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THE PROSPECTS FOR THE EURO AGAINST THE US DOLLAR

AS AN INTERNATIONAL CURRENCY

İDİL GÖKSEL

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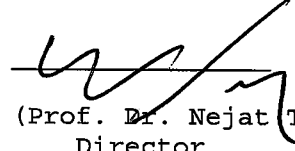THE IZMIR UNIVERSITY OF ECONOMICS

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İDİL GÖKSEL

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF

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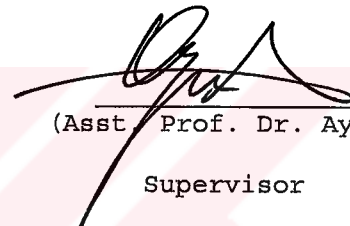
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for the degree of Master of Arts.

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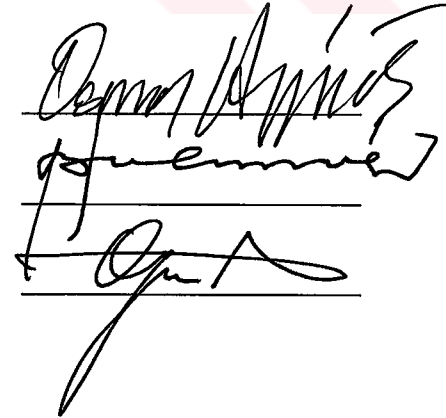

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ABSTRACT

THE PROSPECTS FOR THE EURO AGAINST THE US DOLLAR AS AN INTERNATIONAL CURRENCY

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MA in Financial Economics, Department of Social Sciences

Supervisor: Asst. Prof. Dr. Ayla Oğuş

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How should a reserve money be? What are the basic characteristics of the international currencies? The dollar has been the dominant currency since World War II. Will the euro ever be able to challenge the dollar? This thesis analyzes the costs and benefits of both the international currencies and the monetary union and the prospects for the euro to become an international currency. Why was the Dutch guilder the dominant international currency in the 17th and 18th centuries, the pound sterling in the 19th and early 20th centuries, and the dollar since the end of World War II? In order to understand the chance of the euro against the dollar some comparisons are made between them. Starting with the main economic indicators to their roles in international trade, their power and potential in many economical aspects are analyzed and compared. Furthermore, their elasticities, their roles in the international financial markets, historical inflation rates, current account and trade balance of the the two regions are discussed. An empirical study on international bonds and notes is made by using the attraction model. All of the analyses undertaken point to the potential of the euro to become an international currency. Although the dollar has still some advantages over the euro, a bipolar currency regime dominated by Europe and the United States may replace the dollar-centered system that has continued for most of this century.

Key Words: *euro, dollar, monetary union, international currency, international financial markets*

ÖZET

EURO'NUN DOLARA KARŞI ULUSLARARASI REZERV PARA OLMA PERSPEKTİFİ

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Tez Yöneticisi: Yrd. Doç. Dr. Ayla Oğuş

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Rezerv para nasıl olmalı? Uluslararası paraların temel özellikleri neler? II. Dünya Savaşı'ndan beri egemen olan para birimi dolar. Acaba euro doların bu egemenliğine son verebilecek mi? Bu çalışma hem uluslararası para birimlerinin hem de para birliğinin fayda ve maliyetlerini analiz ederek euro'nun uluslararası bir para birimi olup olmama ihtimalini irdelemektedir. 17. ve 18. yüzyılda Hollanda gulderinin, 19. ve 20. yüzyıl başlarında ingiliz sterlininin ve II. Dünya Savaşı'ndan beri de doların egemen uluslararsı para birimi olmalarının nedenleri nelerdi? Euro'nun dolar karşısındaki şansını anlayabilmek için aralarında türlü karşılaştırmalar yapıldı. Temel ekonomik göstergelerden başlayarak dünya ticaretindeki rollerine kadar birçok ekonomik konudaki güçleri ve potensiyelleri kıyaslandı. Buna ek olarak her iki para biriminin arz esneklikleri, uluslararası finans piyasalarındaki rolleri, geçmiş enflasyon oranları, cari ve ticaret dengeleri tartışıldı. Atraksiyon modeli kullanılarak uluslararası tahvil ve bono piyasaları üzerine ampirik bir çalışma yapıldı. Bu çalışmadaki bütün analizler bize euro'nun uluslararası para olma potensiyeline sahip olduğunu göstermiştir. Euro ile kıyaslandığında doların halen bazı avantajları olmasına rağmen, Avrupa'nın ve Amerika'nın egemen olacağı iki merkezli para rejimi, yüzyılımızın büyük bir kısmında süregelen dolar merkezli sistemin yerini alabilir.

Anahtar kelimeler: *euro, dolar, para birliği, rezerv para, uluslararası finansal piyasalar*

To My Family

ACKNOWLEDGEMENTS

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1. INTRODUCTION

The creation of the single European currency, the euro, is the most important development in the evolution of the international monetary system since the adoption of flexible exchange rates in the early 1970s. It is comparable to the Bretton Woods conference of 1944, the dollar replacing the pound sterling as the leading currency in the interwar period, and even the consolidation of the gold standard in the nineteenth century. It is obvious that the monetary union has fundamentally changed the structure of international relations.

A successful euro will be the first real rival for the dollar since the latter surpassed sterling as the world's dominant money during the interwar period. Europe is approximately the equal of the United States in economic output and trade, so why should it not be a competitor to the US in also monetary matters? Does the euro have a chance to challenge the dollar? The purpose of this thesis is to explore prospects for the euro as an international currency.

When the euro was introduced on January 1,1999, it immediately became the world's second leading currency. In terms of economic and financial importance it has been behind only the US dollar and well ahead of the Japanese yen. The euro took its importance mainly from its role as the domestic monetary unit of the twelve countries that form the European

Monetary Union (EMU). The GDP of EMU was equal to nearly 80 percent of that of the United States and more than double that of Japan. From an international perspective, the advent of the euro was a very important development for the economy and financial system of the rest of the world.

In this thesis we try to discuss this very important development and see whether the euro has a chance to become an international currency. The thesis starts with a literature review concerning what has been made about this subject till now. Then we begin by asking the question: "How does a currency gain the status of an international currency?" In short currencies gain international status as they meet the various needs of foreign agents more effectively than do other financial assets. Of course this is not the only reason. More may be found in the following chapters. Afterwards the need for an international currency is explained and advantages and costs of being an international currency are discussed. In short in chapter 3 the question "What factors affect the use of a specific money as an international currency?" is asked. In the last part of the chapter the great international currencies till now and their features are discussed. Why was the Dutch guilder the dominant international currency in the 17th and 18th centuries, the pound sterling in the 19th and early 20th centuries, and the dollar since the end of the World War II? There are some essential factors that a currency must have in order to become international.

In chapter 4 costs and benefits of a monetary union is explained and a comparison is made between them. Then a brief history of the euro and

formation of the euro is written. Chapter 5 is the main part of the thesis. In this chapter we are looking for an answer to our question "Does the euro have a chance to challenge the dollar?" Comparisons are made between the euro and the dollar in many aspects starting with the main economic indicators to their roles in the world trade. The thesis ends with a brief conclusion chapter.

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CHAPTER 2

2. LITERATURE REVIEW

Euro, a major milestone of European integration and the common currency of 12 European Union (EU) member countries (Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxemburg, the Netherlands, Portugal and Spain) became an international reserve currency on January 1, 1999. However, Euro banknotes and coins were introduced and have begun to replace national banknotes of these countries starting from January 1, 2002. The advent of the euro is a very important event in the international monetary system; indeed, as Mundell states in the world Gold Council in 2000, some people say that it is the most important event since the breakdown of the gold exchange standard in 1971. In this chapter, works on the euro in general, and as a challenger to the dollar will be reviewed.

A large common market with 304 million residents using the same currency is created with the launch of the euro. The last time Europe had a common currency was 2000 years ago, when the Romans ruled Europe and the gold solidus was widely used (Berberoğlu, 2003).

Adoption of the euro brings many advantages and opportunities. Kaikati (1999) summarizes these as lower transaction costs, elimination of uncertainty

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regarding the exchange rates, increased competition, stronger European identity and sustainable fiscal, economic and financial stability.

There are also political economic approaches to the advent of the euro. While discussing the U.S policy toward Europe, it is stated that the Community's choice of forming a monetary union as an ultimate objective leaves American policy pretty much where it would be or ought to have been without that decision (Krause, *et al* 1972). On the other hand forming a monetary union has also very important implications on the political economy of the member countries. They have lost two policy instruments that have traditionally been associated with their sovereignty over economic policy. For the member states of the monetary union neither interest rates nor devaluation are available any more (Dyson, 2002). These will have important implications on the political economy of the member states.

Furthermore, the structure of the world economy will be affected by the advent of the euro. With the euro, a new international monetary system that is characterized by four distinct features is emerging. These features are the exchange rate regime, the principles of international crisis management, the choice of preferred foreign exchange reserves and the mechanisms for eliminating external disequilibria (Welfens, 2001).

There exists a growing literature on the potential for the euro as an international currency. In his article Greenspan (2001) tries to answer the question "Why do we need for an international currency?" According to him an international currency emerges because it is a solution to an economic problem

(Greenspan, 2001). The world economy itself needs a unit of account, means of payment, and store of value for both governments and private firms in a world of more than 150 national currencies. Interbank operations, trade in primary commodities and invoicing patterns for exports of manufactured goods would be too complex in the absence of generally accepted metallic money such as gold or even a currency of a dominant country like the United States (McKinnon, 2000). Therefore, world financial and goods markets will naturally pick one national currency to be the interbank vehicle currency, the invoice currency in international trade, the preferred official intervention currency, and the principal official reserve asset (McKinnon, 2002).

According to Bergsten (1997) with the introduction of the euro, the monetary world is expected to move from being a purely dollar-centered one to being a bipolar one. In the foreign exchange market the euro/dollar exchange rate will play a crucial role and the changes in this rate will affect the relative prices of exports sourced in Europe and the US. As a result these changes will cause a shift in global demand from one continent to another.

The existence of a large financial market, in which euro-denominated assets are actively traded and domestic and foreign borrowers could raise sizeable volumes of funds at low costs, would enhance the euro's attractiveness as an international currency (Funke et al, 1997). The financial markets of the euro area are large and growing and Euroland is expected to have good inflation performance. The euro has been boosting the deepening of financial markets by lowering the barriers to cross-border transactions (Galati, Tsatsaronis, 2001).

Moreover the large size of the Euro area will cause a wider use of the euro as an anchor for the exchange rates of small countries (Artis, Hennesy, Weber, 2000). Bergsten (1997) predicts that the financial system will integrate rapidly and this might increase the demand for euros. The euro began life as a full-fledged adult and an instant success as a currency for use in international finance (Mussa, 2000). Mussa (2001) states that in the first year of the euro, the volume of international bonds (from issuers outside the euro area) denominated in euro was more than triple the volume of any previous year denominated in the predecessor currencies. Also in 1999, the volume of international bonds denominated in euro exceeded the volume denominated in US dollars. Mussa (2001) concludes that the euro is likely to remain the co-equal of the U.S. dollar as far as the bond issuance is concerned. The pace of integration of the euro area financial markets has clearly accelerated since the changeover to the euro in January 1999 (Euro Papers, 2002). Eichengreen (2000) states that the implications of the euro for European financial markets at the end of its first year have been more immediate than anticipated even by the currency's most enthusiastic proponents.

Euro's share in official international reserves of central banks is also an important aspect in euro's becoming an international currency. The standards of international monetary history show that a longer time period is needed for the euro to gain a large share in official reserves. It took a long time for the guilder and the pound, which were international currencies in the previous centuries, to have a big share in the official reserve holdings (Greenspan, 2001). Still, it is generally argued that central banks sooner or later will bring the euro in their reserve portfolios (Neaime, Paschakis, 2002). For example Solans (2003) states that central banks of

Asia hold euro in their reserves. On the other hand, there is a contrary argument which claims that any demand to hold euro assets as official reserves will not be greater than the former demand for reserve holdings in Europe's legacy currencies, especially German Mark and French Franc (McKinnon, 2000).

Portes and Rey (1998) predict that the transaction costs of private and public use of the euro will play a decisive role for its international role. They expect the transaction costs to decrease due to the integration of European capital and securities markets that increases the depth and liquidity of these markets (Rey, 1996). They expect the quasi status quo scenario to be the steady-state scenario. In this scenario, the euro replaces the dollar as a dominant currency for exchanges between the EU and Asian bloc. Instead the dollar will still be the vehicle currency of the foreign exchange markets. Hartmann (1998) agrees with this prediction, but he states that the most neglected function of international money is the function of a forex vehicle currency.

Some authors also used empirical data in order to discuss the international role of the euro. The central importance of size for international currency purposes is verified by econometric evidence. Eichengreen and Frankel (1996) concluded that a rise of 1 percentage point in a key currency country's share of world product, which is measured at purchasing power parities, is associated with a rise of 1.33 percentage points in that currency's share of central bank reserves. Also Eichengreen (1997) found that the rise of a currency's share in global reserves that derived from a rise of 1 percentage point in its country's share of global output (at PPP) is 0.9 percentage points, about two thirds as much as in the prior calculation.

The second question that is discussed in most of the articles is whether the euro will become a strong international currency that can challenge the dollar's international dominance. Some authors argue that the euro will be a strong rival to the US dollar and it will compete with the US dollar for world dominance (Bergsten, 2002; Eichengreen, 1998; Köhler, 2001; Neaime, Paschakis, 2002; Pollard, 2001). Some of these authors were careful to warn that the displacement of the dollar could take a long time as the dollar enjoys advantages conferred by incumbency (Schwartz, 1999; Wyplosz, 1997). Only a few were quite certain that the euro would challenge the dollar and might make that very quickly. In 1997 Bergsten wrote:

> The creation of a single European currency will be the most important development in the international monetary system since the adoption of flexible exchange rates in the early 1970s. The dollar will have its first real competitor since it surpassed the pound sterling as the world's dominant currency during the interwar period. As much as $1 trillion of international investment may shift from dollars to euros (Bergsten, 1997).

In 2002 Bergsten still stands by his prediction but now he says that the euro may not realize its potential unless the US misbehaves. "Inertia is so strong in financial affairs that it may be impossible to dislodge an incumbent unless that incumbent essentially abdicates" (Bergsten, 2002). Whether the euro will be able to compete with the dollar rapidly as Robert Mundell (2000) and Richard Portes (2002) expect is quite uncertain. Richard Rosecrance (2000) believes that the year 2010 is a little bit early to obtain equality in the two primary reserve currencies' worldwide holdings. Achieving the balance between the two currencies requires a $100 billion transfer from dollars to euros for each of the next twelve years

(Mundell, 2000). In order to achieve such a transfer what mechanisms must be used are uncertain. Mundell (2000) observes: "Unless this massive shift were offset by increasing lending by Europe and increased borrowing by the US, it would mean a massive shift in current account balances, with that of Europe's turning strongly negative, and that of the US moving in a positive direction" Richard Cooper notes, " this [shift] will require (other things equal) a current account deficit by the EMU-countries on a continuing basis, achieved by an appreciation of the euro relative to the dollar and other foreign currencies..." Cooper (1999) then observes, however, that the result could stem from the provision of 'exports of long-term financial capital form Europe' putting euros in the hands of foreigners as the US put dollars in the hands of foreigners through its investments abroad in the 1950s and 1960s.

In contrast to the authors who believe that sooner or later euro will become an international currency, Dornbusch (1996) argues that far from creating prosperity for Europe and becoming an international currency, the euro will be blamed for a period of poor performance in Europe. Nevertheless, arguments in favor of the euro are more in numbers. Eijffinger (2003) divides the authors that predicted the future of the euro into two as euro-enthusiasts and euro-sceptics. Euro-enthusiasts (Bergsten, Hartmann, Portes and Rey) predict that the euro will dominate the dollar rapidly, because investors' portfolios will be diversified into euros. On the other hand euro-sceptics (Kenen, Feldstein, Summers and other American economists) express that the euro will need to establish a track record before investors move their portfolios into euros. This process would take at least one decade because of inertia in reserve diversifications. The euro-sceptics state that if

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the euro proves to be a strong and expensive currency, only the amount of euros necessary for portfolio diversification will be bought. Also risk-averse investors will want to keep a sufficient degree of diversification and this requires that they hold a variety of currencies.

Hartmann and Issing (2002) conclude that although the euro area and the US have a real economy and domestic monetary stability that is similar, the dollar has still the largest international role, because several other factors give it a relatively large advantage over the euro. The dollar's international strength comes from the fact that the United States has remained larger in terms of GDP, trade and other size variables, than any other currency issuing economy in the world (Bergsten, 2002). The advent of the euro has created a rival for the US dollar as an international currency that has a domestic base of roughly the same size and general attractiveness of the US dollar (Mussa, 2002). The acceptance of the euro in international markets will surely take time. Some barriers may be overrun with time. The value of the euro depends on confidence of the markets in continuance of some economic fundamentals, such as positive GDP growth, a current account surplus, a decrease in unemployment rate, and containment of inflation in the Euroland. Moreover, the value of the euro also depends on the confidence of the markets in the commitment of the governments of the Euroland to implementing the structural reforms in the labor, product and financial markets (Neaime, Paschakis, 2002). In the category of current account position and debtor status, the United States is at a disadvantage, but this could be offset by the advantage of incumbency and network effects (Henning, C.R *et al*, 2000).

According to Schroder (1999), one of the most important criteria for a national or regional currency to become an international currency is its stability, free convertibility and predictability. For example, after World War I, the US dollar was able to replace the British pound because of its more stable value, the existence of large and well-developed financial markets in the US, and the large size of the US economy (Salvatore, 2000b). The euro fulfills the last two conditions but time is essential in order to prove and demonstrate its stability, which was one of the key promises given to European citizens. In order to have an incentive to hold euros instead of dollars in their portfolios, international investors have to believe in the euro's stability (Galati, Tsatsaronis, 2001). It took the US dollar almost half a century to overcome the British pound's dominance in international financial markets (Schroder, 1999). The British pound preserved its dominance at least half a century after the GDP of the US overcome the GDP of Britain. The reason of it is the fact that inertia is too strong in financial affairs (Bergsten, 2002).

Some authors argue that there will be a portfolio diversification away from dollars into euros by private investors and central banks as soon as the ECB establishes its own credibility and this will lead to an appreciation of euro (Bergsten, 1997; Bergsten, 1999). For such a diversification, the ECB has to establish confidence in its monetary policies. McCauley (1997) states after its introduction, the euro may benefit from shifts by central banks into treasury bills issued by European governments. The primary goal of the ECB has always been maintaining price stability. Neaime and Paschakis (2002) have suggested that the ECB will not be very much interested in targeting the euro/dollar and the euro/yen exchange rates to protect its commitment to price stability.

The studies on the euro/dollar exchange rate also focus on portfolio management decisions of both European and foreign investors and the expected reflections of these decisions on the euro/dollar exchange rate. Edmunds *et al* (2000) found that the advent of the euro makes it more likely that exchange rate fluctuations will display longer waves than before. Substitution into euro assets will occur when euro assets yield expected returns in excess of dollar assets (Neaime, Paschakis, 2002). However, in order to expand this portfolio shift in favor of euro-denominated assets, the ECB has to apply a tighter monetary policy than the Fed.

Some authors claim that the euro's role as a rival against the US dollar depends on political elements. There are doubts on the euro's stability and its strength against the US dollar, as EU cannot be considered as a strong central state (Mundell, 1998). On the other hand US is alone while taking decisions regarding the economic and political issues that will affect the value of the US dollar. No other nation is involved in such a process. However, the political and instrumental independence of the central bank is an important institutional fundamental for a stable currency (Schroder, 1999). ECB is completely independent and this is promising for the euro. ECB will prove its political independence with the stability of its monetary policies (Kaikati, 1999). Buiter (1999) stated that the performance of the ECB in the first six months had been successful, except as regards accountability, openness and transparency.

This thesis is a contribution to the literature that evaluates the international role of the euro as a challenger to the US dollar. In the following chapters, the euro's presence in international markets and portfolios will be analyzed comparatively with that of the US dollar. In addition, based on economic analysis on the performance of the euro since its advent in 1999, predictions will be made about the potential rate of the euro in international markets and portfolios.

CHAPTER 3

3. INTERNATIONAL MONEY

In this chapter firstly the functions of money and quality of a currency will be described. After making the definition of an international currency, the need for it is explained. Furthermore, the advantages and costs of being an international currency is discussed and the features of international currencies are explained by analyzing the historical evidence.

3.1. Functions of Money

Money has four primary functions in an economy: medium of exchange, unit of account, store of value and standard of deferred payment. Money distinguishes from other assets such as stocks, bonds and loans by its function as a medium of exchange.

In our economy, in almost all market transactions money is used to pay for goods and services, as a medium of exchange. The use of money as a medium of exchange brings economic efficiency as it saves time while exchanging goods and services. If our current economy is compared with a barter economy in which goods and services are exchanged directly for other goods and services without money, the benefits of the medium of exchange function of money can be understood better. Suppose a shoemaker wants to buy something to eat. In a barter economy he has to find a farmer who not only produces the food he likes but also wants to buy shoes. Barter transactions require a double coincidence of wants.

Each individual must have something the other desires. It will be difficult and time consuming to search for such a farmer. The time consumed while trying to exchange goods and services is called a transaction cost. In a barter economy transaction cost will be really high.

As a result the need for money is so strong that even the primitive societies invent it. A commodity must have several characteristics in order to function effectively as money. First of all it has to be easily standardized. Secondly, it must be widely accepted. In order to make the exchange easy, it has to be divisible. Besides it must be easy to carry and last but not the least, it must not deteriote quickly.

Other than being a medium of exchange, money has also a second role: to provide a unit of account. The value of goods and services is measured in terms of money, just as weight is measured in terms of pounds or kilos. Using money as a unit of account reduces the number of prices that need to be compared and makes the comparison of the prices of the commodities easier. In the absence of a common unit of account, there would be more prices than goods in the economy. The presence of money as a unit of account reduces transaction costs. As the economy becomes more complex, this function of money becomes more beneficial.

Third function of the money is its store of value function. It is used to save purchasing power from the time income is earned until the time it is spent. There are also other assets that have this function, besides they often pay the owner a

higher interest rate than money; but still people prefer to hold money. The reason of it is the concept of liquidity, which can be explained as the relative ease and speed with which an asset can be converted into a medium of exchange. As it is itself a medium of exchange, money is the most liquid asset. All other assets involve transaction costs when converting into money. This fact explains why people are willing to hold money even if it is not the most attractive store of value.

Finally, money serves as a standard of deferred payment. A payment that is deferred to the future is usually stated as a sum of money. Having a common standard for deferred payments makes it relatively easy to determine precisely how much a deferred payment will be.

These are the basic functions of money. All currencies have these functions on a national level, but an international currency serves as a medium of exchange, a unit of account, a store of value and a standard of deferred payment through out the world.

According to Tavlas (1997) underlying the dollar's dominant position are the medium of exchange and unit of account functions of money, and the role of money in conveying information about relative prices. By using money, people reduce the amount of information that they must acquire and process, and also the number of transactions that they would make. Money performs a function very similar to that of an international language. If just a one person speaks a language then it will not have any social value, but as the number of people who speak it

increases it can become a mean of communication. The same is true also for money. A currency cannot become a useful unit of account and medium of exchange if just a single person uses it. The utility of money depends on how many others use it. That is the reason why individuals have to convince many other agents to make the switch as they do if they have an incentive to switch to another currency. The effect of the switching cost had best been seen in the case of United Kingdom, when the pound sterling had continued to be widely used internationally years after the United Kingdom lost its position as the world's leading economic power.

Table 3.1: Private and public sector functions of international currency

Money Function	Private sector use	Public sector use
Means of payments or Medium of exchange	*Vehicle currency* used to settle international trade and to discharge international financial obligations	*Intervention currency* used in foreign exchange markets and currency used for balance of payments financing
Unit of account (numeraire)	*Quotation currency* used to denominate international financial instruments and to invoice foreign trade transactions	*Pegging currency* used in expressing exchange rate relationship and as an anchor for other currencies
Store of value	Investment currency used to denominate deposits, loans and bonds	Reserve currency used as international reserves by monetary authorities

Source: Hartmann (1998) based on Cohen (1971)

3.2.Quality of a Currency

Currency competition and competitiveness appeal to a quality theory of money. How can we explain the concept of quality? Hayek (1976) underlines two 'not wholly unrelated dimensions': the expected behavior of the value of the currency, its acceptability (same as its degree of liquidity) (Boissieu, 2000).

The first criterion is about the stability condition of money. A currency should have the capacity to post a purchasing power approximately constant in time. Economic agents prefer currencies with low inflation variability and low inflation costs in an environment with competing monies. Here the external value of the currency that is measured by the exchange rate has to be considered as it has a significant effect on its internal value.

The second criterion relates both to the medium-of-exchange function and the expected liquidity of the currency. A reserve currency must rely on domestic capital markets and financial intermediaries that are fully deregulated, deep and elastic in order to be competitive.

Also some other determinants of credibility have to be taken into account including the political dimension. Furthermore, the Hayekian paradigm must be complemented. For example the tension between currency concentration and diversification is both internationally and domestically permanent. According to Boissieu concentration is warranted by potential and/or actual economies of scale and the derived reduction in unit transaction costs with size. It could also be

founded on 'preferred habitat' considerations. Diversification is rational for risk-averse agents facing portfolio decisions under uncertainty.

3.3. Definition of an International Currency

A currency is international when it is used outside the domain in which it is legal tender, not only for transactions with the issuing country, but also with third countries. Hartmann and Issing (2002) identified four factors that are important for the international role of a currency. The first factor is breadth, liquidity and openness of domestic financial markets. Large and liquid financial markets imply low transaction costs and attract foreign agents. The second factor is stability and confidence in the future stability of the currency. The third factor is the size, strength and international linkages of the domestic real economy. When a country or region plays an important role in the world economy then their currency can be re-used in other transactions by foreign agents and they will accept the currency easily. The last factor is the previous use of the currency.

According to Portes and Rey (1998) if a currency wants to become an international vehicle currency, its transaction costs need to be lower than the transaction costs of the domestic currency. Transaction costs are lower when the volumes of transaction in that currency is high and the exchange rate variability is low. In one of the cases of Portes and Rey (1998), the euro becomes a major international currency because of the growth of domestic and cross-border trade in euro-denominated claims. And in one version of that case, the growth of that asset trade makes the euro the dominant currency in the foreign exchange markets.

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Garganas (2003) counts several factors that are essential for a currency to be used internationally. In order to be acceptable market participants must be willing to hold it as a store of value. This brings the fact that the country or monetary union issuing the currency must have a low and stable inflation rate relative to those of other currencies. As inflation reduces the purchasing power of a currency, it discourages its use internationally. Besides, it leads to exchange-rate depreciation and uncertainty. A currency's future value in terms of goods and services being predictable and stable is a necessary condition for the international use of it. This is a necessary condition but of course not the only condition for a currency to be international. There is also another factor that is named as the size factor by Garganas (2003). The size factor relates to the relative economic and demographic area for which the currency serves as a legal tender. According to Garganas "A strong, competitive economy, open to, and active in, international trade and finance will naturally generate a large quantity of foreign exchange transactions with at least one leg in the home economy to support its wide-ranging business activity." The last factor Garganas mentions is the presence of an open, well-developed financial system.

