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COSTS OF EMU FROM A REGIONAL APPROACH: THE SPANISH CASE

José Villaverde Castro*

villavej@unican.es

Blanca Sanchez-Robles

sanchezb@unican.es

Address:

Department of Economics

Av Los Castros s/n

39005 Santander (Spain)

Phone: 34942201630

Fax 34942201603

In this paper we analyse one of the main cost of the common currency, the loss of monetary policy tools at the country levels. The basic idea is that this cost will not be very onerous if business cycles in the eurozone are similar enough. Following some recent contributions in the framework of the modern approach to business cycles, we look at the correlation of relevant variables at the regional and at the national level with some UE countries**,** particularly the inflation rate. Our basic findings suggest that these correlations are rather similar. However, a more accurate comparison of Spanish regional inflation profiles with those exhibited by selected EU countries (especially German) suggest some differences. Thus, the monetary policy implemented by the European Central Bank may favor some regions but be detrimental to others, if it is not carefully designed in order to try to benefit all EU members.

I. - Introduction

There is no doubt that the integration of Spain into the EMU has reported many advantages to the country. Due to the strong motivation of economic agents to join the single currency on January 1, 1999, and the associated behavior involved by this desire, the nation has acquired in the last five years a reasonable degree of nominal convergence with its European patterns, that in turn has also promoted real convergence to the average income level in the EU. Notwithstanding this fact, the process has also entailed some costs. The first, and perhaps the more obvious one, is the loss of the monetary policy as a tool to influence economic activity.

The second drawback of the integration is the possibility that it may bring about an increase in regional disparities within the country. The basic intuition for this assertion, according to the classical theory of optimum currency areas (OCA) is as follows: the main benefits of integration – the reduction of exchange rate uncertainty and transaction costs, and a more aggressive competition in the markets – will be enjoyed especially by those regions more actively involved in international transactions of good and services. Therefore, the regions that have developed a more dynamic trade sector will get the most out of the process of integration. The rest of the areas, instead, will not be able to profit in such a way. Villaverde (2000) shows that average cost savings due to the fixed exchange rate will be larger in more open regions (Table 1), although in all cases the potential savings will be sparse. It is feasible, thus, that the relative gaps among Spanish regions will be enlarged as a consequence of the single currency.

No doubt it is a challenge to quantify the costs and benefits called for by the integration, especially because of the short span of time that has taken place since the implementation of the single currency. As Gros and Thygesen (1998) pose, at this point it is only possible to come up with tentative results and preliminary conclusions. Nonetheless, in this paper we shall try to develop some ideas that may prove useful for researchers and policymakers, focusing primarily on the costs caused by the process. It is necessary to bear in mind, at any event, that conclusions will be only preliminary.

The rest of the paper is organized into three sections. Section II reviews the literature on this subject. Section III provides some empirical analysis by means of looking at the correlation of some key variables, basically inflation. Section IV concludes.

II. – A brief review of the literature.

As it was said above, one of the main costs of joining the EMU is the loss of the design and control of monetary policy by domestic central banks. It can be argued that this cost is in turn associated to the degree of correlation among the business cycles of the countries that share the monetary policy designed by the ECB. If cycles are highly correlated in the eurozone, then it is more likely that a single monetary policy will prove to be adequate for all members of the UE.

The issue of the correlation among business cycles of different countries or regions and the comovements of economic variables have been analyzed for many years, but it has certainly being placed at the

forefront of the academic research agenda in the last decades. Obviously, this topic is still more relevant for those interested in the performance of the EMU, and this is, precisely, one of the areas that has been more intensely explored in this regard. The intuition is simple: one of the traditional sources of interdependence between countries is international trade, which is one of the key elements fostered by the integration. Moreover, the policy implications for EU policymakers and citizens of a particular degree of business correlation are crucial.

On the theoretical side, models with different predictions have been designed over the years. The traditional Mundell-Fleming model argues that, under certain assumptions (perfect capital mobility and a unique interest rate), a monetary expansion in a country with a large relative importance in the world capital markets (the so called *big country*) may bring about a contraction in another, smaller (in the sense of their relevance in the capital markets) nation. Thus, according to this approach, business cycles can conceivably move in the opposite direction in both countries.

