

How the size of a Country Affects its Performance when joining the European Monetary Union

Bachelor Thesis within Economics

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Jönköping: January 2009

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Date: January 2009

Keywords: European Monetary Union, Optimum Currency Areas, Euro

JEL Classifications: E32, E50, E65, F43

Abstract

The purpose of the thesis is to evaluate if smaller countries that have joined the 'European Monetary Union' outperform their larger partners in terms of higher growth and lower inflation. This is something suggested by the theory of Optimum Currency Areas (OCA). Three smaller countries, Austria, Finland and Ireland, were selected for analysis. Their growth and inflation were compared to the weighted growth and inflation of France, Germany and Italy and against a control-group of advanced countries.

A simple form of regression analysis along with some graphical analysis was used and the results to some extent support that the small countries have outperformed their larger partners in term of growth. On the other hand they seem to experience a relatively higher inflation, which is contradicting the OCA theory. Perhaps this can be explained by the fact that higher growth is often associated with higher inflation in more advanced countries.

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1 Introduction

Ever since the seminal paper on optimum currency areas (OCA), written by Robert Mundell in 1961, these types of areas have been a hot topic within economics. The theory suggests that there are certain regions that would benefit from pegging or even sharing their currency with another country or region. There have been many attempts with sharing currencies or adopting the currency of another country as an 'anchor'. Two such examples are the European exchange-rate mechanism (ERM) where a number of European countries pegged their currencies against the German Mark and the Bretton-Woods system, created after World War II, where the U.S dollar or gold was used as a peg. Both these systems broke down, and there are few examples of common currencies that have survived over a long period.

Currency unions can take two forms, either the countries issue a new currency under a joint central bank or one country adopts the currency of another country (called Dollarization). In the first case the new central bank takes care all the monetary policy of all members, and under Dollarization the adopting country gives up all its possibilities to influence monetary policy.

In January 1999, eleven EU member countries irrevocably fixed their exchange rates toward one another and three years later the currency now known as the euro replaced these countries' own currencies as the means of payment in these countries. The creation of a common European currency is a bold project. The Euro-Zone is a huge area and while some countries in the past have benefited from pegging their currency to a more stable one, there are also examples when the peg or common currency have been less successful. During the break-down of the Bretton-Woods system the U.S central bank was accused of exporting inflation and by doing this accelerating the break-down of the system.

1.1 Research Problem

The hope of the member-countries is to promote economic growth and political stability. The union has been active for almost 10 years and during this time, the member countries have experienced relative political stability

To evaluate how the European Monetary Union has affected economic growth and stability is harder; Mundell (1961) stated that countries with symmetric shocks were best suited for monetary cooperation since their cost of giving up monetary policy was low. Other researchers, starting with McKinnon (1963) started to investigate which countries that were best suited to join currency unions. McKinnon concluded that small economies with a high amount of trade were best suited for monetary unions.

Alesina, Barro and Teneyro (2000, 2002) continued to form criteria for countries suited to join a common currency area. They found that small countries, countries with a history of high inflation and countries that lie close to their trading partners had the most to gain from giving up their own currencies. The smaller a country is the more it will benefit from the removed trading costs that come with a currency union, and therefore it will enjoy a larger increase in growth and decrease in inflation.

Edwards and Magendzo (2002) focused their study on optimum currency areas and their effect on real GDP growth, inflation and growth volatility. In their study they concluded that the growth has been larger in common currency unions, and that inflation has also

been significantly lower. Their study, as many of the previous ones, has been made on less developed countries than the EU countries.

Previous research and theory indicate that small countries with higher degrees of inflation should have the most to gain from adopting a common currency. The question that this paper addresses is how the growth and inflation of the smaller countries have been affected after they joined the European Monetary Union.

1.2 Purpose

The purpose of this thesis is to examine the GDP growth and inflation of a number of 'smaller' EMU member countries, and see if these countries have had a significantly larger increase in growth and a significantly larger decrease in inflation in comparison to larger EMU member countries (which is what the theory implies).

1.3 Disposition of the Thesis

The next section explains the ideas and the formation of the European Monetary Union (EMU). This is followed by some important concepts of optimum currency areas and the criteria that are important for a country when deciding to join a common currency area. After this comes a presentation of how the data are gathered and used and the regression-models used to run the data. Finally there is a presentation of the regressions results, followed by an analysis, conclusions and some suggestion of future research.

2 The formation of the EMU

The idea for forming a truly unified European economy was formed in the 'Single European Act' in 1987, and the criteria for joining the European monetary union was decided during a summit in Maastricht in 1992. The goals for a prospective EMU-member consists of five criteria, these are called the Maastricht criteria:

- Two years membership in the European exchange-rate mechanism, without devaluation
- Inflation of the target country not more than 1.5 percentage points higher than the average inflation of the three member countries with the lowest inflation
- An interest rate that in the short run is not more than 2 percentage points higher than the one noticed in the countries mentioned in previous goal
- A budget deficit no higher than three percent of one's GDP
- A level of public debt no higher than 60 percent of GDP, or declining towards this level (Wyplosz, 2008)

It can be seen as a bit strange that these criteria are not aimed towards criteria of OCA, instead these criteria aim to guarantee price stability. The conclusion from this is that countries like Germany would not abandon their own currency for a weaker currency and that many of the positive effects of the euro were perceived as political (Wyplosz, 2008).

To take care of monetary policy a new European Central Bank (ECB) was formed in 1998, and since the official launch of the union in 1999 the banks governing council have been responsible for the policies. In 1997 the growth and stability pact was launched as an addition to the Maastricht criteria, providing a mechanism to punish countries that could not

meet the Maastricht criteria. If some countries ran too high deficits or increased their public debts over the allowed level they should be forced to make a non-interest-bearing deposit to the European central bank until they again had reached the goals. Since the EMU started several countries have missed the guidelines but none of them have yet been punished (Warin, 2008).

When the idea of common currency cooperation was formed, the European community already had a customs union which meant there were no trade barriers such as quotas or tariffs within the European Union. Some of the proponents of the Maastricht treaty argued that there were still some indirect border-barriers such as very time consuming paperwork while crossing borders. Another thing hampering trade and travel was the massive amount of different regulations in each country, such as health regulations amongst other things. The only way to truly liberate trade was to form common standards for goods, so that all goods produced within the union would meet the common standards to be set up. By removing all these direct and indirect trade barriers, committing to a common currency and common standards, the GDP gain estimated by EU economists was estimated to be 7 percent. Sceptics said that markets would not be fully integrated since many of the differences were cultural rather than depending on regulations. Since the union started some markets have become very integrated while other markets have hardly integrated at all (Krugman & Obstfeld, 2003).

3 Optimum Currency Areas

The following pages describe some of the most important ideas of optimum currency regions, and how they have been used to study different currency regions in the world. This section will serve as a foundation for the research in the thesis.

The theories concerning optimum currency areas (OCAs) build on the original framework by Mundell. While Mundell defines the meaning of an OCA; more recent authors have focused on the properties and performances of different country types operating under a common currency. This thesis is about how countries of different size perform in the EMU. Therefore this section will not be outlined in chronological order but rather in a way where the previous findings most important for this thesis are presented first, followed by a discussion of the classic theories on OCAs by Mundell, McKinnon and Kenen.

