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DOES THE EURO HAVE A CHANCE TO CHALLENGE THE DOLLAR?

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**ABSTRACT**

The dollar has been the dominant currency since the World War II. Will the euro ever be able to challenge the dollar? 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 the international trade, their power and potential in many economical aspects are tried to be figured out and compared. Furthermore, their elasticities, their roles in the international financial markets, current account and trade balance of the the two parts are discussed. An empirical study on international bonds and notes is made by using the attraction model. All of the analyses made in this research show us 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.

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# **DOES THE EURO HAVE A CHANCE TO CHALLENGE THE DOLLAR?**

## **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 paper 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 paper I try to discuss this very important development and see whether the euro has a chance to become an international currency. We are looking for an answer to the question "Does the euro have a chance to challenge the dollar?" Comparisons are made

between the euro and the dollar in two respects; their role in the international financial markets and in the world trade.

## **2. 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".

The main reason for that is the fact that the 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 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-fourth the size of the 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. The first one is the fact that it had roughly the equal trade volume as the 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 the US à 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 paper 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.

### **3. 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 3.1 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 larger. 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 3.2).

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

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\* 12 countries that are members of the EMU are taken into account in all the comparisons

significant in 2003. The same can be said also for the ten year average inflation rates (Table 3.2). 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 3.2). 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 3.2). It may be concluded that the US has slightly higher credibility than the Euro land 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.

**Table 3.1 Main Indicators of the Euro Zone and USA**

	<b>USA</b>	<b>Euro Zone</b>
<b>Area (approximately)</b>	9.4 million km <sup>2</sup>	2.5 million km <sup>2</sup>
<b>Population (2001)</b>	278,058,900	303,909,700
<b>GDP at market prices (at current prices)</b>	9,713,490	7,254,036
- Millions of euro (2003)	9,309,696	7,552,315
- Millions of PPS (2002)	32,560	23,010
- PPS per inhabitant (2001)		
<b>GDP per capita PPS<sup>(1)</sup> (2001)</b>	139.5	98.6
<b>Real GDP growth rate<sup>(2)</sup> (2003)</b>	3.1%	0.4%
<b>Inflation rate<sup>(3)</sup> (2003)</b>	2.3%	2.1%
<b>Interest rates (Annual Average) (2003)</b>		
- Long term <sup>(4)</sup>	4.0%	4.2%
- Short term:3-month interbank	1.2%	2.3%
- Short term: Day to day money	1.1%	2.3%
<b>Seasonally adjusted unemployment rate</b>	5.6%	8.8%
<b>Exports (2003)</b>	≈724 billions \$	≈1,305 billions €
<b>Imports (2003)</b>	≈1,035 billions \$	≈ 968 billions €
<b>Trade Balance (2003)</b>	≈ -546 billions \$	≈ 125 billions \$
<b>Current Account (2002)</b>	≈ -481billions \$	≈ 61 billions \$

<b>Current Account (% of GDP) (2002)</b>	-4.6	0.9
<b>GDP Share (2002)<sup>(5)</sup> (%)</b>	21.1	15.7
<b>Share of Export of Goods and Services (2002)<sup>(5)</sup> (%)</b>	12.4	31.2
<b>Share of Population<sup>(5)</sup> (%)</b>	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

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.

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 a likely case 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 about 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 a complete trust, as the union itself may give harm to its identity. If not because of the 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 the people's minds a political union should also be established between the member countries.

**Table 3.2 10 Year and 5 Year Averages of the Main Economic Indicators**

	<b>USA</b>	<b>Euro Zone</b>
<b>Real GDP Growth Rate<sup>(1)</sup></b>	3.28%	2.04%
<b>Inflation Rate<sup>(2)</sup></b>	2.46%	1.99%
<b>Interest rates (Annual Average)</b>		
- <b>Long term<sup>(3)</sup></b>	5.8%	5.9%
- <b>Short term:3-month interbank<sup>(4)</sup></b>	4.6%	4.3%
- <b>Short term: Day to day money<sup>(5)</sup></b>	3.6%	3.4%
<b>Seasonally adjusted unemployment rate<sup>(5)</sup></b>	4.94%	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

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 share in global trade and in international financial markets. In the following sections the Euro zone and the US will be compared according to their strength in these issues.

