EUROPEAN CENTRAL BANK

EUROSYSTEM

THE INTERNATIONAL ROLE OF THE EURO

JULY 2008

THE INTERNATIONAL ROLE OF THE EURO JULY 2008

EUROPEAN CENTRAL BANK

EUROPEAN CENTRAL BANK

EUROSYSTEM

In 2008 all ECB publications feature a motif taken from the €10 banknote.

THE INTERNATIONAL ROLE OF THE EURO

JULY 2008

Address
Kaiserstrasse 29
60311 Frankfurt am Main
Germany

Postal address
Postfach 16 03 19
60066 Frankfurt am Main
Germany

Telephone
+49 69 1344 0

Website
http://www.ecb.europa.eu

Fax
+49 69 1344 6000

As at 20 June 2008.

ISSN 1725-6593 (online)

CONTENTS

TABLES

STATISTICAL TABLES

FOREWORD

This is the seventh issue of the annual Review of the international role of the euro. It presents available evidence on trends in the use of the euro by non-residents, covering the euro's role in global markets and in individual countries outside the euro area. Like previous issues, this year's Review aims to enhance the coverage, quality and timeliness of statistics and to deepen the analysis of the use of the euro abroad and its underlying drivers.

This year's Review largely confirms some of the main findings of earlier issues. Developments in the use of the euro during the year 2007 have been heterogeneous across market segments. The share of the euro declined in international debt securities markets and in international bank deposits, remained broadly stable in foreign exchange markets, and increased somewhat in international bank loans, foreign exchange reserves, and parallel circulation of euro banknotes outside the euro area. The turmoil in global financial markets since mid-2007 may explain some of these developments, in particular the declining share of the euro in international debt securities markets. The Review underlines the importance of certain statistical effects, such as valuation or composition effects, which had a significant impact on the share of the euro in a number of market segments. Finally, the Review confirms the largely regional character of the euro, in particular its role in countries with close geographical and institutional links to the euro area.

Developments in the use of the euro by non-residents are the outcome of private sector decisions. The ECB will continue to monitor the international role of the euro and to provide regular information to the public.

Jean-Claude Trichet

President of the European Central Bank

EXECUTIVE SUMMARY

This seventh Review of the international role of the euro examines recent developments in the use of the euro by non-euro area residents. In line with earlier Reviews, it assesses trends since the last issue across various market segments, covering the period between end-2006 and end-2007. The Review aims to deepen the Eurosystem's analytical understanding and statistical coverage of the international use of the euro.

DIVERGING TRENDS ACROSS MARKET SEGMENTS

During the period covered by this Review, global financial markets were hit by heightened volatility and increasing tensions, starting from August 2007. In some of the market segments covered in this Review, the global financial turmoil led to a decline in overall market activity during the second half of 2007. However, in most cases, this decline in total market activity affected all currencies broadly equally, and hence the shares of individual currencies in different market segments remained broadly unaffected over the review period. That said, the overall stability of the international role of the euro in the course of 2007 reflects diverging trends across market segments.

In international *debt securities markets*, the euro's share declined by around 1 percentage point over the review period, reaching 32.2% in December 2007, based on the narrow measure. This decline was entirely driven by a relative fall in the short-term segment, i.e. money market instruments, whereas the euro's share marginally increased in the gross issuance of international bonds and notes. The financial market turmoil may possibly explain the decline in the relative share of the euro in the short-term segment.

In *international banking activity*, the euro's share increased by 1.1 percentage points on the international loans side, but declined by 1.8 percentage points on the side of international deposits. As at the fourth quarter of 2007, the euro's share stood at 22.1% in international loan markets and 21.0% in international deposit markets.

Similarly, the use of the euro remained broadly unchanged in *foreign exchange markets*. Data on foreign exchange trades settled by the Continuous Linked Settlement (CLS) system indicate a slight decline in the average share of the euro in daily settlements, from 39.1% in 2006 to 37.8% in 2007. More comprehensive survey data compiled by the Bank for International Settlements (BIS) suggest that the euro was used in around 37% of all foreign exchange transactions in April 2007, which is broadly comparable to the figures obtained in the last survey three years ago. Over this three-year period, the shares of the US dollar and the Japanese yen decreased by 2.4 and 3.7 percentage points respectively, largely to the benefit of emerging market currencies, possibly reflecting these countries' increasing trade and financial integration in the global economy.

In *derivatives markets*, covered for the first time in this Review, the role of the euro differs strongly across specific market segments. For foreign exchange derivatives, the US dollar's leading role as a vehicle currency, also observed in traditional foreign exchange markets, is clearly confirmed. It was involved in 88.6% of all transactions in April 2007, the period for which survey data are available, far ahead of the euro (35.0%) and the Japanese yen (15.8%). By contrast, the euro's share outpaces that of any other currency in the market for interest rate derivatives, accounting for 38.9% of turnover and 37.8% of notional principal outstanding, against the US dollar's 31.6% and 31.8% respectively.

Developments in the use of the euro as a *settlement or invoicing currency* of euro area countries' trade showed a diverging pattern across countries, with the euro's share continuing to increase in some countries, while declining in others, albeit from the comparatively high levels achieved thus far. For non-euro area EU Member States and EU candidate countries, the euro's share in invoicing or settlement of trade continued to outstrip the share of

trade with the euro area, signifying euro-denominated transactions with third countries on a considerable scale.

During the review period, the euro maintained its role as an *exchange rate anchor*, especially in countries with close geographical or institutional links to the European Union. In Russia, the share of the euro in the currency basket of the Central Bank of the Russian Federation (Bank of Russia) increased during the review period.

The use of the euro in *foreign exchange reserves* held by third countries, i.e. countries outside the euro area, increased moderately by around 1½ percentage points during the review period owing to positive valuation effects. When measured at constant exchange rates, the share of the euro in global foreign reserves decreased slightly by almost 1 percentage point, mainly as a result of a decline in developing countries.

Asset substitution in third countries was the only area where the international use of the euro underwent a more pronounced change. The stock of euro banknotes held outside the euro area continued to increase gradually in the course of 2007 and was estimated to have reached the upper end of a range of 10% to 20% of total currency in circulation by end-2007. The use of euro-denominated deposits also increased, in particular across most non-euro area EU countries and EU candidate countries.

INTERPRETING RECENT TRENDS

Building on the work of earlier Reviews, the current issue aims to further deepen the analysis of the possible drivers of the international use of the euro. Such an assessment has to take account of two statistical phenomena, namely valuation effects and composition effects. Valuation effects arising from exchange rate changes were particularly significant in the review period, given the relatively large degree of exchange rate fluctuations observed in the course of 2007. Where possible, the analysis is based on constant exchange rate data, which filter out the effects of exchange rate fluctuations. In most market segments, this correction for valuation effects dampens the observed fluctuations in the share of the euro. One prominent example in the current issue concerns the use of the euro in foreign exchange reserves. According to data available from the IMF, the share of the euro increased by around 1.5 percentage points between December 2006 and December 2007 when measured at current exchange rates. Corrected for exchange rate fluctuations, however, the share of the euro actually declined by around 1.5 percentage points.

Composition effects may further complicate the assessment of the international role of the euro. Swings in the share of the euro in a particular market may arise because specific parts of that market with different practices in terms of currency use grow at a different pace. Such effects are examined, where relevant, in the various markets analysed in the report. For the reserve composition, for instance, it is suggested that asymmetric reserve growth in specific regions with different portfolio shares could be one reason for the observed swings in the euro's share in aggregate reserves. Geographical shifts in the international activities of banks can also explain part of the swings in the aggregate share of the euro in international loans and deposits markets.

Accounting for valuation and, where possible, composition effects, the current issue of the Review largely confirms the findings of earlier Reviews regarding the drivers of the international role of the euro. One of the most prominent factors remains geographical, economic, financial and institutional proximity to the euro area. In debt securities markets, for instance, the use of the euro is clearly highest in the non-euro area EU Member States. At the end of 2007, euro-denominated debt securities accounted for, on average, 58% of all international debt securities issued in Denmark, Sweden and the United Kingdom and 78% across all other non-euro area EU Member States, compared with a global average of 32%. Likewise, the share of the euro in turnover on

traditional foreign exchange markets is highest in the United Kingdom and other non-euro area EU Member States, after transactions involving the euro in the euro area itself. Finally, the use of the euro in third countries by both the public and private sectors remains most pronounced in countries in or close to Europe. New data included for the first time in this Review suggest that the use of euro banknotes abroad is highest in neighbouring regions, although the data also point to an increasingly wide use of euro banknotes in some other regions such as emerging Asia.

The Review also confirms that the specific motives for currency usage may differ across market segments and may not be a reflection of currency preferences. One example is the impact of enhanced integration and improved liquidity in euro area financial markets on the international role of the euro. Whereas euro area financial integration and deepening typically tend to foster the use of the euro across most market segments, the opposite effect may be seen in the case of some segments of the derivatives markets. Indeed, the gradual integration of euro area government bond markets has partly fostered the use of outright spot transactions and reduced the need for derivatives transactions. This could be one explanation for the observed decline in the use of the euro in over-the-counter interest rate derivatives between April 2001 and April 2007.

Another specific driver of the international role of the euro concerns the composition of foreign exchange reserves held by the central banks of the non-euro area EU Member States. In most cases, the share of the euro is relatively high given the widespread use of the euro as a point of reference in the exchange rate policies of these countries. In some cases, the share of the euro increased somewhat in the course of 2007, partly owing to valuation effects (e.g. in Romania) but partly also reflecting ERM II membership (e.g. in Slovakia). In other new EU Member States, the share of the euro in foreign exchange reserves has declined (e.g. in Latvia). For countries coming closer to potential euro area membership, the currency composition of reserves at some point becomes a matter of deciding on the level of reserves to be held within European Monetary Union, given that all euro-denominated foreign exchange reserves automatically become domestic assets in the event of euro adoption.

The Review also presents some new analysis on the currency choice in international bond issuance. The existing empirical research emphasises the need to create a "natural hedge" to foreign currency revenues by issuing bonds denominated in a currency different from the home currency of the issuer. Therefore, the relative strength of the business cycle among the various currency areas is expected to have a positive influence on their currency shares in the narrow measure of international debt securities. A growing number of studies, including preliminary findings of ECB staff research, have explored other possible motives for the currency choice. This recent analysis suggests that the opportunistic behaviour of borrowers, who try to lower borrowing costs and "hunt" for lower-yield currencies, could also play a role in explaining short-term movements of the currency shares in international bond issuance.

SPECIAL FOCUS: THE USE OF THE EURO IN INTERNATIONAL RESERVES

The special focus chapter of this Review is dedicated to the use of the euro in global foreign exchange reserves, a subject which has, among the various international uses of the euro, typically attracted a very high degree of public attention. In fact, as central banks in many emerging economies have accumulated notable amounts of international reserves, the currency composition of official portfolios is often discussed in the context of global imbalances and the global savings glut.

The special focus chapter reviews available empirical evidence, recalls the main findings of the available literature, and presents new analytical findings on this aspect of the euro's international role. It confirms the findings of

earlier Reviews on the trends in the use of the euro in global foreign exchange reserves since 1999. Specifically, its role gradually increased during the first few years of European Monetary Union but has been broadly stable for around five years. Several factors underpin the observed gradual increase in the use of the euro over the first few years of Monetary Union, including the establishment of a credible, stability-oriented monetary policy and the improvements in the liquidity of euro area capital markets.

The analysis also highlights an additional driver of shifts in reserve composition, namely changes in the motive for holding reserves. Using a portfolio model based on central bank-specific motives for reserve holdings, it is argued that recent patterns in the use of the euro as a reserve currency may reflect the gradually declining importance of self-insurance or "transaction motives" in central bank reserve management. Such motives would generally favour the use of the US dollar as a reserve currency, as it offers a hedge against global sudden stops in capital flows. At the same time, as central bank reserve allocations converge towards more traditional minimum variance portfolios, many countries with pegged or managed exchange rates may find it optimal to remain "overweight" in their anchor currency, which is often the US dollar.

Such considerations apply only to bond portfolios and not to equity portfolios. As some reserve-accumulating countries are currently considering transferring some of their foreign assets from central banks to more return-oriented sovereign wealth funds, stock market investments may become more relevant for sovereign portfolios. Simple back-of-the-envelope calculations, which assume that sovereign wealth funds would invest their assets according to market capitalisation, suggest that the euro area would not necessarily attract more capital inflows in such a situation.

Irrespective of whether foreign assets are accumulated by foreign authorities in the form of traditional central bank reserves or within sovereign wealth funds, efforts to increase transparency would help to monitor the international use of the euro in this area.

Key data sheet

	Current Review (latest data available)	2007 Review[3] (as at)
Share of the euro in:		
– narrowly defined stock of international **debt securities**[1]	2007 Q4: 32.2%	2006 Q4: 33.5%
– **all cross-border loans**[1]	2007 Q4: 22.1%	2006 Q4: 21.0%
– **cross-border loans** from non-euro area banks to non-bank borrowers outside the euro area (narrow measure)[1]	2007 Q4: 20.9%	2006 Q4: 18.4%
– **all cross-border deposits**[1]	2007 Q4: 21.0%	2006 Q4: 22.8%
– **cross-border deposits** of non-euro area non-banks in banks outside their country of residence excluding the euro area (narrow measure)[1]	2007 Q4: 20.6%	2006 Q4: 19.8%
– daily **foreign exchange trading** (settled by CLS)[2]	Jan. 2007 - Dec. 2007 (average): 37.8%	Jan. 2006 - Dec. 2006 (average): 39.1%
– **settlement/invoicing of goods' exports** from selected euro area countries to non-euro area countries	2006: 39% to 68%	2005: 39% to 62%
– **settlement/invoicing of goods' imports** of selected euro area countries from non-euro area countries	2006: 34% to 59%	2005: 34% to 56%
– share of the euro in **global foreign exchange reserves**[1]	2007 Q4: 26.5%	2006 Q4: 27.2%
Cumulative net **shipments of euro banknotes** to destinations outside the euro area	Dec. 2007: €71.1 billion	end-2006: €60.1 billion

1) At constant 2007 Q4 exchange rates.
2) Given the convention to account for both sides of each trade in foreign exchange markets, percentages add up to 200%, meaning that the euro's actual share in total turnover is half the percentage reported in this key data sheet.
3) Figures may differ from those presented in the 2007 Review owing to data revisions.

INTRODUCTION

In line with earlier issues, this Review analyses the international role of the euro across different market segments. Section A examines the role of the euro in global markets, in particular debt securities markets, international loan and deposit markets, foreign exchange markets, and international trade. The regular reporting is supplemented by a number of analytical boxes, including a review of the determinants of currency choice in international debt issuance and a discussion of regional patterns in the euro's international use by euro area banks. The Review also presents, for the first time, available data on the overall structure and role of the euro derivatives markets. A number of new elements that were introduced in the last Review are updated in the current issue, including data from the euro area's international investment position, from the IMF's Coordinated International Portfolio Survey, and from a survey of the invoicing or settlement of trade by euro area countries with countries outside the EU.

Section B focuses on the euro's role in third countries. It reviews the euro's role in the exchange rate regimes, the foreign reserves and the intervention policies of third countries. This is complemented by an analysis of the use of the euro by private agents, in the form of either cash holdings or bank deposits and loans. The Review includes, for the first time, data on the geographical composition of euro banknote shipments. It also contains an update and expansion of the results of the survey on the use of the euro in central, eastern and south-eastern Europe conducted by the Oesterreichische Nationalbank.

The special focus chapter in this issue of the Review deals with the use of the euro in global foreign exchange reserves. It reviews trends in the euro's role as a reserve currency since its introduction in 1999 and examines the potential drivers of change over time. Combining the existing literature with new findings from ECB research, the special focus chapter examines in particular the implications of different motives for reserve holdings for the optimal reserve composition. The analysis is complemented by a discussion of possible trends in the currency composition of assets under the management of sovereign wealth funds.

Finally, the Review has been complemented by a statistical appendix that aims to provide more detailed data on a number of specific aspects of the international role of the euro.

1 THE EURO IN GLOBAL MARKETS

1.1 THE EURO IN INTERNATIONAL DEBT MARKETS

The euro's share in the stock of international debt securities decreased over the review period by around 1 percentage point when measured at constant exchange rates, reaching 32.2% in December 2007. The decline in the euro's share was entirely driven by a relative fall in the short-term segment for money market instruments, whereas the euro's share in the gross issuance of international bonds and notes increased marginally. The financial turbulence provoked a marked slowdown in the net issuance of international debt securities, in particular euro and US dollar-denominated debt, in the second half of 2007. As in previous years, the financial sector was the major issuer of euro-denominated bonds and notes, gaining market shares at the expense of all other issuing sectors. Debt issuance data and international investment position surveys confirm the notable use of the euro in the countries and regions neighbouring the euro area.

This section examines developments in the euro's role in international debt securities markets over the year 2007, covering bonds, notes and money market instruments. A precise analysis of the international role of currencies in such markets requires not only statistical information on the currency denomination of the securities, but also information on the residence of both the issuers and holders of the securities. Typically, however, combined information on the issuer and the investor in a single statistical database is very limited. In line with earlier Reviews, the analysis in this section therefore examines available information from the issuer's side and from the investor's side separately. Sub-section 1.1 reviews trends from the issuing side and includes an analysis broken down by financial instrument, by sector of issuance and by geographical location of the issuer. This sub-section draws on a "narrow" concept of international issuance of debt securities, covering issuance in a currency other than the currency of the country in which the borrower resides. This information is complemented by data on alternative measures of international bond issuance (Box 1). Sub-section 1.2 presents evidence from the investor's side, drawing on surveys of the international investment position.

Box 1

ALTERNATIVE DEFINITIONS OF INTERNATIONAL DEBT ISSUANCE

To complement the data in the main text, which are based on the narrow measure of international debt issuance, this box reports the latest available data on the basis of two alternative measures, the broad measure and the global measure. The broad measure adds to the narrow measure those debt securities that are targeted at international markets but denominated in the home currency of the borrower. The global measure includes all debt securities, including domestic currency

Alternative measures of debt securities supply and major currencies' shares

(fourth quarter of 2007)

	Amounts outstanding (USD billions)	Shares (%)		
		Euro	US dollar	Japanese yen
"Narrow measure", excluding home currency issuance	9,703	32.2	43.2	5.4
"Broad measure", including home currency issuance	22,772	48.4	34.9	2.7
"Global measure", including domestic issuance	79,857	29.8	40.4	11.9

Sources: BIS and ECB calculations.

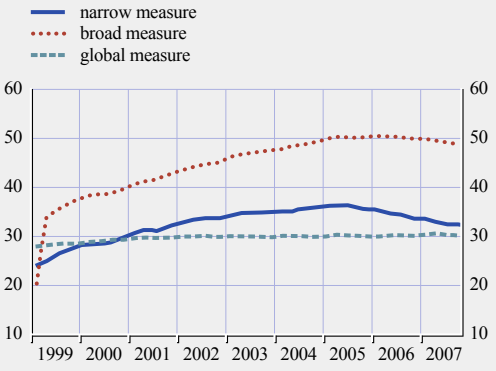
issues targeting the domestic market, and thus does not distinguish between domestic and international bonds.

In the fourth quarter of 2007, the euro's share in international debt markets stood at around 32% according to the narrow measure and at more than 48% according to the broad measure, and equal to almost 30% according to the global measure of international debt securities (see the table).

Looking at developments since the start of Monetary Union, it appears that the share of the euro has remained relatively stable based on the global measure. On the basis of the narrow and broad measures, by contrast, the share of the euro was subject to more pronounced trends, as it increased until the end of 2005 and then declined slightly. The rise of the euro's share in the broad measure over the last ten years has been particularly pronounced – around 16 percentage points – although this particular measure may overstate the extent to which euro-denominated issues are targeted towards the international market [1] (see the chart).

Narrow, broad and global measure of the share of the euro in the stock of outstanding international debt securities

(percentage)



Sources: BIS and ECB calculations.
Notes: The shares at constant exchange rates are reported at 2007 Q4 exchange rates. For a definition of the various measures, see ECB (2007).

1 Specifically, the broad measure includes issuances placed by a syndicate of financial institutions in which at least one institution does not share the borrower's nationality. In the case of the euro area, this also applies to other euro area countries.

1.1.1 TRENDS IN INTERNATIONAL DEBT SECURITIES MARKETS

OVERALL TRENDS

In 2007 net issuance of euro-denominated debt securities according to the narrow measure reached around USD 340 billion, roughly USD 50 billion above the 2006 figure (see Table 1).[1] Within the year, the quarterly profile clearly reveals the impact of the financial turbulence which began in the summer. The net issuance of euro-denominated international debt securities contracted to USD 55 billion in the second half of the year, following net issuance of above USD 280 billion in the first half. However, this impact of the turmoil was not limited to the euro-denominated segment of the

1 Net issuance of debt securities is defined as gross issuance minus repayments.

Table 1 Net issuance of international debt securities

(narrow measure, i.e. excluding home currency issuance; USD billions)

	Annual				Quarterly				
	2004	2005	2006	2007	2006	2007			
					Q4	Q1	Q2	Q3	Q4
Euro	261.8	232.1	290.0	341.0	89.7	143.2	142.8	15.1	39.9
US dollar	254.4	322.5	753.9	735.6	280.6	245.7	306.8	149.4	33.7
Japanese yen	3.5	-1.0	15.3	76.1	11.2	14.4	28.2	12.3	21.2
Total (incl. other currencies)	649.9	764.9	1324.1	1415.2	456.0	516.8	583.1	188.1	127.2

Sources: BIS and ECB calculations.

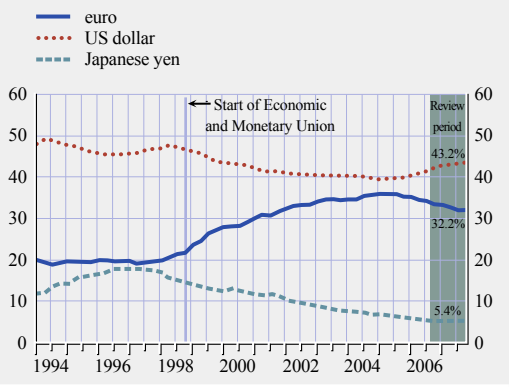
international debt securities market. A similar trend was visible in the net issuance of US dollar-denominated debt by non-US residents, which soared to more than USD 550 billion in the first half of the year and fell to about USD 180 billion in the second half. It is necessary to go back to 2002 to find such low levels of net issuance of euro and US dollar international debt securities as in the final quarters of 2007.

In terms of outstanding stocks of international debt securities (again according to the narrow measure; see Box 1 for a review of alternative measures), the share of the euro continued the declining trend that started in 2005. Measured at constant exchange rates, the euro's share declined to 32.2% at the end of 2007 from 33.5% at the end of 2006 (see Chart 1).[2] By contrast, the US dollar's share rose to 43.2% at the end of 2007, increasing by around 1 percentage point over the review period. The share of the Japanese yen remained stable at 5.4% in 2007.

The decline in the euro's share in debt securities markets (in terms of the narrow measure) between end-2006 and end-2007 was entirely driven by a relative fall in the short-term segment, whereas the euro's share in the long-term segment increased.

Chart 1 Stock of international debt securities: currency shares

(bonds and notes and money market instruments, excluding home currency issuance; as a percentage of the total amount outstanding and at 2007 Q4 exchange rates)



Sources: BIS and ECB calculations.

This is most clearly visible in gross issuance data, where the share of the euro dropped by around 3 percentage points in the short-term segment (money market instruments) and increased by half a percentage point in the long-term segment (international bonds and notes). The drop in the euro's share in the short-term segment was most pronounced in the second half of the year, possibly reflecting the impact of the global financial turmoil, which may have triggered an increased demand for US dollar liquidity relative to the demand for euro liquidity (see Annex Table 1).

It is only possible to offer tentative explanations for these observed trends in the currency shares in international debt securities markets. Empirical research on bond issuance has pointed to the need for a "natural hedge" to foreign currency revenues as a main determinant of issuance denominated in foreign currency. Issuers with foreign currency revenues – e.g. firms with foreign sales accounting for a large fraction of total sales or firms with a large number of subsidiaries in foreign countries – may wish to match these revenues with foreign currency cash outflows in order to balance the foreign exchange exposure. Therefore, the relative strength of the business cycle of a given currency area is expected to have a positive influence on the use of the corresponding currency in international debt securities markets. In addition, a number of studies, including preliminary findings of ECB staff research, suggest that the opportunistic behaviour of borrowers, who try to lower borrowing costs by issuing in low-yield currencies, could play some role in explaining short-term movements of the currency shares in international bond issuance (see Box 2).

2 Currency shares related to debt securities data are derived (i) at constant 2007 Q4 exchange rates for stock data and (ii) at current exchange rates for flow data. Although correcting for exchange rate valuation effects may imply some imprecision, the currency valuation effect for stock data is deemed too important to be neglected, as most stock variables cannot be adjusted by market participants in the face of exchange rate movements.

Box 2

DETERMINANTS OF CURRENCY CHOICE IN INTERNATIONAL DEBT ISSUANCE

The share of the euro in the narrow measure of international debt securities – i.e. issuance in a currency other than the currency of the country in which the borrower resides –increased constantly from the start of Monetary Union in 1999 until 2005. The increasing financial integration in the euro area, fostering the growth of a deep and liquid market for euro-denominated sovereign debt issuance, most likely supported this trend. However, over the past two years, these structural factors seem to have ceased to act as a driving force and the relative importance of the euro in the issuance of international debt securities has declined slightly. Little is known about the factors that may increase the attractiveness of one currency over another for the denomination of foreign currency-denominated bonds. This box summarises available theoretical and empirical evidence of the determinants of currency choice in international debt issuance, providing some tentative explanations for the recent movements in the share of the euro in the narrow measure.

There are three possible explanations as to why borrowers issue debt securities denominated in a foreign currency instead of borrowing in their domestic currency. First, issuers may have revenues in foreign currency and may want to match these revenues with foreign currency cash outflows in order to balance the foreign exchange exposure. By issuing foreign currency-denominated debt, therefore, these issuers create a "natural hedge" to their exposure to foreign currency revenues. A growing number of studies focusing on selected samples of listed non-financial firms confirm that the exposure to foreign exchange risk is an important determinant of foreign currency debt. In particular, the probability of issuing foreign currency debt is positively correlated with proxies of foreign exchange exposure such as foreign sales as a share of total sales; earnings or cash in foreign currency as a percentage of firm value; exports as a fraction of net sales; or the ratio of foreign subsidiaries to total subsidiaries (see Elliot et al. (2003) or Clark and Judge (2007) for comprehensive reviews of this literature).

Second, issuers may be rationed in the domestic currency market and wish to tap broader and more liquid markets in the major international currencies. The empirical evidence suggests that large firms in developed economies, which may be more likely to meet credit constraints in the domestic market and to have a greater incentive to broaden their investor base, tend to issue more foreign currency debt (see Allayannis and Ofek (2001); Kedia and Mozumdar (2003); and Siegfried et al. (2007)). In addition, borrowers from emerging market economies may decide to target international investors and issue in a foreign currency because their domestic currency markets are too thin and shallow, or virtually absent, in particular for long-term maturities. The constraint of emerging market borrowers is known in the literature as "original sin", following the seminal work by Eichengreen and Hausmann (1999). The currency choice of these emerging market issuers often follows a geographical pattern, as shown in sub-section 1.2 of this Review.

Third, issuers may have opportunistic reasons for issuing foreign currency-denominated debt securities in an attempt to lower the cost of servicing debt, exploiting tax differences across countries, arbitrage opportunities or, simply, lower interest rates in a foreign currency. Indeed, a survey of US public corporations by Graham and Harvey (2001) confirms that the factors that are considered as "important or very important" in the decision to issue foreign debt include: favourable tax treatment relative to the United States (for 52% of firms in their sample) and the low level of foreign interest rates (44%). Johnson (1988) finds that Canadian financial corporations alter the currency patterns

of their outstanding debt in response to a perceived differential in borrowing costs. Similarly, Keloharju and Niskanen (2001) show that Finnish firms tend to borrow in foreign currency when the domestic interest rates are higher than those of other currencies, in spite of tax incentives to do the opposite. Asian firms also seem to tap foreign currency markets in order to obtain a cheaper source of funding, measured by a positive interest rate differential between local and foreign interest rates (see Allayannis et al. (2003) and Esho et al. (2007)). All these studies implicitly assume that the issuer believes that the uncovered interest parity does not hold, so that the gain resulting from issuing in the low yielding currency would not be wiped out by a future appreciation of the latter. Indeed, a large body of literature rejects the hypothesis that interest differentials are an unbiased predictor of future exchange rate movements and finds that low-yield currencies in fact tend on average to depreciate (see Chapter 2 of Sarno and Taylor (2002) for a survey).

Other studies explicitly examine the time variation of currency shares in aggregate bond issuance, testing the role of interest rate differentials together with some assumptions on the role of exchange rate changes. Their findings are mixed. Cohen (2005) concludes that, for major currencies, excluding the pound sterling, the share in international bond issuance tends to increase with relatively "higher" interest rates, implying a higher costs of servicing the debt for the borrowers. However, Cohen (2005) notes that when currencies are strong – as measured by the level of their exchange rate – their share in international bond issuance tends to rise. To the extent that exchange rates are mean-reverting, borrowers may take advantage of an expected depreciation of the issuance currency. McBrady and Schill (2007), by contrast, maintain that deviations from the uncovered or covered interest parity present opportunities to lower borrowing costs by issuing in foreign currency, which are taken up by borrowers. They find that sovereign government and agency borrowers – which have no foreign currency cash flows – are able to time their issuance, borrowing in currencies which have relatively low nominal interest rates and which subsequently depreciate. In addition, using currency swap yields, they measure deviations from covered interest parity over the long run and conclude that these deviations are large enough to trigger one-way arbitrage opportunities, which are exploited by bond issuers.

