REGIONAL LABOUR MARKETS

AND INTERREGIONAL MIGRATION:

SPAIN, 1963-1990

by

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ABSTRACT

The Ph.D. thesis submitted under this title consists of three main parts. I start with a description of the regional labour markets in Spain in the last few years. It is followed by a theoretical model of interregional migration, to finish with an empirical exercise on the economic determinants of migration within Spain in recent years.

The first two chapters are dedicated to analyze the composition of the two sides of the labour market, employment and unemployment, respectively, according to various dimensions, such as sectoral employment, sex, age, time unemployed. This study includes not only a description of the evolution along time for each region in Spain, but also a comparison of the relevant structures of the labour market across regions, paying particular attention to the degree of geographical homogeneity of both employment and unemployment.

The theoretical part of the thesis consists of a model of interregional migration. Using recent developments in search theory, the idea consists of being able to specify a migration function from a micro-economic model of utility-maximizing individuals. Each individual will decide the proportion of the searching time he dedicates to search for a job in each region, as a function of, amongst other things, the probability of getting a job in each one of them. However, at the aggregate level we have to take into account the existence of an externality present in the model, as these probabilities depend on the allocation of searching time decided by the individuals. Once this system is solved, interregional migration appears, under certain assumptions, as the product of the number of effective job-seekers at any time from one region into another times the probability of getting a job in this other region. This model concludes with an study of the comparative statics of the migration function with respect to certain exogenous variables.

Finally, the last part is dedicated to an estimation of the reduced form derived from the same principles as the theoretical model. It is done for the case of the migration flows that took place amongst the Spanish regions from 1963 till 1986, and it examines the economic determinants of interregional migration, addressing the issue of why these movements came down when they were more needed to reduce unemployment differentials.

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INTRODUCTION

Recently, there has been considerable attention paid to the question of the movements of the labour force across regions within the same country. The large and sustained increases in the unemployment rate that most countries have experienced have something to do with the renewed interest on this topic of internal migrations. In particular, some of the recent research along this line has been related to the issue of geographical "Mismatch" in the labour market. By mismatch is meant the inadequacy of the labour supply to the requirements of demand. It shows up through the persistence of the differences in regional unemployment rates.

As some people have pointed out, it is important to understand the process of the interregional movements of the labour force specially due to the role that these migrations can potentially play in bringing down the differences in regional unemployment. In this respect, it has been observed in a number of countries that, surprisingly, these flows came down precisely when they were more needed. In fact, the interregional migration rates were lower when national unemployment rates and also regional unemployment differentials were increasing through the late 70's and early 80's.

The present research is an attempt to shed some light into this question of regional labour markets and the economic aspects of the interregional migration function for the particular case of Spain during the last three decades.

The analysis of the regional labour markets in Spain is currently an issue of some importance. The reason is that, since 1978, when the Spanish Constitution was approved in referendum, there has been a considerable decentralization of economic and political decision-making towards the Autonomous Communities. This process has given some incentives to study the regional economies on their own, analyzing them with some degree of independence from the rest of the country.

In this research, we have addressed the question of the degree of geographical homogeneity of the Spanish Labour Market and how it has evolved during the last fourteen years. To carry out this study, we have considered in turns both employment and unemployment. In order to identify the sources of heterogeneity we have analyzed different

dimensions of the market. The final purpose of this analysis is the study of the evolution of the Spanish labour market from the regional point of view, specially during the period of the crisis and the subsequent recovery.

From the employment point of view, we have also taken the relative importance of the main sectors in the economy of each region with the intention to check whether there are some other regional factors which can explain the evolution of the degree of regional homogeneity of the demand side of the labour market. This analysis has been complemented with the study of various aspects of unemployment, such as the duration structure, the sex composition and also the sectoral origin of the unemployed.

This consideration of the evolution of the regional labour markets in Spain leads to the analysis of the economic determinants of the behaviour of the labour force with respect to migration. The large majority of the models and empirical studies carried out so far are generally based upon human capital theories. However, we will follow an alternative route. Recent studies about the labour market consider the "hiring" function, as a way of representing the matching between vacancies and unemployed people, a central element in the analysis of this market. We will take this concept and use it to develop a new model of migration. It is new in the sense that starts from a different concept to the human capital theories. In this respect, we use search theories to get to an aggregate interregional migration function, from the basis of individuals that behave in an optimizing way. This procedure will provide the model with sound microeconomic foundations.

This model will be used to find out the economic determinants of the Spanish internal migration. Using a similar line of reasoning to the one used to develop the theoretical model, it is possible to obtain an equation suitable to be estimated. In this respect, this equation has already been applied to British data, which will allow us some ground for international comparison, together with some reassurance about the validity of this new model. On the other hand, different studies of migration within Spain have also been carried out. It will give us a chance to compare our approach with other ones based on human capital theories. Furthermore, this empirical analysis to the case of Spain will serve as a way of checking how well the new model developed is able to explain the evolution of interregional

migration, and whether it is worthwhile to do some further research along this line.

Chapter 1

EVOLUTION OF REGIONAL EMPLOYMENT

in SPAIN: 1977-1990

1.1 INTRODUCTION

The purpose of the present chapter is to carry out a detailed analysis of the evolution of employment in Spain in recent years (1977-1990) from both its sectoral decomposition and also the geographical one. Similar analysis about regional characteristics of the Spanish labour market have been carried out recently by, among others, Giráldez and Gómez (1988) and Muro (1988).

The characteristics of the Spanish labour market during this period has been widely explored in a number of studies, and it is not the intention of the present one to repeat them in here. What we intend to do is to look at the evolution of employment over the last fourteen years in the different regions as well as for the main sectors in the economy. The combination of these two dimensions of the labour market will help us to understand how homogenous the Spanish labour market is from a geographical point of view. **Figure 1.1** shows the map of Spain divided into the 17 Autonomous Communities which form the regions considered throughout this study[1].

It is clear that the various regions in Spain have a relative specialization in different sectors of the economy. We intend to report these differences by looking at the importance of each sector, through their employment share, in each region. The hypothesis to be tested in this respect is that the performance of employment in the regions is fully explained by the various sectoral compositions of the regional economies.

The alternative hypothesis is that there are some regional-specific elements which will make of the economy of each region something more than just an extension of the national economy with a certain sort of sectoral specialization.

The conclusions about this point are important because they will be useful to understand the degree of geographical homogeneity of the Spanish labour market and outline the regional differences. This is interesting for the present research as it affects the mobility of the labour force, which is the last aim of the investigation.

The period chosen to analyze the variables goes from 1977 to 1990. The reasons for this election are various. The first one is that 1977 was the year of the "Moncloa Agreements", which led to the implementation of strong measures against a rising inflation. It also meant a sharp increase in unemployment from that year until 1985 [2]. During this period, employment was also decreasing continuously. Thereafter, this trend has been reversed and a recovery in employment taken place. Therefore, we might say that the period chosen is sufficiently long to cover almost a full economic cycle with an initial period of crisis followed by the upturn in the labour market.

The second reason concerns the data. The *Encuesta de Población Activa*, **E.P.A.** (Spanish Labour Force Survey), has suffered some methodological changes since it was first introduced in 1964. The latest of these changes took place in 1987 in order to adequate it to the E.E.C. The **Instituto Nacional de Estadística, INE** (Spanish National Statistics Office) has homogenized the series obtained from the EPA back, but only to start from the third term of 1976. As the data used in here has been provided by the INE, the first complete year in the series is 1977.

1.2 HISTORICAL INTRODUCTION

Before we analyze the evolution of employment at both the sectoral and regional levels from 1977 to 1990, it is convenient to describe, although briefly, what has been the development of the Spanish economy previous to this period.

From the beginning of this century there has been a continuous transference of the importance of the economic activity in Spain away from agriculture towards the rest of the sectors. However, it is widely recognized that the deepest changes took place from 1960 onwards. During that decade, the relative aperture of the economy to foreign trade helped to reduce the gap that alienated Spain from the rest of western countries, as it was able to keep a sustained economic growth at an average annual rate of around **7%** of increase in the **GNP** from 1959 till 1973 (Donges (1976), p. 141). Although employment did not reach this rate, there were important changes in its structure from the sectoral point of view. It is also

important to mention that these changes were accompanied by relatively large movements of the labour force from certain areas to those which experienced a more intense process of industrialization[3].

In 1960, agriculture was still the most important sector in Spain in terms of employment as it accounted for **43%** of the labour force. As it can be seen from **Figure 1.2**, its continuous decline was accelerated during the following years. Thus, in 1975 it provided less than **25%** of the national level of employment. As **Table 1.1** shows, there was a considerable reduction of about **35%** between 1962 and 1975 in the number of people employed in this sector. The explanation for it lies in the fact that it was during the 60's when the rural exodus took place in Spain, with large movements of people, specially young, from the rural areas in search for a job in the more prosperous manufacturing and construction sectors.

The industrial sector was the most dynamic during this time with great increases in the output . In fact, its share of the **GNP** went up from **26.3%** in 1964 to **33.5%** in 1975. However, looking at the figures reported in **Table 1.1**, the contribution to Spanish employment, although positive, was fairly moderate in relative terms. This shows up also in **Figure 1.2**, as its share of national employment increases very slightly, just over 2 percentage points from 1962 till 1975. This is consistent with the well known fact that in this period there were important improvements in the productivity of the labour force. Within manufacturing, the largest increases in employment were provided by the consumer goods sector and metallurgy and chemical industries, together with some other basic ones, which were heavily subsidized by the State. On the other hand, some traditional industries like textiles experienced an important reduction not only in employment, but also in their relative contribution to the manufacturing value added in this period of expansion[4].

Construction was very important as it represented the channel through which part of the labour force moved from the agricultural sector to the manufacturing one and also to some countries in Europe. The boom in this activity, specially during the first half of the Sixties, was due mainly to three factors:

1. The investment in much needed infrastructure demanded by the modernization of

the country

2. The reactivation of the housing market as a consequence of the large number of migrations

3. The additional demand created by the developing of tourism as an economic activity of great importance, with the construction of a large number of hotels and apartments.

On the other hand, the service sector was the one with the largest contribution to the increase of employment in Spain during the period. Actually, when considering the employment created jointly by the manufacturing, construction and service sector, the latter accounts for **63%** of the total number. In 1965 it provided **1/3** of the total employment, and this percentage grew continuously as its employment figure went up by **40%** between 1962 and 1975, as reported in **Table 1.1**. As a sign of the interaction between service and industry, professional services to the firm (banking, insurance,...) was the most significant group within the sector, together with those activities related to the tourist industry. It was also important the contribution of public employment as a substantial increase in the services provided by the State took place, specially in the fields of education and health.

These changes led to an economy in which agriculture dropped from being the main sector, from the employment point of view, to the third place, while the service sector has replaced it in the top position. **Figure 1.2** shows clearly the evolution of the Spanish economy in this respect during the period that covers the decade of the sixties and the first half of the seventies. Although it is not clear from the figures in **Table 1.1**, it is important to stress the intensity of the process of industrialization the Spanish economy underwent during this period. It does not show up in the employment figures because of the importance of the increase in its productivity, which has already been mentioned.

The process of deep economic changes that took place in Spain and that has just been described briefly was not territorially homogenous. Actually, the regional dimension which accompanied it is certainly important in order to understand the regional impact of the crisis.

During the period of high growth, the most favoured regions by the inflow of

investments were those with an already important industry. Traditionally these regions have been Cataluña, País Vasco and Madrid. Neighbouring regions also experienced a certain industrial expansion, like Asturias and Cantabria in the North, together with Valencia in the East. Therefore, it led to a stronger concentration of the industrial activity in the already leading regions.

At the same time, this unequal regional growth was reinforced by the migratory movements from the mainly agricultural regions, so that capital was not constrained by the supply of labour as they meant the incorporation of a large number of people into those regions with greater demand.

In order to support this hypothesis of increasing industrial concentration during these years, we can add that in 1962 over **54%** of the national employment in the manufacturing sector was concentrated in Cataluña, Madrid, Valencia and País Vasco. In 1975 these regions were providing almost **60%** of the manufacturing employment.

Figure 1.3 also highlights the territorial concentration of the Spanish industry. It is a map of Spain indicating the regions with a proportion of employment in manufacturing above the national average in 1962 and also in 1975. As it can be seen, they are located in the North and in the East of Spain, and there is hardly a change in the main manufacturing regions along the years. Madrid drops out of this group in 1975, but this is due to the large impact the service sector has in the capital's region. On the other hand, two more regions are added to it: La Rioja and Aragón. However, this can be seen as the result of some spill-over effects coming from two regions with an important concentration of industries.

With respect to the service sector, there is a general movement in all the regions towards an increase in the number of employments provided by it. But then again, as in the case of manufacturing, these increases are not homogeneously distributed among the regions. Accordingly, there has been some changes in the ordering of the regions by the importance of the service sector from 1962 till 1975. **Table 1.2** gives us the regions with a percentage of employment in services above the national average in 1962 and in 1975. Cataluña and País Vasco are no longer within these top four regions by the end of the period.

They have been replaced by Canarias and Andalucía. In the case of Madrid, the importance of the service sector is not new to the period and, as it has already been pointed out, it is a consequence of being the capital of the nation. Canarias and Baleares, on the other hand, have undergone a huge transformation in the service sector. Its participation in the regional economy in both cases has increased so much that it provides the absolute majority of the employments. Undoubtedly, this is due to the impact of tourism in Spain during the sixties and early seventies, which was specially significant in these two regions. Andalucía is an altogether different case, as the importance of the service sector is chiefly the result of the bad performance of the rest of the regional economy. In fact, the last column in **Table 1.2** gives the rate of growth of the employment in this sector for these regions, and while the rates of the other three are the highest in Spain, Andalucía is below the national average with just **2.74%** of annual growth rate between 1962 and 1975, while the Spanish one was about **3.11%**.

From the territorial point of view, the evolution of agriculture also shows that the modernization of the economy in Spain did not act to correct regional disequilibria. There is a loss of agricultural employment in every single region during all the period. However, unlike in the service sector, it did not change the ranking of the regions according to the share of employment in this sector. **Table 1.3** indicates the regions with the highest shares in 1962, and they are the same that those in 1975. Obviously, the shares are lower in the latter year as this period is characterized by an intense destruction of employment in agriculture. However, the reduction in these shares does not mean that the rest of each regional economy has increased its employment potential in order to be able to absorb the people expelled from agriculture. Thus, Extremadura, Castilla-León and Castilla-La Mancha are among the four regions with the largest relative losses in manufacturing employment and, at the same time, among those with the lowest growth rates of employment in services. Galicia, on the contrary, behaved much like the national average in terms of growth rates in employment in the rest of the sectors.

The conclusion is that during the sixties and the early seventies Spain went through a period of intense change in its economy. Manufacturing experienced an important increase in its output, although its employment level did not go up that much because of the

large improvements in productivity. Agriculture, on the other hand, continued loosing employment and importance in the economy, while the service sector was the most dynamic one in terms of creation of employment. All of this led to a shift of the economy towards a more service oriented one, with a more productive manufacturing sector.

From the geographical point of view, this period of intense change, did not originate any significant reduction in the regional differences. The North and the East continued being the main manufacturing regions in the country, while the Centre, except Madrid, and the West were the areas with the largest proportions of employment still in agriculture and the weakest manufacturing sectors. The only important changes from the territorial distribution perspective have been brought by the impact of tourism. It has helped Baleares and Canarias to become regions where the majority of the jobs are provided by the service sector.

In this process, interregional migration has played a very important role. People liberated by the agricultural sector was able to find alternative jobs in the rest of the economy (or, alternatively, in Europe). In order to get them, they had to migrate to a different region. Therefore, the supply of labour moved to meet demand in the regions were the latter was provided. It made possible the maintenance of the regional differences in terms of economic structure.

1.3 IMPACT OF THE CRISIS ON REGIONAL EMPLOYMENT

Let us turn now to the analysis which is the centre of this paper, and that relates to what has been the effects of the last economic crisis on the employment structure of the various regions of Spain. In this respect, we want to stress the geographical differences in order to obtain some conclusion about the degree of homogeneity in the labour market across the Spanish regions. For this purpose we will use the figures of sectoral employment for each of the 17 regions from 1977 till 1990, comparing those among them and also with the data for the whole of the country.

At the beginning of this period the Spanish economy was clearly biased towards the service sector, which provided over **41%** of total employment, being the largest sector in this respect. Manufacturing was the second sector by the number of employed people: **27%**, which increases up to **37%** when construction is included. Finally, agriculture, although it has experienced a large outflow of labour force, still accounted for over **21%** of the national employment.

Looking at the geographical distribution of the sectoral shares of employment in 1977 (**Table 1.4**) we can distinguish some areas depending on the relative importance of each sector. Thus, the mainly manufacturing regions are located to the North and to the East of Spain. Alternatively, the regions with the highest proportions of employment in the service sector are, precisely, those along the Mediterranean coast, plus Baleares together with Madrid and Canarias; reflecting the different impact tourism has had on the Spanish regions. Agriculture, on the other hand, is proportionally more important in the Centre, except Madrid, together with Galicia, in the North-West.

1.3.1 Evolution of Aggregate Spanish Employment

Let us start with an overview of the behaviour of employment in each sector along the period considered (1977-1990) in Spain considered as a whole.

Figure 1.4 depicts the evolution of total employment together with its sectoral decomposition for Spain. By looking at overall employment, we can easily distinguish two different periods: from 1977 employment is continuously decreasing until 1985; that year is the end of this subperiod as from then on employment increases every single year. Thus, we can say that there is a crisis in employment followed by a recovery and that the turning point in this process is the year 1985.

During the first eight years, Spain lost almost **14%** of the employment, which gives an idea of the depth of the crisis. However, the subsequent recovery is stronger. In just five years, Spain increased employment by **18.2%**, and already in 1989 it had managed to re-create all the employment lost from 1977 till 1985. This achievement is less impressive if

we consider that, nevertheless the increase in employment has not been able to keep up with a growing labour force.

Turning now to sectoral employment, we will begin with the agricultural sector. As it has been mentioned earlier, Spain is a society undergoing a big transformation from a mainly agricultural economy into a more service oriented one. Previous to this period, agriculture had diminished its employment figure by a large amount. This secular downward trend is also followed during these years: it continued loosing employment even after 1985, when the economy as a whole started to recover from the crisis, and by 1990 it has lost almost **43%** of the employment level of 1977.

There is, however, one important aspect with respect to the impact of the crisis on the agriculture sector. Examining closely the evolution of its employment figure, we can distinguish a somehow flatter path from 1981 until 1985. The average annual growth rate of employment during these years is about **-1.87%**, which compares rather favourably with the **-4.76%** average annual growth rate from 1977 till 1981 and also with a similar figure between 1985 and 1990. One possible explanation for this slow down in the destruction of employment during these particular years could be the following. As the destruction of employment in the economy extended over time, the opportunities for getting a job became truly scarce (not only due to the lack of vacancies, but also to the increase in the number of job seekers). It means that people might prefer underemployment in the agricultural sector rather than being fully unemployed. Therefore, agriculture could have played the role of being a refuge sector in times of decreasing employment. After 1985, as employment recovers, there is no need for this refuge, and it regains the declining path it had in the late seventies.

In contrast with agriculture, the evolution of employment in the manufacturing and construction sectors seems to represent more truly the economic cycle of the period considered here.

Employment in these sectors was continuously falling until 1985, year in which it reached the lowest level in both cases. From that year till the end of the period, employment was continuously increasing again in both sectors. The reduction in employment was relatively

worse in construction as the loss amounted to **35.7%** from 1977 to 1985, while in the same period, manufacturing lost **23.2%** of its employment level. On the other hand, the subsequent recovery was also more intense for the construction sector, as it increased employment over **442.000** people, approximately **57%**, from 1985 to 1990, overcoming both in absolute and, obviously, relative terms the increase in employment that took place in the manufacturing sector: over **383.000** people, i.e. **14.8%**. As a consequence of that, the level of employment in the manufacturing sector in 1990 was still below the level in 1977. On the other hand, construction was able to make net gains of employment over that interval of time, although very limited.

Finally, the service sector also reflects the two subperiods that characterize the Spanish economy during these years, with the year 1985 as the turning point.

The economic crisis did not hit service employment as hard as it did with the rest of the economy. The main effect is that it was not able to create practically any new jobs: from 1977 till 1985, employment in the service sector increased by **3.25%**. Once the economic phase of the cycle changed in 1985, the service sector proved to be dynamic in the creation of new employment: it grew at an estimated annual rate of **5.24%** between 1985 and 1990 [5]. Actually, not only because it was already the most important sector in the economy, but also due to this ability to create new jobs, the service sector accounts for more than **65%** of the total employment created by manufacturing, construction and services during the last five years of this period.

The previous comments on the evolution of the employment figures will help us to understand now the evolution of the sectoral distribution of employment, which appears depicted in **Figure 1.5**.

As expected, the economy has moved in the direction of a mainly service oriented one. At the end of the period, **54.7%** of the national employment was provided by the service sector, whose percentage has been increasing in a very steady way during all these years. However, until 1985, the gain in this percentage reflects the loss in employment by the rest of the economy, rather than increase in its own.

On the other hand, the fall in the importance of agriculture as a resource of employment in Spain was very important, as in 1990 the share of total employment was already below **12%**. It is significant to note that the role of this sector as a refuge one during bad times shows off again in the employment share as from 1981 to 1985 it hardly fell by half of a percentage point, from **18.8%** down to **18.4%**.

Finally, with respect to the two remaining sectors of the economy, although the behaviour of employment is very similar, the shares evolved in a different fashion during the years of recovery. In the case of construction, it recuperated the relative importance this sector had in the economy in 1977. For manufacturing, however, the increase in employment was not big enough and, therefore, its share of employment continued going down, actually below **24%**, indicating that the increase in manufacturing employment after 1985 was lower in relative terms, though not by much, than the increase of the whole economy.

1.3.2 Links between sector shares and overall effects

In line with this, we can try to explain the changes in employment in terms of the relative importance of the sectors in the regional economies. If we consider that the evolution of employment follows closely the demand side of the labour market[6], then this analysis is an attempt to explain the labour demand across regions, from the initial structure of regional employment.

To this effect, we have run several regressions with the change in employment across regions as the dependent variable, and the share of regional employment of each of the sectors at the beginning of the period as the regressors, taken one at a time. The results obtained are reported in **Table 1.7**.

With respect to the change from 1977 to 1990 we find that when the sectoral shares are considered one at a time, only the coefficients for agriculture and for services are significantly different from zero at the 1% confidence level, although the service sector is able to explain more of the variance of the change in employment, as the R^2 is greater: **41.2%** against **33.6%**. What is important to note is the sign of the coefficients. As one could easily

suspect, a large agricultural sector affects negatively the labour demand, while the service sector has a positive impact on it.

These two sectors are again the only two that have a significant effect on the employment change during the period that goes from 1985 till 1990. In this case, the signs are as expected: positive for the service sector and negative for agriculture. However, the R^2 is much smaller this time: **18.4%** for the first one and just **21.4%** for the latter.

Unfortunately, for the years of the crisis, there does not appear to be any particular relationship between the change in the demand for labour and the initial sectoral structure of employment across the regions.

1.3.3 Regional peculiarities

Turning now to the regional characteristics, we will start by analyzing the behaviour of total employment in the regions.

The first thing we can note when looking at the evolution of this figure is that not in all of the regions the year 1985 appears as the one with the lowest level. Thus, we find that Asturias, Galicia, Cantabria and Extremadura did not start to recover employment until, at least, one year later. On the other hand, in regions like Andalucía, Castilla-La Mancha, Murcia and Navarra employment began to grow on a steady basis earlier than in the rest of Spain.

Apart from these differences in the timing of the recovery, there are also variations in the intensity of the crisis and the strength of the recovery as measured by the proportion of employment lost and gain in the various subperiods. In this respect, we have that, starting with the one of the crisis, the range of proportional loss across the regions is quite wide. La Rioja and Extremadura are the two regions with the larger relative loss: over **20%** of the region's employment was lost then, followed by País Vasco with almost **18.5%**. At the other end of the range we find Baleares and Canarias, where the loss of employment amounted just up to about **6.5%** of the initial figure in 1977. However, these two are extreme

cases as the third region with the lowest loss is Murcia, whose proportion is **12%**, much closer to the national one.

Regarding the period of recovery of employment, there is still a wide range of variation of the relative regional increases. The regions with the largest proportional increases are Cataluña, Murcia and Andalucía, with over **27%** of employment growth. At the other end of the classification there are regions like Galicia, Asturias and Cantabria, with an increment inferior to **9%**. For the changes of employment during this second subperiod it is possible to get some geographical location of the regions just mentioned, unlike in the case of the classification of the regions during the years of the crisis in employment. Accordingly, the more dynamic regions are located along the Mediterranean coast, while the three regions with the worst record in this respect are in the North of Spain.

Considering now the whole period under analysis here, eight of the 17 regions did not manage to reach by 1990 the level of employment they had back in 1977. The worst performers regions are in the North and West of the country, with Galicia and Asturias being the worst of all, as both had an employment level reduced by over **12.5%**. In the case of Galicia this is due mainly to the lack of growth in the last years of the period, while Asturias has been among the worst performers in both subperiods. On the other hand, the regions with the largest net gains are the islands (Baleares and Canarias) together with Murcia (in the South-East), all of them with a growth over **10.5%**. Roughly speaking, with respect to the geographical distribution of the net results of the period, employment growth took place along the Mediterranean coast and in the islands, while the North and West of Spain accounts for the net loss in employment.

1.3.4 The role of regional sectors

The different sectoral composition of employment across the regions plays an important role in explaining the diversity of the evolution of the levels of occupation regionally, specially having in mind that the growth rate changes considerably from one sector to another at the national level. Therefore, we can expect that those regions were the service

sector is more important, or at least has a relatively large share, are among the best performers within the country in terms of employment.

Actually, taking the year 1977 as the reference point for the sectoral composition of employment, the four regions with the largest share of employment in service are among the top five regions with the largest increase in total employment over the whole period. Equally, three of the four regions which have had the most important relative losses are those that had the lowest proportion of people in services in 1977. This is consistent with what has been shown earlier with respect to the links between sector shares and changes in employment, and also with the results reported in **Table 1.4**. Therefore, the heterogeneity in the sectoral composition shows up in the different behaviour of the regional labour markets over the entire period.

During the years of crisis in employment, we should recall that manufacturing and construction were the worst hit sectors[7]. In line with this, we find that from 1977 till 1985, the three regions with the highest share in these sectors (País Vasco, Cataluña and La Rioja) were among the five regions where the employment loss was, relatively, the largest.

Obviously, this period of crisis led to changes in the relative importance of the sectors in the economy of each region. **Table 1.5** shows the employment share of the sectors at the regional level in 1985. Comparing these shares with the regional growth experienced during the last years of the period, we can obtain some conclusions. Although some of the regions with a large service sector are among those with high growth, now there are some other regions that, despite having a service sector share below the national average, have had the largest relative increase in total employment: Cataluña and Murcia. On the other hand, the five regions with the lowest growth have a service sector with a share of the regional employment below the national percentage.

The sectoral composition seems to be less important in the recovery period. This is clearly shown by the comparison between País Vasco and Cataluña. Both regions have a very similar composition both in 1977 and also in 1985. However, the behaviour of the labour market is quite different. While Cataluña has led employment growth in the later part

of the period, País Vasco did not manage to create employment above the national average in relative terms. It points out that, apart from the importance of the sectoral composition of employment in the evolution of the regional figure, there are other aspects, more regional specific such as industrial mix for example, that also must be taken into account when examining the geographical homogeneity of the Spanish labour market.

Following Buck (1970), we are going to apply the "shift-share" analysis approach to the evolution of regional employment. We can try to separate the effect of the sectoral composition on the regional employment growth from that of other regional specific aspects, both in the period of crisis and also during the subsequent recovery. Then, we will be able to check more accurately how important is the sectoral heterogeneity in explaining the regional diversities in the behaviour of the labour market during these years.

We know that the regional employment growth rate (r_j) is the weighted average of the sectoral growth rates in that region (r_{ij}), where the weights are the sectoral shares of employment in the region (s_{ij}) at the beginning of the period under consideration, i.e.:

$$r_j = \sum_i r_{ij} \cdot s_{ij} + \varepsilon \qquad \begin{matrix} i=sector \\ j=region \end{matrix} \qquad (1)$$

where the error term ε appears due to the fact that the growth rates have been estimated regressing employment on time.

