CAUGHT OFF GUARD

Implications of Monetary Union on the Unprepared

ERASMUS UNIVERSITY ROTTERDAM
Erasmus School of Economics
Department of Economics

Supervisor: Prof. Dr. J.M.A. Viaene

Name: Paul Kramer
Exam Number: 331733
E-mail Address: p.a.kramer@hotmail.com

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1. Introduction

1.1 The Euro

The European integration has been a defying part of the times we live in. From its economic beginnings of the European Coal and Steel Community to its more political integration contracted in the Lisbon treaty, Europe has followed a continuous path of convergence. Although Europe has always taken this path, the speed of integration has been known to have had different velocities. In this thesis, I will focus particularly on monetary integration through the Euro as a currency and the European Monetary Union (EMU). The idea of a Euro, debated as early as the period of the treaty of Rome, was primarily fast-tracked into existence with the fall of the Berlin wall and German unification. This account may not be as well-known, but is essential for the discussion in this paper and shall therefore briefly be discussed in the introduction. A more detailed overview of this can be found in an extensive article published in *Der Spiegel* (Sauga et al., 2010) and in an account written by Barber for the *Magazine of the European Union* (Barber, 2002).

Among the ruptures of the European Monetary System (EMS) in the late 1980s, when the European currencies were largely pegged to the Deutsche Mark, a new monetary future was being set up for Europe. With time running out for the EMS and the Cold War coming to an end, quick decisions had to be made concerning the direction of regulation for monetary Europe and how a European common market should be realized further. At the time, currency exchange rate volatility was an enormous problem with inflation rates also being particularly sensitive.

After the fall of the Berlin wall in 1989, West Germany was hoping to reunite with East Germany now that its communist and Russian influence was ousted. In exchange for European (and in particular French) support for a unified Germany, Germany was persuaded to give up its monetary sovereignty over the dominant Deutsch Mark, that to which most European currencies were pegged during the EMS era. The tradeoff was a unified Germany and a European currency which was no longer only influenced by the Bundesbank. This was a predominantly French goal as its socialist government under Mitterrand was tired of being consequently submissive to the choices made in Frankfurt when balancing its own extensive fiscal policies.

In hindsight, it is interesting to see that in order to obtain monetary independency, countries looked towards a common currency instead of letting markets choose the strongest one to which other countries could peg against, thereby avoid volatility. It can also be questioned whether countries were truly as dependent on the Deutsch Mark during EMS since it seems that predominately France worked on “independence.” England under Thatcher was in particular against the Euro. However, within a very

short period of time, consensuses were made and the road toward the Euro and EMU was quickly paved; the complete introduction implemented only nine years later in 1999.

This relatively sudden change in such a major part of sovereign economics gives room for many interesting discussions and research. For the 11 initial members of the EMU, it does not seem as if they all had equal intentions or even a say in the creation of the Euro. I do not propose that the Euro was forced upon EU countries, or that this is in fact a bad thing since a common currency seems to be a logical subordinate to a free internal market. However, such a sudden change in the monetary building blocks can have interesting economic effects when governments and central banks have not anticipated it, or have not been able to fittingly adjust their economies. In post Euro-crisis discussions, many scholars openly question if the Euro was a good idea for the southern European countries at all. Via this paper, I hope to contribute to this discussion.

1.2 Caught off guard

It is through this proposed *caught off guard* effect that I wish to research the consequences of the introduction of the Euro, and more generally, any loss in monetary freedom for those economies who initially allowed for such. The most predominant influence that the introduction of the Euro had would in theory be in economic areas that are influenced by the exchange rate. This is in fact a broad and diverse area as it hits the very core of government policy tackling national economic issues.

The focus of this thesis is area of discussion that is somewhat lacking in research. During the numerous Euro discussions I have followed, be these in the media or in personal conversation, an interesting point surfaced concerning predominantly southern European countries. It appeared that these nations had artificially manipulated their exchange rates, kept up a regime other than floating, or pegged at a natural rate in order to compete with other European countries. These accusations, as far as I could find, have never been proven. It is with this explicit research that I wish to add to the contemporary body of literature. To save time and space, I shall only focus on Spain as opposed to all southern European countries. I chose Spain because it is a major, relatively independent economy in Europe and was hit particularly hard by the Euro crisis post 2009, something that I believe may have been catalyzed through the aforementioned currency issues.

To be more specific, I would like to research the effect of the introduction of the Euro on the areas of inflation, wages rate, budget deficits, foreign investment and export in Spain, these properties being influenced by a country's exchange rate policy. In each of these five areas, I will first analyze what the predicted effect of the Euro introduction would have been, should Spain have entered the Euro at equilibrium rates, and to follow, give a prediction under the circumstance that their currency was in

fact manipulated. I will then compare the actual reaction of these properties to what was predicted and test for statistical significance.

Should enough significant effects of the Euro implementation contradicting its theoretical outcomes be found, this could be considered proof that pre-Euro Spanish exchange rates were not at equilibrium levels and that this new, over-valued exchange rate had effects on its economy. The argumentation would follow that the sudden Euro introduction did not allow for countries to ease monetary policy before having to give it up completely.

This paper will begin by researching the relative literature and theory on this issue and then propose a methodology to research my hypothesis. An extensive presentation of the results will follow, and the paper will close with a discussion on the research and proposed extensions and a final presentation of my concluding findings and potential policy implications.

2. Literature

2.1 The importance of exchange rates and the Euro

The study of exchange rates and currency union is a relatively new one, although the heart of the discussion can be considered as part of the core of economics (Mussa et al., 2000). Firstly, I would like to point out the importance of exchange rates and why their role is becoming more and more important. As world trade increasingly becomes more globalized, profit margins have been decreasing, causing shocks in exchange rates to have a relatively stronger effect on these margins. These margins have been falling for two general reasons. Firstly, trade barriers are weakening and information technology better enlightens market demand to those who are able to supply it. Potential competitors are increasingly able to find new routes for arbitrage and in combination with falling entrance costs for new entrants, as a customer and supplier network can be acquired more easily, firms are forced to keep prices as low as possible. The second reason behind decreasing profit margins is due to global financial integration which has made it increasingly easy to do business with companies who handle with different currencies. This has opened up the roads for businesses, predominantly in upcoming economies, and has allowed for more intensive trade between countries.

When margins are small, exchange rates play an increasingly important role. I can give an example through personal experience. A friend and I import plastic cups from China and sell them on the European market. When we began, our margins were quite high and a web shop was enough to make a comfortable profit. However, within a year, five competitors entered our market, forcing us to lower our price until eventually all of the competitors left. This was possible because we paid the Chinese and the shipping agencies in dollars. We received relatively high amounts of dollars for our Euros and we knew that the competitors imported from Germany in Euros. If it costs 5 dollar cents to produce and import a cup from China, we would have to pay 4 Euro cents, meaning that selling to customers for 5 Euro cents gives us a small, but sufficient margin (25%). When the Euro falls, however, percentage changes in the exchange rate will have a much higher influence on our profits then if the margins were higher.

As is exemplified above, exchange rates are to be taken seriously. Not only can they affect real companies, they also have an ever-growing effect on governments and national economies. This is all the more reason for countries and governments to attempt to control their own exchange rates. Many papers have been written on which factors influence the exchange rate (Mussa, 1984). I will look at the effects of the exchange rates on the following national parameters; inflation, wage rates, export, the current account and bond yields. As stated in the introduction, I will analyze the expected reaction of these characteristics to the Euro and then analyze the data.

It is important to see the relationship between exchange rates and the adaptation of the Euro. For European countries, the Euro simply sets the exchange rate at exactly 1 against all other EMU members. Because trade between European countries is so gross, this has major implications and its effect can be predicted in models.

2.2 Models

The models used in these analyses will differ, as some models work better when researching certain properties. The models used are as follows: to research inflation, Purchasing Power Parity (Dornbusch, 1986); when researching the effect for wage rates, the Ballassa Samuelson (Balassa, 1964) (Samuleson, 1964); for the exports, the Monetary Approach (Frankel, 1983); for the current account, the Mundell-Fleming model (Mundell, 1963) (Flemming, 1962); and when investigating bond yields, the Portfolio Balance Approach (Frankel 1983). I will predominately use the textbook *Exchange Rates and International Finance* by L. Copeland for classic explanations of the well-known models I am to use. I realize that I could have assessed all five variables using only one or two models (the monetary model is in particular very resilient), however, as this is a Bachelor thesis, I enjoy using as much information as I have learned throughout my studies as possible in forming my conclusion. The resulting loss of explanatory power will be discussed later in the paper.

Furthermore, in forming my predictions and analyzing the outcomes of the research, I have made reference to papers already written on the subject. Much research has already been done on the effects of the Euro on different economic areas per country within the EMU. Publications in the journal *Economic Policy* from the Paris School of Economics have been of much help in analyzing inflation and the current account. In analyzing the effect the Euro has on wage rates, I fall back on a paper that I myself have written for a Bachelor seminar given by Prof. Dr. Viaene at the Erasmus University Rotterdam. As I intend to look at national bond markets when studying foreign investment, I am not forced to look at only academic work. Due to the crisis, this discussion has been held over a wide variety of channels. The same applies for the discussions concerning the influence of the Euro on the current account, although to avoid the populist discussion, I prefer to refer to the academic papers in forming my theories.

A guide to the empirical analyses of convergence in the areas of inflation and wage, research done by Dreger et al. using the beta test for convergence, is outlined in their paper in an almost step-by-step approach which is applicable to this research (Dreger et al., 2007).

What I have not been able to find in the literature, yet incidentally forms the core of this entire thesis, is research concerning whether certain EMU members were artificially keeping their exchange rates high before adopting the Euro. I understand that such research would be difficult to conduct as

countries during EMS where not purely floating and the high shocks in inflation at the time could have weakened the data. However, I believe that by taking the outcomes of the five parameters I will research into account, possible statements can be made, be they on intentional differentials, incorrect exchange rate levels or the stance of national currencies before the introduction of the Euro. Interesting accounts of the same accusations against China have been made and studied which provide a decent background for this study (Staiger et al., 2008).

3. Data and Methodology

3.1 The doctors' approach

The methodology I propose to use was inspired by the diagnostic practices of doctors on their patients in the medical branch and as such may be considered slightly unconventional for an economic study. It is therefore practical to formulate my thesis through a similar diagnostic approach. In researching the (negative) effects of fixing exchange rates through the Euro on certain areas within a country, it could be stated that I am researching how "healthy" is the latter is. Healthy countries in this paper are those considered to perform well and at the same time have their economies in equilibrium. Unhealthy countries by extension are not performing well. They have slow or negative growth, high inflation, unemployment, unbalanced payments and pay high interest on their bonds. However, as is the case in healthcare, it is possible for sick patients to behave well if they take the proper medicine. Their sickness may still be there, but subdued by some means.

