Does Trade Foster Regional Economic Activity? Aggregate Evidence from Spanish Regions

Joan Costa-Font*, Ramon Tremosa-Balcells, and Montserrat Font-Vilalta

Universitat de Barcelona - London School of Economics and Political Science, UK, Universitat de Barcelona, and Universitat de Barcelona, Spain

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Abstract The economic and monetary integration of the European Union (EU) brings to the fore the question of whether trade integration affects the distribution of economic activity among countries as well as within regions. On the one hand, the reduction of real exchange rate variability is expected to promote EU trade. On the other hand, trade promotion might be highly asymmetric, especially if trade creation increases the economic activity of frontrunner regions. This paper examines the determinants of Spanish regional trade, and in particular real exchange rate variability, over the period 1990–1999 coinciding with the period of transition to a common currency in order to measure any effects thereafter when the exchange rates of previously national currencies became fixed. Furthermore, we explore the appreciable effects over the regional economic activity. Our results provide suggestive evidence that the reduction of real exchange rate variability at the regional level promotes regional trade although it leads to a *regionally idiosyncratic* distribution of economic activity.

Keywords: Exchange rate variability, gravity approach, Spanish regions, economic activity

JEL Classifications: F15, O18, O52

Introduction

It is widely accepted that the set up of a monetary union is an institutional policy tool fostering price stability in a specific area where it takes place. Compared to alternative currency arrangements, a common currency appears as an effective instrument to promote 'credibility' in containing nominal and real exchange rate variability and is found to foster trade (Rose, 2000). Indeed, price instability has long been one of the major barriers to the development of regional trade along with geographical distance, dimension and economic dynamism. Given that *real exchange rate variability* is significantly reduced with the withdrawal of national currencies and the set up of a currency union, trade is likely to expand as a result.

As noted by Cecchini (1988), the establishment of a common market *per se* is believed to bring important reductions in the costs of trade and economic activity. However, the new scenario of a European Monetary Union (EMU) has sparked significant debate on the likely effects of a reduction of the real exchange rate variability on the promotion of trade and economic activity. A recurrent question is whether the induced patterns of trade significantly shape economic activity within regions. The importance of this question lies in that the establishment of an EMU might lead to an increase in the regional heterogeneity of economic activity within the European Union.

The recent literature has emphasized the key role of transport costs as measured by distance to the dynamics of trade and production (Brown and Anderson, 2002). Moreover, exchange rate variability is often understood as a barrier to trade (Rose, 2000). However, most of this evidence on the EU is grounded on country based data (De Grauwe and Skudelny, 2000), while a significant part of the appreciable effects of a monetary union might take place at the regional level (through the so-called real exchange rate effect), although current evidence is still descriptive (Costa-Font and Tremosa-Balcells, 2004). Therefore, there is still significant lack of evidence on the combined effects of real exchange rate variability along with other determinants on increasing aggregate regional trade, and especially in Spain which stands as one of the poorest countries along with Greece and Portugal of the former EU-15.

Yet, most of the barriers to trade and economic activity are well documented. European Monetary Union (EMU) member states, such as Spain, now are confronted with 'smaller barriers' to trade as compared to those existing at the beginning of the European integration process in the early 1990s. Nonetheless, following the classical literature, the effects of the EMU are likely to exert, in addition to a 'pure trade creation', some 'trade diversion'. That is, the EMU, once it took place as a currency arrangement, might enhance additional effects outside the EMU given that the EMU might induce other countries to establish commercial arrangements with EMU member states and regions. This effect might suggest that a monetary union is not strictly speaking an 'endogenous arrangement' to internal (regional trade) trade, as far as trade promotion might have been encouraged more intensively in the years prior to the establishment of a monetary union, whereas the monetary union might have more important external effects. Accordingly, it is important to examine the effects of the reduction in the exchange rate variability before the EMU took place, which in the case of Spain dated back to 1999, when the exchange rate of the former national currency (peseta) became fixed. On the other hand, there is not yet sufficient data at this stage to examine the effects of the EMU at the regional level.

