Robert Schuman

The Dollar, the Euro and Exchange Rate Regimes in Latin America

-Luis Miotti, Dominique Plihon and Carlos Quenan

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11. Is it possible to conceive a strategic partnership between the United States, the European Union and Russia?
12. Russia: a member of the European Union? Who would be interested in this association?

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The Dollar, the Euro and Exchange Rate Regimes in Latin America

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THE DOLLAR, THE EURO AND EXCHANGE RATE REGIMES IN LATIN AMERICA

Introduction

The creation of the euro on January 1st 1999 was one of the major economic events of the end of the 20th century. Completing a lengthy process of economic integration, the emergence of the European Monetary Union is likely to produce significant transformations in international monetary and financial relationships. This view is based on the economic weight of the euro zone, similar to the weight of the United States, and on the desire of the monetary authorities not to restrain the internationalisation process of the new European currency.

However, monetary history shows that the process of birth and decline of international currencies is very slow and subject to important inertia. This inertia is particularly important for the functions of medium of exchange and store of value. The two first years of existence of the euro confirm this view. They also seem to give some credit to the analyses, proposed before the creation of euro, which mentioned the possibility of an important role of the euro with respect to financial operations. These approaches also stressed the idea that the evolution of the international monetary system is related to the choice that will be made with respect to indebtment and investment currencies. In this respect, the significant growth of international bond issues in euro during the last two years is a very important fact. Latin America actively participated in the growth of the international euro bond market. This led us to study the long-term implications of this process of intensification of the financial relationships between Europe and Latin America, with a particular focus on exchange rate regimes.

As a matter of fact, we explore one aspect which has not been addressed much in recent studies on the euro and Latin America: the link between the emergence of the euro and the function of unit of account. This function is not limited to the denomination of international trade; it also deals with the use of international currencies as anchors for monetary policy. The euro already plays the role of an anchor (alone or in baskets) for about 50 countries. This concerns first African countries, but also a great number of Eastern European countries, some of which are candidates for future admission in the euro zone. One may foresee the existence of a duopoly, less and less asymmetry with respect to international currencies, with an increasing proportion of developing country currencies pegged on the euro and/or the dollar. One interesting question is whether the euro is likely to be used for pegging local currencies in countries that are already strongly dollarised.

This paper draws upon a study sponsored by ECLAC on "The Euro and Financial Relations between Latin America and Europe: Medium- and Long-Term Implications."[1]

[1] Luis Miotti , Carlos Quenan and Dominique Plihon, "The Euro and Financial Relations between Latin America and Europe: Medium- and Long-Term Implications," Series Macroeconomia del desarrollo, N° 13, Economic Development Division, ECLAC, March 2002.

The paper starts with a survey of recent debates on possible evolutions of the international monetary system (IMS) in the medium to long run as a result of the creation of the euro. The central part of our study deals with a theoretical and empirical analysis of the determinants of *de facto* monetary pegging, as opposed to *de jure* exchange rate regimes published by the IMF. We present an econometrical analysis of the determinants of *de facto* exchange rate regimes of 93 countries. We put a specific emphasis on Latin American countries.

The Euro and the IMS: Theoretical and Empirical Aspects

The appearance of the euro on the international scene marks the beginning of a new era in international monetary and financial relations. The deepening process of integration that began in the 1950s and the creation of the euro represent decisive steps on the long road toward a truly common European market. At the same time, given the economic weight of "Euroland" and the will demonstrated by the European authorities, the advent of the euro provides the possibility of instituting a new international currency capable of competing with the dollar. The scenario that seems most plausible, i.e., an increasing but gradual bipolarisation of the IMS, is very likely to give rise to greater exchange-rate volatility unless the U.S. and European authorities implement a strengthened monetary cooperation, which does not for the moment seem to be on the horizon.

Theoretical Framework

The impact of the creation of the euro on international monetary relations will depend largely on the degree of internationalisation of the European monetary unit. It is useful, therefore, to begin by distinguishing between the different private and public uses of currencies on an international level, and then present the conditions required to achieve the internationalisation of a currency as they are formulated and analysed in the economic literature. This will make it possible to use these analytical tools to evaluate the extent to which the euro is likely to become an internationally used currency.

A Typology of the International Use of Currencies

On the basis of the typology proposed by Krugman[2] and following the presentation made by Bénassy-Quéré, Mojon and Schor,[3] we can distinguish six types of international uses of a currency as a function of a twofold criterion: (1), the three traditional functions of currencies, and (2) the private and public use of currencies on an international scale (**Table 1**).

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[2] Paul Krugman, "The International Role of the Dollar: Theory and Prospects," in Currency and Crises, MIT Press, 1991.

[3] Agnes Bénassy-Quéré, Benoit Mojon and Armand-Denis Schor, "The International Role of the Euro," Document de travail, No. 98-03, CEPII, Paris, 1998.

Table 1: International Uses of a Currency

Function	Private use	Public use
Medium of exchange	Means of payment / vehicle currency	Intervention currency
Unit of account	Price-setting / invoicing currency	Reference currency (anchor)
Store of value	Investment and financing currency	Reserve currency

Source: Krugman (1991)

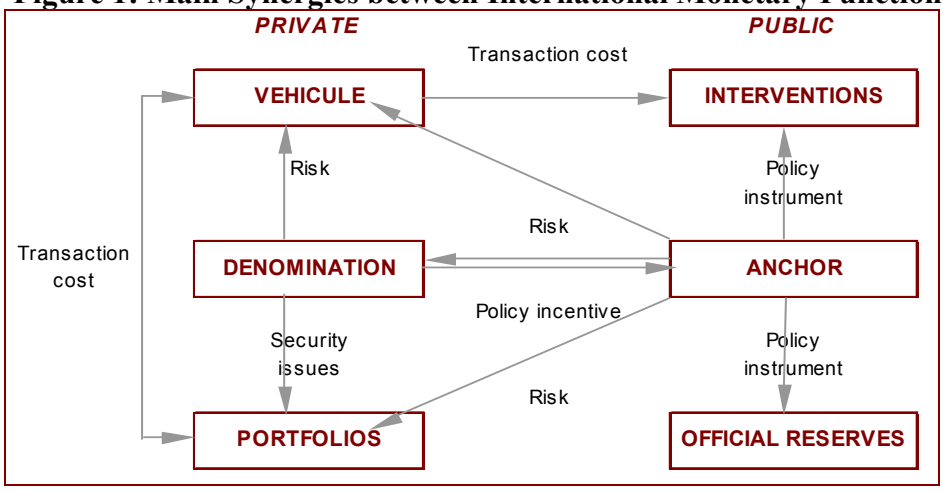
An international currency is used by non-residents as a medium of exchange in trade transactions and capital movements. Private agents use an international currency as a vehicle, i.e. as an intermediary between two second-ranking currencies. Thus, transactions between Brazil and Thailand are broken up into two separate moments: real/dollar and dollar/baht. In turn, monetary authorities also use international currencies as a medium of payment in their interventions in foreign-exchange markets.

Secondly, an international currency is used as a unit of account by private agents to invoice their trade or financial international transactions. This function is different from that of a medium of payment in the sense that one transaction can be denominated in one currency and then paid in another (distinction between invoicing currency and medium of payment). Monetary authorities also make use of the unit-of-account function in implementing their exchange policies when they decide to anchor their currencies to an international reference currency. This has to do with exchange system issues.

As a store of value, an international currency is used by private agents with the aim of preserving the value of their assets. They place their assets in different international currency denominations as part of their strategies to optimise their risk/yield ratio. In turn, monetary authorities manage the composition of their international reserves as a function both of their objective of optimising their risk/yield ratio and of the nature of their interventions in the foreign-exchange market.

These different international uses of currencies are separable but interdependent. Schematically, the interaction between these different uses can move along various channels (see **Figure 1**). For example, the decision adopted by the monetary authorities to give priority to certain currencies in the composition of international reserves (store-of-value function) can be conditioned in part by the choice of an anchoring mechanism with regard to these currencies (unit-of-account function).

Figure 1: Main Synergies between International Monetary Functions



Source: Bénassy-Quéré, Mojon and Schor (1998)

Another channel has to do with transaction costs. If a currency is used as a vehicle currency, transaction costs are low and the monetary authorities will tend to use it in their interventions, while private investors will try to procure assets denominated in that currency.