The "sickness" we are researching is under-competitiveness. The "medicine" for this problem is artificial exchange rates through currency manipulation. When adopting the Euro, countries had to stop using this drug cold turkey. This has given room for countries who suffer from this sickness, to see those symptoms associated with this disease rise again.

If you see a doctor because you are not feeling well, the doctor assesses your symptoms and uses them to diagnose you. It is possible that you do not tone all of the symptoms associated with a certain disease, but if the doctor sees enough, you can still be diagnosed. I propose to do the same for Spain. Five symptoms shall be searched in the areas of inflation, wages, export, the current account and bond yields. In each area, I must first derive what the symptom would be were a country to suffer from the sickness of under-competitiveness according to a certain model.

An important assumption made when applying the models is as follows: were countries to be in equilibrium, the new exchange rate would stay at the same relative value, as prices stay at natural levels in comparison to the rest of the Euro. Were countries to be artificially keeping their prices low through exchange rate manipulation, adopting the Euro would force prices back up meaning that Euro introduction is the same as currency appreciation. It is therefore that we compare situations where the exchange rate stays the same, implying that the country was in equilibrium, to those where the exchange rate appreciates, implying that the country was unnaturally over-competitive.

Another important assumption made in this research is that foreign prices, currency or anything foreign for that matter refers to other European countries, seeing as Spain is integrated in the European market and its most important economic relations are with Europe.

After having modeled the effects of the introduction of the Euro on each specific parameter, I conducted statistical tests to prove that a country tones the predicted symptoms of under-competitiveness. Should a country tone all of my predicted symptoms, I still leave it up to the reader to draw his or her own conclusions. I realize that the aspects of the economies I research can be influenced by many things and it is still extremely difficult to use my method of diagnosis as proof that countries were manipulating their currencies prior to the introduction of the Euro. The obvious objection is that all five components of my research can easily be rejected on their own due to there are numerous causation problems. Were I to have the expertise, I would conduct much higher quality econometrics in assessing correlations and effects. However, I believe that if the economies react in a way predicted by the models, this fact alone would add an interesting point to the discussion outlined in the introduction.

3.2 Empirical Methods

To formulize the discussion in a more statistical manner, I will conduct two different types of analyses. Both compare data of the parameters before and after the introduction of the Euro, however, only the first two compare stationary values against averages and the last three compare differences in a time series.

For the first group of parameters, I predict there to be smaller differences in the European countries' rates against the overall EU average after adopting the Euro. I am in fact actually testing for convergence between the rates in doing so. For this convergence test, I use a test called a beta convergence test. The idea behind this inspired by a paper on price convergence in the EU (Dreger et al. 2007). In it, the theory is based on classic growth theory (Solow, 1956) which assumes the law of diminishing returns. Should a group of countries be converging in some manner, the countries with values lagging in comparison behind the rest will see their speed of "catching up" diminish. To test this statistically, I built a growth model of the parameter.

$$ln\Delta(y_{i,t}) = \alpha + \beta ln(y_{i,t-1}) + \mu_{it} \tag{3.1}$$

This test, used extensively by Barro and Sala-i-Martin (Barro et al. 1995), is a regression of the growth rate of variable y taken as an average for a cross section of countries *i* over period *t* with error μ. A significant beta is a sign of a convergence process. Because we have a dynamic structure in our panel regressions, the Arellano and Bond (1991) generalized least square (GLS) method is appropriate. I conduct this test in EViews 7 using only one lag.

For the second group of parameters, I predict the introduction of the Euro to tone structural breaks in the time series produced by the data. I therefore propose using a Chow-Break test to test for significant

structural breaks in the time series data using the introduction of the Euro as focal point. These tests are also done in EViews 7.

It is important to view the research of the five properties as separate. For each prediction, I use different models and in some cases, these have different assumptions as well. One example, is the law of one price. In some models I assume sticky or variable prices, where as in other models, I assume prices to be fixed. This may seem contradictory but can be supported through my diagnostic method of looking at five different symptoms. My conclusion is based on additive results from five separate researches.

3.3 Data

Concerning the data itself, I use as much official data as possible, entailing data directly from institutions such as the OECD and EuroStat. Because I intend to use a long time frame, OECD countries are essentially the only option for research as they have reliable data for such a period. It may be the case that some variables I use in the regressions are not variables from which I can directly copy data. In this case I will have to create the data myself, based on OECD and EuroStat figures.

The time span of the data I use differs per subject. I have tried to find and use data from 1990 until the present for all subjects. In the graphs, I present all possible data in order to form a complete view. In the convergence tests, I use data from 1999 until 2012, and in the time-series test this data accounts for the period between 1990 to the beginning of the credit crisis of 1997. The exact folders of the datasets that I find the needed data will be given further on in the paper. Both data sets can be accessed through www.stats.oecd.org and www.epp.eurostat.ec.europa.eu.

4. Results

In this section, I will compare the expected effect of the Euro on the specific property using a certain model. These pairs can be found in the chapter literature.

4.1 Inflation

When studying inflation I would like to use the model of Relative Purchasing Power Parity (PPP). PPP is essentially an extension of the explanation on the increasing importance of exchange rates introduced in Chapter 2. The model flows from the law of one price which states that, *if two goods are identical, they must sell for the same price*. Deviations from this law lead to arbitrage, the process of buying or selling something in order to exploit a price differential so as to make a riskless profit. In theory, the only difference in prices should be those of the transactions cost C, getting to the good from the foreign supplier to the domestic buyer, with *P* being the price of the buyer and *P** that of the seller.

This account thus far assumes that prices of goods are given in the same currency. But what happens when this is not the case? Suppose you want to buy a good in dollars, but you only have Euros. That good is going to cost you the amount of Euros you have to pay in order to get the amount of dollars the seller is willing to accept. The cost for this transaction can also be added to the C variable, but a new variable arrives in the equation, namely the exchange rate S.

$$P = SP^* + C \tag{4.1}$$

PPP becomes particularily interesting when you assume transaction costs to be 0. Although this may seem a bit absurd, as I have shown in the cup example in Chapter 2, modern technology and globalization can diminish transaction costs in such a way that they can be neglected, or in any case, equal for all countries in Europe.

Letting the C fall, allowing P to be not only the price of a single good but also the price level on all the goods put together, and implementing some mathematical adjustments, the derivative of the natural logarithm of the variables creates the equation that I will use in this paper. This equation states that the difference in the period changes of the price (inflation) of domestic goods p between those of foreign goods p^*, is equal to the change in the exchange rate.

$$dp - dp^* = ds \tag{4.2}$$

I therefore expect differences in national inflation (changes in price) in comparison to the Euro average to be smaller when joining EMU as *ds* becomes 0. This is logical, as unexpected differences in exchange rates no longer have to be compensated through prices. A cost variable is dropped. If a country were to be “sick” or under-competitive before entering the Euro, it would mean that its equilibrium prices

were actually higher. Instead of inflation convergence to a European average, prices in sick countries would first have to adjust to the Euro, resulting in different inflation rates as prices flow back into equilibrium.

I test the data for this effect by comparing the absolute difference in inflation between Spain and the rest of the Euro area. To formulate the comparison, it can be written that:

$$\left|dp_{pre} - dp^*_{pre}\right| > \left|dp_{post} - dp^*_{post}\right| \tag{4.3}$$

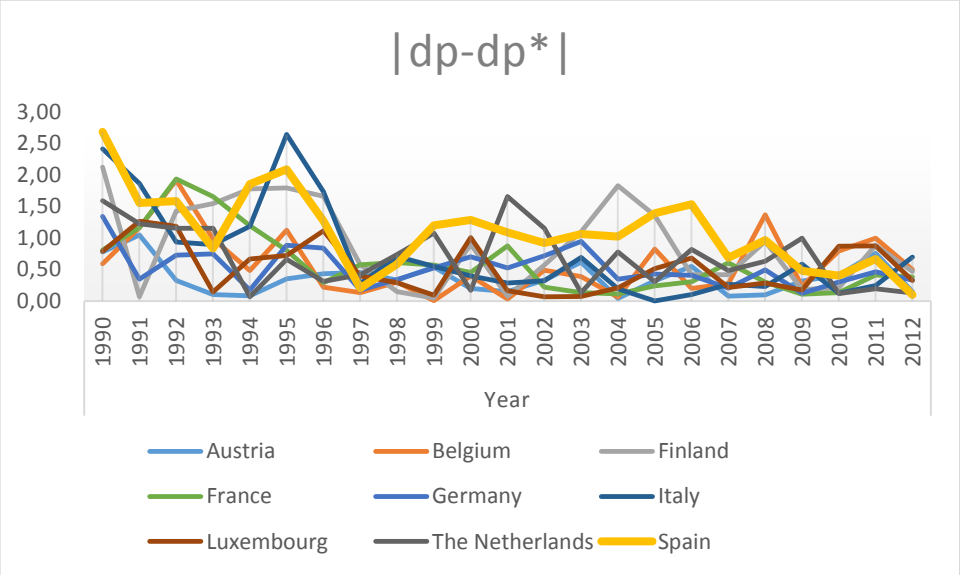
My hypothesis can be written as:

$$H0: inflation\ rates\ are\ converging$$
$$H1: inflation\ rates\ are\ not\ converging$$

dp represents the domestic inflation rate, *dp** the average EMU inflation rate, the pre suffix relates to before the introduction of the Euro and the post suffix after.

We compare pre and post Euro data by looking at the differences in national inflation against the EMU average before and after the introduction of the Euro for convergence. The European average inflation rate *dp** is the average of the Euro inflation rates weighted against GDP. I will first show a graph to reveal how inflation development against the European average differs per country.

Figure 4.1



Source: Own calculations based on data from inflation.eu

The first results seem to fall nicely in line with my theory. If the outliners produced by Ireland and Finland are ignored, it seems that a steady conversion of inflation to the Euro average in comparison to the pre Euro period can be seen. What also stands out, is the consequential relatively large deviation

from average inflation from Spain for the first 10 years of the Euro. This is exactly what was predicted given the model.

