



WP/06/153

IMF Working Paper

The Euro's Challenge to the Dollar:
Different Views from Economists and
Evidence from COFER (Currency
Composition of Foreign Exchange
Reserves) and Other Data

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June 2006

Abstract

This Working Paper should not be reported as representing the views of the IMF.

The views expressed in this Working Paper are those of the author(s) and do not necessarily represent those of the IMF or IMF policy. Working Papers describe research in progress by the author(s) and are published to elicit comments and to further debate.

This paper examines opposing views on the euro's challenge to the dollar as an international currency. One view emphasizes Europe's large economy and diversification effects as undergirding a vigorous challenge. The other emphasizes "network externalities," particularly undergirding continued dollar dominance. The data to date support the second view but also show the euro has significantly overtaken the legacy currencies as a reserve currency. Generally, large economic size alone is insufficient to challenge the network externalities supporting vehicle currencies, but scope exists for the euro to advance as an international store of value. The paper discusses the euro's medium-term prospects.

JEL Classification Numbers: F31, F39

Keywords: Euro, dollar, international currency, network externalities, reserves, currency composition

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¹ Ms. Maria Tanzi provided valuable research assistance. I would like to thank Rob Edwards, Armida San Jose, Hamid Faruqee, Jaewoo Lee, Robert Heath, Hidetoshi Takeda, Gerardo Peraza, and Paul Duran for their helpful comments. Any errors are mine.

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I. INTRODUCTION

Even before the euro's launch in 1999, economists had differing views of its challenge to the dollar's status as the world's dominant international currency.² Some, like Bergsten (1997), Mundell (1998), and Portes and Rey (1998), were optimistic the single currency of the European Economic and Monetary Union (EMU) would challenge the dollar immediately and even replace it eventually as the dominant currency. Indeed, Bergsten (1997) predicts that "as much as \$1 trillion of international investment may shift from dollars into euros"; and Mundell (1998) predicts that "the euro will become an international currency on the same scale as the dollar," anticipating transition problems from investors shifting out of dollars to euros.

Other economists, notably Cooper (1997) and McKinnon (1998), were less sanguine.³ McKinnon (1998) argues the euro would only be an important regional currency, although this argument "in no way denigrate[s] the great contribution the euro could make to...the greater European economy (p. 60)."

Since 1999, other studies have been conducted, but the issue remains unsettled. McKinnon (2001, 2002, 2003) and Kenen (2002, 2003) see dollar dominance continuing, but Eichengreen (2005) is optimistic about the euro's prospects as a reserve currency. Taking a more historical perspective, Bordo (2003) and Dwyer and Lothian (2003) are cautiously optimistic, while Chinn and Frankel (2005) project a possible large role using econometric estimates.

This paper takes another look at the challenge. The issue is relevant today because of the ongoing and persistent large U.S. current account deficits—potentially a significant source of risk for the dollar's value (Table 1). Should the dollar come under pressure at some point, sizable currency shifts could occur, possibly from the dollar to the euro, as Mundell predicted in 1998. Thus, it is useful to take stock of how the euro currently stacks up against the dollar, to get some sense of its potential to assume a significantly larger international role.

We will begin by examining the underlying reasons for the different views of the economists. These views appear to emanate from the same conceptual framework, with each economist apparently focusing on different elements of the framework. Understanding the differences will help to focus issues and facilitate a more systematic assessment of the euro's prospects. For the empirical discussion, we will examine some new data from the International Monetary Fund's database on the currency composition of foreign exchange reserves

² An international currency is one used outside its home country by nonresidents for transactions with residents of the home country or with residents of third countries.

³ We will not be discussing whether EMU is an optimum currency area. We will, however, touch implicitly on such issues when the importance of political stability for international currencies is discussed.

Table 1: U.S. Current Accounts and Exchange Rates

	1998	1999	2000	2001	2002	2003	2004	2005Q1	2005Q2	2005Q3
Dollar/Euro; End of Period	...	1.00	0.93	0.88	1.05	1.36	1.31	1.30	1.21	1.20
Current Account Deficit/GDP	-2.4	-3.2	-4.2	-3.8	-4.5	-4.7	-5.7	-5.8	-6.4	-6.7
Memorandum Items										
Nominal Effective Exch Rate Volatility (US\$) 1/										
1970s										
1980-95										
1996-2005										

Source: *International Financial Statistics*, various issues; Federal Reserve Board of Governors website:

http://www.federalreserve.gov/releases/H10/Summary/indexb_m.txt

1/ Standard Deviation divided by Average for the Period.

(COFER see Box 1). In addition, we will examine the available data on foreign exchange and international bond markets from the Bank for International Settlements (BIS). COFER and international bond data will be useful in assessing the euro's role as an international investment currency, while foreign exchange market data will be useful in assessing its role as a medium of exchange for trading currencies (or vehicle currency).

Box 1: COFER Data

Quarterly COFER data were disseminated for the first time on December 21, 2005 on the IMF's external website: <http://www.imf.org/external/np/sta/cofer/eng/index.htm>.

The currencies identified in the COFER data are the U.S. dollar, euro, pound sterling, Japanese yen, Swiss franc, and a category for all "other currencies." Before the euro was introduced in 1999, the European currencies identified separately were the European Currency Unit (ECU), Deutsche mark, French franc, and the Netherlands guilder.

COFER data are currently reported on a voluntary basis by 115 member countries of the IMF, comprising all 24 industrial countries and 91 out of the 160 developing countries. The classification of countries in COFER follows that currently used in the world tables of *International Financial Statistics (IFS)* (page 32 in the April 2006 issue). Countries report COFER data in millions of U.S. dollars.

The structure of the paper follows. We first discuss why there is a need for international money (Section II); then examine the factors that facilitate the development of an international currency (Section III); the underlying reasons for the different views (Section IV); the data on COFER, foreign exchange, and international bond markets (Section V); and medium-term prospects (Section VI), before concluding (Section VII).

II. WHY IS THERE A NEED FOR INTERNATIONAL MONEY?

All the economists above agree that the world needs international money—because of the roles money plays as a medium of exchange, unit of account, and store of value (Swoboda, 1968; Chrystal, 1977; McKinnon, 1979; Krugman, 1984; Hartmann, 1998; Mundell, 1998; and Greenspan, 2001). Of these roles, the one as medium of exchange provides the most intuitive explanation for the need: it is more efficient to use a single currency (or a limited number)⁴ as the numeraire and exchange medium to trade across multiple currencies, than bilateral trading in all pairs of currencies—in the same way that it is more efficient to use domestic money to trade goods than barter. Efficiency gains are achieved in two ways. First, channeling transactions through one currency involves fewer foreign exchange markets, thus reducing set-up costs for market makers. Second, with fewer markets, the volume of transactions in each will likely be larger, in general reducing transaction costs.⁵

⁴ In general, there can be more than one international currency at any given time. See ahead.

⁵ See Hartmann (1998) for a formal theoretical model of the medium of exchange function.

McKinnon (1998) gives a good example to explain these gains. Suppose there are N national currencies in interbank markets. With bilateral trading in all pairs of currencies, there would be $N*(N-1)/2$ bilateral markets.⁶ However, if the markets were to select any one of the N currencies to be the vehicle currency, through which all trades are channeled, and all exchange rates are quoted (bids and offers, at all terms to maturity), the number of markets would be reduced to just $N-1$. In a world of 150 national currencies, this change implies a reduction from 11,175 to just 149 markets and large cost savings for the market-making banks. It also implies lower transaction costs because the volume in each market would likely be higher than if the total amount of transactions was to be splintered across 11,175 markets, many of which would likely be shallower, thinner, and more costly.

III. CONCEPTUAL FRAMEWORK—FACTORS THAT FACILITATE INTERNATIONAL CURRENCY STATUS

The question arises: If any of the N currencies can be the vehicle currency, how does any one currency get selected? In the international arena, there is no government to decree what should be international money (as in the domestic context). Instead, a myriad of private traders and market participants must somehow reach agreement on which currency to use as international currency. The literature has identified five major factors (“facilitating factors” or FFs), facilitating a currency’s international status, as follows:⁷

A. Large Economic Size (FF.A)

International currencies are usually associated with large, competitive economies, particularly those with far-reaching trade and financial ties. Such an economy will usually generate a large market in foreign exchange transactions with at least one leg in its own currency. As noted, large market size will tend to result in lower transaction costs—reflecting *technical (supply) economies of scale* in financial management. That is, while large costs may be associated with installing the requisite software, hardware, trading, and clearing systems, once installed, these investments can handle many or few transactions with indifference. Marginal costs are minimal, and average costs fall with scale, leading to lower transaction costs. Since many economies may be too small to have efficient, competitive markets in foreign exchange, vehicle currencies, in particular, tend to belong to large, dominant economies.

B. Well-Developed Financial System (FF.B)

International currencies are usually associated with open, liquid, and well-developed financial systems. When sterling was the dominant international currency in the 19th and early 20th centuries, London was the world’s preeminent financial market. Presently, the dollar is backed by the deep, liquid, and well-diversified financial markets in New York.

⁶ That is, there are N choose 2 combinations (of bilateral markets).

⁷ This section follows the presentational structure in Chinn and Frankel (2005).

A well-developed financial system increases the attractiveness of the home currency in at least three ways:

First, it offers deep and liquid secondary markets for securities to international market participants; these participants do not normally hold their international money in the form of currency balances, but instead require liquid, interest-bearing assets (usually a short-term risk-free instrument) to hold their temporary positions. The liquid secondary markets allow participants to quickly build up or liquidate large positions in the currency without fear of capital loss (Cooper, 1997).

Second, a well-developed financial system offers a wide range of ancillary services efficiently to international market participants, who may want to borrow or invest in the domestic currency, or hedge their foreign currency positions.

Third, a well-developed financial system is more likely to attract business from abroad, where financial markets may be less developed or barriers to efficiency exist. This possibility makes it cheaper for market participants to borrow or invest abroad in an international currency and then exchange the proceeds for domestic currency, rather than conduct the transactions directly at home (Greenspan, 2001).

