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0521632730 - Currency Competition and Foreign Exchange Markets: The Dollar, the Yen and the Euro

Philipp Hartmann

Excerpt

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# 1 Introduction

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The world today is dominated by the US dollar ... This structural imbalance in the international monetary system is a factor of instability. I see advantages in not living in a dollar-dominated world.

(Yves-Thibault de Silguy, 1997)

The international role of the euro is the hidden agenda of Europe's long-planned adoption of a single currency.

(Charles Wyplosz, 1997)

This book studies the phenomenon of international currencies, from both a theoretical and an empirical perspective, and applies the results in order to give an answer to the question: 'what role will the euro, the future single European currency, play in the international monetary and financial system *when competing with the US dollar and the Japanese yen* after its introduction, scheduled for January 1999?' An 'international currency' is a currency which fulfils one or several of the classical money functions – medium of exchange, store of value and unit of account – for non-nationals or non-residents of the issuing country, be they private or public agents. 'International currency competition' refers to the process determining to what extent various national currencies are employed by non-residents. With respect to the euro, the issuing 'country' is the sum of all European Union (EU) countries joining European Monetary Union (EMU). 'Euro internationalization' refers only to the acceptance of the single European currency by non-EMU-area residents, since there will not be any genuinely competing alternative currency within the EMU zone.

The intention of my project is twofold: on the one hand, I hope to make an academic contribution to an area which, in my view, has been considerably under-researched. Two out of six chapters (chapters 3 and 5) are analytical, using the quantitative theoretical and empirical tools of modern economics and finance – game theory, time series and panel econometrics – to throw some light on the key mechanisms at work determining which national currencies achieve an important international role. In contrast to most of the previous analytical academic literature,

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which usually takes a macroeconomic perspective, my approach links financial market – in particular foreign exchange (forex) market – micro-structure analysis with transaction cost economics. In chapters 2 and 4 I apply the analytical results and provide an additional empirical, historical and institutional dimension in order to answer more practical and policy-relevant questions of international currency use. Now that EMU is imminent, there is tremendous demand by government officials and business men and women to know the impact the euro will have on the international monetary and financial system. For the purpose of motivating what follows in the main body of the book I proceed in reverse order, starting with the policy questions.

### **1.1 Importance of currency internationalization and European Monetary Union**

The extent with which national currencies in general and the euro in particular are used in the international sphere after 1999 is of major importance, for both the global community and for the specific issuing country. The more important is a country's national currency for cross-border or completely foreign transactions the stronger the impact of exogenous domestic shocks as well as the monetary and exchange rate policies of that country on other countries. The issuer of a large international currency will therefore have to be a major player in international policy coordination: in other words, a large international currency gives a country a lot of political power in international monetary relations, with substantial geopolitical consequences. In modern history a dominant international currency has often been the expression of, or even one of the driving forces behind, political and/or economic world leadership, as was the case for the British pound during the nineteenth century and for the US dollar after the Second World War.

Beyond the political sphere the internationalization of a currency has substantial consequences for internationally active businesses, which are the transmitters of this internationalization. Transnational corporations, for example, may find it more cost-effective to base their internal accounting on the dominant international currency instead of their home currency at headquarters. Banks and non-bank financial institutions offering financial services internationally will face increased demand for products in internationalized currencies, requiring them to develop expertise and operations in the respective financial markets (be they domestic or off-shore ('euro') markets). Of course, this increased demand will also feed back into domestic financial markets of the country issuing an international currency, enhancing their size and liquidity. In case of a

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virtual regime shift – say, from one dominant international currency to another or from a one-currency to a two-currency system – private payments and settlements systems will have to be adjusted to the new monetary order. Similarly, the pricing practices and hedging needs of international traders of homogeneous primary goods, which are usually priced and settled in the dominant international currency, may change substantially.