Can this be proven with empirical evidence? The graph most defiantly shows that Spain has continuous high rates of inflation, but this is only interesting when we can prove that the rest of the European countries' prices are indeed converging. I will prove this by using a beta-test for convergence as explained in the Chapter 3. The formula to beused for this beta-test is:

$$\Delta p_{i,t} = \alpha_i - \beta p_{i,t-j} + u_{i,t} \tag{4.4}$$

Here, a negative relationship between the initial price level and inflation is tested for. For this test, data from EuroStat is used once more, namely each country's harmonized indices of consumer prices indexed at 2005 from 1996 until 2013. In this time period, convergence is expected as exchange rates of pre EMU countries were fixed even before the introduction of the Euro in 1999. Here, an initial Harmonized Index of Consumer Prices (HICP) is used to explain subsequent changes. Because a lag of 1 is to be used, this regression can be changed into:

$$HICP_{i,t} = \alpha_i + (1-\beta)HICP_{i,t-1} + \mu_{i,t} \tag{4.5}$$

Deleting Luxembourg due to outline problems and conducting the Arellano and Bond (1991) test, the following output is acquired.

Table 4.1

Dependent Variable: HICP		
Method: Panel Generalized Method of Moments		
Transformation: First Differences		
Total panel observations: 10		
Periods included: 16		
B-convergence		
Variable	Coefficient	Prob.
HICP(-1)	1.010637119	0.000
Cross-section fixed (first differences)		

Source: Own calculations EViews

As can be seen, the tests show a significant beta value which verifies price convergence between the EMU members after introduction of the Euro. It should however be noted that the coefficient itself is extremely close to 1. An applicable test of significance should be carried out to test whether the beta is in fact not just one. In this paper we will assume that it is.

4.2 Wage Rates

In studying wage rates, it is important to understand the Balassa-Samuelson effect, which can also been seen as an extension of PPP. For measure of example, the Banana-Republic, a small country in

which two goods (bananas and houses) are produced, will be examined. Bananas are traded to the rest of the world and houses are used domestically. Labor is divided between the two such that wages are equal in both sectors because there is complete labor mobility. Due to PPP, the price of bananas is fixed. The price index of the Banana-Republic can be shown as:

$$P \equiv P_T^{\gamma} P_N^{1-\gamma} \tag{4.6}$$

$$W = PA \tag{4.7}$$

where P_T is the price of the tradable bananas and P_N the price of the non-tradable houses. Gamma is the weight of the two and depends on the size of the sectors. The prices themselves are determined by the wage and the marginal product of labor *A* in its sector. *A* itself is influenced by productivity.

Suppose, due to modernization, the production of bananas becomes more productive. As A increases, the wage will also increase, because P is fixed due to PPP. Workers in the non-traded sector will now demand higher wages as well, but since their productivity is the same, the prices of houses will have to increase as well leading to a total increase in the CPI.

$$W_N = W_T = P_T A_T \tag{4.8}$$

This explains the Balassa-Samuelson effect which shows that relatively higher growth in the tradable sector leads to a rise in the prices in the non-tradable sector and therefore also a rise in the general price level *p*, pushing up the real exchange rate and connecting wages in both sectors. Now that this effect is clear, a focus on its implications on the real exchange rate, which incorporates the nominal exchange rate S, can be written as:

$$P_T = SP_T^* \tag{4.9}$$

$$Q_T = \frac{SP_T^*}{P_T} = \frac{S^{W^*}/_{A^*}}{W/_A} \tag{4.10}$$

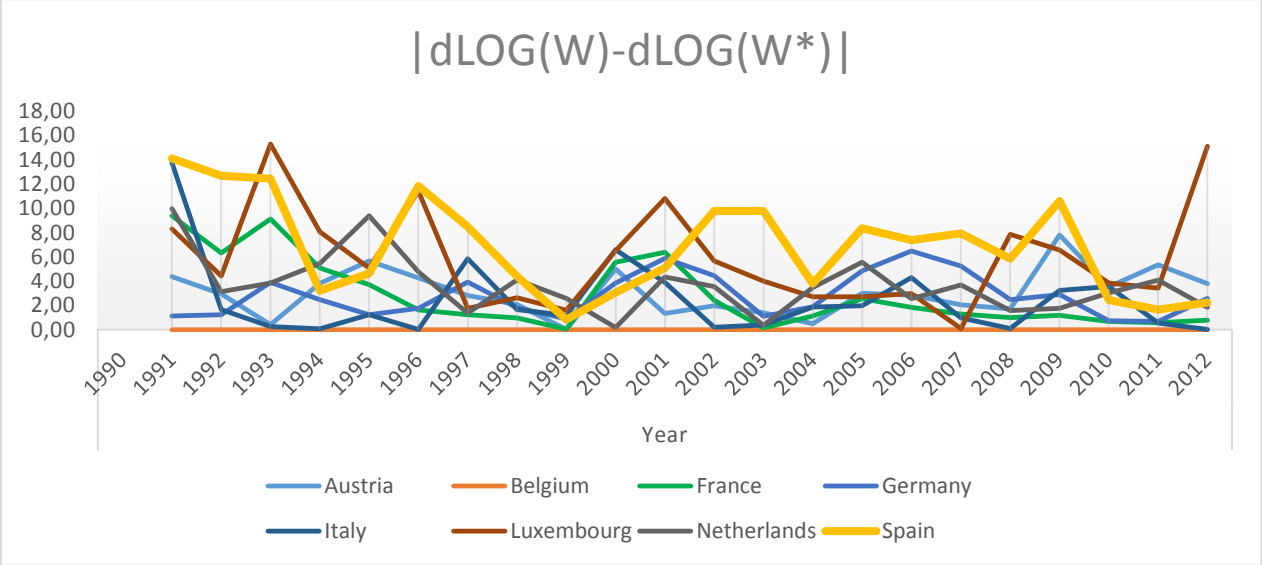
Normally, when the real exchange rate gets out of hand, countries can change their nominal exchange rate in order to stay competitive. However, with S being fixed at 1 after introduction of the Euro, it can be expected that wages will react more heavily, or at least react differently to the European average should a country first have to adapt to the new currency. The heavier the reaction, the clearer it is that the original real exchange rate was out of equilibrium. Should this not be the case, wages should converge as exchange rates prices are now equal. To test wage reaction, percentage changes in wage rates are compared once again against the European average as was done when testing inflation.

$$\left|dLogW_{pre} - dLogW^*_{pre}\right| > \left|dLogW_{pst} - dLogW^*_{post}\right| \tag{4.11}$$

$$H0: wage\ devlopment\ is\ converging$$
$$H1: wage\ development\ is\ not\ converging$$

The Hourly Earnings Index (MEI) from the OECD found in the labor theme under earnings at www.stats.oecd.org was used for data. These wages are all indexed at the year 2010 and because of this indexing, the annual difference of the logged values of the wage index are used for changes in wages. The average log is once again weighed against GDP. Unfortunately, data for Portugal and Belgium are missing. To begin, as was done in the inflation example, preliminary results were graphed.

Figure 4.3



Source: Own calculations with data from stats.oecd.org

Once again, initial results seem to align to the model. Wage development in the EMU seems to converge towards a European average after introduction of the Euro, except for the wages in Spain, which seem to develop along their own path.

As was the case under inflation, the consequential higher wage deviations on Spain are only interesting if there seems to be a European convergence. A test using the Arellano-Bond estimation for β-convergence can be conducted once more, the regression written as follows:

$$MEI_{i,t} = \alpha_i + (1-\beta)MEI_{i,t-1} + \mu_{i,t} \tag{4.12}$$

Here, the same data as from the chart above, covering 1999 until 2013, is used. The results from EViews are:

Table 4.4

Dependent Variable: MEI		
Method: Panel Generalized Method of Moments		
Transformation: First Differences		
Total panel observations: 10		
Periods included: 13		
B-convergence		
Variable	Coefficient	Prob.
MEI(-1)	0.962457	0.000
Cross-section fixed (first differences)		

Source: Own calculations EViews

Again, there is proof that there is a wage conversion within Euro member countries and as the graph clearly depicts, Spanish wages have had consequently higher levels of change in comparison to the other Euro countries. Here the beta also seems significantly different from 1.

4.3 Export

To investigate the effects of the introduction of the Euro on exports, the monetary model, what is currently likely the most well-known and accepted model in exchange rate theory, will be implemented. An extremely diverse and broadly applicable instrument, this model could have been used in drawing conclusions on all five parameters of the economy in this research.

The model assumes fixed supply, stable demand for money and PPP (in the long run) and can be derived through the following four equations:

Source: Copeland - *Exchange Rates and International Finance*

Domestic Money Demand	$M = kPy$	(4.13)
Foreign Money Demand	$M^* = k^*P^*y^*$	(4.14)
Goods Market Equilibrium	$P = P^*S$	(4.15)
Nominal Exchange Rate	$S = \frac{P}{P^*} = \frac{M/_{kPy}}{M^*/_{k^*P^*y^*}}$	(4.16)

Money demand *M* is a function of price *P*, income *y* and a positive parameter *k*. The same holds true for foreign money demand *M**. Due to PPP, the goods market is in equilibrium when prices are the same in both countries given a certain exchange rate. If domestic prices rise, the country would be under-competitive, resulting in an excess supply of domestic currency in turn pushing the exchange rate up (depreciation).

The association with exports in this model comes when exchange rates are assumed to be fixed. When this happens, the exchange rate can no longer adjust to compensate for certain changes in P. It is then convenient to look at money *supply*. This is not only domestic credit (DC) but also foreign currency

reserves (FX). These reserves can flow in or out of a country for several reasons, one important reason being export. Foreign cash must, of course, be traded against something domestic.