In the framework of the new open economy macroeconomics, the seminal contribution by Obstfeld and Rogoff (1995) argues, instead, that monetary policy may have positive spillover effects: an expansion in one country can conceivably increase the level of welfare in another country (For a thorough survey of related models, see Lane, 1999). Corsetti and Pesenti (1998) come up with the same conclusion in a two countries framework. Furthermore, they claim that the magnitude of the spillover effect is associated to the elasticity of substitution between home and foreign goods. In the Corsetti-Pesenti model, the channels of transmission are the change in both the interest rate and the terms of trade. If we relate these arguments to the eurozone, however, results do not necessarily carry over, but we can nonetheless get some interesting insights. A decline in the interest rate in the eurozone may have asymmetrical effects upon the 12 members in terms of its impact on inflation. Those countries in which some sectors are less liberalized, for example, or that have certain centralized patterns of wage negotiation, may be more vulnerable to monetary expansions and suffer more severe inflationary pressures that other EU members. Anyway, at the theoretical level, it is not easy to find conclusive arguments that pose a particular kind of correlation among business cycles, at least for the case of the EU.

On the empirical side, the number of studies available is larger. Moreover, they have employed different methodologies in order to ascertain the existence or absence of common business cycles. A related branch of the literature is encompassed by papers that analyze what is the response of a sample of countries to a particular shock, or, alternatively, what is the main source of business cycles for a group of countries. We shall not cover them here; examples of these papers can be found in Canova and De Nicoló (2000) and Cuñado and Pérez de Gracia (2001). Sometimes this particular kind of papers implicitly address the close issue of business cycles correlation.

We can summarize the literature on common business cycles as follows:

a) Some pieces of research have employed calibration in order to compare the predictions of a model with the real data, and establish if a particular source of shock can explain a relevant proportion of the variance of the fluctuations. Examples of such studies are Chari et al. (1998) and Kollmann (1997, 1998).

b) Other researchers have preferred VAR analysis and the subsequent analysis of the impulse – response function. (Blanchard and Quah, 1989; Bayoumi and Eichengreen (1993; Obstfeld and Peri, 1998, Den Haan and Sumner, 2001). Some of these papers deal with the specific issue of the EU and, in general, they document a slower degree of adjustment to shocks in Europe than in the US. Moreover, shocks also seem to be more persistent at this side of the Atlantic. This technique has been applied to the Spanish regions in Sanchez-Robles and Cuñado (1999). They report that the timing of the adjustment of a shock is rather similar for all regions, with the exception of those areas that have a larger share of the agricultural sector: in these regions the adjustment is more sluggish. Den Haan and Sumner (2001) analyze nominal and real indicators for the G-7 countries during the post war period. The interest of this particular contribution is twofold: first, they come up with some findings that show that correlation coefficients among variables are higher and positive in the short run, whereas these figures become negative in the long run. Second, as far as methodology is concerned, they propose an innovative technique to compute the covariances of VAR forecast errors.

c) Several authors have looked at contemporaneous correlation in some key variables (Baxter and Stockman, 1989; De Grauwe and Vanhaverbeke, 1993). Fatas (1997) shows that the correlation among the business cycles in the European countries has increased over time. His thesis is in accord with Frankel and Rose (1997). Wynne and Koo (2000) compare the synchronization of business cycles among the 12 Federal Reserve districts and the EU members. They look at the correlation of key variables, such as output, prices and employment. Their main finding is that the average volatility of fluctuations is similar in both samples. However, employment is more volatile in the US, consistent with the fact that labor markets are less regulated in the US. Gallegati and Gallegati (2000) look also at cross correlation among 18 variables for 17 European countries in the period 1960-98. They report that most series behave rather similarly, but there are some exceptions as, for example, the price level

d) Another methodology related to the latter, proposed by Engle and Kozicki (1993) and Vahid and Engle (1993), interpret common serial correlation as evidence in favor of common cycles. This approach is especially suitable for series that may have unit roots, since it takes into account the possibility of cointegration in the series. Carlino and Sill (2000) have implemented this technique for the case of the US regions in the period 1953-1995. They find a larger degree of cyclical correlation in core regions, which becomes smaller when refereed to peripheral areas. Perez de Gracia and Cuñado (2001) use this method to explore the performance of Spanish regions. They report a high degree of comovements among the growth rate of most Spanish regions, although, according to their findings, evidence does not suggest the existence of a common cycle.