#### **4. Euro vs Dollar in Global Trade**

Trade is a very crucial factor in determining the international role of a currency. In this part first the supply elasticities of the Euro zone and the US will be compared in order to understand their adoptability to the changes in the price levels. Afterwards the trends and the relationship between the current account and trade balance of the two parts will be examined. High fluctuations are not acceptable in these accounts of an international currency. Besides, there should be a close relationship between the current account and trade balance of an international currency in order to able the issuer country to feed the world with its own currency. Lastly, the shares of the euro and the dollar in global trade are compared. Having a share in the world trade is crucial as it is one of the indicators that shows the fact that the currency is used as an invoicing currency.

##### **4.1. Supply Elasticity**

Between the features of 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 that the long run aggregate supply curve is perfectly inelastic and may be drawn as a vertical line as shown in the Figure 4.1. 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.

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 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 somehow 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.

$$\text{GDP} = a + b P_L \quad (1)$$

$$\text{GDP} = a \times P_L^b \quad (2)$$

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 US are shown in Table 4.1. From microeconomics theory we know that the supply elasticity is equals to:

$$e_s = \frac{dGDP}{dP_L} * \frac{P_L}{GDP} \quad (3)$$

Elasticity of supply is 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 mean of the prices is found. These prices are inserted in the estimated equation and three different supply elasticities are found. As it may be seen in Table 4.2 the three numbers are very close to each other and the supply elasticity of US is around 2.9.

The same process is applied also to the Euro zone data. From Table 4.1 the regression results of the Euro zone area may be observed. The CPI data of Euro Zone is searched for its minimum, maximum and average mean values. The findings are applied to the estimated equation and the results in Table 4.2 are observed.

**Table 4.1 Regression Results**

Sample: 1997:1 2000:4 (US) Sample: 2000:1 2003:4 (Euro Zone)						
	<b>a</b>	<b>b</b>	<b>R<sup>2</sup></b>	<b>Adj R<sup>2</sup></b>	<b>DW</b>	<b>F</b>
<b>US</b>						
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
<b>Euro Zone</b>						
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.

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 4.1 under the column constant elasticity. The X variable of the regression results gives directly the elasticity of the supply curve<sup>•</sup>.

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

$$\log \text{GDP} = a + b \log P_L \quad (4)$$

The b coefficient in equation (4) gives directly the supply elasticity (See Appendix A).

The regression results of the US case are shown in Table 4.1. 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 4.1 are found. 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 4.2.

When Table 4.2 is observed carefully, it may be concluded that the dollar has a huge advantage against 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 have a supply elasticity of almost six times that of the Euro zone and according to microeconomics theory 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 have an advantage of

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<sup>•</sup> The explanation to this issue may be found in Appendix A

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 4.2 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
<b>USA</b>	3.05012649	2.90465946	2.73727777	2.913354
<b>Euro Zone</b>	0.38340787	0.39348768	0.40268855	0.394084

#### 4.2. 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. First one is the trend of the current account and trade account of the euro zone and the US, 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:

$$CA_e = \beta_0 + \beta_1 t \quad (5)$$

$$TB_e = \alpha_0 + \alpha_1 t \quad (6)$$

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 (5) is 0.39, meaning that the time factor describes approximately 39% of the changes in the current account. Likewise, for

the equation (6) 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.

$$CA_U = \delta_0 + \delta_1 t \quad (7)$$

$$TB_U = \omega_0 + \omega_1 t \quad (8)$$

Here the notation is same as before. The adjusted  $R^2$ s of equation (7) and equation (8) 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.

$$CA_e = a + b TB_e \quad (9)$$

$$CA_U = c + d TB_U \quad (10)$$

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.