ECB staff broadened the analysis of McBrady and Schill (2007) to a larger sample of international bond issuances since the start of Monetary Union in 1999, examining the extent to which deviations from swap-covered interest parity and from uncovered interest parity affect currency choice in the issuance of foreign currency-denominated bonds. This sample is a subset of the "narrow" measure that is reported in this Review, since it is limited to long-term debt securities and, in particular, issuance of non-convertible, fixed-coupon, investment-grade bonds, which, however, account for more than half of foreign currency-denominated bond issuances. The analysis is restricted to issuances in five major currencies – the euro, the US dollar, the Japanese yen, the pound sterling and the Swiss franc, which account for around 90% of total issuances.

Chart A and Chart B report the share of the euro in the total issuance of international bonds in the sample. This share is measured in terms of the value of outstanding bonds – the usual measure that is reported throughout this Review – but also in terms of the "number" of issuances. This latter "count" measure is expected to better capture the responsiveness of currency choice among issuers to covered and uncovered savings in borrowing costs, given that the decision concerning the size of issuance, in terms of value, is taken well before the issuance date itself. In Chart A, the share of the euro in terms of both value and count data is plotted against the differential between the average benchmark government bond yields (five-year average maturity) across the four non-euro currencies and euro area bond yields. This is a proxy for the interest rate saving

Number and value of issuances of international bonds in five major currencies: Euro share versus interest rate differential (Chart A) and expected EUR depreciation (Chart B)

(percentages)

Chart A

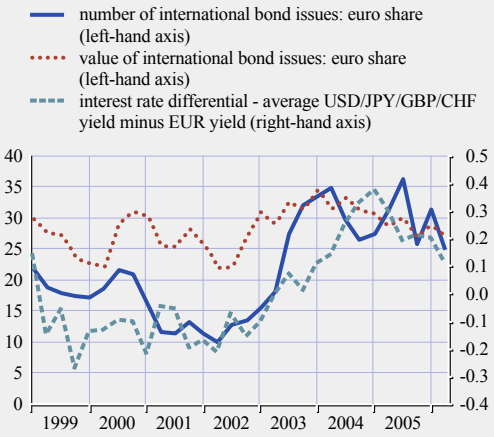
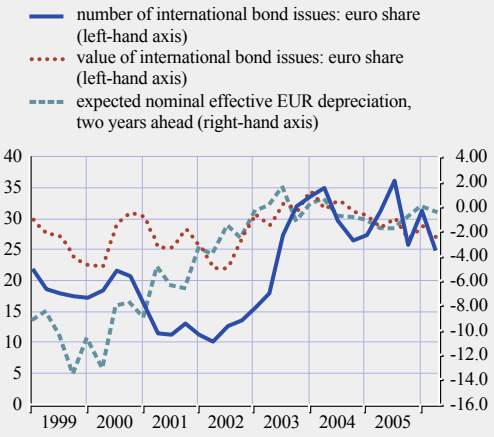


Chart B



Sources: Bondware, Consensus Economics and ECB calculations.

which would come from issuing in euro disregarding exchange rate movements. Interestingly, in Chart A, it is possible to distinguish a fairly close co-movement between interest rate differentials and the share of the euro, when measured in terms of "number" of issuances. Chart B plots the share of the euro in international bond issuance against the expected, two-year-ahead, nominal effective exchange rate depreciation of the euro, according to the available consensus forecasts. This latter variable is a proxy for the expected gain of a borrower who leaves the exchange rate risk unhedged. The relationship of this variable with the euro's currency shares is again positive, but rather loose when compared with that of interest rate differentials.

Preliminary econometric results of panel-data analysis, including the five major currency shares, indicate that arbitrage opportunities, arising from deviations from the swap-covered interest parity, do not have a statistically significant impact on currency choice. However, uncovered cost savings – i.e. interest rate differentials, adjusted for exchange rate expectations – seem to exert a significant influence on currency choice. In particular, confirming the descriptive analysis of Charts A and B, it is the interest rate differential, rather than expected exchange rate appreciation, which exerts the greatest influence. Again, this impact is detected only when the currency share – the dependent variable – is measured in terms of the "number" of bonds issued in that currency as a proportion of the total number of foreign currency-denominated bonds and not when the share is measured on the basis of the outstanding "value" of issued bonds.

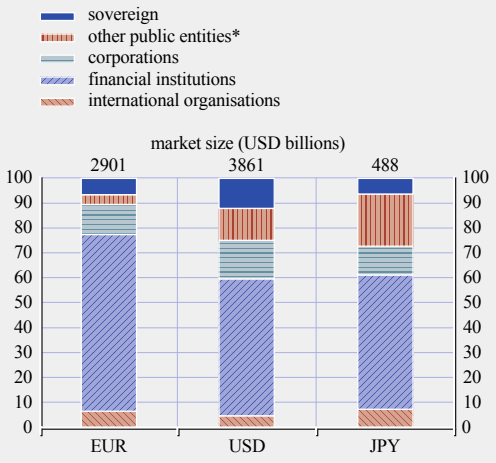
Summing up, the existing empirical research emphasises the need to create a "natural hedge" to foreign currency revenues by issuing bonds denominated in a currency different from the home currency of the issuer. The relative strength of the business cycle among the various currency areas is therefore expected to have a positive influence on their currency shares in the narrow measure of international debt securities. In addition, a growing number of studies, including preliminary findings of ECB staff research, suggest that the opportunistic behaviour of borrowers, who try to lower borrowing costs and "hunt" for lower-yield currencies, could play a role in explaining short-term movements of the currency shares in international bond issuance.

DISTRIBUTION BY SECTOR OF ISSUANCE

In 2007, as in previous years, the majority of euro-denominated debt securities were issued by the private sector, and in particular by the financial sector. At the end of 2007, the private sector accounted for 83% of the total USD 2.9 trillion outstanding bond and note issues in euro (see Chart 2). Over the review period, the share of private sector issuances increased by around 3 percentage points, owing to an increase in the share of private banks and financial institutions from 67% to 71% of total issuances, while the corresponding share of private corporate issuers decreased from 13% to less than 12%. The dominance of the private banking and financial sector in the issuance of euro-denominated international bonds and notes remains greater than in the case of other major currencies, such as the US dollar and the Japanese yen, where it accounts for around 55% of total issuance.

Chart 2 Outstanding volume of international bonds and notes by sector

(percentages; fourth quarter of 2007)

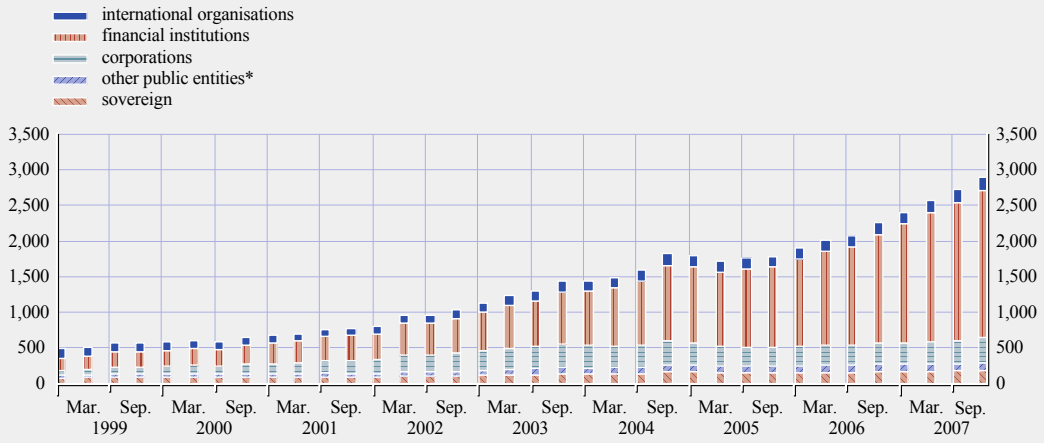


Sources: BIS and ECB calculations.
* includes public corporations, public banks and other public financial institutions.

The share of sovereign issuances in international euro-denominated debt continued to decline over the review period. As at December 2007, sovereign issuances accounted for less than 7% of total outstanding euro-denominated issuances, a decrease of 1 percentage point compared with the end of 2006. International organisations and other public institutions accounted for more than 6% and almost 4% of the total stock of euro-denominated international bonds respectively at the end of 2007, both declining slightly during the review period (see Chart 3).

Chart 3 Outstanding volume of euro-denominated international bonds and notes by sector

(USD billions)



Sources: BIS and ECB calculations.
* includes public corporations, public banks and other public financial institutions.

Table 2 List of top 20 non-euro area issuers of euro-denominated bonds and non-US issuers of US dollar-denominated bonds

(total amount issued in the review period; EUR millions)

Top 20 non-euro area issuers of euro-denominated bonds		Top 20 non-US issuers of US dollar-denominated bonds	
Merrill Lynch & Co Inc	15,257	Kreditanstalt fuer Wiederaufbau – KfW	17,100
UBS AG (London)	13,812	European Investment Bank – EIB	13,969
Credit Agricole SA (London)	10,318	Granite Master Issuer Plc Series 2007-1	9,276
Bank of America Corp	8,645	Gracechurch Mortgage Financing 2007-1	8,857
Morgan Stanley	8,598	Holmes Master Issuer plc Series 2007-2	8,627
Alpha Credit Group plc	8,178	Royal Bank of Scotland Group plc	8,563
HBOS Treasury Services plc	7,342	Holmes Master Issuer plc Series 2007-1	8,287
Nationwide Building Society	7,125	Brunel Residential Mortgage Securitisation No 1 plc	8,138
Goldman Sachs Group Inc	6,815	Deutsche Bank AG (London)	7,732
Danske Bank A/S	6,275	Barclays Bank plc	7,358
BA Covered Bond Issuer	5,500	Granite Master Issuer plc Series 2007-2	6,740
Credit Suisse (London)	5,455	Permanent Master Issuer plc 2007-1	6,590
Lehman Brothers Holdings Inc	5,325	Arran Residential Mortgages Funding No 3 plc	6,501
Swedbank Mortgage AB	5,180	Landwirtschaftliche Rentenbank	5,829
JP Morgan Chase & Co	5,100	Petroleos de Venezuela SA – PDVSA	5,645
Procter & Gamble Co	4,600	Lambda Finance BV (Gracechurch Corporate Loans 2007-1)	5,313
Citigroup Inc	4,500	AstraZeneca plc	5,068
Bank of Nova Scotia	4,395	HBOS Treasury Services plc	4,681
EFG Hellas plc	4,369	Arkle Master Issuer plc Series 2007-1	4,495
Royal Bank of Scotland Group plc	4,257	Rabobank Nederland	4,366
Memo item:			
European Investment Bank	20,525		

Sources: DCM Analytics and ECB calculations.

Euro issuances by the private financial sector increased at an annual pace of around 24% during 2007, outpacing the growth rates of sovereign and other public entities' issuances of less than 10%. As a result, the amount of euro-denominated bonds issued by the financial sector peaked at more than USD 2 trillion at the end of 2007, ten times more than at the start of Monetary Union in 1999 (see Chart 3).

Investment banks based in the United States (for example Merrill Lynch, Morgan Stanley, Goldman Sachs and Citigroup) and financial institutions based in the United Kingdom (such as UBS AG, Credit Agricole SA, Alpha Credit Group plc and HBOS Treasury Services) continue to top the ranking of the largest non-euro area issuers of euro-denominated bonds (see Table 2). Among the top 20 non-euro area issuers of euro-denominated bonds, it is necessary to go down to 16th position to find a non-financial corporation (Procter & Gamble Co) in the list. A similar ranking of the non-US issuers of US dollar-denominated bonds finds KfW, the German public sector bank, and the European Investment Bank at the top. Interestingly, many firms providing securitisation of residential mortgages, originating mainly in the United Kingdom, appear among the largest issuers of US dollar-denominated bonds and notes over the review period (Granite, Gracechurch, Holmes, Brunel). The growing importance of such securitisation over the past few years – at least until the recent turmoil – could be one factor explaining the increase in the share of the US dollar in international security issuance since 2005. For the first time since the start of this Review, there are no sovereign states in the list of major international bond and note issuers in either euro or US dollar.

DISTRIBUTION BY GEOGRAPHICAL ORIGIN OF ISSUANCE

An overview of the currency composition of the stock of international debt securities, according to the narrow measure, broken down into the regions in which the issuers reside, provides further evidence for the geographical pattern of

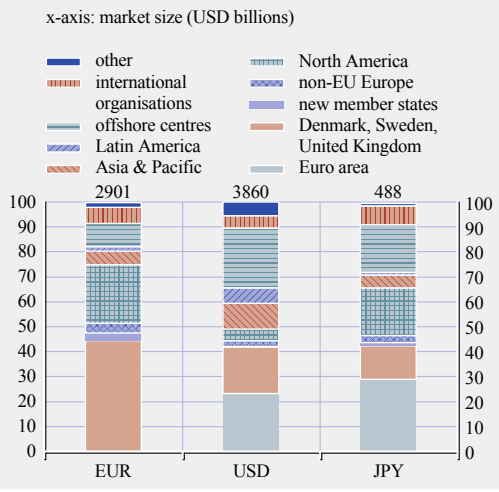
the international role of the euro, which remains focused on the euro area's neighbouring regions, in particular non-euro area EU Member States, and mature market economies.

The largest stock of international debt securities in euro continues to be accounted for by Denmark, Sweden and the United Kingdom, which together issued USD 1.3 trillion euro-denominated bonds and notes, equivalent to around 45% of the total outstanding (USD 2.9 trillion) in 2007. During the review period this share increased by 3 percentage points. Residents from North America issued around 24% of total euro issuances in 2007, whereas residents in offshore centres accounted for almost 10%. By comparison, the latter category – offshore centres – tends to account for a much larger share of US dollar issuances – about one-quarter of the total US dollar issuances by non-US residents – and Japanese yen issuances – around one-fifth of the total yen issuances by non-Japanese residents (see Chart 4).

It is interesting to examine the currency choice in the issuance of international debt securities from the point of view of the issuing countries. Chart 5 shows that residents of the countries that have joined the EU since 2004, but are not yet part of the euro area, issue almost 80% of their foreign currency-denominated debt securities in euro. Euro-denominated debt securities account for about 60% of international issuances in the United Kingdom, Sweden and Denmark. It is worth noting that around one out of two foreign currency-denominated bonds issued by North American residents is also denominated in euro. In the case of residents of the United States, this share goes up to 64%, whereas Canadian residents prefer issuances in US dollar (see Annex Table 2). Only about 20% of issuances from offshore centres are denominated in euro, where US dollar issuances tend to dominate (67% of total international issuances). Overall, these figures confirm the geographical pattern of the international role of the euro, which plays a central role in the regions neighbouring the euro area, but they also highlight the importance of euro-denominated issuances in other major economic areas.

Chart 4 Outstanding volume of international bonds and notes by region

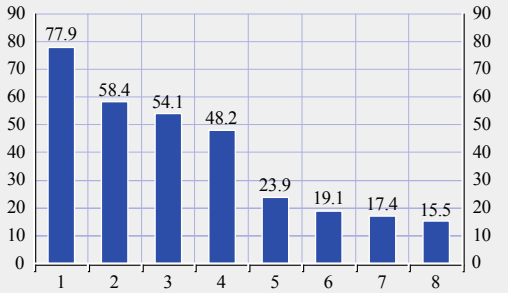
(percentages; fourth quarter of 2007)



Sources: BIS and ECB calculations.

Chart 5 Share of the euro in the stock of outstanding international debt securities in selected regions (2007 Q4)

(narrow measure, i.e. excluding home currency issuance; as a percentage of the total amount outstanding)



1 New Member States
2 DK, SE and UK
3 North America
4 Africa
5 Asia and Pacific
6 Offshore Centres
7 Latin America
8 Middle East

Sources: BIS and ECB calculations.

1.1.2 EVIDENCE FROM INTERNATIONAL PORTFOLIO INVESTMENT POSITIONS

Data from surveys of the international investment position – the stock of foreign assets and liabilities of a country – offer an opportunity to monitor the relative importance of the euro in the portfolios of euro area residents and

non-euro area residents. Since the last Review, according to Eurosystem data, the use of the euro in debt securities issued by non-residents and held by euro area residents remained stable, whereas the euro gained market share in those debt instruments which were issued by euro area residents and held by non-euro area residents. As regards non-euro area residents, publicly available data from the IMF on the currency composition of foreign portfolio investment assets in selected countries confirm the major role of the euro on a regional basis.

EVIDENCE FROM EURO AREA RESIDENTS

At the end of 2006, the total value of euro-denominated foreign debt securities[3] held by euro area residents was €1.2 trillion, accounting for about half of the total foreign debt security holdings of the euro area, thus reflecting no change in the share of the euro in such assets compared with end-2005 (see Table 3, left panel).[4] As indicated in the 2007 Review, data should be treated with caution as variations may also reflect valuation effects owing to the fact that figures are reported at market value. Price and exchange rate movements can therefore modify the relative share of the various currencies in the portfolio of foreign assets and liabilities.[5] The breakdown by the different instruments shows that bonds and notes issued abroad represent around 85% of total debt securities, with more than half of these long-term securities denominated in euro. By contrast, the euro's share in foreign money market instruments held by euro area residents is much smaller and was equal to nearly one-third of the total at the end of 2006, a marginal increase of around half a percentage point with respect to the previous year.

At the end of 2006, the total value of euro-denominated debt securities issued by euro area residents and held by non-euro area residents was around €2.0 trillion, representing around two-thirds of total foreign-held debt securities in the euro area. As a result, on the liabilities side, the euro's share increased by 1.5 percentage points with respect to the end of 2005 (see Table 3, right panel).[6] The breakdown by the different instruments shows

3 Foreign debt securities are defined as those issued by non-residents of the euro area.

4 Since 2004, the Eurosystem has collected data on the currency composition of the euro area's portfolio investment, covering in particular debt securities, including bonds, notes and money market instruments.

5 As an example, during the course of 2006, the euro appreciated against other major currencies, which in turn led to valuation losses in the foreign currency holdings of euro area residents.

6 The increase was the combined result of three different factors: (i) stimulated issuance of euro-denominated debt securities by euro area residents; (ii) a decrease in the value of the stock of foreign currency-denominated liabilities, mainly owing to the appreciation of the euro in 2006, and (iii) to a lesser extent, a decrease in the value of the stock of euro-denominated liabilities, which could be due to price changes triggered by rising interest rates in the euro area.

Table 3 Euro area portfolio investment position – debt securities by instrument and currency of issue

	Assets						Liabilities					
	Total		Bonds and notes		Money market instruments		Total		Bonds and notes		Money market instruments	
	Total	of which in euro	Total	of which in euro	Total	of which in euro	Total	of which in euro	Total	of which in euro	Total	of which in euro
EUR billions												
end-2004	1,787	951	1,500	840	287	111	2,319	1,605	2,093	1,473	226	132
end-2005	2,151	1,068	1,835	968	316	100	2,680	1,754	2,375	1,564	305	189
end-2006	2,427	1,203	2,049	1,081	378	122	3,035	2,030	2,741	1,852	294	178
As a percentage of the total												
end-2004	100.0	53.2	83.9	56.0	16.1	38.8	100.0	69.2	90.3	70.4	9.7	58.4
end-2005	100.0	49.6	85.3	52.7	14.7	31.6	100.0	65.4	88.6	65.9	11.4	62.1
end-2006	100.0	49.6	84.4	52.8	15.6	32.3	100.0	66.9	90.3	67.5	9.7	60.6

Source: ECB.

that in the course of 2006 the euro lost ground in the markets for short-term instruments, which was, however, more than compensated for by a greater issuance of euro-denominated bonds and notes. Money market instruments make up only a small fraction – around 10% – of the total foreign liabilities of the euro area.

EVIDENCE FROM NON-EURO AREA RESIDENTS

Data on the euro's share of foreign assets held as debt securities by non-euro area residents, collected within the IMF's Coordinated Portfolio Investment Survey (CPIS) for end-2006, reveal the familiar geographical pattern of the international role of the euro.[7] In advanced economies geographically close to the euro area (for which CPIS data are available), the euro's share ranged roughly between 40% and 50% (see Chart 6a). For developing countries, this geographical pattern is even more accentuated. In most non-euro area EU countries for which such data are available, the euro's share varies from 44%, in Bulgaria, to 67%, in Hungary. One exception to this pattern is Poland, which holds a higher share of foreign assets in debt instruments denominated in US dollar (33%) than in those denominated in euro (29%). According to CPIS data, Ukrainian residents hold the bulk of their foreign assets, nearly 85%, in euro-denominated debt instruments. By contrast, residents of Russia hold a large proportion of their foreign assets in US dollar-denominated debt instruments and only a relatively marginal amount in euro-denominated debt instruments (see Chart 6b).

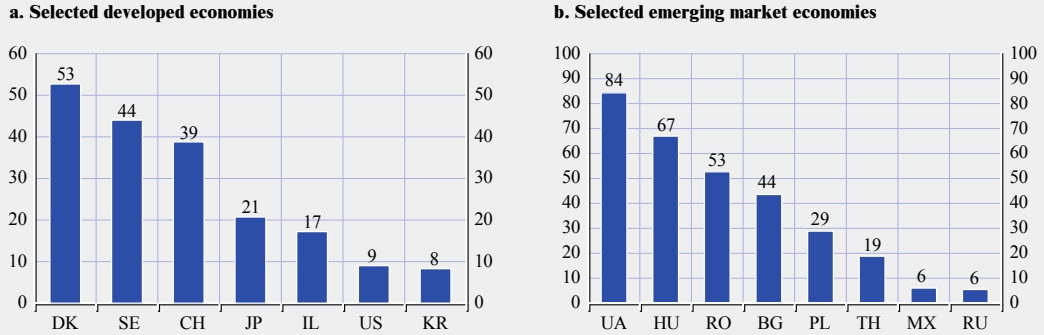
In other regions, available data confirm the dominance of the US dollar in holdings of debt instruments as foreign assets. The US dollar is by far the main currency of denomination of foreign debt securities in Latin and North America as well as in Asia. In the Americas, only the United States and Mexico report a share of foreign assets denominated in euro of more than 5%. With regard to Asian countries, Japan and Thailand stand out as the only countries holding significant amounts of euro-denominated debt securities. At the end of 2006, 21% of Japanese and 19% of Thai foreign debt securities were held in euro-denominated instruments.

In comparison with the use of currencies at the end of 2005, available data suggest that the

7 The Coordinated Portfolio Investment Survey (CPIS) of the IMF collects and publicly presents data on the currency composition of foreign portfolio investment assets in selected countries. In this respect, it should be noted that the total outstanding volume of portfolio investment assets held in debt securities varies substantially among the countries reporting a breakdown of currencies, with Japan (USD 1,833 billion) and Ukraine (USD 6 million) at the opposite extremes of the range. Moreover, the importance of portfolio investment assets held in debt securities differs from country to country, with some countries also holding considerable amounts in equities.

Chart 6 Share of the euro in portfolio investment assets held in debt securities (end-2006)

(percentages)



Sources: IMF (Coordinated Portfolio Investment Survey CPIS) and ECB calculations.

euro's share has remained broadly stable for holdings of foreign assets held as debt securities by non-euro area residents. In general, for those countries for which data by the IMF are available, a greater diversification of the currency denomination of holdings of foreign debt securities can be observed. In particular, the share of currencies other than the US dollar, the Japanese yen and the euro in most of these countries increased at the end of 2006. Interestingly, even in those countries where the euro's share declined during the course of 2006, in most cases neither the US dollar nor the Japanese yen profited from these market share losses.

1.2 THE EURO IN INTERNATIONAL LOAN AND DEPOSIT MARKETS

Over the review period, the euro's share increased in the international loan markets by 1.1 percentage points but declined in the international deposit markets by 1.8 percentage points. As at the fourth quarter of 2007, the euro's share stood at 22.1% in the international loan markets and 21.0% in the international deposit markets.[8] *Overall, the share of the euro in international loan markets remains relatively close to its level around the time of the introduction of the euro while the euro's share in international deposit markets stays clearly below its initial level in 1999.*

1.2.1 THE ROLE OF THE EURO IN INTERNATIONAL LOAN MARKETS

The share of the euro in overall international loan markets reached 22.1% in December 2007, 1.1 percentage points above its share in December 2006 when measured at constant 2007 Q4 exchange rates (see Table 4, left-hand column).[9] While the share of euro-denominated loans increased somewhat, their total volume continued to expand briskly. The total stock of all cross-border loans denominated in euro amounted to USD 1.3 trillion in December 2007 (USD 5.7 trillion for all currencies), 28% above the December 2006 level when measured in US dollar and at constant exchange rates.

Seen from a longer perspective, the share of the euro in all cross-border loans has declined by 2 percentage points since June 2005, when it peaked at 24.1%, and it is now showing signs of recovery from a setback which pushed the euro down to the level seen in the very early days of the single European currency (see Chart 7). Trends in the share of the euro in overall cross-border loan markets mask, however,

8 In line with earlier Reviews, the data presented exclude interbank activity, given that the currency choice in interbank markets may reflect very specific factors that differ from the markets involving non-banks. All data in this section are based on BIS statistics.

9 See Annex Table 7 for international loans and Annex Table 8 for international deposits for a time series covering the period from 1999 until 2007.

Table 4 Share of the euro in international loan markets

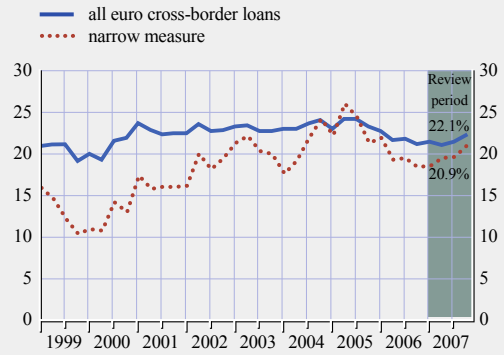
(as a percentage of the total amount outstanding and at constant exchange rates)

	All cross-border loans	(A) Loans by euro area banks to borrowers outside the euro area	(B) Loans by non-euro area banks to borrowers in the euro area	(C) Loans by banks outside the euro area to borrowers outside the euro area [1]
Mar. 1999	20.8	40.9	49.6	15.9
Dec. 2000	21.8	39.3	55.3	13.1
Dec. 2005	23.2	39.3	56.7	21.4
Dec. 2006	21.0	38.4	56.6	18.4
Dec. 2007	22.1	39.0	55.1	20.9

Sources: BIS and ECB calculations.
Notes: Excluding interbank loans.
1) Excluding loans to/from Japan, Switzerland, the United Kingdom and the United States in their domestic currency.

Chart 7 Share of the euro in international loan markets

(all cross-border loans and loans by banks outside the euro area to borrowers outside the euro area – narrow aggregate – denominated in euro; as a percentage of the total amount outstanding and at constant exchange rates)



Sources: BIS and ECB calculations.

important differences between specific types of activity, in particular between (a) loans from euro area banks to non-bank agents outside the euro area, (b) loans from banks outside the euro area to euro area non-banks and (c) loans from banks outside the euro area to non-banks outside the euro area.

In segment (a), i.e. loans granted by euro area banks to non-bank borrowers outside the euro area, the importance of the euro was largely stable over the review period when measured at constant exchange rates. As at the fourth quarter of 2007, the share of the euro was at 39%, whereas the US dollar had a share of more than 42% (see Chart 9a, upper panel, left diagram). A regional breakdown of those data on the borrowers' side confirms findings in earlier issues of the Review that emerging Europe (developing Europe in the BIS taxonomy)[10] is playing a growing role in attracting euro-denominated loans, probably reflecting factors of geographical and institutional proximity (see Box 3).

The euro continued to be the most widely used currency of denomination in segment (b), i.e. loans made by non-euro area banks to borrowers in the euro area. In the fourth quarter of 2007, the euro accounted for more than 55% of such loans while loans denominated in US dollar accounted for above 29% of the total amount of loans outstanding of USD 805 billion (see Chart 9a, upper panel, right diagram). However, the share of the euro in such loans – measured at constant exchange rates – decreased by 1.5 percentage points over the review period. The largest non-euro area lenders to non-bank borrowers in the euro area – in all currencies – are UK banks, which accounted for approximately two-thirds of the outstanding loans in the fourth quarter of 2007, followed by banks in the United States, offshore centres and Japan.

In segment (c), i.e. activity completely outside the euro area (narrow measure),[11] the share of euro-denominated loans remained lowest, at 21%, whereas the US dollar's share was around 47% as at the fourth quarter of 2007 (see Chart 9a, upper panel, lower diagram). According to this narrow aggregate, the euro's share rose by 2.5 percentage points over the review period.

1.2.2 THE ROLE OF THE EURO IN INTERNATIONAL DEPOSIT MARKETS

In the international deposit markets, the share of the euro declined by 1.8 percentage points to 21.0% in December 2007 compared with its share in December 2006, measured at constant exchange rates (see Table 5, left-hand column). The total volume of all cross-border deposits denominated in euro amounted to USD 1.4 trillion in September 2007 (USD 6.5 trillion for all currencies), a modest expansion of 11% over the review period, measured at constant exchange rates.

Comparing the current share of the euro in all cross-border deposits with its share in early 1999, it has – after a period of fluctuations around its initial value – steadily declined since

10 This definition follows the terminology and classification of the BIS.

11 The narrow measure includes only cross-border transactions denominated in a currency which is neither the home currency of the borrower nor that of the lender. The measure makes it possible to eliminate the home bias of currencies while comparing their relative importance in international markets.