Summing up, so far literature has provided some insights about the correlation among relevant variables. There is some accord in the results, although the different techniques and samples that have been used leave still many questions unanswered. More research is necessary to fill this gap and come up with some definite conclusions.

III. – Main empirical results

The issue of the correlation among business cycles should be considered with special care when studied at the regional level. Indeed, the differences in the cyclical behavior of some regions may be due both to national factors or to international episodes. It is not easy to disentangle both aspects, and we do not intend to perform such an investigation here. Our purpose is mainly to compare the correlation of some key variables with their national counterparts, as well as with those belonging to other EU countries.

First, and following Fatás (1997), we have looked at the performance of employment growth rates. Data sources are National Statistics Institute (Spain) and European Comission (DG II). Table 2 shows contemporaneous correlations of employment growth for each Spanish region with both the EU15 aggregate and Spain, in the first case for the period 1977-97 and in the second for the period 1977-99. Our findings show that, for the whole sample, regional correlations with respect to Spain and EU15 are, without exception, positive. But, generally speaking, they are higher with Spain than with EU15, the (non-weighted) average correlation being 0.77 with the country and 0.56 with EU15. Moreover, the correlation – with Spain and with the EU15 - is slightly higher for the richer areas of Spain. It is also interesting to point out that after 1986 (when Spain joined the EC) the regional correlation of employment growth rate with Spain and EU15 figures increases. This finding could be interpreted as posing that the Spanish and European components of the regional business cycles are more relevant after the Spanish accession to the EC have increased their significance over time, the latter more significantly than the former. This conclusion partially contrasts with the findings of Fatás (1997) for the German, Italian, French and British regions: business cycles correlations of these regions increased with relation to the EU but decreased with relation to their national values.

We have repeated this exercise with another variable, the inflation rate. The message is rather similar to the one conveyed by the analysis of the employment growth rates. We have devoted special attention to the comovements among inflation rates for two main reasons. The first is more general: research in macroeconomics has been traditionally interested by the connection between prices and output. The Phillips curve has been a highly debated topic for decades, and it seems that interest in its existence has somehow experienced resurgence in the last few years. Intuitively, correlation among prices and output can be of either sign on theoretical ground: positive on the basis of a demand shock; negative if the shock is driven by a change in the supply side of the economy. Second, the issue is especially relevant for the EU area. As already suggested above, the degree of homogeneity in the price level change across the countries that encompass the Euro is an indirect indicator of the convenience of a single monetary policy. As it is well known, the priority of the European Central Bank is the control of inflation, and therefore its policy should be designed in order to achieve this goal. If inflation moves in a rather similar way across EU members, then the common monetary policy implemented in Frankfort will be beneficial for all members of the eurozone. The converse is true if patterns of inflation are remarkably different.

We have used several techniques in order to capture empirically this correlation among inflation rates. First we have computed cross correlation coefficients among the inflation rate in each of the Spanish regions and inflation both in Spain and in EU 15. Results are displayed in Table 3-5. It should be stressed that the correlation among regional and national rates is very high, although slightly smaller in the second subperiod, 1987-99. Moreover, the corrrelation with EU 15 has also decreased somehow in the subperiod 87-99, while the standard deviation has increased. If we look at the relationship between regional inflation

rates and the same indicator in different countries (Table 4), we can notice that the values are also rather high. Nevertheless, a reduction in the correlation with core EU countries, such as France, Germany and Italy, in the subperiod 1987-99 can be observed. Table 5 displays the results with the cohesion countries. The case of Ireland is similar to the one found for the core countries: i.e. a decrease in the correlation for the second period. Instead, the indicator is higher for the second subperiod for the case of regional correlation with Portugal and Greece.

Since most time series may exhibit unit roots, we have performed the Augmented Dickey Fuller test for all series of inflation. We can not reject the null hypothesis of unit roots in any case. However, since the number of observations is limited these results should be looked at with some caution. In spite of the fact that all variables are I(1), no cointegration relationships have been found using the traditional tests for cointegration. This result, although surprising, is in accord with other papers, like Cuñado and Perez de Gracia (2001).

