horizons, the relation between business cycles and associated cycles in monetary policy will figure importantly in variations in the dollar/euro rate. Portfolio flows between the euro and the dollar might at times exert a powerful force, but they are unlikely to run in a single direction enough to predominate in setting the dollar/euro rate.

Annex 1: Quantitative effects of portfolio shifts

This appendix tackles two different aspects of portfolio shifts from the dollar into the euro. First, it considers the implications of shifts from dollar cash into euro cash holdings by residents of third countries. Secondly, given ex ante shifts from the dollar by official or private asset managers, it asks what order of magnitude of change can be expected in exchange rates.

Effects of redistributing seigniorage

When considering the effect of monetary union on the international role of the dollar, it is important to keep in mind what is *not* at stake. One such matter is a large flow of seigniorage, the interest savings to the US Treasury that result from foreigners' holding hundred-dollar bills. Official reserves bear interest and so do not convey a windfall to the issuing country. (Although US Treasury bills may yield slightly less owing to the substantial share held by foreign central banks, the roughly 10% higher yields paid on private instruments like bank deposits mostly reflect liquidity and default risk differences.) Countries can and do borrow to build up their reserves, so reserve accumulation need not entail a resource transfer to the reserve-currency country. The intermediation margin between dollar borrowing rates and returns on dollar reserve holdings is determined in competitive markets and large bank deposits in the United States no longer attract a reserve requirement. This margin, moreover, need not accrue to the nationals of the reserve-currency country; indeed, a substantial fraction of official dollar reserves, perhaps one-quarter, appears to be held outside the United States (BIS (1997b), p. 83). Furthermore, foreign branches and agencies in the United States receive some fraction of official dollar deposits. Similarly, the private use of the dollar typically does not convey seigniorage to the United States.[50]

Only holdings of dollar cash by foreigners (estimated at $200-250 billion) pay an annual tribute, estimated at $12-15 billion, in the form of interest savings (Porter and Judson (1996) and Johnson (1994)). Even those analysts of European monetary union who foresee a significant shift of this seigniorage towards the euro have estimated a stream of seigniorage measured in single-digit billion dollar figures and recognised its tiny potential contribution to the GDP of Europe.[51] Indeed, when the substitution of euros for marks occurs in the new millennium, there is a risk that the stock of Deutsche mark notes held outside Germany might not be replaced by crisp new euro notes but might instead be put into interest-bearing bank accounts or even dollar cash. At risk here is a current flow of

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50 For an opposing view, see Tavlas, 1991, p. 12.

51 Emerson et al. (1992), using an estimate of $100 billion for offshore dollar cash, guesstimate that one-third of that amount could shift into ECUs, which at a 7% nominal interest rate would generate a $2.5 billion of seigniorage per year, or 0.045% of EU GDP. If one doubles the $100 billion, halves the interest rate and makes some allowance for the DM 65-90 billion estimated by the Bundesbank (1995, p. 70) to be already circulating in Turkey, Poland and elsewhere, the seigniorage would remain a single-digit billion dollar equivalent, making a point-zero something contribution to EU GDP. Alogoskoufis and Portes (1992, p. 292) produce an estimate similar to that of Emerson et al. Johnson (1996, p. 165) considers the case in which $100 billion of euro notes are held outside the euro area. See Rogoff (1997) for a discussion of the merits and demerits of international competition for seigniorage.

seigniorage to Germany (at 3% per annum) of DM 2-3 billion. Note that, despite counterfeiting problems, the US Treasury was careful not to force the exchange of old hundred-dollar bills for newly introduced bills recently lest cash tendered in the exchange not return to its sterile mattresses, stashes and safe deposit boxes.

Effects of portfolio shifts

As for the exchange rate effect of the portfolio shifts described above, a quantitative perspective is useful.[52] The stock of debt issued by the governments of the G-10 countries is about $10 trillion. In a somewhat stylised case of $3 trillion of debt in dollars and an equivalent amount in euros, a $30 billion supply shift from dollars into euros represents about 1% of either debt stock. If interest rates do not respond, so that the half-and-half portfolio demands are not disturbed, the dollar would have to fall by 2% against the euro to restore portfolio balance. Such an exchange rate change is not much more than the standard deviation of one week's movement in the dollar/mark rate. In this example, the underlying asset stock and the exclusion of interest rate effects both work to increase the hypothetical exchange rate effect of the $30 billion shift. Under more realistic assumptions, the long-run effect of even triple-digit portfolio shifts would not stand out in monthly trading, although some short-run digestion of shifts might be noticeable for a time.

52 See Hung et al. (1989).

Annex 2: Dollar/mark polarisation and the Swiss franc

In February 1996 the head of the Swiss Federal Department for Economic Affairs asked a commission of academics and bureaucrats, with representation of employers, employees and bankers, to report on the implications of European monetary union for the Swiss economy. The Commission's report (Commission (1996)), made public in November 1996, considered four scenarios: 1) a narrow monetary union starting on time; 2) a broad monetary union starting on time; 2) a credible delay; and 4) a non-credible delay. The text of this essay above noted the report's view that capital is already fleeing the euro area into Switzerland, as well as the Bundesbank's view that no solid evidence existed for this view. The available data give little hint as to the origin of funds in trust accounts of Swiss banks, although there are suggestive observations, like the *Wall Street Journa*l headline earlier this year, "More German Banks Are Opening Swiss Units."[53] In any case, the report concluded famously with some contingency planning: if under scenario 2 or 4 the flight of capital into Switzerland threatened to push the franc to unbearable heights, the franc could be pegged to the euro for a time.[54] Swiss National Bank authorities have from time to time repeated this possibility publicly, which is perhaps the monetary equivalent of letting potential invaders know that dynamite is already set in your tunnels and under your bridges.