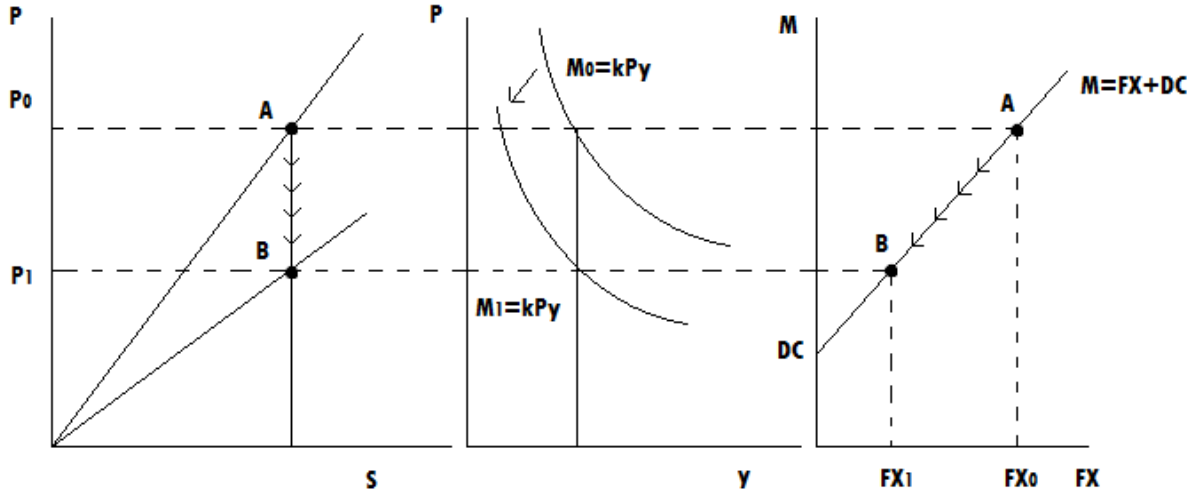
As stated earlier, foreign reserves come into the monetary model when exchange rates are fixed. Beforehand, exchange rates predominantly react to changes in price levels, domestic credit and vice versa. When incorporating foreign currency, add a new equation is added to the model.

$$M^s \equiv FX + DC \tag{4.17}$$

Once again, here follows an analysis of what would happen after introduction of the Euro according to the model if countries were intentionally depreciating their currencies. Firstly, however, an important problem should not be ignored here. Because the monetary model assumes PPP, there is, to a certain extent, the forced assumption that rates prior to the introduction of the Euro are in equilibrium, even if the domestic currency is in fact undervalued. This problem arises because this model does not allow for currencies to be at a level of sustained undervaluation; its mechanics force automatic adjustments when out of equilibrium. In that case, if Spain was not manipulating its currency, the introduction of the Euro should have had no effect on exports as once again, the adaptation of the Euro is a simple price adjustment. In relation to the rest of Europe, their prices would stay the same.

Let it be assumed, however, that a country has found a way to keep its exchange rate at a stable undervalued level such that its domestic prices are relatively cheap. After introduction of the Euro, it can be assumed that it is no longer possible to keep this over-competitiveness and subsequently, prices suddenly appreciate. In the model, the SP curve becomes flatter as foreign goods become cheaper. From this moment, the mechanics in the model speak for themselves. The country is in a state of under-competitiveness. As foreign goods become relatively cheaper, foreign reserves, which are at this moment now the same as domestic credit (Euros) leave the country as people buy foreign products, pushing down overall money supply until prices fall back into equilibrium. As is illustrated in the graph below, this decrease in foreign money leads to a fall in export and at the same time forces prices down.

Figure 4.5

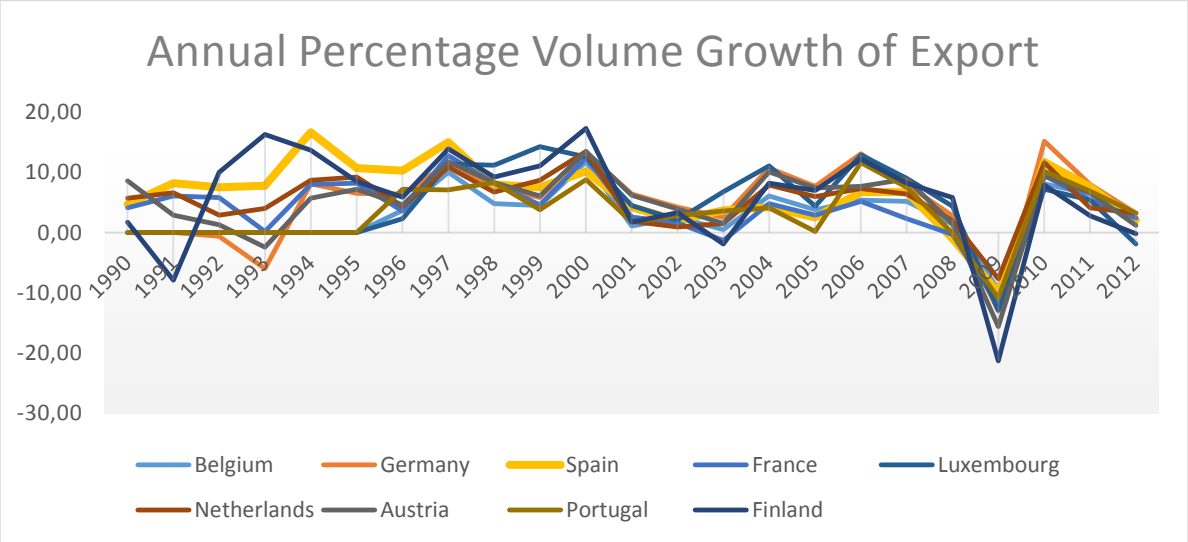


To test statistically whether or not exports have fallen after entering the Euro, I propose a different type of test than when researching inflation and wage development. As the model states, there should be a clear difference in exports before and after Euro introduction. As such, I propose a Chow-Break test to attempt to prove that a structural break exists in the time series of data concerning export.

Data is collected on the annual percentage increase of national export volumes valued in Euros. The data is collected from Eurostat, which is why I assume that pre Euro values have been adjusted for correctly. To be more precise, the data can be found under “exports and imports by the EU countries and by third countries” volumes (nama_exi_k) on the national account database given at http://epp.eurostat.ec.europa.eu/

To assist in understanding this data, a general graph has been provided.

Figure 4.6



Source: Own calculations with data from epp.eurostat.ec.europa.eu

It seems, yet again, that the model properly predicts what the Euro would imply for Spain, should it have had artificially high exchange rates prior to introduction. Where growth rates in Spanish export are among the highest in Europe before the introduction of the Euro in '94, '95, '96, and '97, they fall into the second to last position, just preceeding Portugal, in 2005.

To test this statistically, I conducted a Chow-Break test on the time series of Spanish data from 1992 until just before the credit crisis of 2007. I also searched for significant points around 1999. The following results were obtained.

Table 4.7

Chow Breakpoint Test: 1998				
Null Hypothesis: No breaks at specified breakpoints				
Equation Sample: 1992 2007				
F-statistic	3.798778		Prob. F(2,12)	0.0527
Log likelihood ratio	7.847972		Prob. Chi-Square(2)	0.0198
Wald Statistic	7.597557		Prob. Chi-Square(2)	0.0224

Source: Own calculations EViews

Here, a slightly significant value with break point 1998 can be seen, proving a structural break in our data and that Spanish exports did indeed fall relatively after the Euro.

4.4 The Current Account

In choosing a model to explain the effects of the Euro on the current account, I was quick to choose the Mundell-Fleming (M-F) model. An important feature of this model is the distinction between the current and capital account, which together must always balance in equilibrium through the balance of payments. It is, in this account, tempting to assume that exports react in the same way as the current account such that a surplus automatically means higher exports. However, it should be noted that export and the current account are not correlated (Gaulier et al, 2012).

The M-F model begins with the IS-LM framework (Hicks, 1937). The IS curve links combinations of interest rates and income consistent with equilibrium in the goods market. The LM curve links combinations of income and interest rates consistent with equilibrium in the money market. Their intersection gives the equilibrium values of the two.

The M-F model adds to the IS-LM framework by incorporating the current and capital account and begins by adding a line with levels of income and exchange rates such that the current account is balanced (TT). Since deviations from this line are possible, the model adds two other lines that together must balance with the current account, the balance of payments (BP) and net capital flow (FF). These

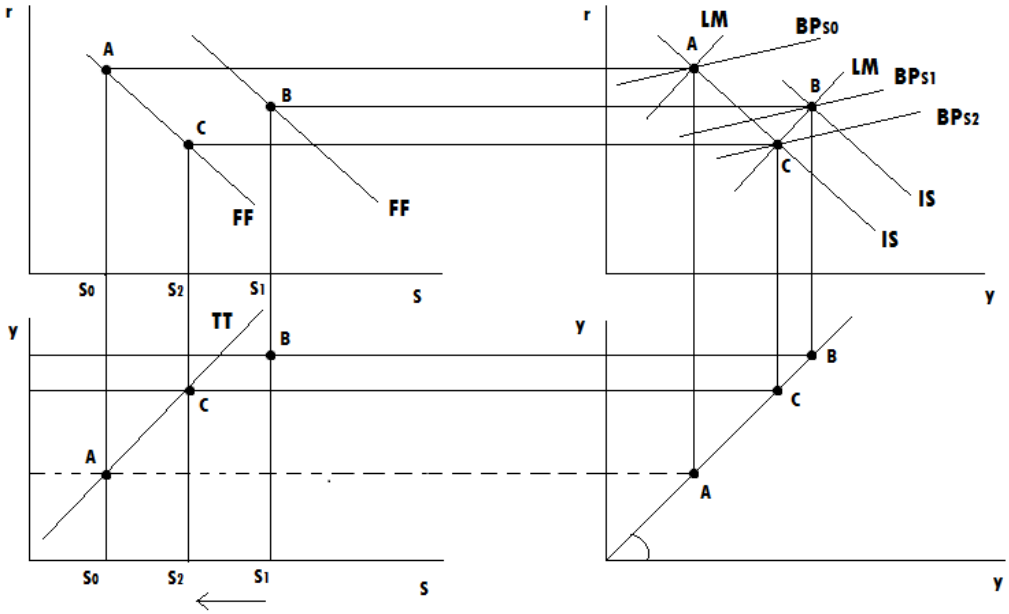
lines link the combinations of interest rates, income and exchange rates that are needed to finance or absorb deviations in the current account. Notice again that the economy does not have to settle in a current account balance, as imbalances can be offset deviances in the capital account.

What this model implies can be analyzed in the following two situations. In the first, a country manipulated its exchange rate, in the second, economy was in equilibrium.

Before the Euro, a country could manipulate the current account by changing the exchange rate S. Countries did this through monetary expansion, shifting the LM curve downwards putting downwards pressure on the domestic interest rate and reducing net capital inflows and depreciating the exchange rate. As this occurs, competiveness improves and we move from point from A to point B resulting in a current account surplus.