The degree of use of an international currency by a country can be very different depending on the above-mentioned functions: thus, the dollar may be chosen as the anchor currency by monetary authorities due to the overwhelming weight of the U.S. financial markets, even though the trade transactions of that same country may be denominated in other currencies. Likewise, it is possible to consider these functions hierarchically, i.e., the international medium of payment function is frequently considered to be the most important.[4]

Conditions for the Internationalisation of a Currency

According to Bourguinat,[5] two criteria should be taken into account:

- Stability—predictability of the currency;
- Acceptability—liquidity: In order to be international, a currency must be universally accepted; it should be a "vehicle" currency, in the sense that it is used by other countries in transactions that do not involve a direct relationship with the issuing country.

[4] Henri Bourguinat , "La concurrence des monnaies véhiculaires: vers le polycentrisme monétaire?" in Croissance, échange et monnaie en économie internationale, Mélanges en l'honneur de J. Weiller, Economica, Paris, 1985.
[5] Henri Bourguinat, "Les vertiges de la finance internationale," Economica, Paris, 1987.

Tavlas[6] proposes two complementary criteria:

- The country issuing the international currency should have a major weight in international trade, thus reinforcing the use of this currency by the other countries.
- The country issuing the international currency should have free, broad and deep financial markets, thus guaranteeing the liquidity of the currency and making it possible for the currency to play a store-of-value role for private and public participants.

These conditions are necessary but not sufficient to explain the reasons why international operators tend to favour one currency as a key currency. Some authors emphasise the role of transaction costs, economy of scale phenomena, positive externalities[7] and network effects.[8] These approaches make it possible to demonstrate the existence of self-reinforcing and inertial processes in the international use of currencies. From this point of view, the progress of the euro as an international currency should be gradual. In other words, the dollar should maintain its supremacy for a long while yet.

The International Weight of the Euro Zone: Overview

The weight of the euro zone relative to the American and the Japanese economies is one of the first empirical criterion to consider for the future role of the European currency in the international monetary system. If we compare the relative weights of the United States and the euro zone in the world economy, we can see that the euro zone has a greater weight in terms of population. At the same time, the weights of the euro zone and the United States are similar in terms of international trade, as shown in **Table 2**.

Table 2: Weight of the United States and the Euro Zone in the World Economy

	Population	GDP	Stock-market capitalisation		External openness
	(1)	(2)	(2)	% GDP	(3)
Euro Zone	302.80	5875.60	3709.80	56.80	19.00
United States	273.70	8590.10	11596.50	121.50	14.80
Japan	126.80	4223.20	2263.40	48.20	9.90

(1) Millions of inhabitants (2000) (2) Billions of dollars (2001)
(3) Exports/GDP in % (2000) *Source: World Bank, Eurostat, OECD*

On the other hand, if we adopt GDP and stock exchange capitalisation as criteria, the weight of the United States is greater. This basic statistical data can lead us to

[6] George Tavlas, "On the International Use of Currencies: The Case of the Deutsche Mark," Princeton University, Essays on International Finance, No. 181, March 1991.
[7] Peter Kenen, "Exchange rates and the international monetary system," Recherches Economiques de Louvain, Vol. 59, No. 1-2, 1992.
[8] Michel Aglietta and Pierre Deusy-Fournier, "Internationalisation des monnaies et organisation du système monétaire", Economie Internationale, No. 59, Paris, 1994.

consider that the euro has a strong potential to increase its share as an internationally used currency in the world economy.

Another relevant factor to be considered is the position of the European authorities with regard to the internationalisation of the euro. Knowing that history and economic theory show that progress in the international use of a currency has to be gradual, the European officials are not actively seeking to promote the internationalisation of the euro. Unlike Japan, however, which has also resisted internationalising the use of the yen (because the Japanese consider that it might disrupt the behaviour of their monetary policy), the European authorities do not oppose a growing internationalisation of the euro. Their position is that the zone's strategy in terms of monetary policy is sufficiently strong to face the implications of an increasing internationalisation of the euro currency.[9] Their position is, therefore, "neutral", and this in fact favours an increasing international use of the euro.

The Euro in the International Scene: A Difficult Beginning

A second empirical aspect of the international role of the euro is the strength of the European currency with respect to the dollar. Contrary to the predictions of a majority of specialists, the euro weakened substantially during its initial stages, and lost almost 30% of its value in the first few years of its existence. Three main groups of factors have been suggested to explain this:

1. Economic factors. A gap has developed between the U.S. economy, which has been experiencing an exceptionally prosperous phase, and the euro zone, in which the growth cycle began later and has been less strong. One of the consequences of this situation is an interest-rate differential that favours the dollar.

2. Financial factors, of a more structural nature. Although the United States is a major net importer of capital, the euro zone has been experiencing net outflows of long-term capital (portfolio investment and direct foreign investment) that far exceed its current-account surpluses since 1994. The United States has a growing current-account deficit (over 4% of GDP), with a favourable basic balance thanks to massive capital inflows. In turn, the euro zone has a current-account surplus (around 0.5% of GDP) together with an unfavourable basic balance due to this significant outflow of capital. The deepening European integration and the creation of the euro have contributed in part to this situation. European companies have been pressed to increase their critical size, which has led to mergers and acquisitions in the U.S. market (which is also the epicentre of the new economy). Moreover, European companies have begun to participate increasingly in the movement to achieve geographic diversification of their security portfolios: between 1998 and 2000 the volume of net purchases of foreign stock doubled.

3. Institutional factors. The implementation of the EMU has not clarified the situation in terms of economic governance of the euro zone. Uncertainty still reigns on

[9] Willem Duisenberg, "The International Role of the Euro," www.ecb.int, November 2002.

many levels, and from the viewpoint of foreign investors, the European Central Bank's policy is far from clear. This latter factor will probably be long-lasting; the strengthening of the European monetary authority entails a slow learning process.

Nevertheless, the recent nominal depreciation of the euro arose from the fact that the dollar was undervalued at the time the euro currency was created. In effect, most of the studies conducted on the basis of a fundamental equilibrium exchange rate (developed by Williamson),[10] indicate that on the date the euro was introduced, it was overvalued vis-à-vis the dollar by an estimated 7 to 10 percent.[11]

The definition of an equilibrium exchange rate is, however, complex. The short term is dominated by the cycle, the medium term by the savings behaviour of the issuing zones, and the long term reflects the external positions of the two currency zones (Artus, 1999), as well as the difference in their potential growth rates.

This last point is crucial: a medium- and long-term source of uncertainty has to do with the ability of the European economy to draw nearer to the potential growth rate of the U.S. economy. A major portion of the studies on this subject show that the long-term trend in the growth rate of the euro zone is between 2.5% and 3%, while that of the United States is close to 4 percent. Even though the higher internal savings rate and the usually positive current-account balance of the euro zone tend to weaken the dollar, a persistent differential in terms of potential growth works against the strengthening of the euro in the long term.

Another factor of uncertainty in the medium term arises from the behaviour of savings and investment in Europe. As we have seen, the euro zone is characterised by a current-account surplus, which is a reflection of surplus savings. This surplus is a result of the existence of substantial private savings, which are higher than the public deficits. This European configuration is just the opposite to that of the United States, which is characterised by a shortfall in savings in spite of its fiscal surplus.

One can foresee that the overall saving rate in the euro zone will continue to be high for two main reasons. First, the reduction of fiscal deficits is an objective of the countries of the zone. Second, it is expected that households will increase their savings efforts for demographic reasons (aging population and pension funding). From this point of view, the development of financial markets linked to the creation of the euro should stimulate the accumulation of these financial savings.

In principle, the abundance of savings in the euro zone should favour the appreciation of the euro currency. European savings, however, may be insufficient if the

[10] John Williamson, "The Exchange Rate Systems," Institute for International Economics, 1983.
[11] Didier Borowski and Cecile Couharde, "Parité euro/dollar et ajustements macro-économiques: que révèle une analyse en termes de taux de change d'équilibre ?" Revue d'Economie Financière, No. 49, Paris, 1998 and Jérôme Teiletche, "La parité euro/dollar durant les décennies 80 et 90: peut-on trouver une spécification raisonnable et à quel horizon?" Etude. CDC. Paris, 2001.

companies of the zone increase their investment in Europe in order to reduce their relative lag vis-à-vis the United States (in particular in the new economy). If this takes place, the euro zone might even experience a major current-account deficit,[12] which could contribute to weakening the euro currency.