3.1 EMU and Optimum Currency Areas

The most important loss that the EU members experience by joining the EMU is the loss of monetary independence. Some research has concluded that the EU-members do not live in one area that is an optimum currency area but rather a number of smaller areas (perhaps three) where each of those regions has a business cycle with correlated shocks. The shocks between the different areas according to the empirical findings will often be asymmetric rather than symmetric and the shared central bank will not be able to use monetary policy in a way that satisfies the needs of all the EMU members (Bernanke, 2006).

The most important gains of joining a common currency union are the reductions in transaction costs between members and the removed exchange-rate uncertainty. The costs of giving up the monetary policy independence may be lowered if a country has high flexibility meaning that prices and wages change quickly to counter the effects of the economic shocks. The more integrated (mutual trading, etc) two countries are, the more likely is it that they will benefit from sharing a currency. Proponents for the EMU have argued that even if the countries at the point of the creation of the currency will make a short term

loss, in the long run the loss will be changed to a increase in trade and growth that will lead to a gain. With the entry into the EMU countries will 'converge' over time: the common currency will increase trade and promote business cycle dependence that will lead to an increase in integration between the member-countries and in the long run this will turn the net loss into a net gain for the countries (Bernanke, 2006).

In a study from 2000, Rose investigated how trade was impacted by the entry into a currency union and found that the trade between union members will be tripled. This seems to support the integration theory in the monetary market, but a problem with Rose's study is that he studied mostly currency unions consisting of small or non-advanced countries (Rose, 2000). Studies concerning the EU have shown that intra-EU trade does not represent a very big part of the members GDP; few countries have an intra-EU trade that accounts for more than 20% of GDP and several big countries such a France and Italy have an intra-EU trade that accounts for only around 10% of GDP. For the benefits of a currency union to outweigh the losses there might be a need for more trade among the union members (Bernanke, 2006).

When doing investigation before the formation of the EMU, the European commission argued that the reduction in transaction costs could be translated into GDP gains for member countries that could be as large as 20 billion euro or 0.5 percent of the total EU GDP. Today almost ten years after the adoption of the euro there is yet no proof of such big gains (Emerson et al, 1992, Bernanke, 2006).

3.2 Edwards and Magendzo's Investigation on Currency Unions

Edwards and Magendzo (2003) focus on the effects of joining a currency union on some of the most important macroeconomic variables: GDP growth, inflation and growth volatility. Most of the previous studies have focused on more indirect variables such as level of international trade and interest rates. In this study they make use of a treatment effects model to see in what manner being a member of some sort of a peg or currency union affects the macroeconomic variables of a specified country.

Edwards and Magendzo (2003) have claimed that countries, with the emerging ones in particular, will tend to outperform other countries if they give up currencies of their own in favour of a peg or a shared currency. They argue that inflation will be lower and that growth will be significantly higher. The growth will be larger due to two different mechanisms. Firstly, a common currency will result in lower interest rates which will stimulate higher investment and by that faster growth. Secondly, by decreasing exchange rate volatility, a common currency will stimulate international trade which also promotes growth.

Common currency unions will sometimes suffer from problems such as external economic shocks and world interest rate disturbances. Another finding, Edwards and Magendzo (2003) highlight is that areas sharing a currency tend to trade more within the area than countries that have a domestic currency. This implies that common-currency countries might outperform countries with currencies of their own in terms of growth

While many studies do not make a difference between common currency unions (such as the EMU, with a shared central bank) and 'dollarized' countries where a country simply pegs against or adopts another country's currency, Edwards and Magendzo (2003) point out that a country giving up its own currency to dollarization loses all its future sovereignty and all control over monetary policy. A country joining a common currency union with a

shared central bank will still have some influence over the monetary policies and will share the seignorage with all the other members of the currency union. The political costs for joining a common currency union and giving up the sovereignty associated with having a currency of one's own is usually perceived as small in comparison to adopting the currency of another country (Dollarization).

Since Mundell (1961) developed his theory of optimum currency areas, it has stood the test of time well. One thing that one should not pay too much attention to, according to Edwards and Magendzo, is that the optimum currency region is a region of labour mobility. The problem of asymmetric business cycles that Mundell describes is indeed a problem of business cycles and not a problem that can be solved with labour mobility, the costs of moving around labour is huge almost everywhere in the world. Edwards and Magendzo find that countries in common currency unions experience higher growth and possibly lower inflation than their counterparts with own currencies. While both 'Dollarized' countries and countries in common currency unions appear to have outperformed the countries with currencies of their own, Edwards and Magendzo notice that the common currency union countries seem to experience slightly higher growth and lower inflation than the dollarized countries. One final remark is that their study of common currency unions and dollarized countries consists of emerging economies and it is not certain that this can be applied to more advanced economies (Edwards and Magendzo, 2003).

3.3 Alesina, Barro and Tenreyro's Currency Unions

According to Alesina and Barro (2002) the adoption of another country's currency or joining into a common currency affects the amounts of trade, output and consumption. There is a trade-off between price stability commitment and loss of independent stabilization policy. Their analysis builds on Mundell's framework, which is still very valid, and they show that the adoption of another currency will buy credibility for countries with high inflation rates. The larger the economy of a country is, the smaller the effects of the reduced trading costs of currency unions, which means larger economies will not enjoy the same increases in production and consumption as will smaller economies by giving up their currencies. Alesina and Barro find that joining a currency union usually leads to gains in output and consumption, and can also help reduce unwanted inflation. How suited an area is for a currency union or adoption of another country's currency depends on country size, their trading costs and correlation in economic shocks. With the increase in the number of countries being at a higher rate than the increase in the number of currencies, the sovereignty-value of having a currency of one's own has apparently decreased since the end of World War II (Alesina & Barro, 2002).

Alesina, Barro and Tenreyro (2002), conclude that in addition to the benefit small countries have from joining a fixed currency union, they also benefit from keeping their borders open for trade which further enhances the positive stabilization effects they get from joining a currency union. The more countries engage in trade with each other, the more they have to gain from adopting the same currency. Alesina, Barro and Tenreyro also find that the smaller a country is the larger the incentive is to give up its own currency. Countries with most to gain from joining a currency union are those with a history of high and volatile inflation. Since this kind of history is often a symptom of monetary mismanagement, the effects from buying external credibility is often very significant (Alesina, Barro and Tenreyro, 2002).

The higher the correlation is in economic shocks the less is the loss from giving up one's ability to control monetary policy. It is more likely for a small country to have a high corre-

lation in economic shocks with a larger trading partner than for two larger countries to have correlation in shocks with one another. In the EMU all members share a common central bank, which is supposed to take into account the monetary needs of all the members. This should be better for the small country EMU members than say pegging their currencies towards the dollar where the US central bank will only focus on monetary policies helpful for the US. Developing countries will have the lowest costs for abandoning their ability for monetary policy since their stabilization policies are usually, as mentioned, subject to mismanagement when exchange-rates are flexible. Alesina, Barro and Tenreyro agree that countries having the largest similarities with their anchor's output and prices have the most to gain from giving up their monetary policies. This implies that large countries usually have less to gain from joining a currency union or pegging their exchange-rate (Alesina, Barro and Tenreyro, 2002).