The nest step has been to compute a two equations VAR (1) linking Spanish regional inflation rates, the national inflation rates and EU inflation rates. The rationale for using a VAR is to take into account the (possible) endogeneity of the variables, as well as correcting by unit roots by means of introducing lags of the variables. The intuition for this endogeneity among different inflation rates is the following: if the countries are closely linked by trade connections, then their price levels will be highly influenced by the price of imports and thus by the inflation of the main partners. We have taken as left hand side variables each regional inflation and the EU inflation rate, and as regressors a constant term, and the rate of inflation in 6 countries. Since we have only 20 observations, we have included only two countries in each equation. Thus, 3 equations are estimated for each region. Basic results are displayed in Table 6.

We can summarize the main findings of this analysis as follows:

1. The degree of persistence of the inflation rate in Spanish regions is not very pronounced. The first lag of the correspondent regional inflation -denoted by Xi (-1) – is significant only in a few case (Pais Vasco and Madrid, especially).

2. Correlation with French inflation is large and significant in the vast majority of cases. The same can be said of Italy and Ireland. Portugal and Greece does not share this result. Portuguese inflation has positive and significant correlation just in a few cases, and this result carries over to the Greek inflation. Moreover, there does not seem to be a clear justification for those regions that have significant association.

3. Germany is negatively correlated with most regional inflation cases. The only exception is Baleares: here the coefficient for German inflation is positive and significant. In fact, both Baleares and Germany have increased their economic links in the past years due to the momentum acquired by tourism of German origin in these islands.

4. Regional results agree with national findings. Spanish average inflation is positively and significantly correlated with EU 15, France, Greece, Ireland and Italy. This connection is negative – albeit not significant – for German inflation. Finally, and as it should be expected, the points estimates for EU inflation are positive, large and significant for France, Germany, Ireland and Italy. Instead, the correlation with Greece is smaller, and in the case of Portugal it is not even significant.

We have complemented the VAR analysis with another technique. In order to consider seriously the possibility of the variables being integrated of order 1, we have detrended them with the Hodrick-Prescott filter, especially suitable for this kind of variables. As it should be expected, now the correlation figures are substantially lower, since we are only considering cyclical associations. Basic findings (not shown for lack of space) are in accord with the results of the VAR for most cases.

From the previous analysis we conclude that the degree of correlation among some relevant variables at the Spanish regional level and their EU counterparts are relatively high. This conclusion is in accordance with the idea proposed by Frankel and Rose (1996) that closer trade links between two countries are strongly associated with more correlated economic activity between them, because, as we have seen before, all Spanish regions have consistently increased their trade relations with EMU countries.

Nevertheless, fear persists because, although increasingly unlikely, the risk of suffering idiosyncratic disturbances is always possible. It is well known that regional wages exhibit a small response to negative shocks in Spanish regions. Thus, it is not logical to expect that real wage flexibility will act as an adjustment instrument to compensate an unfavorable ECB particular measure. Geographical mobility is also rather sparse in Spain nowadays, in contrast with the trend experienced four decades before. Finally, alternative adjustment mechanisms related to fiscal policy are less feasible after the *Stability and Growth Pact* (limiting the size of the central budget deficit) and the process of regional fiscal decentralization in Spain.

IV.- Preliminary conclusions

The investigation of the costs of integration for European regions is no doubt a complex task. The previous analysis offers some interesting, although preliminary, conclusions for the case of Spanish regions.

In contrast to the conclusions obtained in other papers (see, for instance, De Grauwe and Vanhaverbeke, 1993), it has been found that correlation among relevant variables is rather high. In other words, asymmetric shocks will probably play a decreasing role across the Spanish regions.

The finding of the lack of correlation between German inflation and inflation in Spanish regions is especially a matter of concern. If the ECB designs its monetary policy in order to benefit Germany, it will probably damage the economic situations of Spanish regions. Thus, it is important that the ECB take into account th4e situation of all countries when adopting a particular measure, since its effect will not be the same in within Germany and outside Germany. The need for a careful, well studied monetary policy intended to benefit all the eurozone is crucial, also from a regional perspective.

Furthermore, although the probability of suffering asymmetric shocks is low and decreasing for most of the Spanish regions, it must not be ruled out. If this event occurs, the Spanish regions are not well suited to accommodate the negative effects of these shocks. Indeed, wage flexibility and labor mobility are very low at the regional level. The potential role of fiscal policy as an automatic stabilizer at the regional level is loosing relevance.

Summing up, the cost from the integration of Spain in the Euro does not seem to be very high. However, caution is necessary both in researchers and policymakers, not so much because of the disparities in the

business cycles (which is limited) but, rather, by the lack of tools to strive against episodes that have different impact over the eurozone.