From the previous expression, we can get

$$r_j = \sum_i r_{i,Sp} \cdot s_{ij} + \sum_i (r_{ij} - r_{i,Sp}) \cdot s_{ij} + \varepsilon \qquad (2)$$

where $r_{i,Sp}$ denotes the Spanish growth rate in sector **i**.

The first term on the right hand side of the last expression gives the rate at which the region would have grown if all the sectors had increased at the national rate. If we compare the figures obtained from this term alone for the various regions, we will get the differential impact of the sectoral structure on the region's growth.

The second term on the right hand side gives the idiosyncratic part of the regional growth. It shows the one which is due to the geographical peculiarities other than the sectoral structure, such like the particular industrial mix or locational advantages, and which will originate a sectoral growth in the region different to the national one.

Depending on the relative importance of each of the two terms, we will be able to tell which one is the main reason for the heterogeneity in the geographical employment growth in Spain between 1977 and 1985 and also between 1985 and 1990.

The two components of the regional growth have been calculated for each region and for each of the two periods analyzed, and the results obtained are reported in **Table 1.8.**

Starting with the first period, when the crisis in employment took place, we can check that the ordering of the regions by their growth in the case in which all the regions are considered to have the same sectoral growth is practically the same as the one derived from the relative importance of the service sector (see **Table 1.4**). This is obviously the consequence of this sector being the one with the highest share of employment in most of the regions.

Apart from this casual observation, there are some other important things we can comment on from the results obtained. First of all, it is significant to note that the prominent component of the employment growth in each of the regions is precisely the one due to the Spanish average sectoral growth rates when applied to the sectoral shares. It means that the main reason for the geographical heterogeneity in the rates of growth of employment, during the crisis at least, can be attributed to the heterogeneity in the relative importance of the sectoral employment across the regions.

With respect to the idiosyncratic component of the regional growth, it corresponds to those peculiarities other than the initial regional employment structure. By looking at the results, we can, initially, single out four regions that have had a worse performance than that predicted by the sectoral structure (as indicated by the previous

component): Cataluña, Extremadura, País Vasco and La Rioja. Apart from Extremadura, the deviation in the other three regions from the expected growth is significant and it signals for a more acute crisis in the manufacturing and construction sectors due to its particular composition. However, in the case of Extremadura, and also in La Rioja, the agricultural sector is the one that shows a larger negative growth than in the rest of the country. Nevertheless, the lack of data with respect to the composition of regional employment within each sector makes difficult a more precise analysis of this type.

The other 13 regions have, according to the results, particular conditions that have allowed them to experience a larger growth (lower absolute value as it is negative for all regions during this first period) than the one estimated from the first column of **Table 1.8** with the common sectoral growth rates. The larger deviations in relative terms correspond to Baleares, Galicia and Canarias. In the case of Galicia, the most likely explanation lies in the fact that agriculture actually gained employment from 1981 till 1985 caused by, probably, a strong refuge effect of this sector[8]. Baleares has had, on the other hand, all the sectors, but agriculture, performing better than the Spanish counterparts, although the difference is specially important for the service sector. However, Canarias, despite being similar to Baleares, has a service sector with an employment growth much like the Spanish one, and manufacturing and construction are the sectors that grew more than the national average.

In any case, the size of this second component of the regional growth is always below **50%** of the size of the first one, and for the vast majority of the regions it is below **25%**. Therefore, one would think that if the geographical heterogeneity in Spain from the employment point of view has changed during the period of crisis, it is mainly a consequence of the existing situation previous to 1977, and that the idiosyncratic sector growth across regions can not add much to the heterogeneity as its impact on the regional growth is very limited. However, as it will be seen later, this does not seem to be the case, and, actually, the existence of an already heterogenous situation is not necessarily responsible for the change in the dispersion of the sectoral shares among the regions.

Let us see now what has happened during the second period, when employment started to grow in all the regions as a consequence of the upturn in the economy.

Starting with the overall regional employment growth, we have that, unlike in the previous period, the regions with the highest share of service employment are not necessarily those with the largest employment growth. This is again reflected in the obtained $\mathbf{R^2}$ for the regression of the change in regional employment as a function of the service sector share, which, as mentioned earlier, is much lower for the period 1985-1990 than for 1977-1990. It means that the relationship between the employment structure and the employment growth is, at least, more complex when the growth is positive that during the period of crisis. To illustrate this point, we can consider the following examples. Cataluña and Murcia are among the top three regions where the growth rate is the largest; however, the participation of the service sector in the region's employment is below the national average. Equally, Cataluña and País Vasco have a similar employment structure; nonetheless, the former has been the one with the largest growth, while the latter is among those regions with a growth rate lower than the Spanish one.

Comparing the relative importance of the two components of the regional growth rate, it is possible to find that the structural component has a somehow reduced influence, generally speaking, on the regional rate with respect to the situation described for the previous period. Now, there are three regions where the idiosyncratic component is over **50%** of the size of the other one, and other seven regions for which this percentage lies between **23%** and **50%**, regardless of the sign of this component. This also points out the idea that, during the recovery, the sectoral structure of employment has been much less influential on the regional growth rates.

Analyzing now the second component of the regional growth, the first thing to note is the increased range of variation with respect to the period before, going from as low as **-1.42%** up to **+1.76%**. Apart from that, there are five regions with a negative growth derived from their peculiarities. These regions are all, but Madrid, located in the North of Spain. The one with the worst figure in this respect is Asturias, where the expected growth according to its structure has been reduced by half. In this case, the main reason for this is the bad behaviour experienced by the manufacturing sector, which failed to recover employment during these years. It signals for a deeper crisis of this sector in this region due to its particular industrial mix. País Vasco could be the subject of a similar situation, although much less acute[9].

On the other hand, we can find regions like Extremadura and Murcia where the non-structural component has played a very significant and positive role in the regional growth, mainly because the agricultural sector had a more stable employment in these regions than in the rest of Spain, although other characteristics are very much different. There does not appear to be a geographical pattern among the regions with the largest non-structural growth, as some of them are located along the Mediterranean coast, while others are in the Centre of Spain.

With respect to the three regions with the largest deviations from the expected growth in the period between 1977 and 1985, we find now that, in the case of Baleares and Canarias, almost all the growth is due to the sectoral composition. Galicia, however is the region with the lowest growth rate due to the sectoral component and, furthermore, it has also a negative growth from the idiosyncratic ingredient, caused primarily by the bad evolution of the manufacturing sector, which probably has the "wrong" mix.

1.4 THE HETEROGENEITY OF THE SPANISH REGIONAL EMPLOYMENT

It is clear that the fact that employment is not distributed among the different sectors in the same proportions in the various regions signals for a certain degree of geographical heterogeneity in the Spanish labour market. The aim in this part of the present chapter is to evaluate the impact of the crisis and of the subsequent recovery in the evolution of the degree of heterogeneity of the sectoral characteristics of regional employment.

Tables 1.4, 1.5 and **1.6** report the sectoral shares of the regional employment for the years 1977, 1985 and 1990. As it can be seen, the crisis brought some changes in the relative importance of the sectors in all the regions, and it happens equally if we have a look at the corresponding shares for the year 1990. The general move is towards a more service biased economy, at least in terms of employment, in each one of the 17 regions. Actually, in 1990 only 6 of all of them had less than half of the total employment provided by the service sector, while this number was of 14 regions in 1977. This trend is coupled with a continuous

decline in the importance of agriculture in all the regions as a source of employment: the number of regions with a percentage of regional employment in this sector below **15%**, has increased from just 3 in 1977 up to 9 in 1990.

This tendency, shared by all the regions, has led to a reduction in the range of variation of the shares for each sector, except construction, as the difference between the top and the bottom percentages is smaller in each of the top three sectors. However, this is not enough to asses whether this general trend means a more homogeneous environment across the regions, or the other way around.

1.4.1 Measuring the degree of geographical heterogeneity

In order to measure the degree of heterogeneity, we will use the Coefficient of Variation, which is the ratio between the standard deviation and the mean of a group of observations. It has the characteristic that is dimensionless and it will be useful for our purposes. In this respect, **Table 1.9** shows the coefficient of variation of the shares of each sector in the regional employment across all the regions for the years 1977, 1985 and 1990.

From the first column we get that, at the beginning of the period under consideration, agriculture is the sector in which the employment shares change relatively more from one region to another giving a value of **0.59**.

Manufacturing is the sector that follows in this classification of sectors by the regional dispersion of the employment shares with a coefficient of **0.35**, almost half of the one obtained for agriculture. The coefficient of variation is again reduced when we look at the employment shares of the service sector. This means that, relatively, the service sector is the one with the more similarity of the shares across the regions. This observation is important, as it means that the sector which is the one that provides more employment in almost all the regions is the one with the second lowest coefficient of variation, implying that the heterogeneity in Spain does not come principally from the main sector.

Construction requires a very short comment, as the data shows quite clearly

that it has been the sector most evenly distributed in terms of the share of regional employment across the nation. A possible explanation could be due to the fact that its output cannot easily be transported from one region to another, being easier to transport the activity itself, creating, therefore, a geographically more similar pattern.

Turning now the attention towards the other two columns of **Table 1.9**, we will be able to get some conclusions from the evolution of the figures reported.

As it can be seen, in the case of the service and manufacturing sectors, there has been a general move towards greater homogeneity in both of the sub-periods distinguished: 1977-1985, when employment was coming down, and also in 1985-1990, when it was increasing considerably, specially in the case of the service sector. On the other hand, the coefficient of variation for agriculture stayed rather stable during the first years, but then, when the recovery came, it started to increase, signalling for a larger regional heterogeneity in the importance of this sector as a source of employment. Finally, construction behaved in the opposite way to agriculture, as it was during the period of crisis in employment when the disparity increased substantially, and despite it was reduced during the last years, this reduction did not offset totally the previous increase, so that by 1990, the relative importance of this sector in the regional employment was more heterogenous than at the beginning of the period.

From all this analysis there are two important points which deserve to be singled out. The first one is that the Spanish economy has evolved towards a greater geographical homogeneity, specially having in mind that it is a general move in the two main sectors, manufacturing and services, and also that the sector with the highest employment share in almost every region, services, is the one with the lowest index of regional dispersion, as measured by the coefficient of variation, at the end of the period.

The second important thing to note is that, although the crisis in employment has been very deep, and has affected sectors in different ways, the ordering of the regions by the relative importance of each sector has hardly changed. Consequently the regions in which agriculture was more important, compared with the rest of the country, are still the same after

1990; and equally for manufacturing and services.

Therefore, although there has not been dramatic changes in the regions, it is clear that Spain has moved towards a more geographically homogenous labour market, at least from the demand point of view with respect to the importance of the economic sectors.

1.4.2 The underlying reasons for this trend

One of the advantages of using the coefficient of variation as the measure of the dispersion of the regional shares of the economic sectors in total employment is that it does not change even if the shares taken into consideration change, provided the employment growth rate of the particular sector is the same across all the regions involved.

The important consequence for our analysis is that, according to the previous point, all the change that takes place in the coefficient of variation for each sector turns out to be a direct effect of the idiosyncratic regional growth reported in **Table 1.8.** It means that if all the regional growth were the one derived solely from the first column of each of the two periods considered in this table, then the situation in 1990 would lead to the same coefficient of variation as the one obtained for the year 1977.

Therefore, we can conclude that the initial differences among the regions have not got any influence, when considered just on their own, on the change of the degree of heterogeneity occurred in Spain during this period and that has been reported earlier. Accordingly, it moves the emphasis towards the idiosyncratic component of the regional growth rate, as far as it is the one that is responsible for any change in the coefficient of variation. This is also consistent with the fact that it was during the last years of the period that the largest changes in the sectoral coefficients of variation took place, which corresponds exactly to the period when the range of variation of the idiosyncratic regional growth is also the largest, as mentioned earlier.

The reduction in the degree of heterogeneity implies that, roughly speaking, the sectoral growth has been relatively larger in those regions where its percentage of the total

employment was less important, so that there is a certain process of convergence in the regional economies. However, this cannot be seen directly from the columns for the idiosyncratic component of the regional growth shown in **Table 1.8**, as it is the result of aggregating the regional deviations from the common growth rate for each one of the four sectors, so that the net effect is certainly less clear.

Turning then to this regional growth rate for the sectors, we can find some evidence in support of this interpretation. Thus, between 1977 and 1985, we have that for the manufacturing sector, the four regions with the largest negative growth rates are precisely País Vasco, La Rioja, Valencia and Cataluña, which are among the top five regions by the importance of this sector in 1977. For the service sector it happens something similar, although not so clear cut. During the same period, among the regions with the largest growth rate in this sector are those with the lowest percentages of employment, such as La Rioja, Galicia, Cantabria and Castilla-León. However, it is also true that Baleares is among the fastest growing regions with respect to the service sector.

The evidence from the last five years considered is also along the lines of this interpretation. The agricultural sector, for example, experiences an increase in the coefficient of variation, and this is so because the three regions with the worst performance in this sector have a regional share that is below the national average in 1985.

With respect to the manufacturing sector, we find some mixed results. Among the fastest growing regions there are Cataluña and Canarias, the second and the last regions by the importance of this sector in the area in the year 1985. On the other hand, País Vasco, the region with the largest proportion of employment in this sector, has a rate of growth lower than the Spanish one. The interesting thing about the differences in the regional growth is that it is possible to find a clear geographical division among the most important manufacturing regions. Those located in the North of Spain have been unable to recuperate properly from the crisis, and their growth rate is below the Spanish one. In this respect, it is outstanding the case of Asturias, that has been the only region with negative growth during these years. On the other hand, Cataluña and Valencia are among the regions with the largest growth rates of employment in this sector. A certain geographical pattern can also be obtained from the

regional growth rates for the construction sector: the four regions located along the Mediterranean coast are among those where this sector has been more dynamic, in terms of creating employment, than the average Spain.

Finally, the evidence from the service sector is not so clear as one should expect from the reported change in the coefficient of variation. Thus, among the regions with the higher growth rate we can find Baleares and Canarias, with a very high percentage of service employment, together with Castilla-La Mancha, La Rioja and Cantabria, where this sector is much less important. However, we should note that the change in the share of a sector does not depend only on its own performance, but also on that of the other sectors. This could explain why Galicia, despite having a growth rate for the service sector slightly lower than the Spanish one, has had the largest relative increase in the regional share of the sector. The reason for this is that in all of the other sectors, it has performed worse than the national average, and the differences are significantly larger than in the case of the service sector.

1.5 CONCLUSIONS

From the analysis carried out here about the evolution of employment from 1977 to 1990 according to its geographical and sectoral dimensions some interesting points have arisen.

At the national level, both the manufacturing and construction sectors have shown a very clear cyclical evolution with the year 1985 as the turning point. The service sector was not that badly affected by the crisis as it did not lose employment during these first years. On the other hand, it was the more dynamic sector from 1985 till 1990 in terms of creation of employment. And with respect to the agricultural sector, it followed the secular downward trend it already had. The only exception corresponds to the years between 1981 and 1985, when employment loss was slowed down a bit, probably because in times of high and increasing unemployment it acted as refuge against the bad prospects in the rest of the economy.

In any case, the clear result of these years is that the Spanish economy, and with it that of all the regions, has moved towards a service economy, as this was the sector that employed more people everywhere without any exception.

Despite this is a general trend in all the regions, there are differences among them not only in the timing of the upturn of the economy, but also in the extent of the employment lost during the first years and that of the later gains. In this respect, the relative sectoral specialization of the regions plays a very important role in the different evolution of employment. In accordance with this, it has been shown that service is directly related to employment creation, while the share of agriculture has a negative effect on it, though this relationship is less straightforward for the last five years. It must be set in a context where the changes in employment are primarily driven by the demand side of the labour market.

Along the same lines, it has also been reported here that the largest component of the regional growth is the one derived from the sectoral composition, when the national average growth rate for each sector are applied to the specific regional structures. It happens in both periods, although the relative importance of this common growth component is much lower during the years of recovery in employment. It, therefore, explains largely the heterogeneity in the regional employment growth rates; however, it does not add anything to the change in the geographical heterogeneity of the regional structure of employment.

Nevertheless, the sectoral composition on its own is unable to explain regional growth, specially from 1985 till 1990. In fact, the idiosyncratic growth is the one responsible for the changes in the coefficient of variation, the measure used to describe the degree of heterogeneity across the regions in Spain.

The main conclusion drawn from this chapter is that the regional economies are more homogenous after the crisis and the subsequent recovery. In its support, it has been established that the main sector in all the regions, services, has experienced a reduction not only of the difference between the largest and the smallest regional percentage, but also of the coefficient of variation. This greater homogeneity implies, in general, that the sectoral growth rate was larger, on average, in those regions where the respective sector was relatively less

important. This has also been supported by the idiosyncratic component of regional growth, as it showed that, for example, during the period of crisis, the regions where manufacturing and construction were more important have been those with a negative rate for this component. Equally, the increase in the coefficient of variation for the agricultural sector from 1985 till 1990 has been explained through the idiosyncratic part of regional growth.

From the geographic point of view, both the crisis and the recovery have brought changes with respect to the leading regions in Spain. Thus, the North, where some of the mainly manufacturing regions were located at the beginning of the crisis, have been performing relatively bad in terms of employment, specially during the last years; and it has been caused mainly by their particular industrial mix. On the other hand, the most dynamic regions are now those by the Mediterranean coast plus Canarias, where the service sector has proved to be very expansive. Moreover, in the case of Cataluña and Valencia the manufacturing sector has also been able to recuperate successfully from the crisis.

ENDNOTES

1 The limits of these regions are those that were established with the Constitution in 1978. Before then, there was a slightly different administrative division of Spain.

2 The causes of this increase have been widely analyzed in a number of papers, such as those by Dolado et al. (1986), Fina (1987), Andrés et al. (1990) or Bentolila and Blanchard (1990).

3 Olano (1990) reports these movements during a period that he names as a phase of concentration.

4 For an interesting analysis of the importance of the process of industrialization in Spain during the decade of the Sixties see, for example, Donges (1990).

5 To obtain this annual rate we have run a regression where the endogenous variable is the proportional change in employment of the service sector, and the regressor is time. The coefficient on time is precisely the estimated annual rate.

6 This is a very crude approximation, but, nevertheless, it is less crude in times of high unemployment, when employment is determined by the demand side of the market almost exclusively.

7 Agriculture also lost employment, but it was following a secular downward trend held during most of this century.

8 The reason for this effect to be particularly strong in Galicia is because of the specific ownership structure of the land, as the size of the properties is relatively small.

9 Shipyards and metallurgic industries were very important components of the manufacturing sectors of these regions.

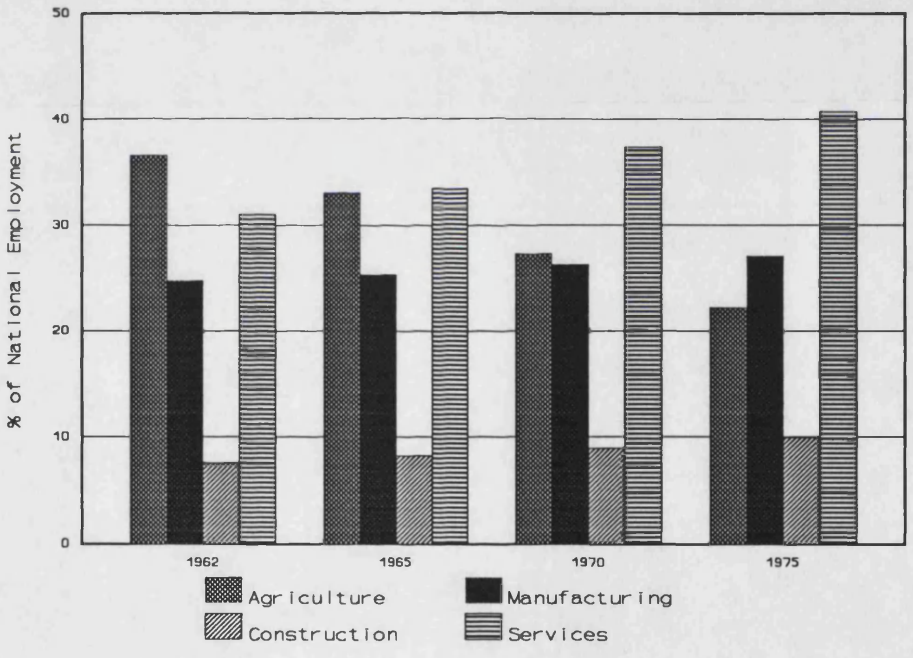
–FIGURE 1.1–

SPAIN: AUTONOMOUS COMMUNITIES

-FIGURE 1.2-

EMPLOYMENT STRUCTURE

SPAIN: 1962-1975



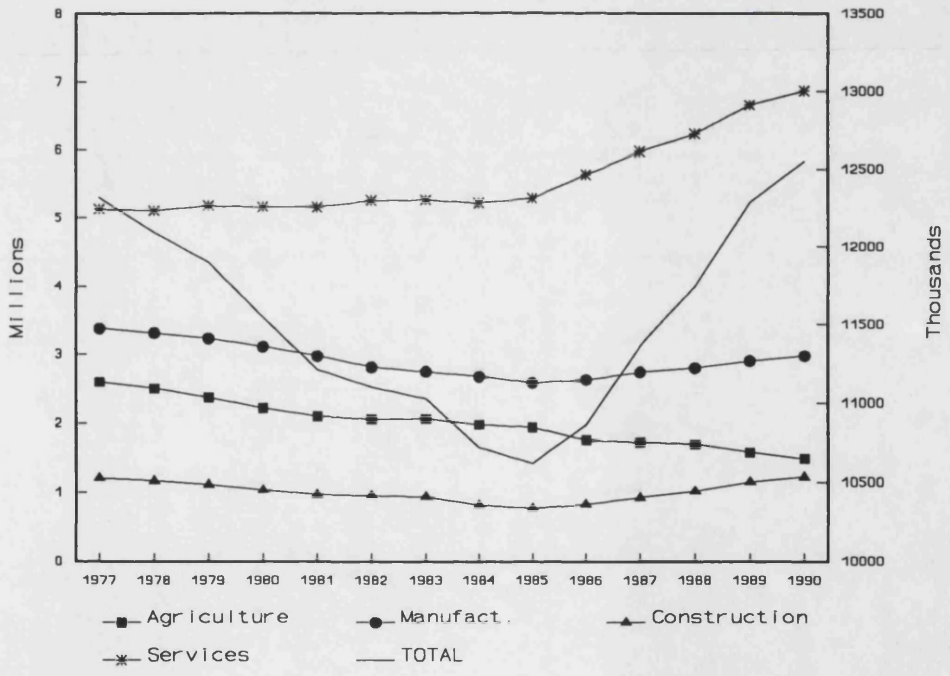
–FIGURE 1.3–

MAIN MANUFACTURING REGIONS

-FIGURE 1.4-

SECTORAL EMPLOYMENT

Spain: 1977-1990



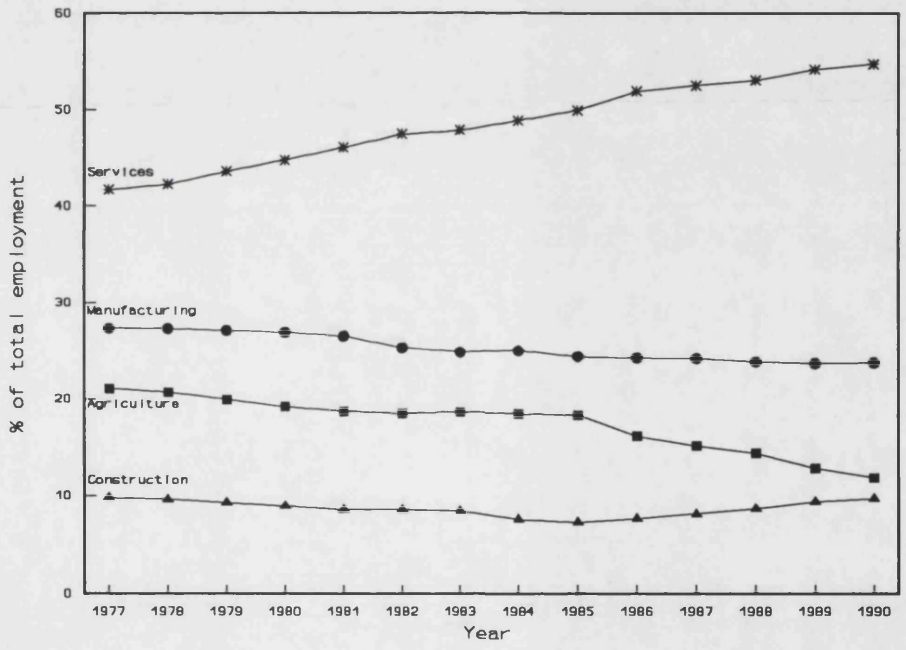
Note:

The level of employment in each sector is measured along the Y-axis on the left. The level of total employment is measured along the Y-axis on the right.

-FIGURE 1.5-

EMPLOYMENT STRUCTURE

Spain: 1977-1990



-TABLE 1.1-

NATIONAL EMPLOYMENT BY SECTORS

	1962	1965	1970	1975
AGRICULTURE	4510776	4206900	3517661	2938856
MANUFACTURING	3068493	3243865	3392939	3593156
CONSTRUCTION	934614	1052271	1152333	1315489
SERVICE	3834112	4254428	4810953	5383495
TOTAL	12347995	12757464	12873886	13230996

Source: Banco de Bilbao

-TABLE 1.2-

THE SERVICE SECTOR IN SELECTED REGIONS

	1962 (1)	1975 (1)	1962-75 (2)
ANDALUCIA	28.97	41.36	2.74
BALEARES	37.56	53.58	5.01
CANARIAS	29.71	54.00	8.74
CATALUÑA	36.15	39.83	2.76
PAIS VASCO	33.61	37.73	2.69
MADRID	55.39	59.45	4.12
SPAIN	31.05	40.69	3.11

(1): Share of regional employment (%)

(2): average annual growth rate (%)

-TABLE 1.3-

AGRICULTURE: SHARE OF REGIONAL EMPLOYMENT

	1962	1975
CASTILLA-LA MANCHA	56.58	37.78
CASTILLA-LEON	51.22	37.08
EXTREMADURA	59.87	46.66
GALICIA	59.48	48.72
SPAIN	36.53	22.21

Source: Banco de Bilbao

-TABLE 1.4-

SECTORAL EMPLOYMENT SHARE: %

YEAR 1977

	AGRICULTURE	MANUFACTURING	CONSTRUCTION	SERVICES
ANDALUCIA	27.86	18.18	9.76	44.20
ARAGON	23.85	28.08	9.54	38.53
ASTURIAS	29.08	29.86	7.40	33.66
BALEARES	16.61	20.68	11.82	50.89
CANARIAS	22.50	11.03	9.99	56.48
CANTABRIA	27.54	29.20	7.20	36.06
C.-LEON	36.34	19.44	8.78	35.43
C.-MANCHA	32.41	21.55	12.06	33.98
CATALUÑA	6.77	40.34	11.17	41.72
VALENCIA	16.41	34.50	9.11	39.97
EXTREMADURA	44.81	10.65	8.04	36.50
GALICIA	47.01	17.00	8.46	27.53
MADRID	1.41	26.77	11.49	60.33
MURCIA	27.03	24.12	9.22	39.63
NAVARRA	18.48	34.71	8.99	37.82
PAIS VASCO	7.25	45.86	8.20	38.69
LA RIOJA	25.03	36.88	8.30	29.79
SPAIN	21.13	27.39	9.80	41.69

Source: I.N.E.

-TABLE 1.5-

SECTORAL EMPLOYMENT SHARE: %

YEAR 1985

	AGRICUL-TURE	MANUFAC-TURING	CONSTRUC-TION	SERVICES
ANDALUCIA	22.09	12.90	7.90	53.98
ARAGON	20.84	21.57	6.61	47.18
ASTURIAS	23.87	27.21	6.98	41.07
BALEARES	11.52	16.61	11.77	57.07
CANARIAS	15.85	9.05	9.17	64.23
CANTABRIA	25.00	25.05	7.51	41.50
C.-LEON	28.45	17.70	7.66	43.95
C.-MANCHA	28.95	18.56	10.22	39.77
CATALUÑA	6.98	29.24	6.62	49.19
VALENCIA	14.36	23.65	6.39	50.48
EXTREMADURA	35.86	9.29	9.19	44.16
GALICIA	46.02	15.50	6.65	32.06
MADRID	1.69	18.83	6.58	68.47
MURCIA	20.86	18.34	6.75	49.67
NAVARRA	15.18	27.93	7.40	45.37
PAIS VASCO	6.30	32.48	6.77	49.48
LA RIOJA	18.17	28.57	6.72	41.25
SPAIN	18.35	20.67	7.31	49.93

Source: I.N.E.