A potentially important implication for the Swiss franc, which was apparently not considered by the commission,[55] arises from the historical pattern of exchange rate changes in conjunction with the scale of the core European holdings of Deutsche mark deposits. A long-observed regularity in exchange markets is that mark strength against the dollar is often associated with weakness of most European currencies against the Deutsche mark (Graph 2). This dollar-mark polarisation has presented a useful risk reduction possibility for European investors. For a French investor, for instance, holding Deutsche mark assets has offered a useful hedge against dollar assets: when the dollar has declined against the French franc, the Deutsche mark has tended to rise. Partly for this reason, non-bank residents of France, Belgium, Netherlands and Austria hold mark deposits in London, Frankfurt and elsewhere (Table A.2.1). Were European exchange rates to be fixed, this negative covariance would disappear. An alternative would most likely remain, however, and it may become more attractive in international portfolios as a result of its greater scarcity: the Swiss franc.[56] This currency tends to appreciate against the Deutsche mark when it appreciates against the dollar. Given this tendency, the worst scenarios in terms of the potential appreciation of the Swiss franc would be ones in which the Deutsche mark rose, for instance scenario 4.

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53 Gerrit Wiesman, *Wall Street Journal Europe*, 21st-22nd February, 1997, p. 14.

54 An interesting question is whether Swiss interest rates would rise or fall under these circumstances. See Mauro (1996).

55 Or by Laxton and Prasad (1997), although they might model it as a persistent portfolio preference shift.

56 Eichengreen (1992), p. 58, suggests that "following EMU, investors in countries like France will have most of their wealth denominated in units of the single European currency. To minimise the risks caused by its fluctuation, they may find it attractive to hold additional dollars." But the Swiss franc might substitute for the lost services of the Deutsche mark better than would the dollar.

Table A.2.1

Holdings of Deutsche mark, Swiss franc and US dollar bank deposits by residents of core EU countries

In billions of US dollars, end-1996

Residents of:	Deutsche mark	Swiss franc	US dollar	Total
Germany	*	3.5	17.7	21.2
France	9.3	3.5	24.8	37.6
Netherlands	53.4	5.1	30.6	89.1
Belgium (/Luxembourg)	23.5	4.2	32.5	60.2
Austria	11.8	0.6	3.6	16.0
Total core Europe	98.0	16.9	109.2	224.1

Note: Non-bank holdings only.

* The deposits made in marks by German residents in non-German banks amount to US$ 149.8 billion.

Source: BIS.

If this nexus among dollar, mark and Swiss franc is expected to reproduce itself in the period of monetary union, as a nexus among dollar, euro and Swiss franc, some potential responses by private investors merit consideration. Some of the $98 billion equivalent of DM bank accounts held by the *ins* might be re-invested in the Swiss franc. To date, most of the reports of euro-related investment in the Swiss franc have centred on German residents redeploying their wealth. Given the disappearance of a negative covariance in dollar and DM returns for French, Belgian, Dutch and Austrian investors, some re-allocation of their portfolios might be expected.

In the long run, the development of euro financial markets (McCauley and White (1997)) may reduce the sensitivity of the Swiss franc/euro exchange rate to movements in the dollar/euro exchange rate (compared to that of the Swiss franc/mark rate to the dollar/mark). Following the argument of Galati and McCauley (1997) that the Swiss franc owes its extreme position in the dollar/mark axis to the disproportionate importance of international investment in the Swiss franc, then the internationalisation of the euro in comparison to its constituent currencies should lead to better balance between the Swiss franc and euro, and less volatility in their exchange rate. This seems to be the conclusion, and the grounds for reaching it, of the Commission:

> The more stable the Euro becomes and the more liquid monetary and financial markets in the EMU are, the more the Euro should establish itself as a currency for international investment, thereby competing against the Swiss franc. The risk of an increased volatility of the exchange rate of the Swiss franc resulting from the substantial difference in size between the European monetary zone and Switzerland will decrease. (Commission (1996), p. 3.)

Annex 3: Resources, constraints and incentives of European official reserve managers

This annex considers reserve management by European central banks in the transition stage and in the steady state and makes plausible estimates of the current composition of EU reserves. It must be said, however, that foreign exchange reserves reflect past intervention and they can rise or fall unpredictably even over a year or two. In particular, they can change markedly in any exchange market turbulence. That said, should one expect European central banks to sell marks in the approach to monetary union but to sell dollars in its aftermath?

Switches into dollars in the transition stage?

In the transition stage, purchases of dollars in the market could occur if participating central banks wished to preserve as foreign exchange reserves their substantial holdings of Deutsche marks and other core European currencies. The scale of these holdings, estimated at $126 billion or a little over a third of total EU foreign exchange reserves of $348 billion at end-1996, makes this an interesting possibility (see Table A.3.1).[57] If dollar weakness does not give such central banks an opportunity to intervene and sell marks against dollars, and off-market transactions were not possible, some portion of the estimated $126 billion could be sold on the market this year or next. The possible motivates for such conversions are by no means obvious. The rules for sharing the seigniorage arising from non-interest-bearing euro liabilities of the European System of Central Banks (ESCB) could conceivably provide incentives to hold dollars from the start of the ECB.[58] But the incentive might pertain less to income or wealth than to power: the rules of the ECB could leave the national central banks more discretion over their (residual) foreign currency assets than over their domestic assets. Sheer uncertainty with respect to either the economic or political implications of a central bank's asset composition might recommend a switch into dollars.