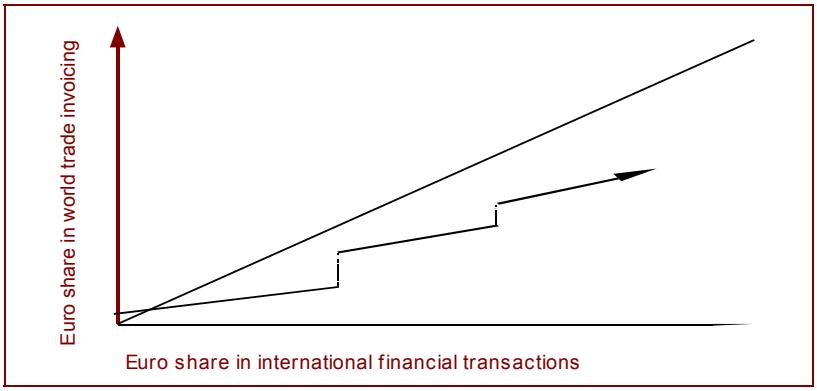
The International Role of the Euro: Three Scenarios

Although they are different issues, the movement of the euro exchange rate and the perspectives for the euro's role in the international sphere are not unconnected. If the euro depreciates permanently and there is scepticism concerning its parity, this could discourage its use and might affect its acceptance among the key IMS currencies.

In any event, many authors expect a rise of the euro as an international currency. A majority of these studies emphasise that the financial role of the euro (that is to say, as a borrowing and lending currency) will develop much more rapidly than its international trade function (i.e. as an invoicing currency). This is confirmed by the two first years of the euro's life, in particular with regard to its role as a borrowing currency, which has developed significantly. This is a distinctive characteristic of the present internationalisation of the euro that will be analysed later on.

On the other hand, some authors indicate that the progress of the "trade" euro might occur in "steps", with qualitative leaps, that should quicken the internationalisation of the euro currency[13] (**Figure 2**). The same authors, however, also argue that an excessive delay in the development of the trade function of the euro could work against the establishment of its financial role: a "complete" international currency should not be subject to excessive or too protracted a divergence between its financial and trade roles.

Figure 2: Theoretical Path of the Iinternationalisation of the Euro



Source: de Boissieu (2000)

[12] Patrick Artus, "Dollar/euro/yen: rôles respectifs, parités d'équilibre," Etude No. 99-13, CDC, Paris,September, 1999.

[13] Christian de Boissieu, "L'euro et le rééquilibrage du système monétaire et financier international," in Rapport Moral sur l'Argent dans le Monde 2000. Paris, December, 2000.

With regard to the evolution of the IMS in the medium to long term, it is possible to distinguish at least three scenarios. The first is an IMS that will long continue to be dominated by the dollar, which implies that the initial progress observed in terms of the financial function of the euro will be followed by back sliding and that the euro currency will fail to win definitive acceptance in that role. Second is the exact opposite scenario: the financial function of the euro becomes firmer and its trade role develops at a faster than expected rate. This would lead to an increasingly symmetrical dollar-euro duopoly. The last and seemingly most plausible scenario, taking into account the first steps of the euro in the international arena and the teachings of economic theory, is a duopoly that gradually decreases in asymmetry. A slow but growing bipolarisation of the IMS, however, also entails the development of the euro's role as an anchor currency in the exchange systems of other countries.

Within the framework of this most likely scenario, it seems clear that the volatility of the dollar-euro exchange rate is unlikely to decrease. On the contrary, as suggested by theoreticians on the role of leadership (such as Kindleberger), asymmetry and the existence of a clearly hegemonic currency are conditions that favour stability. Historic experience shows that the co-existence of two dominant currencies (as occurred with the pound and the dollar in the 1930s) can be a destabilising element and lead to unfavourable effects in third countries.

Let us analyse the hypothetical reaction of the euro-dollar exchange rate to a trade shock that affects the Euroland/dollar bilateral current account under three possible scenarios for anchoring the currencies of third countries to the key currencies of the system: (1) general flotation where no currency is anchored to the dollar or the euro; (2) a hegemonic system in which all currencies except the euro are anchored to the dollar; and (3) a bipolar system in which both the United States and the euro zone conduct half their trade with the countries of their respective monetary blocs. We see that the hegemonic system, although less stable than the general flotation system, is in turn much less volatile than a bipolar IMS.[14]

Thus the current situation, set between the hegemonic and bipolar systems (i.e. an IMS in harmony with the increasingly bipolar but asymmetrical medium- to long-term scenario we see as most likely) entails high volatility between the two main international currencies.

Prior to examining the first steps of the internationalisation of the euro in greater depth, it is useful to indicate that, within the framework of a growing bipolarisation of the IMS, we can foresee two possible configurations regarding the volatility of the euro-dollar parity. On one hand, a "pessimistic" configuration of "competition" between the dollar and the euro, in which the U.S. and European monetary authorities continue to give priority to their domestic objectives and are uncooperative with each other, which would accentuate the instability of the bilateral parity. On the other hand, an "optimistic"

[14] Agnes Bénassy-Quéré and Benoit Coeure, "Big and Small Currencies: The Regional Connection," Document de travail, No. 2000-10, CEPII, Paris, 2000.

configuration of strengthened monetary "co-operation": the U.S. and European authorities consider that international monetary stability is a public commodity and agree to intervene and monitor the evolution of their exchange rates, and to progress toward coordinating their macroeconomic policies. In this configuration, the volatility of the euro-dollar exchange rate would decline.

The former configuration appears to be most likely. While the IMS is in its current intermediate situation, it is difficult to imagine the United States being willing to give lower priority to its domestic objectives. On the other hand, the deficiencies in the institutional architecture of the EMU, including the absence of a unified political authority, makes it difficult to think that Europe could defend a coherent macroeconomic policy on an international scale. In any event, it is clear that the European monetary authorities do not have an explicit objective on the subject of the exchange rate and seem to be increasingly inclined to practice a policy of "benign neglect" as long as the degree of external openness of the euro zone is less than that of their member countries considered individually.

Empirical analysis (**see Box 1**) confirms these hypotheses. As shown in **Table 3** and **Figure 3**, the euro/dollar exchange rate has become more volatile since the introduction of the euro currency.

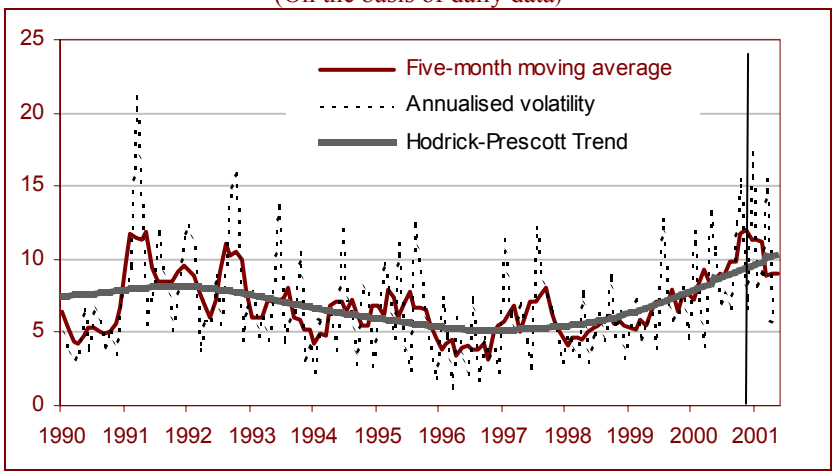
Table 2: Volatility of the Euro/Dollar Parity
(annual and quarterly averages based on daily data)

	Volatility	Five-month moving average	Trend (Hodrick-Prescott Filter)
1998	**5.20**	**5.23**	**5.84**
1999	**6.47**	**6.61**	**7.04**
2000	**9.99**	**9.50**	**8.78**
Q1 2001	10.89	10.43	9.90

Source: Authors' calculations

Figure 3: Annualised Volatility of Euro/Dollar Parity

(On the basis of daily data)



Source: Authors' calculations

Box 1: Method for Calculating the Annualised Volatility

The data used are taken from the spot quotations in the New York market at their closing price. We have used the exchange rate of the German mark between 01/01/1971 and 31/12/1998 and the exchange rate of the euro between 01/01/1999 and 11/05/2001.

As of the introduction of the euro on 1/01/1999, this currency was converted to German marks using the conversion rate established for the member countries of the monetary union.

Annualised volatility was calculated using the following formula:

$$\sigma = \sqrt{\frac{n\sum_{i=1}^{n} x_i^2 - \left(\sum_{i=1}^{n} x_i\right)^2}{n(n-1)}}$$

Where:

x_i = daily quotation

i = day

n = number of monthly quotations

σ is multiplied by 100 in accordance with financial standards

On the basis of the volatility data calculated as shown above, a five-month moving average was calculated using the Hodrick-Prescott method[15] in order to eliminate the strong fluctuations in the volatility and its trend.

[15] This is a smoothing method that is widely used among macro-economists to obtain a smooth estimate of the long-term trend component of a series. The method was first used in a working paper (circulated in the early 1980s and published in 1997) by Hodrick and Prescott to analyse post-war U.S. business cycles.