Table 5 Share of the euro in international deposit markets

(as a percentage of the total amount outstanding and at constant exchange rates)

	All cross-border deposits	(A) Deposits in euro area banks by depositors outside the euro area	(B) Deposits in banks outside the euro area by euro area depositors	(C) Deposits by depositors outside the euro area in banks outside the euro area [1]
Mar. 1999	26.9	50.9	56.1	18.4
Dec. 2000	26.0	51.3	55.0	17.0
Dec. 2005	26.0	53.6	53.2	22.2
Dec. 2006	22.8	49.2	53.1	19.8
Dec. 2007	21.0	46.2	47.0	20.6

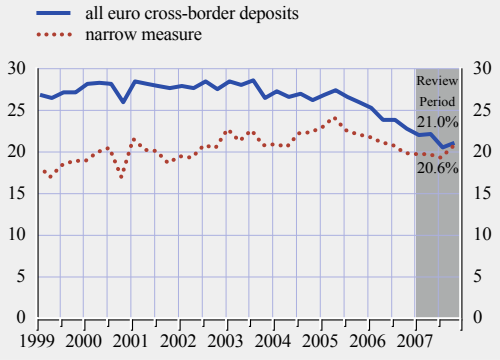
Sources: BIS and ECB calculations.
Notes: Excluding interbank deposits.
1) Excluding deposits in/of Japan, Switzerland, the United Kingdom and the United States in their domestic currency.

mid-2005 and is now almost 6 percentage points lower than its level at the time of the introduction of the euro (see Chart 8). As on the loans side, fluctuations in the importance of the euro may mask diverging trends across different types of activity, namely (a) deposits in euro area banks by non-banks outside the euro area, (b) deposits in banks outside the euro area from euro area non-bank depositors and (c) deposits by non-banks outside the euro area in banks outside the euro area.

In segment (a), i.e. deposits in euro area banks by non-banks outside the euro area, the share of the euro declined by 3 percentage points (measured at constant exchange rates), but the euro nevertheless remained the most widely used currency, accounting for more than 46% of the total volume as at the fourth quarter of 2007 (see Chart 9b, lower panel, left diagram). Deposits denominated in US dollar made up around 36% and other currencies had a combined share of above 18%. From a geographical perspective, two-thirds of the total stock of such deposits was held by residents of developed countries other than those in the euro area. Residents in the United Kingdom held the largest share, accounting for approximately one-third of all deposits in euro area banks by non-banks outside the euro area, followed by those in the United States and in offshore financial centres,[12] each accounting for around one-fifth. In contrast to the international loan markets, emerging Europe only plays a marginal role in this market section (see Box 3).

Chart 8 Share of the euro in international deposit markets

(all cross-border deposits and activity entirely outside the euro area – narrow aggregate – denominated in euro; as a percentage of the total amount outstanding and at constant exchange rates)



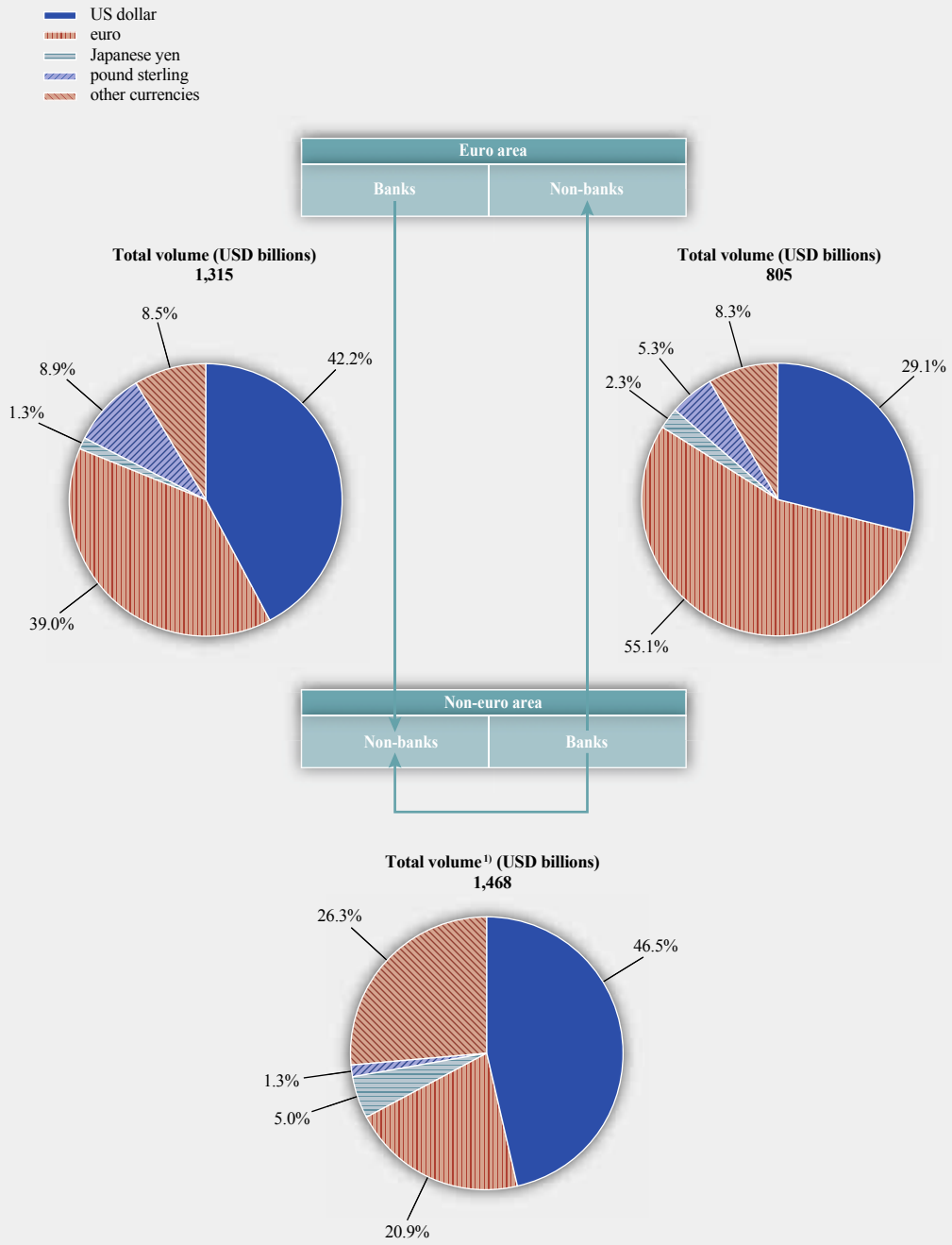
Sources: BIS and ECB calculations

The euro also continued to be the most widely used currency of denomination in segment (b), i.e. deposits of euro area non-banks in banks outside the euro area, accounting for 47% of all deposits in this segment. Deposits denominated in US dollar represented a share of almost 31%, whereas other currencies had a combined share of more than 22% (see Chart 9b,

12 It should be noted that these residents in offshore centres are mainly non-bank financial entities holding deposits in euro area banks.

Chart 9a Cross-border loans between euro area and non-euro area entities

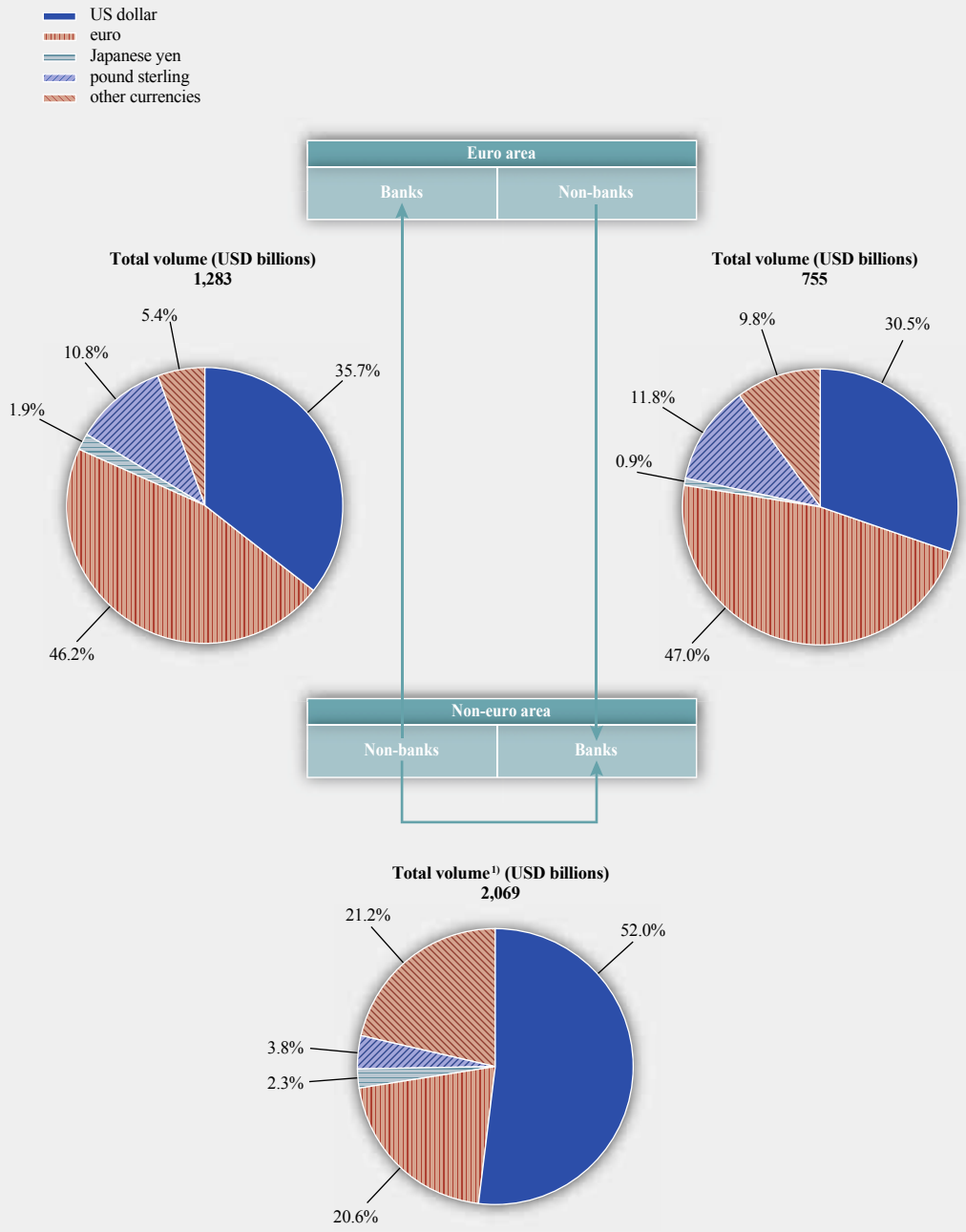
(fourth quarter of 2007)



Sources: BIS and ECB calculations.
Note: Excluding interbank loans.
1) Exluding loans to/from Japan, Switzerland, the United Kingdom and the United States in their domestic currency.

Chart 9b Cross-border deposits between euro area and non-euro area entities

(fourth quarter of 2007)



Sources: BIS and ECB calculations.
Note: Excluding interbank deposits.
1) Excluding deposits in/of Japan, Switzerland, the United Kingdom and the United States in their domestic currency.

lower panel, right diagram). The bulk of all deposits by euro area non-banks held in banks outside the euro area – nearly 60% – are held with UK banks. Over the review period, the euro share for such deposits declined by 6 percentage points.

As in the case of the international loan markets, in segment (c), focusing on international deposits made completely outside the euro area (narrow measure), the role of the euro is the smallest of all three segments. The euro's share stood at almost 21% as at the fourth quarter of 2007, whereas the share of the US dollar was 52% (see Chart 9b, lower panel, lower diagram). According to this measure, the euro's share increased by nearly one percentage point over the review period.

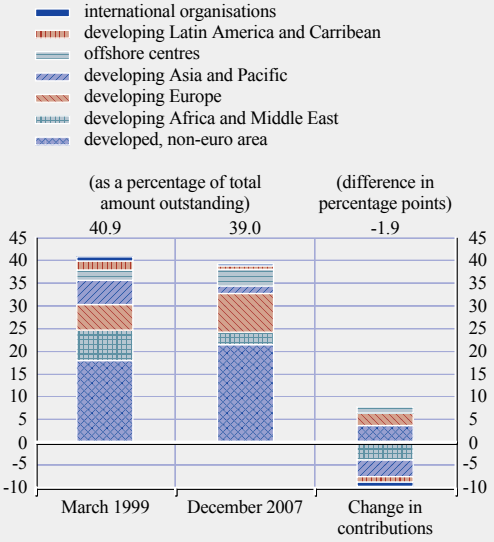
Box 3

THE ROLE OF THE EURO IN INTERNATIONAL ACTIVITIES OF THE EURO AREA BANKING SECTOR

The euro is widely used by euro area banks in international loan and deposit markets – one of the three aggregates available to measure the role of currencies in these markets (referred to as market segment (a) in the main text). On the deposits side, the euro is the main currency of denomination for this market segment, accounting for around 46% of all deposits in the fourth quarter of 2007. On the loans side, the euro ranks second but still has a high share of 39%. This box sheds some light on this development in the international use of the euro over time. [1]

Chart A The euro's share in international loan markets: change in regional contributions 1999 to 2007 [1)]

(first quarter 1999 compared with fourth quarter 2007)



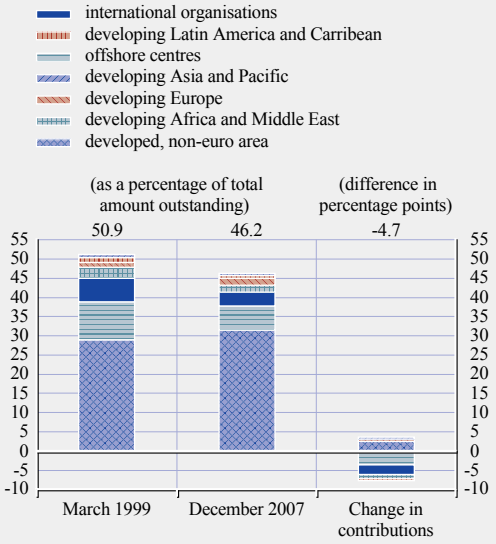
Sources: BIS and ECB calculations.
1) Loans by euro area banks to borrowers outside the euro area.

Regional trends play a key role in understanding the changing role of the euro in this market segment. To demonstrate this, a first assessment can be made on the basis of the contributions of each region to the total share of the euro. Such contributions are computed as the weight of the euro-denominated loans/deposits in each region multiplied by the weight of that region in the total market. Such a contribution analysis highlights the fact that the declining share of the euro in the international loan markets since 1999 can mainly be explained by a significant drop in the contributions of developing Africa and the Middle East as well as developing Asia and the Pacific, where the contributions fell by 4.0 and 3.7 percentage points, respectively (see Chart A). By contrast, the contributions of European countries outside the euro area have risen since the introduction of the single European currency. On the deposits side, the decreasing

1 BIS data (international locational banking statistics) for the business of euro area banks are used throughout this box because all euro area members report data and for these countries then international assets and liabilities of resident banks are broken down comprehensively by currency and by the country of residence of counterparts.

Chart B The euro's share in international deposits markets: change in regional contributions 1999 to 2007 [1)]

(first quarter 1999 compared with fourth quarter 2007)



Sources: BIS and ECB calculations.
1) Deposits in euro area banks by depositors outside the euro area.

share of the euro since the beginning of European Monetary Union can largely be attributed to the substantially smaller contributions by offshore centres, international organisations, and developing Africa and the Middle East (see Chart B).

The contributions analysis can be further decomposed in order to identify the possible drivers of these developments. Looking in more detail at the available data (see Table), it appears that the euro's share declined especially in lending by euro area banks to international organisations, Africa and the Middle East and to developing Asia and the Pacific.[2] Between 1999 and 2007, the share of the US dollar in this market segment increased markedly for business with international organisations, Africa and the Middle East and developing Asia and the Pacific. By contrast, the euro improved its relative importance mainly for loans by euro area banks to offshore centres as well as to emerging Europe (developing Europe according to the BIS classification) , precisely in those regions where the US dollar decline was most pronounced. Growth in international loans by euro area banks in total was mostly seen in loans to developed countries outside the euro area,[3] emerging Europe and offshore centres.

For deposits made by depositors outside the euro area in euro area banks the share of the euro dropped considerably for international organisations when compared with the share at the beginning of 1999. For deposits made by depositors located in developing Asia and the Pacific and offshore centres the share of the single European currency also shrank significantly.[4] Again, as for the loans side, the US dollar absorbed most of the lost market shares of the euro in these regions. Additionally, the US dollar strengthened its relative importance for deposits made by depositors in developed countries outside the euro area. By contrast, for depositors located in emerging Europe and in Latin America and the Caribbean the euro's share increased, again precisely in those regions where the share of the US dollar declined.

In conclusion, a regional shift in international loans and deposits by euro area banks can be observed. Since its introduction in 1999, the euro has more or less maintained or extended its share in business with regions close to the euro area (i.e. developed countries outside the euro area, emerging Europe), whereas its share has declined in other regions of the world mainly to the benefit of the US dollar. One notable exception is Latin America and the

2 It should be noted that lending by euro area banks to international organisations is relatively marginal.
3 In the fourth quarter of 2007 lending to borrowers located in and deposit-taking by depositors from developed countries outside the euro area in both cases represented more than 60% of the respective total amounts outstanding (in all currencies). Furthermore, nearly two-thirds of the total business accounted for by this group is directed to countries in the neighbourhood of the euro area (e.g. United Kingdom, Switzerland).
4 Note: Deposit-taking by euro area banks from residents located in developing Asia and Pacific is relatively marginal.

Currencies' shares in the stock of outstanding international loans by and deposits in euro area banks

(as a percentage of the amount outstanding in the respective region or of the total amount outstanding)

	Total amount outstanding		*of which denominated in:*							
	All currencies (USD billions)		US dollar		euro		pound sterling		other currencies	
			(%)	(% point change) vis-à-vis	(%)	(% point change) vis-à-vis	(%)	(% point change) vis-à-vis	(%)	(% point change) vis-à-vis
	2007 Q4	1999 Q1	2007 Q4	1999 Q1	2007 Q4	1999 Q1	2007 Q4	1999 Q1	2007 Q4	1999 Q1
a) Loans by euro area banks to borrowers outside the euro area										
Developed, non-euro area	792	225	39.5	3.2	35.8	-0.5	12.9	-0.5	11.8	-2.3
Developing Africa and Middle East	76	53	50.2	11.5	47.3	-10.7	0.3	0.0	2.2	-0.9
Developing Asia and Pacific	44	41	45.4	5.3	49.8	-9.0	0.0	0.0	4.8	3.8
Developing Europe	194	48	32.9	-8.8	57.5	3.6	0.5	-0.1	9.2	5.3
International organisations	4	6	26.1	14.9	57.8	-17.9	5.4	0.6	10.7	2.4
Developing Latin America and Caribbean	43	41	72.6	-3.7	21.5	0.7	0.0	0.0	5.9	3.1
Offshore centres	161	40	54.8	-11.3	30.3	4.3	8.0	5.4	6.9	1.7
Total	**1,315**	**455**	**42.2**	**-1.2**	**39.0**	**-1.9**	**8.9**	**1.8**	**9.9**	**1.3**
b) Deposits in euro area banks by depositors outside the euro area										
Developed, non-euro area	853	280	33.4	6.5	47.4	-1.5	11.4	-1.3	7.8	-3.7
Developing Africa and Middle East	41	27	40.7	0.2	54.6	1.9	2.2	-3.1	2.5	1.0
Developing Asia and Pacific	15	5	61.1	21.0	32.0	-20.4	1.9	-1.0	5.1	0.4
Developing Europe	33	10	23.0	-13.0	65.4	5.2	2.4	1.1	9.2	6.8
International organisations	95	35	32.2	20.5	49.2	-33.0	16.6	11.8	1.9	0.7
Developing Latin America and Caribbean	28	15	57.1	-5.9	38.9	4.6	1.5	0.2	2.5	1.1
Offshore centres	217	101	42.3	4.1	37.7	-9.1	10.6	7.4	9.4	-2.4
Total	**1,283**	**473**	**35.7**	**5.2**	**46.2**	**-4.7**	**10.8**	**1.8**	**7.4**	**-2.3**

Sources: BIS and ECB calculations.
Note: All figures are expressed at 2007 Q4 exchange rates.

Caribbean where – interestingly – the use of the euro has increased somewhat and that of the US dollar has declined. In general, these findings underpin the assessment that the use of the euro in international loan and deposit markets is strongly linked to the regional proximity of counterparts. Moreover, the data suggest that the major role of the euro in certain regions has strengthened over time.

1.3 THE EURO IN FOREIGN EXCHANGE MARKETS

Evidence from the latest BIS Triennial Central Bank Survey of April 2007[13] points to a continuous brisk expansion of turnover in traditional foreign exchange markets in the three-year period since the last survey. Average daily volume increased by close to 70%, with the euro staying the second most widely traded currency after the US dollar. While the share of the euro remained roughly constant, at 37.0%, compared with the April 2004 survey, that of the US dollar and the Japanese yen decreased by 2.4 and 3.7 percentage points to 86.3% and 16.5% respectively.[14] The observed declines were largely to the benefit of currencies from emerging markets, which is potentially also a reflection of these countries' increasing integration into the global economy via trade and financial linkages. Regarding the settlement of obligations related to foreign exchange transactions by the Continuous Linked Settlement

13 See BIS (2007). The survey encompasses turnover in traditional foreign exchange markets, including spot transactions, outright forwards and foreign exchange swaps, and OTC derivatives markets, comprising foreign exchange and interest rate derivatives. Its analysis is based on data obtained for a single month (April).

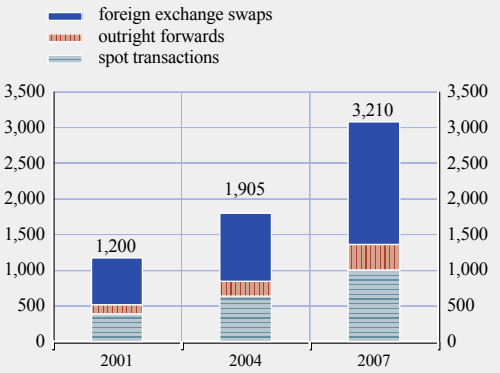
14 The sum of currency percentages adds up to 200%, as both currencies involved in each transaction are counted individually.

(CLS) system[15]*, CLS settlement data indicate slight declines in the average euro and US dollar shares in daily settlements in 2007. The share of the euro settled by CLS dropped to 37.8% in 2007, compared with 39.1% in 2006, whereas that of the US dollar fell from 92.4% to 90.5%, and marginal increases were observed in the shares of the pound sterling and the Japanese yen.*

The most comprehensive analysis of the activity in traditional foreign exchange markets is provided by the BIS Triennial Central Bank Survey. The latest survey, conducted in April 2007, shows an increase in turnover to an average daily volume of USD 3.2 trillion, compared with USD 1.9 trillion in the previous survey in April 2004, which constitutes a rise of almost 70% (see Chart 10). Among the transactions performed in these markets, the use of foreign exchange swaps expanded the most, growing by almost 80%, followed by outright forwards (+73%) and spot transactions (+59%).[16] Hence, outright forwards now account for 11% of the market, behind foreign exchange swaps (53%) and spot transactions (31%).[17] The remarkable advance of foreign exchange swaps is probably related to a heightened need for hedging against the background of a substantial rise in international trade in goods and services in the period under review. In addition, an environment in which exchange rates follow clear trends offering attractive returns and the desire of institutional investors to hold more internationally diversified portfolios may have contributed to the overall expansion of the market. The proliferation of electronic trading platforms allowing the establishment of trading systems and enabling retail investors to participate in the market is also likely to explain part of the rise in turnover.[18] Lastly, the existence of CLS may have also played a part, as the system provides for settlement that virtually eliminates foreign exchange settlement risk. It thus enables institutions to trade more within their existing counterparty limits. These limits are maximum amounts that institutions set in order to control their potential credit exposure to their trading partners.

Chart 10 Turnover in traditional foreign exchange markets

(USD billions; daily averages in April)



Source: BIS.

Turning to the currency composition of foreign exchange market turnover, the US dollar, the euro and the Japanese yen still represent the largest part of the market, with shares of 86.3%, 37.0% and 16.5% respectively (see Table 6).

15 The CLS system was launched in September 2002 and is operated by CLS Bank International, a single-purpose bank under the primary supervision and lead oversight of the Federal Reserve System. CLS addresses the problem of foreign exchange settlement risk, settling the two legs of a foreign exchange trade simultaneously on a payment-versus-payment (PVP) basis, as soon as sufficient funds are available.

16 A *spot transaction* is defined as a single outright transaction involving the exchange of two currencies at a rate agreed on the date of the contract within two business days. An *outright forward* is a transaction involving the exchange of two currencies at a rate agreed on the date of the contract at some time in the future (more than two business days later). A *foreign exchange swap* involves the actual exchange of two currencies (principal amount only) on a specific date at a rate agreed at the time of the conclusion of the contract (the short leg), and a reverse exchange of the same two currencies at a date further in the future and at a rate (generally different from the rate applied to the short leg) agreed at the time of the conclusion of the contract (the long leg).

17 The remaining 5% is accounted for by a statistical residual, referred to as "estimated gaps in reporting" by the BIS.

18 These observations are substantiated by data providing a breakdown of foreign exchange market turnover by counterparty. The share of trade of reporting foreign exchange dealers with other (non-reporting) financial institutions, such as hedge funds, pension funds or insurance companies, and with non-financial customers increased significantly, to the detriment of (interbank) transactions with other reporting dealers.

Table 6 Turnover in traditional foreign exchange markets, currency breakdown

(percentages; daily averages in April) [1]

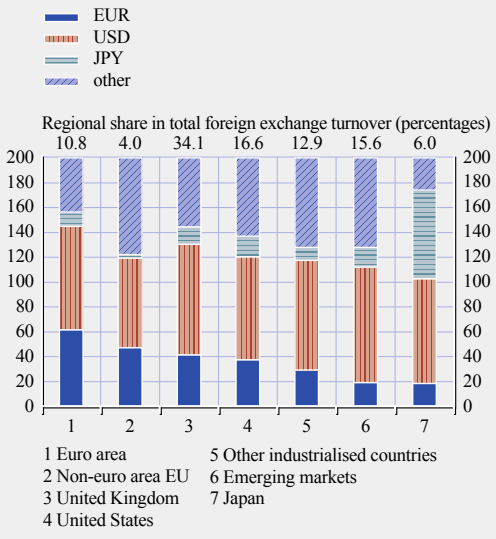
	2001	2004	2007
US dollar	90.3	88.7	86.3
Euro	37.6	36.9	37.0
Japanese yen	22.7	20.2	16.5
Other industrialised economy currencies [2]	32.5	38.8	40.4
Emerging market currencies [3]	16.9	15.4	19.8

Source: BIS.
1) The sum of currency percentages adds up to 200%, as both currencies involved in each transaction are counted individually.
2) AUD, CAD, CHF, DKK, GBP, NOK, NZD, SEK.
3) Difference between 200% and the shares of AUD, CAD, CHF, DKK, EUR, GBP, JPY, NOK, NZD, SEK and USD. This may include some currencies of industrialised economies not reporting separately. Although their shares are likely to be rather small, the figures reported should be seen as an upper bound.

However, their combined share dropped from around 150% in April 2001 to close to 140% in April 2007, triggered in particular by declines for the Japanese yen and, to a lesser extent, also for the US dollar. The beneficiaries of this development were currencies of other industrialised economies and also of emerging markets, rendering the structure of the foreign exchange market more diversified. The increases for the high-yielding Australian and New Zealand dollars are especially noteworthy, and possibly point to their attractiveness as a destination for carry trades. Additionally, the rise in the share of the Hong Kong dollar from 1.9% of foreign exchange market turnover in 2004 to 2.8% in 2007 may be an indication of the increasing openness of China's financial markets.[19] Finally, trading in the Indian rupee and the Brazilian real also approximately doubled, although the shares of these currencies were still comparatively low, at 0.7% and 0.4% respectively.

Chart 11 Turnover in traditional foreign exchange markets by country and currency

(percentages; daily averages in April 2007)



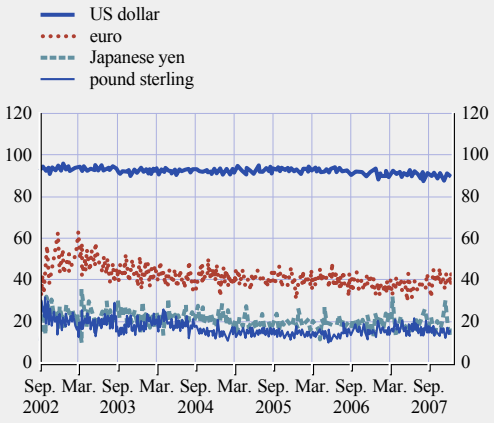
Source: BIS.