The international role of a currency is higher when interest rate and exchange rate developments lead to interest rate and exchange rate developments in the same direction for other currencies.

3.4. The Need for an International Currency

Let's think about a world without an international currency. In such a world, each country's exporters of goods and services would invoice their sales in their own domestic currency and then ask payment in it. In other countries the customers of this country would have to buy that currency whenever they bought goods and services from that country. Additionally, in such a world, firms and governments would issue debt in only their own currency and banks would not take deposits or make loans in any currency but their own. As no one could hold financial instruments denominated in another country's currency, also all international capital flows would be ruled out.

How might the foreign-exchange market function if merchandise trade were conducted in the exporting countries' currencies? Usually a country trades with several other countries. As a result importers would need several foreign currencies to pay for their purchases. However, it may be most efficient for the foreign-exchange market to use a single foreign currency to execute transactions in those several currencies.

Consider a country X, which performs most of its trade with the country A, but smaller amount of trades with many other countries. Conceivably, foreign-exchange dealers in the country X would be willing to trade their domestic currency with many kinds of other currencies. This would be inefficient. There would have to be at least one foreign-exchange dealer ready to offer each of those currencies in exchange for the domestic currency of the country X. In fact, there

would have to be more than one such dealer, in order for each dealer to adjust his/her holdings of, for example, Turkish Lira whenever a firm from country X bought or sold Turkish Lira. Otherwise, the single dealer would be uniquely exposed to losses if the currency of country X-Turkish Lira exchange rate changed.

In most countries, currency markets deal in one foreign currency and this currency then becomes the vehicle currency. When a firm in the country wants to buy Turkish lira, the firm uses its own domestic currency to buy the vehicle currency in its domestic market, then sells the vehicle currency for Turkish Lira in the Turkish market. As there is a large volume of domestic currency-vehicle currency trading in country X and of Turkish Lira-vehicle currency trading in Turkey, transaction costs of this trade are remarkably low. On the other hand Turkish lira- the domestic currency of country X market would be thinner and as a result the transaction costs would be higher.

As the vehicle currency is the main foreign currency traded in country X, it is also the currency used by the central bank of country X when it intervenes in order to influence the value of its own domestic money. Because the vehicle currency becomes an intervention currency at the same time, the central bank of the country X will hold some if not all of its currency reserves in vehicle currency denominated assets.

Also there are two other factors that strengthen these tendencies. The first one is the fact that standardized commodities like oil and nonferrous metals are traded

on organized commodity markets, where it is convenient to quote prices in a single, generally used currency. Secondly, many countries quote and sell their other exports in the national currencies of their largest trading partners.

Moreover, these arrangements are self-perpetuating. In order to shift to another arrangement an explicit or tacit coordination should be made among the trading firms and among the foreign-exchange dealers. A single firm or foreign exchange dealer cannot create a new submarket in which to trade an additional foreign currency against the domestic currency alone. That foreign currency must be wanted to be used by some exporters and importers in their buying and selling activities. Besides it must also be wanted by several foreign-exchange dealers not just to deal with the exporters and importers but to deal with each other. As a result we can say that currency markets are supported and sustained by economies of scale and network externalities. (Kenen, 2002)

In international monetary system a small number of currencies should be used in cross-border trade in financial assets. Two facts can be given as reasons for this. Firstly, in large countries there are large and liquid secondary markets. In these markets it is easy and inexpensive to trade existing financial instruments, so the investors that look for diversity in their holdings internationally will enter in those large markets and the instruments traded in them. Central banks that must hold and manage large amounts of foreign- currency reserves are also included in these investors. As a result central banks hold assets denominated in the currencies of countries with large financial markets. Secondly, in countries that have historically high levels of inflation and currency depreciation, firms and

governments cannot issue debt in their own national currencies. Therefore they must use a foreign currency. This causes that chosen currency to become an international currency for issuing debt and for secondary trading in that debt.

3.5. Advantages and Costs of Being an International Currency

According to Cohen (1977) the benefits of being an international currency can be divided into political and economic benefits that arise because the dominant country can take advantage of the international private and public use of its currency.

One of the advantages of an international currency in political terms is the status and prestige that comes with market dominance. Mundell (1993) states, "Great powers have great currencies." An international money becomes a potent symbol of primacy, an example of what political scientist Joseph Nye (1990) has called "soft power". While forming and implementing policy, the concerned country is insulated from foreign influence. Moreover, this country is more able to pursue its foreign policy objectives without constraint and may have influence on other countries.

There are also several economic benefits. The issuing country can collect seignoirage. It can obtain real goods and services in exchange for costless notes and coins. Cohen (2003) explains the term seignoirage as "the implicit transfer, equivalent to an interest-free loan, that goes to the issuer of a money that is widely used and held abroad". As it is costless to produce, it enables the issuer to acquire great amounts of goods, services, and assets from the rest of the world without

sacrifice. Garganas (2003) mentions the seignoirage as a benefit of an international currency, the increased earnings of its financial sector (loans, investment and purchases of goods and services will be more and more executed through the financial institutions of the country issuing the international currency) and the issuing economy will be less vulnerable to changes in the value of its currency than other economies are. It is estimated that United States earns at least $15-20 billion a year from circulation of the bank notes around the world (Blinder 1996).

The concerned country is able to collect a liquidity discount. Because of the debt and liquidity that characterize its bond market, the interest rate on its debt is relatively low.

The country issuing the dominant currency has the possibility to finance its current-account deficits in its own currency. When the country deliberately allows for larger current account deficit, this financing of the current account deficit could be the largest advantage.

There are also some costs of the country issuing the dominant currency. Political stability for the dominant country is important. It is essential that there is trust in the stability of the currency. The issuer has to avoid a conflict between the preservation of credibility in its currency and the provision of liquidity. A dominant currency has to be both scarce to preserve its credibility and abundant to provide liquidity, at the same time. This is called the Triffin dilemma (Triffin, 1961) and it emphasizes that it is necessary that the responsible monetary

authorities give up the control of their money supply when a national currency gets the function of a reserve currency in other countries. It has to bail out not only domestic but also foreign banks and financial institutions in international financial crisis (Lender of last resort function)

In the issuing country it is necessary to have large, deep financial markets that are free of capital controls, because transaction costs need to be reduced as much as possible.

Garganas (2003) sees the increased complication of the conduct of monetary policy as a cost of having a currency with a dominant international role. A portfolio shift away from the currency can lead to large capital outflows and/or large declines in the exchange rate because foreigners hold a large share of the currency. Tavlas (1997) states that because of these huge capital outflows and the large variations in the exchange rate, the capacity of the monetary authorities to control the monetary base and influence domestic economic activity can decrease.

3.6.Features of International Currencies

In this section the features of the international currencies will be discussed by analyzing the historical evidence.

3.6.1. Historical Evidence

In the history of mankind, there are thousands of currencies issued but only a few of them can be considered as an international currency. The number of such currencies may be counted on the toes of one foot. The dollars of the 20th century,

the pounds of the 19th century and the livres of the 18th century all have their counterparts in earlier centuries. Table 3.2 is taken from an article* of Robert Mundell and it lists the main international currencies of the history and the great powers that issued them.

In his article Mundell explains the historical backgrounds of the ancient currencies:

> The Persian daric and Greek stater were virtually the same coin. The Persian sigloi was modeled on the Babylonian shekel, as was the Greek drachma. The Roman denarius was patterned on drachma. The Islamic dinar was an imitation of the Roman aureus, solidus or besant, while the Islamic dirham was modeled on the Greek (and Sasanian) drachma. The Carolingian denier was modeled after the Islamic half-dirhem. The florins of Florance and sequins of Genoa were simply light or degraded aureii. The Dutch gulden was modeled on the Arabian maravedi. The US dollar was modeled on the Spanish dollar. Originality is not the stuff of what great international currencies are designed.

Let us look at recent history. In 19th century after the emergence of liquid financial markets, modern central banks and the international gold standard, holding foreign assets as a reserve against official liabilities became a standard practice. Commodity monies dominated domestic and international transactions before the industrial revolution. The development of the steam engine facilitated the rise of the gold standard. One of the problems with the gold standard was the fact that the spread of gold had been limited as the smallest gold coin was too valuable for day-to-day transactions.

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* Mundell, Robert (2000). The Euro and the Stability of the International Monetary System

Table 3.2. Great Currencies and Great Powers

	Period	Gold	Silver	Paper
Greece	7th-3rd C. BC	stater	drachma	
Persia	6th- 4th C. BC	daric	shekel	
Macedonia	4th – 2nd C. BC	stater		
Rome	2ndC.BC-4thC	aureus	denarius, sesterce	
Byzantium	5th-13thC.	solidus(bezant)	siliqua	
Islam	7th-13thC.	dinar	dirhem	
Franks	8th-11thC.		denier	
Italian City States	13th-16thC.	florin,sequin, ducat	grosso	
France	13th-18thC.	denier	livre, louis d'or	
Holland	17th-18thC.	guilder (gulden)	stiver	stivers, 1573
Germany	14th-19thC.		thaler	
France	1803-1870	20-francs, 40-francs	franc	
Britain	1820-1914	pound or sovereign	shilling	paper pound
US	1915-	eagle	dollar	greenback
EU	1999-			paper euro

Source: Mundell, Robert (2002) "The Euro and the Stability of the International Monetary System"

Until the gold standard started to be used, most countries had been on the silver standard or on some form of bimetallic standard. Under these kinds of standards government stood ready to mint fixed quantities of both silver and gold bullion into legal tender and small denomination of coins were composed of silver. After the introduction of the steam engine, the main constraint on going onto gold became acquiring an adequate stock of gold. A government might overcome this by suspending its commitment to buy silver and allowing its

domestic price to decline below world levels. As a result arbitragers would export silver and import gold. If the metallic basis of the money supply was concentrated in official hands and only paper money and coins circulated internally, the transformation could be carried out even faster. By this, one institution (it might be the government or the central bank) could itself exchange the nation's silver for gold on the open market. Precious metal was scarce in some of the countries. In these poorer countries, there was a natural tendency to buy interest-bearing financial assets convertible into gold rather than gold itself.

Only after the 1870's the holding of foreign exchange reserves became widespread. Central banks' and governments' foreign exchange reserves amounted to less than 10 per cent of their gold reserves in 1880. Austria, Belgium, Canada, Denmark, Finland, Germany and Sweden were the major countries holding exchange reserves at this time.

After the 1880's the share of the foreign exchange in world reserves started to increase. Japan gained exchange reserves in the form of indemnity from China after her victory in the Sino-Japanese War. In the 1890s Russia started to hold the returns from her foreign loans in Paris and Berlin and use these in order to stabilize her currency. Austria tried to imitate Russia in this sense. The British sovereign was made legal tender in India and the government established a reserve in London in 1899.

In 1899 the official institutions were holding sterling more than twice the French francs, Reichmarks and other currencies. Sterling was the leading reserve

currency. Britain being the leading trading and creditor nation, sterling was the favorable currency in which to borrow. Likewise London was the best place to hold the proceeds. After 1860s Bank of England started to grow increasingly knowing its lender-of-last-resort responsibilities and assured the liquidity of the London market. Until 1871 sterling was the only currency that could be converted into gold without any condition. Being the second most important reserve money at that time, the French franc was convertible into gold at the option of the authorities. There was a possibility that authorities might choose to redeem their liabilities in depreciated silver. Sterling began to lose its superiority after 1913, when modern economic growth had spread to the whole world and commercial and financial dominance of Britain had started to disappear.

On the other hand, the situation just before the break of the World War I shows the limitations of the model of strong network externalities, according to which one reserve currency should crowd out the others. The franc and mark together accounted for as large a share of official foreign exchange holdings as sterling by 1913. According to Lindert (1969), network effects seem to have been regional, not global (Eichengreen, 1997). The main reason of sterling's being dominant in official portfolios was the large sterling reserves held by the governments of India and Japan. On the other hand it was the third currency after the franc and mark in terms of value of the holdings of official institutions. For the Russian government, the Paris capital market was very important as it held most of its exchange reserves in francs. Likewise Greece and Romania, the countries that are mostly dependent on French finance and influenced by French diplomacy, held more francs than sterling. The Reichmark gained its importance from the

countries close to Germany because of the trade relationship between them. These counties were Austria, Italy and Scandinavia. Also in some sense Russia might be included in these countries because of her relative geographic closeness to Berlin.

At the Genoa Conference in 1922, governments adopted a resolution encouraging the practice of holding exchange reserves, as they were concerned about the danger of deflationary pressure. The impact of this attempt was unfortunately less than hoped. About 1928, foreign exchange accounted for 24 per cent of the total global reserves. This percentage was only slightly higher than the one in 1913 (19-20 per cent). As Nurkse (1944) notes, this modest increase can probably be explained away by the widespread higher interest rates in 1920s, compared to the period before the World War I, which increases the return on foreign exchange (Eichengreen, 1997).

Before the World War I, Canada and the Philippiness were the only countries that were holding a significant share of their reserves in dollars. Canada was highly dependent on the New York capital market and the Philippines was effectively a dependency of United States. US started to export more than she imported only after 1890. With the adoption of the Gold Standard Act of 1900, the questions about the dollar's convertibility into gold were removed.

Basically the US was not successful in adapting the institutional prerequisites for promoting the dollar to the status of an international currency. The dollar was not used commonly in international transactions. This was an implication of the absence of a broad and deep market in bankers' acceptances. National banks were

not allowed to accept bills of exchange resulting from international trade before the passage of the Federal Reserve Act. There was no central bank to rediscount those acceptances and other commercial instruments or to purchase bills and acceptances directly using open market operations.

The country's lack of a central bank was blocking the development of the discount market, making American firms dependent on the London market and reducing their international competitiveness. The establishment of a US central bank (FED) was the first step to transform this situation.

In the process of encouraging the use of dollars also other changes played a role. Before the war ended commercial and investment banks of the US started to branch abroad. As Eichengreen (1997) notes, "The Europeans' forced liquidation of foreign assets and accumulation of external liabilities; rendered their balances of payments, and by implication their exchange rates, less secure. And the devastating economic effects of the war and Europe's relatively slow postwar recovery increased America's share of international trade and financial transactions."

The shares of dollars, sterling and franc in the investment portfolios of central banks is not known exactly now although they used to publish information about their gold and foreign exchange reserves in their year-end balance sheets. They did not reveal the currency composition of their foreign exchange reserves. Triffin (1964) estimates that in 1928 the official reserves in dollars were $600 million, versus $2560 million in other currencies. These numbers show us that the US

exceeded the UK as an economic and financial power, but the dollar still could not become a competitor for the sterling as a reserve currency. Eichengreen (1997) believes that "This is powerful testimony to the advantages of incumbency and the enduring legacy of institutional arrangements past."

In 1931 the gold standard started to collapse. It is followed by the exchange rate instability. All these factors caused a large-scale liquidation of foreign exchange reserves as central banks scrambled out of sterling and dollars into gold. According to the estimates of Triffin the reserves denominated in dollars decreased to $60 million by the end of 1933, while the reserves denominated in other currencies fell to $1055 million. Probably more than half of the total decline in other currencies shows the liquidation of sterling after Britain left the gold standard. The French franc remained stable and convertible during this period. In 1930s the known reserves of the sterling area countries were circa $750 million, an amount that exceeds Triffin's estimates of dollar reserves. Also the sterling was not a regional currency any more as bulk of sterling reserves was also being held by Ireland, India, Pakistan and Australia. In 1934 US re-pegged to gold. Although the sterling continued to float, it continued to stay as a reserve currency and surpass the dollar thanks to the advantages of incumbency.

World War II caused a widespread economic damage and changed the financial positions extensively. When the World War I started,the US accounted for half of global industrial production and was the world's biggest financial market. In 1919, the sterling had been allowed to float, but it had still stayed freely convertible to other currencies. During this time, for more than a decade,

the authorities were forced to delay the full resumption of convertibility. The dollar always stayed fully convertible and there was a strong excess demand for it, which is a proof of the other countries' high demand for US exports and dollar reserves.

During the wartime in order to sterilize and block the sterling balances they obtained, Britain had bought raw materials and intermediate inputs by negotiating with other countries. In 1949 the total sterling balances show an impressive reliance on sterling reserves. As these balances were mostly blocked and inconvertible, in real the situation was different. During 1950s the level of the balances remained stable as the liquidation of involuntarily held balances were almost exactly offset by the voluntary accumulation of sterling reserves. But the reserve accumulation in dollars was more. The dollar started to dominate the sterling by the middle of the 1950s and dollar reserves were double of sterling reserves by the early 1960s. Britain's economy was growing slowly meaning that she accounted for a continuously decreasing share of world production, trade and financial flows. As she had balance of payments problems in 1950s, in 1964 and 1967, the countries began to believe that holding sterling meant holding a depreciating currency.

In these years, there was one more important development. The deutsche mark also started to become a reserve currency. In the early sixties deutsche mark reserves were negligible but in the late sixties they increased to $1 billion, which is an amount that is roughly 25 per cent of reserves denominated in sterling and 5 per cent of reserves in dollars. According to Eichengreen (1997) "Seen through a

rear view mirror, this is a surprisingly low level, given the currency's persistent strength, the fact that it was revalued in both 1961 and 1969, and the extent to which Germany was at the center of Europe's trade." The reason was the suspicion of the countries to hold the currency of a former enemy power, which had operated under significant restrictions on its sovereignty as recently as 1955. But Germany insisted on making deutsche mark an international currency although Germany's financial system lacked the deep, liquid and stable security markets that are necessary to make a currency attractive in international transactions.

In the 1960s American military aid and US investment abroad caused a balance of trade surplus but a balance of payments deficit in the US economy. The dollar was still fixed to gold, but the dollar amount outside the US increased and started to exceed the US gold stock. As a result of this devaluation occurred in US and the dollar's value fell relative to yen and the DM.

After 1971 there has been some diversification of currency denomination of official foreign exchange reserves. In this period the currencies were generally floating and a more multi-polar economy developed. The share of the US in the world trade was no longer so large and the number of countries that pegged their exchange rates against the dollar started to fall. In the 1970s, Britain's share in total world trade declined sharply, from 8 per cent at the start of the decade to 2 per cent at the end of it. High inflation and Britain's appeal to the IMF in 1976 did not cause any immediate liquidation of existing sterling reserves but it caused the countries to become unwilling to save more. In the longer term both deusche

mark's and yen's share have continued to rise. The rate of growth in the share of yen is very influential but its weight in central bank portfolios has remained small.

3.6.2. Features of Great International Currencies

The key characteristic of an international currency is the confidence in its stability. Stability depends on several factors such as size of transactions domain; stability of monetary policy; absence of controls; strength and continuity of the issuing state; and fall-back value. (Mundell, 2000)

The depth and breadth of the market is a measure of the degree in which a currency can exploit the economies of scale and scope inherent in money. A currency can behave as a cushion against shocks, if the transactions domain and the single currency area are large. Size produces stability and stability increases the attractiveness of the size. As the transactions domain becomes larger, the currency becomes more liquid, because any particular shock will depress the price less. The liquidity of a single-currency is determined by the size of it. A currency that is used by 100 million people is ten times more liquid than a currency that is used by 10 million. Size is a relative thing. Euro's survival depends on competition with its two rivals, the dollar and the yen. According to Mundell the competition between these three currencies would depend on relative market sizes, and the outlook for the euro is very favorable. The population of EU-11 is 292 million, and the population of EU-15 is 375 million. Even the population of EU-11 that contains the countries that entered the EMU on the first round is somewhat larger than the United States. The population of Japan, by comparison is 125 million. At current exchange rates, EU-15 has a GDP of $8.4 trillion and

EU-11 has $6.6 trillion whereas US having $8.5 trillion and Japan having $4.1 trillion. All of a sudden EU becomes a player on the same scale as the United States and Japan. As the other countries join, the euro will have larger transactions domain than the dollar.

The currency of a nation with a high rate of inflation has never survived as an international currency. Mundell states that "Historically, the countries producing great currencies have avoided inflation by maintaining the gold or the silver content, with devaluation or debasement a comparatively infrequent phenomenon". When the inflation rate is low, the cost of holding money balances will also be lower and consequently more of them will be held. The rate of inflation must not only be low but also be stable. In order to be stable, a monetary policy must also be predictable and consistent. These come with transparency.

Exchange controls would not be a desirable thing for an international currency. The fall-back value of a currency is undermined further by the threat of inconvertibility and exchange controls. Unites States has also used controls as an instrument of its foreign policy. For example, between the years 1933 and 1975, although according to Article IV-4-b of the Bretton Woods Agreement, the dollar was supposed to be freely convertible into gold, the citizens of the United States were forbidden to hold gold.

Strong currencies have always belonged to strong central states. If a state is not powerful enough to defend itself against enemies, it cannot have a strong

currency, either. When a state collapses, the stability of its currency also collapses.

The great currencies of the past were convertible to either gold or silver or both, meaning that they had a fall-back value if the state collapsed. Modern currencies differ in this respect; a paper currency does not have a fall-back value. Before the dollar, historically no fiat currency could achieve a great international power. Until the 20th century all the great currencies were metallic. The dominant currency before the dollar, the pound sterling achieved its great significance as metallic money. Mundell states:

> When the dollar was selected as the unofficial anchor at Bretton Woods, it had ceased to be internally redeemable, but was still externally convertible into gold, the only such currency (apart from the Swiss franc). If the dollar is now a fiat currency, as a 'ghost of gold' it is the exception that makes the rule (Mundell, 2000).

The introduction of the 0SDR is a proof of the importance of the fall-back factor. In 1970, in the first Amendment to the Articles of Agreement of the IMF, it was confirmed that SDR had a gold weight guarantee. After the collapse of Bretton Woods, the SDR underwent a series of transformations and turned into a four-currency basket including the euro. If its gold guarantee had remained, the SDR would have been much more important in the international monetary system.

CHAPTER 4

4. MONETARY UNION

In this chapter after analyzing the costs and benefits of a common currency, the comparison of these costs and benefits will be made. Afterwards, the meaning of the euro, the history of European Monetary Union (EMU) and the three stages of EMU will be discussed.

4.1. The Costs of a Common Currency

In this part the costs of a common currency are divided into two parts as shifts in demand and other costs.

4.1.1. Shifts in Demand (Mundell)

To explain this effect the case of a demand shift developed by Mundell (1961) in his article about optimum currency areas will be considered. Let us suppose that the preferences of EU consumers have changed in favor of Italian products rather than German ones. This will cause an upward shift of the demand curve of Italy and a downward shift of the demand curve of Germany. As a result the total output in Italy will increase while it will decrease in Germany. Probably this will cause an increase in unemployment rate of Germany and conversely a decrease in unemployment rate of Italy (De Grauwe, 2000).

We may also analyze the effects of this demand shift on the current accounts of the two countries. Current account may be formulized as domestic output minus domestic spending. The value of domestic output in Germany has decreased as a result of the shift in aggregate demand. Germany will have a current account deficit unless German residents spend less. As the social security system automatically pays unemployment benefits, this will be the most likely outcome. As the German residents' disposable income will not decline to the same extent as output falls, the budget deficit of German government will increase.

In Italy, the reverse will happen. Probably the value of total spending by Italian residents will not increase to the same extent as the value of output increases. The residents would probably prefer to save some part of the extra disposable income. As a result Italy will have a surplus on its current account.

Consequently, both countries will have an adjustment problem. Germany has troubles with unemployment and current account deficit while Italy experiences a boom. This boom will cause the price level to increase and accumulate current account surpluses. Likely there are two mechanisms that will lead to an automatic equilibration in two countries. These are wage flexibility and mobility of labor. If wages are flexible, and/or if the mobility of labor between the two countries is high enough, then the adjustment problem for Italy and Germany will disappear automatically. Otherwise, the adjustment problem will not vanish. For example, suppose that there is not a decline in the wages of German workers and also they do not move to Italy. In that case there

will be an excess demand for labor in Italy and this will cause the supply curve to shift upward. As a result Italian prices will increase causing German goods to become more competitive again. Then, the aggregate demand curve of Germany will shift upward. We can conclude that if wages do not decrease in Germany the adjustment to disequilibrium will take the form of inflation in Italy.

Now the authorities of Italy will face a dilemma. If they resist these inflationary pressures, the current account surplus will not disappear. On the other hand if they care about the current account surplus, they have to accept the high rate of inflation. The only way to solve this dilemma is to revalue the lira against the mark. By this way the demand curve of Italy will shift back to the left and the reverse will occur in Germany. The German aggregate demand curve will shift upward as the devaluation of mark will increase the competitiveness of Germany.

According to Mundell, these demand shifts solve the unemployment problem of Germany and the inflation problem of Italy. Besides, the current account deficit of Germany and surplus of Italy tend to vanish. If there had been a monetary union between Italy and Germany, then while Germany would have a sustained unemployment and a current account deficit problem, Italy would have high levels of inflation. In this sense it can be said that a monetary union has a cost for both Germany and Italy (De Grauwe, 2000).

As a result it can be said that a monetary union is optimal if either there is sufficient wage flexibility or there is sufficient mobility of labor. On the other hand according to the European Commission, in a monetary union differential shocks in demand will occur less frequently. The industrial European countries usually engage in intra-industry trade, such that countries buy and sell to each other the same kind of products. Consequently, when a shock occurs, aggregate demands of both countries will be affected in similar ways (De Grauwe, 2000).

4.1.2. Other Costs

Countries may have different preferences about inflation and unemployment. This may make the usage of a common currency costly. If two countries decide to form a monetary union, the exchange rate is fixed, so that the rates of inflation must be equal. If their inflation rates differ, the one with the higher inflation rate will lose its competitiveness. In a monetary union, a country can not decide its point on its Phillips curve freely. It has to take the other country's inflation rate into consideration so that the inflation rates become equal in both of the countries.

On the other hand, the differences in labor market institutions may also cause significant costs for a monetary union. Without doubt it can be said that there are important institutional differences between the labor markets of European countries. These differences may lead to divergent wage and price developments even though countries face the same disturbances. For example, how an oil price increase will affect the domestic wages and prices of monetary union countries depends on how their labor unions react to these shocks.

Forming a monetary union between the countries that have very different labor market institutions may be costly. Each supply shock may affect wages and prices in these countries differently and it will be difficult to correct for these differences when the exchange rate is strictly fixed.

Another cost of a monetary union may be because of the differences in legal systems. These differences may have huge effects on the way markets function. Especially the differences in financial legal systems are very important in this sense. The monetary union by itself will diminish some of the institutional differences between national financial systems, but in order to eliminate the deeper differences national legal systems have to converge. This can be only done by further political integration (De Grauwe, 2000).

The differences in growth rates may also cause a problem when countries form a monetary union. A rather fast growing country may face a cost in a monetary union. To explain this issue the following example may be given. Suppose that the GDP growth rates of country A and B are 5% and 3% per year respectively. Furthermore suppose that the income elasticity of A's imports from B and B's imports from A is equal to one. Then the import of country A from B will grow 5% a year, while the imports of country B from A is growing 3% a year. As a result, country A will face trade balance problems, as its imports tend to grow faster than its exports. In order to make its products more competitive country A will have to decrease the price of its exports to country B. Country A can either depreciate its currency or have a lower rate of domestic price increase than country B. In a monetary union, only the latter one

is possible. Consequently country A has to follow deflationary policies, which in turn will constrain the growth process. This shows us how a fast growing country will face a cost in a monetary union. However this view has very little empirical support. The reason is that the income elasticities of the exports of fast growing countries are higher than the low growers. Moreover, the fast growing countries have higher income elasticities for their exports then they have for their imports (Krugman 1989). As a result fast growing countries can continue to grow fast without facing trade balance problems (De Grauwe, 2000).