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Table 1

Openness degree and transactions cost savings

	1	2	3	4	5	6	7	8	9	10
Spain	17,89	29,13	11,24	22,14	0,12	14,93	25,70	10,77	19,02	0,10
Andalucía	8,68	12,04	3,35	9,86	0,05	6,92	9,15	2,23	7,91	0,04
Aragón	28,05	46,16	18,11	36,10	0,19	22,80	42,28	19,47	31,24	0,16
Asturias	7,41	12,80	5,39	9,55	0,05	6,03	11,39	5,35	7,84	0,04
Baleares	4,29	3,97	-0,33	3,70	0,02	2,15	2,32	0,17	2,43	0,01
Canarias	11,55	7,55	-4,00	8,49	0,04	8,79	5,46	-3,33	6,36	0,03
Cantabria	12,72	24,84	12,12	18,30	0,09	10,29	19,55	9,26	15,11	0,07
Cast.-La Mancha	8,71	18,09	9,37	11,74	0,06	7,80	16,17	8,37	10,56	0,05
Castilla y León	14,46	42,08	27,62	26,25	0,14	13,55	39,72	26,18	24,76	0,14
Cataluña	25,94	42,85	16,91	32,72	0,17	22,76	38,91	16,15	28,65	0,15
Com. Valenciana	20,81	27,70	6,89	23,39	0,12	16,58	23,37	6,80	19,78	0,10
Extremadura	3,37	7,30	3,94	4,94	0,03	2,94	6,43	3,48	4,51	0,03
Galicia	12,20	27,87	15,67	18,53	0,10	10,37	26,13	15,76	16,44	0,09
Madrid	20,61	32,98	12,37	24,67	0,14	16,56	30,11	13,55	20,99	0,11
Murcia	13,42	22,85	9,42	16,01	0,08	10,63	17,57	6,93	12,68	0,06
Navarra	31,44	70,13	38,69	50,13	0,25	27,87	65,54	37,67	44,23	0,22
Pais Vasco	26,24	34,60	8,36	28,36	0,15	21,59	26,30	4,71	23,13	0,12
La Rioja	10,66	25,77	15,11	16,31	0,09	8,69	22,88	14,20	13,71	0,07

Notes. 1.Openness degrees (o.d.) in 1988 with respect to EU14; 2:o.d. in 1998 with respect to EU14; 3. 2 –1; 4 Average o.d. between 1988 and 1998; 5 = Average transactions costs savings in relation to EU14. From 6 to10 the meaning is exactly the same than from 1 to 5, but only in relation to EMU countries.

Table 2

Regional correlations: Employment growth rates

	1977-99	1977-97	1977-86	1977-86	1986-99	1986-97
Regions	**Spain**	**EU15**	**Spain**	**EU15**	**Spain**	**EU15**
Andalucía	0,873	0,623	0,513	0,025	0,936	0,891
Asturias	0,790	0,747	0,092	0,353	0,871	0,830
Baleares	0,649	0,528	0,216	0,294	0,563	0,540
Canarias	0,730	0,491	0,486	0,337	0,654	0,502
Cantabria	0,352	0,464	-0,240	0,478	0,330	0,387
Castilla y León	0,859	0,655	0,563	0,128	0,868	0,816
Cast.-La Mancha	0,780	0,444	0,779	-0,137	0,740	0,634
Cataluña	0,886	0,745	0,630	0,409	0,880	0,910
Com. Valenciana	0,915	0,745	0,746	0,484	0,915	0,882
Extremadura	0,684	0,324	0,274	-0,308	0,726	0,654
Galicia	0,648	0,369	-0,024	-0,572	0,727	0,686
Madrid	0,772	0,438	0,608	-0,037	0,722	0,629
Murcia	0,698	0,506	0,224	0,032	0,667	0,615
Navarra	0,807	0,607	0,771	0,411	0,713	0,674
País Vasco	0,911	0,697	0,795	0,309	0,877	0,888
La Rioja	0,789	0,531	0,768	0,275	0,728	0,649
Non-weighted average	0,766	0,562	0,477	0,162	0,750	0,706