The geography of a country seems to have some impact on which region a country should form a currency union with, but a high level of trade between two countries even if they are not close in proximity implies that they could be part of the same optimum currency area. A shared currency between two countries that trade extensively can be a good idea even if both countries have histories of low inflation. According to Alesina, Barro and Tenreyro, the Euro-12 zone might belong together in an OCA along with some non-EMU members such as Sweden and Switzerland. If this is true then countries within the Euro-12 zone should expect greater GDP growth and lower inflation by sharing a currency. A country should be more inclined to join a currency union if it is poorer in terms of GDP and smaller in terms of population size, and joining a currency union should have a positive effect on trade. Alesina, Barro and Tenreyro state that very little research has yet been done on the EMU-area and expect future research to shed more light on how advanced countries work in a currency union (Alesina, Barro and Tenreyro, 2002).

3.4 Mundell's Theory of the Optimum Currency Areas

Mundell is the founding father of the Optimum Currency areas and his seminal paper in 1961 was the starting point for research on OCAs. One currency implies only one central bank, which implies an elastic supply of interregional means of payment. In an area with more than one currency the supply of international means of payment needs the cooperation of several central banks. No area can increase its means of payments (money supply), faster than other banks without losing reserves and impairing convertibility of its national currency (Mundell, 1961).

This means that there will be a big adjustment difference between an area compromising of only one currency and an area which has several ones. Mundell illustrates this with two countries A and B, both countries producing one good each. Initially there is full employment and balance of payment equilibrium. If the demand shifts from country B's good to country A's good and both countries have their own currencies, this causes inflationary pressure in country A and unemployment in country B. If prices and wages cannot change in the short run, this will lead to a decrease in country B's output and employment. If the two countries instead would have a shared currency, and the monetary authority aims for full employment it would increase the money supply to relieve country B, but this would increase the inflationary problems in country A.

According to Mundell neither a region with a shared currency nor two regions with independent currencies can prevent both unemployment and inflation among its members, at

least not as long as each region does not have a positive correlation in shocks (having a synchronized business cycle) with respect to the other regions. Since the world does not have a synchronized business cycle the world is not an optimum currency area; the optimum currency area is rather a region with correlation in shocks and synchronized business cycle (Mundell, 1961).

The existence of more than one currency in the world implies variable exchange rates and in case of a shift in demand from country B's good to country A's good, country B's currency could be allowed to depreciate to correct external imbalance and lower unemployment in country B. At the same time this would lower inflationary pressure in A. The flexible exchange rates will not correct unemployment and inflation between two regions, but it will do so between two countries. The problem according to Mundell is that the optimum currency area is not the country; it is rather the region that has a single correlated business cycle (Mundell, 1961).

For an area to be suited for a common currency there is need for high international factor mobility. In the real world, currencies are a sign of national sovereignty, and the creation of a common currency in Europe is regarded by many as a move toward a high level of political integration. While many argue that there are no economic reasons for a joint European currency, at the same time others argue that there are good reasons for a joint currency because it would stimulate capital mobility. To support the claim of Europe being an OCA in Mundell's model, labour mobility must be increased and there must be more international employment policies. The need for labour mobility is important since this means that asymmetric shocks can become attenuated (Mundell, 1961).

Mundell concludes that internal stability should be pursued, and each homogenous region should have its own currency, but in the real world this is close to impossible. The more currencies there are the less liquid each currency would be and having each small region with a currency of its own would imply huge transaction costs. If there is a high enough factor mobility, Europe could be an optimum currency area. But as it looks today, it is not. (Mundell, 1961).

3.5 McKinnon and Optimum Currency Areas

After Mundell defined what an optimum currency area is, McKinnon tried to take the discussion one step further by discussing some of the characteristics of a country which should be willing to enter a joint currency region. An OCA is defined by a single currency area where monetary and fiscal policy and flexible exchange-rates to the rest of the world can be used to maintain internal balance, maintain a stable internal price level and maintain full employment. This means fighting inflation and promoting a healthy growth and low unemployment (McKinnon, 1963).

McKinnon (1963) shows that in a open economy (with a high degree of trade), flexible exchange rates will prove less efficient for keeping external balance and will at the same time do more damage to the internal price level stability. On the other hand any region with a common currency faced with decreased demand will be forced to lower its expenditure by a loss of bank reserves and regional income. A separate region with fixed exchange-rates will have to do more deliberate cuts in expenditure to protect its price level stability and exchange rate. In both cases reductions in real income is impossible to avoid.

In a small open economy with a high degree of trade, there are large incentives to peg its currency to the currencies of one of their trading partners, since this will keep its internal

price-level at a more stable level. Capital movements are also more important for small countries than for large ones, which gives further incentive to give up the flexible exchange-rate. A small country without a convincing peg will suffer from a less liquid currency and will therefore be interested in gathering foreign reserves. This will lead to a loss of capital in a country where the marginal efficiency of investment is larger than in a large country. This illiquidity could also be a signal for monetary mismanagement that will help to scare off more stable currency investments. This means that capital outflows from small countries in need of capital might take place more for monetary, than for real reasons and small countries have therefore even more incentives to gain monetary credibility from pegging their currency convincingly or joining into a common currency (Mckinnon, 1963).

3.6 Kenen and Optimum Currency Areas: An Electic View

According to Kenen (1969), Mundell's regions are defined as a homogenous set of producers that use the same technology, share demand curves and thus suffer and prosper together as circumstances change. Kenen states that Mundell concludes that optimum currency areas always must be small, for the labour mobility to work, and that such an arrangement does not appeal to common sense.

These small regions would suffer a lot from disturbances in their foreign trade and the exchange rate with the world outside of the OCA would fluctuate quite a lot. Governmental activities may also be subject to economies of scale and an optimum currency area should not be smaller than a least-cost government since a world consisting of the 'small OCA regions' of Mundell would suffer from fiscal inabilities which could harm the monetary advantages. An efficient fiscal system must consist of many single-product regions rather than a small not-optimal currency area (Kenen, 1969).

Kenen (1969), states that there is a risk that a smaller weaker country might end up exporting its own mistakes to the countries it shares exchange-rates with, but this is sometimes a risk it has to take when forming currency unions. If the country is a larger, more diversified one, the demand will not be so dependent on one demand-curve for exports and will be less vulnerable to shocks. A larger, more diversified economy is not a guarantee for internal stability, but some external shocks tend to average out. Despite this, there must be some occupational mobility within the country to make use of the labour and capital being laid off by an adverse disturbance.

3.7 Summary

The most important gains from joining a common currency area are the reduced transaction costs and increased exchange-rate stability. The largest drawback is the loss of independent monetary policy. Many past studies have focused on the impact on trade when measuring performance of currency areas, but according to Edwards and Magendzo changes in important macroeconomic variables such as GDP growth and inflation should give us a pointer on the performance of a currency union. According to most previous studies countries in common currency unions outperform countries with currencies of their own in terms of higher growth and lower inflation.

Several researchers such as Alesina, Barro, Tenreyro and Kenen have focused on the properties a country should have to be able to benefit from currency unions. Some of the major findings are that countries that are small, open to trade, and have a history of high inflation have the most to gain and the least to lose from joining a currency area. Larger countries with a history of price stability should be less inclined to give up their own currencies.