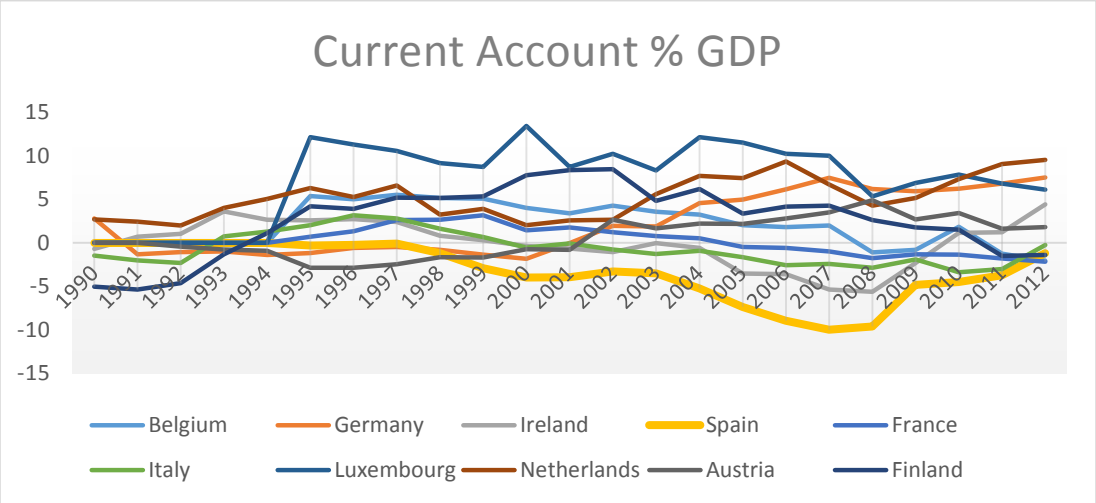
However, something interesting happens when monetary instruments are no longer an option and the exchange rate vis à vis the Euro region becomes fixed. If the new exchange rate is at equilibrium level, there is no expected change as countries are still in the aforementioned point B. Should the Euro result in an appreciation of the currency, however, things change. With the LM curve now fixed and no longer in control of the national government or central bank, a currency appreciation implies that domestic goods become more expensive. Real income subsequently falls and the current account worsens as we move to point C. Reacting to this change in S and y (income), the IS, FF and therefore also the BP curves shift into new equilibrium levels. Note that the IS and FF curves should shift less than is depicted in Figure 4.4.1, but to keep the figure as clean as possible, I only re-shifted the BP curve.

Figure 4.8



To conclude, it would be expected that the introduction of the Euro would have a negative effect on the current account, should countries have been influencing their exchange rates. Likewise, there would be no significant effect were these countries in equilibrium. Again, a graph of the data in initially presented andusing data from the OECD dataset found in the International Trade and Balance of Payments header under Current Account Balance as percentage of GDP, the numbers are compared to reach the following results.

Figure 4.9



Source: Own calculations with data from stat.oecd.org

These results may be the best fitting of all models as of yet as a clear decrease in the current account after introduction of the Euro can be seen. After conducting a Chow-Break test, once again, 1998 forms a significant structural break in the time series and supports the theory considering most of the other European countries seem to hold steady levels of the current account.

Table 4.10

Chow Breakpoint Tes	1998			
Null Hypothesis: No breaks at specified breakpoints				
Equation Sample: 1993 2008				
F-statistic	8.302176		Prob. F(2,12)	0.0055
Log likelihood ratio	13.89844		Prob. Chi-Square(2)	0.001
Wald Statistic	16.60435		Prob. Chi-Square(2)	0.0002

Source: Own calculations EViews

4.5 Bond Yields

To finish, the Portfolio Balance (P-B) Approach is implemented to investigate government yields. This model is in itself quite special. Where other models assume equilibrium or techniques towards them,

the P-B approach is intentionally used by central bankers when managing currency. For this approach, I will assume that the countries studied were using the techniques for currency manipulation given in this model.

To being, the assumption is made that a country's wealth can be spread over three assets; domestic currency *M*, domestic bonds *B* and foreign bonds *B**. As foreign bonds are given in foreign currency, its domestic value is *B*S*. The exact distribution of this wealth between the assets is influenced by the returns given. The return on domestic bonds is, of course, the yield offered *r,* as of that for foreign bonds *r**, both of which in turn influence the amount of *M* held. This leads us to the four formulas that form the equilibrium point of the model:

Source: Copeland - *Exchange Rates and International Finance*

$$\bar{M}/W = m(r, \bar{r^*}) \quad (4.18)$$

$$\bar{B}/W = b(r, \bar{r^*}) \quad (4.19)$$

$$SB^*/W = b^*(r, \bar{r^*}) \quad (4.20)$$

$$W = \bar{M} + \bar{B} + SB^* \quad (4.21)$$

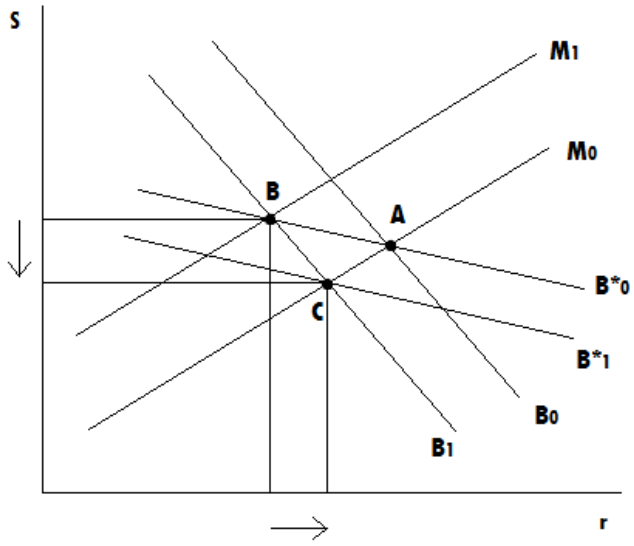
The higher case letter represents the actual supply of the given asset and the lower case letter its demand, both influenced by the rates of return. The accented variables are exogenous and the rest endogenous. These formulas can also be graphed as combinations of the exchange rate *S* against the domestic rate of return *r.* The M curve is upwards sloping as a rise of *S* increases total wealth and with M being fixed, *r* must increase to preserve equilibrium by lowering demand. The opposite is true for the B curve and in lesser sense the B* curve, making them downwards sloping.

Assuming that a country was trying to manipulate S, this could be done by shifting two of the three curves. According to Walra's Law, if there are three markets and two markets are in equilibrium, the third one is by default also in equilibrium. This law allows a country to be able to influence equilibrium rates even though it does not control *B**. What countries do to influence the exchange rate is to increase the supply of money by buying domestic bonds. This shifts the B and M curves upwards and as prices of domestic bonds rise, interest rates fall. This fall in domestic interest rates entices investors to seek out other assets with higher yields. This forces foreign prices up, resulting in a deprecation of the domestic currency. In the graph below, what moves from point A to point B.

I will now analyze for the last time what the introduction of the Euro in this model means. It is assumed that the new domestic Euro priced products are too expensive. The money that was pumped into the economy in fixing exchange rates, was not sent into the real economy, but merely into bonds on the financial markets which drove the domestic currency to depreciation. In this situation, since prices are

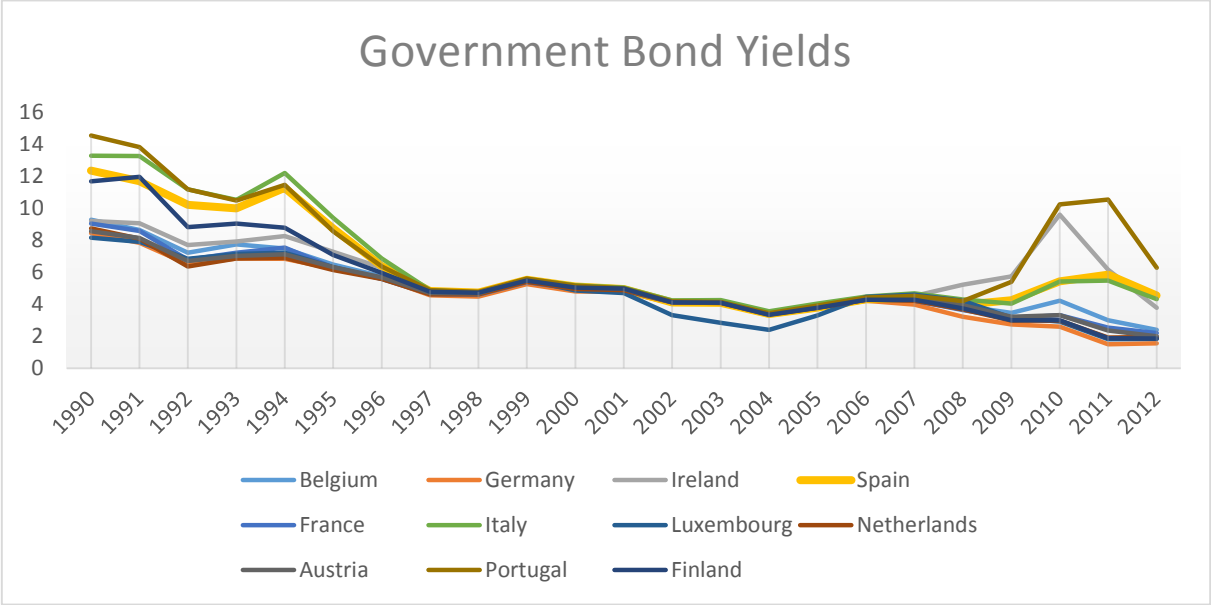
fixed, and the original currency is turned into Euros, money leaves the economy as newly transformed Euros find their way to other places in the union. The M curve is forced back down. To compensate for this flight, domestic bonds must raise their interest rates which in turn should, in the long run, pull domestic investors away from foreign bonds, shifting their holdings in the B* curve downwards, leading us to the a new point C.

Figure 4.11



As can be seen, according to the P-B theory, the Euro should lead to an increase in bond yields, should a country have been manipulating its currency before introduction. Using the data, the following graph is produced.

Figure 4.12



Source: Own calculations with data from stat.oecd.org

Unfortunately, an immediate confirmation seen after graphing the data of the other variables or any conformation of that matter is lacking. It seems the Euro has done an amazing job in converging government bond yields in the periods anticipating the Euro and after. It was not until the European sovereign debt crisis that differences were seen in the interest paid by governments on their debt. To assume that this crisis was triggered by Spanish under-competitiveness after introduction of the Euro seems slightly far-fetched, inhibiting any further investigation.

5. Discussion and Extensions

With the initial results outlined in the chapter above, a more in-depth discussion of the outcomes of the models and predictions can be given below. These seem to point towards a confirmation of the hypothesis that Spain indeed had an undervalued currency before entering the EMU and that the Euro as a currency is too expensive for Spain. It seems that Spain was suffering the "sickness" of under-competitiveness and that its symptoms are on the rise once more since the introduction of the Euro.

Although the results may seem strongly valid, it is important to point out where our research has fallen short and which nuances should be highlighted before drawing concrete conclusions. In almost all aspects of this research, points can be made that contradict the outcomes. In this chapter, I will consider these shortcomings when discussing the different components of this thesis.