C. Confidence in the Currency's Value (Store of Value Function) (FF.C)

International currencies are also held as stores of value, such as the short-term instruments noted above, working balances, international bonds, and official reserves, etc. Thus, an international currency must be perceived as sound—one whose future value is stable in terms of goods and services and not prone to be inflated away. Instability in value increases holding risk, and inflation destroys purchasing power. Both these elements would discourage investors from holding assets in that currency. Confidence in a currency's value is also important indirectly for its medium-of-exchange function. As Friedman (1971) noted, no exchange medium can survive if it is not also a store of value (albeit the reverse is not necessarily true).

To the extent that investors try to minimize risk through diversification, a multiplicity of international currencies is likely to coexist as stores of value at any one time. Modern portfolio theory suggests that efficient portfolios—those not dominated by portfolios with lower risk/given return or higher return/given risk—are likely to be diversified over several currencies (Hartmann, 1988).

D. Political Stability (FF.D)

This factor is particularly highlighted by those economists taking a more historical perspective. Mundell (1998) states that “when a state collapses, the currency goes up in smoke.” He points to the strong historical link existing between international currencies and strong central states—because strength implies political stability, which also facilitates the pursuit of monetary stability. Similarly, Bordo (2003) and Dwyer and Lothian (2003) point out that national monetary unions, where monetary integration is tied to political union, have historically been stable (like the United States). On the other hand, international monetary

unions, where monetary integration is not tied to political union, have historically failed (like the Scandinavian Monetary Union, with different nation states). The reason is that shocks may affect each national member differently and give rise to pressures that weaken the political will to maintain the union.⁸

E. Network Externalities (FF.E)

Finally, a key facilitating factor is “network externalities”—a phenomenon associated with international currencies—whereby a good or service becomes more valuable as more people use it. The classic example is the telephone—a telephone connection becomes more useful to a user as the number of people with telephones increases (Rohlf, 1974). Before considering the implications for international currencies, it may be useful to summarize stylized features of network goods from recent research on technology goods (faxes, instant messaging, Windows software, etc.).

Features of network externalities/goods

Varian (2003) summarizes three features. First, network externalities are efficiencies from the demand side. Varian calls them *demand-side economies of scale*, because they increase average revenue (or demand) with scale, in contrast to the technical or supply-side economies, which decrease average cost with scale. Demand-side economies reflect *positive feedback*. If more people use Windows, the value of the Windows network to users increases, inducing even more people to adopt Windows.

Second, many network goods (like software) also exhibit supply-side returns to scale, making the positive feedback very strong. That is, more sales lead to lower unit costs (supply side) and greater appeal to customers (demand side).

Third, strong positive feedback is likely to drive the network good to market dominance; and once dominance has been achieved, it becomes extremely difficult to unseat it. For instance, firms that have adopted Windows will find it costly to switch to a new operating system, because of the “sunk costs” invested, new retraining costs, and coordination costs resulting from technical compatibility problems with firms that remain in the Windows network. Network externalities thus contribute to “lock-in.” History is important—whichever good is first to dominate the market will likely continue to do so. The equilibrium is path-dependent.

Application to international currencies

An international or, specifically, a vehicle currency also becomes more useful if more people are using it. The larger the dollar’s network of users, the more attractive the dollar becomes to a user. The demand-side economies derive from the currency’s increased liquidity, which results because a larger network implies more potential counteroffers for a trade, thus

⁸ Such an outcome would be less likely if the union constituted an optimum currency area.

enhancing the probability of a favorable match and quick sale.⁹ The increased liquidity then induces even more people to join the network, resulting in a self-reinforcing cycle.

A vehicle currency also enjoys supply-side economies. As noted, an expanding network and market size reduces average cost with scale. In addition, large market size tends to reduce the average waiting time between matching buy/sell orders, allowing market-making banks to carry smaller (costly) inventories of currency—which also reduces cost (Krugman, 1984).

Under the combined impact of demand and supply economies, and lower transaction costs, the beneficiary currency becomes very competitive against its rivals, and the positive feedback is great. The strong currency tends to become stronger while its rivals become weaker. And as with the Windows example, once market dominance is achieved, it is very difficult to dislodge the currency because of higher switching costs. For instance, an individual trader has very little incentive to leave the network unless every other trader decides to do so at the same time; and there are set-up costs for opening new or reopening inactive currency markets.

Thus, there exists a strong inertial bias to keep the incumbent currency as the vehicle, even if *another currency should come along that can play the role just as well*. History is important: Whichever currency is there first will tend to continue to dominate the market. Greenspan (2001) thus views an international currency as having the tendency to become a natural monopoly, while McKinnon (1998) views it as being a natural monopoly.

Network externalities are usually attributed to vehicle currencies in foreign exchange markets. However, they are also present in securities markets, where a highly traded short-term security held as a temporary store of value can also benefit from network externalities (Cooper, 1997).

F. Can There Be More Than One International Currency At Any One Time?

While the issue of several co-circulating international currencies is not a facilitating factor, it follows logically from the discussion above and is pertinent to the euro's prospects. As noted, for stores of value, theory suggests that a multiplicity of international currencies is likely to coexist at any one time. For vehicle currencies, Hartmann (1998) shows theoretically that equilibrium can also exist with more than one vehicle currency (see also Krugman, 1984). However, the economics of network goods suggest that network externalities are likely to drive a currency toward market dominance, implying that the potential number of important currencies circulating at the same time is likely to be very limited. For instance, the only time in the last century when two major vehicles circulated was during the interwar period, when both the dollar and sterling circulated (Krugman, 1984). Even then, however, the dollar was the currency in ascendancy while sterling was the one in decline (see also Box 2).

⁹ Lippmann and McCall (1986) define an asset as liquid if it can be sold quickly at a predictable or what is deemed fair-market price by its owner.

IV. REASONS FOR THE DIFFERENT VIEWS

All our economists agree with the conceptual framework and facilitating factors (FF) above. However, they arrived at different views because they place different emphases on the importance of one or several of these factors.

A. Bergsten/Mundell—Economic Size and Diversification Effects

The Bergsten/Mundell view emphasizes economic size—the facilitating factor A (FF.A in III.A, above)—and the store of value function (FF.C), above. Bergsten (1997) states that the EU accounts for about 31 percent of world output and 20 percent of world trade (excluding intra-EU transactions), while the U.S. accounts for 27 percent of world output and 18 percent of world trade.¹⁰ Mundell (1998) concurs that “as an economic giant, Euroland will be fully the equal of the U.S.(p 228).” The first strand of Bergsten/Mundell thus rests on the tendency for international currencies to be associated with large dominant economies.

The second strand of Bergsten/Mundell stresses the euro’s role as a stable store of value and an alternative investment vehicle into which investors can diversify. For the first time in 50 years, investors have the stable currency of a comparable economic giant as an alternative to the dollar. The impulse towards diversification could be tremendous. This impulse was the rationale behind Bergsten’s projection of the possible \$1 trillion portfolio shift from dollars to euros. Mundell (1998) is even more emphatic: “diversification effects are inevitable”; “the pileup of international indebtedness makes reliance on the dollar as the world’s only main currency untenable”; and “the fact that the bulk of international reserves is held in dollars makes that currency a sitting duck in a currency crisis (p. 232).”

B. McKinnon/Kenen/Cooper—The World Dollar Standard

McKinnon

McKinnon (1998) recognizes the importance of large economic size. He notes that the EU’s “huge economic size and far-reaching trade connections (p. 32)” suggest a role for the euro well beyond its political borders. Many Eastern European countries and Europe’s ex-colonies in Africa are likely to peg to or stabilize their currencies against the euro because of close trade ties; as such, they would likely use the euro as their main intervention and reserve currency. However, the euro will not challenge the dollar; it will instead become the world’s most important regional currency.

¹⁰ In 1997-98, the authors were using the terms “EU” or “Euroland” as the proxy for EMU.

Box 2: How Can A Dominant Vehicle Be Dislodged?

While it is difficult to dislodge a dominant vehicle, it is not impossible. Historically, the dollar replaced the sterling as the world's dominant international currency in the second half of the last century. More recently, the Deutsche mark (DM) emerged as a second vehicle for trading European currencies in the late 1980s/early 1990s—while the U.S. dollar's role declined (Black, 1991).

Hartmann (1998) has a model that illustrates how a dominant vehicle may lose its status. The key variable is transaction costs (or the bid-ask spread). In the model, transaction costs fall with the volume of transactions but rise with exchange rate volatility. The negative impact of volume on transaction costs implicitly captures the demand and supply economies of scale. The positive impact of higher exchange rate volatility reflects the increased risk of loss dealers face when closing open positions under high exchange volatility; dealers then charge higher bid-ask spreads to cover the higher risk. The model is closed by a feedback effect from higher transaction costs (higher spreads) to the volume of transactions. While higher volumes decrease spreads, higher spreads also decrease volumes, because a currency with increasing spreads becomes less attractive as a vehicle. Hartmann calls a trade using the vehicle currency an “indirect exchange” and one not using the vehicle, a “direct exchange.”

The model works as expected. Suppose a sharp increase occurs in the **exchange volatility** of the vehicle currency. Transaction costs for the vehicle increase, which, if significant, may make it attractive for some market participants to switch from indirect exchange to direct exchange for certain currency pairs. This reduces volume and liquidity in the vehicle's market, which may in turn trigger more switches to direct exchange. At some point, trading volumes and liquidity for the vehicle currency decline beyond a critical level, setting off an unraveling of the demand and supply side economies, or negative feedback effects. In the process, a new vehicle currency may emerge.

Hartmann (1988) claims that his model offers an explanation why the DM **emerged** as the second vehicle in Europe in the late 1980s/early 1990s. The reason is that the exchange rate of the dollar had become more volatile in the 1980s/early 1990s. In the meantime, the DM's value, relative to that of the other European currencies, was stable because of the success of the European Monetary System (EMS). The relative stability of the DM's value gave it an advantage in transaction costs, facilitating its emergence as a new vehicle (Black, 1991). While we do not have transaction costs data, the volatility of the dollar's nominal effective rate increased significantly in 1980–95, compared to the 1970s, before declining again in the last 10 years (Table 1, memorandum items).

Hartmann (1988) suggests the **emergence or disappearance** of a vehicle currency may occur slowly in several, gradual steps or quickly in a dramatic restructuring of the exchange market. Whichever scenario develops depends on the size of the shocks affecting the exchange market. However, the long and stepwise decline of sterling suggests that dominant international currencies probably tend to lose their status over a long drawn-out period, rather than in one big catastrophic regime shift in a short period (see also Kannan, 2004).