While some of the older studies mention labour mobility as an important criteria when forming currency unions, more recent research concludes that this assumption is not valid.

Many of the studies conducted have shown that countries joining a currency union tend to outperform other countries in terms of growth and price stability. Most of the studies drawing this conclusion have been conducted on less developed countries and most recent research done on the EU-12 zone indicates that this zone consists of perhaps three different optimum currency areas rather than the one that has been formed (Bernanke, 2006).

4 Data and estimation models

This part presents the data and the empirical findings made by the author. The data will be analyzed with the help of the theoretical background from section two and three and tested with regressions

4.1 The Data

The purpose of this thesis is to analyze whether the size of a country makes a difference when being part of the European Monetary Union. To do this, three small EMU-member countries, Austria, Finland and Ireland were selected. They were chosen since they are among the smaller member countries in the EMU and located in different regions of Europe.

The idea is to compare their respective growth and inflation rates, before and after EMU entry, with the growth and inflation of the three largest economies in the EMU: France, Germany and Italy. In the study the author has also included a control-group of all the advanced countries as defined by the IMF, with Slovenia removed from this group since the data from that country has unreliable and missing values. To be able to compare the small countries with the large countries without having to run a regression of each small country against each large country, which would lead to nine GDP-growth regressions and nine inflation regressions, and would be a lot more complicated to interpret. The large countries are aggregated with weighted averages for GDP growth and inflation calculated for this group. The averages for the large-group are weighted by how much each country's total GDP represents as part of the total GDP of the large-group.

Six figures are constructed where the GDP growth and inflation of the three small countries compared to those values for the large countries are shown over time. The growth and inflation of the small and the large countries are divided by the average growth and average inflation respectively of a control-group to control for common world events and to make it easier to interpret the changes of the variables of interest that has occurred.

The control group consists of Australia, Belgium, Canada, Cyprus, Denmark, Greece, Hong Kong SAR, Iceland, Israel, Japan, Korea, Luxembourg, Netherlands, New Zealand, Norway, Portugal, Singapore, Spain, Sweden, Switzerland, Taiwan Province of China, United Kingdom and the United States. The averages for the control-group are weighted by how much each country's total GDP represents as part of the total GDP of the control-group.

All the data on GDP growth and inflation are collected from the IMF (www.imf.org) and range from 1980-2006. This gives a total of six regressions to run, one for growth and one for inflation concerning each of the three small countries.

5 Estimation models:

To fit the purpose of the thesis the regression concerning GDP growth will take the following form:

$$\frac{Y_s}{Y_l} = \beta_0 + \beta_1 D + \varepsilon,$$

where:

Y_l = Large Group Weighted GDP Growth

Y_s = Small Country GDP Growth

β_0 = Intercept

$\beta_1 D$ = Dummy Variable: 0 if 1980 – 1998, 1 if 1999 – 2006

ε = Error Term.

The regression concerning inflation will look like:

$$\frac{I_s}{I_l} = \beta_0 + \beta_1 D + \varepsilon,$$

where:

I_l = Large Group Weighted Inflation

I_s = Small Country Inflation

β_0 = Intercept

$\beta_1 D$ = Dummy Variable: 0 if 1980 – 1998, 1 if 1999 – 2006

ε = Error Term.

The regressions will be estimated using ordinary least square (OLS). Constructing the regressions this way will in a simple way show us whether the average of variable of interest (growth or inflation) for the small country relative to that average for the large countries have been different since the formation of the EMU. If the dummy-variable coefficient estimate is significant in the regressions it will in the first regression mean that small country growth relative to large EMU-country growth has been different since the start of the union. A similar interpretation goes for the second regression, except this deals with inflation instead of growth.

A number of graphs will also be constructed showing the development over time of small countries growth and inflation divided respectively by the weighted average growth and weighted average inflation of the control group. The graphs will also show the development over time of large group weighted average growth and weighted average inflation divided respectively by control group weighted average growth and weighted average inflation. These graphs will be used to help explain the relative differences between small and large countries before and after EMU-entry in their development of growth and inflation.

The theories concerning currency areas have some implications. A smaller economy should experience a lower level of inflation and a higher level of GDP growth after joining a cur-

rency union put in relation to the larger countries joining the union. Therefore smaller countries should be more inclined to give up their own currencies and they have more to gain by joining a common currency area than their larger partners.

When running the first regression, concerning GDP growth, we expect significant and positive coefficient estimates for the dummy variables. If this is the case this means that the growth of the small country relative to the growth of the large countries increased significantly after EMU entry.

In the second regression, concerning inflation, we expect significant and negative coefficient estimates for the dummy variables. If this is the case this indicates that the inflation of the small country relative to the inflation of the large countries decreased significantly since they joined the EMU.

6 Results

6.1 GDP Results

Table 6.1.1 Austria Relative GDP Growth Regression

$\frac{Y_s}{Y_L} = \beta_0 + \beta_1 D + \varepsilon$	Coefficient Estimate	Standard Error	P-value
(Constant)	1.193	.226	.000
Dummy: Samples from 1980-1998 0: otherwise 1	.678	.415	.115
R Square	.096		

As we can see from the table 6.1.1 the coefficient estimate for the dummy variable is positive, which means that the growth of Austria relative to the growth of the large countries increased since EMU entry. However the p-value for the dummy variable coefficient estimate is not significant at the 10% level and looking at figure 6.1.1 we can see that the difference in growth before and after EMU entry is not very different from before 1999. Still, the positive coefficient estimate show some tendency that the growth of Austria relative to the growth of the large countries has increased after EMU-entry.