Table 3

Regional correlations: Inflation rates

Regions	1979-99 Spain	1979-99 EU 15	1979-86 Spain	1979-86 EU 15	1987-99 Spain	1987-99 EU 15
Andalucia	0,985	0,961	0,929	0,926	0,960	0,901
Aragón	0,994	0,963	0,964	0,982	0,983	0,929
Asturias	0,990	0,968	0,969	0,927	0,979	0,935
Baleares	0,993	0,933	0,979	0,854	0,967	0,861
Canarias	0,957	0,975	0,880	0,973	0,902	0,819
Cantabria	0,986	0,936	0,949	0,825	0,965	0,883
Castilla yLeón	0,999	0,958	0,995	0,930	0,993	0,922
Cast-La Mancha	0,996	0,968	0,996	0,948	0,980	0,909
Cataluña	0,996	0,948	0,995	0,910	0,979	0,938
Com. Valenciana	0,993	0,942	0,966	0,837	0,981	0,927
Extremadura	0,992	0,954	0,973	0,959	0,944	0,836
Galicia	0,993	0,945	0,964	0,863	0,986	0,895
Madrid	0,991	0,949	0,966	0,866	0,962	0,916
Murcia	0,984	0,946	0,961	0,852	0,949	0,880
Navarra	0,993	0,959	0,976	0,933	0,963	0,891
s Vasco	0,990	0,929	0,957	0,896	0,979	0,877
La Rioja	0,976	0,941	0,887	0,844	0,950	0,868
Spain		0,957		0,927		0,935
Non weighted average	0,989	0,951	0,959	0,902	0,966	0,893
Standard deviation	0,010	0,013	0,033	0,051	0,022	0,034

Table 4

Regional correlations with core countries: Inflation rates

Regions	1979-86 France	1987-99 France	1979-86 Germany	1987-99 Germany	1979-86 Italy	1987-99 Italy
Andalucia	0,907	0,850	0,868	0,472	0,970	0,936
Aragón	0,959	0,903	0,916	0,546	0,971	0,964
Asturias	0,897	0,844	0,820	0,625	0,972	0,906
Baleares	0,873	0,862	0,827	0,434	0,947	0,811
Canarias	0,948	0,747	0,914	0,491	0,987	0,981
Cantabria	0,797	0,825	0,718	0,583	0,940	0,768
Castilla y León	0,945	0,884	0,900	0,534	0,965	0,900
Cast-La Mancha	0,945	0,864	0,891	0,570	0,976	0,927
Cataluña	0,914	0,906	0,858	0,554	0,951	0,880
Com. Valenciana	0,866	0,933	0,798	0,456	0,946	0,793
Extremadura	0,959	0,783	0,903	0,598	0,971	0,947
Galicia	0,893	0,907	0,844	0,439	0,955	0,850
Madrid	0,853	0,865	0,766	0,534	0,949	0,829
Murcia	0,885	0,903	0,849	0,375	0,945	0,818
Navarra	0,910	0,875	0,847	0,519	0,966	0,901
País Vasco	0,938	0,918	0,918	0,377	0,948	0,875
La Rioja	0,902	0,852	0,891	0,414	0,942	0,802
Spain	0,931	0,908	0,872	0,526	0,964	0,899
Non weighted average	0,905	0,866	0,855	0,501	0,959	0,876
Standard deviation	0,043	0,048	0,056	0,076	0,014	0,064

Table 5
Regional correlations with other countries: Inflation rates

Regions	1979-86 Ireland	1987-99 Ireland	1979-86 Portugal	1987-99 Portugal	1979-86 Greece	1987-99 Greece
Andalucia	0,906	0,671	-0,038	0,906	0,515	0,827
Aragón	0,940	0,746	0,083	0,901	0,425	0,886
Asturias	0,850	0,749	0,103	0,866	0,359	0,862
Baleares	0,857	0,708	0,244	0,825	0,239	0,824
Canarias	0,938	0,697	0,076	0,779	0,522	0,773
Cantabria	0,746	0,775	0,113	0,832	0,216	0,835
Castilla y León	0,914	0,744	0,261	0,880	0,254	0,867
Cast-La Mancha	0,910	0,708	0,186	0,835	0,321	0,879
Cataluña	0,874	0,761	0,199	0,925	0,247	0,921
Com. Valenciana	0,792	0,796	0,406	0,934	0,028	0,885
Extremadura	0,929	0,664	0,238	0,747	0,353	0,781
Galicia	0,891	0,769	0,231	0,910	0,282	0,853
Madrid	0,765	0,735	0,233	0,925	0,134	0,833
Murcia	0,872	0,871	0,264	0,880	0,195	0,812
Navarra	0,875	0,674	0,127	0,823	0,364	0,890
País Vasco	0,925	0,748	0,310	0,901	0,236	0,865
La Rioja	0,880	0,728	0,514	0,873	0,115	0,745
Spain	0,892	0,766	0,226	0,916	0,265	0,890
Non weighted average	0,892	0,766	0,209	0,867	0,283	0,843
Standard deviation	0,058	0,051	0,131	0,053	0,133	0,047