This paper empirically examines the determinants of regional trade between each of the Spanish regions and the European Union, and especially the impact of exchange rate variability. Furthermore, we examine the impact of trade on economic activity using a 2SLS model. In doing so, we attempt to test the hypothesis of a common currency as being a net trade encouraging arrangement, and thus fostering economic activity indirectly at the regional level. Finally, in the light of the paper results, we discuss the potential inconsistencies between trade integration and fiscal policies in Spain. The first aiming at fostering economic activity of frontrunner regions while the second leads to the redistribution of such gains across regions.

The paper is organized as follows. Section two presents a brief review of the relevant literature, outlining some theoretical underpinnings and preliminary empirical analysis. Section three describes the data and empirical methodology. Section four sets out the empirical results, and the paper finalizes with a summary and a discussion on the regional policy implications.

Theoretical Background

The decision to share a common currency has been an issue under scrutiny since the process of nation-state formation, and is closely associated with aspects of sovereignty (Alesina and Barro, 2002). National economies have always sought to extend their economic influence by extending the use of their currency over vast economic activities. However, to date, the establishment of a common currency enhances in addition to the symbolic value that

the nominal exchange rate is no longer a policy tool to artificially modify economic competitiveness. As with most other economic decisions, a set of countries adopts a common currency when the net benefits of this decision (e.g., trade creation, higher competition, etc) are positive either immediately or in the long run. Among the expected benefits principally two connected effects arise. One is the reduction of transaction costs and, the other is a potential increase of aggregate trade among the European Union (EU) countries and regions resulting from the abolition of previous trade barriers (Frankel and Rose, 1997).[1]

There is a widespread agreement on that the appropriate conceptual framework to analyze whether there are differential regional impacts of a common currency is the theory of optimum currency areas (OCA). This theory has been empirically tested and would seem to successfully predict the variability of exchange rates between currencies in several specific economic areas at the national level (Bayoumi and Eichengreen, 1998) and at the regional level (Costa-Font and Tremosa-Balcells, 2003). The latter employs the notion of the real exchange variability to build up a currency union index at the regional level.

If a reduction in the real exchange rate leads to an increase in trade we should expect trade to shift as a result of the setting up of a monetary union. Following this stream of thought, Frankel and Rose (1997, 1998) argue that a change would be expected in the structure of European economies. Thus, the elimination of nominal exchange rate variability is expected to increase trade and, in turn, lead to a rise in the business cycles synchronization. This argument has latter been named as the 'endogenous convergence hypothesis'.

Along with the trade creation effects, the elimination of exchange rate variability might bring benefits resulting from industrial specialization, as argued by Krugman (1993). Indeed, regions differ in their capacity to take advantage of the greater trade intensities resulting from regional participation in the economic integration process as a result of differences in economic specialization. Therefore, if an increase in trade goes hand in hand with economic diversification, the net effects might exacerbate economic asymmetries between relatively more and/or less specialized regions. Moreover, some empirical evidence at the regional level in Spain (Esteban and Gual, 1999) already demonstrates that even though trade linkages with the European Union are extensive in most Spanish regions, the degree of synchronization of business cycles is still noticeably small being two regions, Barcelona and Madrid the front-runners.

Interestingly, most of the attempts to explain the bilateral volume of trade between countries require taking into account a gravity approach constrained to the available data. Gravity models applicable to international trade have a long history, dating back to the pioneering works of Tinbergen (1962) and Pöyhönen (1963), among many others. Numerous applications of the gravity approach to international trade have proven its consistent ability to statistically explain a large proportion of international trade (for a recent literature review, see Frankel, 1997). Even so, the statistical success of the gravity approach is most limited when the aim is to understand trade, in the sense that this approach cannot effectively address all the underlying causes of trade between countries. The functional form has to be derived from the Heckscher-Ohlin theory (Deardorff, 1995) or from other models based on increasing returns (Krugman, 1979; Helpman and Krugman, 1985).[2]