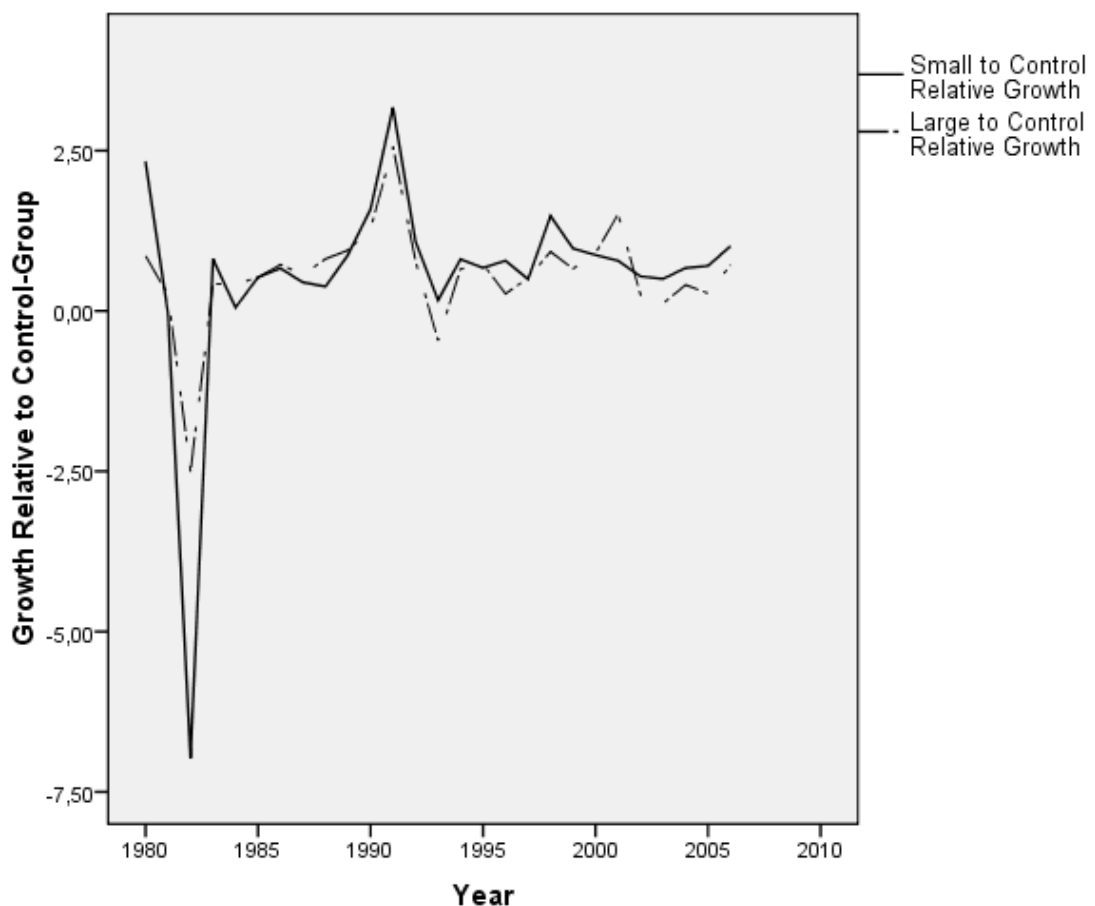


Figure 6.1.1 Austria and Large Group Relative Growth

Source: made by author

Table 6.1.2 Finland Relative GDP Growth Regression

$\frac{Y_s}{Y_L} = \beta_0 + \beta_1 D + \varepsilon$	Coefficient Estimate	Standard Error	P-value
(Constant)	1.741	.440	.001
Dummy: Samples from 1980-1998 0: otherwise 1	1.294	.809	.122
R Square	.093		

As we can see from the table 6.1.2 the coefficient estimate for the dummy variable is positive, which means that the growth of Finland relative to the growth of the large countries increased since EMU entry. By looking at figure 6.1.2 we can see that Finland has experienced higher increase in growth than the large countries since EMU started. The p-value for the coefficient estimate on the dummy variable in table 6.1.2 is close to significant at the 10% level, showing some tendencies that the growth patterns have changed since the EMU started.

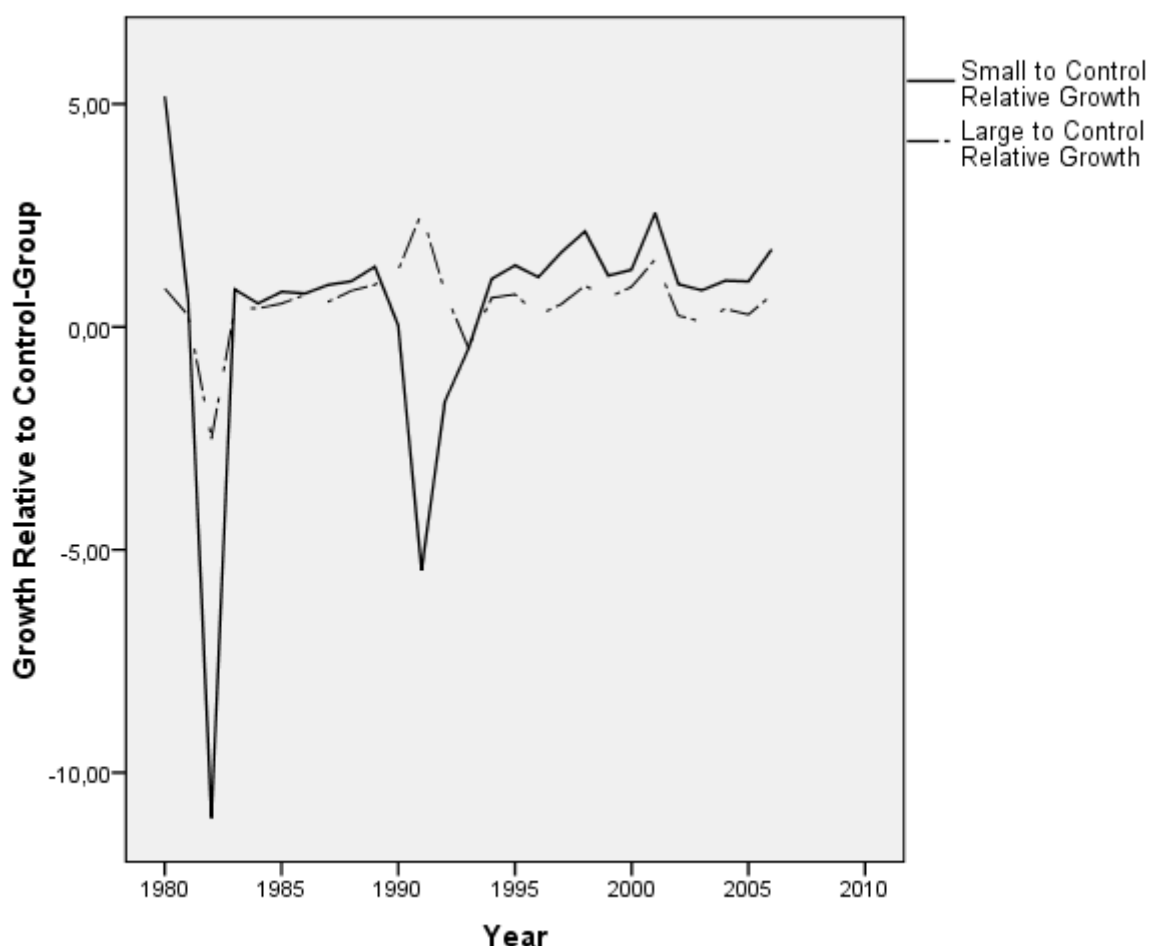


Figure 6.1.2 Finland and Large Group Relative Growth

Source: made by author

Table 6.1.3 Ireland Relative GDP Growth Regression

$\frac{Y_s}{Y_L} = \beta_0 + \beta_1 D + \varepsilon$	Coefficient Estimate	Standard Error	P-value
(Constant)	2.346	.847	.010
Dummy: Samples from 1980-1998 0: otherwise 1	4.494	1.556	.008
R Square	.250		

As we can see from the table 6.1.3 the coefficient estimate for the dummy variable is positive, which means that the growth of Ireland relative to the growth of the large countries has increased since EMU entry. The p-value for the dummy variable coefficient estimate is significant at the 1% level and looking at figure 6.1.2 we can see that the difference in growth has been significantly higher in Ireland than in the large countries since 1999. This gives support to the hypothesis that small countries have more to gain by joining currency unions than large countries have.