Several considerations, however, render the prospect of large and possibly disruptive switches into dollars in the near term less likely: the possibility that some European currencies will

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57 Compare Kenen (1995), p. 114, who reports that EC countries held "more than a quarter" of their foreign exchange reserves in EC currencies in September 1991, according to calculations based on unpublished IMF data. Also compare Gros and Thygesen (1992), who put EU foreign currency reserves held in EU currencies at 40% (p. 403) or 55% (p. 254). Also compare Kenen (1996, p.24), who wrote that "The deutsche mark holdings of EU countries probably account for about 20% of EU foreign-exchange reserves and for about 25% of the currency reserves of EU countries other than Germany". Also compare Masson and Turtelboom (1997, p. 205) who appear to treat all ECUs as official ECUs.

58 The intention is to distribute the euro's seigniorage according to the shares shown in Table A.3.2. The problem then becomes how to identify the seigniorage. The European Monetary Institute (1997), p. 77, reports that the method for identifying seigniorage foreseen in Article 32.2 of the ESCB/ECB Statute was to earmark assets corresponding to cash and bank reserves and pool the actual income earned on those assets. Difficulties in harmonising central bank accounting, however, have led to work on an alternative method, which could be used for up to five years. Under this alternative method, income would be imputed to the assets corresponding to cash and bank reserve liabilities musing the monthly repo rate on euros (see "Dispute over ESCB Profits," in *Central Banking* (1997, p. 8)). At a time of record low European short-term rates, a central bank concerned about its income – and sceptical about the Fisher open interest parity hypothesis – might prefer dollar to euro assets.

Table A.3.1

Foreign exchange reserve composition of EU members

In billions of US dollars and percentages, at end-1996

Currency	Core EU[1]		Other EU[2]	Total
		excluding Germany		
Core EU	33 23%	33 45%	93 45%	126 36%
Other currencies	109 77%	41 55%	113 55%	222 64%
Total EU	142 100%	74 100%	206 100%	348 100%

Note: Foreign exchange reserves are calculated as total foreign exchange reserves reported by the IMF less one-fifth of gold reserves (at the end of September) assumed to have been swapped for official ECUs. It is assumed that 45% of the reserves of both core EU countries excluding Germany and other EU countries are held in core European currencies. Other currencies are mostly dollars. Components may not sum to total owing to rounding.

[1] Austria, Belgium, France, Germany, Luxembourg and the Netherlands (and ECUs with respect to currencies).
[2] Denmark, Finland, Greece, Ireland, Italy, Portugal, Spain, Sweden and the United Kingdom.

Sources: IMF, BIS and author's estimates.

remain outside the currency union for a time; the attractions of a passive strategy; and the fact that the first round of reserve pooling is unlikely to force sales of marks for dollars. If some EU countries were not to join monetary union initially, they might well need holdings of marks (and then euros), and might even seek to hold more reserves in core European currencies (or in euros) to back their commitments under an ERM II. This would hold especially if these "outs", or so-called "pre-ins", were to anticipate that the market for exchanges of their domestic currency against the euro would gain relative to the market for exchanges against the dollar.[59]

For central banks entering the monetary union, the alternative of inaction would permit reserves currently held in European currencies to be transformed into euros and invested in domestic assets. Central banks that anticipate an excess of foreign exchange reserves under the single currency (see below) might find this do-nothing strategy attractive. It has been suggested that this course would be compelling because as the reserves become euros they could be used to retire government debt (Persaud and Dambassinas (1996)). Strictly speaking, however, any transfer of euros from a central bank to its treasury would have to take the form of a special dividend paid out of the central bank's retained earnings.[60] As suggested by the dispute over the German Government's proposal to take into

[59] This would reverse the gain in dollar transactions relative to mark transactions shown in exchanges against the lira and pound sterling between 1992 and 1995 (BIS (1996b), p. 96). For the link between the currency composition of transactions and the composition of reserves, see Dooley et al. (1989).

[60] Such a payment could also be made out of any gains recorded when mark-denominated reserves become euros (if, for instance marks were carried at historical values in terms of domestic currency on the central bank's balance sheet) or from a revaluation of gold holdings.