-TABLE 1.6-

SECTORAL EMPLOYMENT SHARE: %

YEAR 1990

	AGRICUL-TURE	MANUFAC-TURING	CONSTRUC-TION	SERVICES
ANDALUCIA	15.73	15.48	12.09	56.71
ARAGON	13.47	25.63	8.66	52.23
ASTURIAS	16.33	24.37	9.40	49.90
BALEARES	3.68	15.69	12.57	68.06
CANARIAS	8.24	11.04	10.68	70.05
CANTABRIA	15.77	22.95	8.58	52.69
C.-LEON	20.43	20.20	9.88	49.49
C.-MANCHA	18.84	21.94	13.11	46.10
CATALUÑA	3.77	35.34	8.69	52.20
VALENCIA	9.37	29.70	8.63	52.30
EXTREMADURA	25.72	11.14	13.40	49.73
GALICIA	32.72	15.22	9.05	43.01
MADRID	1.08	21.46	8.70	68.76
MURCIA	15.53	21.51	10.44	52.52
NAVARRA	8.45	32.73	8.80	50.02
PAIS VASCO	4.02	33.76	7.15	55.06
LA RIOJA	13.79	32.23	8.05	45.93
SPAIN	11.84	23.72	9.71	54.73

Source: I.N.E.

-TABLE 1.7-

Economic Structure and Changes in Employment

Dependent Variable: Proportional Changes in Regional Employment.

Regressors: Regional Employment of the Sector indicated at the beginning of the period.

Sample: 17 Regions of Spain.

PERIOD	CONSTANT	AGRICUL-TURE	MANUFAC-TURING	CONSTRUC-TION	SERVICE	R^2
1977-90						
REG. 1	99.79 (3.1)	-3.58 (3.02)				33.6
REG. 2	-232.9 (-2.33)			26.24 (2.49)		24.5
REG. 3	-210.1 (-3.22)				5.58 (3.5)	41.2
1985-90						
REG. 4	244.0 (3.8)	-6.5 (-2.32)				21.4
REG. 5	-248.6 (-1.45)				7.51 (2.14)	18.4

NOTE: t-statistics in parenthesis.

Only the regressions with significant coefficients at the 1% confidence level on the regressors have been included in this table.

-TABLE 1.8-

REGIONAL EMPLOYMENT

ESTIMATED ANNUAL GROWTH RATE

	1977-1985			1985-1990		
	STRUC-TURAL	IDIOSYN-CRATIC	TOTAL	STRUC-TURAL	IDIOSYN-CRATIC	TOTAL
ANDALUCIA (1)	-2.01	0.052	-1.959	3.118	1.270	4.388
ARAGON	-2.22	0.088	-2.133	2.811	0.243	3.054
ASTURIAS (2)	-2.38	0.094	-2.286	2.707	-1.418	1.289
BALEARES (2)	-1.77	0.845	-0.922	4.559	0.321	4.880
CANARIAS	-1.52	0.459	-1.065	3.772	0.259	4.031
CANTABRIA (3)	-2.28	0.459	-1.821	2.909	0.221	3.130
C.-LEON	-2.35	0.500	-1.852	2.215	0.179	2.394
C.-MANCHA (1)	-2.46	0.529	-1.935	2.074	0.490	2.564
CATALUÑA	-2.09	-0.462	-2.556	3.933	1.045	4.978
VALENCIA	-2.14	0.177	-1.965	3.377	0.785	4.161
EXTREMADURA	-2.31	-0.083	-2.395	1.748	1.568	3.316
GALICIA (2)	-2.68	1.201	-1.475	0.839	-0.235	0.604
MADRID	-1.36	0.053	-1.308	4.797	-0.873	3.925
MURCIA	-2.18	0.484	-1.694	2.878	1.756	4.634
NAVARRA (1)	-2.23	0.289	-1.939	3.230	-0.449	2.780
PAIS VASCO	-2.16	-0.454	-2.610	4.001	-1.014	2.987
LA RIOJA	-2.54	-0.412	-2.953	2.884	0.870	3.754
SPAIN			-1.913			3.532

(1) Periods used for these regions: 1977-1984 and 1984-1990
(2) Periods used for these regions: 1977-1986 and 1986-1990
(3) Periods used for these regions: 1977-1987 and 1987-1990

NOTES:

1.-The structural growth rate is the result of applying national growth rates for each sector to the regional structure.

2.-The idiosyncratic growth rate is the difference between the total and the structural growth.

3.-The total growth rate is the OLS estimate from the following regression: $\mathbf{Ln(N_i)=a+rt}$.

-TABLE 1.9-

COEFFICIENT OF VARIATION

Of Sectoral Employment Shares across Regions

	1977	1985	1990
AGRICULTURE	0.59	0.59	0.70
MANUFACTURING	0.35	0.33	0.32
CONSTRUCTION	0.15	0.21	0.19
SERVICES	0.21	0.18	0.14

Chapter 2

EVOLUTION OF REGIONAL UNEMPLOYMENT

in SPAIN: 1977-1990

2.1 INTRODUCTION

Unemployment has been, and still today is, a major feature of the Spanish economy for the last years, and there has been many studies that have, more or less successfully, tried to explain it (specially relevant are the articles by Fina (1987) and by Bentolila and Blanchard (1990)).

The present paper is an attempt to address this question from the regional point of view (**Figure 2.1** shows the administrative division of Spain into the 17 Autonomous Communities established by the Constitution, which are the regions considered in here). The aim is to analyze the differences in the regional development of the unemployment component of the labour market from 1977 till 1990. As in the study carried out for the geographical evolution of employment in the previous chapter, unemployment is not homogenously distributed across the 17 regions. Therefore, the first thing to do is to report the degree of this heterogeneity. Then, we can check the way in which the crisis in employment has affected the unemployment figure regionally, and also whether the years of economic recovery have meant a similar downfall in them.

In order to get a more complete picture of the Spanish unemployment, we will analyze some of its different dimensions. Hence, we will also consider possible differences in its evolution for both men and women separately, as well as how the duration structure of unemployment has changed as a consequence of the crisis and the subsequent recovery.

There is also some data available regarding the sectoral decomposition. This one is done considering the latest job of the unemployed person in question. However, its usefulness is somehow limited as these people are not locked into a sector for the whole of their working life, and they can go from a job in a certain sector to another job in a different sector. Within this classification, there is also the question of the people that enter the labour market for the first time, and that goes into unemployment but without being incorporated into any sector. Furthermore, in 1987 there was a methodological change in the Spanish Labour Force Survey (E.P.A.) and all those unemployed for over two years were considered not to

be classifiable under any of the sectors they used to be in, so that there is a break in these series. Despite all these drawbacks, it may still be of interest to consider this decomposition of the unemployed[1].

2.2 HISTORICAL INTRODUCTION

Before describing the evolution of the regional unemployment figures for the period 1977-1990, it might be convenient to consider, at least briefly, the way in which this variable has changed during the decade of the sixties and the first half of the seventies.

The decade of the sixties was, in general terms, a very active one. Spain underwent a very important process of industrialization and, from the employment point of view, the economy moved consistently towards a service oriented one, as it has been reported through the study of sectoral employment carried out in **Chapter 1**. At the same time, there were relatively large movements of the labour force. People migrated from the agricultural regions in the South and Centre of Spain towards the mainly manufacturing regions, located specially in the North and East of the country, and also to Madrid (see Barbancho, A.G. and Delgado, M. (1988) and also Olano (1990)).

With respect to the unemployment rate, the extent of the economic boom during these years was such that it was able to cope not only with an increasing labour force, but also with the increasing number of people that left the agricultural activity. The unemployment rate for the country (**Figure 2.2**) shows it clearly, as it remained at relatively low levels during much of this period. Actually, until 1972 it was below **2%**, and in 1975 it was still less than **3.5%**.

Let us turn now to the geographical distribution of unemployment. **Table 2.1** reports the unemployment rates for the 17 regions for some selected years. Looking at them, we can check that there is a certain territorial disparity. Thus, the regions located to the South of Spain (Andalucía, Murcia and Extremadura) are consistently through all the period among those with the highest unemployment rates. On the other hand, Northern regions, like La Rioja

and Navarra, tend to have lower unemployment rates during much of the period.

Therefore, from the unemployment data we can deduce that the deep economic changes that took place in Spain during these years did not help to reduce the pre-existent gap in the unemployment rates between the different regions. This is consistent with what was observed from the structure of regional employment for the same period.

This characteristic of the Spanish growth during these years is further reinforced by the migratory movements of the labour force. The regions with the largest propensities to emigration are Andalucía and Extremadura, while those that acted as the main endpoints of the flows are Cataluña and Madrid, together with the North. It means that, despite having large outflows of people, the Southern regions were not able to close the gap in the unemployment rates with the North, mainly because the inflow of investments concentrated in those regions with an already important industrial activity.

Specially significant is the case of Andalucía, which has the largest rate every single year and much larger than the rate for any other region: in 1970, when this difference was the smallest, it still was **31%** greater than that of the region with the next larger one, Murcia in this case. Not only that, but it is also the one that have the largest number of unemployed people. In 1962 half of the total number of unemployed in Spain were precisely in Andalucía. Although this proportion came down continuously, it was never below **34%** at any single year. The significance of this large reduction is somehow offset by the persistent difference between its unemployment rate and that of the rest of the country.

Therefore, we have that, after some years of strong economic growth, the regional unemployment rates are still as far apart as they were before. There is also a clear difference between the North and the South regarding these rates, which has not been closed either by the general economic growth or by the intense internal migration flows between regions[2]. Furthermore, unemployment is increasing in practically all the regions since the early seventies.

2.3 CHANGES IN REGIONAL UNEMPLOYMENT

We can turn now to the analysis of the regional unemployment from 1977 till 1990 in an attempt to complete the study of the regional labour market started with the one about the employment side.

Figure 2.3 plots the evolution of the Spanish unemployment rate during the period under consideration. It shows that it is continuously increasing right until 1985. From that year on, it has been coming down, but rather more slowly than the way in which it increased until 1985, giving way to the phenomenon of persistence in high unemployment, quite common in Europe[3]. This characteristic allows us to divide the whole period into two, providing the same division that was obtained in the case of the evolution of employment, with the year 1985 as the turning point.

In contrast with this observation, we have plotted in the same graph the evolution of the actual number of people unemployed. As it can be seen clearly, it went continuously up until 1985, together with the unemployment rate. However, for the next two years, until 1987, it remained at approximately the same level, slightly below **3** millions. And only after then, it started to fall down.

Actually, this could explain some of the persistence of the high unemployment rate in Spain. After 1985, employment grew at a considerable rate, with an increase of **6.93%** from 1985 to 1987. The failure of the unemployment rate to come down means that in those two years there was a similar increase in the labour force. But the significance of the latter lies in that it represented a jump in the path followed until then. In these two years the expansion of the labour force was larger than the one that took place during the previous eight years taken together. It points out towards a change in the expectations of the people at that time, in the sense that some of them who stayed out of the labour market, decided to incorporate to it as soon as the possibilities of getting a job were higher because of the upturn of the economy.

Therefore, this could be one of the reasons for the unemployment rate figures

not to reflect the intensity of the first years of the recovery in employment showing, consequently, strong indications of persistence. In fact, had the labour force grown until 1987 at the same rate as it did along the period 1981-1985, and considering the real evolution of employment, the unemployment rate in Spain would have been in 1987 around **17.8%**, instead of the actual **20.5%**, i.e. a difference of almost three percentage points.

The behaviour of the women with respect to the labour market has much to do with it, and we will come to this point later. But, for the moment, we will analyze the way unemployment is geographically allocated among the regions.

2.3.1 Differences in Regional Unemployment

In this section, we try to observe whether during the crisis in employment and the later recovery the labour market has moved towards a greater degree of territorial homogeneity from the unemployment point of view as well as it did from the employment one.

The first thing to note is the disparity in the years when the unemployment rate reached its highest value throughout the various regions. Actually, only eight of them had it in 1985; the rest of the regions had still an increasing rate at that time. This could offer a different explanation for the persistence of high unemployment rates at the national level during the first years of the recovery. This alternative theory would go more along the lines of a different timing in the regional economies with respect to the evolution of unemployment rate rather than of a difficulty in the economy to reduce it once it has reached high values.

Accordingly, we have that seven of the regional economies had the largest rate in 1986 and two more the following year, including Andalucía, the one with the largest rate. As far as the national unemployment rate is a weighted aggregation of the regional ones, it should reflect precisely this different moments, and that could be a reason why it shows a relatively constant rate between 1985 and 1987.

Nevertheless, this alternative theory is not fully satisfactory, specially when we

observe the evolution of the regional unemployment rates and not only the year of the highest values. In this respect, we have that many of them experience a similar pattern of persistence to the one observed for Spain. Furthermore, in almost all the regions there is a sharp increase in the rate of growth of the labour force around 1985 and lasting for some years. And this is the main reason for most of the regions to have unemployment rates increasing after employment started to expand.

A clear example of this is Andalucía. Employment in this region began to grow in 1984, but the unemployment rate continued increasing until 1987. The most likely explanation for this fact is that as soon as the recovery started, people decided to enter the labour market and search for a job as the chances of getting one were greater. In fact, between 1984 and 1987 the number of people that joined the labour force in this region almost doubled the equivalent number that had done so between 1977 and 1984. Therefore, we can conclude that the disparity in the timing of the evolution of the regional unemployment rates is not likely to be a main cause for the persistence at the national level, though it might have helped to it.

Let us concentrate now on the evolution of the regional rates rather than on the time of the highest values.

Table 2.2 shows the regional unemployment rates for the most significant years of this period. The first thing to note is that there has not been dramatic changes in the ordering of the regions by the importance of the rate. Thus, concerning the top three regions of this classification, they are the same throughout the whole period: Andalucía, Extremadura and Canarias. It is not so clear at the bottom, but still, two of the three regions with the lowest rate in 1977 are also the bottom two in 1990: La Rioja and Aragón; although there have been some movement between these two years.

It is also worth noting that between 1977 and 1985, coinciding with the crisis in employment, the top five regions by the proportion of people employed in the manufacturing sector in 1977 (País Vasco, Cataluña, La Rioja, Navarra and Valencia), as reported in **Table 1.4**, are those that have gone up more positions in the previous

classification. This is consistent with the fact that the crisis hit specially the manufacturing sector.

Equally important is to realize that, after 1985, País Vasco was not able to lower its position in this ranking. Together with this we have that, again after 1985, Asturias, Cantabria and Galicia were the regions that went up more places. It gives us a picture of the geographical impact of the crisis and later recovery. According to it, although this period did not remove any of the top three regions from their places, it can be said that the North of Spain has moved from having relatively low unemployment rates to be among those regions with the largest ones.

With respect to the geographical heterogeneity we have the following results. According to the coefficient of variation of the unemployment rate across regions, reported in **Table 2.3**, as the rate went up in all the regions, this coefficient went down by a relatively large amount: from **0.49** in 1977 down to **0.23** in 1985. However it went up again as soon as the rates started to fall, and so, in 1990, it was around **0.32**. Hence, the crisis brought relatively closer the regions with respect to this dimension, but with the recovery, the regional unemployment rates became relatively more disperse.

On the other hand, if we pay attention to the standard deviation, then the picture we get is somehow different. As the national unemployment rate went up, so it did the standard deviation. But then the latter failed to come down after 1985. Therefore, the standard deviation indicates that during the years of the crisis, the distribution of unemployment across the regions in Spain became more heterogeneous. Then, when employment started to grow, this recovery did not reduce the heterogeneity already built up during the previous years.

2.4 UNEMPLOYMENT AND THE ECONOMIC SECTORS

It has been mentioned earlier some connection between the importance of manufacturing in some regions and the change in the unemployment rate. In this section we will pursue this relationship a bit further by considering the regional economic structures and

the related unemployment figure. For this purpose, we have data not only on the regional employment by sectors (**Tables 1.4, 1.5** and **1.6**), but also on the regional unemployment as well by sectors (**Table 2.5** and **2.6**), though in this classification it is included as a separate group the number of people looking for the first job.

The first thing we have investigated in this area is the link between the sectoral shares of employment, which represent the economic structure of the regions, and the evolution of unemployment. The aim is to check whether the initial rise and later fall in regional unemployment can be explained by the particular employment structure of the various regions.

What we have done is to run several cross-section regressions for the 17 regions, using the proportional change in unemployment levels during the period as the variable to be explained. The regressors are the shares of regional employment for each sector, one at a time, taken at the beginning of the period. According to the path followed by employment, we have considered three periods for this analysis: 1977-1985, 1985-1990 and 1977-1990. The results appear in **Table 2.4**.

For the first years, we have found that between manufacturing and services explain almost half of the variance across regions of the proportional change in the number of unemployed between 1977 and 1985. As it was expected, the sign of the coefficient of the employment share of the manufacturing sector is positive, which means that regions where this sector was relatively large in 1977, had larger proportional increases in the unemployment level. This is, once more, consistent with the fact that the crisis of the late seventies and early eighties was primarily a manufacturing one (see Dolado, J., Malo de Molina, J. and Zabalza, A. (1986)), and, therefore, affected more intensely the regions with an important proportion of the employment dedicated to this activity.

On the other hand, the service sector has negative impact on unemployment, in the sense that it induces a negative growth in the number of unemployed, as it was the only sector that managed to create some employment during these years. With respect to the estimated value of the coefficients, the result obtained is that the effect of manufacturing on

unemployment is larger, in absolute value, than that of services, although not by much.

The next group of results in **Table 2.4** refer to the period of creation of employment, from 1985 to 1990. The first thing that changes with respect to the previous years is the level of the overall significance of the regression, the $\mathbf{R^2}$. In the only two cases where the variable used has a significant role, it is considerable lower, being now around **17%**. It implies the existence of other factors, more important than the economic structure, that are responsible for the differences in the behaviour of unemployment across regions[4].

There are only two sectors, taken one at a time, that explain some of the variance of the proportional change in unemployment in the second half of the eighties. Agriculture's share in 1985 has a very small but positive effect on the evolution of unemployment. On the other hand, manufacturing has a marginally larger coefficient, in absolute value. But what seems more interesting is the change in the sign in its coefficient with respect to the previous period. It reflects the change in the cycle and how the regions with a large manufacturing activity in the Spanish context, managed to reduce unemployment in a more effective way, though very limited due to the low reported level of the $\mathbf{R^2}$.

It is also significant to note the lack of significance of the share of employment in the service sector during this period. It does not mean that the service sector did not help to reduce unemployment. The way it should be interpreted is in the sense that the regional differences in the importance of the service sector did not influence significatively the regional differences in the evolution of the number of unemployed.

Finally, let us consider the last part of **Table 2.4**, which reports the results obtained when the proportional change in unemployment has been taken over the whole period, from 1977 to 1990. Here we find some surprising results. The first one is the high values of the $\mathbf{R^2}$, well above those of the previous cases considered. Equally surprising is the fact that neither the share of the agricultural sector nor that of manufacturing are now significant, while construction and service now play an important role in explaining the variance across regions of the unemployment changes. The latter two variables account for about **55%** of this variance, both of them being equally important when taken on their own.

The coefficients are negative, which means that the regions that have performed better, in terms of smaller relative increases in unemployment, are precisely those regions with relatively larger shares of employment in the construction and service sectors back in 1977.

The overall conclusion of this section is that the regional differences concerning the evolution of unemployment are partly a consequence of the different economic structure, as measured by the proportion of employment provided by the various sectors at the regional level. It has also been found that this sectors have a different impact not only among them, but also during the first eight years and the late five of the period considered.

In any case, this link allows us to distinguish a certain tendency towards a greater geographical homogeneity in the labour market from the unemployment perspective, induced by the employment structure as far as the latter has moved in this direction.

2.4.1 Sectoral Unemployment

Let us turn now to the analysis of the classification of the regional unemployed according to the last sector they have been working in. Its main limitation lies in the lack of continuity of the series. From 1987 onwards, all those unemployed over two years appear under the heading of "others" instead of being included in any of the sectors, as they used to be until then[5]. It implies that the sectoral figures previous to 1987 are not comparable with those after that year, and this is much so if we take into account that there has been a considerable built up of the proportion of long-term unemployment, as it will be reported later. For this reason, we are able to analyze only the impact of the crisis in employment on the sectoral structure of the unemployed.

Tables 2.5 and **2.6** report, for the years 1977 and 1985 respectively, the proportions of unemployed classified according to the last sector where they worked in, together with that of those that have never worked before, i.e. people looking for their first job, or new entrants in the labour market.

In the first of these tables, we already note that the largest group of

unemployed are those that have not had any previous experience, accounting for about a third of the total at the national level. However, the most striking feature is that, for Spain, the second largest group is the one formed by those that have come to unemployment from the construction sector, and this is so in spite of the fact that in terms of employment, this sector provided less than **10%** of the total in 1977. It seems as if this sector had anticipated the crisis in employment. In 1985, on the other hand, this proportion has fallen rather substantially, although it still doubles the proportion of employment in this sector.

We can notice as well, that the participation of first job seekers has increased up to **40%** in 1985. It means that, even though the number of jobs lost was substantial, it is also true that the number of new entrants in the labour market and straight into unemployment grew proportionally more than that of those that became unemployed as a consequence of the crisis of employment.

The geographical difference between the North and the South in Spain, that was clear cut from the employment point of view, it is not so clear when the sectoral unemployment is observed. Still, it is possible to note some features in this respect. For example, the Southern half of Spain is the one where the agricultural unemployment is considerably much larger. On the other hand, the regions in North-East of Spain are those with the greatest proportions of manufacturing unemployment, coinciding with the area where manufacturing is more important in the economic activity. Finally, the highest shares of first job seekers are concentrated in those regions located in the Northern half of the country.

In any case, what seems rather clear is that between 1977 and 1985 there has been a certain process of territorial convergence with respect to the composition of the regional unemployment pools. To illustrate this point more accurately, we have calculated the coefficient of variation for these dimensions of unemployment across regions for the years indicated earlier. **Table 2.3** also reports the results on this. As it can be seen, this coefficient is lower in 1985 for each one of the sectors but agriculture. In the case of the group of unemployed newcomers into the labour market the fall is really important. It implies that the crisis led to a certain homogenization of the various regional unemployment pools. The movement is much neater now than in the case of the economic structure of the labour

demand. Nevertheless, the values reported here are larger than those corresponding to the employment structure for every one of the sectors and for both years. Therefore, we can conclude that the labour demand of the market is geographically more homogeneous than the sectoral composition of regional unemployment, though the latter has changed more extensively.

There are two further points which deserve some comment before finishing this section.

The first one refers to the increase in the degree of heterogeneity of the agricultural unemployment across regions. In 1985, it was implemented a *Programme for Rural Employment*. Its aim was to make unemployment benefits available to a greater number of unemployed from this sector by way of reducing considerably the minimum number of days worked required to qualify for the benefit. However, the application of this program has been limited to Andalucía and Extremadura. Consequently, there were much larger incentives in these two regions, compared with the rest of Spain, for people unemployed from this sector to remain in it[6]. Actually, this number jumped up and its proportion of the total figure of unemployed also increased largely: in 1983 it was of **13.4%** in Andalucía and **10.7%** in Extremadura; in 1985 the percentages were about **24.4%** and **22.8%** respectively. Furthermore, in 1983, **63%** of the national number of agricultural unemployed were located in these two regions. By 1985, this proportion had gone up to **74%**, indicating a larger territorial concentration of this group. Therefore, it is clear that this measure has induced a geographical distortion which can account for the increase in the territorial heterogeneity of this group.

Finally, as far as the methodological change of 1987 did not affect the classification of the unemployed looking for their first job, it is possible to see the way in which the coefficient of variation has changed with the recovery of employment. As reported in **Table 2.3**, it actually doubled from 1985 to 1989. Thus, as employment started to pick up, the geographical distribution of this group of people became more unequal.

In this respect, it is important to mention the effect of the generalization of the

use of "fixed-term contracts", from 1985 onwards. As Bentolila et al. (1991) have pointed out, the entrance into employment takes place, specially for young people, through a contract with fixed duration. On the other hand, they find that these kind of contracts are used mainly in the agricultural and manufacturing sectors together with some divisions of the service sector. These different behaviour of the economic sectors towards these kind of contracts, could be somehow translated into a different behaviour of the various regions towards the group of first-job seekers, formed mainly by young people.

2.5 WOMEN AND THE REGIONAL UNEMPLOYMENT

It is a well established fact there are many differences in the behaviour of men and women with respect to the labour market. One of these differences is that women are more likely to be in the so-called "hidden" unemployment, as they are more mobile between in and out of the labour force than men. In this respect, Alba-Ramírez (1991) reports that, in Spain, by the end of 1985, **40.7%** of women that had lost their jobs, had also decided to leave the labour force. It compares very differently with a percentage of just **11.6%** in the case of men behaving this way.

Along the same lines, it has already been mentioned earlier that part of the persistence of Spain's high unemployment rates after 1985 is due to the large increase in the labour force since that year on. And the main component of this new entrants in the labour market was the female one: it accounts for almost **82%** of the net increase in the labour force between 1985 and 1990. Moreover, from 1977 till 1985, the proportion of women in the labour force increased only by **1.5** percentage points, while in the last five years of the eighties, this proportion went up by **4.8** percentage points (see **Table 2.7**).

In the present section, we intend to report on the regional differences of the incorporation of women to the labour market as far as it can play a significant role in explaining the change in the territorial heterogeneity of the unemployment rates that took place between 1985 and 1990. At the same time, we will address the question of the sex composition of the regional unemployment pools, which can be of some importance due to

the fact that it is a signal of the characteristics of the supply of labour.

2.5.1 Regional Unemployment Rates

Let us start checking the evolution of the regional unemployment rates for each of the two sexes. **Figures 2.4, 2.5** and **2.6** show the position of the regions with respect to the unemployment rate for males (measured in the horizontal axis) and females (measured along the vertical axis), for 1977, 1985 and 1990, respectively.

From these graphs we can observe some interesting characteristics. First of all, the number of regions with an unemployment rate for females smaller than for males decreased from five to just two between 1977 and 1985. By 1990, there were none of them. Furthermore, the difference between the two rates has augmented for every one of the regions, not only between 1977 and 1985, but also, and even more strongly for all of them, during the last five years of the period analyzed, when employment grew substantially. Therefore, we find as a generalized evidence in all the regions, and consequently as well at the national level, that women have suffered a relative deterioration with respect to men in their chances of getting a job, as measured by the unemployment rate. Moreover, this deterioration intensified during the years of recovery of employment: in 1977 the Spanish unemployment rate for women was half a percentage point higher than that for men; in 1985 this gap had increased to **5** percentage points, but in 1990 it went up even more to just over **12** points, being **24.1%** for women and **11.9%** for men. This is a generalized movement all over Spain.

By comparing the positions of the regions in the three figures, it can also be observed that the North-east of Spain performed worst from 1977 till 1985. Thus, País Vasco moved horizontally to the right, meaning that it went from having a male's unemployment rate below the national one to have it larger. Navarra, La Rioja and Valencia moved upwards, showing the same than previously but for the female's rate. Finally, Cataluña had the same experience, though for both groups. During the period of recovery of employment, all these regions returned to their previous position except País Vasco. On the other hand, Asturias and Cantabria experienced a relative worsening of their position both horizontally and vertically, as they moved upwards and to the right. This is consistent with the fact that the crisis affected

mainly the manufacturing regions from the employment point of view, together with that of a much weaker recovery in employment in the Northern regions as already mentioned in **Chapter 1**.

2.5.2 Regional heterogeneity of unemployment by sex

Let us turn now to the consideration of the way in which the geographical heterogeneity evolved in Spain over these years, but this time we will look at it from the sex decomposition of the unemployed.