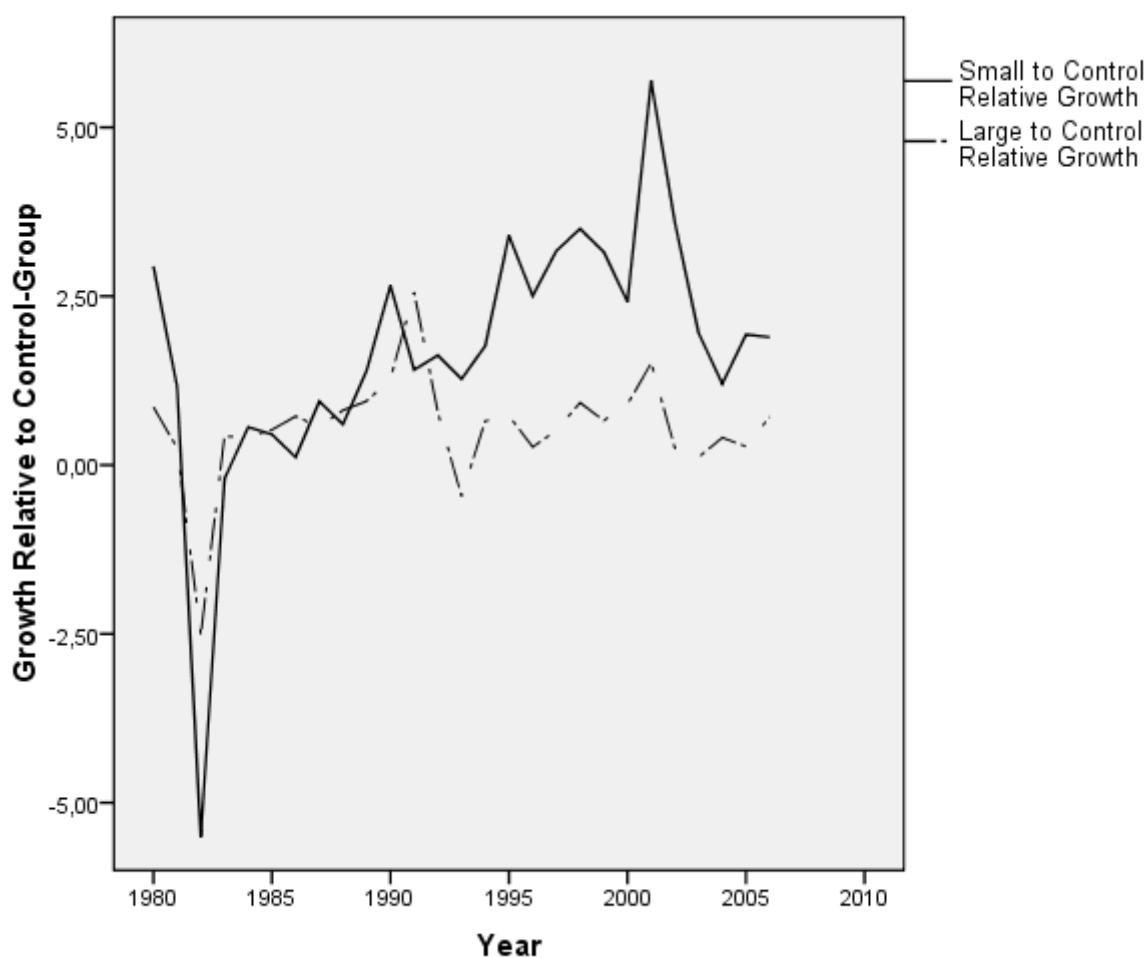


Figure 6.1.3 Ireland and Large Group Relative Growth

Source: made by author

6.2 Inflation Results

Table 6.2.1 Austria Relative Inflation Regression

$\frac{I_s}{I_t} = \beta_0 + \beta_1 D + \varepsilon$	Coefficient Estimate	Standard Error	P-value
(Constant)	.694	.038	.000
Dummy: Samples from 1980-1998 0: otherwise 1	.223	.070	.004
R Square	.287		

As we can see from the table 6.2.1 the coefficient estimate for the dummy variable is positive and the p-value for the dummy is also significant at a 1% level. In this regression we had expected a negative coefficient estimate for the dummy variable, but the significantly positive coefficient estimate for the dummy variable along with figure 6.2.1 indicates that the inflation of Austria relative to the inflation of the large countries increased since they joined the EMU. This is something that does not support the hypothesis of relatively lower inflation for the small EMU-countries.

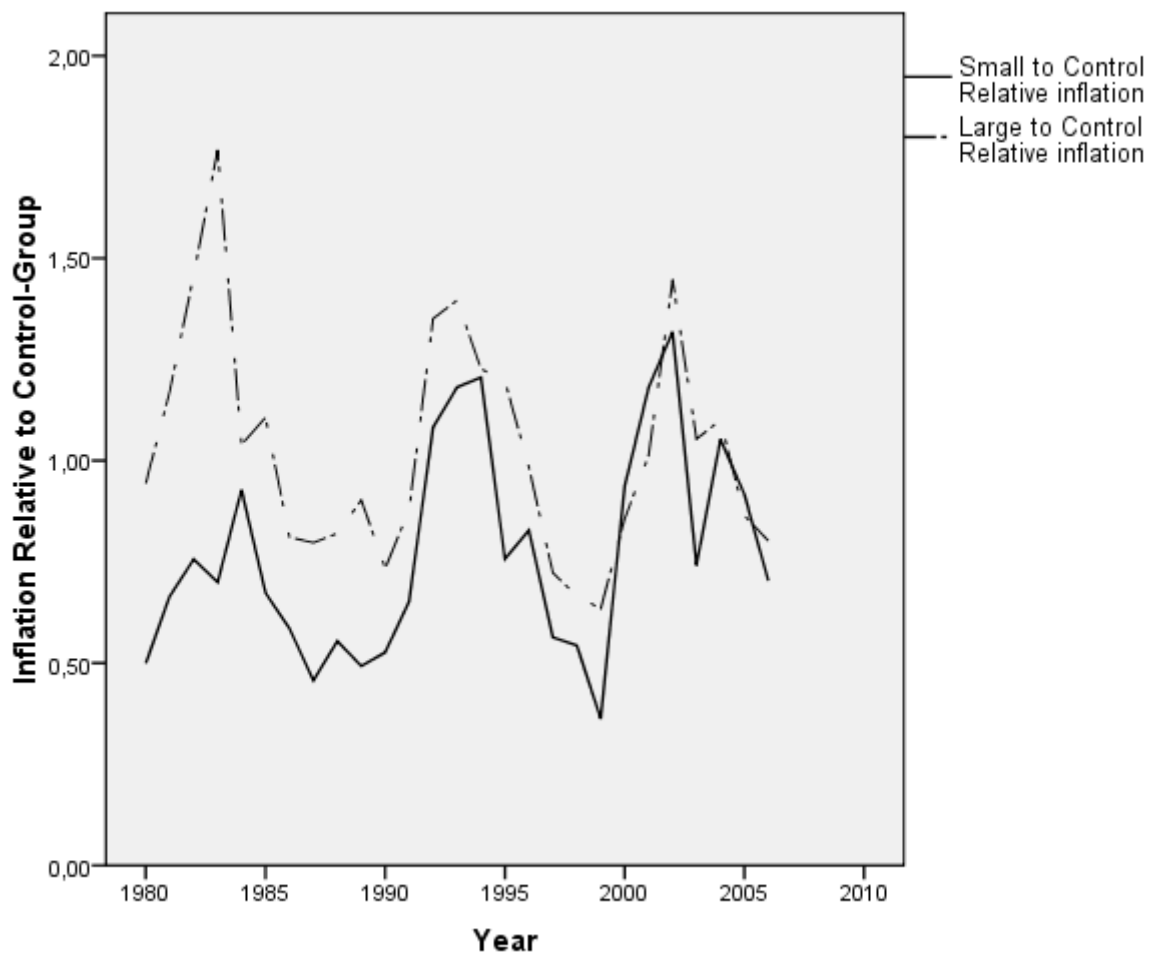


Figure 6.2.1 Austria and Large Group Relative Inflation

Source: made by author

Table 6.2.2 Finland Relative Inflation Regression

$\frac{I_s}{I_l} = \beta_0 + \beta_1 D + \varepsilon$	Coefficient Estimate	Standard Error	P-value
(Constant)	1.027	.106	.000
Dummy: Samples from 1980-1998 0: otherwise 1	-.102	.195	.604
R Square	.011		