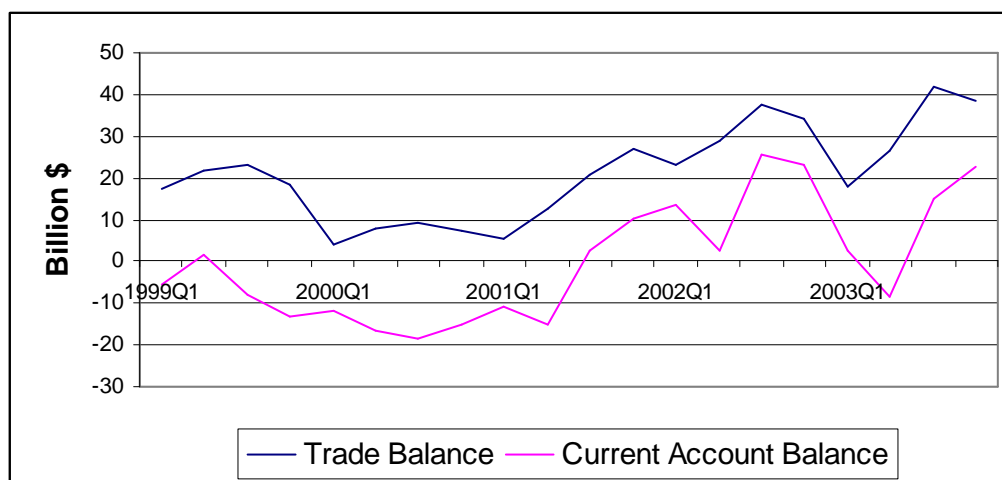
**Table 4.3 Regression Results**

Sample: 1999:1 2003:4						
	<b>a</b>	<b>b</b>	<b>R<sup>2</sup></b>	<b>Adj. R<sup>2</sup></b>	<b>DW</b>	<b>F</b>
<i>US</i>	-2.32E+10 (3.58E+09)	1.0859 (0.1497)	0.74505	0.73088	1.9639	52.6
<i>Euro Zone</i>	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.

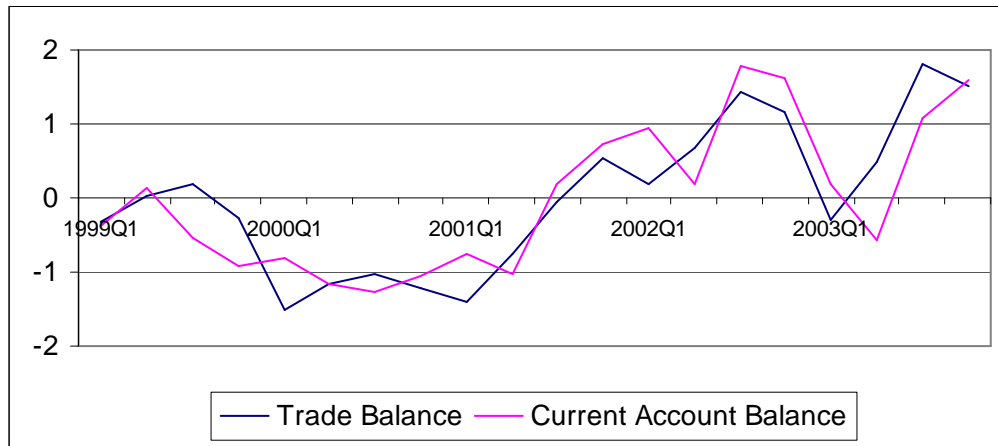
The regression results for the Euro zone is shown in the Table 4.3. From the estimated equation it may be concluded that an increase of one SDR in trade balance of the Euro zone will cause approximately an increase of 1.09 SDR in its current account balance. It may be said that trade balance is the most 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.

As it may be observed in the Figure 4.2, 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 4.2 Trade and Current Account Balance of the Euro Zone**

Furthermore, the Z formula<sup>•</sup> 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. The Figure 4.3 shows the transformed form of the current account and trade balance of the Euro Zone.



**Figure 4.3 Trade and Current Account Balance of the Euro Zone expressed as standard deviations from the mean**

From Figure 4.3, 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.