Concerning the geographical distribution of foreign exchange market turnover (see Chart 11), the location of trading did not change significantly compared with the previous survey, with the United Kingdom accounting for around one-third of the market, followed by the United States (16.6%), the euro area (10.8%), Switzerland (6.1%), Japan (6.0%) and Singapore (5.8%). Transactions involving the euro are most widespread in the euro area, where they represented more than 60% of the volume traded, followed by non-euro area EU countries (47.3%) and the United Kingdom (41.6%). In emerging markets and Japan, the share of the euro in foreign exchange market turnover was rather low, at less than 20% each. Interestingly, while the euro and the Japanese yen displayed the highest level of activity in their respective domestic markets, this was not the case for the US dollar, whose share is more equally distributed across regions, ranging from 71.9%

19 The increase in market share of the Chinese renminbi from 0.1% to 0.5% lends additional support to this assessment.

Chart 12 Settlement in the CLS system, currency breakdown [1)]

(as a percentage [2)] of total transactions settled)



Sources: CLS and ECB calculations.
1) Only days when CHF, EUR, GBP, JPY and USD are traded actively are considered.
2) The sum of currency percentage shares adds up to 200% as both currencies involved in the settlement of a foreign exchange trade are counted individually.

in non-euro area EU countries, to 82.6% in the United States and 93.0% in emerging markets, indicating the US dollar's dominant role as a vehicle currency.[20]

This function of the US dollar in global foreign exchange markets was also confirmed by data related to the settlement of foreign exchange trades by CLS (see Chart 12). While the BIS Triennial Central Bank Survey reported that the US dollar was involved in 86.3% of all transactions in April 2007, the average share of the US dollar in all settlements processed via CLS in the same month was 91.4%. For 2007 as a whole, the euro was again the second most widely settled currency by CLS, with an average share of 37.8%, slightly lower than the 39.1% observed in 2006. Similarly, the share of the US dollar declined from 92.4% to 90.5%, whereas the pound sterling and the Japanese yen recorded gains of 1.3 and 0.6 percentage points respectively.

Overall, CLS settled a daily average of more than €2.6 trillion in 2007, after close to €2.2 trillion in 2006.[21] These settlement volumes and values have grown continuously since the introduction of CLS. Factors underlying this development are the inclusion of new eligible currencies in CLS,[22] the fact that existing CLS users settle a larger share of their foreign exchange trades in CLS, an increase in the number of CLS settlement members, a rise in the number of CLS third-party users[23] (which stood at 2,195 on 1 January 2008) and, finally, intensified trading in foreign exchange markets against the background of the global financial market turmoil that started in the summer of 2007. In terms of value, CLS is the second largest payment system settling euro transactions after TARGET.

20 A vehicle currency (B) is defined as a currency that is used in the foreign exchange markets as a means to exchange two other currencies, so that currencies A and C are not exchanged directly (AC) but via B in two transactions (AB and BC). In the foreign exchange markets, most transactions between relatively illiquid currencies are executed via vehicle currencies in order to reduce transaction costs and avoid excess intraday volatility.

21 The volumes and values of settled foreign exchange transactions amount to double the volumes and values of foreign exchange trades because every trade involves two settlements legs, one in each currency. In general, the value of settlement obligations is a multiple of the market turnover reported by, for example, the BIS Triennial Central Bank Survey, with the size of the multiple depending on the number of currency legs that trades have.

22 Currently, CLS provides foreign exchange settlement services for 15 currencies (euro, US dollar, Japanese yen, pound sterling, Australian dollar, Canadian dollar, Danish krone, Norwegian krone, Singapore dollar, Swedish krona, Swiss franc, Hong Kong dollar, Korean won, New Zealand dollar, South African rand), up from seven originally.

23 CLS third-party users can be banks, fund managers, non-bank financial institutions and corporations. These entities do not have a direct relationship with CLS Bank, but use (trademark) CLS settlement services of CLS members. Accordingly, a CLS third party has to select a member who must handle all its instructions and financial flows which are consolidated in the CLS system. The terms under which CLS members can act on behalf of third parties are governed by contractual arrangements.

Box 4

THE ROLE OF THE EURO IN DERIVATIVES MARKETS

Comprehensive data on activity in global derivatives markets is difficult to obtain. This is partly due to the nature of these markets, with the majority of business taking place as over-the-counter (OTC) transactions instead of being traded on organised exchanges. Moreover, sizeable segments of the market are comparatively novel, with product innovation evolving at a rapid pace. As a result, the available evidence is predominantly survey-based, with the BIS Triennial Central Bank Survey, together with its review of turnover in traditional foreign exchange markets, providing the most comprehensive analysis of developments in OTC derivatives markets. The BIS Triennial Central Bank Survey thereby complements the BIS semi-annual OTC derivatives statistics, which present data in a similar format, but cover a narrower share of the market.[1] In addition, the BIS also collects data on exchange-traded derivatives on a quarterly basis. Surveys by Fitch Ratings and the British Bankers' Association (BBA) offer further insight, but have an exclusive focus on the market for credit derivatives.

This box presents an outline of the structure and development of the global derivatives markets before assessing the role that the euro plays in these markets.

The structure of derivatives markets

The global market for derivatives is divided into two distinct segments, namely an organised market, where contracts are bought and sold on designated derivatives exchanges, and an OTC market, where contracts are directly established between participants, including banks, other financial institutions, corporations and fund managers, often with the support of a market-making intermediary. In addition to this distinction, further differences range from the level of standardisation of contracts to the instruments available for trading and the exposure to a number of risks.

Participants in the market for derivatives can be broadly separated into two groups, according to their roles and motives for taking part in the market. The first group comprises banks, corporations, non-bank financial institutions and fund managers, who enter the market for derivatives because they intend to (i) manage separately certain types of risk, (ii) hedge exposure to the asset underlying the derivative or (iii) gain exposure to the asset underlying the derivative. Instead of directly trading the underlying asset, such agents choose to generate the desired cash flows by engaging in a derivative contract, because this might be financially more advantageous[2] or liquid trading of the underlying asset is not possible. The second group are intermediaries, which include organised exchanges and banks acting as market-makers in the derivatives markets. They enable or facilitate the transactions desired by the first group.

1 The BIS Triennial Central Bank Survey of April 2007 collects data on turnover in OTC currency and interest rate derivatives markets from 54 countries and jurisdictions. Data on the volume of outstanding OTC derivatives contracts are obtained from market participants in 47 countries and jurisdictions. By contrast, the BIS semi-annual OTC derivatives statistics only encompass major dealers in the G10 and Switzerland, thus covering a considerably smaller share of the market.

2 For example, a corporation having a bond with fixed coupon interest payments outstanding which it would like to convert into floating interest payments could buy back the fixed coupon bond from investors and issue a floating coupon bond instead, possibly incurring significant costs while performing this transaction. Alternatively, it could enter a fixed for floating interest rate swap at considerably lower costs.

Concerning the standardisation of contracts, derivatives traded on organised markets are harmonised with regard to underlying assets, contract sizes, delivery months and other factors. By contrast, specifications on the OTC market are individually negotiated between the two counterparties involved in the contract. It is noteworthy, however, that the International Swaps and Derivatives Association (ISDA) has made significant efforts in promoting common standards for OTC derivatives with the goal of enhancing the transparency and liquidity of the OTC markets and reducing the risks encountered by the contracting parties. Nevertheless, these guidelines are not mandatory and both signatories may deviate from the recommendations at will.

In general, the instruments encountered in derivatives markets encompass four main types:

Forwards: A forward is an obligation to buy or sell an underlying asset at a certain future time for a specific price, agreed between the two parties at the start of the contract. Generally, forwards are individually negotiated between the counterparties and are thus not traded on organised exchanges.

Futures: Like a forward, a future is an obligation to buy or sell an underlying asset at a certain future time for a specific price. By contrast with forwards, however, futures contracts are highly standardised by the exchange on which they are traded and can therefore only be found on organised exchanges.

Options: An option gives the purchaser the right to buy or sell an underlying asset at a certain future time for a specific price. Options are available both on organised exchanges and in OTC markets.

Swaps: A swap is an agreement between two parties to exchange a series of future cash flows at predetermined dates. As swap contracts are usually customised to the needs of the two parties involved, they are almost exclusively traded on OTC markets.

In addition, varieties of these four basic forms of derivative can be encountered in the markets, both as combinations of different products, such as swaptions, and as instruments enhancing the standard features of a certain type, such as knock-out options.

Participants in OTC markets are generally exposed to a higher level of a number of risks than actors involved in trading on organised exchanges, as in the latter case some of these risks are normally addressed by the existence of a clearing house. Most notably, these risks include valuation risk, counterparty risk, legal risk, operational risk and settlement risk, which ultimately drive up the cost of operating in OTC markets.

The size and development of derivatives markets

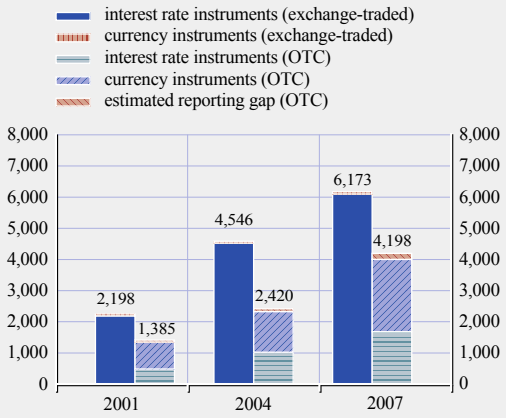
The BIS Triennial Central Bank Survey provides a comprehensive overview of turnover in global derivatives markets, the notional amounts of outstanding contracts and their gross market value. Turnover and notional principals provide the best indication of market size, whereas gross market values are more appropriate for assessing the risk associated with a certain derivatives position.[3]

3 To initiate any type of derivative contract, the two counterparties have to agree on a "notional principal", i.e. the value of the underlying asset which is used to calculate any (potential) future payment(s) at the settlement date(s) of the contract. The notional principal is equivalent to the face value of the contract, which is different from its gross market value, i.e. the price at which it could be bought or sold at any point in time.

Turnover has expanded rapidly in recent years in both organised exchanges and OTC markets (see the chart). Compared with April 2001, average daily volumes of derivatives instruments traded on both organised exchanges and OTC markets had roughly tripled by April 2007, to around USD 6.2 trillion and USD 4.2 trillion respectively. While trading on organised exchanges was dominated by interest rate instruments, currency products accounted for the largest share of activity in OTC markets.[4] With regard to the geographical distribution of trading, transactions on organised exchanges were geared towards North American markets, with a share of 55.4% in 2007, followed by European exchanges, with 34.1%. By contrast, OTC activity was heavily concentrated in the United Kingdom, which accounted for 40.9% of the market in April 2007, before the United States (18.6%) and around 4% each in Japan, Singapore and Switzerland. Trading located in countries of the euro area amounted to 14.0%, with France and Germany sharing the bulk of transactions.

Global derivatives market turnover

(USD billions; daily averages in April)



Source: BIS.

In line with the developments observed for turnover, the notional principal outstanding in global derivatives markets rose from USD 100 trillion in the second quarter of 2001 to USD 516 trillion in the second quarter of 2007. However, while trading on organised markets is considerably larger than that on OTC markets, outstanding contracts on the latter outpaced those on the former by a factor of five (see Table A). This discrepancy is partly due to the shorter maturity of contracts available on organised markets, which increases the volume of trading at the same time as reducing the amount of notional principal outstanding. Furthermore, the notional principal outstanding in OTC markets is inflated by the fact that the cancellation of a derivative position in an OTC transaction is often conducted by entering into an offsetting arrangement with a third party, i.e. not the party with which the contract was initially closed, thereby creating two contracts in order to eliminate an existing position. By contrast, offsetting positions of market

4 It is important to note, however, that the BIS Triennial Central Bank Survey does not provide comparable turnover data for relatively sizeable segments of the global derivatives markets, most importantly equity, commodity and credit derivatives. According to the BIS quarterly exchange-traded derivatives statistics, equity derivatives accounted for around 12% of the annual volume traded on organised exchanges in 2007. BBA (2006) reports that the average weekly trading of credit derivatives amounted to USD 182 billion in 2006. Comprehensive data on market activity in commodity derivatives appears to be unavailable from standardised sources.

Table A Notional principal outstanding in global derivatives markets in the second quarter of 2007

	Organised markets (USD billion)	OTC markets (USD billion)	Total (USD billion)	Total (percent)
Interest rate derivatives	86,135	388,627	474,762	77.4
Foreign exchange derivatives	303	57,597	57,900	9.4
Equity derivatives	10,248	10,760	21,008	3.4
Other derivatives	0	59,428	59,428	9.7
Total	96,686	516,411	613,097	100.0

Source: BIS.

participants are "netted" on an organised market, thereby effectively lowering the notional principal outstanding.

Turning to individual instruments, interest rate derivatives are by far the most important segment of the market, with 77.4% of notional principal outstanding concentrated in these products. They are predominantly (81.9%) found in OTC markets, where interest rate swaps represent the most widely encountered product, with USD 306 trillion of notional amount outstanding.[5] Derivatives linked to movements in foreign exchange rates are almost exclusively located in OTC markets,[6] whereas equity derivatives are fairly equally distributed between both segments.[7] Other derivatives, which cover credit default swaps (USD 51 trillion) and commodity-based instruments (USD 8 trillion), are exclusively traded in OTC markets.

The role of the euro in derivatives markets

A detailed breakdown of the currency denomination of instruments traded in global derivatives markets is available for OTC foreign exchange and OTC interest rate products, both for turnover and for notional principal outstanding.

As in traditional foreign exchange markets, the US dollar's leading role as a vehicle currency is also confirmed in OTC foreign exchange derivatives markets (see Table B).[8] It was involved in 88.6%[9] of all transactions in April 2007, slightly less than six years ago, but still far ahead of

5 They are followed by interest rate options (USD 57 trillion) and interest rate forwards (USD 26 trillion). In organised markets, interest rate options (USD 56 trillion) are more common than interest rate futures (USD 30 trillion).

6 In OTC markets, forwards and foreign exchange swaps (USD 30 trillion) are the largest group, followed by currency swaps (USD 14 trillion) and currency options (USD 14 trillion). By comparison, the notional principal of currency futures and options outstanding on organised exchanges is negligible.

7 Among equity derivatives, equity futures are the smallest group (USD 1 trillion), after equity forwards and swaps (USD 3 trillion), OTC options (USD 7 trillion) and options traded on organised exchanges (USD 9 trillion).

8 It is noteworthy, however, that the statistics provided by the BIS for turnover in traditional foreign exchange markets (see also section 1.3) and turnover in OTC foreign exchange derivatives markets overlap to a significant extent, as they both include outright forwards and foreign exchange swaps. Together, these two product types accounted for almost 70% of turnover in traditional foreign exchange markets and close to 90% in OTC foreign exchange derivatives markets in April 2007.

9 The currency percentages add up to 200%, as both currencies involved in each transaction are counted individually.

Table B Turnover in OTC derivatives markets, currency breakdown

(percentages; daily averages in April)

	2001	2004	2007
Interest rate derivatives	100.0	100.0	100.0
US dollar	31.0	33.9	31.6
Euro	47.3	45.0	38.9
Japanese yen	5.6	4.5	8.1
Other industrialised economy currencies [2)]	14.6	14.1	15.8
Emerging market currencies [3)]	1.5	2.5	5.6
Foreign exchange derivatives [1)]	200.0	200.0	200.0
US dollar	92.3	89.3	88.6
Euro	35.6	34.6	35.0
Japanese yen	22.4	20.9	15.8
Other industrialised economy currencies [2)]	35.7	40.8	41.0
Emerging market currencies [3)]	14.0	14.4	19.5

Source: BIS.
1) The sum of currency percentages adds up to 200%, as both currencies involved in each transaction are counted individually.
2) AUD, CAD, CHF, DKK, GBP, NOK, NZD, SEK.
3) Difference between the total and the shares of AUD, CAD, CHF, DKK, EUR, GBP, JPY, NOK, NZD, SEK and USD. This may include some currencies of industrialised economies not reporting separately. Although their shares are likely to be rather small, the figures reported should be seen as an upper bound.

Table C Notional principal outstanding in OTC derivatives markets, currency breakdown

(percentages; second quarter)

	2001	2004	2007
Interest rate derivatives	100.0	100.0	100.0
US dollar	33.9	34.6	31.8
Euro	32.4	37.5	37.8
Japanese yen	15.7	12.3	12.6
Other industrialised economy currencies [2]	12.6	11.1	11.6
Other currencies [3]	5.5	4.4	6.2
Foreign exchange derivatives [1]	200.0	200.0	200.0
US dollar	89.8	90.2	83.0
Euro	35.8	37.2	37.1
Japanese yen	23.9	23.1	21.1
Other industrialised economy currencies [2]	26.2	28.0	28.8
Other currencies [3]	24.3	21.6	30.0

Source: BIS.
1) The sum of currency percentages adds up to 200%, as both currencies involved in each transaction are counted individually.
2) CAD, CHF, GBP, SEK.
3) Difference between the total and the shares of CAD, CHF, EUR, GBP, JPY, SEK and USD.

other currencies. In fact, only around 8% of all transactions were executed between the euro and a currency other than the US dollar, with even derivatives on some European currencies mainly traded against the US dollar.

By contrast, the euro is the currency on which most OTC interest rate products are based, attaining a share of 38.9% in April 2007, compared with 31.6% for the US dollar. The popularity of the euro in this segment is to some extent attributable to the higher level of fragmentation of the euro area government bond market than that of the United States, thereby rendering derivatives transactions more cost-effective than trading in the spot market.[10] Additional support for this argument appears to be provided by the 8.4 percentage point decline in the share of the euro between April 2001 and April 2007, which may possibly be a manifestation of the gradual integration of euro area financial markets. Furthermore, overnight index swap markets might play a role, since turnover in this segment is especially high for euro-denominated instruments as compared with other currencies.[11]

In line with developments in traditional foreign exchange and OTC foreign exchange derivatives markets, currencies from other industrialised economies and especially from emerging markets have gained increasing prominence since the April 2001 survey, pointing to the rising attractiveness of debt denominated in second-tier currencies as an asset class, in turn triggering heightened activity in derivatives trading based on these instruments.

Concerning the currency composition of notional principal outstanding (see Table C), both actual shares and trends over time broadly reflect those prevalent in turnover data. US dollar-denominated notional principal outstanding outpaces that of all other currencies in OTC foreign exchange derivatives markets by a wide margin, whereas the euro is the dominant currency for OTC interest rate derivatives. However, while euro-denominated turnover in the latter product class has decreased over time, notional principal outstanding expanded by 5.4 percentage points, which could be an indication of a lengthening maturity spectrum of derivatives based on euro area interest rates.

10 See BIS (2007), p. 17. Using interest rate derivatives instead of executing transactions directly in the spot market might be more cost-effective for liquidity reasons.

11 However, while the overnight index swap market may partly explain the relatively high share of the euro in turnover of interest rate derivatives, it is unlikely to account for its prominence in notional principal outstanding, as overnight index swaps are, by definition, short-term in nature.

1.4 THE EURO IN INTERNATIONAL TRADE IN GOODS AND SERVICES[24]

Over the review period, developments in the use of the euro as a settlement or invoicing currency of euro area countries' trade show a less uniform pattern than in previous years, with the euro's share continuing to increase in some countries, while declining in others, albeit from the comparatively high levels achieved thus far.

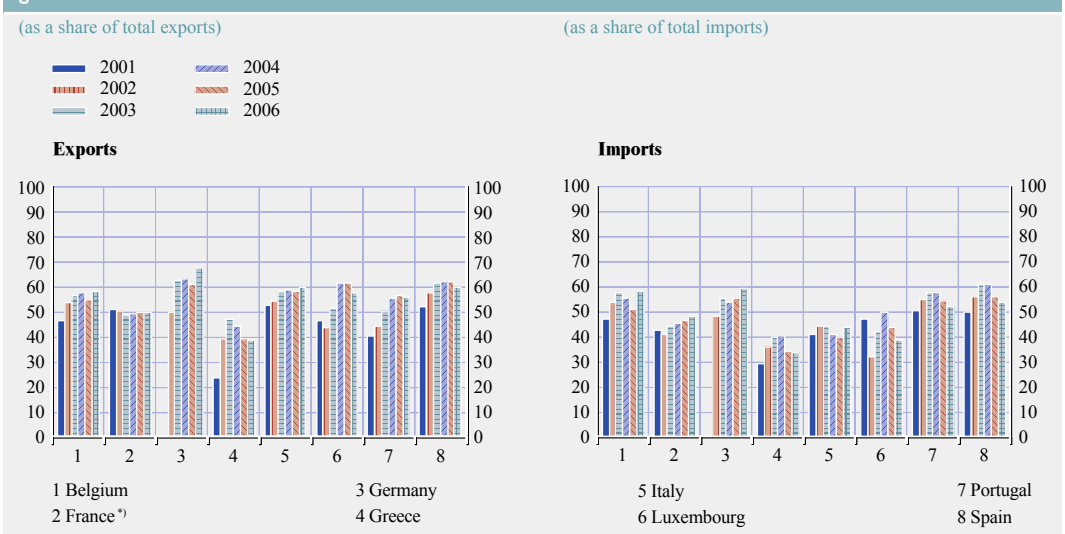
For non-euro area EU members and EU candidate countries, the euro's share in invoicing or settlement of trade continues to outstrip the share of trade with the euro area, signifying euro-denominated transactions with third countries on a significant scale. By contrast, the use of the euro is lower than the share of trade with the euro area for countries outside the euro area's neighbourhood, indicating that close proximity to or institutional links with the euro area or the EU appear to remain the determining factors for the use of the euro in international trade transactions.

1.4.1 THE ROLE OF THE EURO IN INTERNATIONAL TRADE IN GOODS AND SERVICES BY SELECTED EURO AREA COUNTRIES

The use of the euro as a currency for settling or invoicing international trade transactions by euro area countries has shown a notable increase since 2001. The most recent data for 2006 point, however, to relatively divergent patterns. In the extra-euro area exports of goods, the use of the euro picked up in some countries, following a drop in the majority of them in 2005. The share of the euro increased by 6.8 percentage points in Germany, 3.7 percentage points in Belgium and 1.4 percentage points in Italy. In the remainder of the reporting countries, the share of the euro declined (see Chart 13, left panel). As for extra-euro area imports of goods, the drop in the euro's share in extra-euro area imports of goods observed in most countries in 2005 seems to have been reversed in some instances,

24 This section is based on data collected by the ESCB and publicly available data from several non-EU countries.

Chart 13 The euro's share as a settlement/invoicing currency in the extra-euro area trade of goods of selected euro area countries



Sources: National central banks and ECB calculations.
Notes: Data for 2001 include trade settled in euro and in legacy currencies. Data refer to the use of the euro as a settlement currency, except for Germany, where data refer to invoicing. For Germany, data on trade in goods reflect the average value of data collected in surveys carried out in the first and third quarters of 2002, 2003, 2004, 2005 and 2006 on behalf of the Deutsche Bundesbank.
*) 2006 data are based on estimates.

with further decreases recorded in Luxembourg (-5.0 percentage points), Spain (-2.0 percentage points), Portugal (-1.7 percentage points) and Greece (-0.5 percentage points) (see Chart 13, right panel). Finally, as regards services trade, the continuous rise in the use of the euro in both exports and imports observed in previous years seems to have come to a halt in a number of countries (see Annex Table 4).

In the 2007 Review, comprehensive evidence on the settlement or invoicing of euro area members' merchandise trade with countries outside the EU was able to be presented for the first time, based on a special data collection effort conducted by the Eurosystem in the first quarter of 2006. As a follow-up to this, some countries participating in last year's exercise were also able to supply these data for the first quarter of 2007. Developments in the use of the euro in this domain are mixed, as the euro's share has increased in five of the seven reporting countries on the export side and four of the nine reporting countries on the import side. The updated data confirm the main findings of last year's Review, namely (i) that significant disparities exist with respect to euro area countries' practices in invoicing or settling their trade with non-EU countries in their domestic currency, and (ii) that for most countries where available data allow this comparison to be made, the euro's share in trade vis-à-vis countries outside the EU is significantly lower than its share in trade vis-à-vis EU countries outside the euro area (see Annex Table 5).

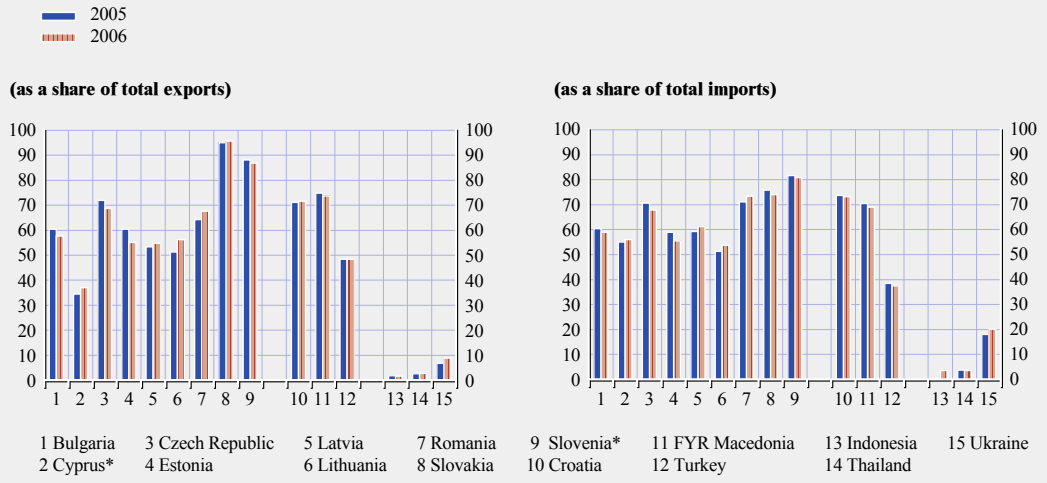
The ECB has welcomed in this context a proposal for a regulation of the European Parliament and of the Council on Community statistics which would include in particular a breakdown of external trade statistics by invoicing currency of exports and imports of goods to and from countries outside the EU.[25]

1.4.2 THE ROLE OF THE EURO IN INTERNATIONAL TRADE IN GOODS AND SERVICES BY THIRD COUNTRIES

Among the non-euro area EU Member States and the EU candidate countries, the euro continued to assert its role as the dominant currency of

25 See the opinion of the European Central Bank on a proposal for a regulation of the European Parliament and of the Council on Community statistics relating to external trade with non-member countries and repealing Council Regulation (EC) No 1172/95 as of 3 March 2008.

Chart 14 The euro's share in the trade of goods in selected non-euro area countries



Sources: IMF and national sources. Data for non-euro area EU countries have been provided by the national central banks of the ESCB. Data for Croatia, the former Yugoslav Republic of Macedonia and Turkey have been kindly provided by the Croatian National Bank, the State Statistical Office of the Republic of Macedonia and the Turkish Undersecretariat of the Ministry for Foreign Trade.
* Data refer to the period before Cyprus and Slovenia adopted the euro.

invoicing or settlement. The use of the euro in exports expanded further in a majority of countries, notwithstanding a decrease in the share of goods exported to the euro area. As in the past, the share of the euro in trade invoicing and settlement continued to surpass the share of the euro area in total trade flows, implying a comparatively high share of euro-denominated transactions with third countries (see Chart 14 and Annex Table 6).

Turning to other countries, as in previous years, Indonesia and Thailand show a lower share of euro-denominated invoicing and settlement than the corresponding euro area share in trade, indicating that the use of the euro in these countries' international trade remains rather limited. By contrast, the use of the euro seems to approach the share of trade with the euro area in Ukraine, for both exports and imports.

These recent data confirm the findings of previous editions of the Review, in particular the euro's widespread use in regions that are in close proximity and display a clear institutional link to the euro area or the EU.

2 THE EURO IN THIRD COUNTRIES

This chapter reviews the role of the euro in third countries, i.e. countries outside the euro area. It focuses on the official use of the euro, referring mainly to its role in monetary and exchange rate policies, and on the private use, covering the use of the euro by private agents.

2.1 OFFICIAL USE: THE EURO IN THIRD COUNTRIES' EXCHANGE RATE POLICIES

During the review period, the euro maintained its role as an exchange rate anchor for countries in the geographic proximity of the EU and countries that have established special institutional arrangements with the EU or its Member States. The use of the euro in the foreign exchange reserves held by third countries increased moderately during the review period owing to positive valuation effects. When measured at constant exchange rates, the share of the euro in global foreign reserves decreased slightly. At the same time, the significance of reserves or other foreign assets held by countries which do not disclose the currency composition of their reserve assets has further increased, meaning that these observations have to be interpreted with caution. Finally, the euro continued to be used as an intervention currency in countries that use the euro as a point of reference for their exchange rate policy.

2.1.1 THE EURO AS AN ANCHOR CURRENCY

The euro's role in the exchange rate regimes of third countries was almost unchanged during the review period. In its latest report on exchange rate arrangements, the IMF listed 29 countries that use the euro as the anchor for exchange rate policies. Adding countries in which the euro is used as a point of reference as part of a currency basket yields, as in the past, a total number of around 40 countries using the euro as a point of reference for their exchange rate policy (see Table 7).[26]

As in previous years, the use of the euro in third countries' exchange rate regimes has a strong geographical and institutional underpinning, as it is observed mainly in EU neighbouring regions and in countries that have established special institutional arrangements with the EU or its Member States. With the exception of those countries participating in exchange rate mechanism II (ERM II), the decision to use the euro as an anchor currency is a unilateral decision and does not involve any commitment on the part of the Eurosystem.

In the period under review, exchange rate regime changes involving the euro as an anchor currency occurred in Cyprus and Malta as well as in Russia and Hungary. Cyprus and Malta adopted the euro on 1 January 2008 and therefore left ERM II as of 31 December 2007. In Russia, the Central Bank of the Russian Federation (Bank of Russia) stated that the share of the euro in its operational basket for the daily management of the exchange rate had been raised to 45%[27]. Outside the review period, at end-February 2008, Hungary abandoned its exchange rate framework in which the euro was used as a point of reference with fluctuation bands and introduced a floating exchange rate regime in combination with inflation targeting.