In the European Union, studies focusing on the impact of exchange rate uncertainty have identified evidence that exchange rate variability negatively affects bilateral trade flows (De Grauwe and Skudelny, 2000; Frankel and Weil, 1985). Indeed, De Grauwe and Skudelny (2000) confirm with their estimates a significant negative influence, concluding that the EMU can potentially generate substantial new trade flows within the European Union (in their model with country specific coefficients, the trade gains from the monetary union were higher for Southern European countries, as well as for Finland, Ireland and the United

Kingdom). However, Frankel and Rose (2000) argue that price stability improves the performance of an economy, which is principally channelled through trade.

In America, gravity models have shown to explain trade patterns between Canadian and US regions (Brown and Anderson, 2002). Output and distance were found, respectively, to be positively and negatively related to trade. This analysis demonstrates that, after controlling for variations in output, distance, wages, productivity and localization economies, the border remains a significant barrier to trade (but this border's influence varies across sectors and is related to the presence of tariff and non-tariff barriers).

Rose (2000) estimates the effect of currency union membership on international trade and finds that bilateral trade was higher for a pair of countries that used the same currency than for a pair of countries with their own sovereign monies. This was true after controlling for a number of factors, which might affect trade as viewed through the gravity approach. Thus, he states that trade between a pair of countries is proportional to their combined incomes and inversely proportional to the distance between them. In this way, he concludes that currency unions promote bilateral trade and overall openness, and as a result of this, there is an increase in economic growth (he calculates that belonging to a currency area increases the effects on trade threefold).

In another contribution, Glick and Rose (2002) employ a large panel data set to estimate the effect of currency union on trade. Using data on annual bilateral trade among over 200 countries from 1948 to 1997 and controlling for a host of other influences, the authors find that a pair of countries which joined/left a currency union experienced a near-doubling/halving of bilateral trade. This result is economically large, statistically significant and seems to be insensitive to a number of perturbations in their methodology.

Thom and Walsh (2002) also use a gravity model to analyze the rate of growth of Anglo–Irish trade, which did not decline significantly as a result of ending the link between the Irish pound and sterling in 1979. This result contrasts starkly with those of Rose (2000) and Glick and Rose (2002), who claim that leaving a currency union, can lead to a halving of trade between the former partners. Yet, this conclusion is not surprising in view of the contrast between the Irish–UK union and most of the unions in their samples. It has to be acknowledged that the Irish–UK currency union is an outlier, because it took place between two members of the European Economic Community and ended without any disruption of the free trade and commercial relations between the former partners.

In the light of this literature, this study will focus on explaining aggregate regional trade and thus, although we employ a measure of distance, we do not explicitly employ a gravity model as is not appropriate for our data. Instead, the methodology employed is a standard model of trade propensity where distance along with some relevant OCA determinants is relevant to explain regional trade. Golstein (1995) argues that geographic situation is an important, relevant variable in explaining the intensity of trade between countries.[3]

Empirical methodology

This section describes the data used as well as the methodology employed to estimate the impact of exchange rate variability on trade. Table 1 presents the evolution over this period of the territorial distribution of GDP, exports, and population. The most interesting result is the considerable export specialization observed at the regional level, as predicted by Krugman (1991). Indeed, the most open and integrated regions at the beginning of the European economic integration process (e.g., Catalonia and Valencia) were expected to benefit more from integration.