The last but not the least cost of a monetary union is the differences of the fiscal systems of the countries and the seigniorage problem. Having different fiscal systems, countries use different combinations of debt and monetary financing of the government budget deficit. Forming a monetary union brings constraints to the way budget deficits are financed. In theory of public finance, rational governments use the different sources of revenue so that the marginal cost of increasing revenue through these sources is equalized. Then, when the marginal cost of increasing revenue by increasing tax rates exceeds the marginal cost of increasing revenue by inflation (seigniorage as Paul De Grauwe (2000) puts it in his book), it will be optimal to decrease the taxes and to increase the inflation. In this case the optimal inflation rates of the countries will be different. Generally raising revenues by inflation is more advantageous for the countries that have an undeveloped tax system. But such less developed countries that join a monetary union with more developed ones that have a low rate of inflation cannot increase their revenues by inflation as they have to

lower their inflation. Then less developed countries will have to increase taxes
for a given level of spending, which will lead to a loss of welfare.

Table 4.1 Seigniorage Revenues as Percentage of GNP

Countries	1976-85	1986-90	1993
Germany	0.2	0.6	0.5
Greece	3.4	1.5	0.7
Italy	2.6	0.7	0.5
Portugal	3.4	1.9	0.6
Spain	2.9	0.8	0.6

Source: Dornbusch (1987); Gros and Thygesen (1992); de Grauwe (2000)

In Table 4.1, which is taken from the book of Paul De Grauwe (2000), the
size of the seignoirage of some southern countries is compared with that of
Germany. It is observed that these countries had high seignoirage revenues up
to the middle of 1980s. However before the formation of EMU these revenues
declined significantly. As a result it may be said that when these countries
joined a monetary union with the-low inflation countries, the additional
financial cost they faced was not very important.

4.2. The Benefits of a Common Currency

The benefits of a common currency are analyzed under four headings:
Gains from the elimination of transaction costs, welfare gains from less
uncertainity, efficient working price mechanism, and benefits of being an
international currency.

4.2.1. Gains from the elimination of transaction costs

In the second chapter, while discussing the benefits of international
currencies, the gains from the elimination of transaction costs are explained in

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detail. The same also works for the monetary union, so it will not be discussed here again. The EC Commission has estimated these gains to be between 13 and 20 billion ECUs per year (EC Commission 1990). This amount is 0.25-0.50% of the Community GDP (De Grauwe, 2000).

4.2.2. Welfare gains from less uncertainty

Firms feel uncertain about their future revenues when there exits uncertainty about future exchange rate changes. This causes a loss of welfare in a world populated by risk-averse individuals. In a monetary union exchange risk is eliminated for sure and this will reduce some source of uncertainty and should therefore increase welfare (De Grauwe, 2000).

4.2.3. Efficient working price mechanism

The price system provides information for the economic agents when they are making decisions concerning production, investment and consumption. The quality and efficiency of these decisions will decline if these prices are uncertain. Large real exchange rate movements lead to large adjustment costs for the economy. These adjustment costs may be reduced by a decline in real exchange uncertainty. As a result, in a monetary union price system becomes a better guide to give the right economic decisions.

Furthermore, an increase in risk because of the price uncertainty generally will increase the interest rate and higher interest rates will cause problems in selecting investment projects in an efficient way. As a result we can say that a

monetary union will eliminate the exchange rate risk and consequently will lead to a more efficient working of the price mechanism (De Grauwe, 2000).

4.2.4. Benefits of being an international currency

When a monetary union is formed, the new currency that comes out will probably weigh more in international monetary relations than the sum of the preceding currencies. Being the issuer of such a currency will create additional benefits to the monetary union. The benefits of being an international currency were discussed before, so it will not be repeated here again.

4.3. Comparison of Costs and Benefits

Welfare gains of a monetary union are directly related with the degree of openness of the economy. It can be said that the benefits of a country that will join a monetary union will be more if its trade ratio is high. Similarly, the loss of a country will be less the more open it is. As a result de Grauwe (2000) draws a figure relating benefits and costs to the openness of a country. The intersection point of benefit and cost line shows the critical point on which it is meaningful for a country to form a monetary union with its trading partners. The country is better off to the left of that point by keeping its own national currency. On the other hand to the right it is better off by replacing its national currency with the currency of its trading partners.

One's idea about the effectiveness of the exchange rate instrument in dealing with different demand and cost developments between the member countries will form the shape and the position of the cost curve.
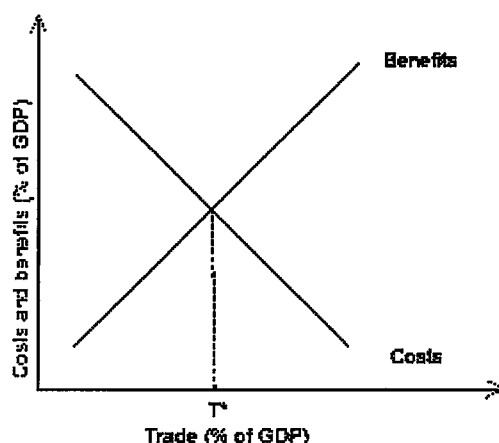
Figure 4.1 Costs and Benefits of a Monetary Union

Monetarist view claims that exchange rate changes are ineffective instruments to correct for these different developments between countries. Monetarists believe that even using exchange rates as an instrument is effective; they will make the countries worse off. In this view, the cost curve of a monetary union is very close to the origin. According to this view, most of the countries in the world would gain if they join a monetary union.

On the other hand the Keynesian view says that there are a lot of rigidities in the world, so for eliminating disequilibria exchange rate is a powerful instrument. The original Mundell model that is discussed in the beginning of this chapter explains this view very well. According to this view, the cost curve is far away from the origin so that only a small number of countries would find joining a monetary union beneficial. This view also states that large countries

that have a single currency would be economically better off if they split the country into different monetary zones.

(a) The monetarist view
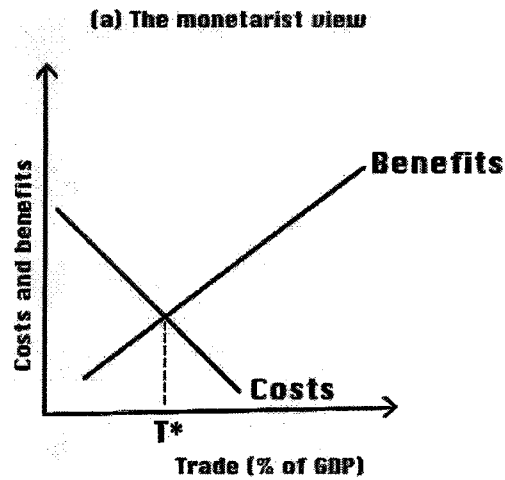
Figure 4.2 Costs and Benefits of a Monetary Union under Monetarist View

Since the 1980's the monetarist view gained more importance and EMU became a reality in the 1990s. To understand whether EMU is an optimal area, first let us examine some data on the importance of intra-EU trade for each EU country. The data in the Table 4.2 show us that EU countries are very open to the rest of the union. In intra-union trade, on average, the UK has the least share, but even UK makes more than half of its transactions within EU. According to these data it can be concluded that the cost-benefit calculus will be different for each country according to its degree of openness relative to other EU countries. For some countries, like Portugal and Belgium, the cost-benefit comparison will show net benefits of joining EMU.

Although they have a low trade share, some countries may still find it beneficial to join a monetary union. High inflation countries, like Italy, in order

to benefit from the credibility of the union might have chosen to join EMU. According to de Grauwe if one is sufficiently monetarist, one could argue that for countries with low degree of openness, the benefits could still outweigh the costs, and being in a monetary union could also make sense for them from an economic point of view.

(b) The Keynesian view
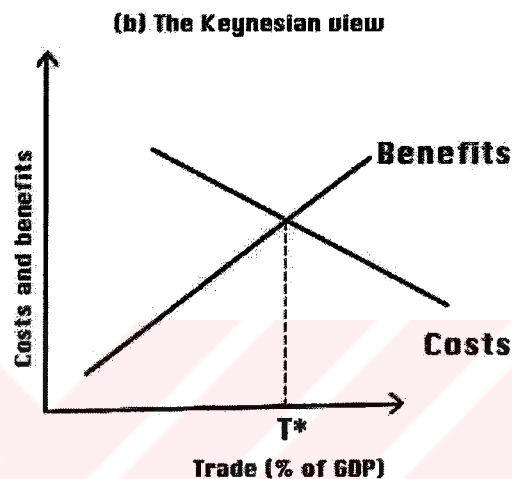
Figure 4.3 Costs and Benefits of a Monetary Union under Keynesian View

The degree of wage and price rigidities also plays an important role in the cost-benefit analysis of a monetary union. Countries that have lower degrees of wage and price rigidities are faced with lower costs when they join a monetary union. A decline in wage and price rigidities will shift the cost curve downwards, so that the critical point at which it will be beneficial for a country to join the monetary union is lowered. Similarly, an increase in the degree of mobility of labour will have the same effect and shift the cost curve downwards, so that forming a monetary union becomes more attractive.

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Table 4.2 Intra-EU Trade as a Percentage of National Trade (1998)

Countries	Intra-EU exports as a % of national exports (fob)	Intra-EU imports as a % of national imports (cif)	Average
Portugal	82	78.1	80.1
Belgium	76.3	71.1	73.7
Spain	71.1	70.7	70.9
Austria	64.2	73.7	68.9
Netherlands	78.9	58.1	68.5
Denmark	66.5	70.4	68.5
Ireland	69.3	61.6	65.5
France	62.4	67.6	65
Sweden	58	69.2	63.6
Finland	56.1	65.7	60.9
Greece	53.8	65.6	59.7
Italy	56.9	62	59.5
Germany	56.5	59	57.8
UK	58	53.4	55.7

Source: Eurostat and author's own calculations

Additionally, the size and the frequency of asymmetric shocks that countries face are important for a monetary union to be attractive. The countries that face very different demand and supply shocks because of their different industrial structure will find to join a monetary union more costly.

The theory of optimal currency areas states that if countries and regions that experience a high divergence in output and employment growth, want to benefit from a monetary union and avoid adjustment problems, they need a lot of flexibility in their labor market. De Grauwe (2000) mentions "the larger the degree of real divergence, the greater is the need for flexibility in the labor markets to make a smoothly functioning monetary union possible". Initially, according to many economists that implemented this theory empirically, the

EU-15 is not an optimum currency area. (See Eichengreen (1990); Neumann and von Hagen (1991); Bayoumi and Eichengreen (1993), (1997); De Grauwe and Heens (1993); De Grauwe and Vanhaverbeke (1993); De Grauwe (2000)) According to their empirical studies the economic costs of the monetary union are higher than the benefits for a significant number of EU countries. On the other hand, they believe that there is a subset of EU countries that form an optimum currency area. This subset consists of Germany, Benelux countries and France (EU-5). However, later empirical analysis has enlarged this subset into one that also includes Southern European countries. This proves that economic integration diminishes the asymmetric shocks and in the near future EU-15 will not only be an optimal currency area but also may enlarge with new countries still being optimal.
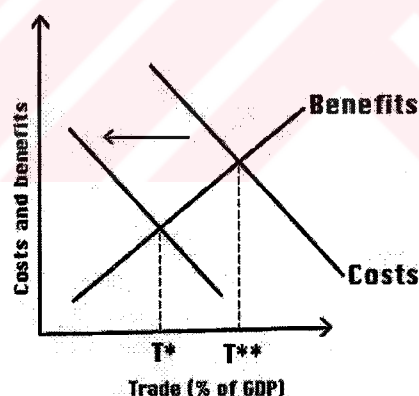
Figure 4.4 Costs and Benefits with Decreasing Rigidities

In order to decrease the degree of divergence policy makers can do just one thing. That is in the field of political unification. A reason for asymmetric shocks is the fact that nations still have their independent spending and taxing

4.4. The Euro: Single Currency of the European Union

In this part the definition of the euro, the history of European Monetary Union, and three stages of EMU will be discussed.

4.4.1. What is the Euro?

The euro was introduced in eleven of the fifteen member countries of European Union on January 1st, 1999. The four convergence criteria that were set in the Treaty of European Union (the Maastricht Treaty) in 1992 were successfully implemented by these eleven countries. According to this treaty the following criteria must be met by the member states by May 1998. Firstly, the budget deficits of the countries could not exceed 60 percent of their GDP. Second, their inflation rates were not to exceed the average rate of inflation of the three community nations with the lowest inflation rate by 1.5 percent. Third, average exchange rate of each country should not deviate by more than 2.25 percent from its central rate for the two years prior to the membership. Fourth, the long-term interest rates of the countries should not exceed the average interest rate of the three countries with the lowest inflation rate by 2 percent.

Although it is possible they might do so at a later date, three countries, the United Kingdom, Denmark and Sweden, did not adopt the euro in 1999 and Greece adopted it in 2000. The euro was launched to the financial markets of

the world in January 1999. After this time the euro could be used in transactions of banks and stock exchanges all over the world. However the actual notes and coins came into circulation in January 2002. The national currencies were given a six-month transition period after which they were withdrawn and left the euro as the euro zone's single currency (July 2002).

Table 4.3 Euro Membership Requirements

General Criteria	Specific Requirements
Price Stability	Annual rate of consumer price inflation must be within 1.5 percent of average annual consumer price inflation from the three countries with the lowest inflation rate as measured by the Harmonized Index of Consumer Prices (HICP).
Sustainable Government Finances	General government deficit must be no more than 3 percent of GDP and show progress towards lowering general government debt to 60 percent of GDP.
Exchange Rate Stability	National currency participates in the Exchange Rate Mechanism (ERM) and observes the normal margins of the exchange rate mechanism without severe tensions or devaluations for 2 years.
Long-term interest rate convergence	Long-term interest rate must be within 2 percent of the average rates from the three countries with the lowest inflation rates as measured by the HICP.

Source: U.S. GAO (2000) based on Treaty on European Union

The European Central Bank was formally established in June 1998 and is located in Frankfurt. It is mainly concerned with the promotion of price stability throughout the Euroland by using a single target monetary policy consisting of the same inflation targets and interest rates for all Euro Zone countries. But still the economic policy such as taxation and government expenditure stays as the responsibility of national governments. The presidents of the national bank of each member country form up the Board of ECB.

On January 1st, 1999 the conversion rates of participating national currencies were irrevocably fixed both against each other and against the euro*. After this time countries will not be able to use devaluation as a policy in order to overcome their economic difficulties. In history, this is the first time that sovereign countries have agreed to replace their national currency by a common currency and also form a Central Bank and a common monetary policy.

Mundell thinks that the creation of the euro was a good idea and it would challenge the dollar for global supremacy. Mundell started to write about this as early as 1969, when he called the currency the "europa". In 1998 just before the launch of the virtual euro, he wrote:

> The introduction of euro will represent the most dramatic change in the international monetary system since President Nixon took the dollar off gold in 1971 [and when] the era of flexible exchange rates began...the euro is likely to challenge the position of the dollar [and hence] this may be the most important event in the history of the international monetary system since the dollar took over from the pound the role of dominant currency in World War I (Mundell, 1998)

4.4.2. History of European Monetary Union (EMU)

EMU was made an objective of the European Community by the European Council of the Heads of State and Government at The Hague in 1969. It is formed in order to harmonize the economic and monetary policy of the member states in order to introduce a single currency. In 1971, that objective became a Community Programme with the aim of creating EMU by 1981. Because of

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* Irrevocably fixed exchange rates may be found in Appnedix A

unfavorable international economic situations, this project failed. The Community attempted a common response to maintain stability between the exchange rates of the member currencies after the world crisis, but it couldn't do so. This encouraged the search of a more efficient instrument. The European Monetary System, with an instrument of reference, The European Currency Unit (ECU) was born as a result of this search, in 1979.

In 1998, the project of re-launching EMU was begun. A group of experts under the authority of the president of the European Commission wrote a report about the results of the methods and the outline of stages for completing economic and monetary union. In 1989, the Madrid Council approved this report and decided to start the first phase of EMU in 1990 and to prepare an intergovernmental conference about it. The decisions of Maastricht Treaty, which is also known as the Treaty on European Union, were taken during this conference. This Treaty determined the economic convergence criteria for EMU participation and the objective of single currency by 1999 at latest.

Between the years 1993 and 1997, the economic performance of the countries that wished to join EMU was monitored in order to understand whether they met the convergence criteria mentioned before.

4.4.3. The three stages of EMU

The EMU Treaty has three phases to be carried out. Each phase has its own importance, specialty and duration. The first phase took place between the dates July 1st, 1990 and December 1993. The aims of this period were to

remove the obstacles to the movement of capital, to strengthen the co-ordination of national economic policies and to intensify co-operation between central banks.

The second phase started on January 1994 and finished by December 1998. The main targets of this stage were the creation of the European Monetary Institute in Frankfurt, the strengthening of economic policy co-ordination procedures, the introduction of economic convergence policies that were stated by the Maastricht Treaty, the adoption of the name euro for the single currency, the designation of the member countries meeting the convergence criteria, the creation of the European Central Bank and the fixing of the exchange rates for the participating countries.

The period from January 1999 to July 2002 was the third phase in which the launch of the process for putting the euro into circulation (just as bank accounts, and electronic money) and the introduction of euro notes and coins for public use (on January 1st, 2002) took place. On July 1st, 2002, the transition phase ended and the euro became the single currency of EMU.

CHAPTER 5

5. THE EURO VS THE DOLLAR

The main reason for the supremacy of the dollar over the past half-century or more is that it has no competition. Although there were periods when the US economy performed very poorly, the dollar stayed as the supreme power as it has no competitor. From the early 1970s through the early 1990s the US economy grew very slowly and productivity growth was especially ordinary. From 1973 to 1981, the US economy experienced high inflation including three years of double-digit price increases. In the last 20 years the US economy has run large external deficits, especially in the periods 1982-87 and 1998-2003 those deficits rose at clearly unsustainable rates (Bergsten 2002). The US has become the world's largest debtor country with a negative net international investment position of approximately $2.6 trillion at the end of 2002.

In the late 1970s and early 1980s the dollar experienced an important erosion of its market share. Also its weakness and instability provided an important motive for the first efforts to create the European Monetary System in 1979. Mc Kinnon (2002) believes that if a full fledged and stable valued euro had been introduced during this weak time of the dollar, the displacement of the dollar would have been substantial. In 1990s the dollar's global finance share stabilized again and has stayed above of any other national currency.

Tavlas (1997) states:

> In general, the dollar accounts for between 40 and 80 percent of the various categories of international currency use, with the categories at the high end of this range (for example foreign exchange market turnover and trade invoicing) representing mainly the unit of account and medium of exchange functions of an international currency (Tavlas, 1997)

The main reason for that is the fact that US has remained far larger, especially in terms of GDP and also trade and other size variables, than any other country. By the help of its incumbency advantages, the dollar has remained dominant and generated a share of currency markets about four times as great as its share of world output and trade. After the war second key currency of the world was the deutsche mark, but it never attained a market share greater than the one-fourth that of the dollar. This was logical as the former West Germany's economy was about one-forth the size of US. Japan's economy was more than half as large as America's but it never realized that portion of world finance, as its financial markets were not developed (Bergsten 2002).

There are several factors that contributed to the dominance of the dollar as a stabilizer. The first one is the fact that the strong US economic performance and weak European economy encouraged international capital to stay in the US capital market. The stock value of the assets did not change although 50 percent of newly issued international bonds were denominated in euro. As there were not any quick flows of capital, instability did not occur. Secondly, Europe became a less attractive place to invest because of the uncertainty of

the political situation that was caused by the war in the former Yugoslavia. The third factor was the slow economic recovery in Asia, which also prevents capital from flowing back at a quick pace. This increased the comparative stability of international financial markets and the US dollar exchange rate stayed relatively stable. Japan is still in recession and the yen is losing its attractiveness. As a result the yen will probably lose its important position in the international monetary system. Fourthly, the US dollar was not affected by the Brazil crisis and the instability in Latin America did not spill over to the rest of the world.

According to Bergsten (2002) it is clear that the euro will provide the first real competition for the dollar since the latter's ascent to global currency dominance. Bergsten (2002) states that observing the impact of the transitional effects, which have influenced the international role of the euro negatively, will be interesting. These caused the movement into dollars first, as investors demanded to rebalance their portfolios to offset the loss of the diversification benefits of multiple national currencies in Europe and secondly as Eastern and black money balances asked for protecting against the unfamiliar new asset (Sinn and Westermann, 2001).

These transitional considerations explain a considerable part of the lag in the euro's acquiring its inevitably large international role, but there are also four additional factors, which affect the ultimate timing. Three of these are within the control of the European entities themselves while one is completely exogenous (Bergsten, 2002).

The first one is the fact that Euroland would need to further integrate its money and capital markets to realize the full international potential of its new currency (Portes and Rey, 1998). Euro activated the European financial markets both directly and indirectly and they have already taken impressive steps forward (Danthine, Giavazzi, and von Thadden, 2000). There has been no single benchmark security, or yield curve that has developed to rival the US Treasury bill and other US government assets. Euroland's speed to overcome these shortcomings will play a great role in the timing of euro's having a share in international asset allocation (Bergsten 2002).

The second important factor is Europe's need to get its act together institutionally. Europe was successful to challenge the previous dominance of the US in trading system because of two reasons. First one is the fact that it had roughly the equal trade volume as US had. Secondly and more importantly it decided to centralize virtually all trade policy decisions and negotiations in a single entity. In order to have a full equivalence with US a' la trade Euroland must have some organizational reforms that enable it to act together and speak with a single voice.

Thirdly, if the economic performance of Europe would improve, the international role of the euro would surely strengthen. In order to challenge the dollar effectively, the achievement of dynamic growth is also necessary for the euro, which has already achieved convincing price stability (Kawai, 1997).

According to Bergsten (2002) the fourth, and perhaps the most important factor is that the US probability to foul up for the euro to realize its potential to achieve rough parity with the dollar at the core of international monetary system.

If the euro (or any other competitor to dollar) had existed in the late 1970s and 1980s what would have happened to the international role of the dollar? In those years the inflation rate of the US was in double digits, its economic performance was mediocre and the US started to run huge external deficits and from being the world's largest creditor shifted to its largest debtor. Even though there was not such a competitor; the global market share of the dollar fell substantially (Bergsten, 2002).

Since the advent of generalized currency convertibility in the postwar period the major dollar depreciations have occurred about once per decade: in 1971-1973, 1978-79, 1985-87 and 1994-95. A future fall of the dollar could bring important, historic, and systemic as well as market and macroeconomic effects. Any particular trade-weighted decrease of the dollar would produce a much greater increase in the euro, as America's major trading partners (like Mexico and perhaps Canada) could not accept substantial appreciation of their currencies against the dollar. Another major trading partner, Japan might also be too weak to accept any significant appreciation.

In this chapter a comparison between the international roles of the euro and the dollar will be made in order to understand the chance of the euro of

becoming an international currency. The main constraints will be the two currencies' main macroeconomic indicators, supply elasticities, roles in financial markets, historical inflation rates, the relation between their current account and trade balances, and the roles in global trade.

5.1. Comparison of the Main Indicators of the Euro Zone[*] and USA

There are many factors that determine whether a currency plays a global role as we discussed in the earlier chapters. By looking at Table 5.1 the main indicators of the two areas may be compared roughly. The area of the US is significantly larger than the area of the Euro Zone, almost four times of it. On the other hand, the population of the Euro Zone is slightly higher than that of the US. Size effect is an important issue in determining the international role of a currency, but by size we do not mean just the geographical size but also the number of people that use the currency. In this aspect the euro and the dollar have more or less the same sizes. The size effect also contains the size of the economies of the countries that can be measured by their gross domestic product (GDP). By this criterion, the US has an advantage over the Euro area. In all GDP measures the US is superior to Euroland and the real GDP growth rate of the US is modestly higher than that of the Euro Zone in 2003. Also when we look at the ten year average real GDP growth rates we observe the same result (Table 5.11).

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[*] 12 countries that are members of the EMU are taken into account in all the comparisions

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Table 5.1 Main Indicators of the Euro Zone and USA

	USA	Euro Zone
Area (approximately)	9.4 million km^2	2.5 million km^2
Population (2001)	278,058,900	303,909,700
GDP at market prices (at current prices)		
- Millions of euro (2003)	9,713,490	7,254,036
- Millions of PPS (2002)	9,309,696	7,552,315
- PPS per inhabitant (2001)	32,560	23,010
GDP per capita PPS[1] (2001)	139.5	98.6
Real GDP growth rate[2] (2003)	3.1%	0.4%
Inflation rate[3] (2003)	2.3	2.1
Interest rates (Annual Average) (2003)		
- Long term[4]	4.0%	4.2%
- Short term:3-month interbank	1.2%	2.3%
- Short term:Day to day money	1.1%	2.3%
Seasonally adjusted unemployment rate	5.6%	8.8%
Exports (2003)	≈724 billions $	≈1,305 billions €
Imports (2003)	≈1,035 billions $	≈ 968 billions €
Trade Balance (2003)	≈ -546 billions $	≈ 125 billions $
Current Account (2002)	≈ -480.9 billions $	≈ 61.2 billions $
Current Account (% of GDP) (2002)	-4.6	0.9
GDP Share (2002)[5] (%)	21.1	15.7
Share of Export of Goods and Services (2002)[5] (%)	12.4	31.2
Share of Population[5] (%)	4.7	5.0

Sources: IMF Annual Report 2003, Eurostat, IFS and author's own calculations
(1) The volume index of GDP per capita in Purchasing Power Standards (PPS) is expressed in relation to the European Union. The index is calculated from PPS figures and expressed with respect to EU=15
(2) Growth rate of GDP at constant prices (1995=100) – percentage change on previous year
(3) Annual average rate of change in Harmonized Indices of Consumer Prices (HICPs)
(4) 10 year government bond yields, secondary market
(5) Share of total for world

The strength, stability and credibility of the economy are other important issues in becoming an international currency. Although the US has a slightly higher inflation rate, the difference between the inflation rates of the Euro Zone and the US is not very significant in 2003. The same can be said also for

the ten year average inflation rates (Table 5.11). Interest rates are also important indicators that show the credibility of the country. The long-term interest rates of the US and the Euro Zone are more or less the same, although the Euro Zone has a slightly higher one in 2003. In the ten year averages this difference is even as small as 0.1 (Table 5.11). On the other hand even the short-term interest rates of the Euro Zone is more than one percent higher than that of the US in 2003, when the ten year averages is concerned there is a very small difference between the short term interest rates of the Euro Zone and the US. Unemployment rate is another factor that determines the stability of an economy. In this context the US seems to be in a better position. While the five years' average of the unemployment rate is 8.6% in the Euro Zone, it is 4.9% in the US (Table 5.11). It may be concluded that the US has slightly higher credibility than the Euroland in economical terms, but in the following sections the financial terms will be taken separately and the results of those studies are also important in determining the credibility of the two currencies. Now it is early to arrive at a definite decision.