Emergence of the Euro and the Unit-of-Account Function: Implications for Latin America

The increased volatility of exchange rates has put forward the question of the unit-of-account function of international currencies. As a result, studies on the creation of the euro and its prospect as an international currency have largely focused on its functions as a medium of payment, financing and borrowing. Recently, the management of international reserves and the potential role of the euro as a reserve currency have also begun to be studied.[16] Conversely, the unit-of-account function is often neglected, probably because currency price-setting in international trade is particularly subject to inertia resulting from the existence of grid externalities. Another factor that is usually put forward to explain this is that invoicing currencies appear to derive their use from their other functions.[17]

As previously mentioned, the unit-of-account function not only has to do with price-setting in international trade; it also concerns the use of international currencies as reference (anchor) currencies, which is one of the crucial functions in the internationalisation process. In the short term, it will be very difficult for the euro to compete with the dollar as a worldwide anchor currency, given that decisions in this sphere are linked to the type of integration—in both trade (geographic pattern of trade flows) and financing (borrowing currencies, FDI sources, etc.) —as well as to trade practices (as previously mentioned, most commodities trade is conducted in dollars). In particular, the existence of strong inertia in trade and financial practices hinders a more rapid development of the euro as an international currency. In any event, the use of the euro as an anchor currency of third countries can be expected to increase in the medium and long term.

In this section, we will: (1) address the issue of the *de facto* determination of currency anchors, as against the officially-stated anchors, i.e., those published by the IMF (in its Annual Report on Exchange Arrangements and Exchange Restrictions); (2) study the real and financial determinants of the options adopted by developing countries in terms of *de facto* anchoring on the basis of an econometric analysis conducted for 93 economies; (3) build a typology of the analysed countries; and (4) explore ways in which the euro could be adopted as an anchor currency across Latin America.

De facto Anchoring Arrangements: Methodology

Following the approach proposed by Bénassy—Quéré and Cœuré, an estimate is made of *de facto* exchange arrangements through the use of econometric equations based on the generalised moments method (see **Annex 1**). The implicit anchors of 111 currencies have been estimated on the basis of weekly data both before and after the financial crises of the emerging countries (1997-98).

[16] George Alogoskoufis, Richard Portes and Helene Rey, "The Emergence of the Euro as an International Currency," Economic Policy, Vol. 5, 1997, and most importantly, Barry Eichengreen and Donald Mathieson, 2000.
[17] Bénassy-Quéré and Cœuré.

The results show that the proportion of currencies with *de facto* anchoring to the dollar is much higher (50%) than could be surmised from the official data published by the IMF (see **Tables 4 and 5**). This phenomenon has continued after the Asian crisis, suggesting that, at least in the short term, the current system has not changed as substantially as is usually suggested (i.e., decline in peg to a reference currencies and generalisation of pure floats). Therefore, pure floats are much less frequent *de facto* (4%) than *de jure* (30%).

These results converge in part with those obtained by Levy Yeyati and Sturzenegger,[18] who observed numerous *de facto* anchors. In addition, there does not appear to have been a decline in the so-called intermediate arrangements (one characteristic of which is an anchor to a basket of currencies). This has been demonstrated by Masson (2000) using a dynamic analysis of the transitions between exchange arrangements.

Table 4: Official Exchange Arrangements and their Evolution
(% of all IMF member country currencies, in December of each year)

Exchange arrangements	1983	1988	1994	1999
Number of currencies	***146***	***152***	***181***	***187***
Fixed anchor to one currency (including currency boards)	**35.6**	**38.3**	**26.0**	**30.0**
Dollar	23.3	25.7	13.8	15.0
Franc, mark, euro	8.9	9.2	8.3	12.3
Other	3.4	3.4	3.9	2.7
Fixed anchor to a basket of currencies	**27.4**	**25.7**	**13.3**	**9.6**
SDR	8.9	5.3	1.7	3.2
Ecu	0.7	0.7	0.6	0.0
Other	17.8	19.7	11.0	6.4
Limited flexibility	**11.0**	**7.2**	**7.2**	**5.9**
European exchange mechanism	4.8	4.6	5.0	1.1
Other	6.2	2.6	2.2	4.8
Limited float	**19.9**	**17.8**	**19.9**	**23.0**
Free float	**6.1**	**11.2**	**33.7**	**31.6**
TOTAL	**100.0**	**100.0**	**100.0**	**100.0**

Source: IMF, Annual Report on Exchange Arrangements and Exchange Restrictions, several numbers

[18] Eduardo Levy Yeyati and Federico Sturzenegger, "Classifying Exchange Rate Regimes: Deeds vs Words," Working Paper, Universidad Torcuato Di Tella, Buenos Aires, 1999.

Table 5: De facto *Exchange Arrangements*
(% of all currencies analysed)

	April 1995-June 1997 (prior to the Asian crisis)	**October 1998-December 1999** (after the Asian crisis)
Number of currencies	***107.0***	***107.0***
Unit anchor to one currency	**61.8**	**59.8**
Dollar	50.6	49.5
Euro	10.3	10.3
Yen	0.9	0.0
Partial anchor to one currency	**13.0**	**9.3**
Dollar	12.1	6.5
Euro	0.9	1.9
Yen	0.0	0.9
Anchor to a basket of currencies	**20.5**	**27.1**
Dollar/euro	12.1	14.0
Dollar/yen	5.6	2.8
Euro/yen	1.9	2.8
Euro/dollar/yen	0.9	7.5
Free float	**4.7**	**3.7**
TOTAL	**100.0**	**100.0**

Note: the 14 African countries of the franc zone are treated as a single country

Source: Bénassy-Quéré and Coeuré (2000)

In sum, according to the approach adopted in this study, the international monetary system does not seem to be evolving toward a general use of floats. Moreover, Bénassy—Quéré and Cœuré note that the IMS is still a long way from a configuration of different currency blocks of comparable size.

Financial and Trade Determinants of *de facto* Anchors

On the basis of the results presented in the previous section, we will now focus on the real and financial determinants of the *de facto* anchoring arrangements adopted by the 93 countries considered. **Table 6** shows the correlations between the anchoring coefficients and the trade, financial and geographic variables.[19]

This table shows, mainly, that the anchoring coefficients are correlated with the trade and financial variables. The use of the euro as a *de facto* anchor currency correlates significantly with the use of the euro as a borrowing currency (0.197) and with the geographic pattern of trade (0.458), i.e. those cases in which Europe is predominant as a client and supplier of the countries considered. It is not surprising, therefore, to find that the countries of Europe (Central, East and South), as well as the African countries of the franc zone, have a strong correlation with the use of the euro as a *de facto* anchor currency (either as the sole currency or as the dominant currency in anchor baskets).

[19] The anchoring coefficients are taken from Bénassy–Quéré and Cœuré (2000). The following binary variables were associated with those variables: Dolbin= 1 if the coefficient is equal to or higher than 0.5, 0 if it is lower; Eurobin= 1 if the coefficient is equal to or higher than 0.3, 0 if it is lower; Yenbin= 1 if the coefficient is equal to or higher than 0.1, 0 if it is lower. The "oil-exporting" binary variable is assigned to countries whose oil sales represent over 10% of their total exports. The "dollarised" binary variable is attributed to countries where the dollar share in M3 is high, following IMF typology. Geographical distances are measured in kilometers (km) between ports or capitals.

Table 6: Trade, Debt and de-facto Anchoring Arrangements

Correlation table

	Dollar	Euro	Yen	Dolbin	Eurobin	Yenbin
Dollar	1.000	-0.969	-0.612	0.911	-0.937	-0.589
Euro	-0.969	1.000	0.396	-0.859	0.884	0.393
Yen	-0.612	0.396	1.000	-0.634	0.649	0.927
Dolbin	0.911	-0.859	-0.634	1.000	-0.865	-0.602
Eurobin	-0.937	0.884	0.649	-0.865	1.000	0.652
Yenbin	-0.589	0.393	0.927	-0.602	0.652	1.000
Debt structure by currency						
In Dollars	0.019	-0.044	0.069	-0.032	-0.021	0.096
In Euros	**-0.272**	**0.197**	**0.378**	**-0.356**	**0.292**	**0.350**
In Yens	**0.205**	**-0.144**	**-0.292**	**0.213**	**-0.142**	**-0.251**
Degree of dollarisation of the economies						
Dollarised	0.089	-0.016	**-0.276**	**0.166**	**-0.154**	**-0.206**
Oil exports						
Oil-exporting	**0.140**	**-0.129**	-0.104	**0.144**	**-0.202**	**-0.155**
Foreign trade structure						
With United States	**0.355**	**-0.352**	**-0.195**	**0.370**	**-0.371**	**-0.198**
With Japan	**0.251**	**-0.240**	**-0.164**	**0.226**	**-0.222**	**-0.178**
With Europe	**-0.451**	**0.458**	**0.211**	**-0.465**	**0.439**	**0.159**