We use panel data methods, including observations for the 17 Spanish regions, for each year of the period 1990–1999 (both included). The variables considered to measure regional trade in Spain are regional exchange rate variability, north latitude with Germany, size of the region, and regional GDP. We compute the real exchange rate at the regional level, considering that prices are a linear function of tradable and non-tradable goods of each region (j) and Germany (A)

$$P_{t,j} = P_{nc,j}^{\theta_j} \cdot P_{c,j}^{1-\theta_j}$$
$$P_{t,A} = P_{nc,A}^{\theta_a} \cdot P_{c,A}^{1-\theta_a} \quad (1)$$

where θ_j, θ_a are the shares of non-tradable goods in Spanish regions and in Germany. Thus, real exchange rate at the regional level is:

$$ER = 1 / \alpha \sum_{i=2}^{n} (\hat{P}_i + \hat{E}_{i1} - \hat{P}_1) \quad (2)$$

Figure 1 shows the patterns of real exchange rate (ER) variability measured, as shown in (2) for the period 1991 to 1999. Substantial differences were found across Spanish regions expected; it was found that specialized regions as well as those with fewer propensities to trade showed higher exchange rate variability (Costa-Font and Tremosa-Balcells, 2003). The data on trade was colleted from the Consejo de Camaras de Comercio exterior, and the data on regional income and population was gathered from the Spanish Institute for Statistics INE, Contabilidad Regional de España).

The determinants of regional trade are defined in equation (3). Essentially, trade (T_{it}) measured as imports and exports, is assumed to depend on the existing barriers to trade. In particular we consider three of them as covariates. First, distance (D_i) to the European core, which we assume is the distance to Germany (which is independent of time). On the one hand, Germany is broadly taken as a benchmark of the European center of gravity. On the other hand, distance is a well known barrier in all gravity models approximating both transport costs and economic localization. Second, as explained above, real exchange rate variability (ERV_{it}) is broadly a measure of price stability which fosters trade to allow a more 'transparent' determination of mark-ups and prices across a specific integration area. Finally, regional income per capita (Y_{it}) is the most prominent determinant of regional trade. Accordingly, the 'simple' trade equation estimated using OLS can be written as follows:

$$T_{it} = \beta_0 + \beta_1 D_i + \beta_2 ERV_{it} + \beta_3 Y_{it} + \beta_4 Time + u_i \quad (3)$$

However, given the potential endogenous economic activity (measured by regional income) and trade, we employ a 2SLS specification. The estimation method employed includes regional income, instruments for trade and regional population which are those included in equation (3) but not in equation (4). The equations include as repressors the following variables: regional income per capita (Y_{it}), population (P_{it}), trade (T_{it}) and the initial level of income per capita Y_{it-n} and a random disturbance (ε_i). In the first step, we seek to explain the effect of exchange rate variability on regional trade in Spanish regions, while in the second step we seek to explain the effect of regional trade on regional income across Spanish regions. The resulting estimated equation is presented in (4):

$$Y_{it} = \alpha_0 + \alpha_1 P_{it} + \alpha_2 T_{it} + \alpha_3 Y_{t-n} + \varepsilon_i \quad (4)$$

It should be noted, that equation (4) turns out to be a simple growth model which is suitable for the purposes of the study.

Results

Table 2 exhibits the results obtained using OLS to measure the effect of exchange rate variability on regional trade in Spanish regions. The results show that the models fit well and the coefficients of the gravity models are statistically significant. Thus, especially significant are the explicative regional variables, where, as expected, distance (measured in North-South Latitude) is positively correlated with regional trade, and regional exchange rate variability again unsurprisingly shows a negative and significant coefficient. However, we tried other specifications to measure distance in terms of Km to Germany. Interestingly, when distance was measured in terms of kilometres, this variable was insignificant. There are several possible explanations for this, most of which relate to the fact that land transport cost might not be as relevant as other costs associated with distance. Finally, the role of regional income is significant at the ten per cent level, displaying the coefficient robust to the inclusion of the time effect although the effect was small.