It can also be argued that banks and other financial institutions have an advantage in dealing with products denominated in their home currency, be it through more experience with domestic macroeconomic policies, the legal and regulatory environment, better knowledge of the functioning and organization of the local securities and banking markets, long-standing relationships with an important domestic end-investor base, or easier access to the domestic payments and settlements systems. In this sense, banks from a country issuing a dominant international currency start with an advantage *vis-à-vis* their foreign competitors. While it might be objected that these competitive advantages should not play an important role among the truly global players operating in practically all important financial centres, the evidence is in favour of home currency advantage.<sup>1</sup>

Since the Second World War the US dollar has been the dominant international currency, a situation ratified rather than caused by the Bretton Woods system of fixed exchange rates – built around it. A gradual diversification out of dollar into mainly Deutsche mark and Japanese yen since the unravelling of the post-war monetary order in the early 1970s came to a halt since the early 1990s and, in any case, never seriously threatened the dollar's dominance (see chapter 2). EMU is certainly the most important event in the international monetary and financial system since the end of the Bretton Woods system in the early 1970s (Bergsten, 1997). Depending on the number of countries qualifying for the European currency union the size of the domestic monetary habitat of the new common European currency, the euro, will become comparable to that of the dollar and larger than that of the yen or that of the mark, the most important European currency at present (see chapter 4).

Will this 'shock' to the international monetary system cause further diversification out of the dollar? Will the euro become as important as the size of Europe in the world economy suggests and challenge the current dollar dominance, maybe even replace the US currency as the world leader? Any of these scenarios has important implications for world

<sup>1</sup> For example, McCauley and White (1997) show that bookrunners in the primary eurobond markets have dominant market shares in issues denominated in their home currency.

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monetary and financial affairs, for both the European common policy institutions as well as for the distribution of power on a global level.

With respect to the European level a quick and far-reaching internationalization of the euro has implications for the domestic monetary policy approach chosen. Large foreign short-term euro holdings are likely to render European money aggregates more unstable and therefore a pure monetary targeting strategy (as opposed to, say, an inflation targeting strategy) more difficult.<sup>2</sup> Moreover, strong euro internationalization will reinforce the case for a structure of EU-internal monetary institutions which allows Europe to speak with one voice to the outside world for the purposes of world monetary policy and exchange rate coordination. The Maastricht Treaty says in article 109 that the EU EcoFin Council can decide unanimously on formal fixed exchange rate agreements or give by qualified majority 'general orientations for exchange rate policies', whereas the European Central Bank (ECB) is in charge of the remaining exchange rate decisions. In fact, the EU summit in Mondorf-les-Bains in September 1997 seems to have confirmed that in normal times the operational responsibility for exchange rate policies would be with the ECB. It remains to be seen how a comparatively large group of national finance ministers, such as represented in the EU EcoFin Council, can effectively decide on formulating coherent policies in times of misalignment or crisis and coordinate them with the ECB.

On the world level, US influence on international monetary affairs will decline and EU influence increase, further strengthening the case for tightening of EMU-internal institutions. When a common EMU-external policy of European monetary institutions is fully accomplished, the composition of cooperative bodies such as the G-7 (currently comprising the USA, Canada and Japan on the one hand, and Germany, France, Italy and the UK on the other), and the refinancing and governance structures of the major international organisations, in particular that of the International Monetary Fund (IMF), will have to be reformed in order to reflect the new balance of power.<sup>3</sup> Other issues concerning the impact of EMU on the international monetary system, relate to reforms

<sup>2</sup> Internationalization is not the only factor which can make monetary aggregates less reliable intermediate targets for monetary policy. Another major factor which plays a role is financial market development and, in particular, financial innovations resulting in more volatile money demand behaviour. Of course, these two factors are not independent: deep, broad and sophisticated financial markets make a currency more attractive for international traders and investors and internationalization itself will produce competitive pressures and incentives accelerating domestic financial market development.

<sup>3</sup> See Alogoskoufis and Portes (1991) and Bergsten and Henning (1996) on these issues. The present share of the USA in total IMF quotas is about 18 per cent, while the cumulative share of all fifteen EU countries amounts to about 30 per cent (Henning, 1997).