McKinnon stresses the importance of network externalities (FF.E) and the market's need for a worldwide currency (rather than a regional currency, “associated with unusually close trade linkages (p. 33)), which the dollar has filled successfully since the Second World War. Now the “dollar standard” is entrenched within the world's financial system. For McKinnon, only some cataclysmic event like massive inflation in the United States, that destabilizes the

dollar's value in terms of goods and services, could dislodge the currency from its dominant position.

Network externalities supporting the dollar

McKinnon (1998) illustrates the *demand and supply economies* supporting the dollar as follows:

First, the dollar is the selected **vehicle currency** in interbank markets because it is “on one side of close to 90 percent of interbank transactions outside of Europe (p. 33)”.

Second, the dollar is the **main invoice currency** for primary commodities, such as oil, wheat, and copper. The dollar's vehicle role facilitated its invoice role because homogenous, primary commodities are traded in centralized exchanges, where it is more efficient to use a widely used currency familiar to all participants—a natural fit for the dollar.

Besides primary commodities, manufactured exports from developing and smaller industrial economies also tend to use the dollar as the main invoice currency. Manufactured exports from the major industrial countries tend to be invoiced in the exporting country's currency, but there are two major exceptions—U.S. and Japan. All countries trading with the U.S. tend to invoice their imports and exports vis-à-vis the U.S. in dollars. For Japan, a large part of its trade is also dollar-invoiced (probably because of its large U.S. trade and large primary imports).

Third, the dollar is the **main intervention currency** used by governments to influence the exchange value of their currencies. And the dollar's roles as vehicle and invoice currencies facilitated this role because it is cheaper and more efficient to intervene with the currency, where the spot/forward foreign exchange and commodity markets are most highly developed.

Fourth, the dollar is the **major reserve currency**, because governments will typically hold reserves in currencies they can use for intervention. McKinnon acknowledges the importance of diversification but stresses “the convenience of holding reserves denominated in the intervention currency (p. 60).” Overall, dollar dominance in one market has tended to facilitate its use and dominance in other markets in an interlocking, synergistic manner.

International currency as nominal anchor

McKinnon (2001, 2002, 2003) advances another role for international currencies, which has implications for their use as **reserve currencies**. McKinnon argues that in times of relatively stable U.S. price levels, the dollar has played a complementary role as nominal anchor, and countries in the dollar area have sought to peg softly to (or loosely target) the dollar. He offers two major reasons: The first is to limit the impact of exchange rate fluctuations on domestic prices. The second reason is to avoid adverse balance sheet effects—for two types of countries.

The first type is **international dollar debtors**, typically developing countries with short-term dollar liabilities and concerns about potential foreign debt servicing problems. Dollar debtors

tend to peg softly to the dollar in normal times, even if they may no longer have official dollar parities.

The second type is **international dollar creditors**—countries like Japan and China, that find it difficult to *lend* abroad in their own currencies. For that reason, financial institutions from such countries have tended to accumulate sizable dollar claims on foreigners—even as their domestic liabilities are mostly in domestic currency (a phenomenon, McKinnon (2003, 2005) calls *conflicted virtue*). Dollar creditors are concerned that significant domestic currency *appreciation* against the dollar could potentially bankrupt their financial institutions—by lowering the domestic currency value of their assets relative to that of their liabilities. For that reason, dollar creditors also have a *rational* incentive to peg softly to the dollar.

Implications of the nominal anchor role

The main implication of the **nominal anchor** role is that it adds a monetary/financial policy rationale for why an international currency might dominate reserve holdings within its domain. Countries pegging softly to their key international currency are more likely to use it as their main intervention currency and, hence, also as a reserve currency. The dollar should dominate reserve holdings within the dollar area and the euro within the euro area (i.e., euro zone countries, excluding EMU).

Beyond that, McKinnon's notion of *conflicted virtue* has contributed a balance sheet rationale for why creditor countries might continue to accumulate reserves in their key international currency, even in the face of large and growing current account deficits by the currency's issuer (such as in the case of the dollar and the United States). Since they cannot simultaneously target price and quantity, these countries have generally been willing to sacrifice quantity (the amount of reserves denominated in the international currency) in favor of a price target (avoiding significant domestic currency appreciation).¹¹

Kenen and Cooper

Kenen (2002, 2003) also emphasizes network externalities. In addition, he gives another reason why it is difficult to challenge the dollar, particularly in third currency markets. Suppose one assumes that the transactions cost for converting DM directly to zloty is the *same* as that using the dollar as the vehicle to convert DM to zloty. The two trades co-exist in the market as follows:

- Trade 1: (DM – Zloty); (Bilateral exchange)
Trade II: (DM – US\$) then (US\$ - Zloty); (Exchange using dollar as vehicle).

¹¹ A different view for why emerging countries have de facto pegs against the dollar is the “New Bretton Woods” hypothesis (Dooley, Folkerts-Landau, Garber, 2003). Here “periphery” countries pursue export-led growth and protect domestic exporters’ U.S. market shares by de facto pegging to the dollar; as a result, they stand ready to accumulate dollar reserves resulting from any payments imbalances. McKinnon’s rationale is slightly more general in that it applies to all dollar creditors, not just peripheral countries.

The euro is now introduced; assume that unification of the legacy currency markets has reduced the euro's transactions cost. Kenen asks: What would have to happen for the (new) bilateral (euro-zloty) trading to eliminate the dollar vehicle trading? The answer is that the cost savings from substituting the euro for DM in the bilateral Trade I above must exceed the cost savings produced by substituting the euro for DM in the first leg of the trade using the dollar as vehicle (Trade II). Ironically, the cost savings from replacing (DM-US\$) with (euro-US\$) in Trade II serves further to *protect* the dollar's vehicle role in third currency markets; and this type of protection occurs in other scenarios as well. Kenen (2003) shows that the required cost savings become even greater if the bilateral (US\$-zloty) trade were to be replaced by one using the euro as the vehicle, i.e., (US\$-euro) and then (euro-zloty).

Cooper (1997), like McKinnon/Kenen, emphasizes network externalities but focuses first on the importance of liquid, well-developed financial markets (FF.B). Cooper argues that the dollar's strength as an international currency has derived from the availability of the very liquid U.S. Treasury bill (T-bill). The T-bill can be bought and sold readily in huge amounts, 24 hours a day, anonymously without influencing the price of the outstanding bills. However, a comparable EMU government securities market (to support the euro) will likely not develop "for decades to come." The size of the EMU government debt market may be the same as the U.S. Treasury market, but there is one significant difference—the EMU market is not homogenous. While debts are denominated in euros, they are issued by separate national governments, have different credit quality and liquidity risk premia, and are governed by different legal procedures. As such, there is, as yet, no benchmark euro asset, like the U.S. T-bill.

The U.S. T-bill, on the other hand, is the debt of one central government, which owns the means of its settlement (i.e., the Federal Reserve or Fed), making it virtually credit risk free. In addition, the T-bill has low market risk because it is available in short maturities. And it has low liquidity risk because of its large secondary market and the support provided by the Fed's open market operations. Cooper (1997) points out that the Fed effectively makes "a perfectly liquid market for foreign official monetary authorities by buying and selling T-bills offmarket in matched transactions...."

The upshot is that the T-bill's liquidity, "wide acceptability and [great] convenience," allows it to benefit from network externalities in the securities markets in the same way the dollar benefits from network externalities in the foreign exchange markets. For that reason, Cooper states that "the euro...is not likely to provide a shock large enough to dislodge the U.S. Treasury bill from its international role," and "major displacement of the dollar will not take place, at least for several decades."

C. Eichengreen's Rebuttal—Reserve Currencies: Back to Diversification Effects

Eichengreen's rebuttal (2005) to the McKinnon/Kenen/Cooper view focuses on the dollar's dominance as a **reserve currency**. He argues that network externalities may be strong in other areas but are "less obviously valid for the currency of denomination of reserves" and that "market liquidity is not all that matters." "It may be worth tolerating a bit less market liquidity in return for the benefits of greater diversification...." Eichengreen thus returns to the Bergsten/Mundell emphasis on diversification.

Eichengreen views the impact of the U.S. current account deficits differently from McKinnon; his view is the traditional one: If U.S. net foreign debt is allowed to grow relative to GDP, confidence in the dollar's value (FF.C) will be undermined. Foreigners will be less willing to hold dollars, the dollar will depreciate and inflationary pressures will increase, making dollars even less attractive and resulting in a downward spiral—perhaps even if the Fed were to raise interest rates.

Eichengreen illustrates the situation's severity with Mussa's (2004) simple analytics, as follows:¹² The ratio of net foreign liabilities to GDP, denoted \underline{n} , will stabilize when

$$c = n * g;$$

where c =current account deficit as a share of GDP;
and g =growth of nominal GDP.

If $g = 0.05$ (3 percent real growth plus 2 percent inflation) and $c = 0.025$, the debt ratio will stabilize at 50 percent. If it is assumed that a debt ratio of 50 percent of GDP, already double the existing ratio of 25 percent, is the plausible upper limit that foreigners will tolerate, the risk of the deficit continuing at 5 percent of GDP (current levels) becomes clear—with $c=0.05$, the debt ratio stabilizes at 100 percent of GDP, a “much higher ratio than ever incurred by a large country, much less by a reserve-currency country.” If foreigners are unwilling to hold this much dollar debt, the scenario of dollar weakness and inflationary pressures will develop, and the dollar's role as dominant reserve currency will disappear.

What about McKinnon's **world dollar standard** and the incentives for dollar area countries to stabilize their dollar exchange rates and accumulate dollar reserves? Eichengreen's general argument is that any collective impulse to maintain stable exchange rates will crack “like most cartels.” Individual interest (to avoid massive capital losses) will triumph over collective interest—the “classic cartel problem.” While the collective interest may be to keep dollar exchange rates stable, “their individual interest [is] to get out before the bottom falls out of the U.S. currency.” In this analysis, however, Eichengreen (2005) does not address McKinnon's hypothesis of “*conflicted virtue*” where it is in the *individual* interest of dollar creditors to maintain stable dollar exchange rates and absorb more dollar reserves—because of concerns about the adverse balance sheet effects of dollar depreciation on their economies.