2.1.2 THE EURO AS A RESERVE CURRENCY

As in the past, the role of the euro as an international reserve currency is reviewed against the background of a continued accumulation of foreign reserves by emerging market economies. While the level and the composition of foreign reserves are often treated as separate issues in the economic literature, the special focus chapter of this Review points to potential links between the level of reserves and their composition.

26 Other entities linking their exchange rate regimes to the euro include the French territorial communities and overseas territories (Saint-Pierre-et-Miquelon, Mayotte, French Polynesia, New Caledonia, and Wallis and Futuna), the European microstates that are not IMF members (the Vatican City and the principalities of Monaco and Andorra), as well as Kosovo (see Table 7). As a result, a combined total of 50 countries and territories have an exchange rate regime involving the euro.

27 In its monetary framework, the Bank of Russia aims to limit the rouble's appreciation against a trade-weighted basket for the real effective exchange rate in which the share of the euro (and currencies with an exchange rate peg to the euro) has been raised by 4 percentage points to around 60%. In addition, the Bank of Russia maintains an operational currency basket as a reference for the daily management of rouble volatility.

Table 7 Countries with exchange rate regimes linked to the euro

(as at 01 March 2008)

Region	Exchange rate regimes	Countries
European Union (non-euro area)	ERM II	Denmark, Estonia [1)], Latvia [2)], Lithuania [1)], Slovakia
	Euro-based currency boards	Bulgaria
	Peg arrangements with fluctuation band based on the euro	-
	Managed floating with the euro as reference currency	Czech Republic, Romania
	Pro memoria: Independent floating	Hungary, Poland, Sweden, United Kingdom
Candidate and potential candidate countries	Unilateral euroisation	Kosovo, Montenegro
	Euro-based currency boards	Bosnia and Herzegovina
	Peg arrangements or managed floating with the euro as reference currency	Croatia, FYR Macedonia, Serbia [3)]
	Pro memoria: Independent floating	Albania, Turkey
Others	Euroisation	European microstates [4)], French territorial communities [5)]
	Peg arrangements based on the euro	CFA Franc Zone [6)], French overseas territories [7)], Cape Verde, Comoros
	Peg arrangements and managed floats base on the SDR and other currency baskets involving the euro (share of the euro)	Seychelles (59.1%) [8)], Russian Federation (45%) [9)], Libya, Botswana [10)], Morocco [11)], Tunisia [12)], Vanuatu [13)]

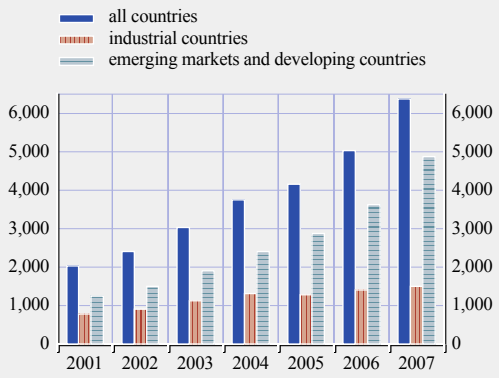
Sources: IMF and ECB compilation.
1) Unilateral commitment to a currency board.
2) Unilateral commitment to an exchange rate fluctuation band of +/-1%.
3) In September 2006, Serbia adopted a new monetary policy framework with the aim of adopting a fully-fledged inflation targeting regime in the future.
4) Republic of San Marino, Vatican City, Principality of Monaco, Andorra. In the case of Andorra: unilateral euroisation. The other countries and jurisdictions are entitled to use the euro as their official currency.
5) Saint-Pierre-et-Miquelon, Mayotte.
6) WAEMU (Benin, Burkina Faso, Côte d'Ivoire, Guinea-Bissau, Mali, Niger, Senegal, Togo) and CAEMC (Cameroon, Central African Republic, Chad, Republic of Congo, Equatorial Guinea, Gabon).
7) French Polynesia, New Caledonia, Wallis and Futuna.
8) Weighted (trade and tourism receipts) basket of currencies comprising the euro, the US dollar and the pound sterling (in October 2006, the currency composition of the basket was reduced from six to three currencies).
9) Trade-weighted currency basket for monitoring and setting ceilings for real appreciation (combined share of euro and euro-linked currencies of around 60%); since February 2005 dollar-euro basket for daily exchange rate management (since February 2007 euro share of 45%).
10) Weighted basket of currencies comprising the SDR and the South African rand.
11) Weighted basket in accordance with the distribution of Morocco's foreign trade and the pattern of currencies of settlement.
12) Real effective exchange rate target.
13) Weighted (trade and tourism receipts) basket of currencies of Vanuatu's major trading partners.

Specifically, different levels of reserves tend to be associated with different motives for holding reserves, and this in turn is likely to have an impact on the optimal currency composition of reserves.

Over the review period, the global reserve build-up was very strong. Indeed, the pace of reserve accumulation further accelerated in 2007. In December 2007 global foreign exchange reserves stood at USD 6,391 billion, an increase of 27% from the figure of USD 5,037 billion at the end of 2006 (see Chart 15). This mainly reflected developments in emerging markets and developing countries, where foreign exchange reserve assets grew at a pace of almost 35% in US dollar terms compared with the end of 2006. At the same time, reserve assets were also accumulated outside traditional foreign exchange reserves held by central banks in sovereign wealth funds (see also the special focus chapter). By contrast, reserve growth in industrialised countries remained subdued, reaching about 7% compared with the end of 2006 and largely reflecting income flows on the outstanding amount of reserves rather than the accumulation of new reserves.

Chart 15 Global foreign exchange reserves

(USD billions; year-end)



Source: IMF.

According to the IMF data on the Currency Composition of Official Foreign Exchange Reserves (COFER), which cover the currency composition of around two-thirds of global foreign exchange reserves, the share of euro-denominated assets in global foreign exchange reserves, measured at current exchange rates, rose to 26.5% in December 2007 (up from 25.1% at the end of 2006, see Table 8).[28] Among industrialised countries, the euro share increased somewhat more markedly (from 21.0% to 23.1%) than in those developing countries which disclose their currency composition to the IMF. In the latter countries, the share of the euro rose only marginally, from 28.1% to 28.4%.

To a considerable extent, these developments reflect valuation changes stemming from the appreciation of the euro against the US dollar during the review period. In fact, between December 2006 and December 2007, the euro appreciated by around 12% in nominal terms against the US dollar, raising the dollar value of euro-denominated foreign exchange reserves.

Filtering out such valuation effects, the share of the euro measured at constant exchange rates declined by 0.7 percentage point (see Table 9). This decline is entirely driven by developments

28 As explained in detail in previous reviews, the COFER data are based only on foreign exchange reserves held by central banks that actually disclose the currency composition of their foreign exchange holdings to the IMF. The implications of this incomplete coverage are significant, as in the fourth quarter of 2007 more than one-third (36%) of global reserves and almost half (47%) of developing country reserves were held by central banks that do not disclose the currency composition of their foreign exchange reserves. In particular, it is important to recall that major reserve accumulators, most notably in Asia, are not covered. Thus, it is not possible to draw definite conclusions from the analysis of COFER data on global currency diversification trends in foreign exchange reserve portfolios.

Table 8 Currency shares in foreign exchange reserves with disclosed currency composition at current exchange rates

(percentages)

		Dec. 2005	Dec. 2006	Mar. 2007	June 2007	Sep. 2007	Dec. 2007
Global	USD	66.9	65.5	65.0	65.0	63.8	63.9
	EUR	24.1	25.1	25.4	25.5	26.4	26.5
	JPY	3.6	3.1	3.0	2.8	2.7	2.9
	GBP	3.6	4.4	4.5	4.6	4.7	4.7
	Other	1.9	2.0	2.1	2.1	2.3	2.0
Industrialised countries	USD	73.0	71.3	71.4	71.2	69.6	69.4
	EUR	19.6	21.0	21.1	21.2	22.5	23.1
	JPY	3.4	3.5	3.2	3.1	3.1	3.1
	GBP	2.2	2.6	2.6	2.8	3.0	2.8
	Other	1.8	1.6	1.6	1.7	1.9	1.6
Developing countries	USD	61.7	61.2	60.5	61.0	60.2	60.7
	EUR	27.8	28.1	28.4	28.2	28.9	28.4
	JPY	3.7	2.8	2.8	2.6	2.5	2.8
	GBP	4.8	5.7	5.8	5.8	5.9	5.8
	Other	1.9	2.2	2.5	2.4	2.6	2.2

Sources: IMF and ECB calculations.

Table 9 Currency shares in foreign exchange reserves with disclosed currency composition at constant exchange rates

(percentages)

		Dec. 2005	Dec. 2006	Mar. 2007	June 2007	Sep. 2007	Dec. 2007
Global	USD	62.6	63.4	63.1	63.3	63.1	63.9
	EUR	28.1	27.2	27.3	27.1	27.1	26.5
	JPY	3.5	3.2	3.0	3.0	2.8	2.9
	GBP	3.9	4.3	4.5	4.5	4.6	4.7
	Other	1.8	1.9	2.1	2.1	2.3	2.0
Industrialised countries	USD	69.2	69.4	69.7	69.6	68.9	69.4
	EUR	23.2	22.8	22.8	22.6	23.1	23.1
	JPY	3.4	3.6	3.3	3.3	3.2	3.1
	GBP	2.4	2.6	2.6	2.8	2.9	2.8
	Other	1.7	1.6	1.6	1.7	1.9	1.6
Developing countries	USD	57.2	59.1	58.6	59.3	59.5	60.7
	EUR	32.2	30.3	30.4	29.9	29.7	28.4
	JPY	3.6	2.8	2.8	2.8	2.6	2.8
	GBP	5.2	5.6	5.7	5.7	5.7	5.8
	Other	1.8	2.1	2.4	2.3	2.5	2.2

Sources: IMF and ECB calculations.
Note: Constant exchange rate figures have been computed using the last available quarter as the base period.

Table 10 Currency breakdown of the total foreign exchange reserves of selected countries

(percentages)

	Euro		US dollar		Japanese yen		Other currencies		
	Dec. 2006	latest	Dec. 2006	latest	Dec. 2006	latest	Dec. 2006	latest	latest as at
G20 countries									
Australia [1]	23.4	45.4	56.6	44.1	19.6	9.6	0.5	0.9	Feb. 2008
Canada	51.0	50.8	47.5	47.9	1.5	1.4	0.0	0.0	Feb. 2008
United Kingdom [2]	64.2	66.7	28.2	24.4	6.4	7.0	1.1	1.9	Sep. 2007
United States [3]	61.2	69.9	-	-	38.8	24.3	0.0	5.8	Dec. 2007
New EU Member States									
Bulgaria [4]	99.6	99.6	0.4	0.4	0.0	0.0	0.0	0.0	June 2007
Latvia	46.4	41.9	44.0	47.8	9.5	9.5	0.0	0.4	Feb. 2008
Lithuania	100.0	-	0.0	-	0.0	-	0.0	-	-
Romania	68.8	69.5	27.2	25.5	-	-	4.0	4.9	Dec. 2007
Slovakia [5]	68.8	77.3	25.8	17.0	0.0	0.0	5.4	5.6	Feb. 2008
EU neighbouring countries									
Croatia	85.5	78.0	14.5	21.9	-	-	0.0	0.0	Feb. 2008
Norway [6]	47.2	48.4	32.4	31.8	4.5	4.6	15.9	15.2	Dec. 2007
Sweden [7]	50.0	50.0	20.0	20.0	0.0	0.0	30.0	30.0	Dec. 2007
Switzerland [8]	48.0	47.0	27.0	28.0	10.0	10.0	15.0	15.0	Dec. 2007
Other countries									
Chile [9]	24.7	-	70.4	-		-	4.9	-	-
Peru [10]	17.8	12.3	80.1	86.0	-	-	0.0	0.0	Feb. 2008
Uruguay	1.3	15.2	98.6	65.3	0.0	5.2	0.0	14.3	Feb. 2008

Sources: Websites of countries' authorities and ECB calculations.
Notes: 1) Data for Australia refer to currency shares expressed as a percentage of total gross foreign exchange reserves excluding SDRs and gold.
2) Data for the United Kingdom refer to combined currency shares for the Bank of England and the Ministry of Finance and refer to September 2006 and 2007.
3) Data for the United States refer to combined currency shares for the Open Market Account (SOMA) at the Federal Reserve and the US Treasury Exchange Stabilization Fund (ESF).
4) Data for Bulgaria exclude SDR assets and gold.
5) In Slovakia, "other currencies" include SDR assets and gold.
6) In the case of Norway, currency shares refer to the fixed income part of Norges Bank's foreign exchange reserve portfolio. It is assumed that geographical locations broadly correspond to currency allocations.
7) Data for Sweden include swap transactions in NOK.
8) Currency shares for Switzerand include derivative positions.
9) Data for Chile refer to the combined currency shares in the liquidity and the investment portfolio of the Central Bank of Chile.
10) In the case of Peru, the share of the euro refers to reserve assets denominated in currencies other than US dollars. According to the Central Reserve Bank of Peru, these are mostly euro-denominated assets.

in developing countries, where the share of the euro – when measured at constant exchange rates – declined by around 2 percentage points between December 2006 and December 2007. Among industrialised countries, on the other hand, the share of the euro increased slightly when accounting for valuation effects.

Evidence from the few central banks that publish the currency breakdown of their reserves indicates that the share of the euro has remained broadly stable in most cases (see Table 10). In fact, many central banks in this group of countries maintain fixed currency benchmarks for their foreign exchange reserve portfolio.

In some cases, the share of the euro changed during the review period for reasons unrelated to reserve currency preferences. For example, the share of the euro (and that of the Swiss franc) in the foreign exchange reserves of the United States increased owing to currency swap operations related to the liquidity tensions in global financial markets.[29] In Australia, the increase in the share of the euro mainly reflects the fact that the Reserve Bank of Australia maintains fixed currency benchmarks (45% US dollar, 45% euro, 10% Japanese yen) for net but not for gross reserves.[30]

The share of the euro in reserves held by the central banks of the new EU Member States has in general remained high as many of these countries also use the euro as a point of reference for their exchange rate policy. In some of these countries, the share of the euro has increased somewhat, most likely to some extent as a result of valuation effects (e.g. in Romania) or related to ERM II membership (e.g. Slovakia). In other new EU Member States, the share of the euro in foreign exchange reserves has declined (e.g. in Latvia). It is worth pointing out in this context that for countries which have come closer to potential euro area membership, the currency composition of reserves may at some point become a matter of deciding on the level of reserves to be held within European Monetary Union. This is because, upon the introduction of the euro, all euro-denominated foreign exchange reserves automatically become domestic assets.[31]

2.1.3 THE EURO AS AN INTERVENTION CURRENCY

As emphasised in past Reviews, the role of the euro as an intervention currency is closely intertwined with prevailing exchange rate regimes and reserve practices. Countries operating an exchange rate peg or managed float tend to prefer to use the anchor currency in their intervention policies.

Most central banks do not publish detailed information on the currency composition of their interventions. Available evidence indicates that the euro continued to be used as an intervention currency mainly in some non-euro area EU Member States (some of which have joined ERM II, such as Slovakia) and in non-EU countries operating a euro-based currency board or an exchange rate that uses the euro as a point of reference (e.g. Croatia and Serbia).

29 In order to facilitate the functioning of financial markets and provide liquidity in US dollars abroad, the Federal Open Market Committee of the Federal Reserve System authorised in December 2007 temporary reciprocal currency arrangements with the ECB and the Swiss National Bank. Holdings related to these arrangements were included in the Federal Reserve's System Open Market Account for the fourth quarter of 2007. Under the terms of these agreements, the ECB and the Swiss National Bank were able to draw up to $20 billion and $4 billion respectively in exchange for local currency, for a period of up to six months. As at 31 December 2007 both central banks had fully drawn down their respective temporary swap lines.

30 The increase in the share of the euro in Australia's foreign exchange reserves mainly reflects the difference between gross and net reserves. Net reserves, which are held for intervention purposes, are managed against a fixed currency benchmark (45% US dollar, 45% euro, 10% Japanese yen). The portion represented by the difference between net and gross reserves has mainly been allocated to the US dollar. This portion, which represents foreign currency assets hedged with foreign exchange swaps, was a direct result of domestic liquidity management operations. With the recent reduction in this portion of reserves (owing to domestic liquidity management operations), the proportion of gross reserves allocated to the euro has increased. On a net reserves basis, however, the proportion of net reserves allocated to the euro has been around 45% since 2002.

31 As a member of the European System of Central Banks, a national central bank may still hold reserves in line with Article 31 of the Protocol on the Statute of the European System of Central Banks and of the European Central Bank.

2.2 PRIVATE USE: THE EURO AS A PARALLEL CURRENCY IN THIRD COUNTRIES

Up to December 2007, the stock of euro banknotes held outside the euro area continued to gradually increase. It continues to account for around 10% to 20% of currency in circulation in value terms. With regard to the use of euro-denominated deposits in euro area neighbouring regions, survey data suggest that the euro's share in foreign exchange deposits has increased in most EU Member States and EU candidate countries.

2.2.1 CURRENCY SUBSTITUTION – THE USE OF EURO BANKNOTES OUTSIDE THE EURO AREA

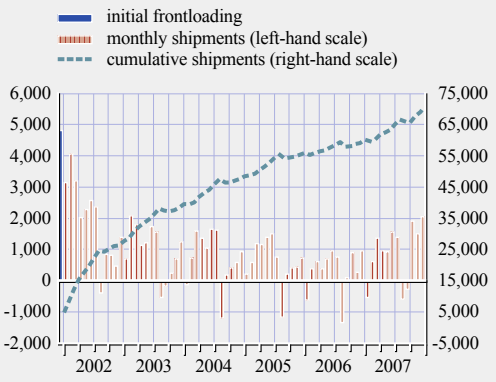
The use of euro banknotes outside the euro area cannot be estimated with full precision. One estimate for the lower bound of the amount of euro banknotes circulating abroad is the accumulation over time of net shipments of euro banknotes by euro area monetary financial institutions (MFIs) to destinations outside the euro area.[32] According to this method, around €70 billion worth of euro banknotes were estimated to be in circulation outside the euro area at the end of December 2007, around 11% of currency in circulation for that reference month (see Chart 16). This estimate is considered to be a lower bound, given that the banking channel is only one of a number of channels for euro banknotes shipped outside the euro area. Indeed, anecdotal evidence suggests that the outflows of euro banknotes via non-MFI channels (for example, via tourism or workers' remittances) are often greater than the backflow of euro banknotes via non-bank channels, creating an incomplete picture of the true banknote flows. A more realistic assumption might thus be that around 10% to 20% (potentially a figure closer to the upper end of the range) of euro currency in circulation was circulating outside the euro area at the end of 2007.[33]

According to the statistics on net shipments of euro banknotes to destinations outside the euro area, foreign demand increased somewhat during 2007 as compared with 2005 and 2006. This strengthening might be related to developments in exchange rate expectations. This view is supported by the fact that, in simple currency demand models for the euro area, developments in the effective exchange rate are one determinant of currency demand.[34]

Further evidence can be taken from statistics by third countries. The Bank of Russia, for instance, publishes data on foreign currency brought into and taken out of the Russian Federation by authorised banks. These statistics show that in 2006 and 2007, the net shipment of euro banknotes increased considerably, whereas, on a net basis, USD banknotes were returned,

Chart 16 Net shipments of euro banknotes to destinations outside the euro area

(EUR millions)



Source: Eurosystem.
1) Net shipments = Euro banknotes sent abroad minus euro banknotes received.

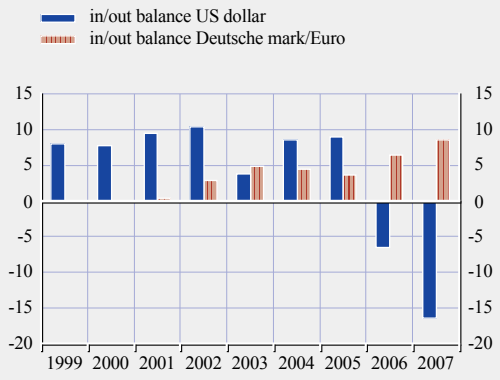
32 Net shipments are defined as shipments of euro banknotes by euro area MFIs to destinations outside the euro area minus euro banknotes returned from outside the euro area to euro area MFIs.

33 For a more complete overview of the methods used to estimate non-resident demand for euro banknotes, see Boxes 7 and 8 in the "Review of the international role of the euro" published in January 2005. The overall amount of currency circulating outside the euro area is small as compared with the broad monetary aggregate M3 (0.7% to 1.5% in 2007). In addition, the developments of this series do not differ strongly from overall M3 developments, so the impact of the non-resident demand for currency on monetary aggregates during 2007 was small.

34 See, for example, the model described in Fischer, B., M. Lenza, H. Pill and L. Reichlin (2008), "Money and monetary policy: the ECB experience 1999-2006", *The role of money – money and monetary policy in the twenty-first century*, ed. A. Beyer and L. Reichlin, ECB.

Chart 17 Foreign currency brought into and taken out of the Russian Federation by authorised banks

(USD billions)



Source: Bank of Russia.

possibly indicating in part a substitution effect related to exchange rate developments (see Chart 17).

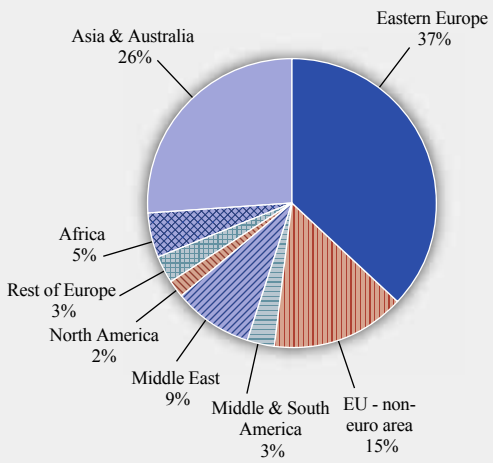
The use of euro banknotes outside the euro area continues to be concentrated to a considerable extent on euro area neighbouring regions, in part due to the proximity of the euro area which makes it convenient to hold euro banknotes, e.g. for purchases in euro area countries. Other reasons are the expectation that the euro will become legal tender in some of these countries in some years and traditions, in particular concerning the use of the Deutsche Mark. However, evidence from a number of sources suggests that euro banknotes are increasingly used in countries east of the EU, mainly as a store of value and for large transactions.

Judging from the development of the euro banknote trade figures obtained from globally active banknote wholesale banks, the use of euro banknotes in other parts of the world also seems to be increasing, although volumes remain relatively moderate. Chart 18a shows the regions outside the euro area from which banknote wholesale banks[35] purchased euro banknotes in 2007. Purchases from regions in Europe, especially from eastern European countries, accounted for 55% of total purchases. A considerable share (26%) of euro banknotes was purchased from the region "Asia & Australia", of which inflows from East Asia,

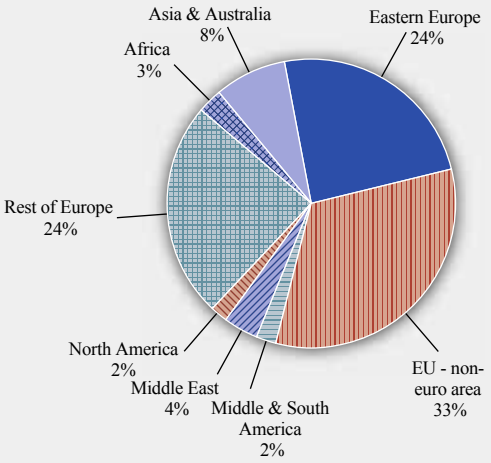
35 The figures were reported by globally active banknote wholesale banks, serving most of the foreign currency market. As some wholesale banks have not always provided detailed statistics, the data are partially based on estimations.

Chart 18 Regional breakdown of euro banknote purchases from and sales to destinations outside the euro area (2007)

a) Purchases



b) Sales



Source: ECB, based on data from banknote wholesale banks.

owing to tourism and trade, constituted the major part. The Middle East accounted for 9% of all euro banknote purchases, presumably reflecting the demand from international market-places, such as Dubai, where goods are traded with consumers from all over the world against cash.

Chart 18b shows the regions outside the euro area to which banknote wholesale banks sold euro banknotes in 2007. The bulk of banknotes (81%) were sold to European countries, especially to the regions "rest of Europe" (mainly Switzerland), "EU – non euro area" (largely the United Kingdom) and "eastern Europe" (particularly Russia and Turkey).

2.2.2 ASSET SUBSTITUTION – THE USE OF EURO-DENOMINATED BANK DEPOSITS AND LOANS

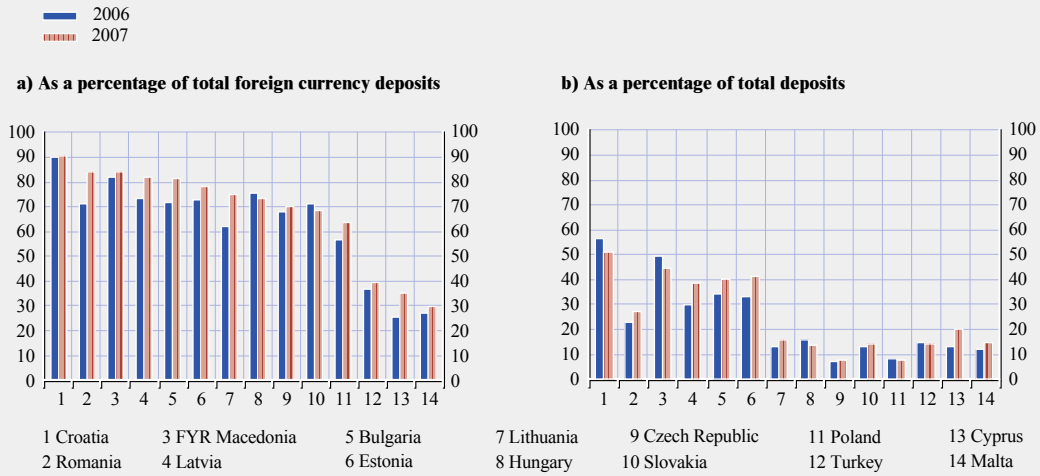
Households and firms in central, eastern and south-eastern Europe have increasingly been using the euro for domestic financial transactions.[36] In general, the use of a foreign currency as a store of value has been explained as the consequence of past macroeconomic instability and high inflation (ECB (2007a)). In central, eastern and south-eastern Europe, several specific factors may have supported the role of the euro as the preferred currency for asset substitution, namely the geographical proximity of the EU – implying trade, financial, migration and tourism links – the institutional anchor of prospective EU and EMU membership, as well as the role of the euro as an external anchor in countries' exchange rate policies.

As in previous years, the Review reports two measures related to the use of the euro in the denomination of deposits and loans in third countries: its share in total foreign currency deposits (loans) and its share in total deposits (loans) including domestic assets (liabilities). Whereas the first measure provides an indication of the role of the euro in asset (liability) substitution compared with other currencies, the second indicator refers more closely to the use of foreign currencies and asset (liability) substitution in general.

Over the review period, the share of the euro in total foreign currency deposits increased

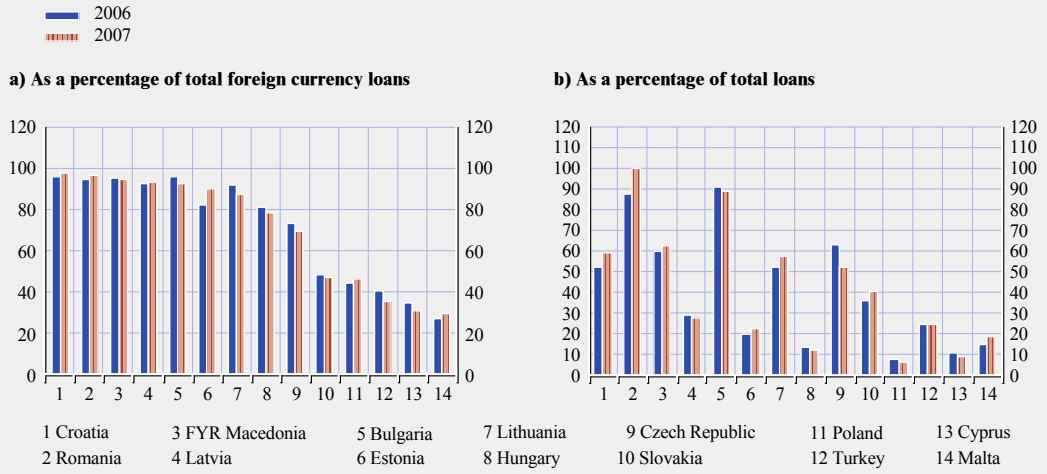
36 See Table 12 and Table 13 for evidence on the use of the euro in deposits and loans in selected other countries.

Chart 19 Share of the euro in deposits in selected non-euro area EU Member States and EU candidate countries



Sources: National central banks and ECB staff calculations.
Notes: Figures for Cyprus and Croatia may not be comparable with last year's review owing to changes in definitions and possible revisions. For Romania, end-2006 figures refer to January 2007.

Chart 20 Share of the euro in loans in selected non-euro area EU Member States and EU candidate countries



Sources: National central banks and ECB staff calculations.
Notes: Figures for Cyprus and Croatia may not be comparable with last year's review owing to changes in definitions and possible revisions. For Romania, end-2006 figures refer to January 2007.

in most non-euro area EU Member States and EU candidate countries (see Chart 19a). This trend took place against the backdrop of distinct developments regarding asset substitution in general (see Chart 19b). In fact, the share of the euro in total deposits has tended to decrease somewhat in countries with typically high levels of asset substitution (e.g. in Croatia and the former Yugoslav Republic of Macedonia). On the other hand, asset substitution has tended to increase in other countries, in particular in those with current account deficits (e.g. in the Baltic States, Bulgaria, Romania).