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of IMF macroeconomic policy surveillance (EMU-wide surveillance versus single-country surveillance), to potential access of EMU countries to IMF liquidity assistance and to the redefinition of currency weights for the Special Drawing Right (SDR), the IMF's artificial basket currency.<sup>4</sup>

The international competitive edge which the European banking industry could gain through euro internationalization and EMU-internal consolidation is likely to lead to more truly global financial players and fiercer international competition, raising the question: how will the related potential systemic risks be matched by financial regulators and supervisors? Although a large part of regulation for the foreseeable future is likely to remain fundamentally national, even within Europe more pressure will build up to improve international coordination in banking supervision and financial crisis management.<sup>5</sup>

## 1.2 Pivotal role of forex markets

Several parts of this book focus on forex markets and media of exchange in currency trading, which I denote as *vehicle currencies in the forex market*. Although there are also some purely academic reasons, this choice has been mainly made because of the key role forex markets play in the international monetary and financial system in general and in the internationalization of currencies in particular. First, for any (non-forex) international transaction, at least one of the parties involved has to enter the forex market at some point to either purchase or sell foreign currency balances. Conditions in this market thus considerably influence the denomination of the underlying transaction.<sup>6</sup>

Second, since the abolition of capital controls among industrial countries, forex markets are among the freest and most competitive markets in the world. Charles Goodhart (1997) has argued strongly that, on the national level, governments at most times in the past effectively determined which money their citizens had to use, with no (or very little) scope for true currency competition. The phenomenon of forex market vehicle currencies is an excellent example, maybe even the only example, of the truly spontaneous emergence of money on a large scale in modern times.

<sup>4</sup> Many of these issues are discussed in Polak (1997) and Thygesen (1997). The future of the SDR has even been the focus of a separate book (see Mussa *et al.*, 1996).

<sup>5</sup> This also raises the question whether European regulators will increasingly come to the Basle Committee on Banking Supervision (the G-10 coordinating body for banking regulatory affairs) speaking with a single voice (McCauley and White, 1997).

<sup>6</sup> While these conditions depend on fundamental trade and investment flows, the market micro-structure analysis below shows that exchange structures, trading volumes, volatilities and so on in forex markets can develop considerable 'autonomy' from these fundamentals.

Table 1.1 *Turnover comparison of different markets, 1995 (bn USD)*

	Global USD spot forex trading	Global US treasury securities trading <sup>a</sup>	US stock market trading <sup>b</sup>	Real-world GDP <sup>c</sup>	World merchandise trade <sup>d</sup>
Total volume per business day	351	125	24	130	20

Notes: <sup>a</sup> 1994 data, all maturities.  
<sup>b</sup> On all recognized exchanges and NASDAQ.  
<sup>c</sup> At purchasing-power-parity (PPP) exchange rates, assuming 255 business days per year.  
<sup>d</sup> At market exchange rates, assuming 255 business days per year.  
Sources: BIS (1996); Fleming (1997); IMF (1997b); OECD (1997); WTO (1996).

Last, but not least, the forex market is particularly important because of its huge size. As reported in table 1.1, total spot US dollar forex turnover alone is almost three times the size of total US Treasury securities trading (for all maturities) world-wide or global GDP. Even total US stock market trading and the overall volume of world trade are negligible compared to forex trading. For all these reasons, I fully agree with Peter Kenen (1995, p. 110) that ‘the international role of the ECU [euro] will be affected crucially by the impact of EMU on the foreign exchange market’.

Another motivation for the emphasis on forex markets in the analytical chapters of this book has to do with the substantial interest which the micro-structure of these markets has recently attracted in the academic profession. It is all the more surprising, then, that until now the forex micro-structure literature has completely ignored the phenomenon of vehicle currencies and the quite peculiar structure of open and closed interbank currency markets. For example, the 300-page volume, *The Microstructure of Foreign Exchange Markets* (Frankel *et al.*, 1996) does not make a single reference to the dollar’s or the mark’s special roles as vehicle currencies.<sup>7</sup> One of the aims of this book, in chapter 3, is therefore to fill the gap and explain this phenomenon, in the hope that this might – in addition to the present applications to the internationalization of currencies – stimulate more research working out further implications, such as for information transmission through forex prices and volatilities, for example, or for optimal official intervention strategies.