D. Summary of the Differences

The Bergsten/Mundell/Eichengreen (BME) view stresses large economic size and diversification effects as supportive of a larger euro role, while the McKinnon/Kenen/Cooper (MKC) view stresses network externalities, path dependence, strong dollar financial markets, and the nominal anchor role as supportive of continuing dollar dominance. Beyond that, Eichengreen has brought up an important new factor—***potential instability in the dollar's value***—which could have a larger impact on the dollar beyond its use as a reserve currency—

¹² A more elaborated model calibrating the possible sizes of dollar depreciation implied by a reversal of the U.S. current account deficit can be found in Obstfeld and Rogoff, 2005.

the focus of Eichengreen’s discussion. As discussed in Box 2, chronic instability in the dollar’s value would disrupt its role as a vehicle currency as well as a store of value, and create opportunities for other currencies to expand their role—a point McKinnon agrees with. We turn now to the empirical evidence to date.

V. EMPIRICAL EVIDENCE TO DATE

A. Currency Composition of Foreign Exchange Reserves (COFER)

In this section, we will examine developments in COFER data since 1999. The aim is to examine broad trends in reserve portfolios—not the impact of specific factors, such as expected exchange rate changes, risk, or trade relationships, as would be done with an econometric study (see Eichengreen and Mathiesen, 2000). In that sense, some of our results will be suggestive in nature, although the overall findings would be grounded in the data.

Table 2 shows the aggregate currency shares for countries that report COFER data to the IMF for the period 1998-2005Q3.¹³ The shares are shown for three groups of countries: All reporters (Panel 1), reporters in the “dollar” area (Panel 2), and reporters in the “euro area” (Panel 3). We define the euro area as comprising all the European countries immediately surrounding EMU and countries worldwide that largely peg to the euro—using as a guide the data in Reinhart and Rogoff (2002). These include several countries on the African continent.¹⁴ We define the dollar area loosely as comprising Asia and the Western Hemisphere and various other countries that largely peg to the dollar.¹⁵

¹³ The currency shares are computed by dividing the total amount reported for each currency by the total amount of reserves for which COFER data are reported, or “Allocated Reserves” in Table 1. Reserves for which COFER data are not reported are “Unallocated Reserves.”

¹⁴ Note that our definition of the “euro area” (and henceforth as used in the paper) is different from the political definition for “Euro Area,” which normally means the geographical area of EMU—where the euro is the domestic currency. EMU is not included in our “euro area.”

¹⁵ The countries included in each area are not identified because of confidentiality issues. Being the currency issuers, EMU and the United States are not included in the data for both areas.

Table 2. Currency Composition of Foreign Exchange Reserves (COFER): 1998Q4-2005Q3

	(In Millions of U.S. dollars)									
	1998Q4	1999Q4	2000Q4	2001Q4	2002Q4	2003Q4	2004Q4	2005Q1	2005Q2	2005Q3
ALL COUNTRIES 1/										
Claims in U.S. dollars	888,724	976,689	1,077,616	1,117,745	1,202,239	1,465,893	1,737,262	1,754,167	1,792,413	1,817,873
Claims in Pound Sterling	34,142	39,820	41,788	42,391	50,527	61,557	89,238	96,146	96,674	100,906
Claims in Deutschemerk	176,951	0	0	0	0	0	0	0	0	0
Claims in French Francs	20,814	0	0	0	0	0	0	0	0	0
Claims in Japanese Yen	80,029	87,794	93,301	79,410	78,376	87,776	101,527	101,850	98,463	100,392
Claims in Swiss Francs	4,237	3,168	4,087	4,372	7,314	4,930	4,313	4,736	3,956	3,988
Claims in Netherlands Guilders	3,489	0	0	0	0	0	0	0	0	0
Claims in ECUs	16,637	0	0	0	0	0	0	0	0	0
Claims in Euros	0	246,948	279,457	301,930	427,993	562,128	660,028	672,929	673,825	667,024
Claims in Other Currencies	57,383	21,604	22,170	19,492	25,666	42,585	47,551	48,269	44,989	48,928
Allocated	1,282,406	1,376,024	1,518,418	1,565,340	1,792,116	2,224,870	2,639,918	2,678,097	2,710,319	2,739,111
Unallocated	361,449	407,400	423,822	487,381	616,640	803,887	1,109,145	1,180,559	1,238,211	1,313,547
Total	1,643,855	1,783,423	1,942,241	2,052,721	2,408,756	3,028,757	3,749,063	3,858,655	3,948,531	4,052,658
SHARES										
Claims in U.S. dollars	69.3	71.0	71.0	71.4	67.1	65.9	65.8	65.5	66.1	66.4
Claims in Pound Sterling	2.7	2.9	2.8	2.7	2.8	2.8	3.4	3.6	3.6	3.7
Claims in Deutschemerk	13.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Claims in French Francs	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Claims in Japanese Yen	6.2	6.4	6.1	5.1	4.4	3.9	3.8	3.8	3.6	3.7
Claims in Swiss Francs	0.3	0.2	0.3	0.3	0.4	0.2	0.2	0.2	0.1	0.1
Claims in Netherlands Guilders	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Claims in ECUs	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Claims in Euros	0.0	17.9	18.4	19.3	23.9	25.3	25.0	25.1	24.9	24.4
Claims in Other Currencies	4.5	1.6	1.5	1.2	1.4	1.9	1.8	1.8	1.7	1.8
Allocated	78.0	77.2	78.2	76.3	74.4	73.5	70.4	69.4	68.6	67.6
Unallocated	22.0	22.8	21.8	23.7	25.6	26.5	29.6	30.6	31.4	32.4

Table 2 (Continued)

(In Millions of U.S. dollars)

	1998Q4	1999Q4	2000Q4	2001Q4	2002Q4	2003Q4	2004Q4	2005Q1	2005Q2	2005Q3
DOLLAR AREA COUNTRIES 2/										
Claims in U.S. dollars	524,483	600,008	708,846	770,549	829,133	1,072,841	1,317,584	1,329,665	1,357,342	1,377,925
Claims in Pound Sterling	16,093	20,322	20,304	21,000	24,100	30,778	42,371	45,061	44,639	48,229
Claims in Deutschemark	44,023	0	0	0	0	0	0	0	0	0
Claims in French Francs	6,002	0	0	0	0	0	0	0	0	0
Claims in Japanese Yen	30,019	37,760	41,381	35,500	36,105	40,687	50,889	53,212	51,313	51,889
Claims in Swiss Francs	486	937	1,609	1,795	1,880	1,789	1,780	1,768	1,798	1,801
Claims in Netherlands Guilders	670	0	0	0	0	0	0	0	0	0
Claims in ECUs	5	0	0	0	0	0	0	0	0	0
Claims in Euros	0	104,054	124,298	135,482	194,652	263,161	320,693	331,866	336,645	322,648
Claims in Other Currencies	39,277	9,246	7,570	6,138	8,775	19,580	17,613	19,944	19,422	23,726
Allocated	661,058	772,327	904,008	970,464	1,094,647	1,428,836	1,750,929	1,781,515	1,811,158	1,826,218
Unallocated	305,304	347,489	361,604	429,630	566,377	769,863	1,063,313	1,136,537	1,191,592	1,258,393
SHARES										
Claims in U.S. dollars	79.3	77.7	78.4	79.4	75.7	75.1	75.3	74.6	74.9	75.5
Claims in Pound Sterling	2.4	2.6	2.2	2.2	2.2	2.2	2.4	2.5	2.5	2.6
Claims in Deutschemark	6.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Claims in French Francs	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Claims in Japanese Yen	4.5	4.9	4.6	3.7	3.3	2.8	2.9	3.0	2.8	2.8
Claims in Swiss Francs	0.1	0.1	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1
Claims in Netherlands Guilders	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Claims in ECUs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Claims in Euros	0.0	13.5	13.7	14.0	17.8	18.4	18.3	18.6	18.6	17.7
Claims in Other Currencies	5.9	1.2	0.8	0.6	0.8	1.4	1.0	1.1	1.1	1.3
Allocated	68.4	69.0	71.4	69.3	65.9	65.0	62.2	61.1	60.3	59.2
Unallocated	31.6	31.0	28.6	30.7	34.1	35.0	37.8	38.9	39.7	40.8

Table 2 (Concluded)
(In Millions of U.S. dollars)

	1998Q4	1999Q4	2000Q4	2001Q4	2002Q4	2003Q4	2004Q4	2005Q1	2005Q2	2005Q3
EURO AREA COUNTRIES 3/										
Claims in U.S. dollars	83,550	88,676	84,174	81,444	100,085	127,678	140,034	142,558	140,336	145,101
Claims in Pound Sterling	8,593	9,727	11,434	11,831	14,678	14,536	26,281	27,012	27,335	27,476
Claims in Deutschemark	75,438	0	0	0	0	0	0	0	0	0
Claims in French Francs	10,903	0	0	0	0	0	0	0	0	0
Claims in Japanese Yen	14,592	12,698	18,385	11,702	11,969	13,209	14,014	15,303	14,150	13,641
Claims in Swiss Francs	1,459	1,261	227	112	321	529	1,027	1,117	965	906
Claims in Netherlands Guilders	1,749	0	0	0	0	0	0	0	0	0
Claims in ECUs	7,010	0	0	0	0	0	0	0	0	0
Claims in Euros	0	107,903	120,236	132,259	185,493	227,333	263,313	266,836	260,487	264,003
Claims in Other Currencies	8,392	3,911	4,032	3,497	5,568	7,544	10,605	10,118	8,845	9,197
Allocated	211,686	224,175	238,488	240,846	318,115	390,829	455,274	462,944	452,117	460,324
Unallocated	6,256	9,012	6,847	5,690	1,707	2,251	2,893	2,663	2,669	1,821
SHARES										
Claims in U.S. dollars	39.5	39.6	35.3	33.8	31.5	32.7	30.8	30.8	31.0	31.5
Claims in Pound Sterling	4.1	4.3	4.8	4.9	4.6	3.7	5.8	5.8	6.0	6.0
Claims in Deutschemark	35.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Claims in French Francs	5.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Claims in Japanese Yen	6.9	5.7	7.7	4.9	3.8	3.4	3.1	3.3	3.1	3.0
Claims in Swiss Francs	0.7	0.6	0.1	0.0	0.1	0.1	0.2	0.2	0.2	0.2
Claims in Netherlands Guilders	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Claims in ECUs	3.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Claims in Euros	0.0	48.1	50.4	54.9	58.3	58.2	57.8	57.6	57.6	57.4
Claims in Other Currencies	4.0	1.7	1.7	1.5	1.8	1.9	2.3	2.2	2.0	2.0
Allocated	97.1	96.1	97.2	97.7	99.5	99.4	99.4	99.4	99.4	99.6
Unallocated	2.9	3.9	2.8	2.3	0.5	0.6	0.6	0.6	0.6	0.4

Sources: IMF COFER Database and Staff Estimates.