Besides the above factors the issuer country of an international currency should have a production variety. This brings the fact of climate variety. When the geographical positions of the Europe and the US are observed it can be concluded that both have the needed climate variety, being located between approximately 20 to 30 parallels. Both have the parts that have sea effects and both have places with terrestrial influences. Of course there are differences in the products produced in the US and the Euro Zone but in my opinion they have approximately the same diversity of products.

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Political power brings economical power, which is a very important issue for an international currency. There are many ideas on whether political power brings economical power or visa versa, but the idea that is generally accepted is the fact that they are closely interrelated. In my opinion economical power brings political power. I will try to explain the reasons of my thought by using the US case. I think no one can deny that currently the US is the super power in both economical and political aspect. Also UK was the political power having a number of colonies in different parts of the world when her currency was an international currency. In the US case as the dollar is international money, it is also demanded by the other countries. What could the US do to feed the other countries with dollar? The US started to give current account deficits by increasing its imports, but this also has a limit. No country would want to import things over the necessary amount that it needed. But although the US was forcing its limits, the rest of the world continued to demand more and more dollars. Then the US started to ask for other things rather than goods and services like military base in another country or some political decisions in favor of the US to be taken. As a result the dollar being the dominant currency brought the US political power. May the Euro Zone do the same? That is an important question to be answered, but it's beyond the scope of this thesis. The important thing to be noted here is the fact that if the euro is to be an international currency, the European Monetary Union has to go further and become also a political union.

After the end of the Bretton Woods all currencies became fiat monies, meaning that they do not have any back up value any more. The currency of a country will not have any value other than a paper in case that country collapses. This brings out the fact that there should be trust that the country will live forever, in order to trust its currency. This brings out another political issue, the strength of the military force. If a country has a strong army that means it can resist its enemies and survive in case a war breaks out. A war resulting with a collapse of a nation is not likely to happen in the contemporary world, but being an international currency is not an easy thing. People should believe in your country in order to believe in your currency. It is known worldwide that the US has the one of the most powerful armies in the world. On the other hand the European Union has also some attempts regarding this issue. The member countries of the union are trying to form a common military force for the union. Besides, the European Union is a member of NATO, which is an important factor for the security. These may protect the union from the outside effects but are not enough for complete trust, as the union itself may give harm to its identity. If not because of war but because of some other political or economical reasons the union collapses, then the euro will have no value. In order to rub out these kinds of thoughts from people's minds a political union should also be established between the member countries.

Now it is time to go back to our economical analysis. Five indicators of an international currency will be taken separately and discussed in a detailed way. The issuer country of an international currency should have high supply

elasticity, deep and liquid financial markets, low inflation rates (an indicator of a stable economy), a strong link between the current account and trade balance, and high share in global trade. In the following sections the Euro Zone and the US will be compared according to their strength in these issues.

5.2.Supply Elasticity

Between the features of an international money that we discussed above perhaps the most important and measurable characteristic is having an elastic supply curve. Elasticity shows how responsive supply is to the changes in the price level. A country that issues an international currency should have an elastic supply curve in order to respond quickly to the changes in its prices and continue to produce accordingly the demanded amounts. If a country is late to adopt to the price changes its currency will not have much chance to become an international currency because it will not be able to increase its production level as the price increases, so will not be able to supply the demands of the other countries as fast as needed. As a result the demander countries will go and buy the products from another country that can supply their needs. Considering the fact that in transactions usually the currency of the exporter country is used as a medium of exchange, the importance of supply elasticity may be understood better.

From theory it is known that the long run aggregate supply curve is perfectly inelastic and may be drawn as a vertical line as shown in the Figure 5.1. In our context the important thing is the elasticities of the short run supply

curves as we are trying to figure out the immediate responses to price level changes. We are trying to find out which country is allocating its resources better and giving fast responses to the price level changes by increasing or decreasing its production level. Accordingly we are concerned with the elasticities of the short run supply curves of the Euro Zone and the US.
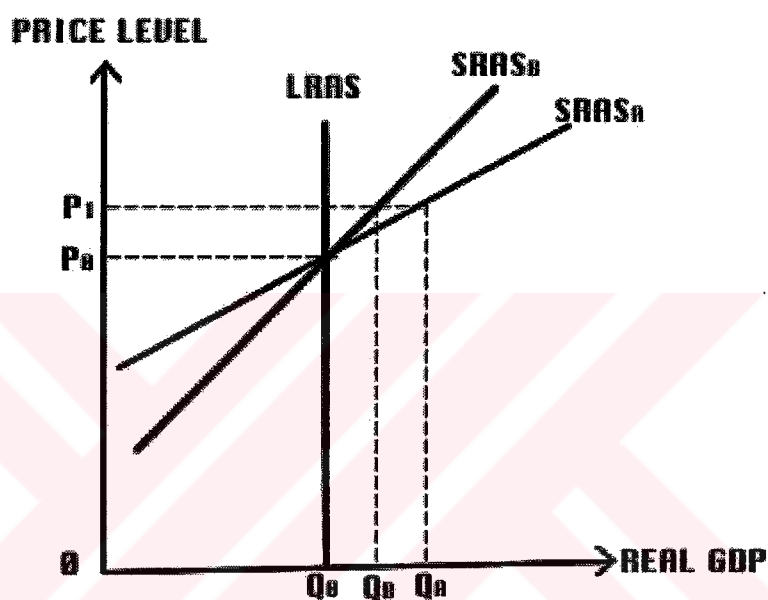
Figure 5.1 LRAS and SRAS Curves

In Figure 5.1 two short run supply curves are shown; one is being more elastic than the other. The one that is more elastic is labeled with A while the other is denoted by B. It may be observed that a 20% price increase causes country A to produce more than that of country B. Here we can say that ceteris paribus country A has more chance to be the issuer of an international currency.

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Now it is time to find out the elasticities of the short run supply curves of the Euro Zone and the US. The data is selected for four years, as we are concerned with the short-run. While selecting the period for the US, business cycles are observed and a period with good economic performance is chosen. For the Euro Zone as euro is a very new currency there was no chance other than choosing the time period between 2000 and 2003. Although it would be more convenient if the same time period was chosen for both of the countries we didn't do so, as 1999-2003 period, especially after September 2001, is an era somewhat stagnant for the United States. As a result, it is preferred to take the time period of 1997-2000. For the analysis quarterly data of GDP and GDP deflator for the US and the Euro Zone are used that is obtained from IFS.

First the scatter diagrams of the data are drawn and the correlation and the standard deviations of the data are observed. As a result it is decided that there is not a significantly high standard deviation and the analysis may be continued using this database. There is an important fact that we should be careful about while checking the scatter diagrams. As we are trying to form a supply curve, price level is put on the vertical axis and real GDP is shown on the horizontal axis, although in mathematics we do the reverse by putting the dependent variable on the horizontal axis and independent variable on the vertical axis.

We know that GDP is a function of price. In the analysis two different types of functions are used.

$$GDP = a + b\, P_L \qquad (1)$$

$$GDP = a \times P_L{}^b \tag{2}$$

Equation (1) is a linear function and each price level has its own elasticity. On the other hand in equation (2) we have a constant elasticity.

The regression results of equation (1) for the US are shown in Table 5.2. As a result of the regression the GDP function of the US is estimated as follows:

$$GDP = -16698.48 + 261.363 \, P_L \tag{3}$$

From microeconomics theory we know that the supply elasticity is equals to:

$$e_s = \frac{dGDP}{dP_L} * \frac{P_L}{GDP} \tag{4}$$

For the US case

$$e_s = 261.363 * \frac{P_L}{[-16698.49 + 261.363(P_L)]} \tag{5}$$

In equation (5) elasticity of supply is found as a function of price, so by putting different prices, elasticities may be found. From the data the minimum price, the maximum price is taken and also the average of the prices is found. These prices are inserted in equation (5) and three different supply elasticities are found. As it may be seen in Table 5.3 the three numbers are very close to each other and the supply elasticity of the US is around 2.9.

The same process is applied also to the Euro Zone data. From Table 5.2 the regression results of the Euro Zone area may be observed. From this result we estimated the GDP function of the Euro Zone as:

$$GDP = 9225.318 + 52.51202\ P_L \tag{6}$$

Using the formula in equation (4) the function of supply elasticity for the Euro Zone may be written as:

$$e_s = 52.51202 * \frac{P_L}{[9225.318 + 52.51202(P_L)]} \tag{7}$$

The CPI data of Euro Zone is searched for its minimum, maximum and average values. The findings are applied to equation (7) and the results in Table 5.3 are observed.

Table 5.2 Regression Results

Sample: 1997:1 2000:4 (US) Sample: 2000:1 2003:4 (Euro Zone)						
	a	**b**	**R^2**	**Adj R^2**	**DW**	**F**
US linear	-16698.49 (1227.40)	261.3630 (12.5952)	0.9685	0.9662	0.6009	430.60
log	-1.851374 (0.29674)	2.913354 (0.14921)	0.9646	0.9621	0.5453	381.21
Euro Zone linear	9225.318 (613.802)	52.51202 (5.38339)	0.8717	0.8626	0.9743	95.149
log	3.371620 (0.08273)	0.394084 (0.04002)	0.8727	0.8636	0.9822	95.975

All coefficients are significant at 1% level. We are aware of the fact that Durbin Watson statistics are below the critical value but when we applied the AR (1) Method the result was not significant. As the number of observations is small it is decided to leave it this way.

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Secondly, the logarithmic functions of the data are taken for each country and they are regressed. This is done in order to solve for equation (2) and the results are shown in Table 5.2 under the column constant elasticity. The X variable of the regression results gives directly the elasticity of the supply curve[*].

When we take the logarithmic function of equation (2) we get:

$$\log GDP = a + b \log P_L \tag{8}$$

The b coefficient in equation (8) gives directly the supply elasticity (See Appendix B).

The regression results of the US case are shown in Table 5.2 and according to these results the following equation is estimated:

$$\log GDP = -1.851374 + 2.913354 \log P_L \tag{9}$$

As expressed before, from this equation we can directly say that the supply elasticity of US is equals to 2.913354.

For the Euro area the regression results at Table 5.2 are found and estimation of equation (8) is:

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[*] The explanation may be found in Appendix B

$$\log \text{GDP} = 3.37162 + 0.394084 \log P_L \qquad (10)$$

It can be concluded that the supply elasticity of the Euro Zone is 0.394084. The elasticities found in each equation of the GDP are very close to each other for each country and all may be followed in Table 5.3.

When Table 5.3 is observed carefully, it may be concluded that the dollar has a huge advantage over the euro in terms of supply elasticity. The US has a more elastic supply curve than the Euro Zone and even the term more elastic does not describe the situation well, as there is a huge difference between them. The US has a supply elasticity of almost six times that of the Euro Zone and according to microeconomics theory the US has an elastic supply curve, as its supply elasticity is greater than one. On the other hand this cannot be said for the supply elasticity of the Euro Zone. The Euro Zone has a rather inelastic supply curve, having supply elasticity smaller than one. The time period chosen for the US is the boom period of the country. On the other hand we had no other alternative for the Euro Zone. As we took the different time periods for the two parts we cannot make strong comments. For example the US could have experienced technological growth in that period. Besides, by just looking at the supply elasticities we cannot say that the euro has no chance to become an international currency, but it may be concluded that other than the advantages we counted before for the US, the US also has an advantage of supply elasticity. This is an advantage to the extent that the strength of the international currency is trade balanced. It may be concluded that the Euro Zone must improve its production techniques, check over its

economies of scale and try to become more adaptive. In current circumstances if a price increase occurs it is likely that the Euro Zone will lose most off its competitiveness against the US in the international trade arena.

Table 5.3 Supply Elasticities of the US and the Euro Zone

	Elasticity for Min P_L	Elasticity for Mean P_L	Elasticity for Max P_L	Constant Elasticity
USA	3.05012649	2.90465946	2.73727777	2.913354
Euro Zone	0.38340787	0.39348768	0.40268855	0.394084

The important thing to note in Table 5.3 is the fact that the supply elasticity of the US decreases as the price increases where as the reverse is true for the Euro Zone. The reason for this is discussed in Appendix C.

5.3. Financial Markets

In this section firstly the current situation of the US dollar and the euro in international financial markets will be discussed and then an empirical case will be made for the euro in international bonds market.

5.3.1. Current Situation in International Financial Markets

The US economy is the world's largest economy. The GDP of the US accounts for 22% of the world's total at purchasing power parity based exchange rates. The world's second largest economy is the euroland, accounting for 16% of world GDP (on the same basis); and this share is supposed expand to 20% if all present member of the European Union started to use the euro, and would expand even further with new participants in the EU and euro area. Japan's GDP is slightly less than half of the present euro

area and Japanese yen is the currency with the third largest domain of domestic use. It can be concluded that the dollar and the euro are the two most important currencies of the world.

Both the dollar and the euro are likely to play important roles as international currencies because both of them have very large domains of domestic use and these domains are highly open to international trade and financial transactions. These currencies are used as medium of transaction, stores of value, units of account, etc also by non-residents.

The euro became undoubtedly more convenient for many foreigners after it replaced the predecessor currencies. This situation also works for the US residents as well as other foreigners. Before the euro US business with the euro area were done in dollars rather than the predecessor currencies of the euro. After the replacement of these currencies by euro some of these transactions will now be done in euro. It may be said that the international role of the euro has increased at the expense of the dollar. This does not imply the US residents suffer from this situation as the US residents that are doing business with the euro area; now find it more convenient to work in euro.

The advent of the euro has created competition for the dollar as an international money by having a domestic base roughly the same size and general attractiveness. Before the advent of the euro it was anticipated that it would rise rapidly and would catch up with the dollar. Now it is time to

analyze some data in order to see whether these expectations were realized or not.

5.3.1.1. International Monetary Market Instruments

International money market instruments consist of two parts: Commercial paper and other instruments. In December 2003, 73% of the total issues is commercial paper and 27% of it is other instruments. (Table 5.12)

In commercial paper from 2002 to 2003 the usage of the US dollar increased by only 17% while the usage of the euro rose by 68%. At the end of 2003 the US dollar share in the total commercial papers was 26%, whereas the euro's share was 51%. After the dollar and the euro comes the pound sterling with 15 percent. It shows that if the UK also joins the monetary union the euro's share will be more than twice that of the dollar's. As financial institutions issue 86% of the commercial papers, it can be said that euro is widely used by the international financial institutions, which is an important aspect to become an international currency.

At the end of 2003, the share of the dollar and the euro in the other international money market instruments is the same (37%). Again they are followed by the pound sterling, which has a share of 10%. Japanese yen is in the fourth row in the arrangement of international money market instruments.

When we look at the currency of issue we see that during the last year the euro showed a 50% increase, while the rise in the dollar is only 13%. As a

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result of this rapid rise at the end of 2003, the euro's share as a currency of issuance of the total international money market instruments is 47%. The dollar and the pound sterling follow it with the shares of 29% and 14% respectively. The share of the Japanese yen is only 3%, a percentage even lower than the Swiss franc (4%).

5.3.1.2. International bonds and notes

Table 5.13 shows us that the total issues of bonds and notes increased by 27% worldwide. There are three types of international bonds and notes: Floating rate bonds and notes, bonds and notes that have straight fixed rate and equity related bonds and notes. Straight fixed rate bonds and notes have the highest share in the total issues and also it is the one that showed a rapid increase of 34% in one-year period. In December 2003, the share of the dollar and the euro denominated straight fixed rate international bonds and notes are very close to each other, 41% and 42% respectively. The euro denominated bonds and notes showed a rapid increase of 60% in 2003 and as a result of this rise the euro denominated assets not only caught up with the dollar denominated ones but also passed them slightly. In the straight fixed rate international bonds and notes the euro and the dollar is followed by the pound sterling and the yen which have shares of 7% and 4% respectively.

Approximately one fifth of the total issues of international bonds and notes are in floating rates. In this sector in 2003 the euro denominated international bonds and notes increased by 22% while the dollar denominated ones slightly decreased by 2%. As a result, at the end of 2003, half of the total issues in this

sector is accounted in euros while only 38% is accounted in dollars. Again they are followed by the pound sterling and yen having the same shares as they have in the straight fixed rate bonds and notes.

Equity-related international bonds and notes only form up 3% of total issues, so they do not have a significant effect on the international roles of the currencies. The shares of the euro denominated and the dollar denominated bonds and notes are very close to each other in this sector, being 43% and 40% respectively. And again the year 2003 has been a year of rapid rise in the euro denominated assets while the level of the dollar denominated ones has not changed much.

When the usage of the currencies in issuance of international bonds and notes is summed up it can be seen that 44% of the total bonds and notes is issued in euro. The euro showed a 47% increase relative to the previous year while the amount of increase in the dollar is just 11%. As a result, in December 2003 the share of the dollar in the issuance of international bonds and notes is 40%. Pound sterling and yen follow it having shares of 7% and 4% respectively.

5.3.1.3. International debt securities

For the international debt securities the first quarter of 1999 (advent of the euro) and the first quarter of 2003 will be compared. It may be seen from the Table 5.14 that the usage of US dollar in international debt securities has approximately doubled itself by increasing 101%. On the other hand the usage

of the euro has been increasing more rapidly (216%). The usage of the Japanese yen has been stable; there has been just 1% decrease, which is not a significant amount when we look at the total. When the shares of the currencies of the total amount are observed it can be seen that in 2003 in international debt securities, the world prefers to use the dollar. Its share is 44% while the share of the euro is 39%. On the other hand it should be also added that the euro showed a great improvement and if it continues to increase in such a rapid way it may soon catch up and even overcome the dollar in the near future. The Japanese yen is used for only 5% of the total debt securities.

In Table 5.15 the nationality of the issuers of international debt securities is given. In 2003, the total international debt securities increased by 56% relative to 2001. Euro countries increased their international debt securities by 87% while the US increased it by 32%. By this rapid increase in Europe, according to the December 2003 numbers, European countries issue 43% of the total world international debt securities, while this percentage is 26 in the US. On the other hand, Japan only issues 2% of the total debt securities. The important thing that must be noted here is that, although 44% of the total debt securities are denominated in dollar, only 26% of it is issued in the US. That means 18% of it is issued abroad by non-residents. Controversially, the amount of euro denominated debt securities is 39% of the total, but the Euroland issues the 43% of the total debt securities. It can be concluded that Euro countries issue foreign currency (other than euro) denominated debt securities amounting at least 4% of the total world international debt securities under the assumption that all euro denominated securities are issued within the

borders of Euroland. This number may be more if there are other countries other than the euro countries that issue debt securities denominated in euro. It may be concluded that the US dollar is used more internationally than the euro in the issuance of the debt securities.

5.3.1.4. Derivatives

In Table 5.16 amounts outstanding of OTC interest rate derivatives are shown by currency. From June 2001 to June 2003 the amount of interest rate derivatives increased by 81% and among the currencies the euro is the one that showed the most rapid rise (123%). As a result by June 2003 the euro became the currency that is mostly used in interest rate derivatives. In 41% of the world's interest rate derivatives market the euro is used. The dollar's share is 33% and it is followed by yen with a share of 13%. On the other hand, the situation is a little bit different in OTC foreign exchange derivatives market (Table 5.17). The increase in this market between the years 2001-2003 is less than the interest rate derivatives market. The total amount outstanding has increased by 31% between these years. Although percentage change in the usage of the euro increased approximately twice as much as the dollar, the amount of euro denominated foreign exchange derivatives could not catch up with that of dollars. In 2001, initially the amounts outstanding in the dollar were 15.141 billion dollars while the volume in euros was 6.425 billion dollars, meaning that the dollar amount was almost 2.5 times more than the euro amount. So having a twice as great an increase compared to the dollar was not enough for euro to catch up with its rival. The US dollar is used in 44% of the total amount of OTC foreign exchange derivatives in 2003 while

this share for the euro is 22%. The portion of the Japanese yen is exactly half of the euro and it is the third currency used in OTC foreign exchange derivatives.

5.3.1.5. Official holdings of foreign exchange

The currency breakdown of the total official holdings of foreign exchange for the years 2000-2002 may be observed in Table 5.4. Although the euro has an increasing trend, its share is far below that of the US dollar. In 2002 the share of the US dollar in all countries' official holdings is 64.5%, while the euro has a share of only 18.7%. It is obvious that the euro is the world's second reserve currency, followed by the Japanese yen and the pound sterling. While the Japanese yen shows a decreasing trend, controversially the pound sterling has an increasing share and the shares of the two currencies are converging to each other. In the near future the pound sterling may not only catch up but also pass the share of the yen. Here the important thing that should be noted is the fact that the UK is member country of the European Union and will sooner or later become also a member of the European Monetary Union. The countries that are holding pound sterling in their reserves will then most probably switch these holdings to euro.

When the Table 5.4 is carefully observed it may be concluded that industrial countries hold both the US dollar and the euro more extensively. The share of the dollar and the euro that are held by industrial countries are greater then their worldwide share. The Japanese yen follows them with a share of 4.7%. For the developing countries again the euro and the US dollar

are the first two currencies in the ranking, but this time they are followed by the pound sterling. Although the share of pound sterling in the reserves of the industrial countries is very low, it is third currency chosen by the developing countries.

Table 5.4 Share of National Currencies in Total Identified Official Holdings of Foreign Exchange, End of Year[1]

	2000	2001	2002
All Countries			
US dollar	67.5	67.5	64.5
Euro	15.9	16.4	18.7
Japanese yen	5.2	4.8	4.5
Pound sterling	3.8	4.0	4.4
Swiss franc	0.7	0.6	0.7
Unspecified currencies[2]	6.9	6.6	7.3
Industrial Countries			
US dollar	72.7	73.4	70.0
Euro	17.2	17.5	21.3
Japanese yen	6.3	5.6	4.7
Pound sterling	2.0	1.8	2.2
Swiss franc	0.2	0.3	0.6
Unspecified currencies[2]	1.6	1.3	1.2
Developing Countries			
US dollar	63.7	63.5	60.8
Euro	15	15.6	16.9
Japanese yen	4.4	4.3	4.3
Pound sterling	5.2	5.5	5.9
Swiss franc	1.0	0.9	0.8
Unspecified currencies[2]	10.8	10.2	11.3

Source: IMF Annual Report 2003
1) Only IMF member countries that report their official holdings of foreign exchange are included in this table.
2) The residual is equal to the difference between total foreign exchange reserves of IMF member countries and the sum of the reserves held in the currencies listed in the table.

To understand the general situation better, some countries are chosen and the official holdings of foreign exchange of these countries are investigated in detail.

US international reserve position by the date of November 21, 2003 is shown in the Table 5.19. The US has all its international reserves in the form of yen and euro. The US keeps 35% of its securities in euro whereas 65% of them in yen. On the other hand, when we look at its total deposits with the other central banks and BIS we see a reverse position. While 82% of its deposits is in the form of euro, 18% of them is in the form of yen. Compared with a week before there is a slight increase in euro holding whereas there is a slight decrease in the yen. It may be concluded that US has a tendency to switch from yen to euro in its international reserve position.

In Table 5.20 the official international reserve position of Bank of Canada is stated for the date of March 14, 2004. Canada holds 51% of its international reserves in dollars, while the share of gold is negligible. From the table we cannot calculate what percentage of 15.605 millions of dollars does Canada hold in euros, but the article of Randall Palmer in Reuters dated January 6, 2002 may give some clues to us. The title of his article, in which he states that the Finance Ministry of Canada brought its holdings of euro-denominated securities to 42% of the total foreign deposits and securities held by the government, is "Canada sells gold, keeps shift into euro reserves". Palmer also mentions that euros accounted for only 23% of the total just two years ago. In this case it may be concluded that from 2000 to 2002, Canada switched 19% of its holdings to euro. In the same article it is also stated that the US dollar share has decreased during that time from 75% to 55% and small holdings in yen constituted most of the rest. Palmer gives a part from his interview with one of the officials of Canada who said that Canada's decision

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on which currency to use for foreign exchange reserves was driven by the difference between the cost of borrowing in that currency and the parallel return on investing it. In light of this information, it may be concluded that the euro is becoming more attractive day by day, but is not yet as attractive as the US dollar for Canada. Of course being a neighbor of the US plays an important role in this situation.

In the UK, neighbor of the euro area and member of the EU, but not a member of the EMU, it is not surprising that the situation is in favor of the euro. In Table 5.21 the positions of both the UK government and the Bank of England are shown. In the Bank of England there is almost a balance between assets and liabilities, so reviewing just one of them will be enough. At end of December 2003, 59% of the assets were euro denominated and 27% of them were dollar denominated. Yen followed with a share of 11%. The total assets of UK government are more than double of the total assets of the Bank of England. The UK government holds 36% of its assets and 45% of its liabilities in terms of euros, while it keeps its 29% of assets and 33% of its liabilities in dollars. The UK government holds fewer euros denominated and more dollar denominated assets than the Bank of England keeps. When the neighbors of two currencies, Canada and UK, are compared it may be concluded that the euro is not as successful as the dollar to convince its neighbor at the government level. Canada keeps more than half of its reserves in US dollars, while the UK government keeps around one third of its reserves in dollars although the Bank of England holds more than half of its assets in euro.

January 2004 records of the Reserve Bank of Australia show us that Australia is somewhat indifferent between holding its international reserves in dollars or in euros although currently its international reserves in dollars are slightly more than that of the euros. The total international reserves of Australia are distributed between the US dollar, the euro and the yen with shares of 42%, 39% and 9% respectively (Table 5.22).

In Russia, although an improvement in the usage of the euro may be observed it may be concluded for sure that the dollar is the dominant currency (Table 5.23).

Table 5.24 shows the breakdown of foreign deposits in banks of Turkey. If the years 2002 and 2003 are compared it can be observed that there is not a significant change in the US dollar and only a slight increase in the euro. In the first two months of 2004 the banks in Turkey held 67% of their foreign exchange deposits in dollars and 30% of them in euros. When we compare these shares with the ones in 2002 we may calculate a 3% decrease dollar and a 2% increase in euro. It may be concluded that in Turkey there may be a tendency to either equalize the foreign exchange deposits that are held in dollar and euro or increase the euro denominated ones slightly if not the level that of the dollar.

5.3.1.6. Banks' local positions in foreign currency

In Bank for International Settlements reports, currency breakdown of reporting banks' local position in foreign currency is stated as in the Table

5.25. Between the dates December 2001 and September 2003 there has been a 40% increase in the local positions of the banks in foreign currency. The increase in the US dollar has been 23%, which is below the average, whereas the euro showed a rapid rise of 93%. This increase in euro hasn't been enough to catch up with the dollar as the initial amounts in the dollar were more than double the euro. In this period the amount of euro denominated assets doubled and in September 2003 the share of the euro denominated assets was 29% of the total. The dollar, being still the most preferred currency, had a share of 48%. It is surprising that the third currency that is most used in the local assets in foreign currency is not the yen but the Swiss franc with a portion of 6%, having an amount of approximately 25 billions US dollars more than that of yen. The banks' liability positions are also more or less the same. The only difference is the fact that the yen is preferred to Swiss franc in this section. The difference of their amount outstanding is 57.4 billions US dollars, which is a far more than the amount of 25 billions US dollars' difference in the assets part.