As regards euro-denominated loans in the new EU Member States and EU candidate countries, the euro has remained the most widely used currency of denomination for borrowing in foreign currency (see Chart 20a). At the same time, borrowing in foreign currencies has increased in some countries, possibly in response to rising domestic interest rates (see Chart 20b).[37]

37 The exchange rate risk stemming from such foreign currency-denominated loans is often not borne by the banking sector because foreign currency assets are broadly covered by foreign currency liabilities (foreign borrowing or foreign currency deposits). At the same time, banks face indirect credit risk as their borrowers – in particular households, which, unlike corporations, often have no natural hedge – are exposed to currency mismatches and may face increasing debt servicing costs following a domestic currency depreciation or a rise in foreign interest rates.

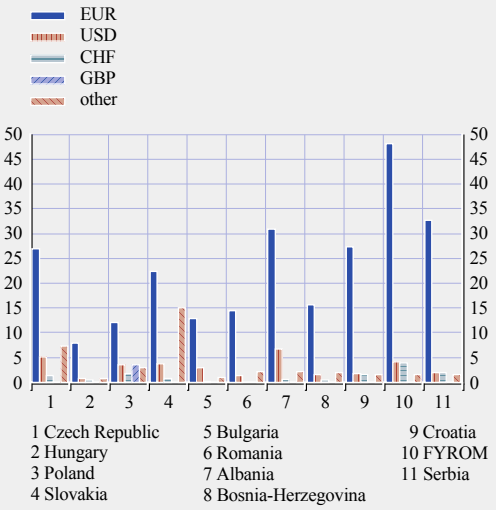
Box 5

THE EURO IN CENTRAL, EASTERN AND SOUTH-EASTERN EUROPE – FIRST RESULTS FROM THE NEW EURO SURVEY BY THE OESTERREICHISCHE NATIONALBANK

In 2007 the Oesterreichische Nationalbank commissioned a new survey on foreign currency holdings.[1] This builds on an earlier survey and extends the geographical scope to 11 countries, comprising four central and eastern European (CEE) countries, namely the Czech Republic, Hungary, Poland and Slovakia, as well as seven south-eastern European (SEE) countries, i.e. Albania, Bosnia and Herzegovina, Bulgaria, Croatia, the former Yugoslav Republic of Macedonia (FYROM), Romania and Serbia.[2] The survey was conducted for the first time in October and November 2007 and will subsequently be carried out every half year (for further details, see Stix, Scheiber and Dvorsky (2008)). The most important questions in the survey refer to the amounts and currency composition of foreign currency cash (FCC) holdings and foreign currency deposits (FCDs) as well as to the motives for holding FCC and FCDs. Other questions pertain, for example, to the respondents' expectations regarding the overall economic situation of their country, exchange rate developments and the prospective date for the introduction of the euro in their respective countries. In certain areas, the new Euro Survey represents a continuation of earlier surveys by the Oesterreichische Nationalbank, thus allowing for the comparison of data over time. A number of new questions have also been included.

Chart A Share of respondents holding foreign cash

(percentage of respondents)



Source: Euro Survey 2007, Oesterreichische Nationalbank.
Note: GBP figures were only requested in Poland.

The results can be summarised as follows. First, the share of respondents holding foreign cash is substantial in some countries, and it varies considerably across countries, ranging from 8% in Hungary to 49% in the former Yugoslav Republic of Macedonia (see Chart A). Second, a decomposition by currency reveals a predominant role for the euro, reflecting the good reputation of the euro throughout the region. With regard to the distribution of euro holdings, the highest ownership rates are recorded for some SEE countries. In CEE countries, a significantly lower share of interviewees reported euro cash holdings, with the exception of respondents in the Czech Republic and Slovakia (where euro cash is held mainly for transactions abroad). Third, cash holdings in other foreign currencies play a limited role. Given their particularly strong economic interlinkages, the Czech Republic and Slovakia represent special cases in this respect.

1 In each country about 1,000 people over the age of 14 were interviewed in person. The results reflect the populations of the respective countries, with the exception of Poland, where only the population of the ten largest cities was sampled.
2 Montenegro and Kosovo, which have both unilaterally introduced the euro, were not covered by the survey.

In an assessment of the degree of a country's de facto euroisation, the new Euro Survey provides useful insights into the motives for holding FCC. If FCC is held primarily as a store of value, this points to a certain degree of asset substitution, which is generally seen as a first step towards euroisation. Another possible reason for FCC holdings is their use for transactions abroad in connection with shopping or holidays in (neighbouring) euro area countries. The final step towards currency substitution is the use of the foreign currency for domestic transactions.

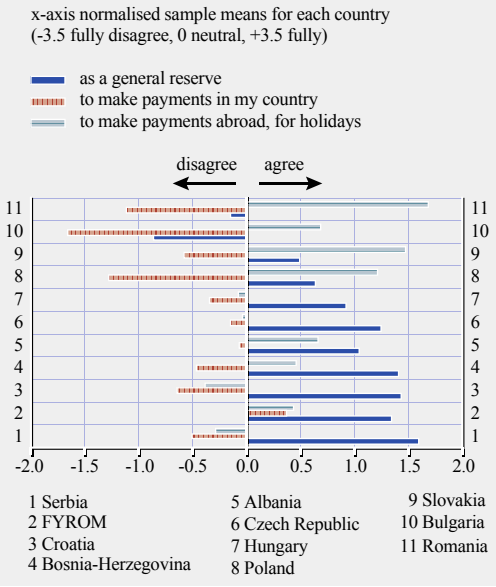
Chart B depicts the standard set of motives for holding FCC, clearly illustrating discernible differences between CEE and SEE countries. In CEE countries, the prime motive for holding euro cash is to make payments abroad. In this context, previous surveys by the Oesterreichische Nationalbank showed that in CEE countries the store of value function has decreased during the past few years, whereas the use for payments abroad has increased, reflecting the more advanced economic situation and higher macroeconomic stability.

In SEE countries, the store of value function is the key motive for holding euro cash. At first glance, it may seem striking that people hoard euro cash virtually "under the mattress", thus foregoing interest earnings. One possible explanation for this behaviour may be that the euro is perceived as a "very stable and trustworthy currency" by a high percentage of respondents. Another explanation may be that respondents still remember past periods of high inflation or hyperinflation and consequently lack trust in their domestic currencies (Backé, Ritzberger and Stix (2007)). This explanation is to some extent underpinned by the survey results, which show in some countries high rates of agreement with the following statement: "I remember periods of high inflation during which the value of the local currency dropped sharply". These results might also be explained by the availability of banking services and the perceived safety of bank deposits, which might affect the choice between FCC and FCD (see Stix (2008)).

As regards the use of euro cash for domestic transactions, Chart B clearly shows that this is not a major reason for holding euro cash in any of the SEE or CEE countries surveyed, at least relative to the other two motives.

All in all, in SEE countries a high proportion of respondents report euro cash holdings and, as questions about amounts revealed, they hold comparatively high amounts of euro cash. In CEE countries the share of respondents holding euro cash is on average smaller and the amounts reported are – in contrast to their higher GDP-per-capita levels – considerably lower. This leads to the conclusion that euro cash plays a more important role in SEE than in CEE countries. This difference may be explained by the different motives for holding

Chart B Motives for holding euro cash



Source: Euro Survey 2007, Oesterreichische Nationalbank.
Note: Respondents who held euro cash were asked whether they agreed or disagreed on a scale of 1 (fully agree) to 6 (fully disagree) the statement that they hold euro cash as e.g. a general reserve.

euro cash: in CEE countries, euro cash is mainly held for transactions abroad, while in SEE countries, it is mainly kept as a store of value.

Overall, the new Euro Survey provides a unique source of information on the role of the euro in the region and is likely to deliver interesting time series in the medium term, providing ample scope for further research in this area.

SPECIAL FOCUS: THE USE OF THE EURO IN GLOBAL FOREIGN EXCHANGE RESERVES

This special focus chapter reviews empirical evidence and analytical findings on the use of the euro in global foreign exchange reserves since its inception in 1999. The analysis emphasises that an understanding of the forces that drive the currency composition of central bank reserve portfolios requires a thorough awareness of the underlying motives for central banks to hold reserves.

The available evidence, which excludes many large Asian reserve holders, suggests that the share of the euro in global foreign exchange reserves increased gradually to around 25% during the first few years following the launch of the single currency and has levelled off somewhat since then. In recent times, the share of the euro has increased slightly further almost entirely as a result of positive valuation effects.

A recent ECB staff study suggests that these patterns in the currency composition of foreign exchange reserves may reflect the declining importance of "transaction motives" in central bank reserve management, as many emerging market economies have accumulated reserve levels in excess of precautionary levels. Given that such transaction motives typically appear to favour the use of the US dollar as a reserve currency, their declining relevance in reserve management can be interpreted as one possible reason for the increase in the share of the euro in the early 2000s. The relative stability of the share of the euro in recent years could reflect a convergence towards minimum variance portfolios that attribute a large weight to the anchor currency. In this respect, the study suggests that for countries with pegged or managed exchange rates vis-à-vis the US dollar, the case for portfolio diversification into euro-denominated assets is in general not very strong.

The logic of such considerations applies only to fixed income portfolios. As some reserve-accumulating countries are currently considering transferring some of their foreign assets from central banks to sovereign wealth funds, other asset classes, such as global equity markets, may become more relevant for sovereign investment patterns. Back-of-the-envelope calculations, which assume that sovereign wealth funds would invest their assets according to market capitalisation, suggest that euro-denominated assets would not be among the main beneficiaries in such a situation.

I INTRODUCTION

Among the various international uses of the euro, its role as a "reserve currency" has typically attracted the most public attention. Compared with many other international market segments reviewed in this publication, monitoring the use of the euro in global foreign exchange reserves is challenging, since many countries do not disclose the currency composition of their foreign exchange reserves. The analysis presented in this special focus chapter is based on IMF data on the currency composition of reserves and refrains from using other, possibly less accurate, survey data.

When the euro replaced 11 national currencies in 1999, it was clear from the outset that it would also be used as an international reserve currency. In fact, by replacing the European legacy currencies which had been used as reserve currencies prior to European Monetary Union (mainly the Deutsche Mark), the euro immediately assumed their international role.[38]

In addition to this "international role by legacy", some observers questioned whether the euro could assume a more prominent role in the international monetary system or even challenge the US dollar's status as leading international reserve currency.[39] Such

38 With the launch of the euro, reserves held by euro area central banks in the legacy currencies were no longer counted as foreign exchange reserves but as domestic assets. Therefore, IMF figures on the combined currency share of all European legacy currencies at end-1998 are not comparable to the share of the euro in global foreign exchange reserve as at end-March 1999. In addition, the IMF changed its reporting methodology for its COFER database in 2005 and revised its figures for the currency composition of foreign exchange reserves back to 1999, but no further back.

39 See, for example, Chinn and Frankel (2006, 2008).

considerations were mainly based on the idea that the euro area fulfilled the main prerequisites for issuing a major reserve currency, namely a stability-oriented policy framework in combination with large and liquid capital markets, backed by a large and reasonably dynamic economy. At the same time, other observers, including most of the central banking community, expected that the advent of the euro would lead to only gradual changes in the currency composition of global foreign exchange reserves. The main argument in this context was the notion of strong "inertia" in the currency composition of reserves, mainly stemming from anchor currency and liquidity considerations by central bank reserve managers.

The debate on the role of the euro in international reserves has intensified over the past few years, mainly as a result of the rise in foreign exchange reserves accumulated by emerging market economies. The notable increase in official foreign assets held by emerging market economies – from USD 964 billion in 1999 to around USD 4.9 trillion in December 2007 – has been caused by a combination of crisis prevention motives, exchange rate policies aimed at promoting export-led growth (most notably in Asia) and a sharp rise in oil and other commodity prices which has led to large current account surpluses in commodity-exporting countries (most notably in the Commonwealth of Independent States, Latin America, Africa and the Middle East). Against this background, the monitoring of the share of the euro in international reserves has often been linked to global policy issues such as the US current account deficit and the level of US interest rates. In fact, some have argued that under a new "Bretton Woods II system", emerging market central banks have increasingly contributed to the financing of the US current account deficit and lower than usual US interest rates by investing the bulk of their foreign exchange reserves in low-yielding US government bonds.[40] According to this line of reasoning, countries with managed exchange rates against the US dollar would find it difficult to diversify their reserve portfolios as such changes would be inconsistent with their overall exchange rate policy framework.[41] Others have stressed that the level of reserves accumulated by many emerging market central banks exceeds conventional measures of appropriate reserve holdings for balance-of-payment purposes.[42] Therefore, it has been argued, some of the resulting "excess reserves" could be invested in more diversified portfolios, in particular when these excess reserves are to be transferred into sovereign wealth funds.

An understanding of the forces that drive the currency composition of central bank reserve portfolios requires a thorough awareness of the underlying motives for central banks to hold reserves. Typically, such motives are divided into two main categories: portfolio and transaction motives.[43] The first motive is similar to the objectives of private investors, i.e. central banks seek to obtain a maximum return for a given amount of tolerable risk, which is often believed to be small. Transaction motives are unique to central banks as they are closely related to the precautionary holding of reserves for balance-of-payment purposes. More specifically, transaction motives for holding reserves refer to the use of foreign exchange reserves for interventions in foreign exchange markets as well as import and external debt financing in countries whose access to international capital markets is limited or disrupted.

This special focus chapter argues that some of the patterns in the use of the euro as a reserve currency since its inception could be a reflection of a changing balance between portfolio and transaction motives among central banks. In Section 2, the academic literature on the currency composition of reserves is reviewed. In Section 3, the available evidence on the share of the euro in global foreign exchange reserves since 1999 is presented and analysed with a view to finding alternative explanations for the

40 See Warnock and Warnock (2006).
41 See Dooley, Folkerts-Landau and Garber (2004).
42 See, for example, Jeanne and Rancière (2006).
43 See, for example, Roger (1993) and ECB (2004).

observed patters. Section 4 presents the findings of an ECB staff study which computes optimal reserve portfolios for emerging market central banks, accounting for portfolio and transaction motives. In Section 5, a tentative assessment of the role of the euro in the portfolios of sovereign wealth funds is presented. Section 6 concludes.

2 THE CURRENCY COMPOSITION OF FOREIGN EXCHANGE RESERVES: A REVIEW OF THE LITERATURE

The academic literature on the currency composition of official foreign exchange reserves can be broadly divided into two general categories: empirical literature that relates the reserve portfolio of central banks to observable country or reserve currency characteristics, and theoretical literature that uses portfolio models to derive the optimal currency composition of reserves.

On the empirical side, several authors who have had access to confidential country-by-country IMF data on the currency composition of reserves have documented the importance of transaction motives.[44] For example, Heller and Knight (1978) find that a country's exchange rate regime and its trade patterns are significantly related to the currency composition of its reserves.[45] These findings led Heller and Knight to conclude that transaction motives, stemming from the need to intervene, to cover imports or to finance external debt, appear to play a major role in determining the currency composition of reserves. Dooley, Lizondo and Mathieson (1989) find further evidence that exchange rate regimes and trade flows are empirical determinants of the currency composition of reserves. Using even more recent country-level data, Eichengreen and Mathieson (2000) document for the period 1979-1996 that exchange rate pegs, trade flows and financial flows (i.e. the currency composition of external debt) determine the currency composition of reserves in a sample of 84 emerging and transition countries. Chinn and Frankel (2006), using aggregate data for the currency composition of reserves, regress the currency shares of the main reserve currencies on various characteristics of the corresponding reserve currencies and find evidence that the size of the home country, the inflation rate (or the lagged depreciation trend) of the reserve currency, exchange rate volatility and the size of the home financial market centre are significant determinants of the currency shares in central bank reserve portfolios.

While the empirical literature in general finds evidence for a strong role of transaction motives as a determinant of reserve composition, the theoretical literature has for the most part neglected transaction motives and derived the currency composition of optimal reserves as the solution to an international version of a Markowitz-type portfolio problem. The discussion then mainly revolved around the correct method of applying optimal portfolio theory in an international context, rather than explicitly taking into account the fact that central banks may pursue objectives different from those of private investors. The resulting optimal portfolio was then compared with actual portfolios and a small difference between the two interpreted as support for the hypothesis that central banks pursue portfolio objectives. Thus, Ben-Bassat (1980) suggests applying mean-variance optimisation in terms of a basket of import currencies. When comparing optimal with actual reserve portfolios using data for 1976 and 1980, he finds some evidence for portfolio objectives as a determinant of the currency composition of reserves in emerging markets, but not in industrialised countries. Dellas and Yoo (1991) use data on the currency denomination of imports and the reserve composition for South Korea to test both a mean-variance optimisation model and an import-based version of the consumption capital asset pricing model (CCAPM). They

44 The IMF publishes only aggregate figures in its COFER database. The confidential country-by-country information is only occasionally made available to researchers who are affiliated with the Fund.

45 Prior to Heller and Knight (1978) the literature focused on the broader choice between gold, foreign exchange reserves and IMF assets, since little information on the currency composition was available.

show that the actual central bank portfolio was quite close to the efficient frontier computed and that the restrictions implied by the CCAPM could not be rejected, but admit that the power of such tests is low. In a rare attempt to take account of the transaction motives of central banks, Dooley (1983) and Dooley, Lizondo and Mathieson (1989) use a small model to show that in the presence of both foreign currency assets and liabilities as well as transaction costs, the composition of gross assets depends on the structure of transaction costs, and the composition of net assets on expected returns and covariances, in the case of a mean-variance-optimising central bank. Papaioannou, Portes and Siourounis (2006) investigate the mean-variance optimal portfolio at the world level using a variety of methods to estimate covariance matrices and return expectations and different reference currencies. They also experiment with imposing different ad hoc constraints that reflect transaction considerations.

Recent empirical papers have examined the currency composition of reserves from a different angle. For example, Wong (2007) and Lim (2007) examine the impact of past exchange rate changes on aggregate currency shares of foreign exchange reserves and document that currency diversification in response to exchange rate changes has thus far tended to be stabilising for foreign exchange markets, i.e. central banks have tended to pursue "portfolio rebalancing" as discussed in Perold and Sharpe (1995) in which they buy (sell) falling (rising) currencies rather than market trend strategies in which one would buy (sell) rising (falling) currencies. Lim (2007) concludes that these findings are consistent with relatively stable currency shares in aggregate IMF data on the currency composition of reserves. He also suggests that these findings may support the view that optimal reserve portfolios have hardly changed over time. Alternatively, Lim (p. 18) suggests that his findings may also support the view that optimal reserve portfolios have changed over time, but reserve managers have on average implemented the change very gradually.

3 THE SHARE OF THE EURO IN GLOBAL FOREIGN EXCHANGE RESERVES SINCE 1999

3.1 THE AVAILABLE EVIDENCE FROM THE IMF'S COFER DATABASE

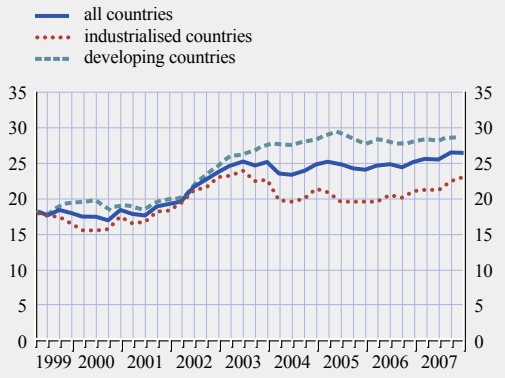
With only a limited number of countries publishing the currency composition of their foreign exchange reserves, the IMF's aggregate COFER database is the only source of such information at the global level. The COFER data are based on a voluntary survey by the IMF conducted with 120 IMF member countries, comprising all 25 industrialised countries but only 95 out of the 160 developing countries. As a result, the survey covers only around two-thirds of total foreign exchange reserves and around half of reserves held by developing countries. Therefore, it is not possible to draw firm conclusions regarding global trends in the allocation of foreign exchange reserves from the COFER data. In particular, great caution should be applied since, according to the IMF, major reserve accumulators in Asia are not covered by this survey.

The data covered in the COFER survey suggest that the share of the euro in international reserves rose gradually from 18% in 1999 to around 25% in 2003. Since then, the share of the euro has remained relatively stable, hovering around 24-25% and reaching 26.5% in December 2007. As shown below, this recent increase occurred almost entirely as a result of positive valuation effects. The gradual rise in the share of the euro since its launch in 1999 has been most pronounced in developing countries, where it increased from 18% to 29% in 2007. Among the industrialised countries, the share of the euro in foreign exchange reserves rose gradually in line with the aggregate trend until early 2003. Thereafter, the share of the euro in industrialised countries declined somewhat until early 2004 and has remained broadly stable at around 20% since then.

These trends are partly driven by valuation effects, notably by the impact of exchange rate changes on the value of euro-denominated reserves. When currency shares in international reserves are measured at constant exchange rates, the overall

Chart 21 The share of the euro in global foreign exchange reserves with disclosed currency composition at current exchange rates

(percentages, at current exchange rates)



Sources: IMF and ECB calculations.

trends are less pronounced. Developing countries are seen to have increased their holdings of euro-denominated assets relative to other assets until mid-2005 (see Chart 22). Since then, they have somewhat reduced their relative exposure to euro-denominated assets. Constant exchange rate shares for the euro in the reserves held by industrialised countries suggest that these countries, after a period of increasing their exposure to euro-denominated assets, decreased euro-denominated assets relative to other currencies in the first quarter of 2003 and the first quarter of 2004.

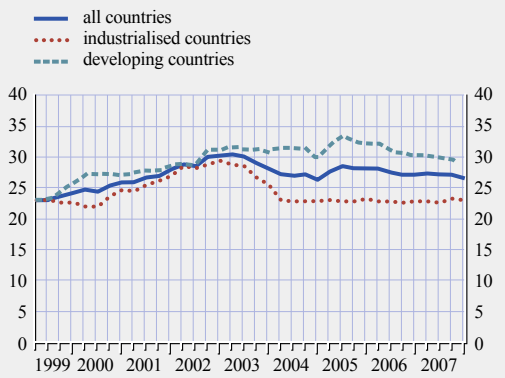
3.2 POSSIBLE EXPLANATIONS FOR THE OBSERVED PATTERNS IN THE CURRENCY COMPOSITION OF RESERVES

When assessing possible causes of the described trends in the currency composition of international reserves, it is worth pointing out first that changes in the aggregate currency composition of reserves may reflect changes in the relative weight of individual countries rather than changes in reserve currency preferences. In particular, aggregate currency shares may change if a reporting country accumulates (or stops accumulating) reserves as a result of interventions in foreign exchange markets and the currency composition of the reserves held by this country is different from the aggregate composition.

For example, the moderate decline in the share of the euro among industrialised countries during the first quarter of 2003 and the first quarter of 2004 (at current and constant exchange rates) coincides with interventions carried out by the Japanese authorities during the same period. This observation suggests that the share of the euro may have declined during this period because notable increases in the level of reserves materialised mainly in currencies other than the euro (see Chart 23).

Chart 22 The share of the euro in global foreign exchange reserves with disclosed currency composition at constant exchange rates

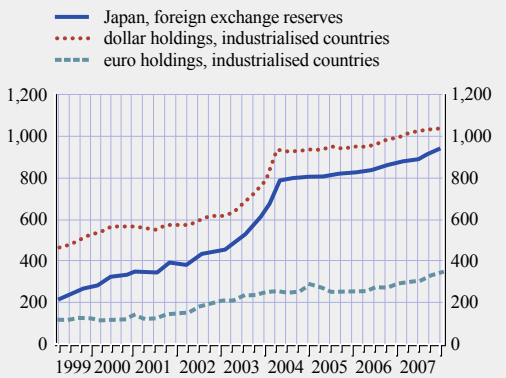
(percentages, at constant exchange rates)



Sources: IMF and ECB calculations.

Chart 23 Japanese foreign exchange reserves versus dollar and euro foreign exchange reserve holdings of industrialised countries

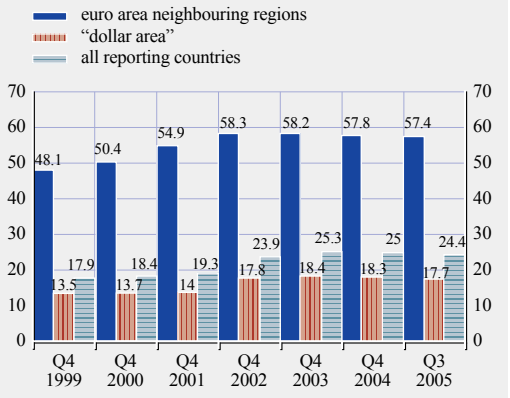
(USD billions)



Sources: IMF/IFS and IMF/COFER.

Chart 24 The euro's share in global foreign exchange reserves by region (at current exchange rates)

(percentages)



Source: IMF Working Paper 06/153.
Notes: According to the IMF Working Paper (p. 16), the euro area neighbouring regions compromise all the European countries surrounding the euro area and countries worldwide that largely peg to the euro. The "dollar area" comprises Asia, the western hemisphere and various other countries that largely peg to the dollar.

Whereas in the case of industrialised countries, it is certain that all developed countries are included in the COFER data, it is not known precisely which developing countries disclose the currency composition of their reserves to the IMF. The gradual rise in the share of the euro among those developing countries which are included in the COFER data is therefore difficult to interpret. In general, one might expect that the accumulation of considerable amounts of reserves by emerging market economies has rather "favoured" dollar-denominated assets at the aggregate level, as many large reserve accumulators have maintained tightly managed exchange rates against the US dollar. However, as mentioned in the introduction, the IMF has stated that many large Asian reserve holders are not included in the COFER database. At the same time, countries in geographic proximity to the EU have in some cases re-oriented their exchange rate regimes towards the euro. With the notable exception of Russia, which has increased the share of the euro in its exchange rate basket since 2005, these cases have been limited to smaller reserve holders.[46] In addition, disaggregated COFER data, broken down into countries which largely peg their currency to the euro and the US dollar, suggest that the share of the euro has also increased among countries that manage their currency vis-à-vis the dollar, albeit to a lesser extent than in countries which use the euro as a point of reference for their exchange rate policy (see Chart 24).[47]

These considerations suggest that the rise in the share of the euro among developing countries cannot be explained solely by an increasing number or weight of countries in geographic proximity to the EU which peg or maintain tightly managed floats vis-à-vis the euro.[48]

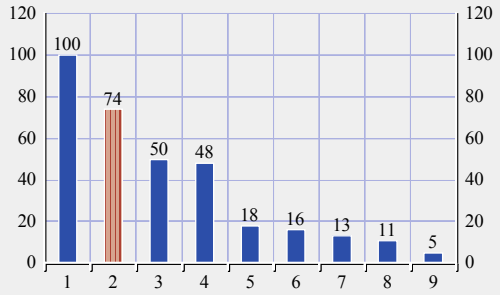
In line with the empirical literature on reserve currencies, another possible reason for the increasing share of the euro in international reserves could stem from the improved liquidity of euro capital markets. Survey evidence suggests that the majority of central bank reserve managers currently regard euro-denominated government bonds as highly liquid, second only to US dollar-denominated bonds (see Chart 25).

A rigorous analysis of the relationship between market liquidity and reserve composition is difficult owing to a lack of time series data. Little evidence related to the development of the market liquidity of euro bond markets is available from the early years of Monetary Union, since the market infrastructure for euro-denominated bonds adapted in the first few years following the introduction of the euro.[49] In addition, certain frictions in European capital markets have diminished only gradually.[50] Taking the size of global bond markets as an approximation for liquidity, the share of euro-

46 The share of the euro in the currency basket used by the Bank of Russia for the management of daily volatility has been gradually increased from 10% to 20% (March 2005), to 35% (August 2005), to 40% (December 2005) and then to 45% (February 2007).
47 These figures are presented in Lim (2006) and are only available up to end-2005.
48 See Section 2.1.1 on the use of the euro as an anchor currency for a complete list of countries which currently have exchange rate regimes linked to the euro.
49 For example, while EuroMTS was created in 1999, it was only in 2001 that it became the largest inter-dealer market for euro-denominated government bonds through a merger of EuroMTS and MTS Spa into MTS Global Market. See Cheung, de Jong and Rindi (2005).
50 See Jappelli and Pagano (2008) for a review of financial integration under EMU.

Chart 25 Perceived liquidity of government bonds denominated in alternative reserve currencies

(percentage of central bank reserve managers ranking government bonds as "highly liquid")



1 US dollar
2 Euro
3 Pound sterling
4 Japanese Yen
5 Australian dollar
6 Canadian dollar
7 NZ dollar
8 Swedish krona
9 Danish krone

Source: RBS Reserve Management Trends 2008.
Notes: The survey by Central Bank Publications was carried out during October 2007 and January 2008. The percentages refer to answers given by 51 central bank reserve managers in charge of managing reserve assets worth USD 2.4 trillion.

denominated bonds in global bond markets rose from around 24% in 1999 to 31% as at September 2007 (see also Section A1). At the same time, bid-ask spreads for euro-denominated bonds have declined considerably over the past few years.[51]

While the liquidity of reserve currency assets may be an important consideration for central banks holding reserves mainly for transaction purposes, the observed patterns in the use of the euro in international reserves may also reflect portfolio motives. As return expectations for investing in alternative reserve currencies and estimates of the underlying risk by central bank reserve managers are not public, it is difficult to provide evidence for this motive.