<sup>7</sup> The same applies to the booming forex high-frequency data literature (see for example the survey by Goodhart and O’Hara, 1998) – with a single notable exception (de Jong *et al.*, 1996).

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However, the relevance of the results go beyond the areas of currency trading and forex vehicle currencies. The hypothesis of a negative relationship between the use of a medium of exchange (its turnover or trading volume) and the transaction costs encountered by its users is at the very basis of the theory of money, but has hardly ever been rigorously tested. It can be traced at least as far back as to the writings of Karl Menger (1892) and it still plays a prominent role in modern search models of monetary exchange (Kiyotaki and Wright, 1989). These *network externalities* or economies of scale in the use of exchange media, are at the heart of a certain tendency towards centralization to a single or only a few monies. It has led to the interpretation of a medium of exchange as a public good (Tobin, 1980).<sup>8</sup> While the volume–transaction–cost relationship is hard to test in relation to fiat government money and goods exchange, the observability of bid–ask spreads – as a measure of transaction costs – and newly available data on trading volumes in the foreign exchange markets permit such a test. Forex market data therefore provide a unique opportunity to test for network externalities in monetary exchange in general, which is exploited in chapter 5, dealing with the empirical spread–volume relationship.

### 1.3 Overview of the book

The book is organized in six chapters. Following this Introduction, chapter 2 surveys the available literature about international currencies. The starting point is a restatement of the classical money functions in an international context. The following survey of the theoretical literature reveals that – without exception – existing theories of international currency can explain only a small part of the functions of international money. One of the most neglected international monetary functions appears to be that of a forex vehicle currency. This and other medium of exchange functions are characterized by the presence of network externalities, which imply forces driving towards concentration to one or a few dominant international currencies. In contrast, investment currency theory predicts that optimal international portfolio choice will be geared towards reaping the benefits of diversification. Currency competition may thus imply a friction between the store of value and medium of exchange functions, providing a new explanation for biases in international investment.

In a brief historical survey of international currencies since the Middle

<sup>8</sup> For differences between money and traditional public goods, however, see de Grauwe (1989).

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Ages, I then argue that – in accordance with network effects and vehicle-currency theories – there has in most times been a hierarchy of several competing international ‘key’ currencies with one clearly dominating all the others in practically all dimensions. Moreover, the available historical evidence suggests that transitions from one dominant international currency to another have been slow: earlier this century, for example, the dollar needed at least thirty years to overtake sterling. The switch to a floating exchange rate environment in 1973 led to a gradual diversification out of the dollar into the Deutsche mark and the Japanese yen, which came to a halt at the beginning of the 1990s, without seriously challenging the US currency’s post-war leadership.

In response to the gap in the theoretical literature, chapter 3 develops a theory of forex vehicle currencies which is based on micro-structure theory and exchange costs. First steps in this direction were taken by Black (1991). Chapter 3 builds on this paper, but goes beyond it in many respects. A forex-dealer model, integrating inventory and order processing costs, is used to derive the (long-run) relationship between transaction costs (bid–ask spreads), expected trading volume and expected exchange rate volatility. Inter-dealer and inter-market competition will cause a currency with high (predictable) turnover and low volatility to emerge as a forex vehicle. However, it is also shown that generally high volatility can completely demonetize the forex market (the ‘barter’ situation).

The theory explains the scope for multiple equilibria with respect to a single vehicle currency and the possible coexistence of multiple vehicle currencies in a forex market equilibrium. Some equilibria with multiple vehicle currencies exhibit a hierarchical structure, as has been observed so frequently in the history of international currencies. It is also demonstrated that the network externality in the use of media of exchange in the forex market can, in some cases, be negative (exchange cost increasing) instead of positive, at least in theory. Transitions from one dominant vehicle currency to another can be both gradual or dramatic, but – within the theoretical structure developed – multiple vehicle exchange structures need not be more unstable than single vehicle structures. An appendix extends the analysis to a Bertrand game of inter-dealer, inter-market price competition.