5.3.1.7. International investment positions

Table 5.26 shows the international investment positions of the countries in 2002. The total liabilities of the euro area are approximately 8 trillion US dollars, which is very close to the liabilities of the US, which is roughly 9 trillion US dollars. The important thing to note here is their net international positions, which are −304 million US dollars for the euro area and − 2,605 million dollars for the US. The US, being under such a big deficit, shows us the riskiness of US assets relative to the others. But when we look at the data

for the US liabilities to the monetary authorities, we see that this fact does not affect its desirability as a central bank reserve currency. The US has a liability of 297 million dollars to the monetary authorities of the other countries where as this number is only 61 million dollars for the euro area.

When we calculate the changes in international investment positions of the US and the euroland between the years 1999 and 2002, we again see the decreasing credibility of the US. In this time period, the US international deficit increased by 144% while the deficit of Euroland increased by only 8%. The other factor that shows the increasing credibility of Euroland is the rise in the direct investments that are made in Euroland in the mentioned period. The direct investments that are made in the Euroland increased by 97% between the years 1999-2002, while they decreased by 28% in the US. The only sector in which the Euroland could not show much improvement between these years is the portfolio investment. The liabilities of the area in portfolio investments increased by only 8% while the liabilities of US increased by 20%. This indicates that individuals and firms still prefer to hold dollar denominated assets in their portfolios rather than the euro denominated ones. But except the portfolio investment in all other sectors the liabilities of the euro area increased more than that of the US. Especially in banking sector the euro became the currency that is more preferred. It may be concluded that currently the euro is a highly penetrated currency and its credibility seems to be more than that of the dollar.

In order to investigate the banking sector in detail, from the Bank for International Settlement data Table 5.27 is prepared for the currency breakdown of reporting banks' positions. When the years 2001 and 2003 are compared it may be concluded that although the dollar is still the most preferred currency, the euro showed a great improvement. While US dominated assets and liabilities increased by 16%, the euro denominated ones increased by 66 and 69 percent respectively in this period. When the total amounts is concerned, we see only one billion dollars between the euro denominated assets and the dollar denominated ones, and the same difference also counts for the liabilities part.

5.3.2. Empirical Study on International Bonds and Notes

There are a number of reasons for choosing to make the empirical study on international bonds and notes. The idea is taken from the paper of Frenkel and Søndergaard (1999), who gave three reasons, which are also valid today, for this. The first reason is the fact that these international assets account for a high share in international private portfolios. Secondly, for these assets, relatively complete and consistent data are available. Finally, virtually the same type of asset can be held in alternative currencies so that the currency of denomination and the expected return on it is the most important factor in the demand for these assets in a specific currency (Frenkel and Søndergaard, 1999). Although the cases of both international bonds and international bank deposits are taken in the work of Frenkel and Søndergaard, in this research just the case of international bonds and notes will be taken. International bond holdings are very important in quantitative terms. According to the Bank for

International Settlements report (March, 2004) at the end of 2003, they amounted to about 11.1 trillion US dollars.

Although the main idea is taken from the work of Frenkel and Søndergaard, the reasons of doing this research is different from them in some aspects. Their research is done in order to project the EMU effects on the currency shares of the international bonds and they investigated the results for EMU-11 and EMU-15 and compared them. The shares that they found for the dollar are very close to the current shares, but they underestimated the euro shares while overestimating the yen shares. The reason of this is probably the fact that they used the share of the Deutsche mark in order to estimate the demand function for EMU. Currently we know the shares of the currencies in international bond markets more precisely, as five years have passed since the advent of the euro, so demand functions for international bonds are estimated using these data. Frenkel and Sondergaard used eight years' quarterly data (1990-1997) and in this research again eight years' quarterly data is used (1996-2003).

It is assumed that the width of a market represents an important factor for the currency structure of private bond portfolios. The higher the width of a market, ceteris paribus the more liquid are the assets. Therefore, the demand for assets denominated in the currency of this market will be more. The stability of the currency in which the bonds are denominated is another factor in determining the currency structure of international bond portfolios. Investors are likely to prefer bonds denominated in low inflation currencies

rather than in currencies with higher inflation. The analysis is restricted to the dollar, the euro and the yen. As a proxy for the market width, the GDP share of the United States, Euro Zone and Japan in the total GDP of these three countries are used. The GDP amounts of the countries are converted to SDR in order to eliminate the exchange rate differences.

Based on these considerations the following equation is estimated for the share of bonds denominated in currency i, which is denoted by $Share_i$ (i = dollar, euro or yen):

$$Share_{i,t} = \beta_0 GDP_{i,t} + \beta_1 Inf_{i,t} + \varepsilon_t \qquad (11)$$

Here GDP_i represents the GDP share, Inf is the inflation rate, and ε is the error term. As a proxy for the inflation rate the actual inflation rates of the three countries during the two subsequent years are used and moving averages of the rates are taken. Using the quarterly data published by the Bank for International Settlements for the period 1996 through 2003, OLS estimates are performed. For 1996 through 1998, all the international bonds that are issued in preceding currencies of the euro are added up. In order to find the GDP of the Euro Zone for the period 1996-1998, individual GDP amounts of the EMU countries are added up, after converted into SDR.

In this research, different from the analysis of Frenkel and Søndergaard, the Seemingly Unrelated Regression (SUR) Method will be used. It is believed that the ideal thing to do would be to estimate the shares of all three

currencies together, as they depend on each other. In order to prevent autocorrelation, first the equations are regressed individually to see whether they have any significance problems.

Table 5.5 shows the results of the first OLS estimates of the euro. The value that Durbin Watson statistics takes shows us that there is first order serial correlation. In order to get rid off this correlation the AR (1) Method is used. The result of it is shown in Table 5.5.

The equation can be estimates as follows according to results in Table 5.5:

$$\text{Share}_{e,t} = 2.699345 \text{GDP}_{e,t} + 0.101131 \text{Inf}_{e,t} \tag{12}$$

After the application of the AR(1) Method, the demand function for international bonds and notes in the Euro Zone may be estimated as:

$$\text{Share}_{e,t} - \hat{\rho}\,\text{Share}_{e,t-1} = 7.060872(\text{GDP}_{e,t} - \hat{\rho}\,\text{GDP}_{e,t-1}) - 0.300132 \text{Inf}_{e,t} \tag{13}$$
$$\hat{\rho} = 0.676113$$

Where Share_e shows the share of the euro denominated bonds, GDP denotes the share of the GDP of the Euro Zone among three major countries, Inf shows the inflation rate and $\hat{\rho}$ denotes the coefficient of the AR(1). Instead of (12), equation (13) will be used in the system formed for the SUR Method. Of course in the application process of the SUR Method the coefficients found here will not be used. Here they are written just for the sake of completeness. Although we couldn't find a significant coefficient for the inflation, the coefficient of AR(1) is significant, which shows us the fact that

using this method is a true decision. The same procedure is applied also for the US. The regression results of the share of the bonds issued in US dollar is shown in Table 5.5.

. In US case, there seems to be no serial correlation and the results are significant. Accordingly the share of the US dollar denominated international bonds is estimated as:

$$\text{Share}_{d,t} = 2.709030\text{GDP}_{d,t} - 1.072074\text{Inf}_{d,t} \qquad (14)$$

Here the same notation as in Equation 12 is used except for Share_d, which denotes the share of the dollar denominated international bonds. As there is no serial correlation equation (14) will be used in the system except for the values of coefficients.

When we look at the regression results of Japan (Table 5.5), which is found by using the same method, we again observe first order serial correlation.

From the results in Table 5.5 equation 11 may be estimated as:

$$\text{Share}_{y,t} = 1.503253\text{GDP}_{y,t} - 0.329382\text{Inf}_{y,t} \qquad (15)$$

As there is serial correlation, again the AR (1) method is used and the results in Table 5.5 are found. According to the results in Table 5.5, the following demand function is estimated for the yen denominated international bonds.

$\text{Share}_{y,t} - \hat{\rho}\,\text{Share}_{y,t-1} = 1.373092(\text{GDP}_{y,t} - \hat{\rho}\,\text{GDP}_{y,t-1}) - 0.292218\text{Inf}_{y,t}$ (16)

$\hat{\rho} = 0.57188$

Notation is the same as before except for Share_y that denotes the share of the yen denominated international bonds. Equation 16 will be used instead of equation 15 for the case of Japan, without the coefficients.

Table 5.5. Regression Results

Sample: 1996:1 2003:4							
	GDP	**Inf**	**AR(1)**	**R^2**	**Adj. R^2**	**DW**	**F**
Euro Zone							
1	2.699** (1.36)	0.1011 (0.126)		0.3353	0.3131	1.087	15.1
2	7.061* (2.06)	-0.3001 (0.193)	0.676113* (0.14333)	0.5217	0.4876		15.3
US							
1	2.709* (0.52)	-1.072* (0.295)		0.2868	0.2630	1.975	12.1
Japan							
1	1.503* (0.38)	-0.329* (0.109)		0.4058	0.3860	0.863	20.5
2	1.373* (0.49)	-0.292** (0.141)	0.57188* (0.15575)	0.5986	0.5699		20.9

* Significant at 1% level
** Significant at 5% level
1- Normal regression
2- Regression with AR(1) Method

The comparison of the three equations gives us some clues about the three currencies. First, it has to be noted that to use the AR (1) method is not always a true decision, because there may be some quarterly effects as we are using the quarterly data and also we do not have an intercept term in our equation. We are using a quarterly data, so there may be some seasonal effects. But as we have a small data set, using AR (4) would not be a realistic decision. We

are aware of these facts, but as the coefficients of the AR(1) are significant in both the Euro Zone and the Japan case, it is believed that using this method is a true decision.

A system is formed by using equation 13, equation 14 and equation 16 in the E-views and the SUR Method is applied. The results may be observed from Table 5.6.

The results give evidence for our assumptions. The GDP share of the issuer country of the currency has a positive relationship with the share of the currency in international bonds market, while the inflation rate has a negative one. The coefficient of the GDP share of the Euro Zone has the highest value; 3.56, which shows us that a unit increase in the GDP share of the euro area will cause 3.56 units increase in its share in the international bonds market at the expense of the US and Japan. The US has a coefficient of 2.42 for its GDP share, which is also a relatively high number, although not as high as that of the euro area. Japan has the lowest coefficient, but still has a positive relationship between its GDP share and the share of yen denominated bonds in the international markets. As a result it may be said that the Euro Zone has a higher potential to increase its share in international bonds market by increasing its GDP share than the US or Japan do have.

The inflation coefficient that is found for the Euro Zone is not significant. For the other two countries it may be concluded that the inflation has a higher negative effect on the share of bonds in the US than in Japan.

Table 5.6 The Results of the SUR Method

Estimation Method: Iterative Seemingly Unrelated Regression Sample: 1996:1 – 2003:4			
	Coefficient	**Std Error**	**Prob (t-stat)**
β_0	3.563512	1.267546	0.0061
β_1	9.29E-05	0.000393	0.8137
α_0	2.424483	0.315366	0.0000
α_1	-0.009122	0.001795	0.0000
δ_0	1.872307	0.427414	0.0000
δ_1	-0.001856	0.000529	0.0007
Equation: $Share_{e,t} - (0{,}767113\ Share_{e,t-1}) = \beta_0(GDP_{e,t}-0.676113\ GDP_{e,t-1}) + \beta_1 Inf_{e,t}$			
R Squared	0.268434	**Adjusted R Squared**	0.243207
Equation: $Share_{d,t} = \alpha_0\ GDP_{d,t} + \alpha_1\ Inf_{d,t}$			
R Squared	0.278796	**Adjusted R Squared**	0.254756
Equation: $Share_{y,t} - (0{,}571880\ Share_{y,t-1}) = \delta_0(GDP_{y,t}-0.571880\ GDP_{y,t-1}) + \delta_1 Inf_{y,t}$			
R Squared	0.231292	**Adjusted R Squared**	0.204785

With the above analysis we cannot make a prediction, as it has no restriction such as the summation of the shares should give the value 1. As a result of this when we try to predict the new share after one percent increase in GDP we find values greater than one. In order to be able to make predictions we will use the market share attraction model (Fok *et al*, 2001).

In the spirit of attraction models:

$$A_{i,t} = f(GDP_{i,t}, Inf_{i,t}) + \varepsilon_{i,t} \qquad (17)$$

where $A_{i,t}$ is the attraction of the country i at time t, $t = 1,\ldots\ldots.T$. $GDP_{i,t}$ and $Inf_{i,t}$ denote the GDP share and the inflation rate of the country.

The market shares for the I brands follow from the Market Share Attraction Theorem (Bell *et al*, 1975). In this theorem the market share of brand i is equal to its attraction relative to the sum of all attractions.

$$M_{i,t} = \frac{A_{i,t}}{\sum_{j=1}^{I} A_{j,t}} \qquad \text{for } i = 1,\ldots\ldots,I \qquad (18)$$

The model in (17) and (18) is usually called the market share attraction model. In our analysis we will use the countries instead of brands.

In our research we took Japan as the base country and we tried the find out the market shares of the Euro Zone and the US relative to Japan in international bonds market.

$$\log \frac{M_{i,t}}{M_{I,t}} = \frac{A_{i,t}}{A_{I,t}} = \beta_1 \frac{GDP_{i,t}}{GDP_{I,t}} + \beta_2 \frac{Inf_{i,t}}{Inf_{I,t}} + u \quad i = \text{Euro Zone, the US} \qquad (19)$$

Here $M_{i,t}$ shows the market shares of country, while $M_{I,t}$ denotes the market share of Japan. $A_{i,t}$ and $A_{I,t}$ show the attraction models for the countries in the same manner. $GDP_{i,t}$ is the GDP shares of the countries and $GDP_{I,t}$ is the GDP share of the base country. Likewise $Inf_{i,t}$ and $Inf_{I,t}$ denote the inflation rates of the countries and the inflation rate of the base country respectively.

We form two equations; one for the Euro Zone and for the US. As before, first the individual equations are regressed in order to see whether there is autocorrelation or not. The Durbin-Watson statistic for the US case is above the critical values, so there is not an autocorrelation, but we can not say the

same for the Euro Zone. Its value for the Durbin Watson statistic is far below the critical values, so we apply AR (1) Method. As a result our equation for the Euro Zone takes the form of:

$$\text{Share}_{e/y} - (0.741172\ \text{Share}_{e/y,t-1}) = \beta_0(\text{GDP}_{e/y} - 0.741172\ \text{GDP}_{e/y,t-1}) + \beta_1\text{INF}_{e/y} \quad (20)$$

where $\text{Share}_{e/y}$ is the ratio of the share of the euro denominated bonds to the share of yen denominated bonds. $\text{GDP}_{e/y}$ and $\text{INF}_{e/y}$ denote the GDP share of the Euro Zone relative to that of Japan and the ratio of inflation rate of Euro Zone the inflation rate of Japan. As there is no autocorrelation in the US case its equation stays the same as before. Using these two equations we form a system under e-views and the SUR method is applied. The results may be observed in Table 5.7.

As before the results support our assumptions. There is a positive relationship between the GDP share and market share and a negative relationship between the inflation share and market share. According to these results we may conclude that a one percent increase in the GDP share of the Euro Zone will cause 4.3% ($= 1 - e^{0,0423949}$) increase in the market share of euro denominated bonds and a percent increase in the GDP share of the US will cause 0.6% (= $1 - e^{0.00564803}$) increase in the market share of dollar denominated bonds. It may be concluded that the Euro Zone has a higher potential to increase its share by increasing its GDP relative to the US. This result is consistent with the one we found before. As we couldn't find a significant coefficient for the inflation rate of the US we cannot comment on

it, but we may say that one percent increase in the inflation rate of Euro Zone relative to Japan will cause its market share by 0.002% $(1 - e^{-0.00221742})$.

Table 5.7 The Results of the SUR Method (Attraction Model)

Estimation Method: Iterative Seemingly Unrelated Regression Sample: 1996:1 – 2003:4			
	Coefficient	**Std Error**	**Prob (t-stat)**
β_0	4.232949	0.956544	0.0000
β_1	-0.221742	0.085005	0.0115
α_0	0.564803	0.144604	0.0002
α_1	-0.466713	0.286838	0.1090
Equation:$Share_{e/y,t}$-(0,741172$Share_{e/y,t-1}$)=β_0($GDP_{e/y,t}$-0.741172$GDP_{e/y,t-1}$)+ $\beta_1 Inf_{e/y,t}$			
R Squared	0.353844	**Adjusted R Squared**	0.331562
Equation: $Share_{d/y,t} = \alpha_0\ GDP_{d/y,t} + \alpha_1\ Inf_{d/y,t}$			
R Squared	0.419951	**Adjusted R Squared**	0.400616

5.4. Historical Inflation Rates of the Euro Zone and the US

In order to compare the historical inflation rates of the Euro Zone and the US, an index is formed up for the euro area by using the data of the period 1980-2003. The data, which is obtained from IFS, consists of the GDP amounts and the GDP deflators of each member country[*]. As all the GDP amounts are in terms of the countries' currencies, first all of them are converted into ECU for the time period before the advent of the euro (1980-1999). Then by adding up the individual countries GDP amounts, the total GDP of the euro area is found out and each country's GDP is expressed as a share of the total GDP. It is assumed that each country will affect the union's inflation rate in an amount proportional to its GDP share, so GDP deflator of

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[*] Although Greece joined EMU a year later, in 2000, the index is formed up by using also its data for the sake of completeness. As the GDP share of Greece is not very high, it is believed that this will not create a major difference for the calculations.

each country is multiplied by its GDP share. The results are added up to find the GDP deflator for that year and this procedure is repeated for all the years of the taken period (1980-2003). As IFS took the base year as 1995 and the US GDP deflator index also had the same base year, it is kept the same in order to be able to make the comparison. In Figure 4.2 the paths that the GDP deflators of the Euro Zone and the US have followed may be observed. It may be concluded that although there have been small fluctuations, both have had more or less stable economies in terms of inflation rates during the considered time period.
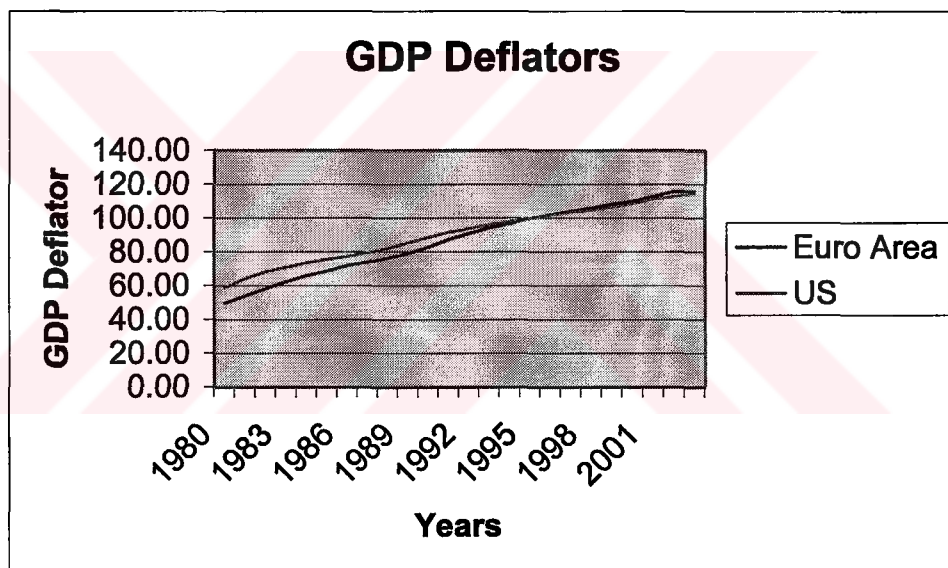
Figure 5.2 The Path of GDP Deflators of the US and the Euro Zone

5.5. Current Account and Trade Balance of the Euro Zone and the US

Current account balance and trade balance are also important issues for an international currency. Many things may affect the amount of the trade and current account deficit or surplus. In this research we will focus on two things. The first one is the trend of the current account and trade account of the euro

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Zone and the US, to see whether there is a time effect on the deficits or surpluses. Secondly, the relation between the trade balance and the current account balance will be investigated.

The quarterly data of the Euro Zone and the US for current account and trade balance is used. The time period after the advent of the euro is chosen (1999-2003), so there are 20 observations. Firstly a trend equation is formed for both the current account and trade balance of the Euro Zone as follows:

$$CA_e = \beta_0 + \beta_1 t \qquad\qquad (21)$$

$$TB_e = \alpha_0 + \alpha_1 t \qquad\qquad (22)$$

where CA_e and TB_e denote the current account balance and the trade balance of the Euro Zone respectively, and t is the time.

The adjusted R^2 of the regression for the equation (21) is 0.39, meaning that the time factor describes approximately 39% of the changes in the current account. Likewise, for the equation (22) we have an adjusted R^2 of 0.40. It may be concluded that the 40% of the changes in the trade balance may be described by the time factor. Of course this is just the time period of five years and five years is a very short time for a country. As there has been just five years since the advent of the euro, we had to choose this time period. We are aware of the fact that we cannot forecast the future conditions of the current account and trade balance with this limited data, but this analysis shows us the situation since the advent of the euro.

The same procedure is applied also for the US case. Again the same time period is chosen for the sake of completeness and in order to be able to compare the two. The following two equations are estimated for the current account and trade balance of the US respectively.

$$CA_U = \delta_0 + \delta_1 t \qquad (23)$$

$$TB_U = \omega_0 + \omega_1 t \qquad (24)$$

Here the notation is the same as before. The adjusted R^2s of equation (23) and equation (24) are 0.76 and 0.69. It may be concluded that time is an important determinant of both the trade and the current account balance of the US in these five years.

Secondly, we are interested in the relationship between the current account and trade balance. In order to investigate this issue the following equations are estimated for the Euro Zone and the US.

$$CA_e = a + b\ TB_e \qquad (25)$$

$$CA_U = c + d\ TB_U \qquad (26)$$

The notation is as follows: CA_e and CA_U denote the current account balance of the Euro Zone and the US respectively. TB_e represent the trade balance of the Euro Zone and TB_U denote the trade balance of the US.

The regression results for the Euro Zone is shown in the Table 5.8. Accordingly equation (25) is estimated as:

$$CA_e = (-2.32E+10) + 1.085918\ TB_e \tag{27}$$

From equation (27) it may concluded that an increase of one SDR in trade balance of the Euro Zone will cause approximately an increase of 1.09 SDR in its current account balance. It may be said that trade balance is the most important factor that affects the current account balance. The changes in other items that form up the current account as current transfers, income, etc. do not have a significant effect on the magnitude of the current account surplus or deficit.

Table 5.8 Regression Results

Sample: 1999:1 2003:4						
	a	**b**	**R^2**	**Adj. R^2**	**DW**	**F**
Euro Zone	-2.32E+10 (3.58E+09)	1.0859 (0.1497)	0.74505	0.73088	1.9639	52.6
US	2.78E+10 (6.93E+09)	1.1927 (0.0608)	0.95522	0.95273	1.3581	383.9

All coefficients are significant at 1% level.

As it may observed in the Figure 5.3, the Euro Zone had not given any trade deficit in the chosen period. On the other hand between the period of the third quarter of 1999 and second quarter of 2001 and in the second quarter of 2002 it had given current account deficits. It may be concluded that in these periods the other factors had more effect on the current account than did the trade balance.
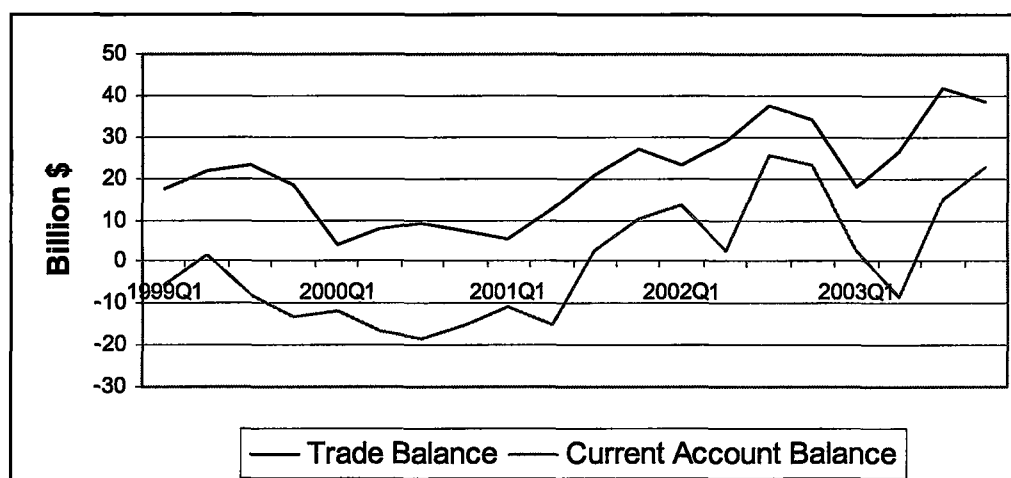
Figure 5.3 Trade and Current Account Balance of the Euro Zone

Furthermore, the following formula is used to express the data of the current account and trade balance as standard deviations from the mean. This procedure reduces the two data series to the same scale.

$$Z_i = \frac{X_i - \bar{X}}{\sigma}$$

Here $\bar{X}$ denotes the mean of the data set, while σ shows the standard deviation. The figure 5.4 shows the transformed form of the current account and trade balance of the Euro Zone.