1/ Includes the United States and EMU.

2/ Asia plus Western Hemisphere plus various countries which largely peg to the dollar; excludes United States and EMU.

3/ Countries around EMU plus several countries on African Continent; excludes United States and EMU.

Figure 1: Shares of the Dollar and Euro in Foreign Exchange Reserves

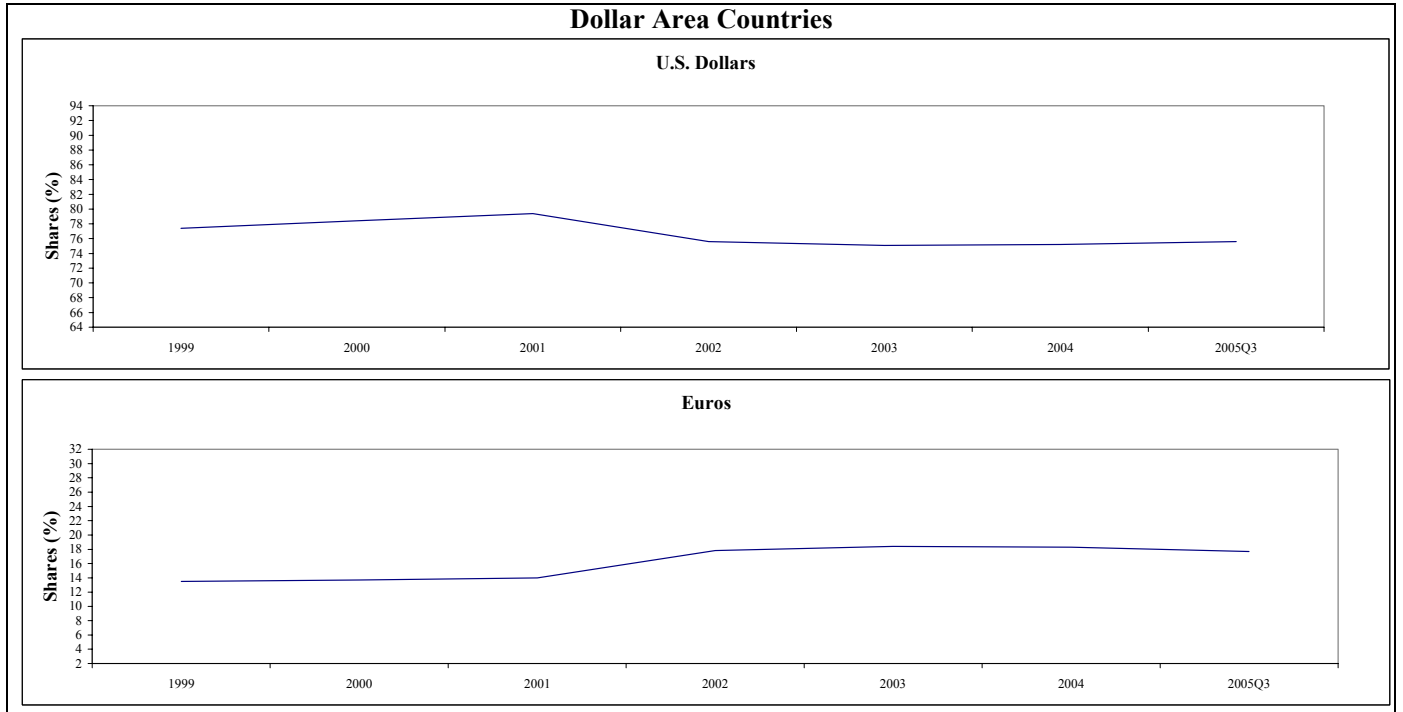
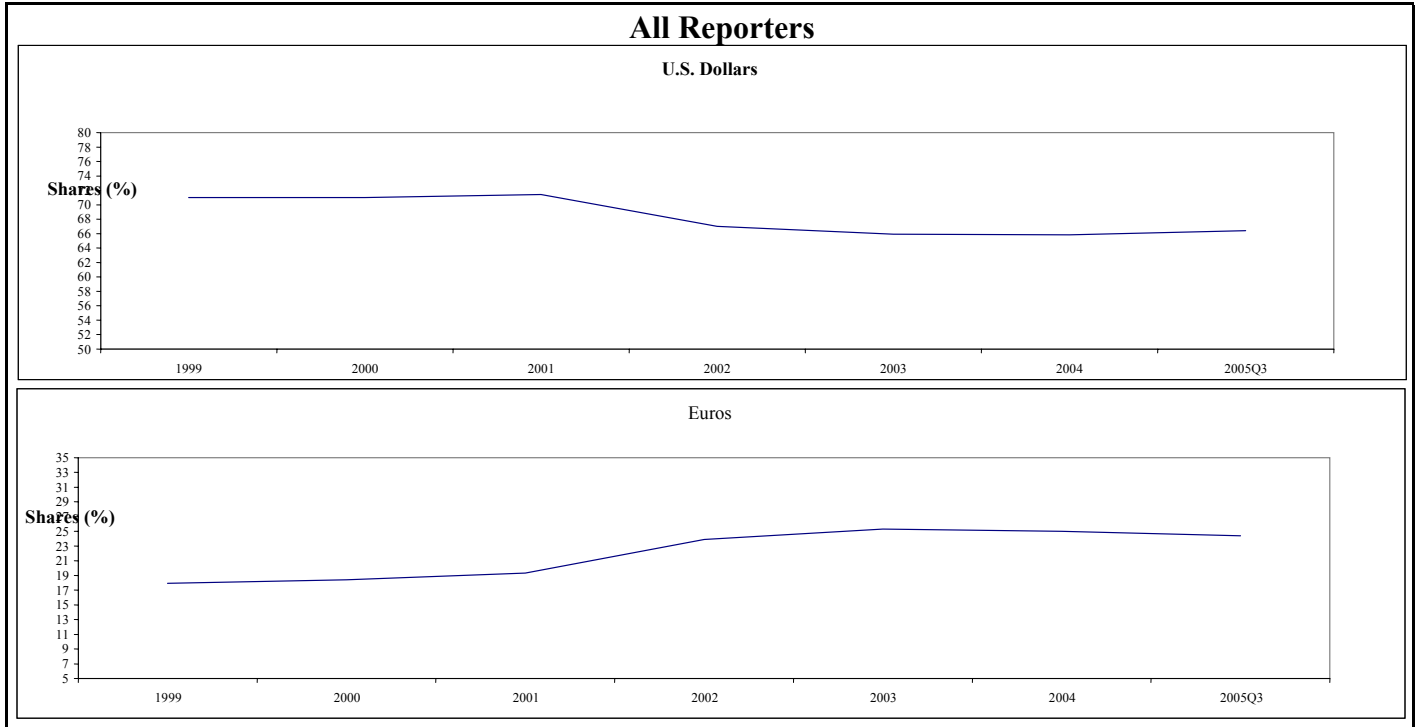
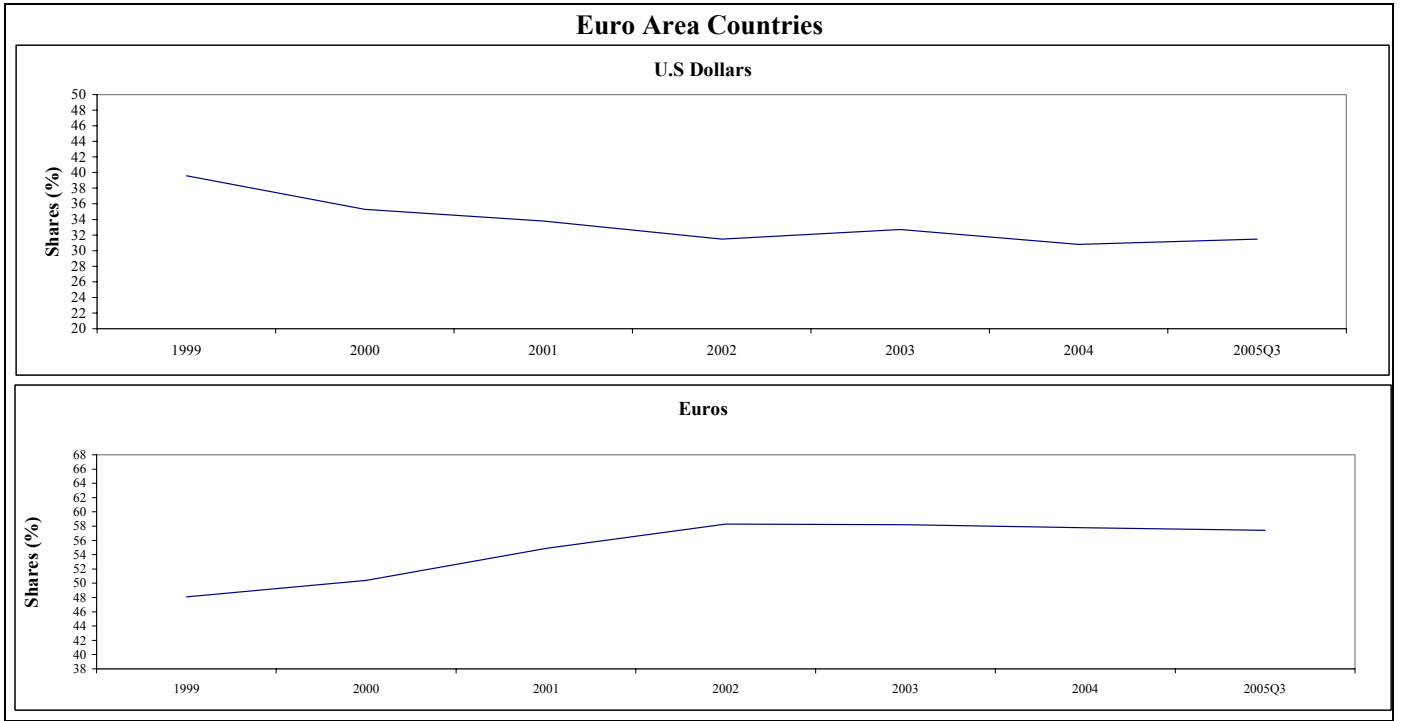


Figure 1:(Concluded)



Since neither precise criteria nor any existing international classification of dollar versus euro area countries exist as yet, our classifications are imprecise. Our goal, however, is to examine broad trends in the currency preferences of each type of country—particularly differences. This is in order to assess McKinnon’s notion of *conflicted virtue* and whether (and how strongly) the dollar and the euro dominate reserve holdings within their respective domains.