Table 6. VAR(1) Results
dependent variable is rate of inflation, 1980-99

	And	And	And	Ara	Ara	Ara	Ast	Ast	Ast	Bal	Bal	Bal	Can	Can	Can
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
int	1.32	0.91	-0.34	1.17	0.18	0.76	1.39	0.41	0.98	1.09	0.31	0.47	1.86	0.81	0.49
	1.48	1.03	0.62	1.57	0.3	1.76*	1.58	0.56	2.27**	2.1**	0.54	0.98	2.62**	1.02	1.12
Xi(-1)	-0.02	0.19	-0.15	0.3	0.19	0.2	0.23	0.18	0.039	0.05	0.3	0.18	-0.46	-0.2	-0.05
	0.067	0.67	0.82	1.17	0.89	1.16	0.76	0.7	0.2	0.43	2.27**	1.07	1.56	0.79	0.27
EU(-1)	0.58	0.38	0.18	0.27	0.1	0.04	0.18	-0.25	0.026	-0.1	0.34	0.43	0.63	0.17	0.1
	1.33	0.85	0.76	0.72	0.33	0.18	0.5	0.07	0.1	0.62	1.42	1.98*	1.32	0.35	0.3
Fra	0.61			0.47			0.61			0.72			1.24		
	2.25**			2.3**			2.16**			4.77***			5.44***		
Deu	-0.18			-0.05			0.03			0.37			-0.1		
	0.63			0.26			0.13			2.58**			0.43		
Gre			0.16		0.19			0.2			0.07			0.18	
			2.84***		2.6**			2.33**			1.24			2.18**	
Ire		0.28			2.82**			0.42			0.19			0.73	
		1.66						2.81**			1.81*			5.02***	
Italy			0.61			0.47			0.68			0.24			0.9
			5.16***			4.28***			5.23***			1.73*			7.77***
Port.		0.053				0.073			0.05			0.06			-0.023
		0.54				1.43			1.08			1.08			0.45
R2	0.9	0.88	0.95	0.93	0.94	0.95	0.91	0.93	0.96	0.96	0.95	0.95	0.94	0.93	0.96

	Cant	Cant	Cant	CL	CL	CL	CM	CM	CM	Cat	Cat	Cat	Val	Val	Val
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
int	0.99	0.36	0.71	0.93	0.19	0.5	0.8	0.06	0.37	0.99	0.27	0.97	0.99	0.27	0.77
	1.18	0.55	1.43	1.46	0.36	1.35	1.24	0.13	1.14	1.33	0.5	2.02*	1.39	0.43	2.11**
Xi(-1)	0.29	0.26	0.17	0.16	0.3	0.036	0.24	0.34	0.076	0.34	0.24	0.2	0.25	0.39	-0.06
	1.36	1.51	0.96	0.8	1.95*	0.22	0.99	2.11**	0.48	1.78*	1.46	1.21	1.39	2.48**	0.44
EU(-1)	0.36	0.06	0.097	0.54	0.22	0.33	0.32	0.015	0.25	0.47	0.24	0.23	0.47	0.27	0.15
	1.28	0.24	0.39	1.92*	0.85	1.75*	1.09	0.05	1.38	1.59	0.95	1.06	1.85*	0.96	0.95
Fra	0.36			0.42			0.52			0.23			0.38		
	1.31			2.23**			2.44**			1.21			1.78*		
Deu	-0.09			-0.12			0.02			-0.07			-0.16		
	0.41			0.65			0.1			0.38			0.82		
Gre		0.14			0.1			0.14			0.16			0.07	
		1.83*			1.77*			2.49**			2.49**			0.97	