On this basis, our results indicate that the closer Spanish regions are to the core of the European Union, the greater their regional trade. Second, the lower the regional exchange rate variability, the higher their trade is. A positive coefficient of distance provided evidence that northern and peripheral Spanish regions (Catalonia, the Basque Country, Navarra, Aragon and Valencia: the Spanish front-runner regions) are more likely to trade with the European Union than are southern regions. Thus, for instance, every year Madrid exhibits a deficit in its balance of trade and this seems to grow year by year despite that it is the political and administrative capital. If one compares Madrid to Catalonia, one may observe in the both regions between 1990 and 1999 a pattern of increasing its export share in Spain (from 22 to 29 per cent) and also in the world (from 0.33 per cent to 0.55 per cent). These results are consistent with Krugman (1991) in that the EMU process particularly benefits the most open and integrated regions, at least at the onset of the integration process as a result of the effects of a reduction of transaction costs as well as an increase in productive specialization. In addition, results confirm the asymmetric territorial impact of monetary policy, which has been often described in the economic literature (see Carlino and DeFina, 1998, and Tremosa and Pons, 2001, for some estimates — using a VAR model — for the USA and the EU, respectively).

Let us now estimate the possible effect of economic integration on growth. Table 3 exhibits the regression results of the 2SLS estimation to explain the effect of regional trade on regional growth in the same sample of Spanish regions. Results reveal an acceptable level of the fitness, and the coefficients of the regression models are statistically significant. Interestingly, regional trade exhibits a positive relationship with regional growth, and regional population displays a negative relationship with regional income (economic activity). Once accounting for endogeneity, trade as well as population size displays significant large effects on growth. This can be interpreted as the result of trade being vibrant when regions are not only dynamic but also attractive markets for exports from other EU countries. On the contrary, our results show that there is no statistical relationship between initial levels of regional GDP, suggesting limited catching-up effects once accounting for regional trade.

Conclusion

This paper aims at providing suggestive evidence on the aggregate effects of the EMU on promoting trade and regional growth. We examine the effects of exchange rate variability on Spanish regional trade for the period 1990–1999. Significant heterogeneity is found among Spanish regions in the trade response to the reduction of real exchange rate variability. This is due to the great differences that still remain at the regional level in Spain in terms of GDP, trade, openness, and productive specialization.

Although some per capita GDP convergence was observed at the country level within the EU during the period, this phenomenon does not hold at the regional level (Costa-Font and Tremosa-Balcells, 2004). Existing heterogeneity in Spain highlights the influence of economic and monetary integration factors in explaining regional income distribution. Intensive fiscal redistribution policies have been implemented by different Spanish governments over this period. Indeed, with the exception of certain regions holding historical fiscal rights, the vast majority of general taxes are still collected and administrated by the Spanish central government to ensure that benefits from this integration process produce investments in other regions, especially the relatively less dynamic regions (Costa-Font and Tremosa-Balcells, 2003) and that inter-territorial solidarity is prioritized over efficiency (Castells et al., 1999; Ros et al., 2002)

The results from this paper can be interpreted as follows. The promotion of regional trade increased the heterogeneity of economic activity in a context where there is no evidence of income convergence. On the other hand, due to fiscal redistribution policies and cumulative flows of public investment, the Spanish front-runner regions' share of public capital stock is moving away from the European shares. Investment in physical, human and technological capital in these regions has not grown with the same intensity as GDP or exports over the period 1990–1999. Accordingly, we believe that if this situation persists in the long run, we might expect that front-runner trade regions of countries where fiscal policies accompany trade policies will be expected to improve their economic performance. Of course, a possible limitation of our analysis is that the Spanish example cannot be extrapolated to other countries. However, holding this assumption over would lead us to foresee the process of economic divergence with the EU in the near future. Furthermore, during the period 1994–999, the European monetary policy (with low inflation, low interest rates, and a non-appreciated exchange rate) tended to benefit the most open and integrated Spanish regions despite the fact that Spain's recent economic pattern was defined by high inflation and interests rates.