From Figure 5.4, it may be concluded that there is a very close relationship between the trade and current account balance. Since the beginning of 2000 current account balance follows the trade balance with one period of lag.
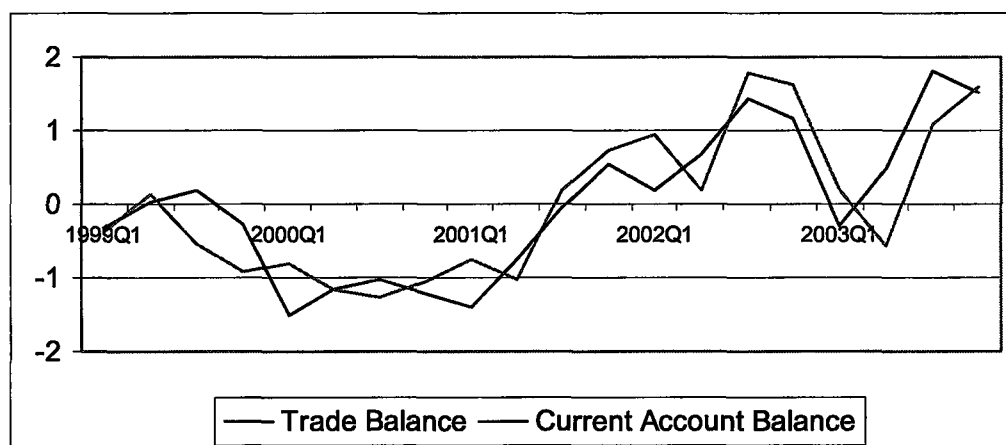
Figure 5.4 Trade and Current Account Balance of the Euro Zone expressed as standard deviations from the mean

In Table 5.8 the regression results for the equation (26) may be observed. According to the regression results shown in Table 5.8 the equation (26) is estimated as:

$$CA_U = (2.78E+10) + 1.192752\ TB_U \tag{28}$$

Here we can say that an increase of one SDR in trade balance will cause an increase of 1.19 SDR in current account balance. The same result as in the case of the Euro Zone may be also concluded for the US case. The changes in the current account balance may be mostly described by the changes in the trade balance rather than the other items current account.
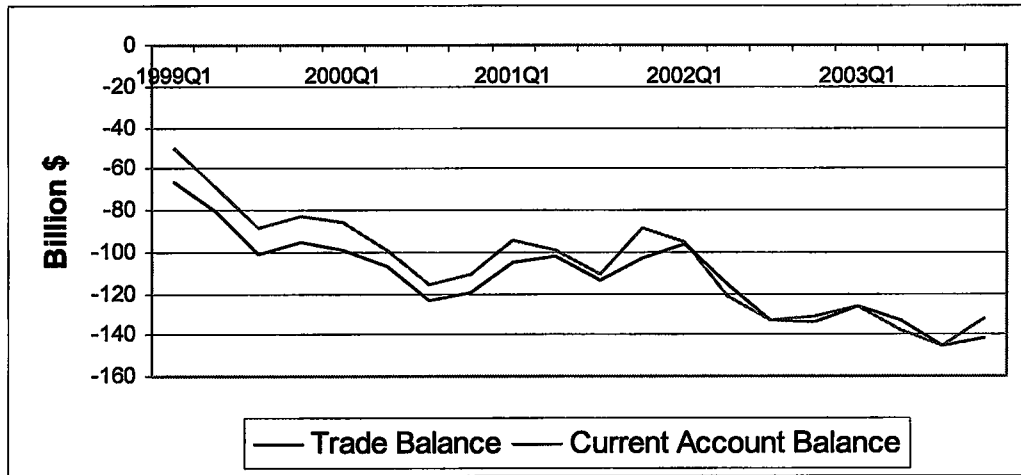
Figure 5.5 The Trade and Current Account Balance of the US
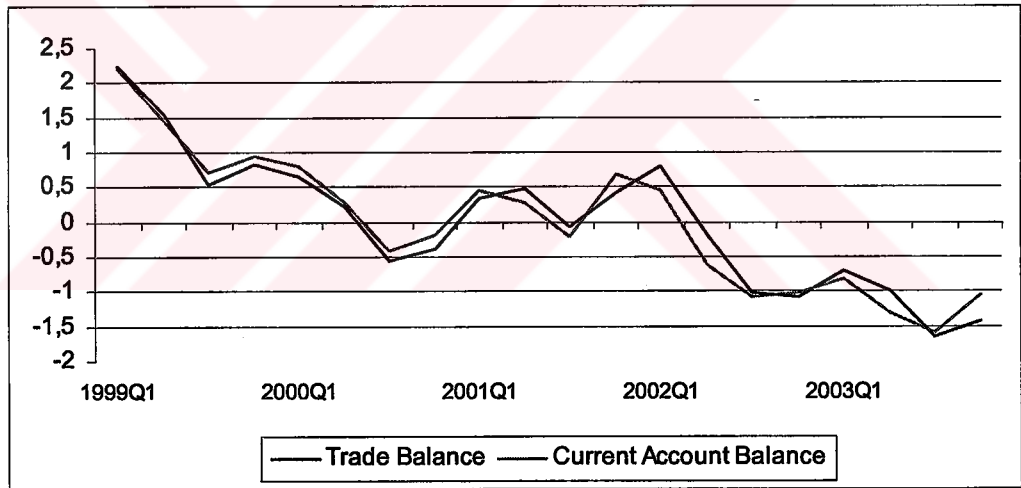
Figure 5.6 Trade and Current Account   Balance of the US expressed as standard deviations from the mean

Unlike the euro case the US had always given both trade and current account deficits between the years 1999 and 2003 (Figure 5.5). Since the beginning of 1999, the current account and trade deficit of the US has more than tripled. The close relationship between the trade and current account of

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the US may be observed in both Figure 5.5 and Figure 5.6. The same procedure as in the case of the Euro Zone is used to draw Figure 5.6.

Giving trade deficits is a way to be an international currency. This does not mean that they should always give trade deficits and no country can have trade deficits for decades, but giving trade deficits is a way to be used wide spread. But while giving trade deficits if a country has a current account surplus that means the money that it sends out by giving trade deficits turns back to the country in means of other factors. We did this analysis in order to see if there is such a situation in the Euro Zone and the US. The results show us that there is a very close and positive relationship between the current account and trade balance of both. An export that has a value of one SDR has a reflection of 1.09 SDR on the current account of Euro Zone. The Euro Zone has link to feed the world with its currency. It is also true for the US. Both the US and the Euro Zone have developed a penetration to make their currency international by having trade and current account deficits. Although the Euro Zone has never had a trade deficit in the chosen period and has a current account surplus recently, if it starts to give trade deficit, it will also have current account deficit. Our analysis shows that the link between the trade and current account deficit of the US is higher than that of the Euro Zone, although the difference between them is very small. Both parts have a potential to feed the world with their currency although the Euro Zone do not use it at the moment.

Table 5.9 Regression Results for the Euro Zone and the US (Trend)

	R^2	Adjusted R^2
CA_e	0.424852	0.392900
TB_e	0.430885	0.399267
CA_U	0.772402	0.759758
TB_U	0.708254	0.692046

The world's reserve volume is increasing. There may be two reasons for that. First one is the growth in the trade volume of the world. We will discuss the recent developments in world trade in the next part. Second one is the decrease in the purchasing power parity of the currencies. If we think of the dollar case there is also a dilemma here. As the trade volume increases the agents need more dollars, but on the other hand as purchasing power parity of the dollar decreases they also want to substitute it with another currency. Here the euro comes into the scene. As the reserve need of the world is growing too fast, I think the dollar will not be able supply it alone. How much the euro takes part will also depend on the amounts of the opposite effects discussed above.

5.6. Global Trade

In this part firstly the current situation in the world trade is analyzed and then the shares of the US and the Euro Zone in the world trade are discussed.

5.6.1. World Trade in 2003

According to the World Trade Organization (WTO) economists a 2.5 percent increase in global output in 2003 spurred world trade to recover by 4.5 percent. Although this growth was stronger than expected a year ago, trade

and output expansion in real terms in 2003 remained below the average rates recorded since 1995. The expectations for 2003 were low because of the outbreak of severe acute respiratory syndrome (SARS) and the build-up of tensions in the Middle East.

In 2003, the regions that recorded the most dynamic trade performance were Asia and the transition economies. They increased their merchandise exports and imports between 10 percent and 12 percent, more than twice as fast as world merchandise trade. China's imports increased by 40 per cent in nominal dollar terms while its exports expanded by 35 per cent.

On the other hand Western Europe and Latin America showed a weak real import growth. They were the ones that recorded the weakest import growth among all the regions, having a growth rate of less than 2 per cent.

The import growth of the United States exceeded the world average for the third successive year. Its import growth continues to exceed its export growth and its trade deficit continues to widen. Merchandise imports of the United States went up by 5.7 percent while its exports rose less than 3 percent after two years of contracting export volumes. The merchandise trade deficit of the United States reached $549 billion dollars, corresponding to 7.6 percent of world merchandise exports in 2003.

In 2003, West European currencies appreciated strongly vis-à-vis the dollar. As a result the dollar merchandise export value of these countries

expanded faster than world trade, but in volume terms there had been a near stagnation. Merchandise exports of Western Europe increased by less than 1 per cent, while imports rose by nearly 2 per cent.

There had been a 16 percent increase in world merchandise exports and they rose to $7.3 trillion. Commercial services exports rose by 12 per cent to $1.8 trillion. This was the strongest annual increase in nominal terms for both merchandise and services trade since 1995. In 2003, developing countries' merchandise exports expanded by 17 percent and this increase had been slightly faster than their imports and the world average.

China recorded an extraordinary expansion in merchandise trade in 2003 and became the third in the ranking of the world's leading merchandise importers.

Many oil exporting countries (such as Russia and Saudi Arabia) and the countries with appreciating currencies like Western Europe had nominal export growth more than 20 per cent. Germany's merchandise exports again exceeded those of the United States because of the appreciation of the euro.

According to WTO report, gains in the ranking of the leading commercial services traders in 2003 were principally recorded by Western European countries at the expense of American and Asian countries. This is true for both export and import rankings. Western Europe and transition economies recorded annual gains in their exports and imports of services ranging from 16

per cent to 21 per cent, while Asia and Latin America's export expansion was limited to 6 per cent. The imports of North America continued to expand much faster than exports in 2003, such that its surplus in services trade was further reduced.

Dollar prices of internationally traded goods lived their strongest increase since 1995 and increased by 10.5 per cent. There had been temporary supply shortfalls of oil because of the conflict in the Middle East and civil unrest in Venezuela and this caused up to 16 per cent increase in the prices of fuels. Prices of non-fuel commodities rose by 7 per cent on spot markets on average and there had been a 12 per cent increase in metal prices.

5.6.2. The Shares of the US and the EU in Global Trade

After a brief summary of the recent developments in the world trade, now it is time to compare the positions of the US and the EU in the global trade. Table 5.10 shows the trade patterns of the US, the EU* and Japan. It may be observed that all the three countries make the highest percentage of their trade with their neighbors. The EU makes the highest percentage of its trade with non-EU European countries and Asian countries except Japan and the US follow them. 28% of the total exports of the US is with the continent of America while Japan exports 25.3% of its total exports to Asian countries.

In order to form Table 5.10, Eurostat and World Trade Organization data are used. As Eurostat gave the percentages directly for EU no calculations is

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* Intra EU trade between the 15 member countries is not taken into account.

made, but for the US and Japan the first forty commodities that have the largest share of the total exports and the imports of the countries are found separately. From the World Trade Organization data the rankings of the countries for these forty commodities are taken. For each commodity the leading two markets, and their share in total export (or import) of the US or Japan are found. The trade partner countries are grouped as shown in the table and the individual countries' shares are added up to find the total share of the group. The chosen forty commodities make up the 50 to 60% of the total trade of the US and Japan, so it is assumed that the rest will also be distributed in the same way.

Table 5.10 The Trade Composition of the Three Major Countries

	EU	US	Japan
Exports to			
US	9.3%	-	31.2%
EU	-	4.8%	4.8%
Japan	1.6%	2.0%	-
America (Excluding US)	3.1%	28.0%	2.9%
Asia (Excluding Japan)	9.4%	5.0%	25.3%
Ocenia	0.8%	0.7%	0.4%
Non EU European Countries	12.3%	0.5%	na
Imports From			
US	6.8%	-	13.0%
EU	-	6.6%	2.9%
Japan	2.7%	9.1%	-
America (Excluding US)	2.7%	23.3%	0.8%
Asia (Excluding Japan)	12%	12.8%	33.9%
Ocenia	0.5%	na	3.5%
Non EU European Countries	12.0%	na	na

n.a = not applicable
Source: WTO, Eurostat, author's own calculations

In order to be able to make some comments about the use of the euro, the dollar and the yen in international trade invoicing we have to make also some

other assumptions. Hartmann (1998) states these assumptions under the heading "Stylized facts of trade invoicing behavior". He mentions that there are a number of regularities observed in the choice of currencies for the invoicing of international trade (Grassman, 1973; Page, 1981; Black, 1990; Tavlas, 1991). First, for trade in manufactured goods between industrial countries the major part of contracts are denominated in the exporter's currency and most of the remaining contracts are denominated in the importer's currency, while the third-currency invoicing is relatively rare (Grassman's Law)*. Second, in most cases the industrial country's currency or a third currency is used for trade between industrial and developing countries. Finally, inflationary currencies are used less in their country's foreign trade than less inflationary currencies. Hartmann's fourth and fifth assumptions are not taken as I have some doubts about their validity for the current international trade transactions and also they are not very important for the analysis that I will make.

In order to find the invoicing shares for the major three currencies first the Table 5.10 is extended. The total amount of exports and imports of the three countries are found from IFS and all are converted into SDR in order to eliminate the exchange rate problems. According to the shares found before, the total amount of exports and imports that each country makes with each group is calculated. After that according to the assumptions that are stated previously the total amount of trade that is denominated by each currency is

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* Grassman's Law highlights the home-currency preference in international trade. However, there are some important exceptions like Japan (Hartmann, 1998)

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found out and the shares of them are calculated. It is assumed that the exports of the EU, the US and Japan are denominated in their own currencies. And for imports it is assumed that the EU imports from Asia, Oceania and non-EU European countries in terms of euro, while the trade within the continent of America is denominated in the dollar. It is also assumed that the imports of the US from Asia (excluding Japan) and continent of America are denominated in dollars. For Japan, the trade with Asia is assumed to be in yen. As a result it is concluded that 49% of the trade in 2002 is denominated in dollars, while the euro and the yen have shares of 28% and 23% respectively. I am aware of the fact that with the assumptions above probably the share of yen is overestimated. Japan does not want its currency to be a dominant one and also for some other reasons it does not usually use its currency as an invoicing currency for its export. However, it is not possible to determine in what percent of its exports it uses its currency as an invoicing currency and for the sake of consistency with the assumptions no manipulation is made. It may be concluded that the dollar is the dominant money in invoicing of the global trade but the euro has also a potential and it is the second most used currency. With the expansion process the members of the EU will increase and as a result the trade amount of the union will increase. In the future, this may bring the euro the chance to catch up with the dollar as an invoice currency in the global trade.

There is also another important factor that may affect the invoicing patterns of the global trade. When we look at the Table 29 and Table 31, we observe that crude petroleum oils are the one of the most important import

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commodities for the US and Japan. In the ranking it is number one for Japan and number two for the US. Approximately 11% of the total imports of the Japan and 7% of the total imports of the US is for the crude petroleum oils. The import share of the EU from OPEC countries is 2.8%. When the shares of these countries in the world trade are concerned it may be concluded that the decision of the OPEC countries for the invoicing currency may have some effect on determining the dominant currency. The US imports of crude petroleum oils has a share of 33.1% in the total crude petroleum oils trade of the world and the leading exporting countries to the US are Saudi Arabia and Mexico with the shares of 16% and 14% respectively. 14.6% of the total world crude petroleum trade is made by Japan and Saudi Arabia is again the main exporter country to Japan. Oil is not only the most important commodity traded internationally, but also it is the lifeblood of all the industrialized economies. If a country does not have oil, it has to buy it. Therefore OPEC countries' decision about the invoicing currency for oil is an important issue. Until recently all OPEC countries agreed to sell their oil for dollars only. Let's think about the other extreme. If OPEC countries were to decide to accept only euros for its oil, then firstly Europe would not need, as many dollars as before, besides Japan would think to convert a large portion of its dollar assets to euro assets. On the other hand the US, being the world's largest oil importer would have to run a trade surplus to acquire euros. The conversion from trade deficit to trade surplus would be very painful for the US. Of course this is an extreme case, but it is important to see how decisions of OPEC countries may change the flows in the world trade.

Until now only one OPEC country switched to the euro: Iraq, in November 2000. Also Iran and Venezuela have been talking publicly about possible conversion to the euro. Of course switching to euro is not only an economical but also a political decision, as it is beyond my scope, I do not want to comment about this. The point that I want to draw attention to the fact that the invoice currency decision of OPEC countries may have some effect on determining the dominant invoice currency of the world.

5.7.   Conclusion

As a result it may be concluded that the euro and the dollar have a some what balanced competiton with each other. Although the dollar has some advantages like incumbency, high supply elasticity, the euro has already caught up with the dollar in international financial markets and even has some advantage over the dollar except for the official reserves. Supply elasticity is an advantage to the extent that the strength of the international currency is trade based, but the international trade is not the only factor that determines the role of a currency in international markets. Financial performance is also important and the euro seems to be very competitive in this area. The dollar is the dominant currency in international trade now, followed by the euro, which has an increasing trend. The currency choice of the world blocs for their international transactions will determine the international roles of the euro and the dollar. In my opinion, both have equal chance and the world may have a bipolar stability provided that international arrangements and aggrements are made between the US and the Euro Zone to prevent high fluctuations of the exchange rates that will cause instability.

As Charles Wyplosz (1999) puts it; "Economically strong, politically shy, culturally subdued, Europe will be seen as the land of la dolce vita, a region that emphasizes shorter working hours and longer vacations as well as economic growth, social justice and high quality of life as well as productivity." I believe as Europe becomes more integrated, the likelihood that it will play an increasingly active role in world economic and political affairs will be greater and the confidence its currency will inspire will be more.

5.8 Tables Related to the Chapter

Table 5.11. 10 Year and 5 Year Averages of the Main Economic Indicators

	USA	Euro Zone
Real GDP Growth Rate[1]	3.3%	2.1%
Inflation Rate[2]	2.5%	1.9%
Interest rates (Annual Average)		
- Long term[3]	5.8%	5.9%
- Short term:3-month interbank[4]	4.6%	4.3%
- Short term:Day to day money[5]	3.6%	3.4%
Seasonally adjusted unemployment rate[5]	4.9%	8.6%

Source: Eurostat, IFS

(1) Growth rate of GDP at constant prices (1995=100) – percentage change on previous year (10 years' average)

(2) Annual average rate of change in Harmonized Indices of Consumer Prices (HICPs) (10 years' average)

(3) 10 year government bond yields, secondary market (10 years' average)

(4) 10 years' average

(5) 5 years' average

Table 5.12. International Money Market Instruments

Type, Sector and currency	2002 Dec	2003 Dec	% Change	% of Total (2003)
(In billions of US dollars) By type, sector and currency (Amounts outstanding)				
Total Issues	437.7	569.5	30	
Commercial Paper	292.2	417.9	43	73
US dollar	93.2	108.7	17	26
Euro	126.5	212.4	68	51
Yen	7.1	5.4	-24	1
Pound Sterling	40.5	61.6	52	15
Swiss Franc	13.1	18.3	40	4
Canadian Dollar	0.4	0.7	75	0
Other Currencies	11.3	10.7	-5	3
Financial institutions	240.1	358.9	49	86
Governments	10.7	7	-35	2
International Organizations	5	5.9	18	1
Corporate issuers	36.4	46.1	27	11
Other Instruments	145.5	151.6	4	27
US dollar	52.1	56	7	37
Euro	52	56	8	37
Yen	16.3	11.9	-27	8
Pound Sterling	15.8	15.9	1	10
Swiss Franc	2.6	2.9	12	2
Canadian Dollar	0.6	1.4	133	1
Other Currencies	6.2	7.6	23	5
Financial institutions	140.3	147.1	5	97
Governments	0.5	1.5	200	1

Table 5.12. International Money Market Instruments (Continued)

Type, Sector and currency	2002 Dec	2003 Dec	% Change	% of Total (2003)
International Organizations	-	-		
Corporate issuers	4.7	3	-36	2
Currency of Issue				
Argentine peso	-	-		
Australian dollar	6.8	6.3	-7	1
Baht	-	-		
Canadian Dollar	1	2.1	110	0
Czech koruna	-	0.1		0
Danish krone	-	-		
Euro	178.5	268.4	50	47
Hong Kong dollar	8.1	8.3	2	1
New rouble	-	-		
New Taiwan dollar	-	-		
New Zealand dollar	0.6	0.6	0	0
Norwegian krone	1	1.1	10	0
Pound Sterling	56.2	77.5	38	14
Rand	-	-		
Singapore dollar	0.2	0.8	300	0
Swedish krona	0.7	0.8	14	0
Swiss Franc	15.7	21.2	35	4
US dollar	145.3	164.6	13	29
Yen	23.4	17.3	-26	3
Zloty	-	0.3		0

Source: BIS and author's own calculations

Table 5.13. International Bonds and Notes

(in billions of US dollars) By type, sector and currency (Amounts Outstanding)				
Type and Sector	2002 Dec	2003 Dec	% Change	% of Total (2003)
Total Issues	8757.6	11111.9	27	
Floating Rate	2192.5	2383.9	9	*21*
US dollar	928.5	913.8	-2	38
Euro	972.6	1182	22	50
Yen	102.7	86.4	-16	4
Pound Sterling	151.8	160.4	6	7
Swiss Franc	12.3	12.1	-2	1
Canadian Dollar	3	2	-33	0
Other Currencies	21.6	27.3	26	1

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Table 5.13. International Bonds and Notes (Continued)

Type and Sector	2002 Dec	2003 Dec	% Change	% of Total (2003)
Financial institutions	2029.3	2217	9	93
Governments	61.9	80.3	30	3
Int. Organizations	17.5	16.9	-3	1
Corporate issuers	83.8	69.7	-17	3
Straight Fixed Rate	6256.1	8366	34	75
US dollar	2977.6	3432.3	15	41
Euro	2183.4	3498	60	42
Yen	312.6	371.2	19	4
Pound Sterling	457.4	610.5	33	7
Swiss Franc	137.7	171.5	25	2
Canadian Dollar	48.3	77.2	60	1
Other Currencies	139.1	205.3	48	2
Financial institutions	4073.3	5657	39	68
Governments	789.8	1037.3	31	12
International Organizations	414.5	484.2	17	6
Corporate issuers	978.5	1187.6	21	14
Equity-Related	309	361.9	17	3
US dollar	141	144.9	3	40
Euro	128.2	156.4	22	43
Yen	18.1	31.7	75	9
Pound Sterling	10	11.4	14	3
Swiss Franc	9.2	12.5	36	3
Canadian Dollar	0.2	0.6	200	0
Other Currencies	2.4	4.4	83	1
Financial institutions	140.4	166.5	19	46
Governments	4.1	4.6	12	1
Int. Organizations	0.1	-		
Corporate issuers	164.4	190.8	16	53
Convertibles	298.5	351.9	18	97
Warrants	10.5	10	-5	3
Currency of Issue	**2002 Dec**	**2003 Dec**	**% Change**	**% of Total (2003)**
Argentine peso	0.6	0.7	17	0
Australian dollar	44	85.2	94	1
Baht	1.5	1.7	13	0
Canadian Dollar	51.5	79.8	55	1
Czech koruna	5.6	8	43	0
Danish krone	8.1	7.7	-5	0
Euro	3284.2	4836.4	47	44
Hong Kong dollar	39.1	45.7	17	0
New rouble	0.3	0.3	0	0
New Taiwan dollar	4.2	3.9	-7	0
New Zealand dollar	7.1	11.7	65	0
Norwegian krone	18.7	23	23	0
Pound Sterling	619.1	782.3	26	7
Rand	6.6	9.4	42	0

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Table 5.13. International Bonds and Notes (Continued)

Type and Sector	2002 Dec	2003 Dec	% Change	% of Total (2003)
Singapore dollar	8	13.3	66	0
Swedish krona	11.1	15.8	42	0
Swiss Franc	159.1	196.1	23	2
US dollar	4047.1	4491	11	40
Yen	433.3	489.2	13	4
Zloty	5.1	5.2	2	0

Source: BIS and author's own calculations

Table 5.14. Debt Securities Market

International Debt Securities: Outstanding amounts in bn euro				
	1999 I	2003 I	% Change	% of Total in 2003
USD	1964.9	3940.2	101	44
JPY	426.4	421.6	-1	5
EUR	1110.7	3514.2	216	39
Other	638	1026.1	61	12
Total	4139.9	8902	115	100

Source: BIS and author's own calculations

Table 5.15. International Debt Securities by Nationality of Issuer

(in billions of US dollars) Amounts Outstanding				
Countries	2001 Dec	2003 Dec	% Change	% of Total (2003)
All Countries	7506.4	11681.4	56	
Euro Countries	2676.8	5014.2	87	43
Austria	90.3	166.8	85	1
Belgium	145.5	252	73	2
Finland	40.7	74.2	82	1
France	385.1	726.6	89	6
Germany	1078.2	1956.1	81	17
Greece	30.1	77.5	157	1
Ireland	47	107.2	128	1
Italy	279.7	530	89	5
Luxemburg	18	38.4	113	0
Netherlands	332.2	582.9	75	5
Portugal	47.4	100.7	112	1
Spain	182.6	401.8	120	3
US	2324.1	3078.3	32	26

Source: BIS and author's own calculations

Table 5.16. Amounts Outstanding Of OTC Interest Rate Derivatives by Currency

(in billions of US dollars)				
Currencies	2001 June	2003 June	% Change	% of Total (2003)
All Currencies	67465	121799	81	
Australian dollar	321	376	17	0
Canadian Dollar	785	1136	45	1
Danish Krone	132	122	-8	0
Euro	22405	50000	123	41
Hong Kong Dollar	119	226	90	0
Japanese Yen	11278	15270	35	13
New Zealand Dollar	3	5	67	0
Norwegian Krone	232	223	-4	0
Pound Sterling	5178	8322	61	7
Swedish Krona	997	1136	14	1
Swiss franc	1167	1962	68	2
US Dollar	23083	40110	74	33
Other	1767	2909	65	2

Source: BIS and author's own calculations

Table 5.17. Amounts Outstanding of OTC Foreign Exchange Derivatives by Currency

(in billions of dollars)				
Currencies	2001 June	2003 June	% Change	% of Total (2003)
All Currencies	16910	22088	31	
Australian dollar	392	625	59	1
Canadian Dollar	675	991	47	2
Danish Krone	32	23	-28	0
Euro	6425	9914	54	22
Hong Kong Dollar	484	522	8	1
Japanese Yen	4254	4907	15	11
New Zealand Dollar	5	8	60	0
Norwegian Krone	120	86	-28	0
Pound Sterling	2472	3093	25	7
Swedish Krona	501	749	50	2
Swiss franc	829	1244	50	3
Thai Baht	13	3	-77	0
US Dollar	15141	19401	28	44
Other	2476	2611	5	6

Source: BIS and author's own calculations

Table 5.18. Amounts Outstanding of OTC Equity-Linked Derivatives

(in billions of US dollars) Notional Amounts Instrument/Market	2001 June	2003 June	% Change	% of Total (2003)
Total Contracts	1884	2799	49	
US Equities	347	558	61	20
European Equities	1363	1955	43	70
Japanese Equities	80	103	29	4
Other Asian Equities	8	32	300	1
Latin American Equities	18	17	-6	1
Other Equities	68	133	96	5
Forwards and swaps	329	488	48	17
US Equities	106	141	33	5
European Equities	177	282	59	10
Japanese Equities	7	7	0	0
Other Asian Equities	1	3	200	0
Latin American Equities	8	4	-50	0
Other Equities	30	50	67	2
Options	1556	2311	49	83
US Equities	242	416	72	15
European Equities	1186	1673	41	60
Japanese Equities	73	96	32	3
Other Asian Equities	7	30	329	1
Latin American Equities	10	13	30	0
Other Equities	38	83	118	3

Source: BIS and author's own calculation

Table 5.19. US International Reserve Position

FROM THE OFFICE OF PUBLIC AFFAIRS					
November 25, 2003					
U.S. International Reserve Position					
The Treasury Department today released U.S. reserve assets data for the latest week. As indicated in this table, U.S. reserve assets totaled $84,992 million as of the end of that week, compared to $84,666 million as of the end of the prior week.					
I. Official U.S. Reserve Assets *(in US millions)*					
	November 14, 2003			November 21, 2003		
TOTAL	84,666			84,992		
1. Foreign Currency Reserves [1]	Euro	Yen	TOTAL	Euro	Yen	TOTAL
a. Securities	7,826	14,507	22,333	7,949	14,448	22,397
b. Total deposits with:						
b.i. Other central banks and BIS	12,799	2,914	15,713	12,989	2,902	15,891

Source: FED

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Table 5.20. Official International Reserves of Canada

Bank of Canada 15 March 2004 Official International reserves Millions of dollars		% of Total
U.S. dollars	16,193	51
Other foreign currencies	15,605	49
Gold	43	0

Source: Bank of Canada

Table 5.21. Official International Reserves of UK

end-Dec 03 US$ millions		UK Government	Bank of England
Assets	US$	13,254	5,555
	Euro #	16,481	12,170
	Yen	5,428	2,242
	Other ccy	2	70
	SDR	6,626	
	Gold	4,202	566
	Total	**45,994**	**20,603**
Liabilities	US$	-9,304	-5,544
	Euro #	-12,528	-12,097
	Yen	-3,449	-2,238
	Other ccy	-1	-71
	SDR	-2,809	
	Gold		-567
	Total	**-28,091**	**-20,516**

Source: Bank of England
This comprises euro and the legacy currencies of EMU countries only; other EU currencies are included in the "Other Currencies" category.