All reporters: broad diversification trends

Table 2, Panel 1 shows that the euro’s share for all reporters has risen steadily since its introduction—from 18 percent of allocated reserves in 1999 to 24 1/2 percent in 2005Q3 (a rise of 6 1/2 percentage points). Meanwhile, the dollar’s share has fallen from 71 percent to 66 1/2 percent (a fall of 4 1/2 points) / (see also Chart 1).

The data thus confirm that reserve portfolios have indeed diversified¹⁶ out of dollars into euros. Significantly, this result holds even if the euro’s share is compared to the estimate of about 17 percent for the share of all legacy currencies in 1998 (see Box 3). However, the pace of diversification appears to have slowed, since the dollar’s share has held around 66 percent and the euro’s share about 25 percent since 2003Q4. As of 2005Q3, the dollar’s share was almost three times larger than the euro’s.

The other significant development is a 2 1/2 point decline in the yen’s share (6 1/2 percent to 4 percent), indicating the euro’s gain has also occurred at the expense of the yen.

Dollar and euro area reporters: broad diversification trends

Panels 2 and 3 of Table 2 show the data for the dollar and euro area reporters, respectively. Together, they account for 83 percent of the allocated reserves of all reporters.¹⁷ As noted, the purpose here is to examine how the preferences of the two groups may be different.

The data show that the *direction* of diversification is largely the same as for all reporters. Both groups of countries diversified out of dollars into euros; and both diversified out of yen.

¹⁶ Diversification is defined in terms of changes in currency shares, not absolute amounts. The focus is on value shares (inclusive of valuation effects) because we are interested in portfolio choices in the context of current prices. That is, how are reserve portfolios being allocated given existing exchange rates. To take an example, assume that the dollar depreciates against the euro, and the euro’s share rises due to the valuation change. If the higher euro and lower dollar shares are not optimal, the investor can sell some euros to rebalance the portfolio and achieve the desired mix under current prices.

¹⁷ Allocated reserves in the euro area are 25 percent of those in the dollar area.

Box 3: Immediate Impact of the Euro

To assess the *immediate* impact of the euro (i.e., whether the euro holdings in 1999 were significantly higher than the legacy currency holdings in 1998), the data in Table 2, Panel 1 must first be adjusted for these reasons: (1) the 1998 data are not directly comparable with 1999 data because they include the legacy currencies held by EMU countries; these became domestic currency in 1999, thus imparting an artificial downward bias to 1999's data; (2) the data for the legacy currencies in 1998 and before are incomplete because they cover only four currencies—DM, French francs, Netherlands guilders, and the ECU; holdings of other currencies like the lira are not available but are hidden in “other currencies;” and (3) the data for “other currencies” appear overly large in 1998 compared to 1999 suggesting either that item (2) is large or there may be other misclassification problems with the 1998 data.

The share of all legacy currencies in 1998 is estimated as follows: First, the EMU holdings of DM, French francs, Netherlands guilders, and ECUs are subtracted from the 1998 data; this results in a fall in the share of these currencies from 17 percent in Table 2, Panel 1 to 14.4 percent. Second, an estimate is made for the other legacy currencies and any data misclassification in the “other currencies” category. The simplest is to assume that the “true” share of “other currencies” in 1998 is about its average in 1999-2004 or 1.6 percent. Since the 1998 share for “other currencies” in Table 2, Panel 1 is 4.5 percent, that leaves 2.9 percentage points to be allocated. By allocating the full 2.9 percentage points to legacy currencies (both unidentified legacy currencies and any misclassification of the four identified legacy currencies), we derive a maximum estimate for legacy currencies in 1998 of 17.3 percent (14.4+2.9). Similarly, by allocating nothing (of the 2.9 points) to legacy currencies, we derive a minimum estimate of 14.4 percent. Knowing the type of problems that exist with the 1998 data, our best guess is that the true share probably lies closer to maximum estimate, say about 17 percent. Since the euro's share in 1999 is 17.9 percent, this exercise suggests there was likely some *immediate* but very modest impact. The results are similar when the procedure is applied to the euro and dollar area subsamples.

The dollar area increased its euro share from 13 1/2 percent in 1999 to 17 1/2 percent in 2005Q3, offset by a decline in the dollar's share from 77 1/2 percent to 75 1/2 percent, and the yen's share from 5 percent to 3 percent (Table 2, Panel 2; Chart 1).

Similarly, the euro area increased its euro share from 48 percent to 57 1/2 percent, offset by a decline in the dollar's share from 39 1/2 percent to 31 1/2 percent, and the yen's share from 5 1/2 percent to 3 percent (Table 2, Panel 3).¹⁸ Where these reporters differ are mainly in the size of the diversifications and the relative shares of their dollar and euro holdings.

¹⁸ Part of the yen decline went into pound sterling (which increased 1 1/2 points to 6 percent).

Differences: size of the diversifications

The dollar's decline of 2 points in the dollar area was quite limited compared to its 8-point decline in the euro area. Similarly, the euro's increase of 4 points in the dollar area was more limited compared to its 9 1/2-point increase in the euro area.

Differences: relative shares of dollar/euro holdings

The dollar and euro area each held significantly higher levels of their key international currency. At 2005Q3, the dollar area held 75 1/2 percent of its reserves in dollars and 17 1/2 percent in euros, while the euro area held 57 1/2 percent in euros and 31 1/2 percent in dollars.

Assessment

The data indicate that the euro, as the unified currency, has been more attractive to official investors than the previous legacy currencies taken together. The significant advance (7 1/2 points compared to the estimated legacy currencies' share in 1998) underscores two points:

First, it fits with the theory that there is likely to be more than one important investment currency at any one time and, thus, greater scope for the euro as an international store of value. Second, it confirms the BME's prediction of significant diversification effects, although the extent was probably not as large as BME might have expected.

The data show the diversification effect has not been greater, because the dollar area countries have been relatively slower in diversifying into euros (up 4 points). That is, while the euro area countries quickly accumulated euros by diversifying out of dollars, the dollar area countries have tended to hold on to their dollars, limiting its share decline to 2 points.

The limited decline reflected two developments: First, the dollar reporters financed half their diversification into euros by diversifying out of another currency, the yen (down 2 points). Second, their appetite for dollars was substantial. During 1999-2005Q3, they allocated 74 percent of their \$1.05 trillion increase in allocated reserves towards dollars, absorbing 93 percent of the combined increase in dollar reserves in both the dollar and euro areas.

The way these reporters absorbed most of the additional dollars in the system—in the face of the growing net debtor status of the United States—is consistent with McKinnon's notion of *conflicted virtue*, which argues that dollar accumulation by creditor countries has a **rational** basis. However, the dollar area's tendency to accumulate dollars also implies a more muted diversification into euros, and preservation of the dollar's role as the dominant reserve currency as of 2005Q3.

The data confirm that each currency is **dominant** within its domain. This is consistent with the general expectation as well as with the notion of an international currency as broad nominal anchor. In relative terms, the dollar appears more dominant within its domain, comprising 75 1/2 percent of reserves, compared to 57 1/2 percent for the euro in the euro area. Concomitantly, the dollar had a larger share in the euro area (31 1/2 percent share) than the euro in the dollar area (17 1/2 percent share).

Does the disparity in dominance suggest that further adjustment is likely, or does the current configuration of holdings represent some rough equilibrium under present conditions? It is difficult to determine either way. One may be tempted to conclude that some rough equilibrium has been reached because (1) the dollar and euro shares appear to have stabilized since 2003; (2) the disparity in dominance may merely reflect the larger size of the dollar area, implying a greater relative need to transact with dollars; and (3) the dollar's exchange rate against the euro, which declined rather steeply from 2002, has reversed itself in late 2005 (Table 1). However, conditions can change radically if perceptions change, as per Eichengreen, and the U.S. current account deficit has thus far shown no signs of slowing down.

Overall, the developments in reserves data have largely confirmed the BME view regarding diversification effects, although the tendency of each currency domain to favor its own international currency (as stressed by the MKC view) appears to have limited the worldwide diversification into euros, and preserved the dollar's role as the dominant reserve currency.

B. Foreign Exchange and International Bond Markets

This section examines the data in foreign exchange and international bond markets. It updates in large part the discussion in Kenen (2002, 2003) using data from the 2004 BIS Triennial Central Bank Survey of Foreign Exchange Market Activity and September 2005 Quarterly Review.

Foreign exchange markets

Kenen (2002, 2003) shows the dollar dominated foreign exchange markets in 2001, two years after the euro's introduction. It was involved in 90 percent of foreign exchange trading, compared to 87 percent in 1998 (Table 3). In addition, the euro's trade with *third currencies* (e.g., the yen and the pound) was less than that of DM in 1998.