The multiplicity of forex vehicles is particularly relevant with regard to the recent emergence of the Deutsche mark as a second vehicle currency in addition to the US dollar (chapter 2, section 2.3). Chapter 4, in a first step, explains the mark’s emergence and describes the current exchange structure in the global forex market. It appears that the mark benefited from the volatility-reduction effect of the European Monetary System

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(EMS) and volume-enlargement effects through financial liberalization and EMU convergence trading. However, the German currency's new role is strictly limited to trading among European currencies and the dollar remains dominant on the global level.

The rest of the chapter discusses the impact of EMU on international currency use in general and the potential future role of the euro in particular. Forex trading, international trade denomination, official reserve holdings and private investments in the euro, dollar and yen are studied in depth. On all these levels, a distinction is made between initial 'arithmetic' effects and dynamic follow-up effects. The former effects – the 'simple arithmetics' of EMU – originate from the removal of intra-European flows and stocks from the 'international' sphere. The latter effects are driven by EMU-internal and EMU-external size effects as well as changes in price level/exchange rate volatilities and international financial market return correlations.

The 'arithmetic' effects push the starting level of the euro well below the current aggregate share of EU currencies in international trade and investment. However, the size jump in the 'domestic monetary habitat' and to a somewhat lesser extent in external relations will lead to a gradual extension of the euro's role. Decelerating forces in this dynamic process will be network externalities and inertia favouring the incumbent dominant currency, the US dollar. Accelerating forces may include the ability of modern financial markets to adjust more quickly than earlier in history. Whether these latter forces can develop will depend on the speed and the extent with which intra-EMU financial markets integrate further.<sup>9</sup> A study of the evolution of world trade flows suggests that the euro will expand its role more quickly in regions closer to the EU. The future of the Japanese yen, which is likely to fall behind the euro, will depend to a large extent on the new monetary and financial system which emerges in Asia as soon as banking and currency crises in the region are resolved.

As pointed out above, a recurrent feature in the theories of (national and) international media of exchange, surveyed in chapter 2, is the assumption or derivation of a positive externality or economies of scale in use. More use of an international medium of exchange makes it even more attractive for further use (see, for example, chapter 3; Krugman, 1980; Chrystal, 1984; Matsuyama *et al.*, 1993; Rey, 1997). In chapter 5 of the book a natural test for this is performed in two very different ways. This test involves the estimation of the impact of trading volumes in the

<sup>9</sup> Portes *et al.* (1997) argue that these forces alone could raise the euro to the level of sharing world power with the US dollar, or even beyond.

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forex market on transaction costs, as measured by bid–ask spreads, and thus goes deeper into the testing of forex market micro-structure theory. If the network-externality hypothesis is true, increasing volumes in a currency market should decrease transaction costs, at least in the long run. (If this were not the case, a vehicle currency would incorporate a certain tendency to auto-destroy its role, because vehicle transactions increase trading volume.) One major challenge for these estimations is the general lack of volume data, due to the fragmented (over-the-counter or OTC) character of forex trading.

Chapter 5 first surveys spread theory and empirics, highlighting the quality of different measures for forex trading volumes. It then goes on to integrate high-frequency exchange rate data and different measures of trading volume (including Reuters ‘ticks’) into two new datasets, one an eight-year long daily time-series for dollar/yen and the other a short panel over many currency pairs. The former dataset is used to estimate the *short-run* relationship between trading volumes and transaction costs, further developing an idea by Bessembinder (1994), who suggests that predictable trading volumes in the forex market should decrease transaction costs, while unpredictable volumes should increase them. Building on these results, I then apply a random-effects specification to the monthly panel data in order to test for the *long-run* relationship between volumes and spreads. Taken together, the results of chapter 5 provide strong evidence in favour of a negative long-run effect of trading volumes on transaction costs and, therefore, also in favour of the presence of positive network externalities and economies of scale in the use of international currencies. Reuters ticks are successfully applied as proxies for unpredictable and predictable turnovers.

The final chapter 6 assembles the main results from the different parts of the book and draws some general conclusions for international monetary and financial policies as well as for desirable future research efforts in the areas of currency internationalization and forex market micro-structure analysis.