Table A.3.2

Reserve pooling of ECU 50 billion at the European Central Bank: three scenarios

In billions of US dollars, at end-1996

Country	Weight(%)	Foreign exchange (FX) reserves*	Gold reserves at end-1996 market value	Only FX pooled (% of FX)	Equal amounts of FX and gold pooled (% of FX and % of gold)		Equal proportions of FX and gold pooled (% of FX and % of gold)	
					FX	*Gold*	*FX*	*Gold*
Core EU								
Germany	*22.6*	68.6	35.1	14.0	7.0	7.0	9.3	4.7
				20.4	*10.2*	*19.9*	*13.5*	*13.5*
France	*17.0*	16.9	30.2	10.6	5.3	5.3	3.8	6.8
				62.5	*31.2*	*17.5*	*22.4*	*22.4*
Netherlands	*4.3*	21.5	12.8	2.6	1.3	1.3	1.7	1.0
				12.3	*6.1*	*10.3*	*7.7*	*7.7*
Belgium/ Luxembourg	*3.0*	14.2	5.7	1.8	0.9	0.9	1.3	0.5
				12.9	*6.5*	*16.1*	*9.2*	*9.2*
Austria	*2.3*	21.0	4.0	1.4	0.7	0.7	1.2	0.2
				6.8	*3.4*	*17.9*	*5.7*	*5.7*
Subtotal	*49.1*	142.2	87.8	30.5	15.2	15.2	18.8	11.6
				21.4	*10.7*	*17.3*	*13.2*	*13.2*
Other EU								
Italy	*15.9*	39.0	24.6	9.8	4.9	4.9	6.0	3.8
				25.2	*12.6*	*20.0*	*15.5*	*15.5*
United Kingdom	15.4	35.7	6.8	9.5	4.8	4.8	8.0	1.5
				26.7	*13.4*	*70.1*	*22.4*	*22.4*
Sweden	*2.9*	17.8	1.8	1.8	0.9	0.9	1.6	0.2
				10.1	*5.1*	*50.0*	*9.2*	*9.2*
Spain	*8.9*	54.7	5.8	5.5	2.7	2.7	5.0	0.5
				10.0	*5.0*	*47.4*	*9.1*	*9.1*
Greece	*2.0*	17.0	1.3	1.2	0.6	0.6	1.2	0.1
				7.3	*3.7*	*47.8*	*6.8*	*6.8*
Portugal	*1.9*	14.2	5.7	1.1	0.6	0.6	0.8	0.3
				8.1	*4.0*	*10.1*	*5.8*	*5.8*
Denmark	*1.7*	13.3	0.6	1.1	0.5	0.5	1.0	0.0
				7.9	*4.0*	*88.0*	*7.6*	*7.6*
Finland	*1.7*	6.1	0.6	1.0	0.5	0.5	0.9	0.1
				16.8	*8.4*	*85.4*	*15.3*	*15.3*
Ireland	*0.8*	7.7	0.1	0.5	0.2	0.2	0.5	0.0
				6.5	*3.2*	*248.4*	*6.4*	*6.4*
Subtotal	*51.0*	205.5	47.3	31.6	15.8	15.8	25.7	5.9
				15.4	*7.7*	*33.4*	*12.5*	*12.5*
Total EU	*100.0*	347.7	135.1	62.1	31.1	31.1	44.6	17.5

Note: Weights are taken from the EMI Annual Report, 1994, p.71. Components may not sum to total owing to rounding. At end-1996, one ECU was worth $1.242.

* Calculated as total foreign exchange reserves reported by the IMF less one-fifth of gold reserves (at the end of September) assumed to have been swapped for official ECUs.

Sources: EMI, IMF, BIS and author's estimates

its budget some of the unrealised gains on the Bundesbank's gold holdings, such a special dividend raises questions among some European central banks. After all, the Maastricht Treaty prohibited central bank financing of governments. Gros and Thygesen (1992) make the point that investing the central bank's former marks, now euros, in domestic government debt is economically equivalent to handing the proceeds over to the government for debt reduction.[61] Indeed, the economic effect of shifting former marks (now euros) out of German government debt and into domestic debt would be visible only as a small change in the spread between the yield on German government debt and domestic government debt.

It is important to recognise that the first round of reserve pooling by the European central banks is unlikely to force sales of marks against dollars. In principle, an EU member having a high proportion of marks in its foreign exchange reserves could be forced to buy dollars because "Only assets denominated in currencies of non-EU Member States and gold will be eligible for transfer to the ECB".[62] But the numbers suggest that forced sales of marks against dollars are unlikely. Three scenarios for the initial pooling merit consideration (Table A.3.2).[63] In the first, European central banks contribute only foreign exchange to the agreed initial ECU 50 billion pooling. In the second and third scenarios, gold as well as foreign exchange is pooled. (These latter scenarios have some of the flavour of the transactions underlying the creation of official ECUs, for which central banks swap a given fraction of their dollar and gold holdings.) In no case does the pooling demand such a high fraction of non-European reserves as to force sales of marks against dollars. Of course, further amounts can be pooled after appropriate agreement.

As matters stand, therefore, European central banks are more likely to buy dollars for the purpose of maintaining reserve holdings than for the purpose of pooling. Given the market attention paid to their actions, however, shifts by any European central bank out of Deutsche marks into dollars are likely to remain modest. Moreover, European central banks not involved in the initial union but with commitments under an ERM II could desire more Deutsche marks and be prepared to buy some off-market.

Excess dollars in the long run?

After monetary union, European central banks may find that they have more dollars than they need. Emerson et al. (1992) put the excess of reserves at between $200 and 230 billion, but Kenen (1995), p. 115, shows that such figures imply excess *dollar* holdings of something like $40-70 billion. Gros and Thygesen (1992) use US reserves as a benchmark to suggest excess reserves of

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61 "From an economic point of view it does not matter how these former foreign exchange reserves are used. The net worth of the government (aggregating central bank and treasury) does not change when, for example, foreign exchange reserves are used to retire public debt" (Gros and Thygesen (1992), p. 254).

62 European Monetary Institute (1995) p. 57.

63 Compare Gros and Thygesen (1992), p. 403, which sets out country-by-country reserve holdings of non-EU currencies and compares these with pooling needs.