The pattern over time of the coefficients of variation across regions of both male and female unemployment rates, reported in **Table 2.3**, follows very closely that of the overall one. Therefore, during the years of the crisis in employment, the regional labour markets became more homogenous from this perspective. But, then again, as the economy started to recover, the geographical heterogeneity started to build up, once more, and for both sexes.

From the comparison of the coefficients across sexes, it seems that the unemployment rate is more unevenly distributed across regions in the case of men than for women. The gap between them increased specially during the last years of the period analyzed. This observation leads us to think that the economic growth of the second half of the eighties turned out to create an even more unequal territorial environment for the male unemployed than for females. A possible explanation for it could lie on the issue of the much larger incorporation of women to the labour force during these years; but this is a topic to which we will come a bit later.

However, these results seem to be very much driven by the magnitude of the unemployment rate. For that reason, we will complete the analysis with a quick look at the standard deviations. The picture they show is somehow different to the one just described. For both sexes, they increased substantially, almost doubled, until 1985, and the deviations are larger for men than for women. Nevertheless, the change in the economic cycle breaks this joint evolution of the standard deviations. Thus, while it decreases in the case of men as a

consequence of the creation of employment, the female's one went on increasing until 1990. The effect was that the latter soon became larger than the former during these years.

Therefore, we can say that the different behaviour of these standard deviations is behind the almost unchanged one for the aggregate unemployment rate after 1985, reported earlier in this chapter.

2.5.3 Incorporation of women to the labour market

It has been pointed out that the significant jump in the incorporation of women to the labour market from 1985 onwards is the main responsible, by far, of the substantial increase that took place in the labour force at that time. This jump has had important effects, not only on their own unemployment rate, but it is also responsible, at least partially, for the apparent persistence of high aggregate unemployment rates once the recovery in employment started. Obviously, it has also induced changes in the composition of the supply of labour, as far as the rate of growth for men lagged behind the women's one. The present section is an attempt to address the question of the regional differences in the women's incorporation into this market, and also to investigate up to what point it led to differences in the regional pools of unemployed.

The upper part of **Table 2.7** reports the percentage of women in the labour force for each one of the regions for the three most significant years of the period. As it can be seen, between 1977 and 1985 there is a general increase in this percentage; the six regions in which this is not the case, have a very small negative change. However, in the last five years, all the regions experienced a much larger positive change in the participation of women in the labour force. As a consequence of this phenomenon, the Spanish percentage went from **28.8%** in 1977 up to **35.2%** in 1990. The reason for this relatively large increase in the participation rate lies in the fact that the net rate of incorporation of women to the labour force is much greater than the rate of men. This difference has been specially extreme during the period between 1985 and 1990, when the former was, for the country as a whole, nothing less than **10** times the latter.

The only region where this process did not take place is Galicia. As it appears clearly in **Table 2.7**, its percentage remained practically constant since 1977. On the other hand, it should also be noted that this region was out of line with the rest of Spain as it had an **8** percentage points difference with respect to the following region in importance. Consequently, after these years, Galicia actually fell more into line with the rest of the country.

With respect to the question of the heterogeneity across regions, we have that this incorporation of women to the labour market has actually moved the labour market towards a greater territorial homogeneity. This is very neatly illustrated by the respective figures reported in **Table 2.3**. The coefficient of variation across regions of the proportion of women in the labour force declines from **0.14** in 1977 down to **0.13** in 1985. And then, until 1990, the fall is a very important one, as it comes down to **0.08** for that year. The reason for this significant trend towards a more homogenous labour market, at least with respect to this dimension, lies in the fact that the three regions with the lowest percentage of women in the labour force in 1985 (Extremadura, Castilla-La Mancha and Andalucía) are among the four regions with the largest proportional increase between 1985 and 1990. Similarly, the three regions with the smallest proportional change during these last years are among the top four regions by the participation of women.

Therefore, according to this considerations, we are able to conclude that the process of incorporation of women to the labour market actually played an important role in homogenising the unemployment rates for women across regions, as it was indicated by the respective coefficient of variation. This effect can be thought of as being derived from the supply side of the labour market.

2.5.4 Effects on the composition of unemployment

We shall now consider the effects that this distinctive change in the labour force has had upon the composition of the pool of unemployed across regions. Obviously, the results do not have to coincide with those just mentioned, mainly because unemployment is the result of the encounter of the supply and the demand sides of the labour market.

The lower part of **Table 2.7** summarizes the evolution during the years considered in this study of the importance of women in the composition of the unemployed for each region, and also for Spain.

As in the case of the labour force, the percentage of women among the unemployed is increasing throughout the whole period, but it is specially intensive during the last five years. The data for the country as a whole shows that it went up by **17** percentage points, against the less than **5** points of growth experienced during the first eight years. In 1990 more than half of the unemployed were women, while back in 1977 they were less than a third of the total number. Again similarly to the labour force, this movement is a generalized one across regions.

Between 1977 and 1985, the changes are relatively smaller, and there are also regions where the percentage of women actually declined. Nevertheless, during the last five years, this figure stepped up its increasing path in virtually every one of the Spanish regions. In 1990, there were just four regions where women did not represent at least half of the unemployed: Andalucía, Canarias, Extremadura and Galicia; but in all of them they represented more than **45%**. In the case of the first three regions, this feature combines with the fact of having the largest female unemployment rates, over **30%**. On the other hand, in 1977 there were only four regions with a percentage of women among the total number of unemployed above that figure of **45%**.

From the point of view of the territorial dispersion of the composition of unemployment by sex, Spain has also moved towards a more homogenous labour market, as measured by the coefficient of variation (see **Table 2.3**). It went down from **0.33** in 1977 to **0.13** in 1990. There are however some points which deserve a further comment with respect to the evolution of this figure.

The first thing to observe about it, is that the main jump in this homogenization process took place during the years of destruction of employment, until 1985. Although for the rest of the period there is also a reduction in the coefficient of variation, this one is much less strong, as the coefficient in 1985 was about **0.17**.

Comparing the coefficients of variation for these variables, we find that the proportion of women in the labour force is a geographically more homogenous one than the proportion among the unemployed at any year of this period. Equally, we have that the changes in the coefficients are different. As in the case of the former variable, the main reduction took place precisely in the last five years, unlike in the coefficient for the other one.

This all leads us to think that during the crisis in employment, the demand side of the labour market gave a very important impulse to the process of homogenization of this dimension of the market across regions. This statement is backed, at least partly, by the source of the rise in the number of women unemployed during these first years. It can be seen that until 1985, the net increase in this number is more than double than that of the net change in the number of female labour force. It implies that labour demand is responsible for at least **2/3** of the total variation of women's unemployment. This situation is completely reversed after 1985, when the main source of women's unemployment is, at least from what can be said when considering the net changes, the supply side of the market. The same conclusions can be drawn for each one of the regions in Spain in what refers to the relative importance of the change in the female labour force as a source of the change in the number of women unemployed.

Therefore, it appears that the large increase in the participation of women in the labour force is surely the main cause of the move towards homogenization in the last five years of the eighties. However, when the focus is placed upon the whole period under analysis, we conclude that the female labour supply had a somewhat limited impact, though still positive, on the homogeneity of the participation of women among the unemployed. The employment crisis during 1977 till 1985 had a larger impact on it.

2.6 DURATION STRUCTURE OF UNEMPLOYMENT

We will end this study of regional variations in unemployment by analyzing the question of the long-term unemployment. When we refer to long-term we mean the number of people who have been unemployed and looking for a job for more than a year. The

importance of the duration structure lies in that it has some responsibility in the persistence of high unemployment rates. It has been commonly said that, generally speaking, long-term unemployed have a lower job-search intensity[7]. Therefore, as the proportion of this group increases, it becomes more difficult for the economy to match the opening of new jobs with the unemployed, and as a consequence, to bring down the unemployment rate.

In the present section we will investigate the possible existence of differences in the pattern of evolution across regions of the proportion of unemployed that can be considered as being long-term ones. At the same time we will check the degree of geographical heterogeneity in the Spanish labour market according to this characterization and how it has changed with the initial crisis and later recovery of the economy. This topic turns out to be of special interest as, according to the theory, regions with a larger proportion of long-term unemployed should find it more difficult to translate economic growth into employment growth than otherwise.

In line with this last comment it can also be of interest to explore whether there is any relationship across regions between the recovery in employment in the late eighties and the duration structure of unemployment just before it took place. Similarly, it can be of equal relevance to pay some attention to the links between this categorization of unemployment and the relative importance of certain sectors in the regional economies. The question of the links between the economic structure, as measured by the sectoral shares of employment, and the evolution of unemployment has already been analyzed earlier in this paper. The conclusion obtained then was that the differences across regions in the relative importance of certain sectors are of great help in explaining regional differences in the behaviour of unemployment. What we intend now is to explain the regional behaviour of long term unemployment on its own.

2.6.1 Regional differences in long-term unemployment

Let us start by reporting the effect that the employment crisis of the first eight years until 1985 has had on the increase of the number and proportion of the long-term unemployed at the regional level.

Table 2.8 shows the percentages of unemployed people that have been in this situation for more than **12** months, for each one of the 17 regions and also for Spain. To the years usually taken along this paper as the most significant ones, we have now added 1987. The reason behind being that the latter corresponds to the moment when both the number and the proportion of long term unemployed reached their highest values not only in Spain but also in most of the regions.

The process of continuous destruction of employment from 1977 till 1985 all over Spain led, as it has been widely expressed, to a large increase in the regional unemployment figures. But it was not the only effect it had. As it can be seen from **Table 2.8**, it also induced a tremendous worsening of the duration structure of the unemployment pool. In 1977 the most important group was that of those unemployed for less than **6** months in every single region. Its proportion over the total of unemployed was over **42%** in all the regions, and over **50%** in nine of them, together with Spain as a whole. Long term unemployed were clearly a minority everywhere: there are only three regions where they are more than **25%**, but still less than **30%** of the region's unemployed.

At the end of the crisis, in 1985, the situation had completely reversed. In ten regions, long-term unemployed account for more than half of total unemployment, and in six more regions they were more than **42%**. The proportion of unemployed for less than six months fell accordingly, although in the majority of the regions it was above **25%**, and even above **30%** in six of them. The exception to this process of deep change in the duration structure is to be found in Baleares, where in 1985 the long term unemployed were still about **31%** of the total number, while the unemployed for less than six months were the main group with **40.7%**. This apparent close relationship between the employment crisis and the rise in the long term unemployment problem prompts towards a close connection between the latter and the sectoral structure of the regional economies, as far as it is clear that the crisis affected mainly manufacturing regions. But this is a topic that will be investigated in greater depth a bit later.

Despite the fact that from 1985 onwards employment started to increase strongly, we can observe that the duration structure still went on its process of deterioration

in all the regions, at least until 1987. That year, Baleares was the only region where the long term were less than **50%** of the total number of unemployed, having increased in every single region with respect to the level of 1985.

On the other hand, we can notice that the proportion of unemployed for less than six months actually increases in these two years in five regions, and it is reduced by less than one percentage point at the national level between 1985 and 1987. The result is a relatively large reduction in the proportion of unemployed between **6** and **12** months, suggesting a certain polarization of the unemployment pool in terms of the duration structure.

The reason behind it is, probably, the jump in the labour force that took place essentially between 1985 and 1987. Actually, most of the regions experience a certain slow down in the process of increasing the number of long term unemployed during 1986, only to pick up again in 1987. This could be explained by arguing that 1986 was a year of change in the source of the long term unemployed. Consequently, we have that the surge in the labour force at that time is a very important factor to take into consideration when we address the problem not only of the persistence of high unemployment rates during the first years of the recovery, but also that of the further deterioration of the long term unemployment both at the regional and at the national levels.

After having reached the peak around 1987 (the actual year varies depending on the region), the duration structure experienced a substantial improvement with the reduction of the proportion of long term unemployed in all the regions. The national average proportion fell by over **8** percentage points, though still remained over **50%** in Spain and in eight regions.

Let us turn now to the consideration of the geographical heterogeneity of the importance of the long term unemployment across regions and how it has evolved during these years. The results obtained about this appear also in **Table 2.3**, along the coefficient of variation for some other dimensions of unemployment.

The fall in the coefficient between 1977 and 1985 indicates that the proportion

of long term unemployed became more homogenous across regions as the result of the economic crisis. However, the reduction it experienced in the following two years turns out to be much more impressive as it came down from **0.19** to **0.12** in 1987.

This large difference between the two periods is better understood if we consider again the question of the change in the origin of the long term unemployed in 1985 as a consequence of the jump in the labour force, coupled with the end of the employment crisis. From **Table 2.3** we can notice that the coefficients of variation for the sectoral dimensions of unemployment are much greater than those of the participation of women in the labour force. Therefore, as far as after 1985 the majority of the newcomers in the labour market are women, then the coefficient of variation of the duration structure of unemployment should reflect the change in the origin of the unemployed on top of the reduction within each group.

From 1987 till 1990, the coefficient of variation of long term unemployment went up again, coinciding with the fall in the relative importance of this group among the unemployed in all the regions. But despite that, in 1990 the dimension of long term unemployment showed a more homogenous picture of the labour market across regions in Spain than in 1985.

2.6.2 Links with Employment

It has been shown that, at least until 1985, there appears to be a close relationship between the evolution of employment and that of the problem of long term unemployment. Similarly, it is clear that the employment crisis affected specially the manufacturing and construction sectors, and, with them, those regions where they provided a relatively large proportion of the jobs. In this respect, we have that the three regions with the largest relative fall in manufacturing employment from 1985 till 1990, i.e. País Vasco, Asturias and Cantabria, appear consistently among the top five regions by the proportion of long term unemployment every year since 1984. The conclusion that we can deduce from this point is that people that was laid off during the crisis, could not get back to their jobs as the manufacturing sector in the North of Spain never recovered employment. Therefore, it seems

evident that the next step is to try to formalize the existence of some kind of link between the regional change in the long term unemployed and the relative specialization of the related regional economy.

The method used is the same as in the case of the links between employment structure and the evolution of employment. The only difference is that, in this case, the dependent variable will be the proportional change across regions in the number of people unemployed and searching for a job who have been in this situation for over a year. The results obtained are reported in **Table 2.9**.

For the period of the crisis in employment (1977-1985), we have found that the only sector with a significantly coefficient different from zero is the manufacturing one. As it turns out to be positive, then we can conclude that those regions with a greater manufacturing sector in 1977 experienced a larger deterioration of the duration structure until 1985. In fact, the variation in the employment shares of the manufacturing sector across regions explains on its own about a third of the total variation of the long-term unemployment. In this respect, it is significant the similarity between the $\mathbf{R^2}$ of this regression and that of the proportional change in unemployment as the dependent variable (see **Table 2.4**). It is also worth noting that, unlike in the case of the evolution of total unemployment, the service sector does not appear to have any effect on the problem of long-term unemployment. A plausible explanation would consider that, during these years, the service sector did not recruit its newly employed people from the pool of long term unemployment.

We have included as well the results for the periods 1985-1990 and 1977-1990, although we are much less sure of its interpretation because of the already reported impact of the increase in the labour force in the growth of long term unemployment after 1985. Still, it is significant to note the positive coefficient of agriculture during the period of employment growth. Equally important is the comparison between the $\mathbf{R^2}$ of the regressions for the whole period with the equivalents from **Table 2.4**. Though the explanatory variables are the same, it turns out that in the present case the $\mathbf{R^2}$ are lower. This observation is consistent with the previous comment about the jump in the labour force in 1985.

Finally, in relation with the links between employment and duration structure of unemployment there is one topic that deserves some comment. According to Blanchard and Diamond (1990), firms tend to choose the job applicant with the shortest unemployment duration. On the other hand, long term unemployed tend to be less intensive in their search for a job, so that it becomes more difficult to match a job to an unemployed person in this group[8]. Consequently, we should expect that regions with a larger proportion of unemployed over one year should have greater difficulties in achieving employment growth than otherwise.

In order to test this idea, we have run a cross-section regression with the proportional change in employment between 1985 and 1990 as the variable to be explained, and the proportion of long term unemployment as the explanatory variable, across the 17 regions in Spain. We should expect a negative coefficient in order to have results that actually supported the theory. However, we were unable to get a significant coefficient out of this regression.

All of this means that in the case of Spain, for this particular period the high percentage of long term unemployed has not impaired the job-matching rate in the economy. The most logical explanation for this finding is that in fact the search intensity is very similar across the different groups of unemployed considered here. This idea is further reinforced by some studies that have found that in the last years of the period, as employment was growing substantially, there has been a significant mobility within this group of long term unemployed. Other studies also support it, though from a different point of view. Using individual household data to analyze the demographic characteristics of unemployment, Gracia-Díez (1991) suggests that the Spanish labour market demands not only education level, but also professional experience. Thus, at times when there is an important amount of new entrants into the labour market, the long term unemployed have incentives to keep up its search intensity provided they have one of the qualifications demanded by the labour market, which is experience, and that places them in a good position when competing for a job.

Therefore, we can conclude that the regions that had a relatively bad duration structure at the beginning of the recovery period have not seen their employment growth limited in any way by this circumstance.

2.7 CONCLUSIONS

The purpose of the present investigation has been to gain further knowledge about the geographical heterogeneity of the Spanish labour market from the point of view of the unemployment during the period that goes from 1977 till 1990. The analysis has been done not only for the regional unemployment rates but a bit more intensive. In this line, different categorizations of the unemployed has been taken into consideration, such as sectoral structure, sex and also the duration structure.

From the study carried out here, we have been able to obtain some interesting results, that are summarized in what follows.

First of all, we have that the evolution of the unemployment rate at the national level also takes the year of 1985 as the turning point. Nevertheless there are some regions which experience an increasing rate until one or two years later. This feature has been pointed out as a possible explanation for the persistence of high unemployment rates in Spain. However, this theory was discarded mainly because almost every region experience a similar pattern of persistence. This phenomenon seems to be more the logical consequence of the huge jump in the labour force that took place from 1985 onwards as a general process all over Spain. This surge was probably the response of the people to a change in expectations as the result of the opening of new jobs in relatively large numbers.

This idea is further supported by the fact that the vast majority of the new entrants into the labour force after 1985 were women. And it is well known that, at least in Spain, they are very mobile between in and out of the labour force in response to the general economic environment.

This sudden increase in the labour force is also responsible for the worsening in the duration structure of unemployment after 1985, even though employment was being created in all the regions.

With respect to the geographical evolution of unemployment, we have found that there were no big changes in the ordering of the regions by their unemployment rate. However, it has been noted that similar conclusions to those derived from the analysis of employment can be obtained now. Thus, between 1977 and 1985 the manufacturing regions performed relatively worse. And in the following years, this role has been taken by the regions located in the North, not only in the regional unemployment rate, but also for each of the two sexes and as well in the proportion of the long term unemployed.

In terms of the territorial heterogeneity of the unemployment side of the labour market, it appears that the coefficient of variation across regions of the unemployment rate was decreasing until 1985, and then it went up again, though by 1990, Spain was more homogenous in this respect than in 1977. However, this pattern is not maintained uniformly for the different classifications of unemployment.

In the case of the unemployment according to the last sector worked in, there is a general move towards a greater territorial homogeneity between 1977 and 1985 in all sectors but agriculture. It remained out of this move probably because of the effect of the *Programme for Rural Employment*, which has only been implemented in Andalucía and Extremadura. On the other hand, the group of the first job seekers is the one that has made the largest advance towards territorial homogeneity, though it went some way backwards until 1989. Comparing the coefficient of variation across regions for the importance of each sector in employment and in unemployment, we concluded that the demand for labour is territorially more homogenous in each sector than the labour supply (as represented by unemployment). Nevertheless, the latter moved faster towards homogeneity than the former.

The group with the largest participation in unemployment in 1977 was that formed by the first job seekers, followed by those that had worked in the construction sector. The latter could have reached this relatively important proportion of unemployed as the result of an anticipation to the crisis in the rest of the economy. With respect to the former group, it turns out that the entrants in unemployment are proportionally in greater numbers from newcomers into the labour force than as a direct result of the crisis in employment. This is what can be deduced from the increase in their participation rate in unemployment.

In terms of the geographical location of the unemployed, we have seen that the South has the largest proportion of unemployed in the agricultural sector. Those unemployed from manufacturing are specially important in the North-east of Spain, while the regions in the North tend to have greater percentages of first job seekers.

Moving now to the sex characterization of the unemployment, it has been found that, in accordance with the trend in the overall unemployment rate, there was an increase in the degree of homogeneity for each sex from 1977 till 1985. The recovery period brought an increase in the heterogeneity. Across sexes, it turned out that men face a greater geographical dispersion in their unemployment rates, and increasingly so along the period considered. In contrast with this, the unemployment rate for women became much larger than that for men in all the regions.

This apparently contradicting results, were somehow reconciled together through the consideration of the incorporation of women into the labour market. It took place in all regions at a much faster rate from 1985 to 1990. Not only that, but it also led to a greater homogeneity in the participation of women in the labour force, specially during these years. This is what might have caused the much faster increase in the female unemployment rate but also the greater territorial homogeneity of these rates. It happens equally with the proportion of women among the unemployed. Nevertheless, in the case of the latter, the process of homogenization was more intense in the period of the crisis in employment (1977-1985), when it was mainly demand driven. From 1985 to 1990 it was the turn for this process to be driven by the supply side of the labour market, and it was less strong.

The last classification of the unemployed that has been taken into account in the present analysis refers to the duration structure of the unemployed. The employment crisis pushed up the number of long term unemployed, and by 1985, they were majority in most of the regions. However, the surge in the labour force at that time pushed this number further up and by 1987 there is only one region where this group is not over **50%** of the total number of unemployed. After 1987, the proportion of long term unemployed fell substantially in almost all the regions.

In consonance with this peculiarity, the coefficient of variation came down until 1985 and even more until 1987. This further reduction in the heterogeneity with respect to the overall unemployment rate is a direct consequence of the surge in the labour force and it must be related to the importance of women in it together with the greater homogeneity across regions of the proportion of women among the unemployed. After 1987, the regions became more heterogenous with respect to their duration structure, but in 1990 they were not that heterogenous as in 1985.

At a different level, we have been able to establish some links between the economic structure of the regions and the evolution of unemployment and also of long term unemployment. In this respect we obtained that manufacturing and services are responsible to a great extent of the regional variations in the evolution of unemployment during the years of the crisis. However, only manufacturing affects long term unemployment during this period. We have also found that the economic structure explains less the evolution of unemployment in the later years of the period, and this is consistent with the fact that, from 1985 onwards, the surge in the labour force becomes very important in explaining unemployment persistence.

Finally, we found no relationship between the proportion of long term unemployment and the performance of employment across regions. This is consistent with some other studies that have suggested that people belonging to this group are equally intensive in job searching as the rest, probably because the Spanish labour market is very keen on demanding experience as an added qualification.

ENDNOTES

1 There is an alternative source of information about unemployment provided by the Ministerio de Trabajo y Seguridad Social (Ministry of Employment). It collects data from registered unemployment. However, we have preferred to use the data provided by the I.N.E. from the Labour force Survey.

2 In this respect, the experience is similar to the one in the U.K., Italy, and some other european countries. In the case of U.K., the question of the North-South division of the country has been extensively analyzed by, among others, Blackaby and Manning (1987, 1990*a* and 1990*b*).

3 This is one of the topics analyzed by Layard, Nickell and Jackman (1991), where there is data on the situation of a number of European and Non-European countries.

4 During this period, there has been an intense process of decentralization in Spain. The Autonomous Communities took over many responsibilities, altering, somehow the institutional set-up that was in place until then.

5 This is due to the methodological change that took place in the Spanish Labour Force Survey in the second term of 1987.

6 Bentolila (1992) also comments on this special subsidy as a factor that could reduce the incentives for people to move out of these regions.

7 For references on this topic, see also Layard, Nickell and Jackman (1991).

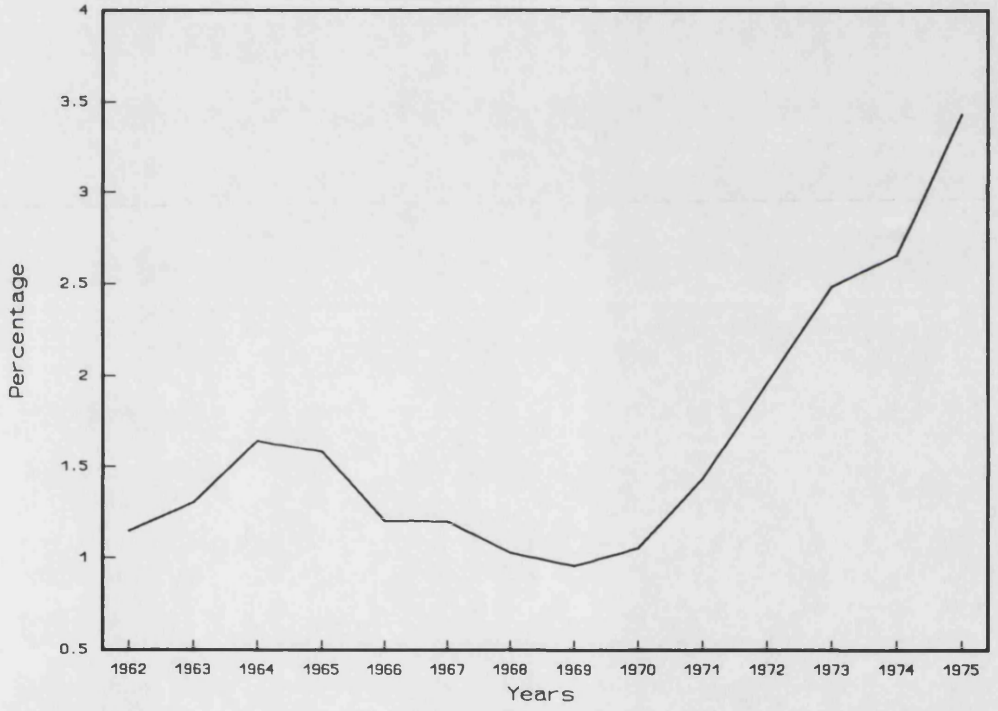
8 On this topic there is some debate about whether the pattern of duration-specific exit rates reflects duration-dependence or heterogeneity among the unemployed people. In this respect, Jackman and Layard (1991) have found, using British data, that pure heterogeneity does not hold. However, they are also unable to establish pure state-dependence.