One way of gauging the relative importance of transaction and portfolio motives is to compare the relative variability of currency shares at current and constant exchange rates.[52] From a portfolio perspective, the currency composition measured at current exchange rates is the relevant target. Therefore, a portfolio in which currency shares are more stable at current than at constant exchange rates could be seen as one which is driven by portfolio motives. If, on the other hand, currency shares are more stable at constant than at current exchange rates, transaction motives are likely to dominate.

As can be seen from Table 11, aggregate currency shares in the IMF's COFER database have on average been more stable at constant than at current exchange rates, suggesting that central bank reserve managers have tended to put greater emphasis on transaction than

51 Bid-ask spreads of euro-denominated government bonds declined from about 0.08% in 2003 to 0.05% in 2006 (ECB (2007b), p. 61). For a comparison of the microstructure of euro debt markets with those of the United States and the United Kingdom, see Dunne et al. (2006).

52 This test has been suggested, among others, by Roger (1993).

Table 11 Relative variability of currency shares in reserves

(Q1 1999 – Q4 2007)

	Standard deviation			Coefficient of variation		
	At current exchange rates (A)	At constant exchange rates (B)	Ratio (B as % of A)	At current exchange rates (C)	At constant exchange rates (D)	Ratio (D as % of C)
USD	2.8	1.4	51.0	4.1	2.1	51.9
GBP	0.7	0.6	79.1	22.4	24.1	107.6
JPY	1.2	1.0	83.2	27.0	23.1	85.5
CHF	0.1	0.1	141.2	29.4	33.4	113.4
EUR	3.3	1.9	57.9	14.8	7.8	52.8
Other currencies	0.2	0.2	119.2	12.4	15.7	126.5
Average (weighted geometric)	2.5	1.4	56.1	6.4	3.5	55.6
Simple weighted average	2.7	1.5	54.5	8.2	5.2	63.3

Sources: IMF/COFER and ECB staff calculations.
Notes: The standard deviation and the coefficient of variation of currency shares have been computed using quarterly COFER data for all countries which disclose their currency composition to the IMF for the period Q1 1999 to Q4 2007.

on portfolio objectives. In fact, the standard deviation and the coefficient of variation (which normalises the standard deviation by the respective mean currency shares) are larger (smaller) when computed for currency shares at current (constant) exchange rates. This finding holds for all major reserve currencies, including the euro and the US dollar.

Nevertheless, the comparison of the relative variability of currency shares at current and constant exchange rates gives at best a rough indication of the possible importance of transaction versus portfolio motives in central bank reserve management and is subject to a number of caveats. First, the relative variability of portfolio weights may depend on the frequency of the data. In particular, the portfolio motives could be more visible with higher frequency data which are unavailable. Second, the variability of currency shares in general may reflect a number of other factors, including the actual use (e.g. for interventions) or the accumulation of reserves, as well as changing portfolio preferences or shifting transaction needs. The next section presents a portfolio model in which some of these issues can be addressed.

4 A MODEL OF OPTIMAL RESERVE COMPOSITION WITH PORTFOLIO AND TRANSACTION MOTIVES

As suggested by the literature review in Section 2 and the empirical assessment in Section 3, transaction motives may be an important consideration in central bank reserve management. However, quantitative theoretical studies have largely ignored these motives and focused solely on portfolio considerations.

Against this background, Beck and Rahbari (2008) have recently suggested a theoretical portfolio model that combines transaction and portfolio motives in a single framework. In this model, central banks can invest in dollar or euro-denominated bonds. The portfolio motive is modelled through the minimisation of the portfolio variance in real local currency terms.[53] The transaction motive is modelled through the possibility of sudden reversals in capital flows ("sudden stops"), which force the central bank to use its reserves to repay short-term foreign currency-denominated debt that is not rolled over.[54] The authors obtain a closed-form solution for the optimal dollar and euro shares. These optimal portfolio weights depend, in addition to standard minimum variance variables, on the extent to which these assets can be used to hedge against sudden stops. Using monthly data from August 1993 to December 2005, optimal reserve portfolios for the major emerging market reserve holders suggest the following:

First, the study suggests that a standard minimum variance portfolio in local currency (abstracting from transaction demand considerations) generates at the aggregate level optimal euro and dollar shares that are of the same order of magnitude as the aggregate currency shares in the IMF's COFER database.[55]

Second, optimal reserve portfolios are dominated by the "anchor currency" if the country operates a de facto exchange rate peg or tightly managed float. Therefore, countries in Asia and Latin America tend to have low optimal euro shares, whereas the optimal euro

53 Formally, the central bank solves the following problem:

$$\min_{a} Var(W)$$
$$s.t.$$
$$W = aAR_{US} + (1-a)\,AR_{E} - S_{US}bB - S_{E}(1-b)B$$
$$0 \le \alpha \le 1,$$

where W is the real end-of-period level of wealth, A, a, B, and b are the level of foreign exchange reserves, the share of dollar-denominated assets in reserves, the level of foreign debt and the share of dollar-denominated debt at the beginning of the period. R_{US} is the real return on dollar bonds, while R_E is the real return on euro bonds.

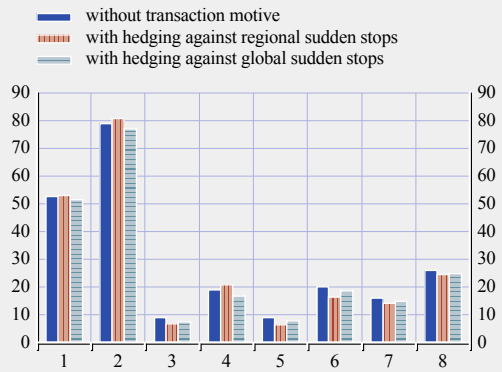
54 The authors stress that the transaction motives in this model can also be interpreted more generally as any other use of reserves for transaction purposes. However, in the empirical application, the authors focus on the repayment of short-term debt during episodes of sudden stops in capital inflows.

55 The IMF's COFER data report for developing countries at the end of 2005 a dollar share of 61%, which would correspond to 68% in a portfolio that includes only dollar and euro-denominated assets. In the minimum variance portfolio, the optimal dollar share for all emerging market economies excluding China amounts to around 74%.

share tends to be high in emerging European countries (see Chart 26, dark bars).[56] The exchange rate regime has a strong effect on optimal reserve portfolios because of its impact on exchange rate risk, which accounts for a large portion of the total risk of bonds. Countries which operate a de facto fixed exchange rate regime or manage their currency against the dollar or the euro have the opportunity to invest their foreign exchange reserves in an asset with very low variance. As the correlation between dollar and euro bond returns is usually quite high, the diversification benefits are limited and optimal portfolios are thus dominated by the low variance currency asset. Interestingly, these research findings suggest that overweighting assets denominated in the anchor currency of a country can be optimal from a portfolio perspective. Hence, this argument relies entirely on optimal portfolio considerations, not on the notion that central banks necessarily have to hold reserve assets in their anchor currency for intervention purposes.[57]

Chart 26 Optimal euro share in a minimum variance reserve portfolio with and without various transaction motives

(percentages share in two-asset portfolio)



1 Emerging Europe
2 Emerging Europe excluding Russia
3 Latin America
4 Middle East & Africa
5 Asia
6 Asia excluding China
7 All EMEs
8 All EME's excluding China

Source: Beck and Rahbari (2008).
Notes: Regional aggregates are weighted by foreign exchange reserves as at end-2005. Countries in emerging Europe include: Czech Republic, Hungary, Poland, Russia, Slovakia. Countries in Latin America include: Argentina, Brazil, Chile, Colombia, Mexico, Peru, Venezuela. Countries in the Middle East and Africa include: Jordan, Kuwait Saudi Arabia, South Africa, Turkey. Countries in Asia include China, India, Indonesia, (South) Korea, Pakistan, Philippines, Thailand. Model parameters for Russia estimated for period January 2004 - December 2005.

Third, in countries which changed their exchange rate regime during the sample period, optimal reserve portfolios strongly depend on the time span used for the estimation of the model parameters. In general, optimal currency shares in the reserve portfolio mirror changes in currency baskets if less weight is placed on past observations from the old regime. For example, the optimal euro share for Russia increases considerably when a sample starting only in 2004 is used.

Fourth, the introduction of transaction demand tends to amplify regional patterns if countries are assumed to hedge against regional sudden stops in capital inflows (see Chart 26, middle bars). For example, in emerging European countries, the euro appears to be a better hedge against regional sudden stops, and introducing sudden stops tends to further increase the optimal share of the euro. On the other hand, the respective optimal euro shares in Latin American and Asian countries are lower when transaction demand is included. At the same time, the introduction of transaction demand tends to decrease (increase) the optimal euro (dollar) share if countries are assumed to be subject to global sudden stops (see Chart 26, light bars). The authors of the study tentatively interpret these findings as a reflection of the status of the dollar and the euro as "safe haven currencies" which tend to appreciate during sudden stops in which investors redirect capital to mature markets. While the dollar appears to retain its traditional role as the currency of choice in such circumstances, the euro appears to have assumed a similar role in emerging Europe.

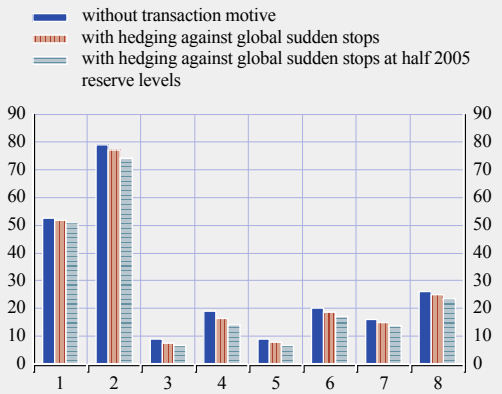
56 Countries with more flexible exchange rates tend to have more diversified portfolios in this framework.
57 In practice, many central banks might prefer to hold reserve assets which are mainly denominated in their anchor currency because they also use this currency as their intervention currency. However, as the major reserve currencies can, under normal market conditions, be exchanged in liquid spot markets, this may not be the only sensible currency allocation for an intervention portfolio, and it is not clear whether such a strategy is mean-variance-efficient.

Finally, the model suggests that a rise in reserve levels tends to reduce the importance of transaction motives for optimal reserve portfolios. At the margin, optimal portfolios converge towards standard minimum variance portfolios. Likewise, lower reserve levels tend to increase the quantitative significance of such motives, as can be seen in Chart 27, where the optimal euro share declines once hedging against global sudden stops is factored in with declining levels of reserves.

According to this model framework, the recent rise in the share of the euro could be a reflection of a gradual decline in the importance of transaction motives for central bank reserve managers. These transaction motives apparently made dollar-denominated assets – which for countries which maintain currency pegs or tightly managed floats vis-à-vis the dollar are already attractive due to their low risk – even more attractive, since they are a good hedge against global sudden stops in capital inflows. At the same time, the subsequent relative stability of the share of the euro can be seen as a convergence towards minimum variance portfolios.

Chart 27 Optimal euro share in a minimum variance reserve portfolio with and without transaction motives at various reserve levels

(percentage share in two-asset portfolio)



1 Emerging Europe
2 Emerging Europe excluding Russia
3 Latin America
4 Middle East & Africa
5 Asia
6 Asia excluding China
7 All EMEs
8 All EME's excluding China

Source: Beck and Rahbari (2008).
Notes: Regional aggregates are weighted by foreign exchange reserves as at end-2005. Countries in emerging Europe include: Czech Republic, Hungary, Poland, Russia, Slovakia. Countries in Latin America include: Argentina, Brazil, Chile, Colombia, Mexico, Peru, Venezuela. Countries in the Middle East and Africa include: Jordan, Kuwait Saudi Arabia, South Africa, Turkey. Countries in Asia include China, India, Indonesia, (South) Korea, Pakistan, Philippines, Thailand. Model parameters for Russia estimated for period January 2004 - December 2005.

The reasoning presented so far has focused on currency shares in reserve portfolios which are invested in government bonds. However, in the debate on "reserve diversification", many observers also consider the case of diversification across asset classes rather than across currencies. While some central banks can in principle also invest their reserves in more risky assets such as agency bonds, corporate bonds or stocks, most central banks have so far continued to invest the bulk of their foreign exchange reserves in government bonds. Some central banks face legal or internal restrictions on the asset classes in which they can invest their reserves. However, an increasing number of countries have started to accumulate foreign assets in sovereign wealth funds, which can typically invest in a wider range of asset classes. Therefore, the next section looks at the possible role of the euro in such national investment vehicles.

5 THE POSSIBLE ROLE OF THE EURO IN SOVEREIGN WEALTH FUND PORTFOLIOS

Sovereign wealth funds can be broadly defined as public investment agencies which manage part of the (foreign) assets of national states. While such national investment vehicles have been operated by many countries for decades, sovereign wealth funds have only recently become important players in global financial markets. Some emerging market countries which have accumulated sizable levels of foreign exchange reserves as a result of high commodity prices or as a result of exchange rate policy have recently set up new sovereign wealth funds in order to earn higher returns on their foreign assets (e.g. Russia and China). Other countries, mainly commodity-exporting

emerging countries (e.g. countries in the Gulf Cooperation Council) and developed countries (e.g. Norway), have accumulated foreign assets in recent years mainly in their sovereign wealth funds. As a result, the growth of traditional foreign exchange reserves held by the respective central banks has been less pronounced in these countries.

Sovereign wealth funds are estimated to manage assets worth around USD 2 to 3 trillion, which is around one-third to half of traditional foreign exchange reserves. In addition, sovereign wealth fund assets are expected to grow fast over the next couple of years, possibly at a faster pace than foreign exchange reserves. Therefore, in the context of the use of the euro in global foreign exchange reserves, it is increasingly important to monitor also the currency composition of foreign assets held by sovereign wealth funds.

In terms of publicly available data on the currency composition, sovereign wealth fund assets held by developing countries are less transparent than traditional foreign exchange reserves. In fact, only a few sovereign wealth funds disclose detailed information about the asset classes and currencies in which they have invested. In Norway's Government Pension Fund – Global, for example, the share of the euro amounts to around 47% of its fixed income and 27% of its equity portfolio (see Table 12).

As regards the possible share of the euro in countries that are transferring parts of their traditional foreign exchange reserves into sovereign wealth funds, it has been argued that more return-oriented investment strategies could also impact the currency composition as compared with traditional foreign exchange reserves. While more return-oriented strategies first involve an expansion of the investment universe to include stocks, corporate bonds and possibly also alternative investments, there may be a link between diversification across asset classes and diversification across currencies.

When comparing central bank portfolios with global market capitalisation-based portfolio weights, central bank reserves appear to be "overweight" in the bond markets of the major reserve currencies (see Chart 28). According to the IMF's COFER data, the central banks of developing countries currently hold around 60% of their reserves in US dollar-denominated assets and 28% in euro-denominated assets, the bulk of which is invested in government bonds.

Assuming that "excess reserves" managed by sovereign wealth funds were to be invested according to market capitalisation with 40% invested in stocks and 60% invested in bonds, simple back-of-the-envelope calculations of the resulting net capital flows suggest that the United States and the euro area could be

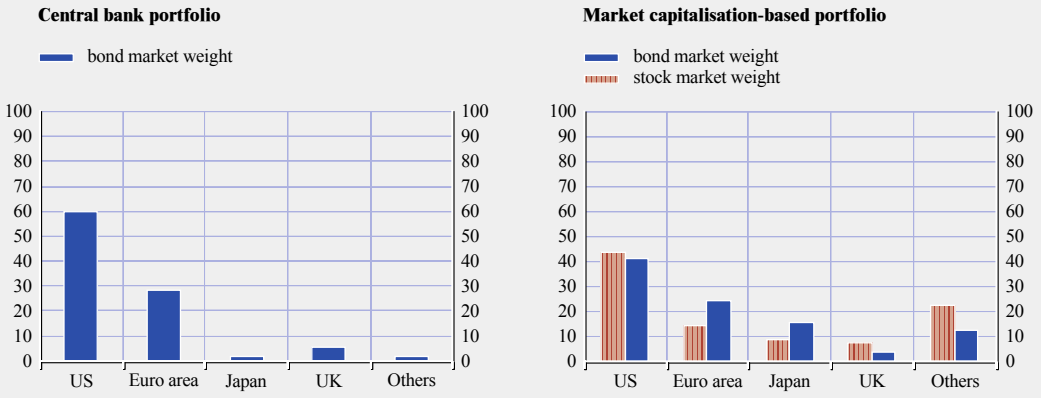
Table 12 Portfolio weights of Norway's Government Pension Fund – Global as at end-2007

	Equity	Fixed income
Asset class weights	**47.2**	**52.8**
Europe	**49.7**	**60.1**
Euro area (EUR)	27.2	47.5
UK (GBP)	15.3	9.7
Other Europe	7.2	2.5
Americas and Africa	**35.6**	**35.2**
US (USD)	30.7	32.9
Other Americas and Africa	4.9	2.3
Asia and Oceania	**14.9**	**5.1**
Japan (JPY)	7.3	4.6
Emerging Asia	4.9	0.2
Australia and New Zealand (AUD and NZD)	2.7	0.3

Sources: Norges Bank Investment Management, Annual Report 2007, and ECB calculations.

Chart 28 A comparison of central bank reserve and market capitalisation-based portfolios

(percentages)



Sources: IMF/COFER, Datastream and ECB calculations.
Notes: For the central bank portfolio, the reported portfolio weights refer to currency shares as reported in the COFER database for developing countries, assuming that these assets are fully invested in bonds. The market capitalisation-based portfolio refers to a long-term average of global bond and equity market capitalisation.

subject to capital outflows, as inflows into US and euro area stock markets would be more than offset by outflows from their respective bond markets (see Chart 29).[58] At the same time, Japan and other markets, mainly in emerging economies, would attract net capital inflows as bonds and stocks from those regions are "underweighted" in central bank portfolios.

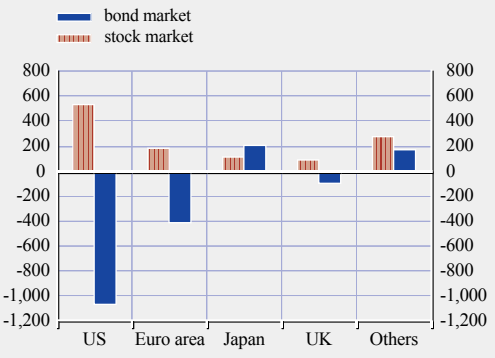
It should be borne in mind, however, that such calculations are subject to many caveats. First, the assumptions underlying such simulations ignore the reserve currency role of the US dollar and also of the euro, which may still play a role for some sovereign wealth funds, in particular those pursuing macroeconomic stabilisation objectives. Such funds may still prefer to invest in the most liquid instruments and may therefore decide to continue being overweight in US dollar and euro assets. Sovereign wealth funds may also pursue other economic objectives, such as hedging against oil price fluctuations. In this case, sovereign wealth funds would underweight oil stocks, for example, which would in turn have an asymmetric impact on their geographic investment patterns.[59] Finally, sovereign wealth funds may still be operating subject to general macroeconomic constraints. To the extent that portfolio shifts across asset classes and across currencies have an impact on exchange rates, this impact could run counter to the exchange rate objectives of their governments.[60]

Nevertheless, the comparison of traditional foreign exchange portfolios with global market

58 See Beck and Fidora (2008) for a definition of excess reserves and further details on this calculation.
59 See Beck and Fidora (2008).
60 For example, according to Norges Bank, the regional weights in its reserve portfolio (which are very similar to those of the Government Pension Fund – Global) reflect the idea of preserving international purchasing power and the readiness to intervene in European currencies.

Chart 29 Simulation of net capital flows resulting from a theoretical reallocation of "excess reserves" into market capitalisation-based portfolios

(USD billions)



Source: Beck and Fidora (2008).

capitalisation-based portfolio weights can give an indication of the direction of possible net capital flows resulting from a transfer of central bank reserves into sovereign wealth funds. Such considerations do not suggest that a transfer of foreign assets from traditional central bank portfolios into sovereign wealth funds would necessarily lead to a "diversification" into euro-denominated assets.

6 CONCLUDING REMARKS

During the first few years of Monetary Union, the share of the euro in global foreign exchange reserves gradually increased beyond the reserve currency status of its legacy currencies. For a few years, it has remained relatively stable, in particular if valuation effects are taken into account. Accounting for changes in the geographic composition of reserves, the share of the euro has also increased somewhat among countries which are traditionally more US dollar-oriented. Therefore, it is likely that euro-denominated assets have gradually become more attractive for central bank reserve managers – in particular in terms of market liquidity.

A recent ECB staff study suggests that the observed patterns in the use of the euro as a reserve currency may also reflect the declining importance of transaction motives in central bank reserve management. Such motives would generally favour the use of the US dollar as a reserve currency, as it offers a hedge against global sudden stops in capital flows. As foreign exchange reserve holdings have grown in many emerging market economies beyond the precautionary levels which may be needed for balance-of-payment purposes, such motives may have become less relevant in central bank reserve management. At the same time, as central bank reserve allocations converge towards more traditional minimum variance portfolios, many countries with pegged or managed exchange rates may find it optimal to remain "overweight" in their anchor currency, as such assets carry very little risk.

The logic of such considerations applies to bond portfolios in which exchange rate risk is a major component of total risk. As some reserve-accumulating countries are currently considering transferring some of their foreign assets from central banks to sovereign wealth funds, other asset classes such as global equity markets may become more relevant for sovereign investment patterns. Simple back-of-the-envelope calculations, which assume that sovereign wealth funds would invest their assets according to market capitalisation, suggest that the euro area could be subject to net capital outflows in such a situation. However, such calculations are subject to many caveats and should be interpreted with great caution.

Irrespective of whether foreign assets are accumulated by foreign authorities in the form of traditional central bank reserves or within sovereign wealth funds, efforts to increase transparency would help to monitor the development of the role of the euro in this area.

REFERENCES

Allayannis, G. and E. Ofek (2001), "Exchange rate exposure, hedging and the use of foreign currency derivatives", *Journal of International Money and Finance* 20, pp. 273-296.

Allayannis, G., G. Brown and L. Klapper (2003), "Capital structure and financial risk: evidence from foreign debt use in East Asia", *Journal of Finance* 58, pp. 2667-2709.

Backé, P., D. Ritzberger-Grünwald and H. Stix (2007), "The euro on the road east: cash, savings and loans", *Monetary Policy and the Economy* Q1/07, pp. 114-127.

BBA (2006), "British Bankers' Association: Credit Derivatives Report".

Beck, R. and M. Fidora (2008), "The impact of sovereign wealth funds on global financial markets", *ECB Occasional Paper* 91, July 2008.

Beck, R. and E. Rahbari (2008), "Optimal reserve composition in the presence of sudden stops: the euro and the dollar as safe haven currencies", *ECB Working Paper* 916 (forthcoming).

Ben-Bassat, A. (1980), "The optimal composition of foreign exchange reserves", *Journal of International Economics*, May 1980, 10, pp. 285-295.

BIS (2007), "Triennial Central Bank Survey: foreign exchange and derivatives market activity in 2007", December 2007.

Cheung, Y.C., F. de Jong and B. Rindi (2005), "Trading European sovereign bonds: the microstructure of the MTS trading platforms", *ECB Working Paper* 432, January 2005.

Chinn, M., and J. Frankel (2006), "Will the euro eventually surpass the Dollar as leading international reserve currency?", *G7 Current account imbalances: sustainability and adjustment*, Richard Clarida (ed.), The University of Chicago Press, Chicago, ILL.

Chinn, M. and J. Frankel (2008). "The euro may over the next 15 years surpass the Dollar as leading international currency", *NBER Working Paper* 13909, April 2008.

Clark, E. and A. Judge (2007), "The determination of foreign currency hedging: does foreign currency debt induce a bias?", *European Financial Management* 14, pp. 445-469.

Cohen, B. (2005), "Currency choice in international bond issuance", *BIS Quarterly Review,* June, pp. 53-66.

Dellas, H. and C.B. Yoo (1991), "Reserve currency preferences of central banks: the case of Korea", *Journal of International Money and Finance* (1991), 10, pp. 406-419.

Dooley, M.P., D. Folkerts-Landau and P. Garber (2004), "The revived Bretton Woods System: the effects of periphery intervention and reserve management on interest rates and exchange rates in center countries", *NBER Working Paper* 10332, March.

Dooley, M.P., S. Lizondo and D. Mathieson (1989), "The currency composition of foreign exchange reserves", *International Monetary Fund Staff Papers*, June 1989, 36(2), pp. 385-434.

Dooley, M.P. (1987), "An analysis of the management of the currency composition of reserve assets and external liabilities of developing countries", *The reconstruction of international monetary arrangements*, R. Aliber (ed.), 1987, Basingstoke: Macmillan.

Dunne, P., M. Moore and R. Portes (2006), "European government bond markets: transparency, liquidity, efficiency", Centre for Economic Policy Research, London, May 2006.

Eichengreen, B. and R. Hausmann (1999), "Exchange rates and financial fragility", *New Challenges for Monetary Policy*, Federal Reserve Bank of Kansas City, pp. 329-368.

Eichengreen, B., and D. Mathieson (2000), "The currency composition of foreign exchange reserves: retrospect and prospect", *IMF Working Paper* 131, July 2000.

Elliot W.B., S.P. Huffman and S.D. Makar (2003), "Foreign-denominated debt and foreign currency derivatives: complements or substitutes in hedging foreign currency risk?", *Journal of Multinational Financial Management* 13, pp. 123-139.

Esho, N., I.G. Sharpe and K.H. Webster (2007), "Hedging and choice of currency denomination in international syndicated loan markets", *Pacific-Basin Finance Journal* 15, pp. 195-212.

European Central Bank (2004), "Risk management for central bank foreign reserves", edited by C. Bernadell, P. Cardon, J. Coche, F.X. Diebold and S. Manganelli, Frankfurt am Main.

European Central Bank (2007a), "Review of the international role of the euro", Frankfurt am Main, June 2007.

European Central Bank (2007b), "The euro bonds and derivatives markets", Frankfurt am Main, June 2007.

Graham, J.R. and C.R. Harvey (2001), "The theory and practice of corporate finance: evidence from the field", *Journal of Financial Economics* 60, pp. 187-243.

Heller, H.R. and M. Knight (1978), "Reserve currency preferences of central banks", *Essays in international finance*, No 131 (Princeton).

Jappelli T. and M. Pagano (2008), "Financial market integration under EMU", mimeo.

Jeanne, O. and R. Rancière (2006), "The optimal level of international reserves for emerging market countries: formulas and applications", *IMF Working Paper* 06/229, International Monetary Fund.

Johnson, D. (1988), "The currency denomination of long-term debt in the Canadian corporate sector: an empirical analysis", *Journal of International Money and Finance* 7, pp. 77-90.

Kedia, S. and A. Mozumdar (2003), "Foreign currency-denominated debt: an empirical examination", *Journal of Business* 76, 4, pp. 521-546.

Keloharju, M. and M. Niskanen (2001), "Why do firms raise foreign currency denominated debt? Evidence from Finland", *European Financial Management* 7, 4, pp. 481-496.

Lim, E.-G. (2006), "The euro's challenge to the Dollar: different views from economists and evidence from COFER (Currency Composition of Foreign Exchange Reserves) and other data", *IMF Working Paper* 06/153, June 2006.

Lim, E.-G. (2007), "Do reserve portfolios respond to exchange rate changes using a portfolio rebalancing strategy? An econometric study using COFER data", *IMF Working Paper* 07/293, December 2007.

McBrady, M. and M. Schill (2007), "Foreign currency-denominated borrowing in the absence of operating incentives", *Journal of Financial Economics* 86, pp. 145-177.

McGuire, P. and N. Tarashev (2007), "International banking with the euro", *BIS Quarterly Review*, December 2007, pp. 47-61.

Papaioannou, E., R. Portes and G. Siourounis (2006), "Optimal currency shares in international reserves: the impact of the euro and the prospects for the dollar", *Journal of the Japanese and International Economies*, Elsevier, vol. 20(4), pp. 508-547, December.

Perold, A.F. and W.F. Sharpe (1995), "Dynamic strategies for asset allocation", *Financial Analysts Journal*, January/February 1995, 51, 1, pp. 149-160.

Roger, S. (1993), "The management of foreign exchange reserves", *BIS Economic Paper* 38, July 1993.

Sarno, L. and M.P. Taylor (2002),"The economics of exchange rates", Cambridge University Press.

Siegfried, N., E. Simeonova and C. Vespro (2007), "Choice of currency in bond issuance and the international role of currencies", ECB Working Paper 814, September.

Stix, H. (2008), "Euroization: what factors drive its persistence? Household data evidence for Croatia, Slovenia and Slovakia", *OeNB Working Paper*, forthcoming.

Stix, H., T. Scheiber and S. Dvorsky (2008), "Euroization in Central, Eastern and Southeastern Europe: first results from the new OeNB euro survey", *Focus on European Economic Integration* 1. Vienna, forthcoming.

Warnock, F.E. and V.C. Warnock (2006), "International capital flows and U.S. interest rates", *NBER Working Papers* 12560, October 2006.

Wong, A. (2007), "Measurement and inference in international reserve diversification", Peterson Institute for International Economics, *Working Paper* 07-6.