Ire		0.3			0.26			0.34			0.2			0.19	
		2.17**			2.64**			3.49***			2.02*			1.63	
Italy			0.44			0.41			0.54			0.3			0.48
			2.72**			3.8***			5.32***			2.58**			4.02**
Port.			0.06			0.095			0.038			0.1			0.19
			1.17			2.05*			0.95			1.93*			4.1***
R2	0.91	0.93	0.94	0.95	0.95	0.96	0.95	0.96	0.97	0.93	0.95	0.95	0.94	0.94	0.97

	Ext 1	Ext 2	Ext 3	Gal 1	Gal 2	Gal 3	Mad 1	Mad 2	Mad 3	Mur 1	Mur 2	Mur 3	Nav 1	Nav 2	Nav 3
int	0.79	0.69	-0.07	1.4	1.29	0.25	0.81	0.28	0.86	2.14	0.89	1.2	1.27	0.55	1.14
	1.01	0.98	0.12	1.75*	1.87*	0.39	1	0.39	2.04**	2.6**	1.21	2.19**	1.5	0.96	2.43**
Xi(-1)	0.17	0.26	0.18	0.04	0.17	0.07	0.51	0.5	0.12	-0.19	0.06	-0.33	0.39	0.34	0.27
	0.7	1.32	1.17	0.2	0.85	0.36	2.29**	2.25**	0.72	0.9	0.37	1.52	1.61	1.89*	1.6
EU(-1)	0.5	0.25	0.23	0.67	0.23	0.4	0.09	0.06	-0.14	0.71	0.23	0.48	0.24	0.006	0.059
	1.4	0.74	0.92	2.13**	0.74	1.57	0.32	0.22	0.7	2.25**	0.66	1.77*	0.85	0.026	0.28
Fra	0.49			0.46			0.34			0.69			0.35		
	2.1**			1.93*			1.34			2.85***			1.65		
Deu	-0.09			-0.25			0.035			-0.25			-0.03		
	0.35			1.08			0.15			1.1			0.15		
Gre			0.05			0.08		0.08			0.14			0.16	
			0.93			1.25		0.88			1.76*			2.57**	
Ire		0.29			0.3			0.19			0.39			0.27	
		2.15**			2.35**			1.28			2.92***			2.57**	
Italy			0.46			0.35			0.55			0.55			0.4
			3.75***			2.32**			3.93***			3.25***			3.61***
Port.		0.1			0.12				0.14			0.13			0.04
		1.32			1.58				2.9***			1.89*			0.97
R2	0.93	0.93	0.95	0.92	0.93	0.93	0.92	0.92	0.96	0.92	0.92	0.93	0.93	0.95	0.95

	Pv	Pv	Pv	Rio	Rio	Rio	nac	nac	nac	EU	EU	EU
	1	2	3	1	2	3	1	2	3	1	2	3
int	0.94	0.28	0.42	2.04	1.2	1.73	0.97	0.22	0.72	0.96	0.49	0.77
	1.49	0.58	1.01	2.38**	1.5	3.58***	1.36	0.4	1.82*	2.13**	0.92	2.42*
Xi(-1)	0.28	0.47	0.33	-0.05	0.19	-0.41	0.29	0.34	0.11	0.14	0.062	-0.19
	1.69*	4.05***	2.4**	0.23	0.95	2.3**	1.34	2.07*	0.68	1.05	0.38	1.46
EU(-1)	0.66	0.26	0.34	0.67	0.46	0.44	0.4	0.11	0.18	-0.19	-0.11	0.12
	2.73**	1.19	1.86*	2	1.18	2.08**	1.36	0.44	0.96	1.06	0.44	0.76
Fra	0.23			0.51			0.38			0.69		
	1.49			2.24**			1.87*			5.39***		
Deu	-0.28			-0.19			-0.08			0.4		
	1.4			0.82			0.42			3.15***		
Gre		0.05			0.03			0.13			0.15	
		1			0.41			2.03*			2.42**	
Ire		0.16			0.24			0.26			0.45	
		1.83*			1.65			2.58**			4.52***	
Italy			0.18			0.43			0.43			0.65
			1.79*			3.65***			3.83***			7.23***
Port.			0.07			0.25			0.1			0.03
			1.35			4.22***			2.12*			0.8
R2	0.96	0.96	0.96	0.91	0.9	0.95	0.94	0.95	0.96	0.96	0.93	0.96

*: significant at 90%. **: id. At 95%. ***: id at 99%. Nº of observations: 20