–FIGURE 2.1–
SPAIN: AUTONOMOUS COMMUNITIES

-FIGURE 2.2-

SPANISH UNEMPLOYMENT RATE

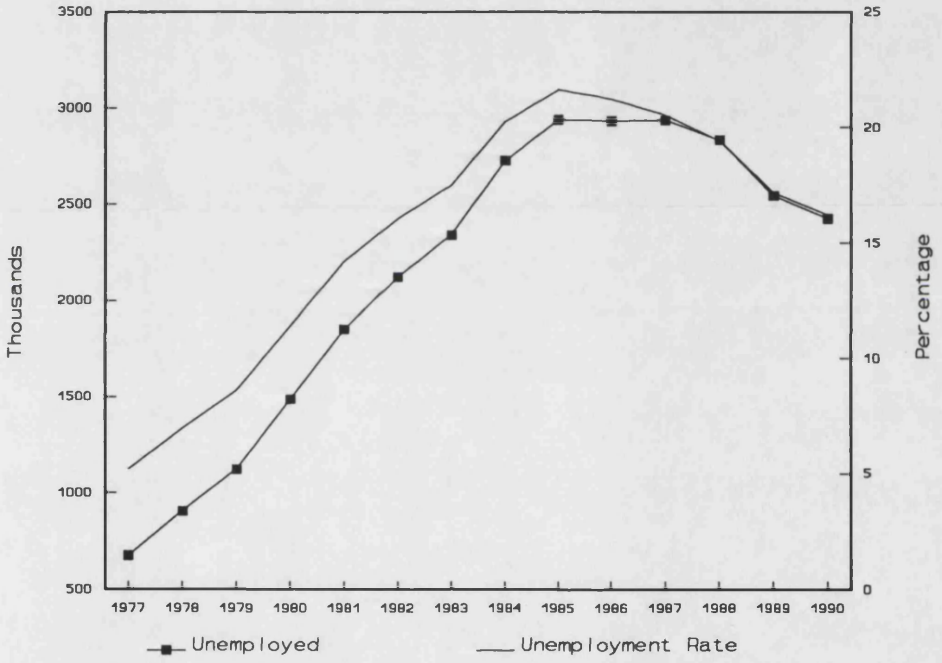
1962-1975



-FIGURE 2.3-

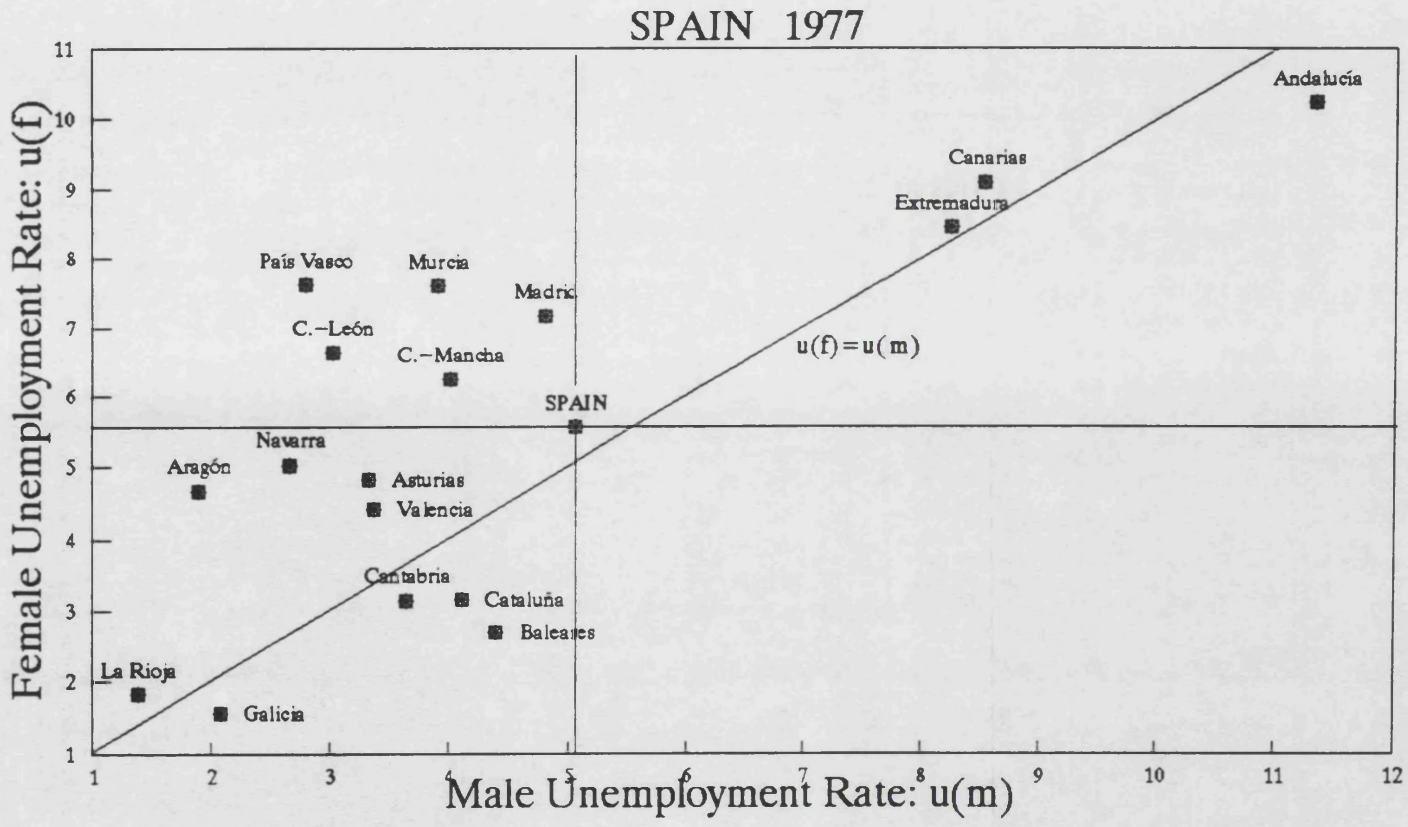
SPANISH UNEMPLOYMENT

Level vs Rate: 1977-1990



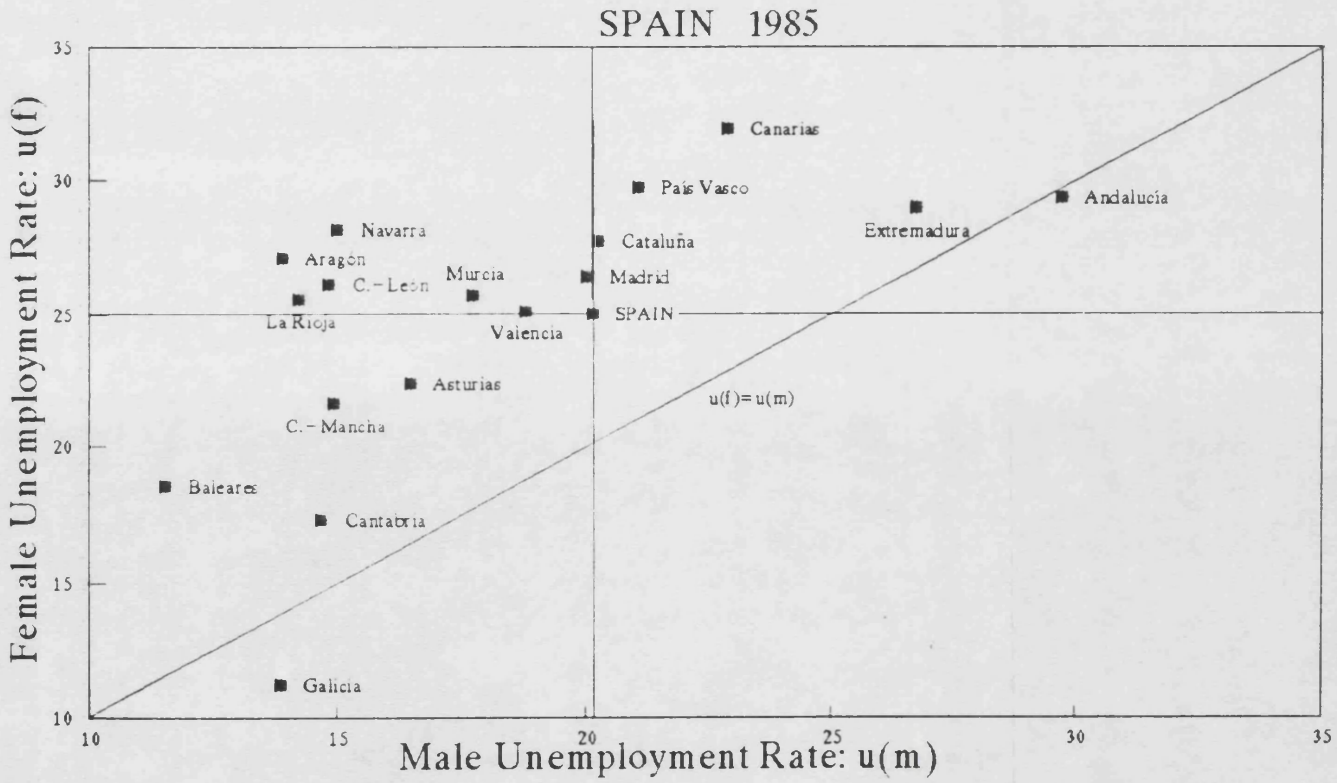
-FIGURE 2.4-

UNEMPLOYMENT RATES by SEX

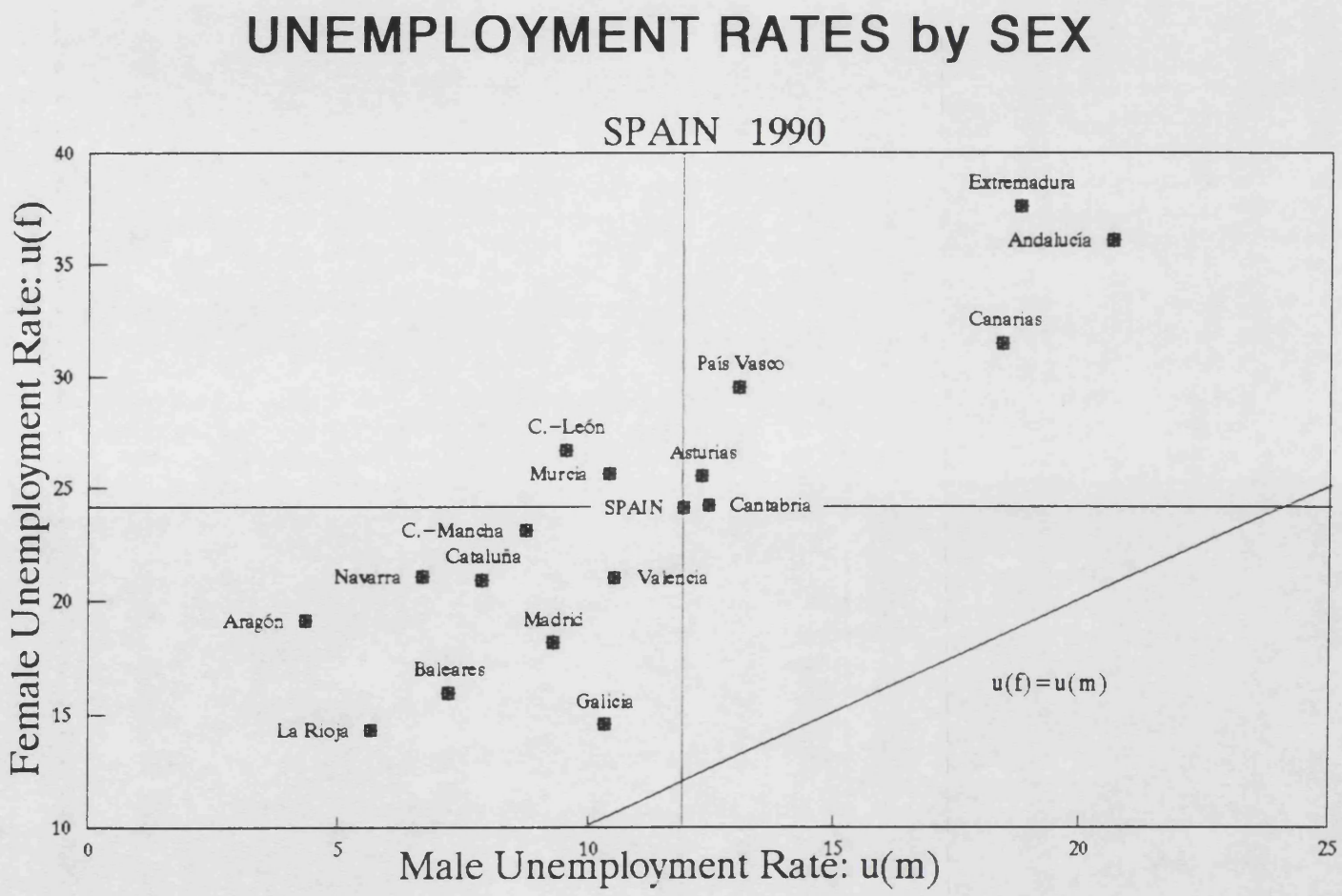


–FIGURE 2.5–

UNEMPLOYMENT RATES by SEX



–FIGURE 2.6–


UNEMPLOYMENT RATES by SEX
SPAIN 1990
Female Unemployment Rate: u(f)
Male Unemployment Rate: u(m)
40
35
30
25
20
15
10
0
5
10
15
20
25
Extremadura
Andalucía
Canarias
País Vasco
C.–León
Asturias
Murcia
SPAIN
Cantabria
C.–Mancha
Cataluña
Navarra
Valencia
Aragón
Madrid
Baleares
Galicia
La Rioja
u(f)=u(m)

-TABLE 2.1-

REGIONAL UNEMPLOYMENT RATES

	1962	1965	1970	1975
ANDALUCIA	3.33	4.15	2.38	8.36
ARAGON	0.19	0.88	0.74	1.64
ASTURIAS	0.33	1.04	0.86	1.78
BALEARES	0.44	0.49	0.16	1.45
CANARIAS	1.11	1.72	0.63	5.72
CANTABRIA	0.47	0.51	0.36	1.68
C.-LEON	0.32	0.97	0.64	2.01
C.-LA MANCHA	0.47	0.75	0.30	5.15
CATALUÑA	0.82	1.45	0.81	1.73
VALENCIA	1.23	1.28	1.13	2.26
EXTREMADURA	1.71	2.25	1.25	4.67
GALICIA	0.34	0.58	0.59	2.67
MADRID	1.07	1.25	1.33	2.77
MURCIA	1.45	2.37	1.82	4.91
NAVARRA	0.15	0.31	0.23	3.28
PAIS VASCO	0.20	0.35	0.43	1.48
LA RIOJA	0.33	0.29	0.18	0.96
SPAIN	1.15	1.59	1.05	3.43

Source: Banco de Bilbao

-TABLE 2.2-

REGIONAL UNEMPLOYMENT RATES

	1977	1985	1987	1990
ANDALUCIA	11.07	29.64	30.80	25.57
ARAGON	2.61	17.60	14.03	9.47
ASTURIAS	3.80	18.41	20.31	17.32
BALEARES	3.84	13.89	14.15	10.49
CANARIAS	8.67	25.69	24.16	23.00
CANTABRIA	3.49	15.51	18.92	16.78
C.-LEON	4.07	18.05	17.16	15.27
C.-MANCHA	4.56	16.57	15.44	13.01
CATALUÑA	3.84	22.66	20.74	12.68
VALENCIA	3.68	20.77	19.01	14.28
EXTREMADURA	8.29	27.29	26.70	24.54
GALICIA	1.87	12.81	12.73	12.03
MADRID	5.50	22.11	17.05	12.52
MURCIA	5.02	20.14	19.37	15.83
NAVARRA	3.27	18.87	16.36	11.73
PAIS VASCO	4.11	23.62	23.24	18.77
LA RIOJA	1.51	17.33	13.61	8.39
SPAIN	5.20	21.64	20.53	16.21

Source: I.N.E.

-TABLE 2.3-

COEFFICIENT OF VARIATION

across REGIONS in SPAIN

Unemployment Dimensions	1977	1985	1987	1990
ECONOMIC SECTORS				
Agriculture	0.92	0.97		
Manufacturing	0.46	0.37		
Construction	0.36	0.27		
Services	0.36	0.32		
1st Job Seekers	0.44	0.13		0.26*
SEX				
Male (Unemployment Rate)	0.54	0.27	0.31	0.40
Female (Unemployment rate)	0.47	0.21	0.21	0.29
% of Labour Force	0.14	0.13		0.08
% of Unemployed	0.33	0.17	0.14	0.13
DURATION				
Long Term Unemployment	0.27	0.19	0.12	0.16
REGIONAL UNEMPLOYMENT RATE	0.49	0.23		0.32

(*): Value for the year 1989.

NOTE: The Coefficients of Variation across regions refer to the proportion of the regional unemployed within each category shown.

-TABLE 2.4-

Economic Structure and Changes in Unemployment

Dependent Variable: Proportional Changes in Regional Unemployment.

Regressors: Regional Employment of the Sector indicated at the beginning of the period.

Sample: 17 Regions of Spain.

PERIOD	CONSTANT	AGRICULTURE	MANUFACTURING	CONSTRUCTION	SERVICE	R^2
1977-85						
REG. 1	117.0 (1.1)		11.4 (2.9)			31.6
REG. 2	844.7 (4.2)				-10.65 (-2.18)	18.9
REG. 3	493.0 (2.3)		9.96 (2.7)		-8.44 (-2.02)	43.2
1985-90						
REG. 4	-31.6 (-3.8)	0.76 (2.07)				17.0
REG. 5	8.9 (0.7)		-1.22 (-2.1)			17.6
1977-90						
REG. 6	740.3 (6.3)			-45.7 (-3.7)		44.3
REG. 7	626.8 (7.3)				-7.86 (-3.7)	44.7
REG. 8	781.7 (7.3)			-28.7 (-2.1)	-5.0 (-2.14)	55.1

NOTE: t-statistics in parenthesis

-TABLE 2.5-

ECONOMIC SECTORS AND UNEMPLOYMENT

% of Regional Unemployment

YEAR 1977

	AGRICUL-TURE	MANUFAC-TURING	CONSTRUC-TION	SERVICES	1st JOB SEEKERS
ANDALUCIA	21.98	10.56	25.14	18.31	23.57
ARAGON	0.92	18.47	10.62	20.86	47.82
ASTURIAS	1.37	10.90	19.68	13.59	53.33
BALEARES	2.10	11.57	29.66	37.94	11.18
CANARIAS	6.54	7.57	33.76	22.85	28.09
CANTABRIA	0.00	18.20	10.51	13.34	57.28
C.-LEON	5.00	8.92	11.91	18.56	54.90
C.-MANCHA	17.05	9.73	22.86	7.57	42.56
CATALUÑA	1.72	28.41	31.95	14.45	22.55
VALENCIA	1.92	24.58	19.05	17.06	36.71
EXTREMADURA	29.25	10.45	22.14	16.28	21.66
GALICIA	3.26	10.56	17.67	14.05	53.90
MADRID	2.20	14.89	18.65	18.71	45.16
MURCIA	7.73	17.56	15.69	20.85	37.71
NAVARRA	2.45	16.92	17.55	18.27	45.15
PAIS VASCO	1.21	19.69	7.73	22.50	48.72
LA RIOJA	0.00	29.45	15.92	22.77	32.53
SPAIN	10.42	14.89	22.43	17.85	33.74

Source: I.N.E.

-TABLE 2.6-

ECONOMIC SECTORS AND UNEMPLOYMENT

% of Regional Unemployment

YEAR 1985

	AGRICUL-TURE	MANUFAC-TURING	CONSTRUC-TION	SERVICES	1st JOB SEEKERS
ANDALUCIA	24.38	8.89	16.72	18.51	31.32
ARAGON	2.13	22.59	9.88	19.21	45.37
ASTURIAS	1.28	14.44	12.22	23.55	48.28
BALEARES	1.07	9.38	9.24	43.63	36.38
CANARIAS	5.83	8.06	15.56	30.23	40.32
CANTABRIA	2.00	13.67	12.64	24.27	47.30
C.-LEON	4.47	13.42	17.37	20.54	43.90
C.-MANCHA	11.88	14.02	18.34	16.06	39.58
CATALUÑA	1.31	26.20	11.57	19.28	41.38
VALENCIA	2.94	24.55	11.75	21.57	39.15
EXTREMADURA	22.63	7.06	23.30	14.71	32.12
GALICIA	2.75	17.96	17.16	19.96	41.44
MADRID	0.36	15.27	12.46	25.75	46.03
MURCIA	13.49	16.29	11.72	19.94	38.26
NAVARRA	4.65	21.09	11.59	21.39	40.72
PAIS VASCO	0.76	20.52	8.85	20.24	49.19
LA RIOJA	1.52	25.01	15.06	16.96	41.53
SPAIN	8.01	16.66	13.99	21.02	40.08

Source: I.N.E.

-TABLE 2.7-

FEMALE PARTICIPATION IN THE LABOUR MARKET

	% of the Labour Force			% of total Unemployed		
	1977	1985	1990	1977	1985	1990
ANDALUCIA	23.67	25.44	32.08	21.87	25.20	45.22
ARAGON	25.79	27.81	34.48	46.22	42.89	69.74
ASTURIAS	31.72	32.46	37.72	40.22	39.47	55.63
BALEARES	32.82	33.07	37.45	23.04	44.27	56.92
CANARIAS	26.54	30.96	35.09	27.80	38.46	48.04
CANTABRIA	30.50	30.25	36.72	27.46	33.87	52.98
C.-LEON	28.76	28.27	33.34	46.91	40.97	58.31
C.-MANCHA	24.54	24.29	29.72	33.61	31.74	52.77
CATALUÑA	28.88	31.74	36.91	23.82	38.92	60.81
VALENCIA	28.99	30.94	35.82	34.89	37.47	52.67
EXTREMADURA	22.84	23.59	30.61	23.25	25.04	46.92
GALICIA	40.26	39.76	40.26	33.72	34.82	48.64
MADRID	29.25	32.33	36.21	38.12	38.70	52.57
MURCIA	30.01	29.95	35.53	45.46	38.30	57.52
NAVARRA	25.41	29.21	35.06	39.12	43.61	62.89
PAIS VASCO	27.11	29.26	34.54	50.31	36.83	54.34
LA RIOJA	29.69	27.24	31.40	35.79	40.22	53.51
SPAIN	28.76	30.34	35.14	30.67	35.10	52.24

Source: I.N.E.

-TABLE 2.8-

LONG TERM UNEMPLOYMENT

% of Regional Unemployment

	1977	1985	1987	1990
ANDALUCIA	20.16	44.60	52.87	49.02
ARAGON	19.07	55.45	57.46	48.75
ASTURIAS	29.28	58.29	68.79	67.97
BALEARES	14.54	31.21	47.22	38.37
CANARIAS	28.53	56.54	58.36	48.69
CANTABRIA	23.81	64.23	68.74	67.23
C.-LEON	26.20	55.78	61.88	58.56
C.-MANCHA	13.90	44.39	53.57	45.78
CATALUÑA	24.24	69.07	69.42	56.75
VALENCIA	19.81	55.97	60.99	49.19
EXTREMADURA	10.89	42.93	54.50	47.30
GALICIA	16.31	49.58	63.18	56.61
MADRID	15.42	67.22	69.22	54.60
MURCIA	19.67	48.52	51.98	45.14
NAVARRA	23.70	56.15	64.11	47.93
PAIS VASCO	17.11	64.07	70.26	65.11
LA RIOJA	14.90	42.26	55.34	51.66
SPAIN	20.08	56.26	61.41	53.10

Source: I.N.E.

-TABLE 2.9-

Economic Structure and Changes in Long Term Unemployment

Dependent Variable: Proportional Changes in Regional Long Term Unemployment.

Regressors: Regional Employment of the Sector indicated at the beginning of the period.

Sample: 17 Regions of Spain.

PERIOD	CONSTANT	AGRICULTURE	MANUFACTURING	CONSTRUCTION	SERVICE	R^2
1977-85						
REG. 1	357.0 (0.96)		38.1 (2.9)			31.1
1985-90						
REG. 2	-40.1 (-3.8)	1.25 (2.74)				28.9
REG. 3	13.7 (0.8)		-1.38 (-1.7)			10.6
REG. 4	-67.4 (-2.3)			6.82 (1.85)		13.2
1977-90						
REG. 5	2594 (4.04)			-1622.6 (-2.41)		23.0
REG. 6	2369.2 (5.4)				-32.5 (-3.02)	33.6

NOTE: t-statistics in parenthesis

Chapter 3

A SEARCH MODEL OF INTERREGIONAL MIGRATION

3.1 INTRODUCTION

It is a well known fact that in most countries there are significant differences in regional unemployment rates. Furthermore, these differences have proved to be very persistent, both in times of crisis and also during the periods of recovery of employment (see, for example, Layard, Jackman and Nickell, (1991)). From a more general point of view, these differences are commonly considered one more dimension within the group of matching problems an economy has. Furthermore, it has been argued that the lack of flexibility in matching the unemployed with the available employment openings is one of the main reasons for the so-called "Eurosclerosis", i.e. high and persistent unemployment that has affected recently many European countries (Savouri, (1990); Schioppa, (1991) and Burgess, (1992)).

In this respect, interregional migration appears to be one of the possibilities any economy has to bring labour supply closer to where labour demand is generated, and reducing the general level of mismatch in the labour market, following the approach by Jackman, Layard and Savouri (1987).

Traditionally, the basic theoretical framework for the analysis of interregional migration has been that of the human capital theories. According to this approach, people would take into account the present value of future gains if migration takes place against the costs of the move[1]. One of the difficulties of these models is that they can hardly explain the existence of migration flows between any two regions in both directions for people that are similar in every personal characteristic, apart from their place of residence. Thus, for example in the U.K. gross migration flows are quite large while the net migration is very small, as reported by Jackman and Savouri (1991). Equally, labour force migration would be inconsistent with regional labour market equilibrium, as labour flows are viewed as a response to market disequilibrium. (For a survey of the literature on migration see Greenwood, (1975 and 1985); Molho, (1986) and Shields and Shields, (1989)).

An alternative approach has been followed by Jackman and Savouri (1991) in their paper about Regional Migration in Britain. In that paper, they start within the theoretical

framework of the job-matching, and use the "hiring function" as the centre piece of the model. It leads to the conclusion that migration is the consequence of a successful job search, so that it concentrates on "contracted migration" against "speculative" one[2]. This classification of migrants was introduced by Silvers (1977), and the distinction between these two categories lies in the fact that the former is undertaken once the job has been secured at the point of destination, while the latter takes place in the "hope" of finding a suitable opportunity.

However, the effort by Jackman and Savouri (1991) is mainly empirically oriented, as their intention is primarily to explain the existence of important gross bilateral migration flows.

In the present paper our intention is to explore the microeconomic foundations of the model developed by Jackman and Savouri in the paper mentioned above, and also of their interregional migration function. We will use the theoretical framework provided by job-search and matching theories, such as the one contained in Pissarides (1990).

Despite the fact that migration is affected by multiple considerations, such as regional amenities, public goods provided by the local authorities and some other living conditions, in formulating the theoretical model in this paper we will restrict our analysis to the economic determinants of the phenomenon of migration of the labour force between regions located in the same country.

In **Section 3.2**, we will explore initially the consequences of the introduction of separate regional labour markets. In this model, I am going to consider a country consisting of just two regions with different economic structures. The only link between them will be that workers have access to the vacancies that are available all over the country, not only in the region where they are located, so that they will move from one to another as the consequence of a successful search for a job when the vacancy involved is from the other region.

The approach followed here is based on search theory. It will allow an analysis of the decision with respect to the possibility of migration faced by the individual when his

objective is the maximization of his utility function. This analysis will be carried out in **Section 3.3**. We will assume also that all workers are identical, so that we will consider the existence of a representative worker in the analysis that follows.

Section 3.4 goes from the problem of the individual to the consideration of the economy as a whole. There I will explore the existence of an aggregate equilibrium when individuals behave as utility maximizers, in the presence of the search-externality. I will be specially concerned about the possibility of an interior solution to the problem as it will lead towards migration flows between the two regions in both directions.

Once it has been shown that this equilibrium exists, we turn, in **Section 3.5**, to the setting of the interregional migration function, analyzing the impact that different economic variables have on the migration flow in the economy.

Finally, **Section 3.6** explores the conditions for regional labour market equilibrium. Basically, human capital theories of migration are disequilibrium theories. However, in this section we will be able to get a conclusion which is different to the one that is obtained under the models of human capital. According to the model developed here, there will be interregional migration flows in both directions even in the case when both regional labour markets have reached the equilibrium point. We end this chapter with the conclusions in **Section 3.7**.

3.2 JOB-SEARCH AND THE TRANSITION RATES INTO EMPLOYMENT

It will be assumed in the present chapter that job-search is a time-consuming activity and that only unemployed workers get involved in that process.

Unemployed workers have the possibility of searching for a job not only within their own region but also in the other region. It will be assumed that there is no need for them to change their place of residence in order to carry out this search. This characterization means

that there are some mechanisms, such as employment agencies with access to the national market or just simple family or friendship ties, through which people from one region learn about the job opportunities in the other region[3]. Nevertheless, it is also consistent with the fact that people may decide to go to another region to carry out some search, provided it is for a very limited period of time. This suggests, of course, that searching for a job outside their own region turns out to be more costly; although this higher cost will not be taken into consideration in an explicit way in the present chapter. According to this formalization, interregional migration will only take place once the unemployed worker gets a job in a region different to the one in which he is currently located. Temporary moves to facilitate the search activity will not be considered as migration unless this search ends in a job matching.

As far as search requires time, it is assumed that, at any given moment in time, each worker is able to consider only one possible job. Therefore, he has to consider, at any moment, in which region he will carry out the search. Consequently, each worker will have to take a decision about how to allocate the time he dedicates to job-searching between doing so in their own region and in the other region. We will take δ_1 as the proportion of time dedicated by the unemployed people in region 1 to the internal search. We will consider equally that in region 2 there are also unemployed workers who may search for jobs in both regions; and δ_2 will be the proportion of time that any one within this group of unemployed takes to search for jobs in their own region[4].