STATISTICAL ANNEX

Table 1 Currency shares in gross issuance of international debt securities, breakdown by maturity

(narrow measure, i.e. excluding home currency issuance; as a percentage of the total amount issued)

	Annual[1]				Quarterly					2007
	2004	2005	2006	2007	2006 Q4	2007 Q1	2007 Q2	2007 Q3	2007 Q4	(total issuance)[2]
a. Short-term international debt securities										
Euro	35.9	35.4	36.1	33.3	34.3	35.0	33.7	33.8	30.5	(761.8)
US dollar	40.8	38.1	38.8	43.6	40.7	40.0	42.8	45.4	46.3	(998.9)
Japanese yen	2.2	2.5	1.7	3.2	1.8	2.8	2.7	2.5	4.8	(72.9)
Total (incl. other currencies)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	(2,290.8)
b. Long-term international debt securities										
Euro	35.7	29.0	27.9	28.4	27.3	29.5	27.5	23.5	33.0	(693.5)
US dollar	39.7	42.9	48.8	45.2	50.3	46.4	49.8	48.2	36.2	(1,125.4)
Japanese yen	6.4	6.3	4.2	5.8	4.6	3.6	5.4	7.5	6.5	(132.9)
Total (incl. other currencies)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	(2,445.3)

Sources: BIS and ECB calculations.
Notes: Shares at current exchange rates.
1) Average quarterly percentage.
2) Amounts in USD billions.

Table 2 Currency shares in the stock of outstanding international debt securities, breakdown by region

(narrow measure, i.e. excluding home currency issuance; as a percentage of the total amount outstanding)

	Total amount outstanding		*of which denominated in:*							
	All currencies (USD billions)		US dollar		Euro		Japanese yen		Other currencies	
			(%)	(% point change) vis-à-vis	(%)	(% point change) vis-à-vis	(%)	(% point change) vis-à-vis	(%)	(% point change) vis-à-vis
	2007 Q4	2006 Q4	2007 Q4	2006 Q4	2007 Q4	2006 Q4	2007 Q4	2006 Q4	2007 Q4	2006 Q4
Africa	32	23	46.9	-7.8	48.2	10.1	4.2	-2.9	0.7	0.6
Asia and Pacific	661	606	60.1	-1.9	23.9	-0.2	3.9	0.6	12.2	1.6
of which:										
Japan	65	69	51.0	3.6	38.8	-3.5	...	...	10.3	-0.1
Europe	4,464	3,712	39.5	-0.3	33.7	0.1	5.2	-0.2	21.7	0.4
of which:										
Euro area	1,828	1,550	49.6	-0.9	...	...	7.8	-0.4	42.6	1.3
Denmark, Sweden, United Kingdom	2,241	1,816	32.5	0.8	58.4	-1.0	3.0	0.0	6.1	0.2
New Member States	114	102	10.0	-0.3	77.9	-0.5	5.2	0.1	6.9	0.7
EU27	4,183	3,468	39.4	-0.1	33.4	0.0	5.2	-0.2	22.1	0.3
Non-EU developed Europe[1]	204	176	26.8	-3.2	45.5	1.5	7.0	0.1	20.7	1.5
Non-EU developing Europe	84	76	76.1	-0.5	20.6	-0.2	0.7	-0.3	2.6	1.0
International organisations	643	600	28.8	-0.7	29.0	-2.0	5.6	0.1	36.6	2.7
Latin America	306	294	79.8	1.0	17.4	-1.9	1.5	0.6	1.3	0.3
Middle East	120	104	80.5	2.1	15.5	-2.9	0.3	-0.1	3.7	0.9
North America	1,279	1,081	14.4	-1.3	54.1	-0.6	7.4	0.6	24.2	1.2
of which:										
Canada	276	249	66.8	-1.2	17.9	2.0	3.4	-0.1	11.9	-0.7
United States	1,003	831	...	...	64.0	-2.2	8.5	0.7	27.6	1.5
Offshore centres	1,449	1,142	67.2	8.2	19.1	-5.8	6.6	-2.0	7.2	-0.4
Total	**8,953**	**7,562**	**43.1**	**0.8**	**32.4**	**-1.1**	**5.4**	**-0.2**	**19.0**	**0.6**

Sources: BIS, ECB calculations.
Note: 2006 Q4 figures are expressed at 2007 Q4 exchange rates.
1) Iceland, Norway, Switzerland and European microstates.

Table 3 Currency breakdown of portfolio investment assets held in debt securities at the end of 2006

(excluding euro area countries, ranked by region and size of total assets)

	USD millions					Percentage of total debt securities				
	US dollar	Euro	Yen	Other	Total	US dollar	Euro	Yen	Other	Total
Non-euro area EU										
Sweden	35,704	59,055	1,096	38,311	134,166	27	44	1	29	100
Denmark	29,773	62,322	416	25,720	118,230	25	53	0	22	100
Cyprus	10,561	8,247	30	3,709	22,547	47	37	0	16	100
Poland	2,856	2,484	....	3,264	8,604	33	29	-	38	100
Hungary	284	848	0	134	1,266	22	67	0	11	100
Bulgaria	419	450	0	164	1,033	41	44	0	16	100
Romania	54	167	....	-	316	17	53	-	-	-
Other European Countries										
Switzerland	87,999	178,186	5,965	187,213	459,362	19	39	1	41	100
Israel	17,198	3,989	18	-	23,165	74	17	0	-	-
Russia	10,413	648	0	698	11,759	89	6	0	6	100
Ukraine	1	5	....	-	6	15	84	-	-	-
America										
United States	1,314,448	148,235	45,657	135,054	1,643,394	80	9	3	8	100
Venezuela	10,259	139	....	-	12,748	80	1	-	-	-
Colombia	6,373	90	....	926	7,389	86	1	-	13	-
Mexico	6,299	408	....	-	6,734	94	6	-	-	-
Uruguay	2,167	43	0	21	2,231	97	2	0	1	100
Costa Rica	1,283	22	....	-	1,305	98	2	-	-	-
Asia										
Japan	773,238	380,068	480,495	199,263	1,833,064	42	21	26	11	100
Korea, Republic of	41,517	3,871	600	714	46,702	89	8	1	2	100
Thailand	1,479	650	0	1,321	3,450	43	19	0	38	100
Malaysia	3,218	88	14	114	3,435	94	3	0	3	100
Indonesia	1,130	9	....	-	1,148	98	1	-	-	-
India	3	....	....	-	44	7	-	-	-	-

Sources: IMF (Coordinated Portfolio Investment Survey CPIS) and ECB calculations.

Table 4 The euro's share as a settlement/invoicing currency in extra-euro area exports and imports of goods and services of selected euro area countries

(as a percentage of the total)

	Goods						Services					
	2001	2002	2003	2004	2005	2006	2001	2002	2003	2004	2005	2006
Exports												
Belgium	46.7	53.6	56.6	57.7	54.8	58.5	...	64.1	70.6	72.2	73.0	73.7
France [1]	50.8	50.5	49.0	49.2	49.8	49.7	40.0	40.3	42.4	42.4	43.6	46.3
Germany	...	50.1	63.0	63.2	61.0	67.8	...	...	...	...	...	...
Greece	23.5	39.3	47.3	44.3	39.1	38.8	11.3	13.3	16.3	14.1	15.6	14.6
Italy	52.7	54.1	58.2	59.0	58.4	59.8	39.7	43.1	47.0	48.9	56.6	54.1
Luxembourg	46.7	44.0	51.5	61.8	61.4	57.7	...	40.4	41.6	41.9	42.4	47.7
Portugal	40.3	44.1	50.4	55.6	56.7	55.8	41.2	47.2	53.4	56.1	58.1	55.5
Spain	52.0	57.5	61.7	62.4	62.1	60.2	53.3	59.5	64.1	64.3	67.5	68.2
Imports												
Belgium	47.2	53.7	57.8	55.7	51.2	58.3	...	60.1	65.8	68.3	71.2	73.8
France [1]	42.6	40.8	44.1	45.7	46.3	48.4	43.3	44.0	46.6	49.2	50.3	52.9
Germany	...	48.4	55.2	53.9	55.2	59.4	...	...	...	...	...	...
Greece	29.3	35.8	39.6	40.6	34.1	33.6	15.3	16.8	20.1	22.7	24.0	26.2
Italy	40.8	44.2	44.5	41.2	40.0	43.6	45.2	53.2	54.4	52.3	55.5	56.1
Luxembourg	47.2	31.9	41.9	50.0	43.8	38.8	...	27.7	34.3	30.2	31.2	29.8
Portugal	50.3	54.7	57.9	57.9	54.1	52.4	63.1	65.5	69.4	71.3	73.2	73.2
Spain	49.7	55.9	61.1	61.3	56.0	54.0	45.2	48.8	54.3	57.0	60.2	60.1

Sources: National central banks and ECB calculations.
Notes: Data for 2001 include trade settled in euro and in legacy currencies. Data refer to the use of the euro as a settlement currency, except for Germany, where the data refer to invoicing. For Germany, data on trade in goods reflect the average value of data collected in surveys carried out in the first and third quarters of 2002, 2003, 2004, 2005 and 2006 on behalf of the Deutsche Bundesbank. Data on services exclude travel, with the exception of Belgium.
1) Data for goods for 2006 are based on estimates.

Table 5 The euro's share as a settlement/invoicing currency in extra-EU exports and imports of goods of selected euro area countries

(as a percentage of the total)

	Exports		Imports	
	2006 Q1	2007 Q1	2006 Q1	2007 Q1
Austria	62.9	...	60.9	55.9
Belgium	50.0	...	46.3	...
Finland	44.0	...	29.6	...
France	45.9	47.0	36.4	35.0
Germany	...	...	40.9	43.2
Greece	28.1	25.6	18.0	21.8
Ireland	46.6	41.8	19.4	16.6
Italy	53.1	55.6	26.4	30.4
Luxembourg	34.5	51.4	33.1	36.6
Netherlands	52.5	...	23.4	...
Portugal	50.7	57.8	43.8	42.5
Slovenia	...	76.9	...	63.1
Spain	53.6	54.6	44.2	41.9

Sources: National central banks/national statistical offices and ECB calculations.
Notes: Data for France are based on estimates. German imports do not fully cover oil.

Table 6 The euro's share in exports and imports of selected non-euro area countries

(as a percentage of the total)

	Exports											
	Exports invoiced/settled in euro						Exports to the euro area					
	2001	2002	2003	2004	2005	2006	2001	2002	2003	2004	2005	2006
Non-euro area EU countries												
Bulgaria	48	52	61	62	60	58	48	48	48	46	51	50
Cyprus [1]	...	...	30	32	35	37	19	23	23	28	41	36
Czech Republic [2]	69	68	70	73	72	69	63	62	64	62	60	59
Estonia [2]	54	65	70	66	60	55	42	38	40	40	40	30
Latvia	34	40	42	48	53	55	30	29	30	25	25	24
Lithuania	28	37	47	50	51	56	26	27	28	31	29	25
Romania	56	59	64	66	64	68	63	62	61	59	54	53
Slovakia	71	74	79	91	95	96	57	58	60	58	54	53
Slovenia [1]	85	87	87	88	88	87	58	55	55	54	54	54
EU candidate countries												
Croatia	63	69	72	69	71	72	62	58	62	59	55	54
FYR Macedonia	...	66	67	75	75	74	48	50	53	53	50	52
Turkey	43	47	49	49	48	48	43	42	43	41	40	39
Other countries												
Indonesia	1	2	2	2	2	2	11	11	11	10	10	10
Thailand	2	3	3	3	3	3	12	11	11	11	10	10
Ukraine	...	4	5	6	7	9	16	18	19	17	16	16

	Imports											
	Imports invoiced/settled in euro						Imports from the euro area					
	2001	2002	2003	2004	2005	2006	2001	2002	2003	2004	2005	2006
Non-euro area EU countries												
Bulgaria	56	60	63	64	60	59	44	45	45	43	41	46
Cyprus [1]	...	...	45	53	55	56	40	43	45	53	55	54
Czech Republic [2]	67	67	68	71	71	68	58	57	56	56	53	60
Estonia [2]	54	59	62	60	59	56	39	41	40	47	46	43
Latvia	45	52	50	53	59	61	40	41	39	34	34	36
Lithuania	38	49	53	55	51	54	35	36	36	37	33	34
Romania	61	66	68	71	71	73	53	54	54	51	48	49
Slovakia	58	61	66	73	76	74	47	47	52	48	45	43
Slovenia [1]	79	83	82	83	82	81	64	64	64	72	67	66
EU candidate countries												
Croatia	73	77	78	78	74	73	58	58	58	56	53	52
FYR Macedonia	...	68	71	75	71	69	47	49	47	42	38	36
Turkey	33	37	40	40	38	38	38	39	39	38	34	31
Other countries												
Indonesia	3	6	6	...	...	4	10	9	9	9	8	6
Thailand	4	5	4	5	4	4	10	9	8	8	7	7
Ukraine	...	11	15	14	18	20	19	21	21	21	20	25

Sources: IMF and national sources. Data for non-euro area EU countries were provided by the national central banks of the ESCB. Data for Croatia, the former Yugoslav Republic of Macedonia and Turkey were kindly provided by the Croatian National Bank, the State Statistical Office of the Republic of Macedonia and the Turkish Undersecretariat of the Ministry for Foreign Trade.
1) Data refer to the period before Cyprus and Slovenia adopted the euro.
2) As a result of changes in the way data are collected from 2004 onwards, more recent figures for the Czech Republic and Estonia are not comparable with previous years.

Table 7 The euro in international loan markets

	All cross-border loans [1]	(A) Loans by euro area banks to borrowers outside the euro area (non-banks)	(B) Loans by non-euro area banks to borrowers in the euro area	(C) Loans by banks outside the euro area to borrowers outside the euro area [2]	(D) Loans by banks outside the euro area to borrowers outside the euro area [3]
Total euro-denominated outstanding amounts in USD millions, at constant exchange rates, end of period					
1999	381,606	194,534	131,323	55,750	55,750
2000	454,538	214,335	172,059	68,144	68,144
2001	520,281	269,633	165,011	85,637	85,637
2002	556,982	281,840	162,526	112,616	112,616
2003	631,350	294,824	205,903	130,623	130,623
2004	748,072	346,600	228,152	173,321	173,321
2005	849,995	368,193	298,735	183,066	183,066
2006	984,028	430,996	353,047	199,985	199,985
2007 Q1	1,070,021	480,311	380,233	209,477	209,477
Q2	1,127,684	481,332	402,188	244,163	244,163
Q3	1,200,786	484,376	453,093	263,318	263,318
Q4	1,263,568	513,064	443,285	307,219	307,219
Percentage of the total amount outstanding, at constant exchange rates, end of period					
1999	19.0	39.7	50.0	10.5	4.5
2000	21.8	39.3	55.3	13.1	5.5
2001	22.3	41.9	52.4	16.1	6.2
2002	22.7	41.8	53.1	19.5	7.6
2003	22.7	39.7	56.0	20.0	7.8
2004	23.9	42.0	55.3	24.3	9.2
2005	23.2	39.3	56.7	21.4	8.3
2006	21.0	38.4	56.6	18.4	6.8
2007 Q1	21.3	40.0	56.4	18.5	6.7
Q2	20.9	38.2	55.4	19.4	7.2
Q3	21.3	37.9	57.1	19.7	7.4
Q4	22.1	39.0	55.1	20.9	8.6

Sources: BIS and ECB calculations.
Notes: Excluding interbank loans and deposits.
1) Sum and weighted average of column (A), (B) and (D), respectively.
2) Excluding loans to/from Japan, Switzerland, the United Kingdom and the United States in their domestic currency.
3) Including loans to/from Japan, Switzerland, the United Kingdom and the United States in their domestic currency.

Table 8 The euro in international deposit markets

	All cross-border deposits[1]	(A) Deposits in euro area banks by depositors outside the euro area	(B) Deposits in banks outside the euro area by euro area depositors	(C) Deposits by depositors outside the euro area in banks outside the euro area[2]	(D) Deposits by depositors outside the euro area in banks outside the euro area[3]
Total euro-denominated outstanding amounts in USD millions, at constant exchange rates, end of period					
1999	577,198	284,249	161,529	131,419	131,419
2000	615,626	330,027	162,768	122,831	122,831
2001	775,315	397,145	205,336	172,835	172,835
2002	839,410	424,820	223,460	191,130	191,130
2003	947,497	435,076	287,381	225,040	225,040
2004	1,069,969	507,632	302,249	260,088	260,088
2005	1,150,399	554,586	295,315	300,498	300,498
2006	1,236,087	588,366	319,044	328,676	328,676
2007 Q1	1,283,122	604,767	336,194	342,161	342,161
Q2	1,365,497	622,248	380,427	362,822	362,822
Q3	1,305,860	592,982	341,785	371,093	371,093
Q4	1,374,285	592,715	355,028	426,542	426,542
As a percentage of the total amount outstanding, at constant exchange rates, end of period					
1999	27.1	52.1	53.2	18.9	10.2
2000	26.0	51.3	55.0	17.0	8.6
2001	27.7	52.8	57.3	18.6	10.2
2002	27.5	53.3	59.0	20.5	10.2
2003	26.5	51.9	60.0	20.7	10.0
2004	26.2	55.1	55.8	22.4	9.9
2005	26.0	53.6	53.2	22.2	10.6
2006	22.8	49.2	53.1	19.8	9.1
2007 Q1	22.0	49.2	50.1	19.7	8.7
Q2	22.1	49.2	51.9	19.8	8.7
Q3	20.5	46.4	48.2	19.3	8.5
Q4	21.0	46.2	47.0	20.6	9.5

Sources: BIS and ECB calculations.
Notes: Excluding interbank loans and deposits.
1) Sum and weighted average of column (A), (B) and (D), respectively.
2) Excluding deposits in/of Japan, Switzerland, the United Kingdom and the United States in their domestic currency.
3) Including deposits in/of Japan, Switzerland, the United Kingdom and the United States in their domestic currency.

Table 9 Global holdings of foreign exchange reserves since 1999

		December					
		1999	2003	2004	2005	2006	2007
Total	USD billions	1,782.1	3,025.5	3,748.6	4,174.8	5,036.8	6,390.6
Industrialised countries	USD billions	729.6	1,126.8	1,324.8	1,301.7	1,403.7	1,501.2
	% of total	(40.9)	(37.2)	(35.3)	(31.2)	(27.9)	(23.5)
Developing countries	USD billions	654.9	1,098.9	1,331.1	1,542.6	1,912.5	2,568.6
(with currency breakdown of reserves)	% of total	(36.7)	(36.3)	(35.5)	(36.9)	(38.0)	(40.2)
Developing countries	USD billions	397.6	799.7	1,092.7	1,330.6	1,720.6	2,320.8
(without currency breakdown of reserves)	% of total	(22.3)	(26.4)	(29.1)	(31.9)	(34.2)	(36.3)

Sources: IMF and ECB calculations.

Table 10 Currency shares in foreign exchange reserves with disclosed currency composition at current exchange rates since 1999

(percentages)

		December					
		1999	2003	2004	2005	2006	2007
Global	USD	71.0	65.9	65.9	66.9	65.5	63.9
	EUR	17.9	25.2	24.8	24.1	25.1	26.5
	JPY	6.4	3.9	3.8	3.6	3.1	2.9
	GBP	2.9	2.8	3.4	3.6	4.4	4.7
	Other	1.8	2.2	2.0	1.9	2.0	2.0
Industrialised countries	USD	73.0	69.8	70.9	73.0	71.3	69.4
	EUR	16.5	22.6	21.4	19.6	21.0	23.1
	JPY	6.6	3.8	3.5	3.4	3.5	3.1
	GBP	2.2	1.6	2.0	2.2	2.6	2.8
	Other	1.6	2.2	2.3	1.8	1.6	1.6
Developing countries	USD	68.8	62.0	61.0	61.7	61.2	60.7
	EUR	19.4	27.8	28.3	27.8	28.1	28.4
	JPY	6.1	4.1	4.1	3.7	2.8	2.8
	GBP	3.6	4.0	4.8	4.8	5.7	5.8
	Other	2.1	2.2	1.8	1.9	2.2	2.2

Sources: IMF and ECB calculations.

Table 11 Currency denomination of deposits from official monetary authorities in BIS reporting banks

(currency composition of deposits from official monetary authorities in BIS reporting banks (%))

	Dec. 1999	Dec. 2000	Dec. 2001	Dec. 2002	Dec. 2003	Dec. 2004	Dec. 2005	Dec. 2006	Sep. 2007
At current exchange rates									
USD	66.3	69.7	69.9	63.8	60.4	61.8	58.6	53.8	54.8
EUR	20.5	17.4	16.9	22.9	25.8	23.7	23.8	28.0	29.3
JPY	2.7	2.5	1.9	0.5	0.3	0.9	0.7	1.1	1.0
GBP	5.0	5.8	5.1	6.0	7.7	8.0	11.7	10.9	9.3
CHF	1.2	1.4	2.3	1.9	1.2	0.7	0.7	0.8	0.5
Residual currencies	4.3	3.2	3.9	4.8	4.6	4.8	4.5	5.4	5.1
At constant (1994 Q1) exchange rates									
USD	63.9	66.1	65.4	62.4	62.5	65.3	59.3	56.6	58.9
EUR	22.8	20.5	20.7	24.7	24.4	21.2	23.6	25.9	25.7
JPY	2.6	2.6	2.3	0.6	0.3	1.0	0.8	1.4	1.2
GBP	5.5	6.4	5.7	5.8	7.0	6.8	11.0	9.9	8.3
CHF	1.1	1.3	2.2	1.7	1.1	0.6	0.6	0.7	0.4
Residual currencies	4.1	3.0	3.6	4.7	4.7	5.1	4.5	5.7	5.5

Sources: BIS, locational banking statistics and ECB calculations.

Table 12 Outstanding euro-denominated bank deposits in selected countries

	2006	2007	as of	2006	2007	2006	2007
New Member States							
Bulgaria	4,526	7,096	Dec. 2007	34.4	40.2	72.1	81.5
Cyprus [1]	7,529	14,782	Dec. 2007	13.3	20.5	25.5	35.3
Czech Republic	5,396	6,838	Dec. 2007	7.3	7.7	68.1	70.2
Estonia	3,228	4,934	Dec. 2007	33.0	41.4	73.0	78.5
Hungary	6,744	6,375	Dec. 2007	15.8	13.8	75.5	73.7
Latvia	1,976	2,959	Dec. 2007	29.7	38.3	73.7	81.9
Lithuania	1,095	1,662	Dec. 2007	13.0	16.0	62.1	75.2
Malta	1,342	2,089	Dec. 2007	12.1	14.9	27.3	29.9
Poland	9,125	10,253	Dec. 2007	8.3	7.7	57.1	64.1
Romania	6,596	9,663	Dec. 2007	23.1	27.1	71.6	84.4
Slovakia	5,502	7,439	Nov. 2007	13.3	14.6	71.1	68.4
Average new Member States				18.5	22.0	61.6	67.6
Candidate Countries							
Croatia [1]	12,833	13,792	Dec. 2007	56.5	51.0	90.2	91.0
Macedonia (FYR)	812	939	Dec. 2007	49.5	44.6	82.2	84.0
Turkey	23,887	27,930	Nov. 2007	14.6	14.2	37.0	39.5
Potential candidate countries and territories							
Albania	1,008	n.a.	n.a.	24.5	n.a.	63.6	n.a.
Bosnia & Herzegovina	1,757	2,753	Dec. 2007	38.9	44.4	86.0	90.3
Kosovo [2]	890	1,089	Dec. 2007	96.3	95.3	96.3	95.3
Montenegro [2]	1,039	2,046	Dec. 2007	96.6	97.7	n.a.	n.a.
Serbia	4,286	n.a.	n.a.	59.4	59.4	95.24	n.a.
European CIS							
Moldova	226	n.a.	n.a.	25.8	n.a.	51.3	n.a.
Ukraine	1,818	2,802	Dec. 2007	6.6	7.4	17.2	23.2
Non euro-area Europe							
Norway	4,120	6,589	Dec. 2007	17.2	17.8	36.0	37.0
Sweden	40,094	32,733	Dec. 2007	10.1	8.3	37.1	32.3
Switzerland	29,469	34,270	Dec. 2007	8.7	10.8	40.7	44.1
UK	1,280,242	1,542,499	Dec. 2007	22.5	23.6	n.a.	n.a.
MENA							
Israel	7,693	8,350	Nov. 2007	6.4	6.9	20.0	21.7
Sub-Saharan Africa							
South Africa	n.a.	681	Nov. 2006	n.a.	0.4	n.a.	14.0

Sources: National central banks and ECB calculations.
Notes: Data may be subject to revisions and may relect different national definitions, in particular with respect to the inclusion of foreign-exchange indexed instruments. End-2006 figures for Romania refer to January 2007.
1) Current figures may not be comparable with last year's review owing to changes in definitions and possible revisions.
2) The euro is legal tender.
3) Mid values refer to end of period figures.

Table 13 Outstanding euro-denominated bank loans in selected countries

	2006	2007	as of	2006	2007	2006	2007
New Member States							
Bulgaria	4,987	9,288	Dec. 2007	43.1	49.1	95.7	98.1
Cyprus [1]	6,636	10,714	Dec. 2007	12.2	15.3	26.7	29.5
Czech Republic	5,669	6,870	Dec. 2007	11.0	10.2	81.4	78.8
Estonia	9,127	12,165	Dec. 2007	75.8	74.3	95.7	92.9
Hungary	10,248	11,962	Dec. 2007	20.1	20.1	40.5	35.2
Latvia	10,131	15,360	Dec. 2007	73.0	83.4	95.0	96.6
Lithuania	5,981	8,934	Dec. 2007	49.6	51.9	95.2	94.7
Malta	4,257	6,808	Dec. 2007	30.2	33.6	48.0	46.7
Poland	8,715	9,645	Dec. 2007	9.1	7.3	34.9	30.9
Romania	11,879	19,447	Dec. 2007	43.5	47.5	91.8	87.4
Slovakia	4,861	6,944	Nov. 2007	16.2	18.4	82.3	90.4
Average new Member States				34.9	37.4	71.6	71.0
Candidate Countries							
Croatia [1]	13,648	12,718	Dec. 2007	52.7	43.3	73.7	69.5
Macedonia (FYR)	355	462	Dec. 2007	24.2	22.7	92.9	93.3
Turkey	6,267	6,993	Nov. 2007	6.2	5.2	44.2	46.2
Potential candidate countries and territories							
Albania	899	n.a.	n.a.	58.3	n.a.	82.0	n.a.
Bosnia & Herzegovina	260	275	Dec. 2007	5.5	4.5	49.5	44.0
Kosovo [2]	637	891	Dec. 2007	100.0	100.0	100.0	100.0
Montenegro [2]	844	2,247	Dec. 2007	99.6	99.9	n.a.	n.a.
Serbia	828	n.a.	Dec. 2006	10.7	n.a.	94.6	n.a.
European CIS							
Moldova	120	n.a.	n.a.	14.9	n.a.	39.0	n.a.
Ukraine	2,009	2,577	Dec. 2007	5.4	4.5	11.0	9.0
Non euro-area Europe							
Norway	8,900	11,272	Dec. 2007	3.6	3.8	36.0	37.0
Sweden	45,661	61,306	Dec. 2007	7.9	9.8	46.2	50.4
Switzerland	22,723	28,258	Dec. 2007	3.9	4.5	23.1	21.4
UK	744,707	1,033,216	Dec. 2007	17.7	21.7	n.a.	n.a.
MENA							
Israel	2,878	3,115	Nov. 2007	3.2	3.4	15.3	16.7
Sub-Saharan Africa							
South Africa	n.a.	626	Nov. 2006	n.a.	4.2	n.a.	13.3

Sources: National central banks and ECB calculations.
Notes: Data may be subject to revisions. End-2006 figures for Romania refer to January 2007.
1) Current figures may not be comparable with last year's review owing to changes in definitions and possible revisions.
2) The euro is legal tender.

DOCUMENTS ON THE INTERNATIONAL ROLE OF THE EURO PUBLISHED BY THE EUROPEAN CENTRAL BANK

REVIEWS OF THE INTERNATIONAL ROLE OF THE EURO (with titles of the special focus chapters)
Asset substitution in central, eastern, and south-eastern Europe: trends and determinants, June 2007.

Determinants of the currency invoicing in international trade, December 2005.

Determinants of the currency choice in the international bond issuance by corporations, January 2005.

The City of London and the international role of the euro, December 2003.

December 2002

September 2001

ARTICLES IN THE MONTHLY BULLETIN
Monthly Bulletin, 10th Anniversary of the ECB, May 2008, Section 5.3, International role of the euro, pp 96-99.

"The international role of the euro", August 1999.

WORKING PAPER SERIES
916, "Optimal reserve composition in the presence of sudden stops: The euro and the dollar as safe haven currencies" by R. Beck and E. Rahbari, (forthcoming).

814, "Choice of currency in bond issuance and the international role of currencies" by N. Siegfried, E. Simeonova and C. Vespro, September 2007.

748, "Financial dollarization: the role of banks and interest rates" by H.S. Basso, O. Calvo-Gonzalez and M. Jurgilas, May 2007.

694, "Optimal currency shares in international reserves: the impact of the euro and the prospects for the dollar" by E. Papaioannou, R. Portes and G. Siourounis, November 2006.

19, "The euro and international capital markets" by C. Detken and P. Hartmann, April 2000, also published in: International Finance, April 2000, 3 (1), Vol 1, pp 53-94.

OCCASIONAL PAPER SERIES
91, "The impact of sovereign wealth funds on global financial markets" by R. Beck and M. Fidora, July 2008.

77, "Oil market structure, network effects and the choice of currency for oil invoicing" by E. Mileva and N. Siegfried, December 2007.

18, "The international role of the euro: evidence from bonds issued by non-euro area residents" by A. Geis, A. Mehl and S. Wredenborg, July 2004.

11, "Official dollarisation/euroisation: motives, features and policy implications of current cases" by A. Winkler, F. Mazzaferro, C. Nerlich and C. Thimann, February 2004.