Geography and anchoring arrangements

Correlations table

	Dollar	Euro	Yen	Dolbin	Eurobin	Yenbin
Geographic distances						
kmUS	0.017	-0.019	-0.005	-0.032	0.020	-0.043
kmJapan	-0.089	0.017	**0.274**	**-0.143**	0.092	**0.241**
kmEurope	**0.446**	**-0.468**	**-0.162**	**0.454**	**-0.415**	**-0.174**
Geographic areas						
LATIN AMERICA	**0.341**	**-0.331**	**-0.208**	**0.398**	**-0.360**	**-0.179**
CENTRAL	**0.202**	**-0.199**	**-0.112**	**0.276**	**-0.195**	-0.032
SOUTH	**0.245**	**-0.234**	**-0.162**	**0.240**	**-0.278**	**-0.210**
ASIA	**0.312**	**-0.284**	**-0.252**	**0.299**	**-0.287**	**-0.261**
MIDDLE EAST	**0.153**	**-0.132**	**-0.146**	**0.139**	**-0.161**	**-0.122**
EUROPE	**-0.358**	**0.456**	**-0.127**	**-0.209**	**0.273**	-0.087
AFRICA	**-0.364**	**0.253**	**0.539**	**-0.506**	**0.424**	**0.481**
AFRICA-CFA	**-0.532**	**0.365**	**0.805**	**-0.668**	**0.578**	**0.765**
AFRICA-NCFA	0.047	-0.029	-0.085	0.001	-0.017	**-0.118**

Sources: Trade: DOTS-IMF (2000), Debt: World Bank (WDI 2000), Dollarisation: IMF 174 (1998), Exchange arrangements: Bénassy-Quéré (2000)

Notes: Figures in boldface indicate statistically significant correlations

CFA: CFA franc zone CNFA: other African countries

To complete the analysis, we conducted an econometric probability study (**Table 7**).

Table 7: Probability of Using an International Currency

	Dollar			Euro			Yen		
	Coef.	Z-Stat	Proba.	Coef.	Z-Stat	Proba.	Coef.	Z-Stat	Proba.
Constant	1.40	1.22	0.222	-0.32	-0.36	0.716	-0.66	-0.57	0.568
Direction of trade									
With Japan	**0.27**	2.30	**0.022**	**-0.19**	-2.64	**0.008**	-0.03	-0.35	0.724
With Europe	**-0.04**	-3.04	**0.002**	**0.03**	2.20	**0.028**	**-0.03**	-2.11	**0.035**
With USA	**0.04**	2.12	**0.034**	**-0.04**	-2.52	**0.012**	**-0.09**	-3.59	**0.000**
Debt composition by currency									
In dollars	0.00	0.034	0.973	-0.01	-0.44	0.660	0.06	2.42	**0.015**
In euros	**-0.10**	-3.441	**0.001**	**0.06**	2.70	**0.007**	**0.16**	3.57	**0.000**
In yen	**0.12**	3.501	**0.001**	**-0.06**	-2.33	**0.020**	**-0.90**	-3.75	**0.000**
Other determinants									
Oil-exporting	**1.82**	2.79	**0.005**	**-1.26**	-2.15	**0.032**	**-1.78**	-2.07	**0.039**
Dollarised	0.21	0.43	0.666	-0.19	-0.46	0.645	**-1.70**	-2.43	**0.015**
Restr. log likelihood		-19.55			-25.44			-13.66	
Probability(LR stat)		0.00			0.00			0.00	
Obs with Dep=0		27.00			58.00			68.00	
Obs with Dep=1		63.00			31.00			18.00	
Included observations		90.00			89.00			86.00	
McFadden R-squared		0.64			0.56			0.69	
% Correct		92.1%			83.9%			72.2%	

Notes: Figures in boldface indicate variables with a significance level at least 90%.
Owing to problems multicollinearity between the trade variables and those that represent geographic distances, the latter have not been included in the econometric estimate.

The econometric estimates suggest that the likelihood of using the dollar as an anchor currency increases when the United States is a major trading partner of the country in question. Symmetrically, the likelihood declines when the main partner is Europe.

As regards to the predominance of a currency for borrowing purposes, when a country is indebted mainly in dollars, the likelihood of using the U.S. currency as an anchor is not significant. This is explained by that fact that all the countries of the sample are mainly indebted in dollars. In addition, the likelihood of anchoring a currency to the dollar declines significantly when a major part of the external debt of the country considered is denominated in euros. On the other hand, oil-exporting countries have a strong likelihood of anchoring their currencies to the dollar because the international oil trade is conducted in dollars.

For the yen, the results of the econometric equations concerning the likelihood of anchoring a currency to the Japanese currency are poor. Thus, being a major trading partner of Japan does not increase the likelihood of using the yen as an anchor currency. Moreover, the likelihood of using the yen as an anchor decreases significantly when the foreign debt of a country is denominated in that currency. Lastly, as would be expected, in the oil-exporting countries and those that are noted for a high degree of dollarisation in their economies, the likelihood of anchoring their currencies to the yen is slight. Several factors serve to explain these econometric results: One is the crisis that has affected Japan since 1990. Another is the strong nominal and real short-term fluctuations experienced by the yen in the past years. Uncertainty regarding the Japanese economy and the volatility of the yen increases transaction costs and exchange-rate risks. Yet another factor is the absence of political will—not to mention the hostility—by the Japanese authorities with regard to developing the yen as an international currency.

For the euro, the likelihood that a country will use it as an anchor currency decreases when the trade of a country is conducted mainly with Japan or the United States, and increases if it is conducted with the euro-zone countries, again assuming these countries are major trading partners. Likewise, the results of the exercise confirm that the likelihood of using the euro as an anchor increases when a major part of the external debt of the country considered is denominated in euros. On the other hand, and inverting the equation that analyses the use of the dollar as an anchor, the likelihood of anchoring a national currency to the euro declines significantly for oil-exporting countries.

A Typology of Countries

The factors considered up to now can be analysed more deeply in order to identify the positioning of the countries of the sample. To achieve this, a factor analysis of the main components is conducted (see **Annex 2**), making it possible to group the countries with homogenous trade, financial and geographical features. We begin by showing how we organised the information (**Table 8**).

Table 8: Inherent Values and Correlations between Main Variables and Factors

For the first four axes (significant)

Inherent values	1	2	3	4
Value	2.40	2.05	1.19	1.02
% variability	26.63	22.75	13.23	11.35
% aggregate	26.63	49.37	62.60	73.95
	factor 1	**factor 2**	**factor 3**	**factor 4**
Trade with USA	**0.75**	-0.09	0.00	**0.45**
Trade with Japan	0.01	**0.70**	-0.03	**-0.35**
Trade with Europe	**-0.72**	**-0.26**	-0.03	**-0.28**
Debt in dollars	**0.61**	**-0.36**	**-0.22**	**-0.39**
Debt in yen	0.06	**0.66**	-0.13	**0.38**
Debt in euros	**-0.60**	**-0.26**	**0.30**	**0.52**
Distance from USA	**-0.40**	**0.65**	**0.42**	-0.15
Distance from Japan	0.12	**-0.55**	**0.71**	-0.14
Distance from Europe	**0.64**	**0.36**	**0.59**	-0.08

The four main axes represent 74% of the aggregate variability. In other words, approximately three-quarters of the total information contained in the variables can be summarised in these four main axes. **Figure 4** makes it possible to identify the opposition between the variables that are more strongly linked to the dollar with regard to those that are more related to the euro.