We will assume that the effectiveness of the search activity is subject to Decreasing Returns to Scale. In particular, we will assume that it takes the form of δ^{α}, with $\alpha<1$. It means that the effectiveness of any unemployed worker decreases as he spends more time searching for a job in the same region. This assumption could be justified by thinking that unemployed people becomes more discouraged as they apply for further vacancies within the same region[5]. We could also consider that there is a variety of methods of search (through employment agencies, advertisements in papers...), some of which are better than others, and the more time spent searching in a region, the methods used are less effective at the margin[6]. Alternatively, we might take into consideration that together with the assumption of people being fully informed about the vacancies available in the various regions, in each region there are, however, some vacancies that are more suitable for the particular characteristics of the

unemployed workers. Consequently, he will assume that he should apply first for these vacancies, regardless of the region where they are currently offered, as he will have better chances of getting the job. Hence, he will put relatively more effort when applying for these vacancies than for those less suitable to his characteristics as a worker.

On the other hand, we will take that all individuals are equally effective in their search activity, regardless of their location and also of the region where they carry it out. It means that we have at any point in time the number of effective seekers for a job in, say, region 1 is given by $\delta^{\alpha}_1 U_1+(1-\delta_2)^{\alpha}U_2$. Equally we have that the number of effective job-seekers in the other region, region 2, now becomes $\delta^{\alpha}_2 U_2+(1-\delta_1)^{\alpha}U_1$ [7]. In these expressions, we will impose that $\alpha<1$ as it is the parameter that shows the degree of the decreasing returns to scale.

According to this, any worker unemployed at the beginning of the period, will be, at the end of the period, in one of the three following alternative positions:

1- working in region 1,

2- working in region 2,

3- remain unemployed.

This brings us to the question of the transition rates into employment[8]. They are defined as the probability that, at any moment in time, any unemployed worker has of ending successfully the search for a job. Nevertheless, we have to take into account one of the peculiarities of this model, and this is the existence of regional labour markets that are different from each other. Thus, we should allow the transition rate into employment in one region to be different from the rate into employment in the other region.

The easiest way of expressing them would be as an straightforward probability expression, with the number of jobs available in the numerator and the number of people applying for these jobs (effective number of unemployed workers) in the denominator. Following Gleave and Cordey-Hayes (1977) and Holt (1978), this ratio can be interpreted as a measure of the *tightness* of the labour market. Therefore, the labour market tightness in region 1 would be given by:

$$\frac{V_1}{\delta_1^{\alpha}U_1+(1-\delta_2)^{\alpha}U_2} = \Theta_1 \qquad (1)$$

and equally for region 2 by

$$\frac{V_2}{\delta_2^{\alpha}U_2+(1-\delta_1)^{\alpha}U_1} = \Theta_2 \qquad (2)$$

where V_i refers to the number of vacancies that becomes available per period in region **i** **(i=1,2)** to be filled by the unemployed workers.

However, according to the characteristics so far described in this model, we should also take into consideration the existence of some degree of efficiency in the search for a job on the side of the unemployed workers. Hence, the transition rates into employment would come out as the result of multiply the labour market tightness by the degree of search-effectiveness by the unemployed in each region.

It means that we will have, a priori, four transition rates from unemployment to employment, as there are two groups of unemployed workers and also two regions where they can get a job. The expressions for these rates are as follows,

$\delta^{\alpha}_i\theta_i$, with **i=1,2**, for the transition into employment in the own region; and

$(1-\delta_i)^{\alpha}\theta_j$, with **i≠j** and **i,j=1,2**, for the transition into employment in the "other" region.

It is easily noticed that these are some very simplified expressions for the transition rates. This way of formulating them is acceptable only if we consider that there are no vacancies left unfilled at the end of the period (and that employment remains constant in both regions if we make $V_i=sN_i$, where **s** is the job-separations rate, common to both regions). It means that firms will open a number of vacancies (which will be equal to the number of job separations if $V_i=sN_i$) and all of them will be occupied by an unemployed worker. In this respect, it is important to note that along the present chapter we do not attempt to model the demand side of the labour market, so that we will be taking both the number of vacancies V_i and the number of employed people N_i as exogenous variables.

A more general approach would consider a hiring function, such as the one that is generally considered in recent literature on job search (e.g. Pissarides (1990)). Through that hiring function both vacancies, offered by firms, and job-seekers, only the unemployed workers in this model, interact to give the number of jobs that are finally created in each region, as it is possible that there are some matching problems that are not considered explicitly in the specification noted above.

3.3 OPTIMIZATION CHOICE BY THE UNEMPLOYED WORKERS

Initially I will be concerned exclusively with the choice by the representative unemployed worker of the proportion of time dedicated to job-search in each region, while all the other variables will be taken as given. In maximizing his utility function he will consider that whatever his action is, it will not have any influence on the labour market tightness of either of the two regions. This assumption introduces the congestion externality in the model.

We will assume that the unemployed worker gets an unemployment benefit proportional to the regional wage, ρw_i, where the replacement ratio ρ is the same in the nation[9] (alternatively, we could have taken that the unemployment benefit is a fixed amount independent of the wage). At the same time, we will also assume that there is an exogenous probability, s, again common to all the regions within the same country, of a worker loosing the job.

Let V^U_i and V^E_i denote the present-discounted value of the expected income stream of an unemployed and an employed worker, respectively, in region **i=1,2**. Then it is possible to write for the workers of both regions the following expressions:

$$rV_1^U = \rho w_1 + \delta_1^{\alpha}\Theta_1(V_1^E - V_1^U) + (1-\delta_1)^{\alpha}\Theta_2(V_2^E - V_1^U) \qquad (3)$$

$$rV_1^E = \omega_1 + s(V_1^U - V_1^E) \qquad (4)$$

$$rV_2^U = \rho w_2 + \delta_2^{\alpha}\theta_2(V_2^E - V_2^U) + (1-\delta_2)^{\alpha}\theta_1(V_1^E - V_2^U) \quad (5)$$

$$rV_2^E = \omega_2 + s(V_2^U - V_2^E) \quad (6)$$

In these expressions we can see quite clearly how the introduction in the model of the possibility of migration by the unemployed workers brings interrelations between the two regional labour markets considered. Expressions (3) and (5) show that the present value of unemployment over the unemployment income in each region is a weighted average of the expected gains from getting a job in both regions.

We can turn now to analyze the problem that faces the representative unemployed worker from each region in their search for a job, and which is none other than the determination of the optimal proportion of time that should be used in the search for a job in each of the two labour markets.

In the case of an unemployed worker from region 1, it will be to choose δ_1 so as to maximise his present discounted value V^U_1, taking all other arguments as given, including θ_i, which is, as commented earlier, the source of the search externalities in this problem. Equally for an unemployed worker from region 2, he will choose δ_2 so as to maximise V^U_2, treating θ_i again as constant, as he considers that his action alone will not affect the aggregate outcome of the regional labour market tightness.

From the economic point of view, it is clear that in order to have an interior solution, any unemployed worker must have some incentives to carry out some search activity, so that he should prefer to be employed in any of the two regions rather than remain unemployed in the region where he is located. Therefore, the unemployed worker will choose to search for a job in the own region if and only if $V^U_i \leq V^E_i$, and equally to search for a job in the other region if and only if $V^U_i \leq V^E_j$. Consequently, there will always be an interior solution as long as $V^U_i < V^E_j$ for each **i,j**.

Under these conditions and in the case of existence of an interior solution, the optimal allocation of search-time of an unemployed worker from region 1 will satisfy the

following condition:

$$\delta_1^{\alpha-1}\theta_1 (V_1^E - V_1^U) = (1-\delta_1)^{\alpha-1}\theta_2 (V_2^E - V_1^U) \quad (7)$$

We also get a similar condition for an unemployed worker from region 2:

$$\delta_2^{\alpha-1}\theta_2 (V_2^E - V_2^U) = (1-\delta_2)^{\alpha-1}\theta_1 (V_1^E - V_2^U) \quad (8)$$

where all the variables are evaluated at the optimal values of δ_1 and δ_2, respectively.

They indicate that, as a result of the utility maximization by the individuals, the expected gain for any unemployed worker from employment in its own region is equal to the gain from employment in the other region, for the marginal search. Notice that these two expressions are closely interrelated as it is important to recognize that in both of them the **V's** and **θ's** depend on δ_1 and δ_2.

Alternatively, we can interpret these equations in the light of the classical models of duopoly. In this case, equation (7) would give us the reaction curve of an individual from region 1, given the election of the representative unemployed from region 2. Similarly, equation (8) could be said to be the reaction curve of people from region 2 for any choice of δ_1, with all other variables taken as given. Even if the tightness ratios, θ_i, are taken as exogenous, the choice of an individual of any region will be affected by that of an individual from the other one as the differences in the present discounted values of being employed and unemployed depend on both variables, as can be seen from expressions (3) to (6). Therefore, the expressions (7) and (8) cannot be solved separately from each other.

The next point in this section will deal with the solution to the maximization problem faced by the individual who is unemployed. In what follows, we are going to consider just one individual from region 1 and another one from region 2, both trying to choose the value of maximize their utility functions. In this respect, as we are analyzing the behaviour by only one individual from each region, then it seems natural to exclude from the problem the search externality, as the individuals, when taken individually do not perceive their influence on the economy as a whole. Therefore, we will assume for the moment that the labour market tightness ratios remain constant, instead of being determined by (δ_1, δ_2).

It might not look very attractive to consider the case of just one person from each region. However, in the context of the chapter the following proposition is, technically, an intermediate step towards the more important result obtained in the next section. For that reason, and also because it gives some insight into the process of the proof of that result is why we have decided to include it now.

Once accepted its convenience, the question that arises naturally is whether the optimization strategies of two individuals, one from each region, are compatible with each other, i.e., whether their respective reaction curves intersect each other in the positive quadrant.

PROPOSITION 1.- In the model presented above, there exist δ_1 and δ_2, with $0<\delta_1<1$ and also $0<\delta_2<1$, such that, provided the regional labour markets are similar enough, individuals from both regions are able to maximize their utility function simultaneously, taking the regional labour market tightness measures as given.

This means that in the optimum, unemployed workers from both regions (one from each of them) will dedicate a positive fraction of their time to search for a job in each of the two regions.

PROOF.- The proof of the existence of an interior solution for the searching behaviour of the individuals amounts to show that the system formed by expressions (7) and (8) has a solution for δ_1 and δ_2, where θ_1 and θ_2 are considered to be exogenously given (as we are considering the behaviour of just two individuals, who ignore the search externality).

It lies on the Theorem of the Implicit Function. According to it, the system formed by

$$F^1 \equiv \delta_1^{\alpha-1}\theta_1 (V_1^E - V_1^U) - (1-\delta_1)^{\alpha-1}\theta_2 (V_2^E - V_1^U) = 0 \qquad (7a)$$

$$F^2 \equiv \delta_2^{\alpha-1}\theta_2 (V_2^E - V_2^U) - (1-\delta_2)^{\alpha-1}\theta_1 (V_1^E - V_2^U) = 0 \qquad (8a)$$

can in principle be solved for the δ_i variables if:

a) the functions F^1 and F^2 have continuous partial derivatives with respect to δ_1 and δ_2, and

b) at some point satisfying (7a) and (8a), the following Jacobian determinant is nonzero:

$$|J_1| = \left|\frac{\partial(F^1,F^2)}{\partial(\delta_1,\delta_2)}\right| = \begin{vmatrix} \frac{\partial F^1}{\partial \delta_1} & \frac{\partial F^1}{\partial \delta_2} \\ \frac{\partial F^2}{\partial \delta_1} & \frac{\partial F^2}{\partial \delta_2} \end{vmatrix} \neq 0 \qquad (9)$$

Therefore, all that is left to do is to calculate the previous Jacobian determinant and check that it is different from zero.

From expressions (3) to (6) it is possible to work out the differences $(V_1^E-V_1^U)$, $(V_2^E-V_1^U)$, $(V_2^E-V_2^U)$ and $(V_1^E-V_2^U)$ as explicit functions of the δ_i's and the rest of the parameters. Then, we are in a position to rewrite the functions F_1 and F_2 as follows

$$\begin{aligned} F^1 = {} & \delta_1^{\alpha-1}\theta_1\Big[\big[r+s+\delta_2^{\alpha}\theta_2+(1-\delta_2)^{\alpha}\theta_1\big]\big[w_1(1-\rho)r+(w_1-w_2)(1-\delta_1)^{\alpha}\theta_2\big]+ \\ & + (1-\rho)s\big[(1-\delta_2)^{\alpha}\theta_1 w_1+(1-\delta_1)^{\alpha}\theta_2 w_2\big]\Big] - \\ & -(1-\delta_1)^{\alpha-1}\theta_2\Big[\big[r+s+\delta_2^{\alpha}\theta_2+(1-\delta_2)^{\alpha}\theta_1\big]\big[(r+s+\delta_1^{\alpha}\theta_1)w_2-\big[(r+s)\rho+\delta_1^{\alpha}\theta_1\big]w_1\big]+ \\ & + (1-\delta_2)^{\alpha}\theta_1 s(1-\rho)w_1-(r+s+\delta_1^{\alpha}\theta_1)(1-\rho)sw_2\Big] \end{aligned} \qquad (7b)$$

$$\begin{aligned} F^2 = {} & \delta_2^{\alpha-1}\theta_2\Big[\big[r+s+\delta_1^{\alpha}\theta_1+(1-\delta_1)^{\alpha}\theta_2\big]\big[w_2(1-\rho)r+(w_2-w_1)(1-\delta_2)^{\alpha}\theta_1\big]+ \\ & + (1-\rho)s\big[(1-\delta_1)^{\alpha}\theta_2 w_2+(1-\delta_2)^{\alpha}\theta_1 w_1\big]\Big] - \\ & -(1-\delta_1)^{\alpha-1}\theta_1\Big[\big[r+s+\delta_1^{\alpha}\theta_1+(1-\delta_1)^{\alpha}\theta_2\big]\big[(r+s+\delta_1^{\alpha}\theta_1)w_1-\big[(r+s)\rho+\delta_1^{\alpha}\theta_1\big]w_1\big]+ \\ & +(1-\delta_1)^{\alpha}\theta_2 s(1-\rho)w_2-(r+s+\delta_2^{\alpha}\theta_2)(1-\rho)sw_1\Big] \end{aligned} \qquad (8b)$$

Now, the derivatives required to calculate the Jacobian determinant can be found explicitly from these expressions and simplified using the conditions that require that

$F^1=0$ and $F^2=0$.

In order to make the calculus easier, we will consider the case in which there is no difference in the regional wages, so that $w_1=w_2=w$. Then, it can be shown that

$\frac{\partial F_1}{\partial \delta_1} < 0$; $\frac{\partial F_2}{\partial \delta_2} < 0$ and that $\partial F_1 / \partial \delta_2$ and $\partial F_2 / \partial \delta_1$ have opposite signs.

The sign of the direct partial derivatives is immediate. In the case of the cross ones, we have to consider that if

a) $\delta_1^{\alpha-1}\theta_1 > (1-\delta_1)^{\alpha-1}\theta_2$, then, using both First Order Conditions, it has to be true, through a process of reduction to the absurd, that $\delta_1^{\alpha-1}\theta_1 \geq \delta_2^{\alpha-1}\theta_2$;

b) $\delta_1^{\alpha-1}\theta_1 < (1-\delta_1)^{\alpha-1}\theta_2$, then, it will happen that $\delta_1^{\alpha-1}\theta_1 \leq \delta_2^{\alpha-1}\theta_2$.

Therefore, we will have that, when the wages in both regions are equal, we are able to sign the determinant $|J_1|$ as unequivocally positive.

Hence, using an argument of continuity, we can claim that, if the regional wages are close enough to each other, i. e. in the case of similar regional labour markets, there will be an interior solution for the optimizing strategies of both individuals. ■

Substituting expression (7) into (3) and combining the resulting one with equation (4), and doing equally with equations (8), (5) and (6) then we are able to obtain the following four expressions

$$rV_1^U = \frac{(r+s)\rho+\delta_1^{\alpha-1}\Theta_1}{r+s+\delta_1^{\alpha-1}\Theta_1} w_1 \qquad (10)$$

$$rV_1^E = \frac{s\rho+(r+\delta_1^{\alpha-1}\Theta_1)}{r+s+\delta_1^{\alpha-1}\Theta_1} w_1 \qquad (11)$$

$$rV_2^U = \frac{(r+s)\rho+\delta_2^{\alpha-1}\theta_2}{r+s+\delta_2^{\alpha-1}\theta_2} w_2 \qquad (12)$$

$$rV_2^E = \frac{s\rho+(r+\delta_2^{\alpha-1}\theta_2)}{r+s+\delta_2^{\alpha-1}\theta_2} w_2 \qquad (13)$$

which give the present-discounted values of being employed and unemployed in each of the two regions when all agents are optimizing and there is an interior solution. It can be seen that in this case the present discounted value is a weighted average of the incomes when employed and when unemployed, and that, in general, the value of being employed in one region will be greater than that of being unemployed in that region. This kind of assertion cannot be made, a priori, when the comparison is across regions as the parameters involved are different.

The proof of existence of an interior solution is important as it is not that clear that it happens anyway. Thus, why might not always have an interior solution, and in particular, that would occur if we get that $V^E_i<V^U_j$. In this case, unemployed workers from region **j** will not have any incentive to search for a job in region **i**, as that would not increase their utility level.

3.4 AGGREGATE EQUILIBRIUM

In the present section we will move to consider the existence and characteristics of an aggregate equilibrium in the present economy. By aggregate equilibrium we mean a situation in which all the individuals involved (in particular, the unemployed workers, as they are those that have a choice to make) try to maximize simultaneously their utility function.

So far we have analyzed the problem of one unemployed worker trying to maximize his utility function, simultaneously to the action of another unemployed worker from the other region. However, the result obtained in **Proposition 1** seems to be very weak. The main reason for it is that we have considered exclusively the behaviour of two individuals and,

consequently, the labour market tightness ratios of both regions have been taken as exogenous parameters, as the individuals considered that their actions could not affect the aggregate outcome. As already mentioned earlier, this is precisely the source of the so-called congestion, trading or search externality.

However, although at the individual level the analysis carried out is correct, when we take the economy as a whole and want to consider the existence of an aggregate equilibrium for all the agents involved, it turns out that it is insufficient. In fact, in the aggregate, even if the agents consider that their actions will not affect the labour market tightness, we have to take into account explicitly this congestion externality, and how the transition rates into employment are affected by it.

Analytically it means that to the system formed by the functions $\mathbf{F}^1$ and $\mathbf{F}^2$, we have to add two more expressions given by those of the labour market tightness of each region,

$$G^1 \equiv \theta_1 - \frac{V_1}{\delta_1^{\alpha} U_1 + (1-\delta_2)^{\alpha} U_2} = 0 \qquad (14)$$

$$G^2 \equiv \theta_2 - \frac{V_2}{\delta_2^{\alpha} U_2 + (1-\delta_1)^{\alpha} U_1} = 0 \qquad (15)$$

This way, we will be able to explore the question of the existence of an interior solution to the problem of unemployed people searching for jobs in various regions at the economy level.

PROPOSITION 2.- In the model presented above, there exist δ_1 and δ_2, with $0<\delta_1<1$ and also $0<\delta_2<1$, such that, provided the regional wages are close enough, there is aggregate equilibrium in the sense that all the individuals of the economy are able to carry out their optimizing strategy.

As in **Proposition 1**, now all the unemployed workers from both regions will choose as their optimal behaviour one in which they spend part of their time searching for a

job in one region and the rest in the other region. The difference with **Proposition 1** is that in this one strategy is sustainable for all individuals in the economy.

PROOF.- As before, the proof of the existence of an interior solution for the search behaviour is done by showing that the system formed now by expressions (7), (8), (14) and (15) has a solution for δ_1, δ_2, θ_1 and θ_2.

We require now that, according again to the Theorem of the Implicit Function,

a) the functions F^1, F^2, G^1 and G^2 have continuous partial derivatives with respect to δ_1, δ_2, θ_1 and θ_2, and

b) at some point satisfying (7a), (8a), (14) and (15) the following Jacobian determinant is nonzero:

$$|J_2| = \left|\frac{\partial(F^1,F^2,G^1,G^2)}{\partial(\delta_1,\delta_2,\theta_1,\theta_2)}\right| = \begin{vmatrix} \frac{\partial F^1}{\partial \delta_1} & \frac{\partial F^1}{\partial \delta_2} & \frac{\partial F^1}{\partial \theta_1} & \frac{\partial F^1}{\partial \theta_2} \\ \frac{\partial F^2}{\partial \delta_1} & \frac{\partial F^2}{\partial \delta_2} & \frac{\partial F^2}{\partial \theta_1} & \frac{\partial F^2}{\partial \theta_2} \\ \frac{\partial G^1}{\partial \delta_1} & \frac{\partial G^1}{\partial \delta_2} & \frac{\partial G^1}{\partial \theta_1} & \frac{\partial G^1}{\partial \theta_2} \\ \frac{\partial G^2}{\partial \delta_1} & \frac{\partial G^2}{\partial \delta_2} & \frac{\partial G^2}{\partial \theta_1} & \frac{\partial G^2}{\partial \theta_2} \end{vmatrix} \neq 0 \qquad (16)$$

It is very easy to show that requisite **a)** holds in any case. However, the new Jacobian $|J_2|$ becomes much more complicated than the previous one, and, unfortunately, the arithmetics cannot be easily simplified. Therefore, we have to use some sort of logical argument in order to make the expressions involved more tractable.

We will show that, when wages are equal across regions, then it should be true that $\delta_1+\delta_2=1$, and also that $V_1^E=V_2^E$. With these conditions, it will be possible then to simplify the partial derivatives and obtain a definite sign for the Jacobian determinant we are interested in.

Intuitively, if wages are equal in both regions, then the income when unemployed is also equal, and therefore the utility level at any point in time, at least with respect to this dimension, is the same regardless of the geographical location of the individual. The fall-back position is common. The other dimension of the utility function concerns the expected gains from getting a job in any of the two regions. As all individuals are equal to each other and there are no special advantages for any group of unemployed workers to search in a particular region, then all of them will dedicate the same amount of time to search in a region, i.e. $\delta_1=1-\delta_2$. Furthermore, as this happens at any moment in time, then the Present Discounted Value of being unemployed, Vi^U, is the same for any unemployed worker in any region.

Analytically, we will check this in three steps:

1.- $\delta_1+\delta_2\geq 1$

Let us assume initially that $\delta_1+\delta_2<1$. In this case it will happen that, as $\alpha<1$,

$\left[\frac{\delta_1}{1-\delta_1}\right]^{\alpha-1} > \left[\frac{1-\delta_2}{\delta_2}\right]^{\alpha-1}$. Then, using the two First Order Conditions given by expressions (7) and (8) we get that $\frac{V_2^E - V_1^U}{V_1^E - V_1^U} > \frac{V_2^E - V_2^U}{V_1^E - V_2^U}$. From this inequality, we obtain that it will true that $(V_2^E-V_1^E)(V_1^U-V_2^U)>0$; provided that $V_i^E>V_j^U$ with $i,j=1,2$, i.e. the value of being employed is always greater than that of being unemployed, whatever the regions involved in the comparison. It means that if $V_1^U>V_2^U$, it implies that $V_2^E>V_1^E$.

On the other hand, using expressions (4) and (6), and considering that the wages are equal in both regions, we can obtain, by subtracting the second from the first one and rearranging, that $(r+s)(V_1^E-V_2^E)=s(V_1^U-V_2^U)$. This means that, if $V_1^U>V_2^U$, then $V_1^E>V_2^E$.

It is clear that this latter result contradicts the one obtained in the previous paragraph. Therefore, it must be true that $\delta_1+\delta_2\geq 1$.

2.- $\delta_1+\delta_2 \leq 1$

Let us consider now that $\delta_1+\delta_2>1$. Following a similar argument to the one used in the previous case, we will have now that $V_1^U>V_2^U$ if and only if $V_1^E>V_2^E$.

If, as in the previous case, we subtract again expression (6) from (4), but rearranging in a different way, it is clear that if $V_1^E>V_2^E$, then $(V_1^E-V_1^U)<(V_2^E-V_2^U)$.

On the other hand, substituting expressions (7) and (8) into (3) and (5) respectively, we get the following two

$$rV_1^U = \rho w + \delta_1^{\alpha-1}\theta_1(V_1^E-V_1^U) \quad (17)$$

$$rV_2^U = \rho w + \delta_2^{\alpha-1}\theta_2(V_2^E-V_2^U) \quad (18)$$

Comparing these two expressions, we notice that for $V_1^E>V_2^E$ and $V_1^U \geq V_2^U$ to hold at the same time, it should be true that $\delta_1^{\alpha-1}\theta_1>\delta_2^{\alpha-1}\theta_2$, and by a sufficient amount.

However, from the First Order Conditions, given by expressions (7) and (8), if $V_1^E>V_2^E$, then the following inequalities will hold: $\delta_1^{\alpha-1}\theta_1<(1-\delta_1)^{\alpha-1}\theta_2$ and $\delta_2^{\alpha-1}\theta_2<(1-\delta_2)^{\alpha-1}\theta_1$.

Therefore, it turns out that, combining these last two results, we will have that $(1-\delta_1)^{\alpha-1}\theta_2>\delta_1^{\alpha-1}\theta_1>\delta_2^{\alpha-1}\theta_2>(1-\delta_2)^{\alpha-1}\theta_1$. If we take the first and third terms of this inequality, as $\alpha<1$, we will get that $1-\delta_1<\delta_2$. If, alternatively, we take the other two terms we will have that the inequality goes the other way round, i.e. $\delta_1<1-\delta_2$. These two opposite results mean that we cannot have $V_1^E>V_2^E$ and $V_1^U \geq V_2^U$.

A similar contradiction happens when we want $V_1^E<V_2^E$ and $V_1^U \leq V_2^U$ to hold at the same time.

It all means that it is not possible to have the result "$V_1^U>V_2^U$ if and only if $V_1^E>V_2^E$" when wages are equal in both regions, so that $\delta_1+\delta_2$ cannot be greater than 1. Therefore, it should be true that $\delta_1+\delta_2 \leq 1$.

3.- $\delta_1+\delta_2=1 \Rightarrow V_1^E=V_2^E$

From the two previous steps it is clear that the only way both inequalities that hold are consistent with each other is when they hold with equality, i.e.: $\delta_1+\delta_2=1$. It means that the proportion of time an unemployed worker spends in searching for a job in region 1 is the same regardless of his region of origin, as δ_1 is this proportion for people from region 1, while $(1-\delta_2)$ is that for those unemployed from region 2.

Using the same line of reasoning as the one used in **step 1** above we get, under the equality condition indicated, that $(V_2^E-V_1^E)(V_1^U-V_2^U)=0$. It implies that either the values of being employed are equal across regions, or the values being unemployed are so, or both.

But, then again, as $(r+s)(V_1^E-V_2^E)=s(V_1^U-V_2^U)$, as shown earlier, we will have that $V_1^E=V_2^E$, and also that $V_1^U=V_2^U$.

Finally, before working out the sign of the Jacobian determinant, we notice that the equality between the value across regions of being employed and also of being unemployed gives rise to the following set of equalities

$$\delta_1^{\alpha-1}\theta_1 = (1-\delta_1)^{\alpha-1}\theta_2 = \delta_2^{\alpha-1}\theta_2 = (1-\delta_2)^{\alpha-1}\theta_1 \qquad (19)$$

We are now in a position of being able to simplify the expressions of the partial derivatives which are required to work out the sign of $|J_2|$. Using this last set of equalities we will have that

1) $$\frac{\partial F^2}{\partial \delta_1} = \frac{\partial F^1}{\partial \delta_2} = 0 \qquad (20)$$

2) $$\frac{\partial F^1}{\partial \theta_1} = -\frac{\partial F^1}{\partial \theta_2} = -\frac{\partial F^2}{\partial \theta_1} = \frac{\partial F^2}{\partial \theta_2} \qquad (21)$$

3) $$\frac{\partial G^1}{\partial \delta_1}\frac{\partial G^2}{\partial \delta_2} = \frac{\partial G^1}{\partial \delta_2}\frac{\partial G^2}{\partial \delta_1} \qquad (22)$$

With all of this, it can be shown rather easily that the Jacobian determinant we

are interested in is strictly positive, i.e. $|J_2|>0$, in the particular case when the regional wages involved are equal to each other. However, if this is true for $w_1=w_2=w$, then, invoking the argument of continuity, it should also be true for regional wages close enough to one another, as arbitrary small deviations from the equality of wages will not change the sign of the Jacobian determinant. This implies that there exists an interior solution for the problem of the unemployed workers choosing the optimal strategy of job-search in both regions as we wanted. ∎

According to this, if $(1-\delta_1)$ is the proportion of time any unemployed worker from region 1 dedicates to search for a job in region 2, then $(1-\delta_1)^{\alpha}$ will be that proportion in terms of efficient time, and $(1-\delta_1)^{\alpha}U_1$ is the number of efficient unemployed workers from region 1 that are searching for a job in region 2 at any given moment in time.