Public policy implications of these results are manifold. If the EMU benefits more the most opened and integrated European regions and if labor mobility remains limited, then fiscal policies at the country level end up with 'redistributing the gains from regional trade' rather than providing incentives to the economic activity. Yet, in the near future, the rise of regional inequalities is expected to bring political issues to the fore as well as other economic considerations. In certain countries, as is the case of Spain, front-runner regions (e.g., Catalonia) exhibit significant fiscal imbalances with the central Spanish State that flow from the lack of correspondence of trade and fiscal policies. Recent estimates indicate that Spanish front-runner regions such as Catalonia show a growing fiscal deficit of 8 per cent of Catalan GDP in 1998 (Castells et al., 2000) and 10.5 per cent of Catalan GDP in 2000 (Alcaide and Alcaide, 2002). Furthermore, if this increasing solidarity-effort of Spanish front-runner regions continues in the near future within country level, which might be the case if EU regional policy focuses on eastern European countries, Spanish regions might be following a

'convergence in the inefficiency'. This pessimistic scenario is grounded on the normative judgment that the objective of overcoming differences between countries and regions must not affect the competitiveness and real convergence of Spanish front-runner regions, which might have significant economic and political implications.[4]

Footnotes

* Corresponding author: Joan Costa-Font (PhD), Departament de Teoria Ecòmica, Universitat de Barcelona, Diagonal 690, 08034, Barcelona, Catalonia, Spain. Fax: +34934021937 Tel:+34934024333. Email: j.costa-font@lse.ac.uk. Acknowledgements: We acknowledge the helpful comments of the journal referees as well as the comments of the participants of the European Regional Science Association Meeting, Zagreb, 2001. We strongly appreciate the funding from the Comisión Interministerial de Ciencia y Tecnologia, number CICYT-SEC2002-0321.

1. There is also some uncertainty resulting from the removal of the currency specific exchange rate risk.

2. Initially in applying a gravity approach, most studies found a significant negative impact of exchange rate variability on those international flows. Since the end of the 1980s, evidence of this impact is mixed: some authors find no significant influence while others show significant negative effects. This might possibly be because more data on the flexible exchange rate system (after Bretton Woods) were available (see Sekkat, 1998, for a complete literature survey).

3. Thus, it would explain the strong centripetal forces that exist in the European Union (in terms of activity and production concentration): the attraction exerted by the 'great banana' (the area limited by the cities of Milan, Munich, Frankfurt, Amsterdam, London and Paris) is one of the biggest problems faced by the peripheral European countries, on their way to economic growth and to GDP convergence

4. Alesina, Spolaore and Wacziarg (2000) have developed a theory of country size which is of some relevance here as they discuss the role of regional size in determining economic success. Their most interesting theoretical finding for the results of our study is that during times of closeness to international trade, regions would attempt to integrate into large countries to attain economies of scale, whereas during periods of openness they might afford the 'luxury' of splitting up into smaller countries. Thus, an increasing economic and monetary integration of Spain in the EU might lead to an incompatibility with regional redistribution mechanisms and thus, fostering the support for secession of frontrunner areas.

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Figure 1. Average real exchange rate variability, 1991–1999