The situation is unchanged in 2004. The dollar was involved in 89 percent of all trades, the euro in 37 percent, both one point lower than in 2001 (Table 3).¹⁹ Chart 2 shows the structure of trading activity in 2004. The dollar's continued dominance as a vehicle currency is reflected in these numbers: dollar-euro trades make up 28 percent²⁰ of total trades; dollar-yen, 17 percent; dollar-sterling 14 percent; and dollar with all others, 30 percent (Table 3, memo items). Altogether, dollar trades with third currencies (besides the euro) make up

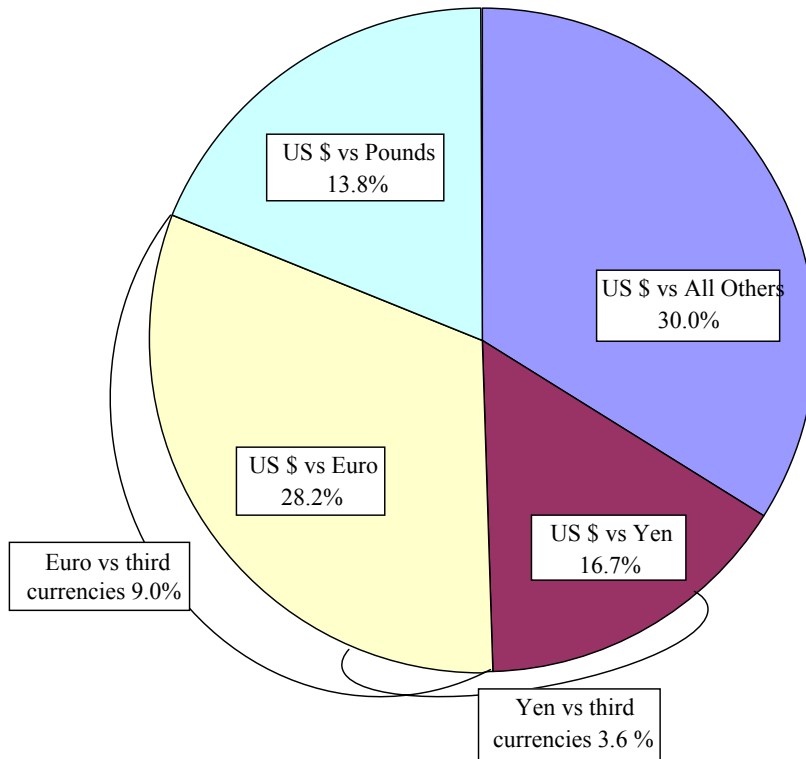
¹⁹ These percentages add to 200 because of double counting in turnover data. For instance, suppose there is only one transaction in a period—US\$100 dollar for euros. Total transactions in the period then equal US\$100, but total dollar and total euro trades are recorded as being equal to US\$100 each.

²⁰ Euro-dollar trades make up 32 percent of total dollar trades; hence, euro-dollar trades are 0.32×89 percent of total trades.

Table 3. Foreign Exchange Turnover

	April 2004		April 2001		April 1998	
	\$ millions	Percent	\$ millions	Percent	\$ millions	Percent
US dollar	1,572,918	88.7	1,060,441	90.4	1,260,000	87.4
Euro/Legacy Curr.	659,361	37.2	441,545	37.6	752,262	52.2
Yen	359,231	20.3	266,050	22.7	300,064	20.8
Sterling	299,417	16.9	155,309	13.2	157,906	11.0
Swiss franc	107,705	6.1	71,053	6.1	100,975	7.0
Other	547,918	30.9	351,734	30.0	311,851	21.6
Total	1,773,275	200.0	1,173,066	200.0	1,441,529	100.0
US dollar	1,572,918		1,060,441		1,260,000	
Against:						
Euro/Legacy Curr.	500,533	31.8	354,006	33.4	540,753	42.9
Yen	295,786	18.8	231,413	21.8	266,638	21.2
Sterling	244,717	15.6	125,490	11.8	117,664	9.3
Swiss Franc	78,235	5.0	57,084	5.4	78,615	6.2
Euro	659,361		441,545		429,952	29.8
Against:						
US dollar	500,533	75.9	354,006	80.2	290,480	67.6
Third Currencies	158,828	24.1	87,539	19.8	47,977	11.2
					91,495	21.3
Memorandum Items						
US\$ Vs. Euro		28.2		30.2		
US\$ Vs. Yen		16.7		19.7		
US\$ Vs. Sterling		13.8		10.7		
US\$ Vs. All Others		30.0		29.8		
Euro Vs. Third Curr		9.0		7.5		
Yen Vs. Third Curr		3.6		3.0		
Euro Vs. Yen		2.9		2.6		
Euro Vs. Sterling		2.4		2.1		

Source: BIS Triennial Central Bank Survey of Foreign Exchange Market Activity, 1998, 2001, 2004

Figure 2: Structure of Trading in Foreign Exchange Markets: 2004

61 percent of total trades, up slightly from 60 percent in 2001. On the other hand, most of the euro's trades (76 percent) continue to be with the dollar, leaving euro trades with third currencies at only 9 percent (37 – 28) of total trades, up slightly from 7.5 percent in 2001.

Trades involving either the euro or the dollar in one leg make up almost 98 percent (89 + 9) of total trades; while trades involving either the dollar or the yen (the third largest currency) in one leg make up 92 percent (89 + 3) of total trades (since yen trades with third currencies make up about 3 percent of total trades). The outsized shares of either combination mainly reflect the dollar's large role, since most yen and euro trades tend to go through the dollar.

The dollar's dominance as a vehicle currency is accentuated in Table 4, which shows that it dominates activity even within European markets. Its share of total trade was 87 percent in 2004, compared to 45 percent for the euro. Outside Europe, the euro's share falls sharply.

These findings are consistent with the stylized facts that network externalities/path dependence will tend to “lock in” the dominance of the network good, here, the dollar. The historical association between vehicles and large economies is, thus far, an insufficient condition for ensuring a currency's vehicle status. Despite the euro's stable value and association with Europe's large economic size, the euro has not advanced as a vehicle currency in foreign exchange markets. The developments in foreign exchange markets support the MKC view.

International bond markets

An area where the euro has made the largest impact might be in international bond markets. Table 5 shows BIS data on the net issues of international bonds and notes for all issuers, issuers resident in EMU countries, issues denominated in dollars, and in euros for 1997–2005H1 (first half). Following the euro's introduction, net issues of euro-denominated bonds more than doubled in 1999 and trended upwards to reach \$923 billion in 2004, almost double the issues in 1999. In turn, the share of euro/legacy bonds increased from 33 percent of total in 1998 to 59 percent in 2004, while the share of dollar-denominated bonds declined in proportion from 60 percent to 24 percent.

The surge in euro issues was sparked by the unified currency. On the demand side, the creation of the euro relaxed a tight currency constraint on EMU investors. Large institutional investors previously were limited in their holdings of bonds from other EMU countries, owing to restrictions on foreign currency exposure. Now they were free to buy those bonds without incurring any exposure. On the supply side, European corporations had incurred large bank debts from mergers and acquisitions in anticipation of monetary union. They now took the opportunity to pay off the short-term bank debts by issuing the longer dated euro-denominated bonds (Kenen, 2003) (McKinnon, 2000).

One possible *caveat* to the above, however, is that the surge in euro-denominated bonds appears to reflect mostly issues from EMU residents. Table 5 shows that net issues from EMU residents increased from 26 percent of total net issues in 1998 to 53 percent in 2004, tracking closely the increase in euro-denominated issues from 33 percent of total to

Table 4. Foreign Exchange Turnover by Country and Currency

WITHIN EUROPE	Daily Averages in millions of US dollars														
	April 2004					April 2001					April 1998				
	Total	US dollar	Euro	Yen	Sterling	Total	US dollar	Euro	Yen	Sterling	Total	US dollar	Curr.	Yen	Sterling
Austria	13,298	8,495	9,332	3,036	779	7,950	6,670	5,594	1,131	379	10,488	8,082	6,206	368	517
Belgium	19,678	17,019	11,157	1,235	5,012	10,051	8,815	6,010	797	1,446	26,534	20,900	7,466	1,780	1,912
France	64,002	56,667	37,478	6,373	11,232	47,972	44,466	34,917	4,955	4,072	71,896	58,834	24,420	5,055	4,447
Germany	117,531	94,773	65,537	18,763	14,373	88,469	75,808	56,368	16,060	9,348	94,281	80,794	62,145	7,738	7,313
Italy	19,966	17,197	15,158	1,968	2,925	16,950	14,060	12,948	3,880	1,042	28,196	21,265	6,647	755	1,689
Luxembourg	14,466	12,037	7,922	2,175	1,964	12,908	11,233	7,840	1,824	1,413	22,159	15,841	10,799	1,174	1,184
Netherlands	48,929	45,860	27,831	4,825	6,660	29,985	25,565	22,247	3,364	2,566	41,039	30,903	15,503	2,123	3,030
Spain	13,573	10,972	10,269	963	3,785	7,579	6,919	6,583	390	359	19,318	16,650	5,079	394	546
Denmark	40,903	34,359	15,356	2,048	2,603	23,294	19,473	7,920	1,019	1,085	27,283	23,246	6,953	685	1,069
Norway	14,390	11,782	3,971	182	576	12,841	11,282	4,266	690	359	8,807	7,320	3,012	299	534
Sweden	30,820	20,611	10,219	809	2,194	24,076	15,297	7,723	962	1,508	15,356	10,639	5,352	750	819
Switzerland	79,192	66,900	36,189	8,295	12,178	70,824	60,793	31,571	10,473	5,733	81,719	67,947	28,431	11,161	6,265
United Kingdom	753,009	674,059	316,547	112,514	209,468	504,429	462,094	207,268	87,698	122,852	637,309	558,215	205,577	91,355	114,817
Russia	29,792	26,337	5,859	556	1,340	9,589	9,438	860	163	175	6,763	6,529	1,220	213	332
TOTAL	1,259,549	1,097,068	572,825	163,742	275,089	866,917	771,913	412,115	133,406	152,337	1,091,148	927,165	388,810	123,850	144,474
(In Percent)															
Austria	64	70	23	6	6	84	70	14	5	5	77	59	4	5	5
Belgium	86	57	6	25	14	88	60	8	14	14	79	28	7	7	7
France	89	59	10	18	8	93	73	10	8	8	82	34	7	6	6
Germany	81	56	16	12	11	86	64	18	11	11	86	66	8	8	8
Italy	86	76	10	15	6	83	76	23	6	6	75	24	3	6	6
Luxembourg	83	55	15	14	11	87	61	14	11	11	71	49	5	5	5
Netherlands	94	57	10	14	9	85	74	11	9	9	75	38	5	7	7
Spain	81	76	7	28	5	91	87	5	5	5	86	26	2	3	3
Denmark	84	38	5	6	4	84	34	4	4	4	85	25	3	4	4
Norway	82	28	1	4	3	88	33	5	3	3	83	34	3	3	3
Sweden	67	33	3	7	6	64	32	4	6	6	69	35	5	5	5
Switzerland	84	46	10	15	8	86	45	15	8	8	83	35	14	8	8
United Kingdom	90	42	15	28	24	92	41	17	24	24	88	32	14	14	14
Russia	88	20	2	4	2	98	9	2	2	2	97	18	3	5	5
TOTAL	87	45	13	22	18	89	48	15	18	18	85	36	11	13	13