The crucial point in this proof is, undoubtedly, the assumption of wages being not too far apart from each other. As it has already been indicated, it is needed for an interior solution, which will lead us to ensure the existence of two way migration simultaneously. The argument in its favour lies in the fact that we are considering different regions within the same country, which is usually a well integrated economic area, so that the economic structures of the different regions may be taken as very similar amongst them. If it did not hold this way, the consequence would be that we cannot be sure of the determinant $|J_2|$ being different from zero, so that there would be a corner solution in the optimization problem faced by the unemployed workers from both regions. Of course, if we considered regions from different countries, specially if we take less-developed and developed countries, then the present model would be consistent with the widely observed fact that, in the absence of immigration restrictions, the flows of people all tend to be one-way.

The question that stands up is why the emphasis on having an interior solution. The importance of it is none other that it will imply that unemployed workers from both regions will spend some positive proportion of their time searching for a job in each of the two regions. It will lead, as we will see later, to the conclusion that there will be migration of the labour force in both directions and for economic reasons. Unemployed workers from region 1 will also look for a job in region 2, and eventually will migrate there, at the same

time as unemployed workers from region 2 search for jobs in both regions, and therefore will also migrate to region 1. The most important aspect of this process is that these bilateral flows of the labour force take place simultaneously and in a context of rational behaviour by the agents.

Under the special circumstances of equality between the regional wages, we can not only prove the existence of an interior solution, but also we are in a position of finding out the equilibrium values of the variables involved. For this purpose, all we need is to remember that in equilibrium the variables will satisfy the following conditions:

$$1)\quad \hat{\delta}_1 = 1 - \hat{\delta}_2 \tag{23}$$

$$2)\quad \hat{\delta}_1^{\alpha-1}\,\hat{\theta}_1 = (1-\hat{\delta}_1)^{\alpha-1}\,\hat{\theta}_2 \tag{24}$$

With these two conditions it is easy to determine the following equilibrium values:

$$\hat{\delta}_1 = \frac{V_1}{V_1 + V_2} \qquad \hat{\delta}_2 = \frac{V_2}{V_1 + V_2}$$

$$\hat{\theta}_1 = \frac{V_1 + V_2}{U_1 + U_2}\left[\frac{V_1}{V_1 + V_2}\right]^{1-\alpha} \qquad \hat{\theta}_2 = \frac{V_1 + V_2}{U_1 + U_2}\left[\frac{V_2}{V_1 + V_2}\right]^{1-\alpha} \tag{25}$$

These values show that, when wages are equal across regions, the proportion of time unemployed workers spend searching for a job in a particular region is equal to the proportion of vacancies offered by that region over the total of national vacancies. Equally, the regional labour market tightness measure is equal to the national one but somehow corrected by the proportion of vacancies offered in the region with respect to the total number of vacancies.

Finally, in relation to the transition rates, we can say that the transition rate into employment in any region is the same regardless of the region of origin of the unemployed workers, but different from the transition rate into employment in the other

region. Analytically it means that

$$\hat{\delta}_1^{\alpha}\,\hat{\theta}_1 = (1-\hat{\delta}_2)^{\alpha}\,\hat{\theta}_1 \neq \hat{\delta}_2^{\alpha}\,\hat{\theta}_2 = (1-\hat{\delta}_1)^{\alpha}\,\hat{\theta}_2 \qquad (26)$$

3.5 THE INTERREGIONAL MIGRATION FUNCTION

The migration function refers to the number of people that move from one place to another as a function of, chiefly, the economic variables.

As it has already been assumed, we will take that the individual will migrate from one region to the other only once he has secured a job (contracted migration). According to this characterisation, the number of migrants from region 1 to region 2 will be equal to the number of unemployed workers in region 1 that are searching for a job in region 2 at any given moment times the transition rate from unemployment in region 1 to employment in region 2. In general, we will have the following expression for the migration from one region to another

$$M_{ij} = (1-\hat{\delta}_i)^{\alpha}\,U_i\,\hat{\theta}_j \qquad i,j=1,2 \qquad (27)$$

Replacing the equilibrium values of the variables by those obtained explicitly earlier in the case of equality of regional wages, we are able to rewrite the migration function as a function of only the exogenous variables in the following way:

$$M_{12} = \left[\frac{V_2}{V_1+V_2}\right]^{\alpha} U_1 \frac{V_1+V_2}{U_1+U_2}\left[\frac{V_2}{V_1+V_2}\right]^{1-\alpha} = \frac{U_1 V_2}{U_1+U_2} \qquad (28)$$

We are finally in a position of finding out what are the effects of different economic variables on the migration process of the labour force.

It can easily be checked that, by working the partial derivatives of the previous expression with respect to the relevant variables, migration from region 1 to 2 will increase

with the number of unemployed people in region 1 and also with the number of vacancies offered by firms in region 2. On the other hand, this migration flow will decrease with the number of unemployed workers present in region 2. Notice also that the elasticity of the migration function with respect to the unemployment level in the own region is equal and with the opposite sign to that with respect to the unemployment level in the other region.

However we find some strange results. First of all, as long as wages are considered to be equal across regions, they will not play any role in determining migration. This is the reason why they do not appear in the previous expression. On the other hand, this simple model leads to the conclusion that the number of vacancies in a certain region will not affect the out-migration of labour force from that region, when we should expect a negative effect. This is due to the fact that, by assuming equal regional wages, we have introduced in the model some sort of separability in the transition rates into employment. Accordingly, they will depend only on the total number of unemployed workers and on the number of vacancies of the region people are intending to move to.

These problems could be overcome by re-introducing in the model different regional wages. Unfortunately, in doing so, we manage to get all sort of complicated expressions for the partial derivatives, which turn out to be really difficult to simplify.

We can write the expression for the migration from region 1 to region 2 as

$$M_{12} = (1-\delta_1)^{\alpha} U_1 \theta_2 = (1-\delta_1)^{\alpha} U_1 \frac{V_2}{\delta_1^{\alpha} U_1 + (1-\delta_2)^{\alpha} U_2} \qquad (29)$$

using the definition for the labour market tightness in region 2. Then, by taking partial derivative with respect to w_1, we can show that the effect of the wage of the region of origin on the migration flow is

$$\frac{\partial M_{12}}{\partial w_1} = -M_{12} \frac{\alpha}{\delta_1^{\alpha} U_1 + (1-\delta_2)^{\alpha} U_2} \left[\frac{\delta_1^{\alpha-1} U_1 + (1-\delta_2)^{\alpha} U_2}{1-\delta_1} \frac{\partial \bar{\theta}_1}{\partial w_1} - (1-\delta_2)^{\alpha-1} U_2 \frac{\partial \delta_2}{\partial w_1} \right] \qquad (30)$$

From it, we can see that the sign of the effect will depend on the signs of both $\partial\delta_1/\partial w_1$ and $\partial\delta_2/\partial w_1$. If, as it should be expected, an increase in the wage of a region leads to an increase in the proportion of time dedicated to search in that region, and to a reduction in that of the other region, then we can conclude that out-migration is inversely related to the wage in the own region. We can also find in the same way that M_{12} will increase when the wage in region 2 increases.

Furthermore, it is not difficult to check that, as $w_1 \frac{\partial F_i}{\partial w_1} = - w_2 \frac{\partial F_i}{\partial w_2}$, we get that, $w_1 \frac{\partial \delta_i}{\partial w_1} = - w_2 \frac{\partial \delta_i}{\partial w_2}$, with **i=1,2**. It leads to the following equality

$$\frac{w_1}{M_{12}} \frac{\partial M_{12}}{\partial w_1} = - \frac{w_2}{M_{12}} \frac{\partial M_{12}}{\partial w_2} \qquad (31)$$

which means that, abstracting from the sign, the elasticity of the migration function with respect to the wage of the region of origin is equal to its elasticity with respect to the wage of the region of destination. This one seems to be an important conclusion as the model leads to a certain restriction on the empirical equation to estimate which is that migration from one region to another depends, amongst other things, on the logarithm of the relative wages, of both regions.

So far, the main difference between this approach and that of the human capital theories, with respect to the migration function obtained, lies in the role played by the regional unemployment rates. In the human capital theories, they are introduced as a way of measuring the possibility of getting a job in a certain region (see, for example, the Harris-Todaro model of rural-urban migration, Harris and Todaro (1970)). However, in the present model, this role is assigned to the regional vacancy rates.

The introduction of the latter variables is not new. In this respect, Fields (1976) argues that, even within the framework of human capital theories, the use of the unemployment rate is not the best way to measure employment conditions from the point of

view of prospective migrants. Accordingly, he prefers to use measures of labour turnover, such as the rates of new hires and layoffs in each regional labour market. However, in our model, the introduction of the regional vacancy rates does not drive away of the model the regional unemployment rates. The latter variables have now a new role to perform, which is to account for the level of competition that any person faces when he applies for a job in a certain region.

3.6 LABOUR MARKET EQUILIBRIUM

In the previous sections we have analyzed the microfoundations of the migration function, and we have been able to determine the economic variables that affect the migration function in the economy, together with the sign of this effect; and all of this has been done in a context in which the individuals behave rationally and maximize their expected utility.

In the present section, we will continue the analysis by addressing the question of the existence of equilibrium in the regional labour markets, as we have to take into account now the possible effects that interregional migration might have on the variables that define the labour markets. In this respect, we will take the general view that there is equilibrium in the regional labour markets when the number of people that enters the pool of unemployment is equal to the number of unemployed that leave it, i.e., when the number of people unemployed remains constant. This condition of equilibrium translates into two further equations:

$$sN_1 = \delta_1^{\alpha} U_1 \theta_1 + (1-\delta_1)^{\alpha} U_1 \theta_2 \tag{32}$$

$$sN_2 = \delta_2^{\alpha} U_2 \theta_2 + (1-\delta_2)^{\alpha} U_2 \theta_1 \tag{33}$$

The left hand side of these expressions show the number of people that enters the pool of unemployment in each region as a consequence of having been laid off. On the

other side of the equalities we find the number of people that leaves unemployment in each region, which belong to one of two groups: the first term of the right hand side of each equation shows the number of unemployed people that gets a job in their own region, while the other term is the number of those that move to employment in the other region, i.e., those that emigrate.

If we assume that the level of employment is determined by the demand side of the market on its own in both regions, then these two equations should allow us to find out the equilibrium levels of unemployment in each region, provided we have been able to determine the values of δ_1, δ_2, θ_1 and θ_2.

However, we are considering an economy in which the labour force at the national level is constant at the level $\bar{L}$. This further consideration adds a new equation to those we already have:

$$\bar{L} = L_1 + L_2 = N_1 + U_1 + N_2 + U_2 \tag{34}$$

It means that one of the two previous equation is redundant, as the assumption of fixed national labour force will determine the equilibrium level of unemployment of one region once the other is known, without having to use the appropriate condition for equilibrium in the regional labour market.

Furthermore, we will also add that, at the regional level, employment is exogenously given. It means that the number of vacancies opened in a certain region is exactly equal to the number of people laid off there, i.e.: $V_i=sN_i$. According to this, we can rewrite expressions (1) and (2) as follows:

$$sN_1 = \delta_1^{\alpha}\theta_1 U_1 + (1-\delta_2)^{\alpha}\theta_1 U_2 \tag{35}$$

$$sN_2 = \delta_2^{\alpha}\theta_2 U_2 + (1-\delta_1)^{\alpha}\theta_2 U_1 \tag{36}$$

It is convenient to note that this further assumption hardly affects the analysis

carried out so far. Actually, the only thing we have to do to adequate the model is to redefine properly the functions G^1 and G^2 by substituting V_i by sN_i.

Although expressions (32) and (33) look very much like expressions (35) and (36), it is important to notice that the second term of the right hand sides is different when we compare (32) and (35) and also when compare the other two expressions. This is so because they represent different concepts. The last two, (35) and (36), come from the definition of the concept of labour market tightness at the regional level. On the other hand, the first two expressions are not other thing but the characterization of the equilibrium in the regional labour market.

Therefore, we find ourselves that, in order to calculate the equilibrium values of unemployment levels in each region in the context of optimizing individuals that face the possibility of interregional migration, we have to add two further equations to the model described previously. These two equations are:

$$H_1 \equiv U_1 - \frac{sN_1}{\delta_1^{\alpha}\theta_1+(1-\delta_1)^{\alpha}\theta_2} = 0 \qquad (37)$$

$$H_2 \equiv N_1 + N_2 + U_1 + U_2 - \bar{L} = 0 \qquad (38)$$

The first of these two equations is the result of a simple transformation of equation (32), and, consequently, it refers to the equilibrium condition for the labour market in region 1. On the other hand, equation (38) appears as a consequence of the introduction of a constant labour force at the national level, made explicit in expression (34). Therefore, it will give us the equilibrium condition of the labour market in region 2, as indicated earlier in the text.

As in the previous two propositions, in order to be able to show that there exists equilibrium in the regional labour markets under the particular conditions of this model we have to check that the following Jacobian determinant is different from zero:

$$|J_3| = \left|\frac{\partial(F^1,F^2,G^1,G^2,H^1,H^2)}{\partial(\delta_1,\delta_2,\theta_1,\theta_2,U_1,U_2)}\right| = \begin{vmatrix} \frac{\partial F^1}{\partial \delta_1} & \frac{\partial F^1}{\partial \delta_2} & \frac{\partial F^1}{\partial \theta_1} & \frac{\partial F^1}{\partial \theta_2} & \frac{\partial F^1}{\partial U_1} & \frac{\partial F^1}{\partial U_2} \\ \frac{\partial F^2}{\partial \delta_1} & \frac{\partial F^2}{\partial \delta_2} & \frac{\partial F^2}{\partial \theta_1} & \frac{\partial F^2}{\partial \theta_2} & \frac{\partial F^2}{\partial U_1} & \frac{\partial F^2}{\partial U_2} \\ \frac{\partial G^1}{\partial \delta_1} & \frac{\partial G^1}{\partial \delta_2} & \frac{\partial G^1}{\partial \theta_1} & \frac{\partial G^1}{\partial \theta_2} & \frac{\partial G^1}{\partial U_1} & \frac{\partial G^1}{\partial U_2} \\ \frac{\partial G^2}{\partial \delta_1} & \frac{\partial G^2}{\partial \delta_2} & \frac{\partial G^2}{\partial \theta_1} & \frac{\partial G^2}{\partial \theta_2} & \frac{\partial G^2}{\partial U_1} & \frac{\partial G^2}{\partial U_2} \\ \frac{\partial H^1}{\partial \delta_1} & \frac{\partial H^1}{\partial \delta_2} & \frac{\partial H^1}{\partial \theta_1} & \frac{\partial H^1}{\partial \theta_2} & \frac{\partial H^1}{\partial U_1} & \frac{\partial H^1}{\partial U_2} \\ \frac{\partial H^2}{\partial \delta_1} & \frac{\partial H^2}{\partial \delta_2} & \frac{\partial H^2}{\partial \theta_1} & \frac{\partial H^2}{\partial \theta_2} & \frac{\partial H^2}{\partial U_1} & \frac{\partial H^2}{\partial U_2} \end{vmatrix} \neq 0 \quad (39)$$

Using the same set of equalities we reached during the proof of **Proposition 2** above, we can add two further results that will permit us to simplify the partial derivatives needed here. These are the following:

$$1) \quad \frac{\partial G^1}{\partial U_1} = \frac{\partial G^1}{\partial U_2} \quad (40)$$

$$2) \quad \frac{\partial G^2}{\partial U_1} = \frac{\partial G^2}{\partial U_2} \quad (41)$$

We also notice that, given the definitions of $\mathbf{H^1}$ and $\mathbf{H^2}$, then it will happen that

$$1) \quad \frac{\partial H^1}{\partial U_1} = \frac{\partial H^2}{\partial U_2} = 1 \quad (42)$$

$$2) \quad \frac{\partial H^2}{\partial U_1} = \frac{\partial H^1}{\partial U_2} = 0 \quad (43)$$

Using all these results, it turns out that the new Jacobian determinant $|\mathbf{J_3}|$ is equal to $|\mathbf{J_2}|$ and, consequently, it is also positive, which means that there exists an interior solution for the optimal choice of the allocation of the job-searching time between regions that

also gives equilibrium in the regional labour markets.

Hence, unlike in the models of human capital, we have been able to obtain in the present model the conclusion that, even when the equilibrium in both regional labour markets has been reached, there will remain some degree of interregional migration in both directions.

Once we have shown the existence of an interior solution to the proposed problem here, we can turn now to see some of the relationships that the economic variables hold amongst them in equilibrium.

Thus, if we substitute sN_1 from G^1 into H^1, and simplifying we get that

$$\delta_1^{\alpha}\,\theta_1\,U_2 = \delta_2^{\alpha}\,\theta_2\,U_1 \ .$$

From this equality we have that, knowing that $\delta_1+\delta_2=1$ in equilibrium, $M_{21}=M_{12}$. Therefore, regional labour markets equilibrium implies that the flow of migrants from region 1 to region 2 is equal to the flow from region 2 to region 1, leading to a zero net migration. This is an important result as it is an argument in favour of using gross flows instead of net flows when running regressions to find out the economic determinants of interregional migration. According to it, net flows can be misleading with respect to the importance of migration of the labour force.

Also from the previous equality, and using the fact that $\delta_1^{\alpha-1}\theta_1=\delta_2^{\alpha-1}\theta_2$, we get that $\delta_1/\delta_2=U_1/U_2$. From here, we conclude that, as $\delta_1=1-\delta_2$, the proportion of time any unemployed worker spends in searching for a job in a particular region is equal to the proportion of unemployed people located in that region, i.e.: $\delta_1=U_1/(U_1+U_2)$.

On the other hand, if we divide equation G^1 by G^2 and simplify, we get that now $\delta_1/\delta_2=N_1/N_2$. Therefore, the proportion of the unemployed workers that are in a certain region is equal to the proportion of those that are employed:

$$\delta_1 = \frac{N_1}{N_1+N_2} = \frac{U_1}{U_1+U_2} \qquad (44)$$

And this also leads to the conclusion that the unemployment rates are equalised across the regions in the case of equilibrium of the regional labour markets. Behind this conclusion underlies the assumption that the wages are also equal across regions. Therefore, migration will lead towards labour market equilibrium in both regions, and in that process, there will take place a redistribution of the total number of unemployed between the two regions so that certain conditions are satisfied.

As we can see, this is the same result as the one that could have been obtained under the human capital theories, had the same assumptions been made, although the difference is that according to this model, there will still be migration in equilibrium, although net migration will be equal to zero.

3.7 CONCLUSIONS

In this paper we have shown that it is possible to construct a theory of migration of the labour force between regions within the same country starting from an alternative approach to that of the human capital theories, namely that of job-matching.

Working within the framework of job-search and matching theories, we have been able to get an interregional migration function which seems to have sound microeconomic foundations, as the underlying behaviour of the individual is that of maximising the present discounted value of the alternatives. There are some elements missing from this function, but this is so because we have chosen to concentrate on the economic determinants of migration.

One of the main properties of the model is that it allows for migration flows in both directions for individuals that are very much alike, without having to differentiate them by their profession, skill, and other personal characteristics. Within this model it is possible

to find a rational individual that moves from region 1 to region 2 at the same time as another one just like him goes from region 2 to region 1. This is a consequence of the existence of an interior solution, which says that any unemployed worker will spend part of his time searching for a job in one region and the rest of it searching in the other region. In this respect, the assumption of decreasing returns to scale to the searching activity is essential.

The model also gives a role for regional unemployment together with regional vacancies in the same specification. While the level of regional vacancies enter as the variable for job opportunities, unemployment rates do so as they characterize the degree of competition to fill the vacancy.

The analysis of the interregional migration function is somewhat limited because of the complicated expressions we have to work with. Despite so, we have obtained that unemployment in the region of origin and vacancies in the region of destination are positively related to the migration flow, while unemployment in the region of destination affects migration negatively. We have also found that the elasticity of migration with respect to the wage in the region of origin is equal, but with the opposite sign, to the elasticity with respect to the wage in the region of destination.

The last part of the paper has been dedicated to the consideration of equilibrium in the regional labour markets. Unlike in the human capital theories, we have stated that it is possible to find bilateral migration flows in both directions even when the two regional markets are in equilibrium. The only condition for the equilibrium to be compatible with migration is that the net flow is equal to zero.

The model, as it has been set out, has some great simplifications, such as the form of the matching function and the absence of costs related to migration or search in the other region. With respect to this last point, a number of possibilities could have been explored in here. We will mention now only two which seem realistic.

First, assume that there are costs involved in the searching process when this is carried out in the "other" region. If they are proportional to the proportion of time spent

there, then expressions (3) and (5) should be rewritten as follows

$$rV_1^U = z_1 + \delta_1^{\alpha}\theta_1(V_1^E - V_1^U) + (1-\delta_1)^{\alpha}\theta_2(V_2^E - V_1^U) - (1-\delta_1)C \qquad (3a)$$

$$rV_2^U = z_2 + \delta_2^{\alpha}\theta_2(V_2^E - V_2^U) + (1-\delta_2)^{\alpha}\theta_1(V_1^E - V_2^U) - (1-\delta_2)C \qquad (5a)$$

If, on the other hand, there are only costs associated with the act of migration, i.e. when a job offer from the other region is accepted, instead of being with the action of searching outside, then the new expressions to consider would be

$$rV_1^U = z_1 + \delta_1^{\alpha}\theta_1(V_1^E - V_1^U) + (1-\delta_1)^{\alpha}\theta_2(V_2^E - V_1^U - C) \qquad (3b)$$

$$rV_2^U = z_2 + \delta_2^{\alpha}\theta_2(V_2^E - V_2^U) + (1-\delta_2)^{\alpha}\theta_1(V_1^E - V_2^U - C) \qquad (5b)$$

where in both cases it has been assumed that the cost C is constant and independent of the direction in the searching or the migration processes.

Though these expressions are closer to reality than the initial ones, we have restricted our analysis, nevertheless, for the sake of simplicity, to the simplest of the cases and taken the problem of maximization by the unemployed workers when there are no costs[10].

Apart from this question, the model is also very limited, as the demand side of the labour market has been left out entirely. However, I consider that it constitutes a good starting point to analyze interregional migration from a relatively new position, which obviously has plenty of room for improvement and further research.

ENDNOTES

1 The path breaking article on this area was that of Sjaastad (1962). Since then, the human investment approach to migration became very popular.

2 Mattila (1974) estimated that the majority of job changes in the U.S. are made without an experience of unemployment, suggesting that contracted migration is more important than speculative.

3 It is a common practice to introduce the number of migrants lagged one period in order to account, among other things, for these information flows.

4 The "participation decision" in the labour market, although a very important one, is left out of this model as it is not central to it.

5 This question is directly related to the degree of search intensity applied by the job seekers.

6 Although not directly related to this paper, see Pissarides (1979) for a model of alternative methods of job-search with a different degree of efficiency.

7 It could also be considered, alternatively, that unemployed workers are less effective in their search in the "other" region than those that are located there. In this case, the number of effective job-seekers in, say, region 1 would be $\delta^{\alpha}{}_1U_1+c(1-\delta_2)^{\alpha}U_2$, with $c<1$, as this factor represents the heterogeneity in the efficiency of the search. However, we will stick to the assumption made in the main text in order to keep the model simpler.

8 Fields (1976) introduced this concept of the probability of moving from unemployment to employment into the human investment theory of migration.

9 This is consistent with the Spanish system, according to which an unemployed worker, previously employed over one year, receives a certain percentage of the wage he was earning, at least during the first few months of unemployment.

10 In fact, there are few articles dedicated to the question of the costs associated to the change of jobs within the framework of job search, such as those by Hey and McKenna (1979) and by Burgess (1992). However, none of them are directly related to the topic of interregional migration, although some of the ideas in those papers could be conveniently adapted.

Chapter 4
STUDY OF THE ECONOMIC DETERMINANTS OF REGIONAL MIGRATION FLOWS: SPAIN, 1962-1985

4.1 INTRODUCTION

It has been a common argument across the different theories of migration that the flow of workers from one region to another can play an important role in helping to solve the problem of regional structural imbalances in the labour market. In this respect, workers would take advantage of the existence of regional differences in the labour market and move to the region where they consider they can obtain the best returns to their human capital. Accordingly, unemployed workers should go to those regions with, other things equal, lower unemployment rates, as it would lead to an increase in their chances of getting a job. This is the case in the Harris-Todaro (1970) labour-flow model, in which regional wages are weighted by the respective probability of employment, measured by one minus the unemployment rate (see Greenwood (1975 and 1985); Molho (1986) and also Shields and Shields (1989), for a survey of the literature on internal labour migration).

Migration can be viewed as a consequence, at least to some extent, of the differences in the performance of the labour market at a regional level. At the same time, migration should act to correct those differences by, for example, bringing closer regional unemployment rates. However, a number of countries have experienced some persistence in structural imbalances among the various regions (Layard, Jackman and Nickell (1991)). This fact casts some doubts about the ability of migration to overcome those imbalances. In a recent paper, Neumann and Topel (1991) have studied the determinants of the regional differences in unemployment in the United States. According to their analysis, "equilibrium" differences in the regional unemployment rates are the consequence of differences in the degree of uncertainty about current and future states of labour demand: greater diversification of sectoral demands reduces equilibrium unemployment. However, their main concern is not that of labour force migration.

The present paper is an attempt to shed some light on the economic variables, together with the sign of their effect, that influence migration, in the particular case of Spain. In particular, it is important to identify these determinants as that will help to explain the question of why migration flows fall precisely when unemployment in Spain is increasing, and

these flows could help to reduce it by reducing interregional disparities and bringing closer the regional unemployment rates. There are other works on the topic of interregional migration in Spain analyzed from an economic point of view. The closer ones to the present paper are those by Santillana (1978), González Pérez (1990), Bentolila and Dolado (1991) and Antolín and Bover (1993). However, we think that this research provides a new approach to the question of interregional migration, as will come clear in the present chapter.

Traditionally, Spain has been administratively divided into several provinces, which in turn are grouped into regions. Since 1978, Spain has consisted of 17 Autonomous Communities, which have a different degree of self-organization, with a number of responsibilities having been transferred from the central government[1]. Though the limits of these regions were different prior to 1978, the geographical organization resulting from the Constitutional period is the one we have adopted along this paper, although the period under study dates back to 1962.

Spain is one of those countries where the differences between the regions have been, and still are, really persistent over time. On this topic, **Chapters 1** and **2** of the present Thesis contain a detailed analysis of the evolution over the last 14 years of the different characteristics of the regional labour markets in Spain. Therefore, we will limit ourselves to just outline a few of those characteristics here.

Table 4.1 shows unemployment rates for the 17 regions, considered for some selected years. As can be seen, absolute differences have been increasing over time, as the overall unemployment rate was also increasing. In order to be more precise on this point we have worked out two regional unemployment inequality indices[2]. Both of them are shown in **Figure 4.1**. The first one refers to the sum of the absolute differences in unemployment rates across regions, weighted by their labour force share; and it is clear that it has been increasing over most of the period under analysis. However, the other index, which is related to the sum of the relative unemployment rates, also weighted by the labour force share, shows a tendency towards a greater regional similarity in this respect.

Despite this increase in the absolute differences among regional unemployment

rates, as a sign of persistent structural imbalances, the interregional migration rate has been decreasing since 1964, with some exceptions, going from over **2.3‰** that year to just under **1.2‰** in 1985 (**Figure 4.2**). In the present chapter we will investigate this issue of why migration flows came down precisely when they were most needed in order to reduce the increasing differences in regional unemployment. Nevertheless, this reduction in the internal migration rate during the seventies is a worldwide phenomenon (see, for example, Vining and Pallone (1982) and, more recently, Ishikawa (1992) for the case of Japan).