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Table 5.22. International Reserves of Bank of Australia

Reserve Bank of Australia International reserves and Foreign Currency Liquidity $Millions		
January 2004	**Amount**	**% of Total**
- US dollars	16,528	42
- euros	15,411	39
- Japanese yen	3,544	9
- other (inc. Gold and SDRs)	4,192	11

Source: Reserve Bank of Australia

Table 5.23. Selected Indicators Featuring Foreign Cash Transactions by Authorized Banks' Exchange Offices and Tills in Russia in 2003

	Average single transaction (units of currency)		No. of transactions (thousand units)		Percent share of a specific foreign currency transactions in total volume of foreign cash transactions by exchange offices and tills	
	purchase from private individuals	sale to private individuals	purchase from private individuals	sale to private individuals	purchase from private individuals	sale to private individuals
US Dollar	3,810	10,629	45,982	17,267	90.00	77.88
Euro	2,897	8,307	5,721	5,197	9.64	21.84

Source: http://www.cbr.ru/eng/statistics/bank_system/print.asp?file=in_out_03_e.html

Table 5.24. Breakdown of Foreign Exchange Deposits in Banks by Foreign Exchange Types in Turkey

Millions Date	USD	Euro	Other FX
2002	1,629,740	663,219	45,643
2003	1,631,014	707,613	61,474
2004(first 2 months)	290,973	132,186	12,537

Source: Central Bank of Turkey

Table 5.25. Currency Breakdown of Reporting Banks' Local Positions in Foreign Currency (in billions of US dollars)

Amounts Outstanding				
ASSETS	2001 Dec	2003 Sept	% Change	% of Total(2003)
All Currencies	1482.5	2073.6	40	
US dollar	814.9	998.7	23	48
Euro	311.6	601.5	93	29
Yen	81	105.5	30	5
Pound Sterling	47	52.3	11	3
Swiss franc	90.1	130.4	45	6
Other	57.9	100.5	74	5
Unallocated	80.1	84.6	6	4
LIABILITIES	2001 Dec	2003 Sept	% Change	% of Total
All Currencies	1599	2234.9	40	
US dollar	944.1	1132.3	20	55
Euro	329.3	623.3	89	30
Yen	52.9	115.9	119	6
Pound Sterling	43.9	53.1	21	3
Swiss franc	45.6	58.5	28	3
Other	105.2	166.4	58	8
Unallocated	78.1	85.6	10	4

Source: BIS and author's own calculations

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Table 5.26. Percentage Change in International Investment Positions for Three Major Countries (1999-2002)

	Euro Area	US	Japan
Assets	*31%*	*-12%*	*1%*
Direct Investment Abroad	72%	-28%	22%
Portfolio Investment	14%	-27%	12%
Monetary Authorities	24%		
General Government	0%	2%	-10%
Banks	37%	32%	-23%
Liabilities	*30%*	*7%*	*-27%*
Dir. Invest in Rep.Economy	97%	-28%	69%
Portfolio Investment	8%	20%	-48%
Monetary Authorities	55%	19%	
General Government	24%	-19%	-55%
Banks	30%	28%	11%
Net	*8%*	*144%*	*76%*
Dir. Invest in Rep.Economy	19%	-29%	12%
Portfolio Investment	-7%	131%	919%
Monetary Authorities	58%	19%	
General Government	-16%	9%	-8%
Banks	14%	-12%	-344%

Source: IFS and author's own calculations

Table 5.27. Currency Breakdown of Reporting Banks' Positions

US DOLLAR						
	Assets			Liabilities		
	2001 Dec	2003 Sept	% Change	2001 Dec	2003 Sept	% Change
Locally	815	999	23	944	1,132	20
Cross Border	4,205	4,654	11	4,283	4,604	8
Cross Border Domestic	1,039	1,355	30	1,195	1,693	42
Total	6,059	7,007	16	6,422	7,430	16

EURO						
	Assets			Liabilities		
	2001 Dec	2003 Sept	% Change	2001 Dec	2003 Sept	% Change
Locally	312	602	93	329	623	89
Cross Border	1,146	1,841	61	845	1,489	76
Cross Border Domestic	2,170	3,568	64	1,838	2,967	61
Total	3,627	6,010	66	3,012	5,079	69

Source: BIS and author's own calculations

Table 5.28. Exports of United States of America

Rank	HS code and product label	Exports 2002 (US$ m.)	Share in world (%)	Leading markets 1st	%	2nd	%
	ALL GOODS (WTO)	730,803					
1	8542 Electronic integrated circuits and microassemblies	28,788	27.5	MYS	14	PHL	14
2	8802 Aircraft & spacecraft	27,694	45.0	CHN	11	AUS	9
3	8708 Parts & access of motor vehicles	27,452	18.7	CAN	57	MEX	22
4	9999 Special Transaction Trade	21,205	18.9	MEX	17	CAN	17
5	8703 Cars (incl. Station wagon)	20,001	6.0	CAN	52	MEX	15
6	8471 Automatic data processing machines; optical reader, etc.	16,616	8.7	CAN	17	MEX	12
7	8411 Turbo-jets, turbo propollers and other gas turbines	15,047	32.7	FRA	18	CAN	11
8	8803 Aircraft parts	14,054	42.8	JPN	15	GBR	11
9	8473 Parts&acces of computers & office machines	12,982	10.0	MEX	12	GBR	9
10	9018 Electro-medical apparatus	9,444	26.9	JPN	16	DEU	11
11	3004 Medicament mixtures, put in dosage	8,162	6.8	CAN	20	GBR	19
12	8431 Machinery part	7,748	38.8	CAN	8	SGP	6
13	8517 Electric app for line telephony, incl curr line system	6,947	13.0	NLD	12	CAN	11
14	8479 Machines & mech appl having indiv functions, nes	6,094	19.5	TWN	14	KOR	13
15	2710 Petroleum oils, not crude	6,010	4.8	MEX	36	CAN	13
16	8704 Trucks, motor vehicles for the transport of goods	5,925	10.5	CAN	76	MEX	12
17	8407 Engines, spark-ignition reciprocating or rotary int. Combust. Piston	5,879	21.4	CAN	67	MEX	10
18	1201 Soya beans, whether or not broken	5,607	49.6	CHN	16	MEX	15
19	1005 Maize (corn)	5,093	55.9	JPN	31	MEX	13
20	8536 Electrical app for switching not exceedg 1000 volt	4,478	12.0	MEX	35	CAN	23
21	8409 Part for use solely/principally with the motor engines	4,279	15.3	CAN	40	MEX	15
22	9030 Oscilloscope/spectrum analysers; instr for measuring ionising rad	4,193	43.4	JPN	13	TWN	12
23	8529 Part suitable for use solely/princ with televisions, recpt app.	3,846	11.6	MEX	24	CAN	12
24	8544 Insulated wire / cable	3,695	9.9	MEX	40	CAN	29
25	8421 Centrifuges, incl centrifugal dryers; f§ltering/purifying machinery	3,652	19.7	CAN	32	MEX	10
26	8525 Television camera, transmissn app for radio-telephony	3,642	4.3	MEX	15	CAN	14
27	1001 Wheat and meslin	3,618	27.5	JPN	13	MEX	10
28	8414 Air, vacuum pumps; hoods incorp a fan	3,256	12.6	CAN	21	MEX	17
29	3926 Article of plastic nes.	3,214	12.0	MEX	48	CAN	19
30	8481 Tap, cock, valve for pipe, tank for the like, incl pressure reducing valve	3,201	12.1	CAN	34	MEX	19
31	9021 Orthopaedic appliance	3,119	23.2	IRL	20	JPN	12
32	9027 Instruments for physical/chemical analysis; inst for viscosity , heat, etc.	3,106	24.4	JPN	14	CAN	11
33	8541 Diodes/transistors&sim semiconductor devices; etc.	3,077	9.8	MEX	13	MYS	12
34	8413 Pumps for liquids; liquid elevators	3,074	15.0	CAN	32	MEX	9
35	8524 Recorded tape, recorded for sound	3,069	16.2	CAN	33	JPN	9
36	3907 Polyacetal, polyether, epoxide resin. Polycarbonate, etc. In pirmary form	2,829	14.9	CAN	23	MEX	17
37	7108 Gold unwrought or semi-manuf forms	2,818	11.4	CHE	59	GBR	23
38	3923 Plastic packing goods or closures stoppers, lids, caps, closures, plastic containers, etc.	2,785	14.4	MEX	39	CAN	31
39	3002 Human&animal blood; antisera, vaccines, toxins, micro-organism cultures	2,737	18.2	BEL	19	NLD	11
40	3822 Composite diagnostic or laboratory reagents, nes	2,662	34.9	GBR	18	JPN	14

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Table 5.29. Imports of United States of America

Rank	HS code and product label	Exports 2002 (US$ m.)	Share in world (%)	Leading markets 1st	%	2nd	%
	ALL GOODS (WTO)	1,202,499					
1	8703 Cars (incl station wagon)	115,881	34.1	JPN	31	CAN	27
2	2709 Crude petroleum oils	82,588	33.1	SAU	16	MEX	14
3	8471 Automatic data processing machines; optical reader, etc	51,013	30.3	CHN	18	MEX	14
4	9999 Special Transaction Trade	49,380	40.2	CAN	31	MEX	12
5	8708 Parts & access of motor vehicles	30,137	20.8	CAN	33	JPN	24
6	8473 Parts&acces of computers & office machines	24,638	18.8	CHN	22	JPN	18
7	8542 Electronic integrated circuits& microassemblies	22,910	12.0	MYS	17	KOR	15
8	8525 Television camera, transmissn app for radio-telephony	22,754	24.6	KOR	21	JPN	19
9	2710 Petroleum oils, not crude	21,822	17.2	CAN	19	VEN	10
10	3004 Medicament mixtures, put in dosage	17,898	14.9	IRL	28	GBR	14
11	2711 Petroleum gases	14,022	20.7	CAN	91	TTO	5
12	8802 Aircraft & spacecraft	13,000	17.6	FRA	36	CAN	32
13	9403 Other furniture and parts thereof	12,737	38.5	CHN	39	CAN	24
14	7102 Diamonds, not mounted or set	12,150	24.2	ISR	48	IND	22
15	6110 Jerseys, pullovers, cardigans, etc, knitted or crocheted	12,012	51.8	CHN	12	HKG	12
16	8517 Electric app for line telephony, incl curr line system	11,745	23.2	CHN	20	MEX	20
17	8411 Turbo-jets, turbo propellers and other gas turbines	10,717	20.8	GBR	25	FRA	24
18	6403 Footwear, upper of leather	10,635	40.4	CHN	60	BRA	10
19	6204 Women's suits, jackets dresses skirts etc&shorts	10,487	34.9	MEX	15	CHN	14
20	8528 Television receivers	10,194	32.6	MEX	48	JPN	16
21	9401 Seat & part thereof	9,678	37.6	MEX	32	CHN	26
22	2933 Heterocyclic compounds with nitrogen hetero-atom; nuclei	8,734	32.4	IRL	51	DEU	11
23	8544 Insulated wire/cable	8,638	24.5	MEX	65	CHN	10
24	8407 Engines, spark-ignition reciprocating or rotary iny. Combust	8,388	32.1	JPN	36	CAN	26
25	9503 Other toys; scale model	8,223	51.1	CHN	84	MEX	2
26	9018 Electro-medical apparatus	7,581	21.2	MEX	20	DEU	14
27	6203 Men's suits, jackets, trousers etc & shorts	7,354	34.1	MEX	27	DOM	11
28	4407 Wood sawn/chipped lengthwise, sliced/peeled	7,075	32.9	CAN	81	BRA	3
29	8527 Reception app for radio-telephony/radio-broadcastg	7,007	39.3	CHN	38	MEX	26
30	2934 Heterocyclic compounds, nes	6,599	49.2	IRL	65	GBR	10
31	8504 Electric transformer, static converter	6,574	21.9	MEX	25	CHN	24
32	7113 Articles of jewellery&parts thereof	6,131	30.1	ITA	25	IND	14
33	9504 Articles for funfair, table/parlour games&auto bowling alley equipment	6,014	50.2	CHN	45	JPN	35
34	8481 Tap, cock, valve for pipe, tank for the like, incl pressure reducing valve	5,335	21.7	MEX	22	JPN	15
35	8536 Electrical app for switchg not exceedg 1000volt	5,118	14.4	MEX	31	JPN	15
36	8409 Part for use solely/principally with the motor engines	4,991	18.1	JPN	31	CAN	21
37	9405 Lamps& lighting fittings nes; signs, nameplates	4,977	39.3	CHN	65	MEX	14
38	4011 New pneumatic tires, of rubber	4,855	20.3	CAN	25	JPN	23
39	8803 Aircraft parts	4,814	12.3	JPN	22	CAN	20
40	8704 Trucks, motor vehicles for the transport of goods	1,665	30.3	CAN	55	MEX	40

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Table 5.30. Exports of Japan

Rank	HS code and product label	Exports 2002 (US$ m.)	Share in world (%)	Leading markets 1st	%	2nd	%
	ALL GOODS (WTO)	403,496					
1	8703 Cars (incl. Station wagon)	62,699	18.7	USA	57	CAN	5
2	8542 Electronic integrated circuits and microassemblies	22,699	11.0	HKG	14	CHN	13
3	9999 Special Transaction Trade	17,029	15.2	USA	30	CHN	9
4	8708 Parts & access of motor vehicles	16,881	11.5	USA	42	GBR	6
5	8473 Parts&acces of computers & office machines	12,529	9.7	USA	30	NLD	15
6	8471 Automatic data processing machines; optical reader, etc.	11,140	5.8	USA	43	NLD	18
7	8525 Television camera, transmissn app for radio-telephony	10,529	12.5	USA	39	DEU	7
8	8479 Machines and mech appl haning ind functions, nes	6,926	22.2	TWN	19	USA	17
9	8541Diodes /transistors&sim semiconductor devices;etc	6,335	20.3	HKG	18	CHN	13
10	8704 Trucks, motor vehicles for the transport of goods	5,927	10.5	AUS	13	SAU	11
11	8409 Part for use solely/principally with the motor engines	4,830	17.3	USA	36	THA	8
12	8711 Motorcycles, side-cars	4,482	49.4	USA	42	FRA	8
13	8407 Engines, spark-ignition reciprocating or rotary int. Combust Piston	4,323	15.7	USA	61	CAN	5
14	8529 Part suitable for use solely/princ with televisions, recpt app	3,942	11.9	USA	18	CHN	16
15	8536 Electrical app for switchg not exceedg 1000volt	3,883	10.4	USA	17	HKG	13
16	8528 Television receivers	3,733	12.3	USA	43	DEU	7
17	8429 Self-propelld bulldozer, angledozer, grader, excavator, etc.	3,551	26.0	USA	26	HKG	10
18	4011 New pneumatic tires, of rubber	3,281	13.7	USA	31	AUS	6
19	8532 Electrical capacitors, fixed, variable or adjustable	3,258	24.1	HKG	16	TWN	14
20	8414 Air, vacuum pumps; hoods incorp a fan	3,176	12.2	USA	22	NLD	13
21	9010 Apparatus&equip for phtographic laboratories nes	2,867	61.2	USA	34	TWN	20
22	8483 Transmission shafts&cranks, bearing housing; gearing;etc.	2,807	16.1	USA	34	CHN	7
23	9001 Optical fibre, cables; sheets&plate of polarising mat	2,711	38.6	TWN	28	KOR	25
24	7208 Flat-rolld products of iron/non-al/s wdth>/=600mm. Hr.not clad	2,692	16.4	KOR	43	THA	15
25	8543 Electrical mach&app having individual function, nes	2,600	18.9	USA	24	KOR	14
26	8507 Electric accumulator	2,498	24.1	TWN	14	USA	13
27	9018 Electro-medical apparatus	2,464	7.0	USA	35	DEU	14
28	8523 Prepared unrecordd media for sound record(tapes)	2,422	23.8	USA	41	NLD	16
29	9013 Liquid crystal devices; lasers; other optical appl&instruments nes	2,103	20.3	CHN	23	TWN	20
30	7210 Flat-rolld products of iron/non-al/s wdth>/=600mm. Clad plated or coated	2,063	12.3	CHN	23	THA	9
31	8534 Printed circuits	2,029	12.0	CHN	22	KOR	14
32	8482 Ball or roller bearings	1,975	15.8	USA	20	CHN	9
33	9504 Articles for funfair, table/parlour games&auto bowling alley equipment	1,920	12.7	USA	45	DEU	25
34	8540 Thermionic, cold cathode valves&tube	1,891	12.1	CHN	25	USA	14
35	8413 Pumps for liquids, liquid elevators	1,846	9.0	USA	21	KOR	11
36	8504 Electric transformer, static converter	1,817	5.6	USA	20	CHN	15
37	8517 Electric app for line telephony, incl curr line system	1,816	3.4	USA	31	DEU	9
38	8481 Tap, cock, valve for pipe, tank for the like, incl pressure reducing valve	1,780	6.7	USA	27	KOR	13
39	2902 Cyclic hydrocarbons	1,747.7	16.4	CHN	32	TWN	27
40	8479 Machines and mech appl haning ind functions, nes	6,926.6	22.2	TWN	19	USA	17

Table 5.31. Imports of Japan

| Rank	HS code and product label	Exports 2002 (US$ m.)	Share in world (%)	Leading markets 1st	%	2nd	%
	ALL GOODS (WTO)	336,385					
1	2709 Crude petroleum oils	36,487	14.6	SAU	26	ARE	24
2	2711 Petroleum gases	15,719	23.2	IDN	26	MYS	15
3	8471 Automatic data processing machines; optical reader, etc	14,333	8.5	CHN	28	USA	16
4	8542 Electronic integrated circuits& microassemblies	13,562	7.1	USA	27	KOR	19
5	8473 Parts&acces of computers & office machines	6,995	5.3	TWN	25	CHN	23
6	2710 Petroleum oils, not crude	6,381	5.0	KOR	33	KWT	13
7	2701 Coal; briquettes, ovoids&similar solid fuels manufactured	6,284	31.4	AUS	58	CHN	17
8	8703 Cars (incl station wagon)	6,268	1.8	DEU	51	USA	9
9	9999 Special Transaction Trade	5,928	4.8	USA	26	TWN	12
10	0203 Meat of swine, fresh, chilled or frozen	3,756	35.0	USA	32	DNK	31
11	7601 Unwrought alumimum	3,594	16.9	RUS	26	AUS	22
12	0303 Fish, frozen, whole	3,531	49.2	USA	21	TWN	15
13	0306 Crustaceans	3,112	31.4	IDN	17	RUS	15
14	3004 Medicament mixtures, put in dosage	3,069	2.6	GBR	24	USA	14
15	2601 Iron ores &concentrates; including roasted iron pyrites	3,047	32.1	AUS	52	BRA	22
16	6110 Jerseys, pullovers, cardigans, etc, knitted or crocheted	3,024	13	CHN	85	ITA	6
17	8411 Turbo-jets, turbo propellers and other gas turbines	2,909	5.6	USA	88	GBR	5
18	4202 Trunks, suit-cases, camera cases, handbags etc, of leather	2,833	18.1	CHN	45	FRA	21
19	9018 Electro-medical apparatus	2,816	7.9	USA	55	IRL	9
20	8517 Electric app for line telephony, incl curr line system	2,750	5.4	CHN	27	USA	20
21	6204 Women's suits, jackets dresses skirts etc&shorts	2,585	8.6	CHN	79	ITA	8
22	8708 Parts & access of motor vehicles	2,545	1.8	USA	35	DEU	11
23	8802 Aircraft & spacecraft	2,541	3.4	USA	79	FRA	14
24	4407 Wood sawn/chipped lengthwise, sliced/peeled	2,434	11.3	CAN	38	FIN	8
25	8529 Part suitable for use solely/princ with televisions, recpt app	2,333	6.1	CHN	42	USA	20
26	8544 Insulated wire/cable	2,232	6.3	CHN	43	PHL	12
27	2933 Heterocyclic compounds with nitrogen hetero-atom; nuclei	2,212	8.2	IRL	34	USA	19
28	2603 Copper ores and concentrates	2,070	35.8	CHL	30	IDN	27
29	8504 Electric transformer, static converter	2,048	6.8	CHN	53	USA	9
30	2402 Cigars, cheroots, cigarillos & cigarettes	2,026	15.8	USA	95	DEU	3
31	1005 Maize (corn)	1,995	20.3	USA	92	BRA	3
32	6203 Men's suits, jackets, trousers etc & shorts	1,841	8.5	CHN	79	ITA	6
33	9403 Other furniture and parts thereof	1,816	5.5	CHN	35	TWN	13
34	4412 Plywood, veneered panels and similar laminated wood	1,732	26.3	IDN	53	MYS	33
35	4401 Fuel wood; wood inchips or particles; sawdust&wood	1,672	92.8	AUS	33	SAF	18
36	8543 Electrical mach&app having individual function, nes	1,625	10.9	USA	38	CHN	19
37	7110 Platinum, unwrought or in semimanufactured forms	1,602	24.9	SAF	61	RUS	11
38	4403 wood in rough	1,600	24.8	USA	36	RUS	23
39	8528 Television receivers	1,550	5.0	CHN	42	MYS	32
40	0304 Fish fillets and pieces, fresh, chilled or frozen	1,517	20.9	CHN	22	USA	18

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5.9 Figures Related to the Chapter
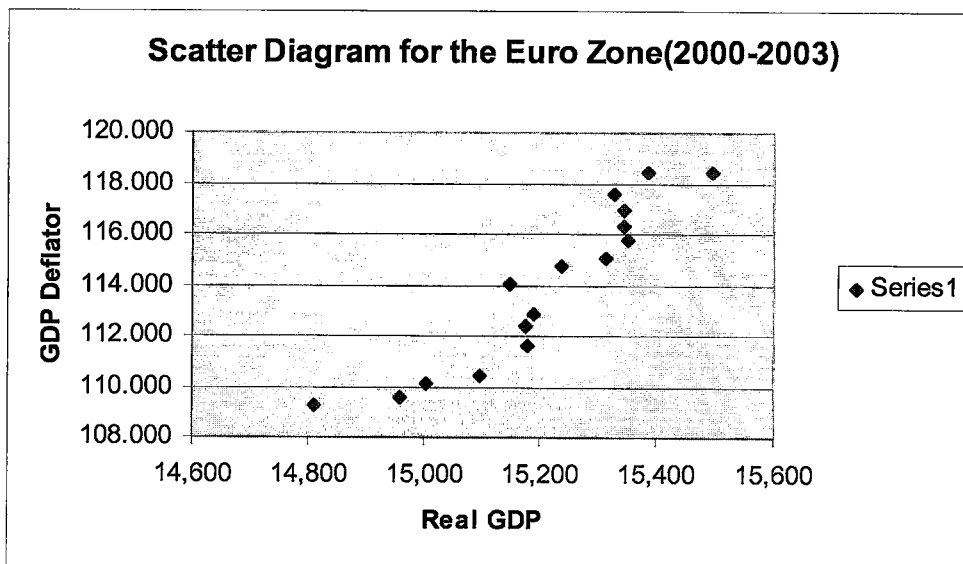
Figure 5.7 Scatter Diagram for the Euro Zone

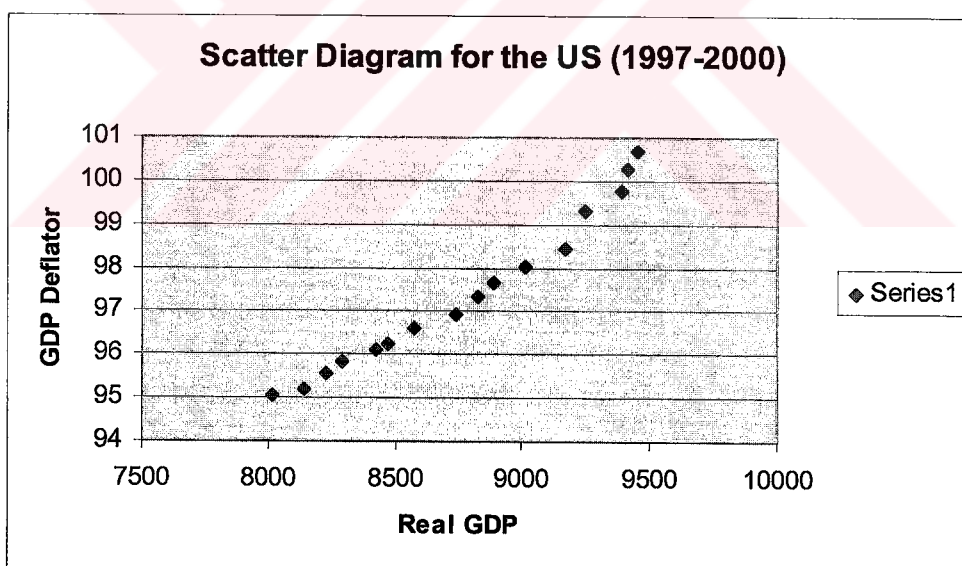**Figure 5.8 Scatter Diagram for the US**

CHAPTER 6

6. CONCLUSION

Our findings in this research also make it obvious that the euro is and will be a real rival for the US dollar. The competition between the dollar and the euro is investigated in many phases. When we look at the main economic indicators both regions have nearly the same values, although in some issues the US has slightly higher numbers. It is obvious that the US is the dominant power in international politics at the moment, but the EU also tries to take its role in the international scene nowadays. In terms of supply elasticity the dollar has an advantage over the euro, while the opposite is true for the financial markets. In international financial markets, our findings indicate that the euro has already caught up with the US dollar and even passed it except for the reserves of the central banks. Also in these official holdings the euro has an increasing trend, but still far beyond the share of the US dollar. Nevertheless, the euro has a high potential to increase its share in international bond markets. Inflation rate is another important indicator in determining the credibility of a currency and based on our analysis we conclude that the historical trends of the inflation rates of both the US and the Euro Zone are very close to each other. It is obvious that the US dollar has an advantage of being used more as an invoicing currency in international trade, but the euro is the second most used one and shows an increasing trend. Furthermore, in both regions, the current account deficit or surplus is mostly affected by the trade deficit or surplus. Neither region faces huge capital inflows or outflows that will

cause fluctuations in their current account balance. The analysis show that their current account balances have a trend and do not show high fluctuations. It may be concluded that both regions have rather stable economies, which is a very important factor in becoming an international currency. Being an invoicing currency in international trade is also an important factor that determines the international role of a currency. Now, the dollar is the most used currency as an invoicing currency and the euro follows it with a percentage of 28%. As oil is an important commodity in global trade, in terms of value, if the pricing of oil were to shift to the euro, it could provide a boost to the global acceptability of the single currency. One of the arguments for keeping oil pricing and payments in dollars has been that the US remains a large importer of oil, despite being a substantial crude oil producer itself. However, looking at the statistics of crude oil exports, one notes that the Euro Zone is an even larger importer of oil and petroleum products than the US.