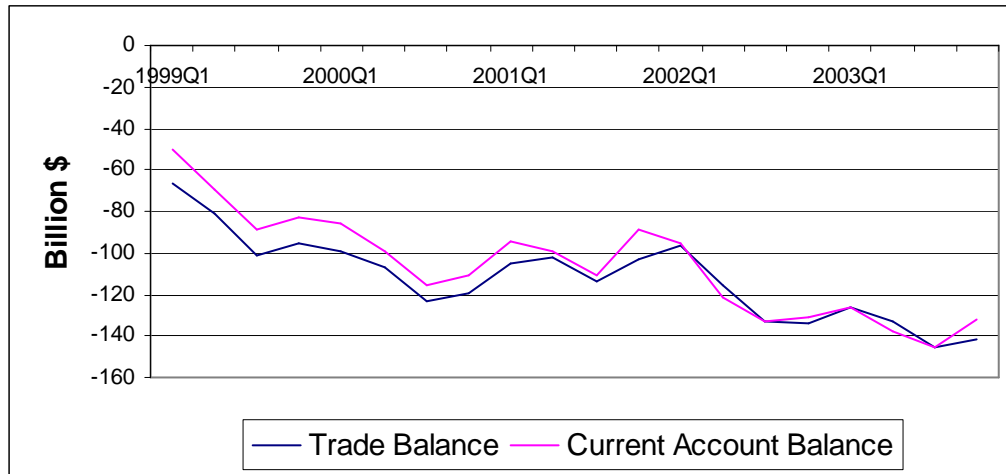
In Table 4.3 the regression results for the equation (10) may be observed. Here we can say that an increase of one SDR in trade balance will cause an increase of 1.19 SDR in current account balance. The same result as in the case of the Euro zone may be also concluded for the US case. The changes in the current account balance may be mostly described by the changes in the trade balance rather than the other items current account.

Unlike the euro case, the US had always given both trade and current account deficits between the years 1999 and 2003 (Figure 4.4). Since the beginning of 1999, the current account and trade deficit of the US has more than tripled. The close relationship between

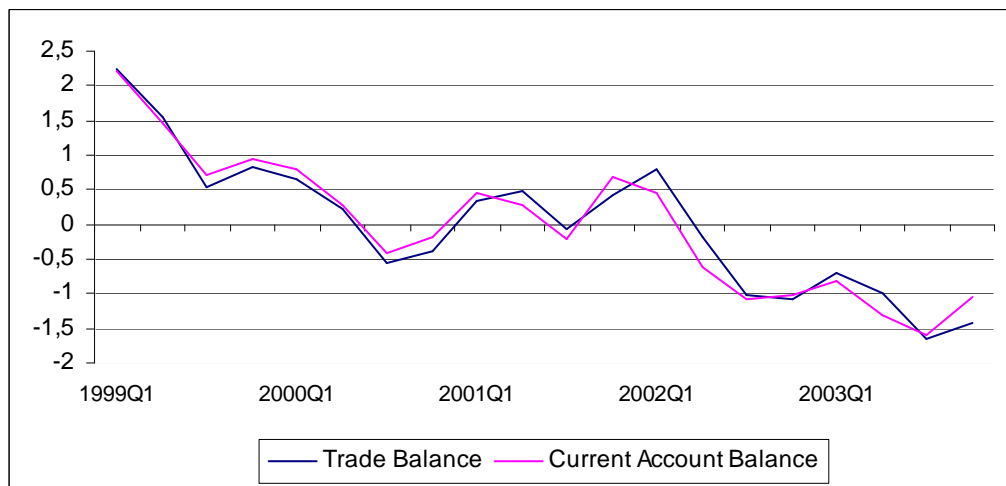
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<sup>•</sup>  $Z_i = \frac{X_i - \bar{X}}{\sigma}$  where  $\bar{X}$  denotes the mean of the data set, while  $\sigma$  shows the standard deviation.

the trade and current account of the US may be observed in both Figure 4.4 and Figure 4.5. The same procedure as in the case of the Euro zone is used to draw Figure 4.5.



**Figure 4.4 The Trade and Current Account Balance of the US**



**Figure 4.5 Trade and Current Account Balance of the US expressed as standard deviations from the mean**

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 4.4 Regression Results for the Euro Zone and the US (Trend)**

	<b>R<sup>2</sup></b>	<b>Adjusted R<sup>2</sup></b>
<b>CA<sub>e</sub></b>	0.424852	0.392900
<b>TB<sub>e</sub></b>	0.430885	0.399267
<b>CA<sub>U</sub></b>	0.772402	0.759758
<b>TB<sub>U</sub></b>	0.708254	0.692046

The world's reserve volume is increasing. There may be two reasons for that. The first one is the growth in the trade volume of the world. We will discuss the recent developments in world trade in the next section. The 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 take part will also depend on the amounts of the opposite effects discussed above.

### **4.3. Global Trade**

In this section 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.

#### **4.3.1. World Trade in 2003**

According to 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 United States went up by 5.7 per cent while its exports rose less than 3 per cent after two years of contracting export volumes. The merchandise trade deficit of United States reached \$549 billion dollars, corresponding to 7.6 per cent 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 percent, 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 percent to 21 percent, while Asia and Latin America's export expansion was limited to 6 percent. 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 experienced their strongest increase since 1995 and increased by 10.5 percent. 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.