Table A.3.3

Surplus foreign exchange reserves of euro area: various recent estimates

In billions of US dollars

Source	Surplus			Benchmark
	Core EU	Other EU	Total EU	
CS First Boston *Keating* (*1996*)			none	US reserves as a ratio of trade with *non-dollar area*
JP Morgan *Persaud and Dambassinas* (*1996*)			30-70	average ratio of reserves to imports for 23 industrial countries
Goldman Sachs *Brookes* (*1996*)	30	93	123	1994 reserve/import ratios for individual EU countries
Paribas *Parsons* (*1996*)			none	current aggregate reserves/import ratio for the EU
Nomura *Golden* (*1996*)			100	current aggregate reserves/ import ratio for the EU
Union Bank of Switzerland *Adler and Chang* (*1996*)			some reduction plausible	"reserves are a residual that results from central banks leaning against the wind of dollar depreciation" (p. 22)
Salomon Brothers *Lipsky et al.* (*1996*)			none	"in a world of free capital movements, trade flows are not a good guide to the desired scale of reserves" (p. 39)
Morgan Stanley *Bulchandani* (*1997*)			possibly a deficit	larger portfolio shifts with larger, more liquid euro financial markets
Deutsche Bank *Deutsch* (*1997*)	50-90	150-110	> 200	US reserves of 1-1½ months' imports
Deutsche Bank *Hoffman and Schröder* (*1997*)			130	US reserves of 1-1½ months' imports

Note: Estimates presented in chronological order of publication.

about ECU 50 billion at one point in their discussion (p. 254) but revisit the question (p. 403) and use unpooled reserves to suggest excess reserves of ECU 80 billion.[64] The excess of reserves over each country's share of the ECU 50 billion in Table A.3.2 cannot be taken as the measure of this surplus, however, because calls beyond the ECU 50 billion can be made in the future. Unpooled reserves left at the national central banks, moreover, are not necessarily useless. Some countries, including Austria, Belgium and Italy, have dollar debt outstanding. Furthermore, national central banks could conceivably carry out foreign exchange intervention as long as they act "under instructions from the ECB".[65]

One crude but very popular benchmark against which to measure the potential excess is the shrinkage of EU members' international trade by about 60% when intra-EU trade ceases to be

[64] Could the inconsistency have arisen from different treatments of the dollars "swapped" for official ECUs, more a nominal than a substantial transaction?

[65] European Monetary Institute (1996), p. 56, based on Article 31 of the ESCB/ECB Statute requiring ECB authorisation for national central banks' foreign exchange operations.

international. The fraction of EU members' trade with each other, however, is shrinking because their trade with fast-growing countries whose currencies are anchored to the dollar is expanding most rapidly, albeit from a low base. One can imagine that EU countries would desire to reduce their international reserve holdings by something like one-half. But it should be recalled that EU reserve holdings denominated in core EU currencies amount to one-third of total holdings. If this fraction of international reserves is allowed to become euro-denominated assets, then EU countries would already have lost one-third of their reserves. Given this potential for passive reserve reduction, active reserve management in Europe might yield a reduction of one-sixth in current reserves, about $55 billion.[66] Most analyses of this question by economists at banks and securities firms have taken something like this approach (Table A.3.3).

The trade benchmark is an anachronism, however a vestige of thinking from the Bretton Woods era, when capital controls made imports the first and often the last claim on reserves. When the Bank of England was mobilising its reserves to defend the pound's link to the mark in September 1992, it was not only UK importers on the other side of the market. Although imports range from one-tenth to one-third of GDP, capital flows far exceed it (Table A.3.4).

Table A.3.4

Cross-border transactions in bonds and equities[1]

As a percentage of GDP

Country	1975	1980	1985	1989	1990	1991	1992	1993	1994	1995	1996
United States	4	9	35	101	89	96	107	129	131	135	163
Japan	2	8	62	156	119	92	72	78	60	65	84[2]
Germany	5	7	33	66	57	55	85	170	158	172	200
France		5	21	52	54	79	122	187	197	187	228
Italy	1	1	4	18	27	60	92	192	207	253	468
Canada	3	10	27	55	64	81	113	153	212	194	258

[1] Gross purchases and sales of securities between residents and non-residents. [2] Based on settlement data.

Source: National balance of payments data.

In practice, central banks accumulate and hold reserves as much as a by-product of other policies as owing to a reserve policy per se. Machlup's likening of reserve size and composition to the contents of his wife's closet – a collection of by-products of decisions rather than the object of an independent optimisation – suffers more from changing social norms for acceptable images among economists than from its loss in truth value. A recent attempt to model European reserve holdings,

66 Golden (1996) and Parsons (1996) get different numbers using this same trade benchmark, while Brookes (1996) uses current ratios of reserves to imports of individual EU countries in recognition of the wide range of observed ratios: from 0.8 months' imports for France; through 3.4 for the EU on average; and as high as 7.0 for Greece. Keating's (1996) approach has much to recommend it. He uses the United States as a benchmark but measures US reserves against US trade with the non-dollar area.

done under genteel duress, produced little in the way of robust results (Leahy (1997)). Contrary to the assertions of some market analyses,[67] reserves are not expensive to hold for countries with good credit ratings. Even if surplus reserves can in some sense be identified, is it safe to presume that they will be sold?[68] Moreover, caution would suggest deferring any paring of reserves until the process of union is very far advanced and the credibility of the ECB well secured. These considerations, in combination with the amounts involved and the time horizon, suggest that any reserve liquidation will prove to be modest in scale and limited in effect.

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67 "Excess reserves represent an economic loss," according to Persaud and Dambassinas (1996), p. 2.