As we can see from the table 6.2.2 the coefficient estimate for the dummy variable is negative, but its p-value indicates that it is not significant or not even close to significant. From these results we draw the conclusion that Finland's inflation relative the inflation of the large countries has not changed since they joined the EMU. Figure 6.2.2 indicates that the inflation of Finland does not seem correlated with the inflation of the large countries before EMU entry but shows some tendency to become more correlated with the inflation of the large countries after EMU started.

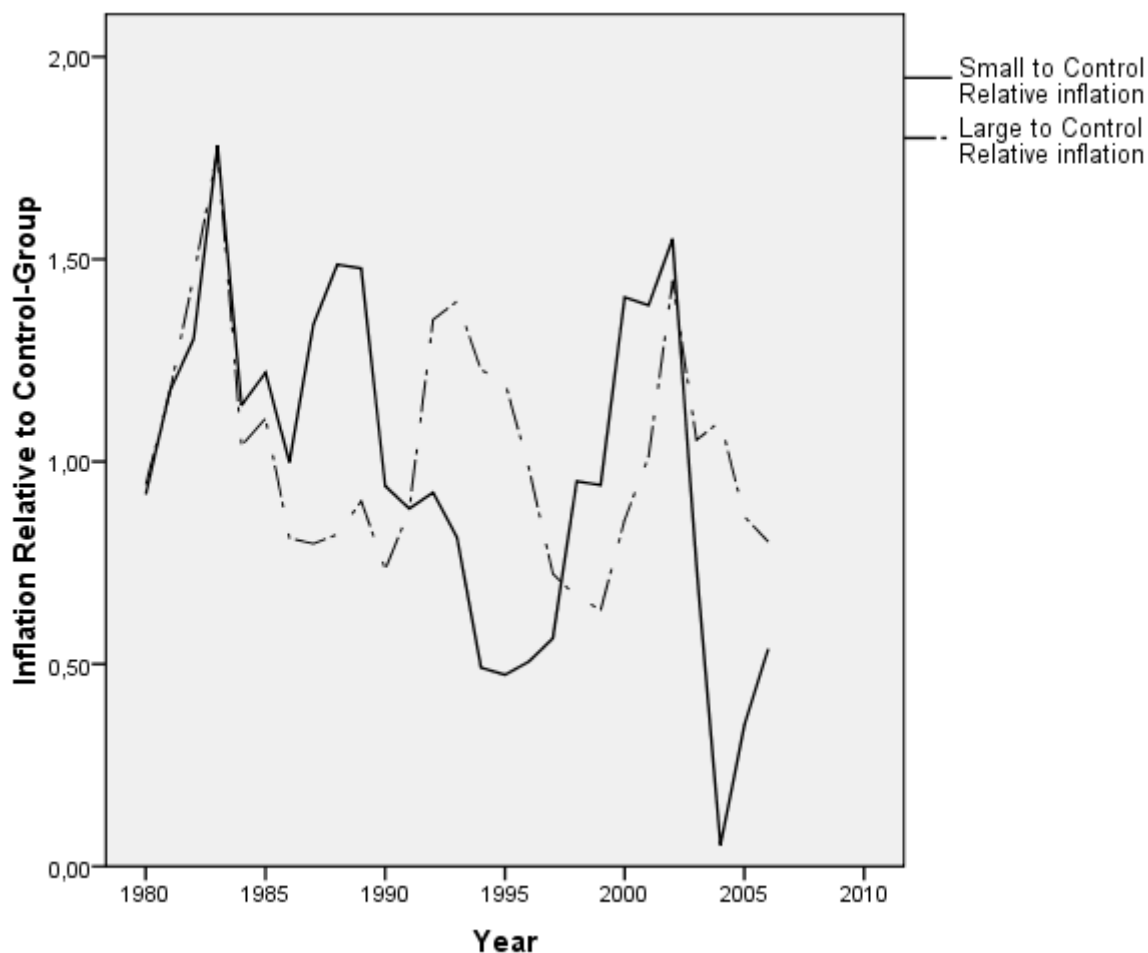


Figure 6.2.2 Finland and Large Group Relative Inflation

Source: made by author

Table 6.2.3 Ireland Relative Inflation Regression

$\frac{I_s}{I_l} = \beta_0 + \beta_1 D + \varepsilon$	Coefficient Estimate	Standard Error	P-value
(Constant)	1.132	.123	.000
Dummy: Samples from 1980-1998 0: otherwise 1	.870	.225	.001
R Square	.374		

As we can see from the table 6.2.3 the coefficient estimate for the dummy variable is positive and the p-value for the dummy variable coefficient estimate is significant at a 1% level. This along with figure 6.2.3 gives indication that Ireland's inflation relative to the inflation of the large countries has increased since EMU entry. This implies that the hypothesis that smaller countries should have relatively lower inflation than their larger partners is not supported by the evidence.