#### **4.3.2. 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 4.5 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

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

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 the Table 4.5 Eurostat and World Trade Organization data are used. As Eurostat gave the percentages directly for EU no calculations is 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.

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.

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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)

**Table 4.5 The Trade Composition of the Three Major Countries**

	EU	US	Japan
<b>Exports to</b>			
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%
Oceania	0.8%	0.7%	0.4%
Non EU European Countries	12.3%	0.5%	na
<b>Imports From</b>			
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%
Oceania	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 find the invoicing shares for the major three currencies first the Table 4.5 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 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. As 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 exports, but as 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. We observe that crude petroleum oils are the one of the most important import 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 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 has 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 take attention is the fact that the invoice currency decision of OPEC countries may have some effect on determining the dominant invoice currency of the world.

## **5. Euro vs Dollar in International Financial Markets**

In this section firstly the current situation of the international financial markets will be discussed and then an empirical case will be made on international bonds market.

### **5.1. 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 euro land, 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 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. This paper is based on my thesis named “How should reserve money be? Does the euro have a chance?” Detailed information about the position of the euro and the dollar may be found in that thesis. In the thesis the situations of the dollar and the euro in different financial forms such as international monetary market instruments, international bonds and notes, international debt securities, derivatives, official holdings of foreign exchange, banks’ local positions in foreign currency, and international investment positions. Briefly, in international financial markets, our findings in the thesis show us the fact 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 (Göksel, 2004).

## **5.2. 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 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 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 Søndergaard 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 is 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):

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

Here  $GDP_i$  represents the GDP share, *Inf* is the inflation rate, and  $\epsilon$  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 5.1 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 5.1 and the estimated equation in this result will be used in the system. 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 5.1.

In the US case, there seems to be no serial correlation and the results are significant. As there is no serial correlation equation (11) will be used in the system.

When we look at the regression results of Japan (Table 5.1), which is found by using the same method, we again observe a first order serial correlation. As there is serial correlation, again the AR (1) method is used and the results in Table 5.1 are found.

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 shortcomings, 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.

**Table 5.1 Regression Results**

Sample: 1996:1 2003:4							
	<b>GDP</b>	<b>Inf</b>	<b>AR(1)</b>	<b>R<sup>2</sup></b>	<b>Adj. R<sup>2</sup></b>	<b>DW</b>	<b>F</b>
<i><b>Euro Zone</b></i>							
<b>1</b>	2.699** (1.36)	0.101 (0.126)		0.335	0.313	1.087	15.131
<b>2</b>	7.061* (2.06)	-0.300 (0.193)	0.676* (0.143)	0.522	0.488		15.271
<i><b>US</b></i>							
<b>1</b>	2.709* (0.52)	-1.072* (0.295)		0.287	0.263	1.975	12.064
<i><b>Japan</b></i>							
<b>1</b>	1.503* (0.38)	-0.329* (0.109)		0.406	0.386	0.863	20.491
<b>2</b>	1.373* (0.49)	-0.292** (0.141)	0.572* (0.156)	0.599	0.569		20.880

\* Significant at 1% level

\*\* Significant at 5% level

1- Normal regression

2- Regression with AR(1) Method

A system is formed and the SUR Method is applied. The results may be observed from Table 5.2.

The results are in line with 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.

**Table 5.2 The Results of the SUR Method**

Estimation Method: Iterative Seemingly Unrelated Regression Sample: 1996:1 – 2003:4			
	Coefficient	Std Error	Prob (t-stat)
$\beta_0$	3.563512	1.267546	0.0061
$\beta_1$	9.29E-05	0.000393	0.8137
$\alpha_0$	2.424483	0.315366	0.0000
$\alpha_1$	-0.009122	0.001795	0.0000
$\delta_0$	1.872307	0.427414	0.0000
$\delta_1$	-0.001856	0.000529	0.0007
<b>Equation:</b> $\text{Share}_{e,t} - (0,767113 \text{ Share}_{e,t-1}) = \beta_0(\text{GDP}_{e,t} - 0.676113 \text{ GDP}_{e,t-1}) + \beta_1 \text{Inf}_{e,t}$			
<b>R Squared</b>	0.268434	<b>Adjusted R Squared</b>	0.243207
<b>Equation:</b> $\text{Share}_{d,t} = \alpha_0 \text{GDP}_{d,t} + \alpha_1 \text{Inf}_{d,t}$			
<b>R Squared</b>	0.278796	<b>Adjusted R Squared</b>	0.254756
<b>Equation:</b> $\text{Share}_{y,t} - (0,571880 \text{ Share}_{y,t-1}) = \delta_0(\text{GDP}_{y,t} - 0.571880 \text{ GDP}_{y,t-1}) + \delta_1 \text{Inf}_{y,t}$			
<b>R Squared</b>	0.231292	<b>Adjusted R Squared</b>	0.204785