Before I begin, I would like to point out that this a Bachelor level thesis and although I strived to conduct my research in the most scientific way possible, I over-simplified certain assumptions and/or broadened discussions to some extent in order to try and incorporate as much of that which I learned throughout my undergraduate years into this thesis. As stated earlier, it was possible to have used only one or two models in formulating my predictions on differing properties. This would likely also be the preferred method of analysis as it requires fewer assumptions. Nonetheless, I very much enjoyed investigating the problem through various economic lenses.

5.1 General Assumptions

The basis for my research lay in the fact that the Euro was a French project and that, although a general consensus for introduction did exist, not all countries were entirely ready. Were Spain to indeed have had an undervalued currency, it certainly did not have enough time or influence to allow for a smooth transition and if this has been the case, the nation did not in any case prepare adequately, resulting in the measurements presented by this research. I am aware of the boldness of this statement. However, little can change the fact that the results indeed point towards an undervalued currency in comparison to their current Euro in pre-Euro Spain. Also, as my historic account in the introduction states, Spain was not a major player on the stage when the Euro was formed.

5.2 Methodology

The doctors' approach implemented (an attempt to "diagnose" Spain with the "sickness" of under-competiveness) may work in medicine, but it is everything but the rigor we find in contemporary economics. The most problematic implication of this method lies in the problem of cofounders and lack of proof of causation. The classic dilemma within econometrics is that not all correlations are causalities. In this research, I assume that a sudden appreciation of the currency resulting from the

adaptation of the Euro is the reason for the changes in the parameters I value. This is, however, almost impossible to state with confidence.

The statement that the introduction of the Euro is the same as an appreciation for Spain is in itself difficult to make, however it does seem logical when explained. Furthermore, even with the outcomes of the Chow-Break tests pointing to Euro introduction as a point of change, this does not imply that it is this appreciation that leads to these outcomes. With the Euro came countless amounts of other economic changes, the most predominant of these being the sentiment in the markets. There are many reasons as to why Spanish developments in inflation, wage development, current account balances, exports and bond yields changed when Spain adopted the Euro.

It was this problem that eventually led me to implement what I refer to as the doctors' approach. Symptoms such as headaches or muscle pains can have many causes, but it is in combination that the bigger picture behind these deviations becomes clear. It may be difficult to take the conclusions of this research seriously due to the problem of cofounders, but with four of the five outcomes significantly complying with the theories, there is an unquestionable hint of being on the right track.

Another major problem in the methodology is that the models used in formulating my predictions are most usually two-country models. These models are made for comparing small open economies against a second country, that being the rest of the world. This A vs. B concept itself is not the problem, however. The problem lies in the fact that these models assume two different currencies, prices, rent levels etc. The appreciation we assume to be the consequence of the Euro itself is not hard to incorporate in the models as this is namely just an appreciation. The difficulty in using the models is that the second country (the rest of the Europe) also switches in monetary characteristics. What makes implementing these models in this research even more difficult is that these monetary issues are not simply switched, but that they are merged together with the other country. The models in some ways morph from a two-country to a one-country model, which has forced me to make some strange assumptions here and there. To those economists who read this thesis: it may at first seem that the models are misinterpreted, but the assumptions I make in using the models when taking monetary convergence into account can themselves be discussed in depth.

5.3 Data

The data used seems in most cases to have been of good quality. Only two data sets were confronted keeping measurement problems minimal. Also, all countries studies are OECD and of course EMU members which have outstanding statistics bureaus.

An interesting point concerning the data chosen was made by a PhD student I spoke when presenting my thesis topic. He stated that any effects that the Euro would have on certain economic parameters

would be short term, one or two years at maximum. This would make it difficult to test the data, as most rates found were annual and not monthly. This leads to the discussion concerning whether or not the time span of the data is too long. In the variables, I tested for structural breaks, which should not have be a problem since two potentially different equilibrium rates were compared. In analyzing inflation and wages, however, this presents a problem, one to be discussed later on. In general, I feel that the data does not show quick adjustments into equilibrium and so supports my decision to use data from 1990 through 2008.

Another point that should be brought into consideration concerning the data is that average rates are weighed against GDP. Seeing as the Euro area has many small economies up against larger ones, the added value of comparing Spanish development to those Luxembourg for example is questionable. Again, this is predominantly an issue in the first two parameters as a self-made Euro average was used for comparisons.

5.4 Inflation

The results of the first parameter tested was in line with my predicted symptoms. The model itself is straightforward and does not rest on any strange assumptions. As mentioned earlier, there can however be room for discussion concerning the period chosen in which to measure predicted developments. Inflation rates differ significantly more than those of other European countries in comparison to the European average. Those of the other countries also seem to converge. The inflation rates prior to 1991 were literally off the chart during the EMU. However, can this phenomenon still be the result of prices falling into new equilibrium rates, or have prices already adjusted for the Euro and are now reacting to something else? This question is difficult to answer but should definitely be noted when discussing the results.

Another side note, also applicable to the discussion concerning wages, is that my empirical results only test for a convergence in the EMU. The last part of my assumption that Spanish rates are higher than other countries was not done statistically, but by looking at the results in the graph of the orginal data. Unfortunately, I do not know how to test for outliners in the beta convergence test.

5.5 Wages

Concerning wages, the same discussion of time can be made as was the case with inflation rates. However, for wage development, I do not feel that this is as much an issue as wages are well protected through labor unions and deviations take much more time and effort into account. Another critical note concerns the Belassa-Samuelson effect, which was developed to explain why fast growing economies needed real exchange rate adjustment to smoothly transit to modern economies. In this paper, it was used to predict outcomes for a developed country falling out of growth.

To focus on the successes in the outcomes when studying wages, I would like to point out the remarkable convergence of wage development as was predicted though the model. Prior to the Euro, for all countries, wages in Europe seemed to change incoherent to those in other countries. Only three years after the Euro, in 2002, did almost all countries have minimal deviations from the European average, unlike Spain. It seems that Spanish wages ran differently after the introduction of the Euro. Again, it is difficult to assume that this is because of the Spanish need for real exchange rate adjustment, especially because prices themselves were also changing quicker than those of other countries. The theory states that wages change because prices are fixed due to PPP. However, it does seem possible that both can change at the same time when adjusting the real exchange rate.

5.6 Export

In this section of the paper, I came across a contradiction in our models that puts the finger on the wound in our interpretation of what the introduction of the Euro actually means economically, should Spain have had an undervalued currency. Prices should fall according to this model, but in other models we assume prices to rise. This is the difficult part of my interpretation. In theory, I predicted an instantaneous increase in prices followed by a slow fall back into a new competitive equilibrium since in the long run, PPP must hold. The problem lies in the speed of the adjustments. In some models, I assumed direct changes and in other models slower ones. This led to the problem we now have in this model as a fall in prices completely contradicts the high inflation detected in our first analyses. This contradiction, however, does not have to dismiss the model. The fall in prices is a gradual process and is much slower than the fall in exports which react almost directly. I would also propose that prices themselves must first rise as a reaction to the adaptation of the Euro since the determination of the selling price is the last stage in the cost management process. We expect a rise in prices according to PPP, followed by the relative fall in prices according to this model, proceeded by a fall in exports. These three points also align with the data.

Another small point that should be made is that the monetary model uses only stock variables whereas export itself is a flow. The conclusions made do not have to be altered but it should be noted that a fall in export according to the model is not at all continuous. The fall in foreign exchange reserves is definite, during which the export sector will be hurt. When this stock has been achieved, the flow will stop which seems to make sense. Export growth in Spain seems to be upward sloping after hitting its lowest point just after introduction of the Euro.

5.7 Current Account

The current account was an extremely important parameter in researching the “sickness” of Spain. In many crises such as sovereign debt, currency or stock market crashes, the current account always seems to play an important role. I was interested in how the Spanish current account would develop

after the introduction of the Euro and had a hunch that this would be negative. In this model, it was again difficult to deduct what the Euro introduction would mean. What was particularly strange was that the LM curve was suddenly fixed as monetary power was lost, but also that a sudden appreciation influenced through a monetary decision appeared. Explaining the situation through this model was confusing to say the least, but the outcome, once reached, seems quiet logical.

As I stated in the results, this result seems to be the clearest result confirming the theory predicted in the model used. Just before and after the introduction, the current account of Spain continued to deteriorate while the rest of the Euro countries continued their normal rates, some countries even increasing their surplus. Although this difference is quite clear, it once again must be noted that we cannot hold the introduction of the Euro solely accountable for this.

5.8 Bond Yields

The research in bond yields has been by far the most disappointing. The model was difficult to allow for a sudden common currency but its conclusions did seem logical. It seems, however, that the most important factor in the development of bond yields is sentiment in the markets. Bonds have made remarkable convergences leading up to the Euro. This development does not have to seem so strange. The Portfolio Balance model is a central bank tool and with the Euro, naturally came a European Central Bank to take over the monetary policy. Bond yields seem to be purely influenced by the central banks in calm markets. Only during a crisis do we see bond yields react nationally. However these reactions do not seem to have anything to do with the amount of money in the market.

6. Conclusions

To conclude, I would like to provide give a quick summary of the thesis. This research began with an account of the introduction of the Euro and a focus on countries such as Spain which were largely left out of the rather swift decision making process. I claim that such a quick and autonomous change in monetary policy could expose a country to the problems of under-competiveness, were countries combating this problem through currency manipulation. I accuse Spain of having done this and propose a doctor's approach to diagnosing Spain with the "sickness" of under-competiveness. The five symptoms I statistically recognize later are derived through five different models that were taught to me over the course of my Bachelor studies. Four of the symptoms concerning inflation, wages, exports and the current account all seem to align to my predictions that given Spain's undervalued currency, what the introduction of the Euro would imply.

Although these outcomes seem quite clear, in Chapter 5, I discuss various problems in my research, the biggest of which being the issue of causality. Although it can be logically deduced that with the Euro came an end to possible Spanish undervaluation, the consequential changes in inflation, wage, exports and the current account do not necessarily mean causation from undervaluation. More so, even if this were true, it is not explicit proof that Spain was intentionally keeping its currency cheap. The situation could also simply have come about as a result of the Euro being too expensive for Spain although it is also possible that with the Euro came other factors resulting in the developments seen.

However, even if the many shortcomings of this research are taken into account, it seems that Spain's reaction to the Euro was unique. It is interesting to point out that this reaction complies with four of the five expectations contracted from models. Spain's increase in inflation relative to the rest of the Euro area saw their rate converge and points out that prices in Spain are adjusting upwards, pointing toward their original prices being too cheap. Spanish wages are reacting in the same way, showing that Spain in this manner is also having more trouble adapting to new currency levels now that it has lost the option of currency revaluation. Spanish export growth has dropped from the highest European rates to one of the lowest after adoption of the Euro, hinting that its pre-Euro products were undervalued. Lastly, the current account in Spain has rapidly deteriorated since the Euro, proof that it simply cannot seem to cope with new competition from other Eurozone members.