68 Kenen (1995), p. 114: "The EC countries may be stuck with redundant dollars, just as they were stuck with gold after it was demonetized officially by the Second Amendment to the Articles of Agreement of the IMF". (European central banks could easily take a different view of gold acquired at $35 dollars an ounce, although total returns on dollars and gold measured from a late-1960s base have been converging for some time.)

Annex 4: European monetary union and the structure of the foreign exchange market

It is a commonplace that monetary union in Europe will shrink turnover in the global foreign exchange market. A euro area embracing all of the European Union will deprive foreign exchange dealers of something like 10% of the flow of their transactions (see Table 5 and BIS (1997b), p. 92).[69] From the standpoint of the participants in the foreign exchange market (if not from a broader point of view), this contraction of volume threatens to arrive at an awkward time. Technical change is already squeezing the revenue of market participants. Initially, electronic brokering offered by Reuters and a consortium of banks was meant to challenge the business of the voice brokers. But medium-sized banks that previously transacted directly with other banks have seen how the electronic brokers have rendered price discovery in the market more transparent and have narrowed trading margins, and they are also switching away from direct dealing to electronic brokering. (At this stage, the innovation of electronic brokering appears to be on the steepening portion of its logistic S-curve of diffusion.)

Less well appreciated is the effect of the euro on the structure of foreign exchange dealing. As things stand, the dollar remains the main vehicle currency in the foreign exchange market. Although US GDP and trade represent only one-fifth the GDP and trade of industrial countries, the dollar is used on one side of over 80% of all transactions. The decline in the dollar's role as a vehicle currency has not favoured a whole matrix of cross exchange rates not involving the dollar, as modelled by Black (1991). Instead it has favoured the mark, which as noted in the text is to be found on one side of $140 billion of the daily $150 billion in transactions of one EU currency against another. (Table 4 shows $300 billion of transactions in European Monetary System currencies, but this figure counts both sides of each transaction, whereas the mark figure above counts only one side.) Thus, not only is a transaction of French francs against Spanish pesetas likely to entail transactions against marks, but a customer transaction of French francs against dollars is likely to be balanced with a franc/mark transaction and a dollar/mark transaction between interbank counterparties.

Judging from the 1995 data, the euro, at its birth, would trade in a foreign exchange market in which the dollar is more dominant than today. With a broad monetary union, the euro would be appear on one side of 56% of all foreign exchange transactions, larger than the 34-40% share of the mark, but smaller than the 70% share of EU currencies. The dollar would be on one side for nine out of ten dollars of foreign exchange transactions, a fraction not observed since 1989 (BIS (1993), pp. 8-9). Exchanges of euros against yen would amount to a twentieth of exchanges of euros against dollars and a tenth of exchanges of yen against dollars. The other sizeable exchange rate pair not involving the dollar would be exchanges of euros against Swiss francs, which might exceed a third of transactions of dollars against Swiss francs.

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[69] This estimate is not much different from other estimates made by Hartmann (1996) and Lipsky et al. (1996), which is not surprising considering that all estimates start with the 1995 Central Bank Survey (BIS (1996a)).

Table A.4.1

Foreign exchange turnover in emerging currencies

In billions of US dollars

Currency	Local turnover[1]		Global turnover		
	April 1995	April 1996	March 1996[2]	April 1997[2]	early 1996[3]
Asia	>13.6	>17.8	>16.3	>39.4	36.6
Indian rupee	1.6[4]	1.2	1.0	n.a.	1.1
Indonesian rupiah	4.8[4]	7.8[4]	3.5	10.0	8.5
Korean won	3.1	3.2	1.8	2.4	2.4
Malaysian ringgit	n.a.	n.a.	5.0	10.0	9.5
New Taiwan dollar	1.5	1.6	n.a.	3.0	1.1
Thai baht	2.6[4]	4.0[4]	5.0	14.0	14.0
Latin America	9.1	10.9	>5.8	n.a.	
Argentine peso	1.7	2.0	n.a.	1.5	
Brazilian real	4.3[5]	5.5[5]	4.5	n.a.	
Chilean peso	0.8	0.9	n.a.	n.a.	
Colombian peso	0.1[4]	0.1[4]	0.1	n.a.	
New Mexican peso	2.1	2.2	1.2	n.a.	
New Peruvian sol	0.1	0.2	n.a.	n.a.	
Eastern Europe	1.8	>5.9	>1.6	8.1	
Czech koruna	0.6[4]	2.5[4]	0.5	5.5	
Hungarian forint	0.3	0.6	0.3	0.4	
Polish zloty	0.3[4]	n.a.	0.3	0.35	
Russian rouble	0.6	2.6	0.5	1.4	
Slovak koruna	0.02	0.2	n.a.	0.4	
Other currencies	5.4	6.7	>7.4	>7.0	
New Israeli shekel	0.3	0.5	n.a.	n.a.	
Saudi riyal	1.4	1.5	0.3	n.a.	
South African rand	3.7	4.7	6.0	6.0	
Turkish lira	0.01[4]	0.02[4]	1.1	1.0	
Total[6]	>29.9	>41.3	>31.1	>56.0	

Note: The countries shown (excluding South Africa) had aggregate GDP of $3.4 trillion in 1992 or 15% of world GDP, compared with 80% for the countries included in the April 1995 central bank survey.