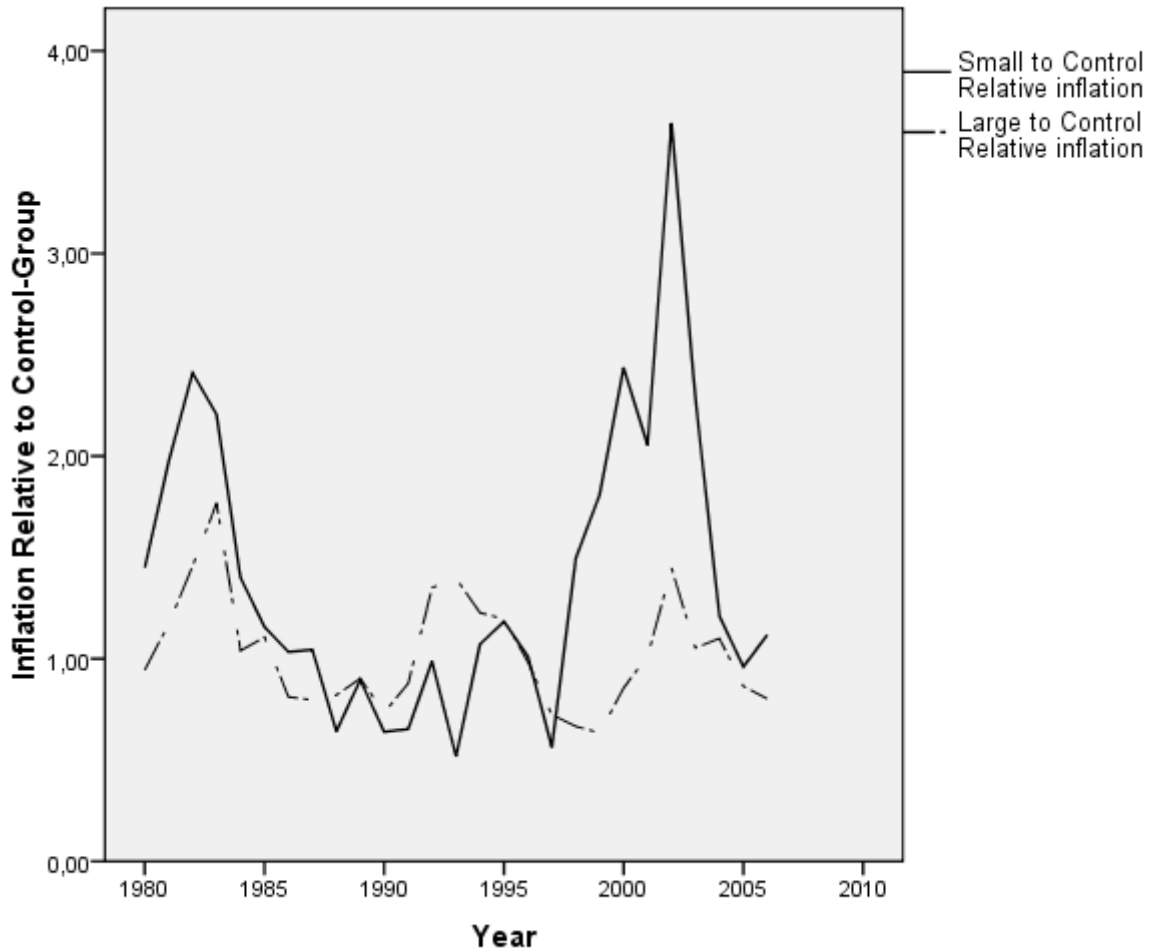


Figure 6.2.3 Ireland and Large Group Relative Inflation

Source: made by author

6.3 Analysis

Here we will try to analyze the findings from section six, by examining the results from the regressions and the figures that illustrate the relative growth and inflation of small and large countries over time.

We will start by looking at the results concerning growth and then the results concerning inflation and finally try to come to a conclusion whether the small countries have outperformed the large countries when joining the EMU.

6.4 GDP

When it comes to GDP growth, there are indications that the growth of the smaller countries actually has increased more than the growth of the larger countries since the EMU was formed. Ireland is a solid case where we in figure 6.1.3 can see a much larger increase in growth compared to the growth of the larger EMU-partners. Regression 6.1.3 is also significant at the 1% level and the coefficient estimate for the dummy variable is positive. Both the regressions for Austria (6.1.1) and Finland (6.1.2), have positive coefficient estimates for the dummy variables, indicating that the growth rates of both these countries have increased more than the growth of the large countries. Neither of these coefficient estimates were significant but their p-values were not far from the 10% level.

For Finland, Ireland and perhaps Austria the increase in growth compared to the growth of the large countries seems to start around 1995. At this time the union was not yet in place but very much in the planning, and the fact that the growth increases at this time can perhaps be seen as an early positive effect of the formation and integration of the countries in the union.

These results give some support for the hypothesis that small countries actually have more to gain in terms of growth than large countries when joining a currency union.

6.5 Inflation

Austria has in table 6.2.1 a positive coefficient estimate for the dummy variable and a significant p-value at the 1% level, and this implies that the inflation of Austria has actually been higher, compared to the inflation of the large countries, since they joined the EMU. From figure 6.2.1 we can see a pattern where Austria's inflation (divided by inflation of control group) during the 1980s and beginning of the 1990s is lower than the one for the large countries (divided by inflation of control group), but then shifts up above the inflation of the large countries. Ireland's inflation, in table 6.2.3 and figure 6.2.3 show the same pattern as Austria but even more clearly.

Finland has a negative coefficient estimate for the dummy variable but the very low significance level of the regression presented in table 6.2.2 and figure 6.2.2 indicates that Finland's inflation, compared to the inflation of the large countries, has not changed since they joined the EMU.

Most of the changes in the countries inflation came around in 1997, which can be an effect of the changes in growth that took place around 1995 as an early effect of the formation of the union.

From theory we had expected negative coefficient estimates for the dummy variables in the regressions concerning inflation. The positive coefficients estimates for the dummy variables of Austria and Ireland actually imply that the inflation of the small countries increased compared to the inflation of the large countries, after they joined the EMU. This does not support the hypothesis from theory. Theory suggests that smaller countries should experience a larger decrease in inflation compared to the decrease expected for larger countries in the currency union.

7 Conclusion and suggestions for further studies

Theory implied that smaller countries would outperform their larger partners in terms of growth and inflation in a common currency union such as the EMU.

All the regressions concerning growth had positive coefficient estimates for the dummy variables and significance levels too good to be ignored, and this supports theory and gives support to the hypothesis that small members of currency unions actually have more to gain than their larger partners when it comes to growth. This relationship is also supported by the figures drawn to show the growth of Finland and Ireland, whereas Austria's case was a bit harder to evaluate.

Both Austria and Ireland experienced a higher increase in inflation (positive coefficient estimate for the dummy variable) than their larger partners since they joined in the union. Finland's inflation compared to the inflation of their large partners was not different since they joined the EMU. The results expected from theory were that the smaller countries should instead have experienced larger decrease in inflation than in large countries, but this was not the case.

From these results we can draw the conclusion that in the EMU there is no clear evidence to support the hypothesis that small countries have outperformed their larger partners in terms of lower inflation.

The purpose of this paper was to examine the growth and inflation of three smaller countries that were members of the EMU to see if they outperformed the larger EMU partners. There was some evidence to the hypothesis that small countries outperform the large currency union members in terms of growth. The hypothesis that small countries should also outperform large in terms of inflation seems wrong; in fact the small countries instead seemed to experience lower decrease in inflation than their large partners.

All the small member countries are considered by the IMF to be advanced countries, and for countries to be admitted into the EMU they were not allowed to have too high inflation. When the countries have been admitted into the union there is another regulation to punish countries not pursuing low inflation. No countries within the union have yet been punished for letting their inflation rise too high. This can be one possible explanation why Ireland's and Austria's inflation have risen; once they were let in they did not have to pursue low inflation policy since they were unlikely to get punished for not doing it anyway.

Another possible explanation for the higher inflation of the small countries is actually the higher growth. This can perhaps be explained by the Phillips curve; when the economy grows at a higher pace lowering the unemployment rate, this also increases the levels of inflation.

Perhaps in a longer run the formation of the EMU along with the political integration that is a continuous process within the union will lead to even greater economic integration that

will benefit the smaller members of the EMU even more. One drawback of this paper is that there is only six years of data available on growth and inflation of the EMU members; this is of course because the union has only existed for a rather short period of time. A suggestion is that a study of similar sort be carried out when there is a longer time-span of data available.

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