Figure 4: Circle of Correlations: axes 1 and 2 ***(50%)***

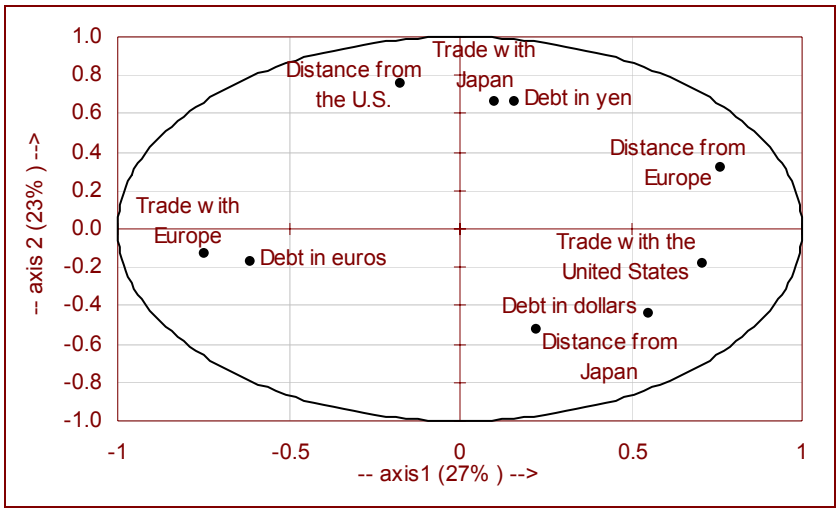
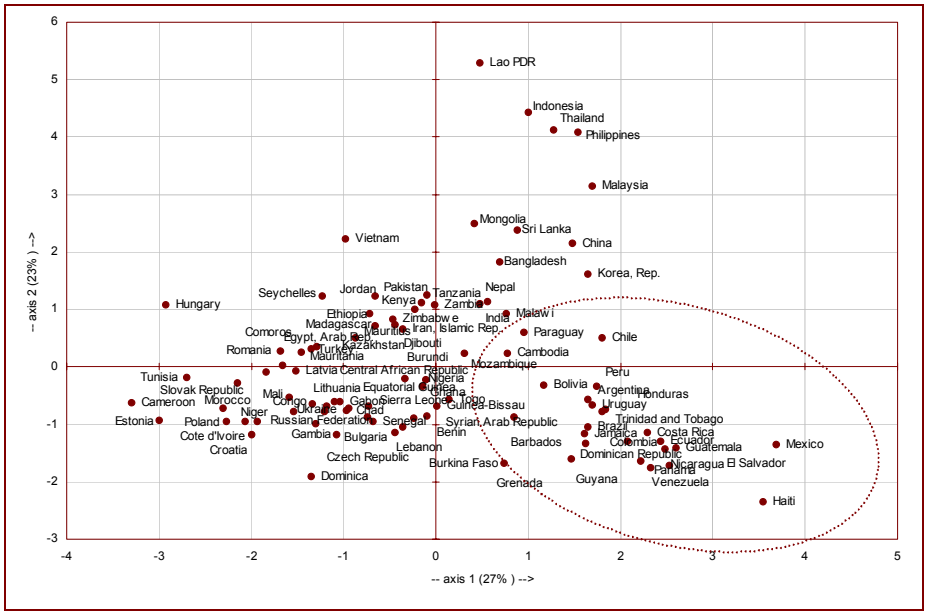


Figure 5 presents the projection of the countries in the factor space defined by the two main axes, which summarise approximately 50% of the total information contained in the variables used. Predictably, a great majority of the Latin American countries are situated in the south-eastern region of the factor space dominated by trade with the United States and indebtedness mainly denominated in dollars.

Figure 5: Projection of Countries in the Factor Space Defined by Axes 1 and 2 ***(50%)***



From the country coordinates in the factor space defined by the main four axes, we can identify five different groups (**Table 9**).

Table 9: Typology of Countries on the Basis of PCFA Results

Classification of observations / Number of countries				
Group 1	Group 2	Group 3	Group 4	Group 5
15	26	16	22	14
Bulgaria	Benin	Bangladesh	Argentina	Cameroon
Croatia	Burkina Faso	Cambodia	Barbados	Congo, Rep.
Czech Rep.	Burundi	China	Bolivia	Cote d'Ivoire
Dominica	Central African Rep.	India	Brazil	Egypt, Arab Rep.
Equatorial Guinea	Chad	Indonesia	Chile	Estonia
Grenada	Comoros	Jordan	Colombia	Gabon
Kazakhstan	Djibouti	Korea, Rep.	Costa Rica	Hungary
Latvia	Ethiopia	Lao PDR	Dominican Rep.	Mali
Lebanon	Gambia, The	Malaysia	Ecuador	Morocco
Lithuania	Ghana	Mongolia	El Salvador	Niger
Poland	Guinea-Bissau	Nepal	Guatemala	Nigeria
Romania	Iran, Islamic Rep.	Pakistan	Guyana	Russian Federation
Slovak Republic	Kenya	Philippines	Haiti	Tunisia
Syrian Arab Rep.	Madagascar	Sri Lanka	Honduras	Turkey
Ukraine	Malawi	Thailand	Jamaica	
	Mauritania	Vietnam	Mexico	
	Mauritius		Nicaragua	
	Mozambique		Panama	
	Paraguay		Peru	
	Senegal		Trinidad and Tobago	
	Seychelles		Uruguay	
	Sierra Leone		Venezuela	
	Tanzania			
	Togo			
	Zambia			
	Zimbabwe			

A second econometric exercise, taking into account the coordinates of the countries on the factor plane (which summarise the information provided by the variables used to calculate the factor axes) confirms the fact that exporting oil increases the likelihood of anchoring the national currency to the dollar and significantly decreases the likelihood of anchoring it to the euro. In turn, a high degree of dollarisation of the economy strongly increases the likelihood of anchoring the national currency to the dollar and appreciably decreases the likelihood of anchoring it to the euro (**Table 10**).

Table 10: Probability of Using an International Currency
Probit Equations on the Factor Coordinates

	Dollar			Euro			Yen		
	Coef.	Z-Stat	Proba.	Coef.	Z-Stat	Proba.	Coef.	Z-Stat	Proba.
Constant	**1.35**	2.82	**0.005**	-0.45	-1.48	0.139	**-1.28**	-3.04	**0.002**
Direction of trade									
Axis 1	**1.45**	3.65	**0.000**	**-1.02**	-4.50	**0.000**	**-0.26**	-2.13	**0.034**
Axis 2	**2.27**	3.38	**0.001**	**-1.35**	-3.35	**0.001**	**-1.26**	-3.30	**0.001**
Axis 3							**0.83**	2.79	**0.005**
Other determinants									
Oil-exporting	**1.56**	1.87	**0.061**	**-1.67**	-2.41	**0.016**	-0.75	-1.38	0.168
Dollarised	**1.83**	2.74	**0.006**	**-0.99**	-2.12	**0.034**	-0.36	-0.86	0.391
Restr. log likelihood		-54.10			-57.68			-49.16	
Probability(LR stat)		0.00			0.00			0.00	
Obs with Dep=0		27.00			57.00			70.00	
Obs with Dep=1		63.00			31.00			21.00	
Included observations		90.00			88.00			91.00	
McFadden R-squared		0.70			0.60			0.38	
% Correct		95.3%			81.3%			57.1%	

Notes: Figures in boldface indicate variables with a significance of at least 90%.

Even more importantly, a final econometric exercise relating the groups of countries and the *de facto* anchoring currencies shows that groups 3 and 4 have a statistically significant relationship with the dollar. At the same time, groups 1 and 2 appear to be areas that anchor to a basket (dollar-euro in group 1, euro-yen in group 2), whereas group 5 is characterised by a statistically significant relationship with the euro. The Latin American and Caribbean countries, included mostly in group 4, are unequivocally part of the dollar zone (**Table 11**).

Table 11: Geographic Groups and International Currencies
Probit Equations on the Basis of the Typology

	Dollar			Euro			Yen		
	Coef.	Z-Stat	Proba.	Coef.	Z-Stat	Proba.	Coef.	Z-Stat	Proba.
Constant	**-1.16**	-2.77	**0.006**	-0.85	-1.84	0.065	**-0.71**	-1.42	**0.156**
Groups resulting from the typology									
Group 1	**1.23**	2.75	**0.006**	**0.87**	1.80	**0.071**	**0.52**	1.01	**0.315**
Group 2	Reference			**2.56**	4.40	**0.000**	**1.34**	2.18	**0.030**
Group 3	**9.56**	22.74	**0.000**	Reference			**0.08**	0.14	**0.889**
Group 4	**9.62**	22.89	**0.000**	**-0.48**	-0.75	**0.454**	**-7.28**	-14.89	**0.000**
Group 5	**0.61**	0.98	**0.329**	**1.56**	2.70	**0.007**	Reference		
Other determinants									
Oil-exporting	**0.47**	1.11	**0.269**	**-0.39**	-1.10	**0.271**	-0.33	-0.91	0.364
Dollarised	**1.07**	2.07	**0.039**	**-1.51**	-2.68	**0.007**	-1.08	-2.46	0.014
Restr. log likelihood		43.56			37.86			24.05	
Probability(LR stat)		0.00			0.00			0.00	
Obs with Dep=0		28.00			59.00			70.00	
Obs with Dep=1		65.00			34.00			23.00	
Included observations		93.00			93.00			93.00	
McFadden R-squared		0.38			0.31			0.23	
% Correct		87.7%			82.4%			21.7%	

Notes: Figures in boldface indicate variables with a significance of at least 90%.