Table 4 (Concluded)

OUTSIDE EUROPE	Daily Averages in millions of US dollars						(In Percent)								
	April 2004			April 2001			April 1998			Legacy Currencies.					
	Total	US dollar	Euro	Yen	Sterling	Total	US dollar	Euro	Yen	Sterling	Total	US dollar	Yen	Sterling	
Australia	80,793	75,210	16,127	12,026	6,015	51,886	50,037	6,706	7,930	3,654	46,586	44,089	7,595	8,269	2,861
Canada	53,926	51,443	9,492	5,061	4,246	41,646	40,088	6,559	3,590	3,276	36,796	35,689	5,494	2,705	1,667
Japan	198,870	177,214	38,924	139,632	14,561	146,780	135,069	25,934	109,708	4,961	148,577	136,416	18,038	124,045	5,308
United States	461,291	422,750	175,043	103,742	61,125	253,654	236,436	100,111	67,622	25,901	350,863	315,872	121,642	85,788	35,880
Hong Kong SAR	102,162	95,971	26,778	22,435	11,241	66,823	64,618	11,505	13,933	3,856	78,555	73,030	17,913	21,264	8,289
Korea	19,808	19,367	1,175	1,445	238	9,597	9,473	307	700	74
Singapore	125,269	118,678	34,262	28,029	14,920	100,655	95,907	28,549	26,016	9,303	138,986	131,709	28,037	32,392	7,992
Mexico	14,565	14,549	83	11	37	8,574	8,568	7	7	5	8,622	8,619	30	8	13
South Africa	9,693	9,422	1,225	263	634	9,847	9,475	920	279	435	8,848	8,168	673	343	615
TOTAL	1,066,377	984,604	303,109	312,644	113,017	689,462	649,671	180,598	229,785	51,465	817,833	753,592	199,422	274,814	62,625
Australia		93	20	15	7		96	13	15	7		95	16	18	6
Canada		95	18	9	8		96	16	9	8		97	15	7	5
Japan		89	20	70	7		92	18	75	3		92	12	83	4
United States		92	38	22	13		93	39	27	10		90	35	24	10
Hong Kong SAR		94	26	22	11		97	17	21	6		93	23	27	11
Korea		98	6	7	1		99	3	7	1	
Singapore		95	27	22	12		95	28	26	9		95	20	23	6
Mexico		100	1	0	0		100	0	0	0		100	0	0	0
South Africa		97	13	3	7		96	9	3	4		92	8	4	7
TOTAL		92	28	29	11		94	26	33	7		92	24	34	8

Source: BIS Triennial Central Bank Survey of Foreign Exchange Market Activity, 1998, 2001, 2004

Note: Curr. = Legacy Currencies.

Table 5: Net Issues of International Bonds and Notes

	(In billions of U.S. dollars)								
	1997	1998	1999	2000	2001	2002	2003	2004	2005H1
All Issuers	555	669	1,149	1,091	1,427	1,009	1,389	1,552	966
EMU	131	174	376	362	530	453	741	825	602
Austria	5	9	9	15	18	16	23	21	26
Belgium	3	-1	10	5	11	9	14	17	14
Finland	-3	-4	-1	0	3	5	14	11	7
France	18	28	70	62	91	54	112	86	75
Germany	35	56	121	111	207	171	199	248	131
Greece	1	2	1	3	4	11	11	16	26
Ireland	12	4	9	7	13	13	64	89	66
Italy	5	10	19	44	49	51	76	129	66
Luxembourg	4	5	14	10	28	15	31	26	26
Netherlands	45	56	107	87	87	67	106	45	38
Portugal	3	1	1	6	5	8	6	2	4
Spain	5	8	17	11	14	33	84	135	124
Euro or Legacy Currencies	130	220	518	425	624	495	786	923	623
Dollar	325	403	544	554	705	436	442	372	186
U.S.	180	232	478	466	595	341	259	204	81
	(In Percent)								
Euro Issues/All Issuers	23	33	45	39	44	49	57	59	64
Dollar/All Issuers	59	60	47	51	49	43	32	24	19
EMU/All Issuers	24	26	33	33	37	45	53	53	62
Euro Issues/EMU	99	126	138	117	118	109	106	112	104
Dollar Issues/U.S.	181	174	114	119	118	128	171	183	230

Source: BIS Quarterly Review, Various Issues.

59 percent. If the euro-denominated issues should represent mainly bonds issued by EMU residents (as the close correspondence in the data suggests) and *purchased by EMU financial institutions and institutional investors*, it may be argued that these bonds should be classified as “domestic” bonds for comparative purposes—since dollar bonds issued and bought by residents within the United States monetary union are considered to be domestic bonds. Overall, however, developments in international bond markets fully support the BME view, subject to the caveat above.

VI. MEDIUM-TERM PROSPECTS FOR THE EURO

Having assessed the current situation, we consider now the euro’s medium-term prospects—15 to 20 years down the road. Again, we turn to our economists and their views. According to them, the euro’s medium-term prospects depend on four factors, and how they will in turn impact the facilitating factors.

The first factor is **structural reforms** in Europe. While applauding the euro’s “spectacular success,” Bergsten (2004) notes that Europe has failed to “follow up the creation of the euro with the complementary policy reforms...needed to assure the success of overall [EMU] (p. 3);” “further integrate its money and capital markets”; and “improve its economic performance.” Such reforms are needed to develop well-diversified, liquid financial markets (FF.B) to match the strength of American financial markets. In addition, dynamic growth and a competitive economy (FF.A) could increase foreign interest in the euro by setting “in motion a self-reinforcing cycle of euro appreciation and increased portfolio diversification into euros by both private and official holders (p. 6).”

The importance of structural reforms is also affirmed by Bordo (2003) and Dwyer and Lothian (2003). Bordo states that real side integration, particularly of labor markets, has substantially lagged monetary integration (union) because of the existence of legal, cultural, language, and institutional barriers. Without the reforms to improve economic flexibility and integration, Dwyer and Lothian reiterate that cross-country differences in cyclical behavior may create severe strains on the system (FF.D), which will be detrimental to the euro’s prospects.

The second factor is **membership** and economic size (FF.A). Who will join EMU in the future? Bergsten (2004) argues that an expansion of EMU to include the original 15 as well as the 10 new members of the European Union would make EMU 20-30 percent larger than the United States in terms of output. Using simulations based on econometric estimates, Chinn and Frankel (2005) project that an EMU expansion including the United Kingdom, with its strong financial markets, could propel the euro to surpass the dollar as a reserve currency by 2022—even under assumptions that the value of the United States dollar does not deteriorate from end-2004.

The third is **financial innovation** that may weaken network externalities (FF.E). Eichengreen (2005) predicts that financial innovations will further reduce the cost of converting currencies and thus reduce the present network incentive to hold reserves in the same currency as held by other countries—in order to minimize transactions costs. In the coming decades, such changes in financial technologies, by weakening network effects, would likely result in a few

currencies becoming major reserve currencies, rather than just one presently, the dollar. Being the dollar's major competitor, the euro is the natural beneficiary.

Finally, the fourth and probably most significant factor is the possibility of **serious economic mismanagement** by the U.S. that undermines confidence in the dollar's value (FF.C) through *inflation and depreciation*. This view is shared by virtually all the participants—McKinnon (already mentioned above), Bergsten, Eichengreen, and Chinn and Frankel.

Bergsten (2004) states that “the United States might have to foul up for the euro to realize its potential to achieve rough parity with the dollar” because “inertia is so strong in financial affairs (p. 6).” Eichengreen (2005) states that British inflation in “conjunction with repeated devaluation against the dollar played a major role in sterling's loss of reserve currency status.” Chinn and Frankel (2005) find that by assuming a rate of dollar depreciation equal to that in 2001–04, their simulations project the euro overtaking the dollar in 17-19 years, regardless of whether Denmark, Sweden, or the United Kingdom join EMU.

And Eichengreen (2005) paints the scenario for mismanagement most often cited—one where “policies allow the unsustainably large current account deficits to persist, lead to the accumulation of large external debts, and result in a high rate of U.S. inflation and dollar depreciation (p. 20).” Such a scenario could then jeopardize the dollar's roles as both dominant vehicle and investment currency, and open up opportunities for other currencies like the euro.

VII. CONCLUSION

The Bergsten/Mundell/Eichengreen (BME) view stresses the importance of economic size and diversification effects, while the McKinnon/Kenen/Cooper (MKC) view stresses network externalities, strong financial markets, and the nominal anchor role of international currencies. In the last seven years, developments in reserves data have tended to support the BME view on diversification effects, although the tendency of the dollar area to accumulate dollars (stressed by the MKC view) has limited the size of the diversification and preserved the dollar's status as the dominant reserve currency. Data on international bonds have also tended to support the BME view, subject to a caveat (see above).

Data on foreign exchange markets appear conclusively to support the MKC view on the lock-in effects of network externalities. In some sense, the BME emphasis on Europe's large economic size makes the argument for the euro as a *plausible alternative* to the dollar but does not extend far enough to address the issue of network externalities and history. Interestingly, these developments have also borne out the predictions from economic theory, on network goods and portfolio diversification, that there would likely be more opportunities for the euro's international role as a store of value (reserve currency and international bonds).

There is no a priori reason to assume the euro's role as an international store of value would not advance further—although the pace of progress may depend on the various factors already spelled out above by our economists. Two factors, perhaps, deserve highlighting—the pace of structural reforms in the EMU and impact of U.S. current account deficits on the dollar's value.

Continuing structural reforms to integrate further EMU's financial ²¹ (such as the EU's Financial Services Action Plan and follow-up actions) and goods and labor markets would likely increase the euro's attractiveness for international investors—by further enhancing several facilitating factors—FF.A, FF.B, FF.D. It seems likely that diversification effects would continue over time to drive global demand for euro-denominated assets higher in relative terms.

The scope for the euro to advance as a vehicle currency appears much more limited for reasons already discussed—unless the scenario described by Eichengreen above occurs and the U.S. current account deficit begins to weaken as well as destabilize the dollar's value for a prolonged period. Then, as noted, the dollar's problems could open opportunities for other currencies like the euro to advance as both a vehicle and investment currency.

²¹ See IMF (2005) for information on the integration of European financial markets.

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