Taking these four outcomes into consideration, I would propose that Spain suffers from under-competitiveness. That fact that these issues were not a problem prior to the Euro seems to suggest that Spain was keeping its economy artificially competitive through its exchange rate, no longer possible after joining the EMU.

To finish, I would like to add some personal comments. Since the sovereign debt crisis in Europe combined with the global recession, there have been many heated discussions on the Euro as a currency and to what extent it can be blamed for current problems. This thesis may seem to fall in line with the camp of the Euro sceptics, however it would be a shame to read this research wearing such glasses. Spain's problems triggered by the Euro, if the conclusions of this paper are correct, have everything to do with my assumptions about the country's under-competiveness. Of course, currency management can be extremely helpful when dealing with the problem, but it can more often than not be used as a scapegoat in avoiding reform. I do not in any way feel that the Euro as such has been bad for the Spanish economy. Pursuing that thought, in taking a closer look at the development of inflation, wage, export, the current account and most defiantly bond yields, the EMU seems to have had many prosperous implications. The general conclusion can be made that the Euro has had a calming or stabilizing effect in many sectors of the different members of the EMU and as post-recession Europe has proven, stability and calmness on the markets is an extremely valuable trait to have.

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8. Appendix

WEIGHTS

	AUS	BEL	FIN	FRA	GER	IRE	ITA	LUX	NLD	POR	ESP
1990	0.03	0.04	0.02	0.22	0.36	0.01	0.16	0.00	0.06	0.02	0.08
1991	0.03	0.04	0.02	0.22	0.36	0.01	0.16	0.00	0.06	0.02	0.08
1992	0.03	0.04	0.02	0.22	0.36	0.01	0.16	0.00	0.06	0.02	0.08
1993	0.03	0.04	0.02	0.22	0.36	0.01	0.16	0.00	0.06	0.02	0.08
1994	0.03	0.04	0.02	0.22	0.36	0.01	0.16	0.00	0.06	0.02	0.08
1995	0.03	0.04	0.02	0.22	0.36	0.01	0.16	0.00	0.06	0.02	0.08
1996	0.03	0.04	0.02	0.22	0.34	0.01	0.18	0.00	0.06	0.02	0.09
1997	0.03	0.04	0.02	0.22	0.33	0.01	0.18	0.00	0.06	0.02	0.09
1998	0.03	0.04	0.02	0.22	0.32	0.01	0.18	0.00	0.06	0.02	0.09
1999	0.03	0.04	0.02	0.22	0.32	0.01	0.18	0.00	0.06	0.02	0.09
2000	0.03	0.04	0.02	0.22	0.31	0.02	0.18	0.00	0.06	0.02	0.10
2001	0.03	0.04	0.02	0.22	0.31	0.02	0.18	0.00	0.07	0.02	0.10
2002	0.03	0.04	0.02	0.22	0.30	0.02	0.18	0.00	0.07	0.02	0.10
2003	0.03	0.04	0.02	0.22	0.29	0.02	0.18	0.00	0.07	0.02	0.11
2004	0.03	0.04	0.02	0.22	0.29	0.02	0.18	0.00	0.06	0.02	0.11
2005	0.03	0.04	0.02	0.22	0.28	0.02	0.18	0.00	0.07	0.02	0.12
2006	0.03	0.04	0.02	0.22	0.28	0.02	0.18	0.00	0.07	0.02	0.12
2007	0.03	0.04	0.02	0.22	0.28	0.02	0.18	0.00	0.07	0.02	0.12
2008	0.03	0.04	0.02	0.22	0.28	0.02	0.18	0.00	0.07	0.02	0.12
2009	0.03	0.04	0.02	0.22	0.28	0.02	0.18	0.00	0.07	0.02	0.12
2010	0.03	0.04	0.02	0.22	0.28	0.02	0.18	0.00	0.07	0.02	0.12
2011	0.03	0.04	0.02	0.22	0.28	0.02	0.18	0.00	0.07	0.02	0.12
2012	0.03	0.04	0.02	0.22	0.28	0.02	0.18	0.00	0.07	0.02	0.12

INFLATION

1990	3.26	3.45	6.16	3.23	2.7	3.35	6.45	3.25	2.45	13.62	6.72
1991	3.34	3.22	4.32	3.22	4.04	3.15	6.25	3.12	3.16	11.89	5.94
1992	4.02	2.43	2.92	2.41	5.07	3.06	5.28	3.16	3.19	9.56	5.93
1993	3.63	2.75	2.19	2.08	4.48	1.45	4.63	3.59	2.58	6.8	4.57
1994	2.95	2.38	1.09	1.67	2.69	2.36	4.05	2.2	2.8	5.43	4.72
1995	2.24	1.47	0.8	1.79	1.71	2.53	5.23	1.87	1.93	4.23	4.68
1996	1.86	2.07	0.63	2	1.45	1.72	4.02	1.18	1.98	3.07	3.56
1997	1.31	1.63	1.19	1.19	1.94	1.42	2.04	1.37	2.18	2.34	1.97
1998	0.92	0.95	1.4	0.64	0.91	2.44	1.96	0.96	1.99	2.57	1.84
1999	0.57	1.12	1.16	0.54	0.59	1.63	1.66	1.02	2.19	2.34	2.31
2000	2.34	2.54	3.04	1.69	1.44	5.55	2.54	3.15	2.31	2.85	3.43
2001	2.65	2.47	2.58	1.63	1.98	4.89	2.79	2.67	4.16	4.37	3.59
2002	1.81	1.65	1.57	1.92	1.42	4.64	2.46	2.07	3.29	3.6	3.06
2003	1.36	1.59	0.88	2.11	1.03	3.5	2.67	2.05	2.11	3.23	3.04
2004	2.06	2.08	0.19	2.13	1.67	2.2	2.21	2.23	1.24	2.36	3.04
2005	2.3	2.8	0.62	1.74	1.55	2.41	1.98	2.49	1.67	2.28	3.37

2006	1.44	1.79	1.57	1.68	1.58	3.94	2.09	2.67	1.17	3.11	3.52
2007	2.17	1.82	2.51	1.49	2.3	4.92	1.83	2.31	1.61	2.45	2.78
2008	3.22	4.49	4.07	2.82	2.63	4.06	3.35	3.41	2.49	2.59	4.09
2009	0.51	-0.04	0.01	0.09	0.32	-4.46	0.78	0.37	1.19	-0.83	-0.28
2010	1.81	2.19	1.19	1.53	1.1	-0.93	1.52	2.27	1.28	1.4	1.8
2011	3.29	3.53	3.42	2.12	2.07	2.59	2.78	3.41	2.34	3.64	3.2
2012	2.49	2.84	2.81	1.96	2.01	1.72	3.04	2.67	2.47	2.78	2.44

HICP

	BEL	IRE	ESP	FRA	ITA	LUX	NLD	AUS	POR	FIN
1996	85.25	75.7	77.92	86.64	81.8	81.18	80.43	87.21	78.12	87.3
1997	86.53	76.7	79.39	87.75	83.3	82.3	81.92	88.22	79.6	88.37
1998	87.32	78.3	80.79	88.34	85	83.1	83.38	88.95	81.36	89.56
1999	88.31	80.3	82.59	88.84	86.4	83.94	85.07	89.41	83.13	90.73
2000	90.67	84.5	85.47	90.46	88.6	87.12	87.06	91.16	85.46	93.41
2001	92.88	87.8	87.88	92.07	90.7	89.21	91.51	93.25	89.23	95.9
2002	94.32	92	91.04	93.86	93.1	91.04	95.05	94.83	92.51	97.82
2003	95.75	95.7	93.86	95.89	95.7	93.36	97.18	96.06	95.52	99.1
2004	97.53	97.9	96.73	98.14	97.8	96.37	98.52	97.94	97.92	99.24
2005	100	100	100	100	100	100	100	100	100	100
2006	102.33	102.7	103.56	101.91	102.2	102.96	101.65	101.69	103.04	101.28
2007	104.19	105.6	106.51	103.55	104.3	105.69	103.26	103.93	105.54	102.88
2008	108.87	108.9	110.91	106.82	108	110.01	105.54	107.28	108.34	106.91
2009	108.86	107.1	110.64	106.93	108.8	110.02	106.57	107.71	107.36	108.66
2010	111.4	105.4	112.9	108.79	110.6	113.1	107.56	109.53	108.85	110.49
2011	115.14	106.6	116.35	111.28	113.8	117.32	110.23	113.42	112.72	114.16
2012	118.16	108.7	119.18	113.75	117.5	120.72	113.34	116.34	115.85	117.77
2013	119.57	109.2	121	114.88	119	122.77	116.24	118.8	116.36	120.38

WAGE INDEX

	AUS	FIN	FRA	GER	IRE	LUX	NLD	POR	ESP
1999	76.8	66.7	71.9	81.9	60.3	79.6	76.2	..	64.8
2000	78.7	69.7	75.4	84.0	63.6	83.7	79.0	98.3	66.7
2001	81.2	73.0	78.7	85.3	69.1	88.2	82.1	102.9	69.4
2002	83.0	75.8	81.3	86.8	73.2	89.5	85.0	103.3	72.9
2003	85.0	79.1	83.5	88.9	76.8	91.1	87.2	101.0	76.6
2004	87.0	82.3	85.8	90.7	80.4	92.7	88.6	100.7	79.2
2005	89.5	85.5	88.2	91.6	83.9	94.2	89.5	100.0	82.5
2006	92.3	87.7	90.7	92.4	86.5	97.1	91.0	101.0	85.9
2007	95.0	90.8	93.2	93.6	90.7	99.6	92.6	103.2	89.7
2008	97.9	95.1	96.2	96.2	95.2	101.1	96.0	105.6	94.0
2009	97.3	98.3	98.2	97.9	99.5	97.2	98.8	100.0	98.6
2010	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
2011	103.6	102.2	102.4	102.5	99.0	103.1	101.4	99.9	102.7
2012	106.9	104.8	105.0	105.5	101.0	97.3	103.3	96.8	104.6
2013	109.9	107.7	107.1	108.1	100.9	98.1	104.9	95.0	106.1