Implications for Latin America

In spite of their apparent obviousness, the results obtained are not devoid of interest. Our evidence confirms the logical assumption that the pre-eminence of the dollar as an anchor currency is favoured by inertial factors. In addition, the degree of dollarisation of the

economies considered, as well as the intensity of the financial and trade relations with the United States, are factors that reinforce the role of the dollar as an anchor currency. Thus, virtually none of the Latin American countries break away from the dollar zone. Our analysis shows that the often-mentioned "rifts" between Mexico and the countries of Central America, on one the hand, and the countries of South America, on the other, have little basis in fact.

However the use of the euro as the sole anchor currency is clearly confined to countries whose trade and financial relations with the European monetary union are very close (group 5 of our typology, made up mainly of African and Central/East European countries). As shown by Boone and Maurel,[20] for example, for these countries the euro represents a more "natural" regional anchor currency than the dollar. In particular, the countries of Central and Eastern Europe and those of North Africa, which conduct a sizeable portion of their trade with the euro zone, display activity cycles that coincide quite closely with those of Europe, as well as specialisation structures that are relatively similar to those of Western Europe.

Our study also indicates, however, that the euro participates, in numerous cases (groups 1 and 2 of our typology), in *de facto* anchoring baskets. This point is important: in a medium- to long-term perspective, the euro's potential for increasing its share in the anchor baskets cannot be disregarded. Indeed, another result of this study is that the likelihood of anchoring a national currency to the dollar decreases strongly when the share of debts denominated in euros increases.

Since 1997 there has been an increase in the euro-denominated bonds as a share of total issues by Latin American countries. **Table 12** shows that, for a group of selected countries - the largest economies of the region, the use of the euro as a borrowing currency is increasing rapidly. More precisely, the euro's share of government-securities issue has reached very high levels in the case of Argentina, Brazil, Colombia and Venezuela.

On the other hand, as was noted in the second part of this study, the international component of private-sector bonds in euros has grown substantially. It is not unlikely, therefore, that Latin American firms may tend progressively toward debt issues denominated in euros. The growing penetration of European banks in Latin America, the sustained increase of European banking loans to Latin American countries and the boom of foreign investment of European origin in the region could intensify this trend.

Thus, in the medium to long term, the Latin American countries that participate more actively in the process of development of the single European currency as a borrowing currency might consider the use of the euro as a component of anchor currency baskets. Obviously, the dollar would continue to have a pre-eminent position in these currency baskets, given its entrenchment in Latin America.

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[20] Laurence Boone and Mathilde Maurel, "L'ancrage de l'Europe centrale et orientale à l'Union européenne," Revue Economique, Vol. 50, No. 6, Paris, November 1999.

Table 12: Change in Share of Euro-Denominated Issues in Selected Countries

	Argentina	Brazil	Chile	Colombia	Mexico	Venezuela
	Private-sector bond issues					
1993	0.0%	0.0%	0.0%	0.0%	1.0%	0.0%
1994	0.0%	12.9%	0.0%	0.0%	0.0%	0.0%
1995	21.0%	6.5%	0.0%	0.0%	0.0%	0.0%
1996	7.5%	2.2%	0.0%	0.0%	0.0%	0.0%
1997	8.6%	3.9%	0.0%	0.0%	0.0%	0.0%
1998	5.8%	3.6%	0.0%	0.0%	5.4%	0.0%
1999	29.2%	4.5%	18.5%	0.0%	0.0%	0.0%
2000	20.9%	16.8%	0.0%	0.0%	40.1%	0.0%
	Government bond issues					
1993	28.2%	0.0%	0.0%	0.0%	4.5%	14.4%
1994	22.4%	0.0%	0.0%	0.0%	0.0%	0.0%
1995	37.8%	34.7%	0.0%	21.1%	12.8%	48.8%
1996	47.2%	30.5%	0.0%	11.0%	18.7%	68.6%
1997	28.4%	29.1%	0.0%	0.0%	33.1%	0.0%
1998	57.0%	32.5%	0.0%	16.0%	16.1%	26.0%
1999	56.1%	58.3%	0.0%	0.0%	13.9%	54.3%
2000	51.7%	25.3%	0.0%	36.1%	19.9%	68.5%
	Total bond issues (private-sector+government)					
1993	10.7%	0.0%	0.0%	0.0%	2.3%	13.8%
1994	9.9%	11.5%	0.0%	0.0%	0.0%	0.0%
1995	33.3%	15.7%	0.0%	8.8%	11.1%	48.8%
1996	39.2%	13.6%	0.0%	9.7%	15.7%	68.6%
1997	22.8%	16.6%	0.0%	0.0%	22.5%	0.0%
1998	44.3%	17.7%	0.0%	16.0%	11.9%	26.0%
1999	52.9%	43.2%	12.7%	0.0%	8.3%	54.3%
2000	47.7%	24.4%	0.0%	36.1%	23.7%	68.5%

Sources: CDC IXIS, Department of Economic and Financial Analysis, Country-Risk and Emerging-Markets Unit, Bondware

This hypothesis is consistent with the analyses in the theoretical and applied literature on the choice of anchor currencies. According to Bénassy-Quéré and Lahrèche-Révil[21] for instance, the relatively diversified geographic patterns of the foreign trade of some of the large Latin America countries (except of Mexico) could justify the adoption of a basket including the euro. These authors even suggest the hypothesis that countries of the region might create regional monetary unions linked to a basket of currencies including the euro. On the strength of our findings, we might add that a key factor to increase the possibility of adopting baskets including the euro is the intensification of financial relations between Europe and Latin America.

Undoubtedly, anchoring to a single currency—in this case the dollar—represents a very attractive alternative in Latin America. With regard to the prospect of regional monetary unions, the unilateral decision to link the national currency to the dollar is an "easy" solution that involves fewer demands in terms of regional coordination and cooperation. In addition, full participation in the dollar zone may increase foreign investment attracted by exchange-rate risk diversification.[22] Still more importantly, a

[21] Agnes Bénassy-Quéré and Amina Lahrèche-Révil, "L'Euro comme monnaie de référence à l'est et au sud de l'Union européenne," Revue Economique No. 50-2, Paris, 1999.

[22] Agnes Bénassy-Quéré, Lionel Fontagne and Amina Lahrèche-Révil, "Exchange-Rate Strategies in the Competition for Attracting FDI," CEPII Working Paper, No. 99-16, CEPII, Paris, 1999.

policy of anchoring to a single key currency can easily be tested by the market. Transparency thus contributes to rapidly reinforce the credibility of the countries that adopt this type of policy.[23] In turn, in Latin America, where the degree of dollarisation is in fact high and the question of credibility is crucial to many countries, the issue of the dollar's role goes beyond the discussion of a dollar peg. The debate conducted openly since 1999 is increasingly focused on the advantages and disadvantages of total dollarisation; that is to say, the replacement—in principle, irreversible—of the national currencies by the dollar, as has recently occurred in Ecuador and El Salvador.

As long as credibility in Latin America is associated with establishing a close relationship with the dollar (in the form of *de jure* anchoring or floating arrangements involving *de facto* anchoring) and, in some way, to the Federal Reserve, the possibility of adopting baskets including the euro will be limited. There are two arguments, however, that can serve to temper this statement:

1. As indicated by Levy Yeyati and Sturzenegger,[24] with the launching of the euro, the European Central Bank could—if its policy is successful—offer a new alternative in the medium or long term to countries in search of credibility. Although both the Federal Reserve and the ECB are obviously extremely wary of any proposal to share the management of monetary policy with third countries, these authors argue that they might be less reluctant to some type of exchange agreement with certain Latin American countries. The so-called European Monetary System (EMS), an exchange agreement that links the European Union with other European countries that are applying for membership, represents an interesting antecedent—although of course it is intrinsically inapplicable to other countries or regions.

2. The previously-mentioned factors conducive to adoption of anchor baskets could be strengthened by the medium- to long-term international scenario that is favoured in this study. An increasingly bipolar but asymmetrical IMS presupposes high volatility between the two main international currencies. In this context, anchoring exclusively to the dollar could prove fatal for countries that have major trade and financial relations with the euro zone. Conversely, anchoring to a basket that includes the euro would be decisive in reducing vulnerability—and, hence, increase credibility—to abrupt exchanges-rate swings among the main reference currencies. As already mentioned, this is one of the objectives of the decision adopted recently by Argentina, which is to anchor the peso to a basket made up of the dollar and the euro whenever these two currencies achieve a one-to-one exchange-rate.