[1] Estimates as reported by the respective central banks, net of double-counting unless otherwise specified, for a period as near as possible to April. For Thailand, 1995 second half and 1996 annual averages. For Indonesia and Argentina, annual averages. The turnover of the Russian rouble and the South African rand in April was well above the annual average. [2] Citibank estimates, net of double-counting. [3] Estimates reported in the Singapore Foreign Exchange Market Committee *Annual Report* 1996. [4] On a gross basis. [5] Includes other currencies. [6] The *Central Bank Survey of Foreign Exchange and Derivatives Market Activity 1995* reports a grand total (including South Africa) of $1,136.9 billion.

Of course, a smaller euro area would leave more trading of euros against "out" currencies, perhaps the pound and the Swedish krona. Hartmann (1996, pp. 21-2) notes that of the non-core European countries, only the United Kingdom would make a material difference to the

structure of the foreign exchange market by choosing not to adopt the euro. Still, the point would remain that the euro will start off as much less a vehicle currency than the mark, which is another way of saying that the mark's use as a vehicle currency has been largely confined to exchanges involving its neighbours' and near-neighbours' currencies.

It is plausible that the mark is developing into, and the euro will become, the main means of exchange against the Eastern European currencies. Transactions in these currencies are at present small, over $6 billion per day (Table A.4.1), smaller than 1995 transactions between the mark and the guilder, ECU, Swedish krona, peseta *or* lira. Nevertheless, the question is interesting insofar as the transactions in these currencies are likely to grow rapidly. Table A.4.2 suggests that, except in the Czech republic, dollar transactions tend to exceed mark transactions against local currency in the local foreign exchange markets of Eastern Europe. While the mark is probably serving as a vehicle for transactions from other core European currencies into these emerging currencies, it is not obvious that the mark is serving as a a vehicle currency for transactions involving currencies outside Europe.

Table A.4.2

Foreign exchange turnover in emerging currencies, April 1996

In millions of dollars

Currency	Dollar	Mark	Yen	Total
Eastern Europe	4,786	1,920	48	7,161
Czech koruna	1,025	1,421	0	2,532[1]
Hungarian forint	334	105	35	626
Polish zloty	863	270	0	1,174
Slovak koruna	117	71	12[2]	200
Asia	10,090	78	145	10,498
Indian rupee	1,104	38	11	1,214
Korean won	3,082	13	50	3,180
New Taiwan dollar	1,924	20	69	2,090
Thai baht[3]	3,980	7	15	4,014
Other currencies	6,286	>143	>99	6,690
New Israeli shekel	385	n.a.	n.a.	469
Saudi riyal	1,410	3	3	1,494
South African rand	4,470	140	96	4,706
Turkish lira	21	0	0	21[1]

Note: In some cases the total includes transactions not involving domestic currency and thus may not match with local turnover on Table A.4.1.

[1] On a gross basis. [2] All other currencies. [3] Annual average, on a gross basis.

Source: National central banks.

Thus the euro stands to incorporate most of the currencies for which the mark plays a vehicle role at present. "The potential of the euro to become a forex vehicle for the rest of the world" could start out as pure potential (Hartmann (1996), p. 23).

Annex 5: Currency invoicing of international trade

The importance of currency invoicing of international trade is easily overstated. There was a time when the unit of account for international trade, one of the functions of international money, could be strongly related to the means of payment function as measured by turnover in the foreign exchange market. But these days, when world trade turns over in the global foreign exchange market twice a week, this relationship has lost its strength.[70]

What does the contractual currency tell us? If exports are priced in dollars, does that mean that private or official external borrowing in foreign currency ultimately secured by these exports should likewise be denominated in dollars? The question as usually posed misses the distinction between what might be called the nominal or apparent currency of denomination and the effective currency of denomination. The case of gold illustrates this distinction. The gold trade has all along been conducted in dollars. Yet the response of the dollar price of gold to changes in the dollar/mark exchange rate 15 years ago suggests that the price of gold at that time was effectively set more in marks than in dollars. In contrast, the comparative lack of such an exchange rate response these days suggests that gold is now truly priced in dollars, not only in appearance, but also in substance. Under these circumstances, it would have made more sense some years ago than it would today for South Africa to borrow abroad in European currencies and to manage the rand against those currencies. The invoicing of exports of gold offered no clue.

As noted by the Bundesbank (1991, p. 43), moreover, a substantial fraction of the invoicing, especially that of trade in manufactures, reflects the pricing of transactions between wholly-owned affiliates of the same firm. The invoicing decisions of which may reflect accounting, tax or organisational choices.

Not only is the question of the denomination of international trade often misapprehended, but the data are poor. The very useful effort by the European Commission (Ilzkovitz (1995)) to bring together data from the United States, Japan, Germany, France, the United Kingdom, Italy and the Netherlands confronted the fact that little information is available on the portion of world trade that is growing most rapidly, namely trade among developing and emerging countries. Table A.5.1 is derived from this effort, but its limitations must be understood. The invoicing of trade among Asian countries other than Japan is estimated using Japanese data and trade among Latin American countries is taken to be a mix of US and European behaviour, with two-thirds and one-third weights. The danger in these quite understandable estimation methods is that the dollar's share maybe under-represented. More importantly, the information gap implies that we do not really know how invoicing behaviour is evolving over time.

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[70] After monetary union, trade will represent something like 10% of GDP for the euro area, the United States and Japan. By contrast, international bond and equity flows alone exceed GDP for major countries, in some cases by sizeable multiples (Table A.3.4). Contrary to the assumption of Black (1991, p. 522), the denomination of trade can no longer be taken to have much of a direct effect on the use of different currencies in the foreign exchange market.