As soon as its advent, the euro became the second most used currency in the world. All of the analyses made in this research show us the potential of the euro to become an international currency. Although the US dollar has still some advantages over the euro, the euro shows an increasing trend. Besides, the world economy is growing day by day and the burden of being a single international currency will be huge to the issuer of that currency. In my opinion a bipolar currency regime dominated by Europe and the United States, with perhaps Japan as a junior partner, will replace the dollar-centered system that has continued for most of this century. I think that in the near future no single economy would be able to carry this huge burden, but in order to have this bipolar stability a

transatlantic cooperation is required to handle both the transition to the new regime and its longer term prospects. Otherwise the world will pass through instability rather than a bipolar stability.

REFERENCES

Apel, Emmanuel. 1998. *European Monetary Integration 1958-2002.* London and New York: Routledge.

Arestis, Philip; Brown, Andrew and Malcolm Sawyer. 2001. *The Euro Evoluation and Prospects.* Cheltenham,UK: Edward Elgar.

Artis, M., E. Henessy and A. Weber (eds.).2000. *The Euro: A Challenge and Opportunity for Financial Markets.* London: Routledge.

Bank for International Settlements, Quarterly Review. 1996. International Banking and Financial Market Developments, August 1996, Statistical Annex.

Bank for International Settlements, Quarterly Review. 1996. International Banking and Financial Market Developments, November 1996, Statistical Annex.

Bank for International Settlements, Quarterly Review. 1997. International Banking and Financial Market Developments, February 1997, Statistical Annex.

Bank for International Settlements, Quarterly Review. 1997. International Banking and Financial Market Developments, August 1997, Statistical Annex.

Bank for International Settlements, Quarterly Review. 1998. International Banking and Financial Market Developments, February 1998, Statistical Annex.

Bank for International Settlements, Quarterly Review. 1998. International Banking and Financial Market Developments, May 1998, Statistical Annex.

Bank for International Settlements, Quarterly Review. 1998. International Banking and Financial Market Developments, November 1998, Statistical Annex.

Bank for International Settlements, Quarterly Review. 1999. International Banking and Financial Market Developments, March 1999, Statistical Annex.

Bank for International Settlements, Quarterly Review. 1999. International Banking and Financial Market Developments, June 1999, Statistical Annex.

Bank for International Settlements, Quarterly Review. 1999. International Banking and Financial Market Developments, November 1999, Statistical Annex.

Bank for International Settlements, Quarterly Review. 2000. International Banking and Financial Market Developments, February 2000, Statistical Annex.

Bank for International Settlements, Quarterly Review. 2000. International Banking and Financial Market Developments, August 2000, Statistical Annex.

Bank for International Settlements, Quarterly Review. 2000. International Banking and Financial Market Developments, November 2000, Statistical Annex.

Bank for International Settlements, Quarterly Review. 2001. International Banking and Financial Market Developments, March 2001, Statistical Annex.

Bank for International Settlements, Quarterly Review. 2001. International Banking and Financial Market Developments, September 2001, Statistical Annex.

Bank for International Settlements, Quarterly Review. 2002. International Banking and Financial Market Developments, March 2002, Statistical Annex.

Bank for International Settlements, Quarterly Review. 2002. International Banking and Financial Market Developments, March 2002, Statistical Annex.

Bank for International Settlements, Quarterly Review. 2002. International Banking and Financial Market Developments, June 2002, Statistical Annex.

Bank for International Settlements, Quarterly Review. 2002. International Banking and Financial Market Developments, September 2002, Statistical Annex.

Bank for International Settlements, Quarterly Review. 2002. International Banking and Financial Market Developments, December 2002, Statistical Annex.

Bank for International Settlements, Quarterly Review. 2003. International Banking and Financial Market Developments, March 2003, Statistical Annex.

Bank for International Settlements, Quarterly Review. 2003. International Banking and Financial Market Developments, September 2003, Statistical Annex.

Bank for International Settlements, Quarterly Review. 2003. International Banking and Financial Market Developments, December 2003, Statistical Annex.

Bank for International Settlements, Quarterly Review. 2004. International Banking and Financial Market Developments, March2004, Statistical Annex.

Bank for International Settlements. 2004. 73rd Annual Report.

Bayoumi, T., and B. Eichengreen. 1993. "Shocking Aspects of European Monetary Integration", in De Grauwe, P. *Economics of Monetary Union,* Oxford: Oxford University Press.

Bayoumi, T., and B. Eichengreen. 1997. "Ever Close to Heaven. An Optimum Currency area Index for European Countries". *European Economic Review,* 41 (3-5): 761-770

Bell, D.E.; Keeney, R.L., and J. D. C. Little 1975. "A Market Share Theorem". *Journal of Marketing Research,* 12, 136-141.

Berberoğlu, Pınar. 2003. "Changing Balances in the International Monetary System: Euro vs. US Dollar". *Researching Europe: The European Integration by the View of Young Researchers,* p: 165-173, METU.

Bergsten, C. Fred. 1997. "The Dollar and the Euro". *Foreign Affairs,* 76:4, p: 83-95

Bergsten, C. Fred. 1999. 'America and Europe: Clash of the Titans?'. *Foreign Affairs,* 78:2, p: 20-34

Bergsten, C. Fred. 2002. "The Euro versus the Dollar: Will There be a Struggle for Dominance?". *Journal of Policy Modeling,* 24:4, p: 307-314. Atlanta: Annual Meeting of the American Economic Association.

Black, S. 1990. "The International Use of Currencies" in Suzuki, y., Miyake, J. and Okabe, M. (eds), *The Evaluation of International monetary System.* Tokyo: University of Tokyo Press, 175-194.

Blinder, A.S. 1996. "The Role of the Dollar as an International Currency". *Eastern Economic Journal,* 22(2), p: 127-136.

Boissieu, C. 2000. "The Euro and the Dollar: Currency Competition, Competitiveness and Policy Coordination" in Robert A. Mundell and Armand Clesse, eds., *The Euro as a Stabilizer in the International Economic System.* Boston: Kluwer Academis Publishers, ch 15.

Buiter, W. H. 1999.'Six Months in the Life of the Euro: What Have We Learnt?'. Seminar on monetary and budgetary policy in the Economic and Monetary Union, Rabobank, Utrecht.

Cohen, B. J. 1977. *Organizing the World's Money: The Political Economy of International Monetary Relations.* New York: Basic Books.

Cohen, B.J. 2003. "Global Currency Rivalry: Can the Euro Ever Challenge the Dollar?". T*he Third Journal of Common Market Studies,* European Union Studies.

Cooper, R. N. 1999. "Key Currencies After the Euro". *World Economy,* 22:1, p: 1-23

Danthine, J. P., F. Giavazzi, and E. L. von Thadden. 2000. "European Financial System After EMU: A First Assessment". *NBER Working Papers,* WP8044.

De Grauwe, P., H. Heens. 1993. "Real exchange Rate Variability in Monetary Unions", in De Grauwe, P. *Economics of Monetary Union,* Oxford: Oxford University Press.

De Grauwe, P., and W. Vanhaverbeke. 1993. "Is Europe an Optimum Currency Area: Evidence from Regional Data", in De Grauwe, P. *Economics of Monetary Union,* Oxford: Oxford University Press.

De Grauwe, Paul. 2000. *Economics of Monetary Union.* Oxford: Oxford University Press.

Dornbusch, R. 1996. "Euro Fantasies". *Foreign Affairs,* 75:5, p: 110-124

Dyson, Kenneth. 2002. *European States and the Euro.Europeanization, Variation, and Convergence.* Oxford: Oxford University Press.

EC Commission. 1990. "One Market, One Money". *European Economy,* 44.

Edmunds, J., and J. Marthinsen. 2000. "The Euro: A seafarer on Tides of 'stateless' money?". *European Managemant Journal,* 18:1, p: 106-112

Eichengreen, Barry. 1990. "Is Europe an Optimum Currency Area?". *CEPR Discussion Paper,* no 478.

Eichengreen, Barry and Jeffrey Frankel. 1996. "The SDR, reserve Currencies and the Future of the International Monetary System" in Michael Mussa, James D. Boughton and Peter Isard, *The Future of the SDR in Light of Changes in the International Financial System.* Washington: International monetary Fund: 337-378.

Eichengreen, Barry. 1997. "The Euro as a Reserve Currency". *Journal of the Japanese and International Economies,* 12, p: 483-506.

Eichengreen, Barry. 1998. "W*ill EMU Work?*", preliminary draft, revised version in Arne Jon Isachsen and Ole Bjorn Roste eds.(2000), *"Euroen og den norske kronens skjebne".*

Eichengreen, Barry. 2000. "The Euro One Year On". Berkeley: University of California.

Eichengreen, Barry. 2002. "Lessons of the Euro for the Rest of the World". Berkeley: University of California.

Eijffinger, S. C. W. 2003. "The International Role of the Euro". Briefing Paper on "The Conduct of Monetary Policy and an Evaluation of the Economic Situation in Europe – 4th Quarter 2003, *European Parliament*.

Euro Papers. 2002. "The Euro Area in the World Economy – Developments in the First Three Years". *European Commission Directorate-General for economic and financial Affairs*, http://europa.eu.int/comm/economy_finance

Eurostat http://europa.eu.int/comm/eurostat/

Feldstein, M. 1997. "EMU and International Conflict". *Foreign Affairs* 76:6 (November/December), 60-73.

Fok, D., P. H. B. F. Franses, and R. Paap. 2001. "Econometric Analysis of the Market Share Attraction Model". *ERIM Report Series Research in Management*, ERS; ERS-2001-25-MKT. http://hdl.handle.net/1765/89

Frenkel, M., and J. Søndergaard. 1999. "How does EMU Affect the Dollar and the Yen as International Reserve and Investment Currencies?". *Social Science Electronic Publishing*, June.

Funke, Norbert, and Mike Kennedy. 1997. "International Implications of European Economic and Monetary Union". *OECD Economics Department Working Papers*, No:174.

Galati, G., and K. Tsatsaronis. 2001. "The Impact of the Euro on Europe's Financial Markets". *BIS Working Papers*, p: 26-33

Galati, G., and K. Tsatsaronis. 2001. "The Euro in International Financial Markets: Where do we Stand?". *Euro 50 Group*, Washington DC.

Garganas, N. C. 2003. "International Role of the Euro". *Conference of the European Commission "Europe, the Mediterranean and the Euro"*, Athens, Greece.

Garnaut, John. 2002. "US Dollar Losing its Position as Asia's Reserve Currency". http://www.rense.com/general27/rec.htm

Grassman, Sven. 1973. "A Fundamental Symmetry in International Payments Patterns". *Journal of International Economics*, 3(2), p: 105-116.

Greenspan, A. 2001. "The Euro as an International Currency: Remarks Before the Euro". *Euro 50 Group Rountable*, Washington, D.C.

Gros, D., and N. Thygese. 1992. *European Monetary Integration: From the European Monetary System toward Monetary Union.* London: Longman.

Hartmann, Philipp. 1998. *Currency Competition and Foreign Exchange Markets: The Dollar, the Yen and the Euro.* Cambridge University Press.

Hartmann, P. and O. Issing. 2002. "The International Role of the Euro". *Journal of Policy Modeling*, 24:4, p: 315-345

Hayek, F. A. 1976. *Denationalization of Money.* London: Institute of Economic Affairs.

Henning, C.R, and P. C. Padoan. 2000. *Transatlantic Perspectives on the Euro.* European Community Studies Association, Pittsburgh, Pennsylvania.

International Fund Statistics online http://imfstatistics.org/imf/logon.aspx

Kaikati, J.G. 1999. "The Euro vs. the US Dollar: An Overview". *Journal of World Business,* 34:2, p: 171-192

Kawai, Masahiro. 1997. "Comments on Bergsten and on Alogouskoufis and Portes", in Masson, Krueger and Turtelboom, *EMU and the International Monetary System*: 79-89.

Kenen, P.B. 2002 "The Euro versus the Dollar: Will There be a Struggle for Dominance?". *Journal of Policy Modeling,* 24:4, p: 347-354.

Kenen, P.B. 2003. "Five Years of the ECB". *CentrePiece,* Summer 2003.

Kenen, P.B. 2003. "The Euro and the Dollar: Competitors or Complements?". *Institute for European Studies, Année Académique,* 2003-2004.

Kenen, P.B. 2003. "Making the Case for the Euro". *The International Economy,* Winter 2003.

Köhler, H. 2001. "The Euro – an Emblem of the Success and Challenges of European Integration". Remarks on the occasion of informal meeting of the ECOFIN Council.

Krause, Lawrence B., and Walter S. Salant. 1973. *European Monetary Unification and its Meaning for the United States.* Washington, D.C: The Brookings Institution.

Krugman, P. 1989. "Differences in Income Elasticities and Trends in Real Exchange Rates". *European Economic Review,* 33: 1031-1047

Lindert, P. 1969. "Key Currencies and Gold, 1900 – 1913". *Princeton Studies in International Finance,* no. 24, International Finance Section, Department of Economics, Princeton University.

McCauley, Robert N. 1997. 'The Euro and the Dollar'. *Bank for International Settlements Working Papers,* no:50, Basle:BIS.

McKinnon, Ronald. 2000. "Mundell, the Euro and the World Dollar Standard". *Journal of Policy Modeling,* 22:2, p: 311-324.

McKinnon, Ronald. 2002. "The Euro versus the Dollar: Resolving a Historical Puzzle". *Journal of Policy Modeling,* 24:4, p: 355-359.

Mundell, R. A. 1961. "A Theory of Optimal Currency Areas". *American Economic Review,* 51.

Mundell, R. A. 1993. "EMU and the International Monetary System: A Transatlantic Perspective". Working Paper 13 (Vienna: Autrian National Bank).

Mundell, R. A. 1998. "What the Euro Means for the Dollar and the International Monetary System". *Atlantic Economic Journal,* 26:3, p: 227-237

Mundell, R. A. 2000. "The Euro and the Stability of the International Monetary System", in Robert A. Mundell and Armand Clesse, eds., *The Euro as a Stabilizer in the International Economic System.* Boston: Kluwer Academis Publishers, ch 5.

Mundell, Robert and Armand Clesse eds. 2000. *The Euro as a Stabilizer in the International Economic System.* Boston: Kluwer Academis Publishers.

Mussa, M. 2000. "The Relationship Between the Euro and the Dollar". *Journal of Policy Modeling,* 22:3, p: 369-377

Mussa, M. 2001. "Reflections on the International role of the Euro". *Euro 50 Group,* Washington DC.

Mussa, M. 2002. "The Euro versus the dollar: Not a Zero Sum Game". *Journal of Policy Modeling,* 24:2, p: 361-372

Neaime, S., and J. Paschakis. 2002. "The Future of the Dollar-Euro Exchange Rate". *North American Journal of Economics and Finance* 13:1 (May), 56-71.

Neumann, M., and J. von Hagen. 1991. "Real Exchange Rates within and between Currency Areas: How far away is EMU?". *Discussion Paper,* Indiana University.

Nye, J. S. Jr. 1990. "Soft Power". *Foreign Policy* 80 (Fall), 153-171.

Nurkse, R. 1944. *International Currency Experience.* Geneva: League of Nations.

Pollard, Patricia S. 2001. "The Creation of the Euro and the Role of the Dollar in International Markets". *The Federal Reserve Bank of St. Louis,* September/October.

Portes, Richard, and Hélène Rey. 1998. "Euro vs Dollar: Will the Euro Replace the Dollar as the World Currency?". *Economic Policy.*

Portes, Richard, and Hélène Rey. 1998. "The Emergence of the Euro as an International Currency". *Economic Policy* 26, p: 307-343.

Portes, Richard. 2002. "The Euro in International Financial System". *Discussion Papers, London Business School and CEPR.*

Rey, Hélène. 1996. "International Trade and Currency Exchange". *Centre for Economic Performance.* Discussion Paper 322, London School of Economics, February.

Rosecrance, R. 2000. "The International political Implications of the Euro", in Robert A. Mundell and Armand Cleese, eds., *The Euro as a Stabilizer in the International Economic System.* Boston: Kluwer Academis Publishers, ch 4.

Salvatore, D. 2000b. "The Euro, Dollar and the International Monetary System". *Journal of Policy Modeling,* 22:2, p: 407-415

Schroder, J. 1999. "The Euro, Dollar and the International Monetary System". *Journal of Asian Economics,* 10:2 p: 237-245

Schwartz, A. J. 1999. "Prospects for International Currency Use of the Euro". *Bradley Policy research Center, NBER, Shadow Open Market Committee,* September, Washington DC.

Sinn, H. W., and F. Westermann. 2001. "Two Mezzogiornos" in M. Bordignon and D. da Empoli (eds.), *Politica fiscale, flessibilità dei mercati e crescita,* Milano: Franco Angeli.

Solans, E.D. 2003 "An Analysis of the International Role of the Euro: Its Impact on Economic Relations Between Asia and Europe". Fifth Asia-Europe Young Parliamentarians Meeting, Guilin, China.

Spahn, Heinz-Peter. 2002. *From Gold to Euro: On Monetary Theory and the History of Currency Systems.* Springer- Verlag, Berlin, Heidelberg, New York.

Summers, L. H. 1997. *Testimony Before the Senate Budget Committee,* 21 October 1997.

Tavlas, G. S. 1991. "On the International Use of Currencies: The Case of the Deutsche Mark". *Essays in International Finance.* International Finance Section, Princeton University.

Tavlas, G. S. 1997. "The International Use of the U.S. Dollar: An Optimum Currency Area Perspective". *IMF Working Papers.*

Triffin, Robert. 1961. *Gold and the Dollar Crisis. The Future of Convertibility.* Yale University Press.

United States General Accounting Service. 2000. "The Euro: Implications for the United States – Answers to Key Questions". *GAO Report to the Chairman Subcommittee on Domestic and International Monetary Policy, Committee on Banking and Financial Services, House of Representatives.* US General Accounting Service.

Welfens, Paul J. J. 2001 *European Monetary Union and Exchange Rate Dynamics: New Approaches and Application to Euro.* Springer.

WTO Report. 2004. "World Trade 2003, Prospects for 2004". 5 April 2004.

World Gold Council. 2000. "The Euro, The Dollar and Gold". *Proceedings of the Conference held in Rome.* 17[th]November 2000.

Wyplosz, Charles. 1997. "An International Role for the Euro?", in *European Capital Markets with a Single Currency* (ed. J. Dermine and P. Hillion). Oxford: Oxford University Press.

Wyplosz, Charles. 1999. "Making the Euro Work: Does the European Union's New Single currency Represent the Future of Money in the Global Economy?". *Time.* Special Issue 1998-1999.

APPENDIX A

THE TRANSITION TO A MONETARY UNION

Table A.1 Chronology of Selected Events

Date	Event
March 1957	Six European countries sign the Treaty of Rome, establishing the European Economic Community (EEC).
January 1962	Council adopts first regulations establishing common market in agriculture
July 1968	Customs Union completed, common external tariff established, and freedom of movement guaranteed for workers within EEC.
February 1986	The 12 members of the European Community sign the Single European Act. The act extends the powers of the Community and establishes framework for a single market.
June 1989	European Council calls for negotiations on treaty revisions necessary for the introduction of EMU and the euro based on plan developed by governors of central banks and Commission President Delors.
February 1992	Maastricht Treaty signed by EU heads of state and government.
1992 – 1993	Treaty ratified by EU member states.
1993 – 1997	Countries reduce inflation and cut budget deficits to meet euro membership criteria.
1994	European Monetary Institute created as the precursor to the ECB
June 1997	EU adopts Stability and Growth Pact.
May 1998	Council of the EU announces participating countries.
January 1, 1999	ECB begins operations as a central bank. Irrevocable fixing of conversion rates to euro. National debt converted into euros.
January 1, 2002	The euro notes and coins are introduced among the participating countries.
June 2002	National currencies are withdrawn, and only euro notes are legal tender.

Source: United States General Accounting Service (2000)

I - The European Monetary System in 1979 – The Spirit of the Treaty[*]

The following criteria are accepted:

1) All member countries should fix a par value for the exchange rate in terms of the European Currency Unit (ECU), which is a basket of EMS currencies weighted according to country size.

2) This par value should be kept stable in the short run by symmetrically limiting range of variation in each bilateral exchange rate to 2.25 percent on either side of its central rate.

3) The strong currency central bank must lend freely to the weak currency central bank to support the exchange rate in case an exchange rate threatens to exceed its bilateral limit.

4) If it is necessary to realign national price levels, par values may be adjusted in the intermediate term by collective agreement within the EMS.

5) All member countries should work in coordination to converge national macroeconomic policies and not to change long run par values for exchange rates.

6) Each member country should keep free convertibility for current account payments.

7) Reserves should be hold mainly as European Currency Units with the European Fund for Monetary Cooperation, and dollar reserves should be reduced. All member countries should avoid holding substantial reserves in other EMS currencies.

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[*] Spahn reproduced from McKinnon 1993: 36, cf. De Grauwe 1994a:98-103

8) Central bank debts should be repaid immediately from exchange reserves, or by borrowing from the European Fund for Monetary Cooperation within strict longer term credit limits.

9) No member country's money is to be a reserve currency, nor is its national monetary policy to be (asymmetrically) the nominal anchor for the group.

II – The Period Between 1979 – 1992 [*]

All Member Countries

1 – 5 is same as above.

6) Using the credit facilities of the European Fund for Monetary Cooperation should be avoided.

Member Countries Except Germany

7) In order to stabilize the national exchange rate vis-à-vis the DM, they should intervene intramarginally, within formal bilateral parity limits. Instead of dollars DM should be used increasingly for intervening.

8) Active exchange reserves should be kept in interest bearing DM open market instruments such as Euromark deposits, as well as in dollar Treasury bonds.

9) National money growth and/or short-term interest rates should be adjusted to support exchange market interventions.

10) Member countries except Germany should keep adjusting long-term money growth so that domestic price inflation (in tradable goods) converges to, or remains the same as, price inflation in Germany.

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[*] Spahn reproduced from McKinnon 1993:37.

11) Capital controls should be liberalized progressively.

Germany

12) Remain passive in the foreign exchange markets with other members of the European Monetary System.

13) German capital markets should be kept open to foreign governments or private residents as borrowers or depositors.

14) The effects of German or other EMS countries' official interventions in the European foreign exchange markets should be sterilized on the German monetary base.

15) An independently chosen German monetary policy should anchor the DM (EMS) price level for tradable goods.

III- Maastricht Treaty and Beyond

The Stage I began in July 1990 before the Maastricht Treaty was signed and ratified by the Member States in February 1992 and October 1993, respectively, as some provisions of this stage did not require a new legal framework. It was essentially a commitment to start the process within the existing legal institutional framework of the European Monetary System and the post-SEA Treaty of Rome (Apel, 1998).

Greater detail was added to the process towards economic and monetary union in the Maastricht Treaty, which was added to the Treaty of Rome. At Maastricht a number of new institutions were set up and the stages by which European Monetary Union (EMU) was to be achieved were specified. EMU was seen as a means of securing 'economic and social

progress' (Article B TEU) and 'price stability' (Article 3a EEC) (Arestis *et al*, 2001).

Some important revisions were adapted to the Delors three stage plan in the Maastricht Treaty. Five strict criteria, which would have to be met before a nation had to join the final stage of monetary union were set. The list of these criteria may be found in Chapter 4. Beside these criteria, there was a provision made for the European Commission and the EMI. They would have to make regular reports to the Ecofin Council on the economic performance of the member states regarding the convergence criteria. The Maastricht Treaty extended the responsibilities of Ecofin by giving it a supervisory role, in cooperation with EMI, of the progress towards EMU (Arestis *et al*, 2001).

In May 1998, the countries that are qualified to participate in stage III of EMU were selected by the European Council. The decision was based on the reports of the EMI and European Commission that were submitted in March 1998. In these reports how each country had complied with the convergence criteria was assessed. The European Central Bank (ECB) replaced the EMI in June 1998 and it took over the responsibility for monetary policy within the Euro Zone in January 1999 (Arestis *et al*, 2001).

Final steps of the EMU are taken in the year 2002. In January, the euro notes and coins were introduced and the euro transformed from virtual to real currency. During the transmission process from the preceding currencies to the euro the irrevocable euro conversion rates are used (Table

A2). Later, in June all the preceding currencies of the euro are withdrawn
and the euro became the single currency of the union.

Table A2 - Euro Conversion Rates

1 Euro is equal to	
Austrian schilling	13.7603
Belgian / Luxemburg franc	40.3399
Deutsche mark	1.95583
Dutch guilder	2.20371
Finnish markka	5.94573
French frank	6.55957
Greek drachma	340.750
Irish pound	166.386
Italian lira	1936.27
Portuguese escudo	200.482
Spanish peseta	166.386

APPENDIX B

The Coefficient "b" is Equal to the Supply Elasticity

Our GDP function is:

$$\text{GDP} = a \ P_L^b \tag{B1}$$

When we take the logarithm of this function we get:

$$\log \text{GDP} = \log a + b \log P_L \tag{B2}$$

The formula for elasticity of supply is equal to:

$$e_s = \frac{dGDP}{dP_L} \ \frac{P_L}{GDP} \tag{B3}$$

$\dfrac{dGDP}{dP_L}$ in equation B3 means the derivative of GDP according to P_L and equals to:

$a \ b \ P_L^{b-1}$ and from equation B1 we know what GDP equals to, so the equation becomes:

$$e_s = a \ b \ P_L^{b-1} \frac{P_L}{aP_L^b} \tag{B4}$$

$$e_s = b \ P_L^{b-1+1-b} \tag{B5}$$

$$e_s = b \ P_L^{0} \tag{B6}$$

$$e_s = b \ 1 \tag{B7}$$

$$\mathbf{e_s = b} \tag{B8}$$

APPENDIX C

The Effects of Price Changes on Supply Elasticity

Our supply function is:

$$Q_s = a + b\,P \tag{C1}$$

Elasticity of the supply curve may be found by using the formula

$$e_s = \frac{dQ_s}{dP} * \frac{P}{Q_s} \tag{C2}$$

The result will be:

$$e_s = b * \frac{P}{a + bP} = \frac{bP}{a + bP} \tag{C3}$$

The elasticity of supply is a function of price:

$$e_s = f(P) \tag{C4}$$

In Table 5.3 we observe that the price elasticity of the Euro Zone increases as the price increases that means:

$$\frac{de_{seu}}{dP} > 0 \tag{C5}$$

and the reverse is true for the US case. The supply elasticity of the US decreases as the price increases meaning that:

$$\frac{de_{sus}}{dP} < 0 \tag{C6}$$

If we take the derivative of the equation (C3) relative to price we find:

$$\frac{de_s}{dP} = \frac{b(a + bP) - (b * bP)}{(a + bP)^2} = \frac{ab}{(a + bP)^2} \tag{C7}$$

In equation (C7) the denominator is always positive, so the signs of the a and b will determine the sign of the derivative.

For Euro zone a>0 and b>0; so $\dfrac{de_{seu}}{dP} > 0$

For US a <0 and b>0 so; $\dfrac{de_{sus}}{dP} < 0$