[23] Jeffrey Frankel, Sergio Schmukler and Luis Serven, "Verifiability: A Rationale for the Failure of Intermediate Exchange Rate Regimes," Mimeographed document, 1999.
[24] Eduardo Levy Yeyeati and Federico Sturzenegger. "The Euro and Latin America. Implications of the Euro for Latin America's Financial and Banking Systems." Working Paper, Universidad Torcuato Di Tella, Buenos Aires: 1999.

Conclusion

The internationalisation of the euro is in its initial stages and it is therefore difficult to draw any definitive conclusions regarding its scope and its implications for Latin America. Indeed, as indicated at the beginning of this study, the emergence of an internationally used currency is slow and subject to inertial forces. Nonetheless, several fairly robust conclusions can be inferred from the results of our analysis.

First, with regard to the development of the IMS, if one takes into account the initial experience of the euro on the international scene and the teachings of economic theory, the most plausible medium- to long-term scenario seems to be the development of an asymmetrical duopoly. This means the euro will come to share the dollar's role as a financial currency, while the U.S. currency will continue to prevail in trade transactions.[25] Even though one can argue with this hypothesis, it seems credible that the dollar will maintain its dominant position for a considerable time, during which there will be a gradually increasing bipolarisation of the IMS. In a context of scant international monetary cooperation, this scenario presupposes high volatility between the two main international currencies, which will be a powerful destabilising factor for third countries.

Secondly, the first three years of the euro's existence confirm that its growing use in financial operations—which now far outweigh transactions in goods and services—will represent a decisive vector (although insufficient in the long term) in its internationalisation. In turn, the effects of the expansion of the euro bond markets on the capital markets of the issuing zone are not neutral. Together with other factors, the growth of the bond market will tend to increase the pressure to widen and deepen the euro financial market and make it more liquid. This should favour the development of better terms for payback period, refinancing, coverage and arbitrage conditions for both European and third-country participants.

Third, the study of the channels for generalising the use of the different key currencies as anchor currencies shows that the likelihood of anchoring a national currency to the dollar decreases when the share of a country's external debt denominated in euros increases. If the Latin American countries continue to increase their borrowing in euros and this translates into a greater diversification of their international reserves, some of them might consider the possibility of using the euro currency in anchor baskets, especially in those cases where the euro zone is a major trading partner. Nevertheless, the dollar will continue to have a preponderant role in those baskets, given the entrenchment of the U.S. currency in Latin America. On the other hand, the medium- to long-term consequences on exchange arrangements will have to be included in the international scenario that is beginning to take shape since the creation of the euro. The previously

[25] An asymmetrical duopoly of rivalry between the dollar and the euro that has both economic and political implications (Cohen, 2000). Also, as certain recent studies suggest (Artus, 2001), the internationalization—and thus its strengthening—assume the euro—and therefore of its strength—assumes a substantial increase in the euro zone's potential for economic expansion. The latter essentially depends on the zone's demography and capital stock, which implies widening it to include young and undercapitalized countries.

mentioned factors tending to enhance the possibility of adopting anchor baskets (at least in the case of some Latin American countries) would be further supported by the medium- to long-term scenario we regard as more likely: an increasingly bipolar but asymmetrical IMS presupposes high volatility between the two main international currencies. In this context, *de facto* and *de jure* anchoring focused exclusively on the dollar, which in theory offers substantial gains in terms of credibility, could turn out to be fatal for countries that maintain close trade and financial relations with the euro zone.

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Appendix I

Method of calculation of *de facto* arrangements and their results

The most frequently used method to identify a *de facto* arrangement consists in estimating an equation that explains the exchange-rate variations of each currency by means of the exchange-rate fluctuations of the major reference currencies (dollar, yen, mark, euro, etc.):

$$\dot{e}_{ikt} = a0 + a1\dot{e}\$_{kt} + a2\,\dot{e}E_{kt} + a3\,\dot{e}Y_{kt} + ut$$

where, $\dot{e}_{ikt}$ = designates the exchange rate variation of currency i in relation to currency k between *t* and *t*—1. \$, *E* and *Y* designate the dollar, the euro and the yen, respectively.

The constant a_0 is positive if i is depreciated (or devalued) regularly to compensate for a positive inflation differential (case of real anchors or crawling pegs). Coefficients a_j are interpreted as the weight of each reference currency in the implicit basket of country i.

The cases that can arise are: $a_{ij} = 1$, which represents unit anchoring in relation to one currency (a single significant coefficient, equal to the unit); $0 < a_{ij} < 1$, which represents anchoring to a basket of currencies (at least two significant coefficients, where the sum is equal to the unit); $a_{ij} = 0 \text{ for } \forall_j$, which represents a free float (no coefficient is different from zero).

As the direct estimate of the equation poses the problem of defining the numeraire *k* (a currency that fluctuates independently from the major explanatory currencies), Bénassy-Quéré and Coeuré use:

$$\alpha_i' X_{it} = \beta_i + u_{it}$$

where, $X_{it} = (\ \dot{e}_{i\$t}, \dot{e}_{iEt}, \dot{e}_{iYt}\ )$, α_i represents the weighting vector and β_i is a scalar.

The equation is estimated as a condition of orthogonality using the generalised-moment method, with the restriction:

$$\sum_{ji=1}^{3} \alpha_{ij} = 1$$

The estimate was made for 111 currencies, on the basis of weekly exchange rates and covering two periods: April 1995 to June 1997 (prior to the Asian crisis) and October 1998 to December 1999 (after the crisis). The euro was identified with the ecu prior to January 1999. Of the 111 countries used by Bénassy-Quéré and Cœuré, the following 93 were selected for this study.

Argentina	Cote d'Ivoire	Honduras	Mexico	Slovakia
Bangladesh	Croatia	Hungary	Mongolia	South Korea
Barbados	Czech Republic	India	Morocco	Sri Lanka
Benin	Djibouti	Indonesia	Mozambique	Syria
Bolivia	Dominica	Iran	Nepal	Tanzania
Brazil	Dominican Rep.	Jamaica	Nicaragua	Thailand
Bulgaria	Ecuador	Jordan	Niger	The Gambia
Burkina Faso	Egypt	Kazakhstan	Nigeria	Togo
Burundi	El Salvador	Kenya	Pakistan	Trinidad and Tobago
Cambodia	Equatorial Guinea	Laos	Panama	Tunisia
Cameroon	Estonia	Latvia	Paraguay	Turkey
Central African Rep.	Ethiopia	Lebanon	Peru	Ukraine
Chad	Gabon	Lithuania	Philippines	Uruguay
Chile	Ghana	Madagascar	Poland	Venezuela
China	Grenada	Malaw i	Romania	Vietnam
Colombia	Guatemala	Malaysia	Russian Federation	Zambia
Comoros	Guinea–Bissau	Mali	Senegal	Zimbabw e
Congo	Guyana	Mauritania	Seychelles	
Costa Rica	Haiti	Mauritius	Sierra Leone	

Source:

Appendix II

Principal component factor analysis (PCFA)

Principal component factor analysis makes it possible to represent numerous relations between variables in a small number of factors. The observations (or individuals) can be represented (projected) on a plane defined by the factor axes.

This quantitative method adjusts better to the analysis of a group of heterogeneous variables, i.e., expressed in units that are *a priori* different. Standardising each variable eliminates the arbitrariness resulting from the use of different measuring scales, which is expressed in a non-comparable dispersion. Thus, each variable has a variance that is equal to 1. For *J* variables, the total variance (that measures the overall dispersion of the individuals resulting from all variables) is equal to *J*.

Geometrically, the variables are represented by points situated on a sphere. The angle between two variables illustrates the correlation between them (Bravais-Pearson's linear correlation coefficient): this is the cosine of the angle. The correlation is more strongly positive when the angle is acute and more strongly negative when the angle is obtuse. The correlation is null when the two variables form a right angle.

The PCFA provides an orderly group of axes and corresponding eigenvalues. Eigenvalue n° α is the variance of the factor corresponding to axis α. The sum of the eigenvalues is always equal to the total variance. If the original variables all have a variance that is equal to 1 (by construction), the first factors will have a variance that is notably greater than 1: each of them embodies the disparity of observations attributable to a group of variables. As of a certain range, the factors associate with eigenvalues that are lower than 1. Thus, these last factors express less disparity between individuals than any of the original variables; this leads us to consider that the information they provide in terms of disparity between individuals is residual and, therefore, allows us to eliminate them from the result-interpretation process.

The factor coordinates of individuals (projections on the factor axes) can be used as new (compound) variables in econometric equations. These variables, that summarise the information contained in the original group of variables, present orthogonality as a fundamental characteristic, i.e. they eliminate all risk of multicollinearity.