WAGES LOG INDEX

	AUS	FIN	FRA	GER	IRE	ITA	LUX	NLD	POR	ESP
1990	1.74	1.68	1.75	1.77	1.62	1.71	1.82	1.77	1.74	1.60
1991	1.76	1.70	1.77	1.80	1.64	1.75	1.83	1.79	1.76	1.64
1992	1.78	1.71	1.79	1.82	1.66	1.77	1.85	1.81	1.78	1.68
1993	1.80	1.72	1.80	1.84	1.68	1.79	1.85	1.82	1.80	1.71
1994	1.82	1.74	1.80	1.86	1.69	1.80	1.86	1.83	1.82	1.72
1995	1.84	1.77	1.81	1.87	1.71	1.82	1.87	1.83	1.83	1.74
1996	1.86	1.78	1.83	1.89	1.72	1.83	1.87	1.84	1.84	1.77
1997	1.86	1.79	1.84	1.89	1.74	1.85	1.88	1.85	1.85	1.79
1998	1.87	1.81	1.85	1.90	1.76	1.86	1.89	1.87	1.86	1.80
1999	1.89	1.82	1.86	1.91	1.78	1.87	1.90	1.88	1.87	1.81
2000	1.90	1.84	1.88	1.92	1.80	1.88	1.92	1.90	1.99	1.82
2001	1.91	1.86	1.90	1.93	1.84	1.89	1.95	1.91	2.01	1.84
2002	1.92	1.88	1.91	1.94	1.86	1.90	1.95	1.93	2.01	1.86
2003	1.93	1.90	1.92	1.95	1.89	1.91	1.96	1.94	2.00	1.88
2004	1.94	1.92	1.93	1.96	1.91	1.92	1.97	1.95	2.00	1.90
2005	1.95	1.93	1.95	1.96	1.92	1.93	1.97	1.95	2.00	1.92
2006	1.96	1.94	1.96	1.97	1.94	1.95	1.99	1.96	2.00	1.93
2007	1.98	1.96	1.97	1.97	1.96	1.96	2.00	1.97	2.01	1.95
2008	1.99	1.98	1.98	1.98	1.98	1.97	2.00	1.98	2.0237	1.97
2009	1.99	1.99	1.99	1.99	2.00	1.99	1.99	1.99	2	1.99
2010	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2	2.00
2011	2.02	2.01	2.01	2.01	2.00	2.01	2.01	2.01	1.9996	2.01
2012	2.03	2.02	2.02	2.02	2.00	2.02	1.99	2.01	1.9859	2.02

EXPORT

	BEL	GER	IRE	ESP	FRA	ITA	LUX	NLD	AUS	POR	FIN
1990	:	:	:	4.70	4.10	:	:	5.70	8.60	:	1.70
1991	:	:	:	8.20	6.10	-1.90	:	6.60	2.90	:	-7.90
1992	:	-0.60	:	7.50	5.80	7.30	:	2.90	1.30	:	10.00
1993	:	-6.00	:	7.80	0.20	9.00	:	4.00	-2.40	:	16.30
1994	:	8.10	:	16.70	8.00	9.60	:	8.70	5.70	:	13.70
1995	:	6.50	:	10.70	8.20	12.60	:	9.20	7.20	:	8.50
1996	3.70	6.40	12.50	10.30	3.60	1.40	2.30	4.40	4.60	7.20	5.90
1997	10.00	11.50	17.60	15.00	12.80	5.30	11.40	10.90	11.80	7.10	13.90
1998	4.80	7.70	23.10	8.00	8.20	2.50	11.20	6.70	8.30	8.30	9.20
1999	4.50	5.80	15.60	7.50	4.60	-1.10	14.30	8.70	6.10	3.80	11.10
2000	11.80	13.20	20.90	10.20	12.40	11.60	12.60	13.50	13.50	8.80	17.30
2001	1.10	6.40	8.50	4.20	2.60	2.80	4.50	1.90	6.20	1.80	1.70
2002	2.50	4.20	4.90	2.00	1.60	-3.00	2.10	0.90	3.90	2.80	3.30
2003	0.50	2.50	0.70	3.70	-1.30	-1.20	6.80	1.50	1.50	3.60	-1.90
2004	6.10	10.70	7.60	4.20	4.80	6.30	11.10	7.90	10.10	4.10	8.20
2005	3.80	7.70	4.40	2.50	2.90	3.40	4.40	6.00	7.40	0.20	7.00
2006	5.40	13.10	5.00	6.70	5.20	8.40	12.90	7.30	7.70	11.60	12.20

2007	5.20	8.00	8.40	6.70	2.30	6.20	9.00	6.40	8.90	7.50	8.20
2008	1.40	2.80	-1.10	-1.00	-0.30	-2.80	4.40	2.00	1.40	-0.10	5.80
2009	-9.40	-13.00	-3.80	-10.00	-12.10	-17.50	-12.90	-7.70	-15.60	-10.90	-21.30
2010	8.10	15.20	6.40	11.70	9.50	11.40	7.20	11.60	9.40	10.20	7.90
2011	6.40	8.00	5.40	7.60	5.40	6.20	5.40	4.10	6.60	6.90	2.80
2012	1.80	3.20	1.60	2.10	2.40	2.10	-1.90	3.20	1.20	3.20	-0.20

CURRENT ACCOUNT

	BEL	GER	IRE	ESP	FRA	ITA	LUX	NLD	AUS	POR	FIN
1990	..	2.8	-0.69	..	..	-1.47	..	2.68	..	..	-5.04
1991	..	-1.31	0.72	..	..	-2.01	..	2.45	..	..	-5.35
1992	..	-1.07	1.05	-3.6	..	-2.3	..	2	-0.45	..	-4.62
1993	..	-0.97	3.6	-1.1	..	0.76	..	4.01	-0.75	..	-1.3
1994	..	-1.41	2.66	-1.3	..	1.31	..	5.04	-0.91	..	1.1
1995	5.4	-1.17	2.59	-0.32	0.7	2.04	12.16	6.3	-2.88	..	4.21
1996	5.02	-0.57	2.72	-0.23	1.32	3.17	11.31	5.26	-2.87	-4.04	3.91
1997	5.53	-0.46	2.39	-0.09	2.62	2.81	10.57	6.59	-2.47	-5.85	5.19
1998	5.18	-0.79	0.82	-1.18	2.64	1.62	9.19	3.25	-1.64	-7.11	5.18
1999	5.08	-1.35	0.29	-2.92	3.16	0.68	8.74	3.92	-1.67	-8.67	5.34
2000	4.03	-1.83	-0.36	-3.97	1.44	-0.53	13.44	2.04	-0.73	-10.36	7.78
2001	3.39	-0.02	-0.66	-3.96	1.76	-0.06	8.75	2.6	-0.82	-10.33	8.36
2002	4.28	1.97	-1.06	-3.27	1.23	-0.77	10.23	2.67	2.66	-8.24	8.46
2003	3.57	1.9	-0.03	-3.52	0.78	-1.29	8.34	5.59	1.68	-6.43	4.83
2004	3.24	4.59	-0.59	-5.25	0.52	-0.93	12.14	7.7	2.22	-8.32	6.19
2005	2.03	4.99	-3.52	-7.36	-0.48	-1.65	11.52	7.46	2.17	-10.32	3.35
2006	1.8	6.17	-3.59	-8.96	-0.58	-2.57	10.24	9.37	2.79	-10.69	4.18
2007	2.01	7.48	-5.35	-9.99	-0.99	-2.43	10.01	6.71	3.51	-10.09	4.27
2008	-1.09	6.19	-5.63	-9.62	-1.76	-2.88	5.33	4.26	4.89	-12.64	2.61
2009	-0.79	5.92	-2.3	-4.82	-1.31	-1.91	6.89	5.15	2.71	-10.92	1.77
2010	1.86	6.24	1.15	-4.49	-1.34	-3.39	7.84	7.35	3.42	-10.59	1.5
2011	-1.23	6.83	1.24	-3.72	-1.79	-3	6.81	9.06	1.64	-7	-1.49
2012	-2.06	7.53	4.42	-1.2	-2.17	-0.26	6.12	9.53	1.82	-2	-1.41

BOND YIELDS

	BEL	GER	IRE	ESP	FRA	ITA	LUX	NLD	AUS	POR	FIN
1990	9.28	8.45	9.21	12.36	9.04	13.28	8.16	8.74	8.56	14.54	11.68
1991	8.65	7.84	9.07	11.69	8.59	13.27	7.91	8.1	8.15	13.83	11.97
1992	7.23	6.51	7.7	10.21	6.78	11.19	6.84	6.36	6.71	11.18	8.83
1993	7.75	6.87	7.92	10	7.22	10.52	7.15	6.86	7.03	10.48	9.04
1994	7.48	6.85	8.26	11.27	7.54	12.21	7.23	6.9	7.13	11.47	8.79
1995	6.49	6.22	7.29	8.74	6.31	9.4	6.32	6.15	6.32	8.56	7.08
1996	5.75	5.64	6.29	6.4	5.58	6.86	5.6	5.58	5.68	6.36	5.96
1997	4.75	4.57	4.8	4.83	4.64	4.88	4.73	4.63	4.71	4.88	4.79
1998	4.75	4.49	4.71	4.73	4.61	4.73	4.66	4.63	4.68	4.78	4.72
1999	5.59	5.26	5.51	5.53	5.39	5.58	5.52	5.4	5.56	5.6	5.48
2000	5.13	4.8	5.01	5.12	4.94	5.19	4.86	4.96	5.08	5.16	5.04

2001	4.99	4.78	5.01	4.96	4.86	5.04	4.7	4.89	4.96	5.01	4.98
2002	4.18	4.07	4.13	4.12	4.13	4.25	3.32	4.12	4.14	4.18	4.13
2003	4.15	4.04	4.08	4.1	4.1	4.26	2.84	4.09	4.13	4.14	4.11
2004	3.43	3.35	3.33	3.39	3.41	3.56	2.41	3.37	3.39	3.44	3.35
2005	3.82	3.76	3.77	3.79	3.8	4.05	3.3	3.78	3.8	3.92	3.78
2006	4.33	4.22	4.31	4.31	4.3	4.49	4.46	4.29	4.3	4.42	4.29
2007	4.42	3.98	4.53	4.37	4.23	4.68	4.61	4.23	4.36	4.52	4.29
2008	3.9	3.22	5.23	3.98	3.65	4.31	4.23	3.69	3.94	4.21	3.74
2009	3.46	2.74	5.74	4.25	3.12	4.04	3.17	2.99	3.23	5.4	3.01
2010	4.23	2.61	9.6	5.44	3.32	5.42	2.92	2.99	3.32	10.24	3.01
2011	3	1.5	6.17	5.85	2.54	5.49	1.82	1.93	2.37	10.55	1.89
2012	2.41	1.57	3.79	4.56	2.2	4.32	1.85	1.96	2.01	6.29	1.86