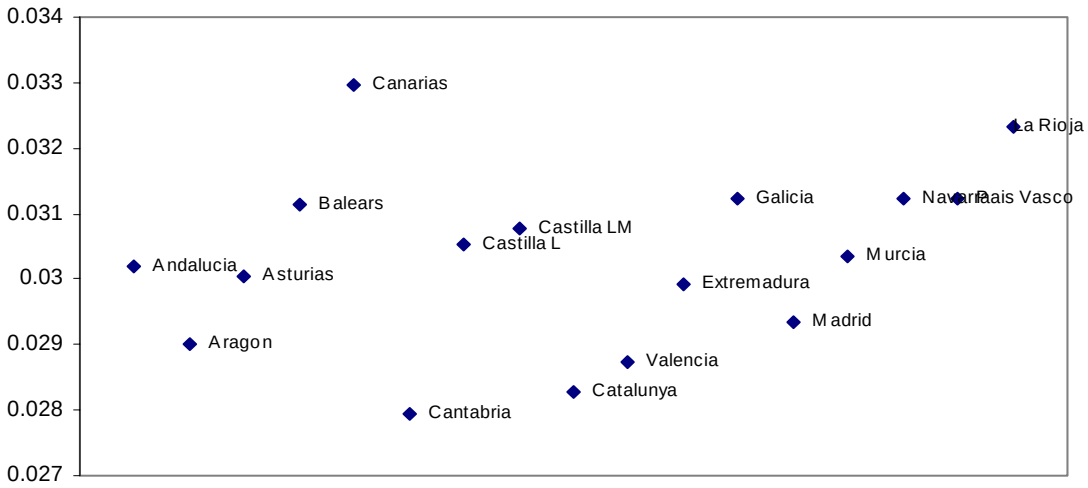

Table 1. Description of patterns of trade, production and population among Spanish Regions 1990–1999

	GDP (%)		Exports (%)		Population (%)	
	1990	1999	1990	1999	1990	1999
Andalucia	12.85	13.34	9.86	8.12	17.86	18.26
Aragón	3.32	3.28	5.29	4.73	3.08	2.95
Asturias	2.55	2.31	2.22	1.29	2.84	2.69
Balearics	2.65	2.79	1.26	0.84	1.82	2.03
Canaries	3.63	3.79	1.51	0.63	3.85	4.15
Cantabria	1.29	1.26	1.13	1.09	1.36	1.32
Castilla-León	5.85	5.74	4.94	6.82	6.60	6.17
Castilla-La Mancha	3.48	3.44	1.42	1.43	4.28	4.31
Catalonia	19.56	19.45	23.81	28.09	15.64	15.42
Valencia	10.31	10.22	15.99	13.37	9.94	10.15
Extremadura	1.85	1.94	0.39	0.62	2.75	2.67
Galicia	5.90	5.65	5.02	5.36	7.07	6.80
Madrid	16.03	16.68	9.59	11.07	12.76	12.71
Murcia	2.26	2.32	2.75	2.64	2.69	2.82
Navarra	1.57	1.60	3.37	3.99	1.34	1.33
Basque Country	6.12	5.95	10.99	9.64	5.45	5.23
La Rioja	0.76	0.72	0.47	0.76	0.68	0.66
TOTAL	100	100	100	100	100	100

Sources: Papeles de Economía Española, 80 (1999); Cuadernos de Información Económica, 161 (2001).

Table 2.The effect of exchange rate variability on regional trade (OLS)

Variable	Coeff	s.e	t-value	Coeff	s.e	t-value
D_i (Latitude)	0.769***	0.220	3.494	0.770**	0.250	3.076
D_i (Km)	$2x10^{-5}$	$3x10^{-5}$	0.643	$2x10^{-5}$	$3x10^{-5}$	0.625
ERV_{it}	-1.815**	0.774	-2.346	-1.815**	0.795	-2.284
Y_{it}	0.038*	0.022	1.753	0.038*	0.022	1.709
1993				0.075	0.310	0.242
1994				0.023	0.310	0.075
1995				0.042	0.310	0.134
1996				0.035	0.310	0.113
1997				0.019	0.310	0.061
1998				0.011	0.310	0.036
Intercept	0.538	4.608	0.117	0.503	4.737	0.106
R^2	0.26			0.330		
F	4.91			5.060		

Note: All variables are in logs except for the dummies.

Table 3. The effect of regional trade on regional growth (Instrumental variables 2SLS)

Variable	Coef.	Std. Err.	t
T_{it}	0.073	0.031	2.336
P_{it}	-1.153	0.211	-5.463
Y_{t-n}	-0.0001	0.001	-0.138
1993	0.010	0.228	0.042
1994	0.036	0.228	0.156
1995	0.069	0.228	0.304
1996	0.114	0.228	0.5
1997	0.159	0.228	0.699
1998	0.611	0.213	0.71
Intercept	13.966	1.125	12.411
R^2	0.92		
F-Test	199.3		

Note: the fist stage is the same as in Table 3. All variables are in logs except for the dummies.