Table A.5.1

Invoicing of international trade by currency

	1980	1987	1992					
			World		Intra-EU		Extra-EU	
	in %	in %	US$ billions	in %	US$ billions	in %	US$ billions	in %[1]
US dollar	56	48	1,741	48	141	4	1,599	59
Major EU currencies	31	34	1,225	34	627	17	598	22
Deutsche mark	14	16	559	15	297	8	263	10
French franc	6	7	230	6	117	3	114	4
Sterling	7	6	208	6	103	3	105	4
Lira	2	3	124	3	62	2	62	2
Guilder	3	3	102	3	48	1	54	2
Japanese yen	2	4	176	5	4	0	171	6
Global exports	100	100	3,656	100	–	–	2,693	100
Memo item: *EU-15*[2]							*679*	*25*

Note: Components may not sum to total owing to rounding.

[1] Of extra-EU exports. [2] Estimate.

Sources: Hartmann (1996), p. 7, citing Ilzkovitz (1995), and United Nations.

All that said, it appears that there are some fairly robust observations. Only the dollar is used extensively as a vehicle currency in the strict sense, that is, to denominate trade between two other countries. For the big industrial countries, the bulk of exports tend to be invoiced in the home currency, although this has become less true over time,[71] with nine-tenths of US exports dollar-invoiced but less than half of Japan's. This invoicing difference between the United States and other industrial countries is consistent with studies of effective pricing behaviour that find that US export prices reflect domestic prices while exporters to the United States show some tendency to price to the US market. Industrial country imports tend to be more dollar-denominated than their exports, reflecting the importance of commodity imports. As matters stood in the early 1990s, the dollar's share of trade invoicing was near one-half (Table A.5.1); its decline since 1980 seems due to the decline in the share of oil trade (Bundesbank (1991), p. 42 and Ilzkovitz (1995), p. 71).

The advent of the euro will presumably lead to less use of the dollar to denominate intra-European trade. Whether the dollar will be supplanted in all its uses – for instance, to denominate energy exports from the Netherlands and the United Kingdom to Germany (Bundesbank (1991),

[71] In contrast, Kenen (1983), pp. 9 and 21, notes that exports from industrial countries generally came to be invoiced to a greater extent in the home currency – at the expense of the dollar – between 1972 and 1976. Kenen's explanation, "the increase of uncertainty attending the change in the exchange-rate regime", would not have predicted the recent reversal of the earlier trend.

p. 42) – remains to be seen.[72] But putting this question to one side, one can calculate invoicing shares on the hypothesis of a broad monetary union using 1992 data on global invoicing practices. The decline in the use of the euro relative to the use of major EU currencies – from 34 % of world trade to 22% – can be seen as a mechanical, arithmetic, or even misleading result of the reclassification of intra-EU trade as domestic (which, however one feels about it on analytic grounds, is increasingly hard to avoid given the effect of open borders on European statistics). Alternatively, the potential reduction of the use of European currencies might be seen as a result of the largely regional importance of the Deutsche mark at present.

One can summarise the observations by noting that in 1992 the dollar was used to denominate trade 3.6 times the value of US trade, whereas the corresponding intensity for the mark was 1.4, about 1 for the French franc and pound sterling, and between 0.6 and 0.8 for the Japanese yen, Italian lira and Dutch guilder. Under the assumption of monetary union, the euro would start off with an intensity of about 1, much like the French franc or sterling today. Even this figure may be overstated in that it assumes that intra-European trade is not more intensively denominated in European currencies than is extra-European trade (Hartmann (1996)), an assumption not justified by the Bundesbank data.

Looking forward, some analysts attempt to arrive at a reasonable role for the euro in trade invoicing by suggesting that the euro could be expected to rise to an intensity of 1.4, much as the Deutsche mark has today (Persaud and Dambassinas (1996)). This seems on its face modest. But on closer examination, it is not so innocent. As noted above, the mark does not figure importantly in contracts between third countries. Its high use in international trade relative to German trade reflects its dominance on both sides of German trade with Western Europe – 77% of German exports and 53% of German imports (Issing (1996), p. 6).[73] Less than half of German imports from other countries are mark-denominated. To assume that the euro will rise to an intensity of 1.4 is to posit that the area of heavy euro use will be as large relative to the euro area as Western Europe is to Germany. For the reasons sketched in the text in Section 3, the outlook for such a development is by no means certain.

Some analysts have tried to reason from prospects for the use of the euro in the invoicing of trade to portfolio shifts by private investors. But more trade invoiced in euros would entail not only more holdings of bank accounts denominated in euros with which to effect payments but also more borrowings in euros as the euro-denominated trade paper is discounted. Thus the change in investor preferences or habits as a result of the greater invoicing of trade in euros needs to be large to represent a net demand for euro assets.

In summary, much less is known of invoicing behaviour than one would like. Moreover, much of what little is known about trade invoicing is not well understood. Many conclusions drawn

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[72] Contrast Alogoskoufis and Portes (1992), p. 281: "The dollar will certainly be displaced in intra-EC trade as a result of ... monetary union."

[73] The figures have fallen from 80 and 60% , respectively, in the 1990s. See Bundesbank (1991), p. 42.

from invoicing practices regarding economic exposure to exchange rate changes suffer from the fallacy of misplaced concreteness. And the euro should not be expected quickly to play as large a role in invoicing in relation to the euro area's trade as the mark did in relation to Germany's trade, since the mark's outsized role is the flip side of the relatively small invoicing role played by the currencies of Germany's neighbours.

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