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.

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:

$$A_{i,t} = f(\text{GDP}_{i,t}, \text{Inf}_{i,t}) + \varepsilon_{i,t} \quad (12)$$

where  $A_{i,t}$  is the attraction of the country  $i$  at time  $t$ ,  $t = 1, \dots, T$ .  $\text{GDP}_{i,t}$  and  $\text{Inf}_{i,t}$  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.

$$M_{i,t} = \frac{A_{i,t}}{\sum_{j=1}^I A_{j,t}} \quad \text{for } i = 1, \dots, I \quad (13)$$

The model in (12) and (13) 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 to find out the market shares of the Euro zone and the US relative to Japan in international bonds market.

$$\log \frac{M_{i,t}}{M_{I,t}} = \frac{A_{i,t}}{A_{I,t}} = \beta_1 \frac{GDP_{i,t}}{GDP_{I,t}} + \beta_2 \frac{Inf_{i,t}}{Inf_{I,t}} + u \quad i = \text{Euro Zone, the US} \quad (14)$$

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 there is no autocorrelation in the US case its equation stays the same as before. Using these two equations we form a system and estimate it by the SUR method. The results may be observed in Table 5.3.

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 command 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 5.3 The Results of SUR Method (Attraction Model)**

Estimation Method: Iterative Seemingly Unrelated Regression			
Sample: 1996:1 – 2003:4			
	<b>Coefficient</b>	<b>Std Error</b>	<b>Prob (t-stat)</b>
$\beta_0$	4.232949	0.956544	0.0000
$\beta_1$	-0.221742	0.085005	0.0115
$\alpha_0$	0.564803	0.144604	0.0002
$\alpha_1$	-0.466713	0.286838	0.1090
<b>Equation:</b> $\text{Share}_{e/y,t} - (0.741172\text{Share}_{e/y,t-1}) = \beta_0(\text{GDP}_{e/y,t} - 0.741172\text{GDP}_{e/y,t-1}) + \beta_1\text{Inf}_{e/y,t}$			
<b>R Squared</b>	0.353844	<b>Adjusted R Squared</b>	0.331562
<b>Equation:</b> $\text{Share}_{d/y,t} = \alpha_0 \text{GDP}_{d/y,t} + \alpha_1 \text{Inf}_{d/y,t}$			
<b>R Squared</b>	0.419951	<b>Adjusted R Squared</b>	0.400616

## 6. Conclusion

Our findings in this research also make it clear 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 parts 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 show us the fact 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. 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 parts the current account deficit or surplus is mostly affected by the trade deficit or surplus. Neither part faces with huge capital inflows or outflows that will cause fluctuations in their current account balance. The analysis shows that their current account balances have a trend and do not show high fluctuations. It may be concluded that both parts have rather stable economies, which is a very important factor in becoming an international currency. Being an invoicing currency in the 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.

## APPENDIX A

### The Coefficient “b” is Equal to the Supply Elasticity

Our GDP function is:

$$GDP = a P_L^b \quad (A1)$$

When we take the logarithm of this function we get:

$$\log GDP = \log a + b \log P_L \quad (A2)$$

The formula for elasticity of supply is equal to:

$$e_s = \frac{dGDP}{dP_L} \frac{P_L}{GDP} \quad (A3)$$

$\frac{dGDP}{dP_L}$  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:

$$e_s = a b P_L^{b-1} \frac{P_L}{a P_L^b} \quad (A4)$$

$$e_s = b P_L^{b-1+1-b} \quad (A5)$$

$$e_s = b P_L^0 \quad (A6)$$

$$e_s = b \cdot 1 \quad (A7)$$

$$e_s = b \quad (A8)$$

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