As a first approach, these two facts could be somehow reconciled if we take into account the evolution of the unemployment rate for Spain as a whole. As **Figure 4.3** shows, the unemployment rate was relatively low during the 60's, marginally over **1%**. In the early 70's it started to increase slightly, but this increase became much sharper from 1975 onwards, reaching really high levels during the 80's: **21.5%** in 1985. The regional unemployment rates moved in a similar fashion to the national one[3]. It could explain, to some extent, the fall in the migration rates as depressed general economic conditions, of which higher unemployment rates are a clear sign, will lead to people being less likely to move, as Vanderkamp (1971) and Gordon (1985) have pointed out. Along the same line, Pissarides and Wadsworth (1989) and also Pissarides and McMaster (1990), both for the U.K., among others, indicate that they affect the net gains from migration. In this respect, they assert that higher unemployment goes together with longer spells of unemployment, in which case the marginal cost of moving is higher.

On the other hand, following also the human capital approach to migration theory, the returns to the decision to migrate will be subject to a greater variance as unemployment rises, because the final outcome of migration will involve a higher degree of insecurity. Therefore, it seems clear that, in the presence of risk-averse individuals, high unemployment rates will deter migration.

Apart from unemployment rates, the performance of the labour markets is also measured in term of wages. Topel (1986) has addressed the related topic of wages and employment dynamics within local labour markets using U.S. data. In his model, people will move towards the labour market that offers the greatest present value of future earnings, so

that geographic wage differences will be, up to certain point, a consequence of costly migration. He also concludes that wages are more flexible among the least mobile demographic groups and that there is a strong evidence of the effects of local markets characteristics on wages.

Nevertheless, differences in regional wages are also likely to affect the behaviour of migration. These differences not only reflect the existence of differences between regions, but they also indicate the presence of rents in certain regions which might be appropriated by individuals migrating from other regions. Accordingly, small differences in regional earnings would mean lower pecuniary incentives for people to migrate. The available data for Spain give the impression that something of this kind might have happened. As **Figure 4.4** shows clearly, the coefficient of variation across regions of average nominal wages has been falling continuously since 1968 (real wages behave in a similar fashion). It shows a tendency towards a higher degree of homogenization in the behaviour of the nominal wages across Spanish regions.

In fact, in a recent study of internal migration in Spain, Bentolila and Dolado (1991) found that both wage differentials and unemployment differentials had a significant effect, although small according to their estimates, on interregional migration rates. They also found that the response of the regional migration rates to these labour market variables was affected by the general rate of unemployment for Spain. However, when testing the hypothesis of the presence of risk-aversion of potential migrants, using the variance of wages and unemployment as a proxy, they found no significant effect of these variables on the net immigration rate.

The present paper intends to address the question of interregional migration, although from a different angle. Instead of aggregating gross flows into net ones and then study the determinants of these net migration rates, we will make use of the gross flows data themselves. Equally, we will pay less attention to the dynamic aspects of migration so as to concentrate mainly on the sign and significance of the labour market variables that will turn out to determine the internal migration flows of the labour force.

The approach adopted here is a continuation of the theoretical model developed in the previous chapter of this Thesis. According to it, migration is a consequence of the process of job-search and hiring when unemployment and vacancies from various regions within the same country take place simultaneously. In contrast, traditional human capital based theories view it as an investment decision by which people consider that they will be more likely to be successful in their search for improvement in their standard of living by changing the place of residence, which could include, amongst other things, the search for a job. Therefore, the present theoretical framework concentrates specifically on "contracted migration". i.e. migration which takes place once an opportunity has been offered in a region different to that of the present residence, as opposed to "speculative migration", which considers movements without the explicit modelling of employment opportunities (Silvers (1977)).

However, one of the main weaknesses of the analysis carried out in the previous chapter is the absence of an explicit reduced form equation to estimate empirically. In fact, the actual equation to be estimated is obtained following the job-matching theoretical framework developed, and examined using data for Great Britain, by Jackman and Savouri (1991)[4]. In a consistent way with the model described in **Chapter 3**, the basic idea consists of considering migration as a special case of job hiring, where people from one region look for job vacancies in a different region. Its main advantage over the standard model of migration based on human capital theories is that it turns out to be more able to explain the behaviour of gross migration flows in the presence of widening unemployment rate differentials.

In this paper we will try to check how well this new theory of migration, based on job-hiring, fits the Spanish data. But before getting to that, we will start in **Section 4.2** by including a review of recent literature on the evidence of the determinants of migration flows. In **Section 4.3** we describe briefly the theoretical considerations that lead to the reduced form equation which will be estimated empirically. Then, **Section 4.4** will be dedicated to comments on the data-set used for this study, together with some reflections on the characteristics of the endogenous and exogenous variables of the model. Finally, **Section 4.5** reports on the results obtained, especially about the signs and significance of the coefficients

on the main variables of interest when the equation obtained previously is applied to the Spanish data. The period covered by the analysis is fairly long, as it goes from the early 60's till the mid 80's, and it includes important changes in the economic and political life of Spain. Therefore, one should expect some kind of structural change in the equation estimated. Thus, in this section we have also included an analysis of the presence of structural changes in the response to the economic incentives to migrate. The last section of the paper, **Section 4.6**, contains the main conclusions of the analysis carried out here.

4.2 INTERNATIONAL EVIDENCE ON THE DETERMINANTS OF INTERNAL MIGRATION

As mentioned earlier, the most recent surveys on this field of research are those by Greenwood (1985), Molho (1986) and Shields and Shields (1989). Though they are very recent, since then new studies have been appearing continuously in different journals, and, for example, **Regional Studies** issued an special number (Vol. 27.4) in 1993 edited by Greenwood.

In order to put in context the central topic of this chapter, the intention of the present section is that of reporting the results found for other countries about the determinants of internal migration. This way it will be more clear how the results that hold for Spain fall into line with those existing in other cases. In fact, given that most of the literature concerning this issue relates to the case of the U.S.A., this review will be necessarily biased towards the evidence of that country, although there are some other very interesting studies for other countries, especially the U.K.

Unemployment is one of the factors that has been quoted more frequently as an important determinant of migration within a country. There have been in the literature two ways of approaching the importance of unemployment in determining migration. The first one refers to it as one of the personal characteristics of the potential migrant, and it corresponds to studies that have been carried out using micro-data. Most of these studies have found a significant and positive relationship between personal unemployment and the likelihood of

migration[5], so that the unemployed are more likely to move to a different area than are the employed. And this is so for each of the major occupational groups (professional and technical, other white-collar and blue-collar workers), as it has been shown by Herzog and Schlottmann (1984) using U.S. data. On the other hand, Hughes and McCormick (1981, 1985) have been unable to find any influence of being unemployed upon the intended rates of migration of manual workers. Finally, in relation to the effect of unemployment as a personal characteristic on the probability of migration, Pissarides and Wadsworth (1989) have found that, in the U.K., households with an unemployed head, are more likely to move than other households.

There is an alternative way in which unemployment has been considered as a determinant of internal migration, and it is related to the magnitude of the local unemployment rates. There are a number of studies which have considered the importance of this variable, and some of them have been reviewed by Herzog et al. (1993). The results obtained now are less homogeneous in the sense that there is not a clear cut evidence that the unemployment rate of the region of origin of the migration flow has a significant effect on the migration rate. Thus, for example, DaVanzo (1978) shows that there is a positive relationship between out-migration likelihood and area unemployment rate, but only for those families whose head is unemployed. On the other hand, Herzog and Schlottmann (1984) get positive relationships between these variables for each of the three larger occupational groups mentioned earlier. In a study about the relevant measure of income for migrants, and using also data for the U.S., Izraeli and Lin (1984) get the associated result that the unemployment rate, which they interpret as a measure of job opportunities, has a negative and significant effect on net migration. However, Van Dijk et al. (1989) found that, for the Netherlands, out-migration was discouraged by high area unemployment rates. With respect to the U.K., Hughes and McCormick (1981) found the striking result that, contrary to the theory, differences in regional unemployment rates have a negative effect on migration rates. Equally, Pissarides and Wadsworth (1989) get that unemployment differentials have a weak, and generally with the reversed sign, effect on migration. However, Pissarides and McMaster (1990) find that unemployment ratios influence net migration in a significant way. They explain this fact arguing that by using the ratios they are also taking into account that in times of high unemployment, migration is lower. This result is confirmed by Pissarides and

Wadsworth (1989), who conclude that at higher overall unemployment rates, migration propensities are reduced. Going back again to the evidence from the U.S., Gabriel et al. (1993), using a place-to-place migration approach, have tested the effect of origin and destination unemployment rates, entered as separate variables and as differences[6]. Their results show support for the hypothesis that both rates are significant and affect migration according to what is expected, and also indicate that this effect is asymmetric in the sense that the coefficients are statistically different in absolute value from each other.

However, one of the problems associated with the use of the area unemployment rate is linked to its justification as a determinant of migration flows. In most of the analysis carried out, it is used as a proxy for the employment probabilities, or as a measure of the relative economic opportunities in the origin and destination areas. As Fields (1976) notes, potential migrants will regard the area unemployment rate as an imperfect index of the tightness of the regional labour markets, and will prefer to use measures of labour turnover, such as the probabilities of moving from unemployment to employment and the other way around, as a best indication of the employment conditions in these labour markets. In fact, he finds that the new hire rate and the layoff rate are both significant and with the expected signs (i.e. positive and negative, respectively). In line with this consideration, Pissarides and Wadsworth (1989) also introduce the region's relative vacancy rate as a proxy of labour demand conditions in each market (together with unemployment differentials), but the coefficient associated with this variable comes out with the wrong sign, and its effect is very weak. Alternatively, Jun and Chang (1986), in a study about the correct functional form to estimate and also about the importance of considering migration between contiguous states in the U.S. as a kind of migration with its own characteristics, prefer to use the ratio of population to employment in each area as an appropriate representation of the pressure factor in the labour market, because the unemployment rate does not reflect the effect of, for example, the existence of discouraged workers. The results they get show that, in general, this variable is not significant when trying to explain the behaviour of internal migration.

The model that Jun and Chang (1986) put to test is a simultaneous two equations model, one for migration and the other for employment growth, and this latter variable could be picking up the effect of employment opportunities in the area, explaining

in this way the lack of significance of the ratio of population to employment in their analysis. In this respect, they find that the employment growth variable is significant, and with a positive sign, in the migration equation; but migration is not significant in the employment growth equation. Therefore, if we take employment growth as a proxy for employment opportunities, it turns out that this is one of the determinants of interstate migration. However, they are unable to prove the hypothesis of employment growth and migration being simultaneously determined. In the study mentioned earlier, Izraeli and Lin (1984) also estimate a simultaneous two equations model for migration and employment growth, where they consider explicitly that the rate of change of total employment as a measure of job opportunities (together with the unemployment rate). Their results indicate that employment growth is one of the most important determinants of net migration, but they also indicate that apparently net migration was not influenced by employment growth. These two studies challenge the results obtained earlier by Muth (1971), who found that these two variables were mutually dependent. Nevertheless, the question of simultaneity is an open one, as Greenwood et al. (1986), using a simultaneous three equations model for migration, employment change and the wage, get similar results to those obtained by Muth (1971).

In this study by Greenwood et al. (1986), they find not only that employment change has a significant impact on migration, but also that this effect changes over the business cycle, being greater during periods of national expansion. It brings out the question of the relationship between the business cycle and interregional migration, analyzed explicitly by Milne (1993) for the case of Canada. Comparing graphically the real GDP growth with the net migration rate for several years, he concludes that business cycle effects can change the migration flows, and that the correlation between net migration rates and the provincial business cycle is stronger than the correlation with the national cycle. He has no doubt that the trend in GDP growth and the trend in migration rates are the same, at least for Canada. This result coincides with the comment made by Pissarides and Wadsworth (1989) or by Gordon (1985) when they argue that in times of crisis and high unemployment, there is a greater uncertainty and new jobs are more scarce, so that migration propensities, and consequently migration flows, should be lower.

Within the determinants of migration, another factor that has been widely

analyzed is the one related to the regional differences in wages or personal incomes. Considering the human capital approach, for example, it seems clear that, other things equal, the decision to migrate will be encouraged by the existence of regions which offer higher wages to the one in which the individual is located. In fact, there is some evidence in favour of this hypothesis. In the case of the U.K., Pissarides and McMaster (1990) conclude that, while the level of relative wages is not very useful in order to explain interregional migration, it responded significantly to differences in regional wage growth. Equally, Pissarides and Wadsworth (1989) obtain that relative wages in the region of origin (classified by the occupational group) have a strong effect on migration. In the case of the U.S, recent evidence shown by Gabriel et al. (1993) indicates that, in a place-to-place migration model using data for the years 1986-1987, wage rate differentials are important in determining migration flows, but they also detect that wages act in an asymmetric way in the sense that local labour market conditions are weighted more heavily. On the other hand, Jun and Chang (1986) get that per capita personal income has no significant effect upon the ratio of immigration to out-migration for a given state. In contrast, they also find that a weighted average of income of other states (measuring the opportunity income of a certain state) has negative impact on the previous ratio. With respect to what the relevant income measure for migrants is, Izraeli and Lin (1984) studied the effect of three alternatives variables (gross nominal earnings, gross real earnings and net real earnings) on net migration. They conclude that, without the cost of living in the regression, nominal earnings did not perform as well as real earnings. And of the two real variables, gross real earnings seemed to provide a better fit. They justify this latter result on the grounds of the existence of some "tax illusion" on the part of the migrants.

Despite the results reported in these studies, Pickles and Rogerson (1984) comment that, while one should expect movements towards those areas with higher wages, there is a considerable evidence in the interstate migration flows in 1975 in the U.S. that people move in the opposite direction in a very large number of cases. Along this line, Roseman (1983) also mentions the need for taking into account the heterogeneity of migrant types together with the diversity of migration reasons in any study of internal migration. He estimates that in the 1975-1980 period around 76% of the interstate migrants in the United States were affected by decisions in which labour force participants were involved. However, by analyzing several "reasons for moving" surveys, he also argues that the decision to migrate

is taken not only on the basis of employment-related reasons. The majority of migrants also take into account other non-employment factors, such as housing problems, family or relatives reasons, climate or school attendance. Therefore, both employment and non-employment factors should be incorporated in migration models explicitly.

In this sense, there has been a number of studies that have considered explicitly the importance of what is generally called as location-specific amenities on the migration decisions. Thus, Graves and Linneman (1979) consider that there are kinds of non-traded goods that also enter the utility function of the individual. Therefore, changes in the demand for these non-traded goods can only be satisfied through migration towards the place where they are offered. Graves (1983) takes the contract rent as a good proxy for all these kind of amenity variables, and he finds that it has a positive and significant effect on net migration across various age groups. In their analysis of the effect of real earnings on net migration, Izraeli and Lin (1984) also include three environmental variables (crime rate, air pollution and climate) that serve as a measure of the quality of life of an area. Of these three variables, only the crime rate has a significant, and negative, effect on net migration. Similarly, on a study designed to test different specifications of distance and space in place-to-place migration models, Cushing (1986) includes climate as an amenity variable and gets positive and significant effects of this variable on the allocation rate of the migrants. In a later work, Cushing (1987) analyzes in greater depth the relationship between migration and location-specific amenities. He includes up to six different amenities: temperature, sunshine, humidity, wind speed, proximity to a major coastline and type of terrain. All estimated coefficients have expected signs and a significant effect on the allocation rates of the migrants. He concludes that location-specific amenities appear to be at least as important as economic factors as determinants of destination choices, although he does not present a formal test of this point.

The consideration of economic related versus non-economic related determinants of interregional migration has led to a very debated controversy between equilibrium and disequilibrium approaches to migration analysis. Traditional models assume that migration should respond to regional differences in economic opportunities, net of relevant costs. Therefore, migrants should go to areas with low unemployment rates and high wages. According to these models, these differences in regional economic opportunities are

a sign of disequilibrium, and interregional migration is a response to this disequilibrium. However, it is assumed that this process of migration is not very efficient, and local market adjustments take place very slowly. On the other hand equilibrium models emphasize the role of location-specific amenities differential in migration, so that the differences in economic opportunities are in fact compensating differentials, and, therefore, potential migrants will not necessarily react to them. In this case, migration turns out to be an efficient process in equilibrating local markets, and there will be a more or less persistent (compensating) differential pattern of spatial economic opportunities. Changes in the demand for consumption amenities is the main determinant of migration for this approach. Therefore, according to it, migration models which exclude these amenity factors will turn out to be misspecified, and, consequently, the econometric estimates of the coefficients of the economic related variables may be biased. The evidence (Cushing (1987) or Greenwood et al. (1991), for example) on this controversy seems to support the idea that both economic opportunity and amenity differences are significant in explaining interregional migration flows. Nevertheless, there is no evidence on which set of variables have a stronger influence on migration.

4.3 THEORETICAL CONSIDERATIONS

4.3.1 Related Migration theories

Before considering the model proposed by Jackman and Savouri (1991), let us review some alternative migration models which are close in their formulation to our model as it has been set up in **Chapter 3**.

As Molho (1986) indicates, despite an extensive literature on search economics, little attention has been paid to migration from this point of view. Furthermore, much of the literature is concerned mainly with the concept of the "reservation wage".

Focusing on contracted migration, Gordon and Vickerman (1982) analyzed the probability of migration as the result of the product of three conditional probabilities:

1) The probability of being in search during a specific period, in a particular area.

2) The probability, conditional on search, of receiving an opportunity from a specific area.

3) The probability, conditional on receiving such an opportunity, of accepting it.

The first choice probability considers migration as one amongst a set of possible activities It will depend upon the characteristics of the individuals and also on the corresponding alternatives they face in the region of origin. This implies that we should include a set of origin and of destination specific factors, such as the size of the population, the particular mix of their characteristics, the degree of opportunities created in the various regions, amongst others.

The second probability will be a function of some destination factors, together with a certain distance deterrence function. Finally, the third probability embodies also a distance decay function, as people prefer to accept a job closer to home, other things equal.

However, this model, as well as those related to it, are essentially models that move around the concept of "reservation wage", which is clearly different to the ideas developed in our model.

Pickles and Rogerson (1984) also utilize notions from the search theory in order to develop a model of interregional migration. The key elements they take from the theory are individual search intensity, spatial direction of search, competition for a job and the decision to accept the job; which correspond to the three conditional probabilities described by Gordon and Vickerman (1982)[7]. They assume that individuals will differ in their search intensity, which becomes a continuous variable and is functionally related to observable variables, such as distance, spatial patterns of job turnover, job creation and past migration. These individuals do not have perfect information about regional wage distributions and there is a random matching process between searchers and vacancies in the labour market. Then, they specify a model based upon concepts of the renewal theory, although limited to the analysis of contracted migration. In this model, there is also a role for a distance deterrence element, which would be representing some possible frictions in the information flows between regions. However, it is a very complex model, and difficult to use for empirical

applications. In fact, they recognize that a very large panel data should be available, and that certain appropriate distributional forms should be chosen so as to avoid the need for numerical integration.

In a similar fashion, Maier (1985) discusses the implications of job search for migration modelling. He focuses on the question of imperfect information about the wage offer distributions on the side of the individuals, although the search process will be useful to update this information. As some other authors do, he also indicates the convenience of using a distance function as a way of measuring, not only migration costs, but also the precision of the knowledge about other labour markets that are spatially separated. He also argues that imperfect information may persuade individuals not to engage in speculative migration immediately; and, consequently, contracted migration would be the prevalent kind of migration as a consequence of the specifications of this model, rather than an "a priori" condition, as it appears to be in the Pickles and Rogerson (1984) paper.

More recently, Herzog et al. (1993) consider a spatial job-search model to analyze the relationship between migration and the likelihood of re-employment, or search-duration. Their emphasis is on whether, among the unemployed, migrants are more successful than those who stay in getting a job. In this sense, this model would be more related to the question of speculative, rather than contracted, migration; as it is in the previous two studies considered. When answering the question of whether migration is an important determinant of employment, they find that it is for those unemployed who are not actively seeking a job[8]. On the other hand, their results do not permit to establish that migration is an efficient job-search strategy for the group of active job-seekers.

Finally, McCormick and Sheppard (1992) have explored the idea of mismatch between unemployment and vacancies at the regional level and the internal migration of the labour force. They analyze a model in which there is an economy with one region characterized by persistent unemployment and steady state employment decline. A proportion of the workers laid off in that region will decide to migrate to the other region, as they will be able to find a job there immediately. In this model, workers are differentiated by their productivity, and they conclude that only workers with productivity above a certain critical

level will migrate from the depressed region to the growing one, which reinforces the declining state of the first region. Then, they investigate the effect of the congestion in the labour market, unemployment pay and the redundancy rate on the characteristics of the equilibria.

This model is closer to one presented here in the sense that both of them start from the concept of a matching function that relates unemployment and vacancies to the number of jobs actually created in a region. Nevertheless, there are still significant differences. Thus, while McCormick and Sheppard concentrate on the question of persistently declining regions, we have addressed attention towards the existence of bilateral flows of migration between different regions even in the case of individuals that have identical personal characteristics.

4.3.2 The Jackman-Savouri model

In this section we will outline the main characteristics of the model presented by Jackman and Savouri (1991) based on the hiring function so as to derive the estimation equation which will be fitted to the Spanish data. At the same time, the high degree of consistency between the theoretical model developed in the previous chapter and this model will become clear.

They start from a simple model, in which there are different regions, but incorporate explicitly these differences at a later stage. They consider migration as a particular case of hiring and thus M_{ij}, which is the number of people moving from region **i** to **j**, can also be considered as the number of job seekers in region **i** taking up vacancies in region **j**. Therefore, they concentrate on contracted migration, as we do in the model presented in this Thesis.

Assuming initially that only the unemployed workers are active job seekers, and also that all of them have exactly the same chance to take up any vacancy everywhere in the country (with distance being of no importance), then interregional migration **Mij** will be given by:

$$M_{ij} = H\left(\frac{U_i}{U}\right)\left(\frac{V_j}{V}\right) \qquad (1)$$

where: **H** is the total number of engagements, given by the hiring function;

U_i is the number of unemployed in region **i**;

V_j is the number of vacancies in region **j**.

Proxying the total number of engagements by the total migration **M**, and dividing through by the labour force in region **i**, L_i, they obtain the following expression:

$$m_{ij} = k\, m\left(\frac{u_i}{u}\right)\hat{v}_j \qquad (2)$$

where: $m_{ij} = M_{ij}/L_i$; $m = M/L$; $u_i = U_i/L_i$; $u = U/L$; and $\hat{v}_j = V_j/V$.

The second stage in the development of the model consists in the introduction of distance in the equation. They argue that, ceteris paribus, people will be more likely to accept a job which is offered in their own region, as they prefer, in general, to work where they are domiciled.

Three are the main reasons why distance may have a discouraging effect on migration:

1.- Information about possible vacancies decreases with the distance between the source of information and the possible recipient.

2.- Search costs increase with distance.

3.- Distance may also act as a proxy for any sort of costs related to moving the place of residence from one region to another.

In relation to this point, in our model in **Chapter 3** we did not consider explicitly any kind of costs in order to make the expressions simpler. Nevertheless, at the end of the chapter was indicated the way these costs could be introduced in the analysis.

They introduce this distance as a discounting factor d_{ij}, arbitrarily set equal to

one for intra regional hiring, so that $d_{ij}<1$, $i \neq j$, and rearrange the expression as

$$m_{ij} = \left(\frac{d_{ij}}{\bar{d}}\right) k\, m\left(\frac{u_i}{u}\right) \hat{v}_j \qquad (3)$$

where $\bar{d}$ is the average value of the discount factor.

The next step is the introduction of the other differences between regions.

The first difference considered is wages, where the relevant variable is relative real wages. However, its effect in the migration equation is not clear. In general, the number of applicants to a certain vacancy will increase with the wage offered. But, at least to a first approximation, it does not mean that the probability of a vacancy in region **j** being filled by a person from region **i** will be increased. The only possibility of having a positive relationship between the number of engagements and relative wages is that it implied a quicker filling of the vacancy and a lower probability of a certain vacancy being left unfilled. However, in support of this possibility we must add that higher wages will not only attract a higher number of job applicants, but it will also shift the relative search effort of those applicants, so that they will search more intensively those vacancies associated with higher wages.

There is one further consideration to take into account in relation to the effect of regional wages on interregional migration. As it was shown in the previous chapter, we should expect the elasticity of migration with respect to the wage of the region of origin to be equal to the elasticity with respect to the wage of the region of destination. However, we were unable to sign unequivocally this effect. In any case, including our conclusion from **Chapter 3** into the present framework, we have that regional wages should enter as a regressor in the way of relative regional wages.

The second type of difference considered concerns the effective number of unemployed job seekers actually looking for a job in a certain region **j**. Taking into account the discounting effect of distance, this number approximates the number of unemployed in region **j**: U_j.

Similarly, unemployed from region **i** will look for work elsewhere due to the relative absence of vacancies in their own region.

Incorporating these effects into the previous expression, leads to:

$$m_{ij} = \left(\frac{d_{ij}}{\bar{d}}\right) k_{ij}\, m \left(\frac{u_i}{u_j}\right)\left(\frac{\hat{v}_j}{\hat{v}_i}\right) \qquad (4)$$

where k_{ij} incorporates relative regional wages.

Finally, they allow for the possibility of currently employed people being involved in job search. For this purpose, they assume that the number of job seekers in a region equals the number of unemployed plus some exogenous (and common to all regions) fixed proportion of employed, i.e.

$$S_i = U_i + \lambda(L_i - U_i) \qquad (5)$$

It means that in the previous expressions, the unemployment rate of region **i** should be replaced, in fact, by the proportion of job seekers in the labour force in that region: $s_i = S_i/L_i$.

In order to retain the regional unemployment rates in the equation they approximate $\log(s_i/s_j)$ by $(u_i-u_j)/(\lambda+u_j)$.

Concerning the issue of the number of job seekers, there are significant differences with the model described in **Chapter 3**. The first one is that in the theoretical model we do not allow the possibility of employed people being involved in the process of looking for another job, in what seems a clear weakness of our model. On the other hand, we do not approximate the number of job seekers in region **j** to only U_j. In fact, we leave that number as an endogenous variable to be determined by the number of unemployed in each region together with the proportion of time they dedicate to search for a job there. Finally, we consider in our model that there are decreasing returns to scale associated with the searching process.

Making all the previous substitutions and rewriting the expression in logarithmic form, they work out the following equation for the migration rate between two regions:

$$Ln(m_{ij}) = Ln\left(\frac{d_{ij}}{\bar{d}}\right) + Ln(k_{ij}) + Ln(m) + \frac{(u_i - u_j)}{(\lambda + u_j)} + Ln\left(\frac{\hat{v}_j}{\hat{v}_i}\right) \qquad (6)$$

They allow some flexibility of the parameters when testing the model, and estimate an equation of the form:

$$\begin{aligned} Ln(m_{ij}) = {} & \alpha_0 + \alpha_1 Ln(d_{ij}) + \alpha_2 Ln(k_{ij}) + \alpha_3 Ln(m) + \\ & + \alpha_4 u_i + \alpha_5 u_j + \alpha_6 Ln(\hat{v}_j) + \alpha_7 Ln(\hat{v}_i) \end{aligned} \qquad (7)$$

where the predictions of the model indicate that:

$$\alpha_3 = 1 \; ; \quad \alpha_4 > 0 \; ; \quad \alpha_5 < 0 \; ; \quad \alpha_6 > 0 \; ; \quad \alpha_7 < 0 \; ; \quad \alpha_6 + \alpha_7 = 0$$

Basically, this is the equation that Jackman and Savouri have estimated for the U.K. in the paper mentioned earlier. The equation that has been estimated for Spain is essentially the same, although with slight changes. Actually, in the expression finally estimated, the variable that measures the distance effect explicitly has been dropped, and a trend variable has been added, for reasons that will be explained later in the text. Equally, we have also replaced $\mathbf{k_{ij}}$ by the effect of relative regional wages ($\mathbf{w_i/w_j}$), as commented earlier.

The two models start from the same basis: the hiring function. In fact, they complement each other in the sense that the model by Jackman and Savouri is more empirically oriented, while the model developed in the previous chapter of this Thesis sets up the microfoundations and then studies the implications for the interregional migration equation.

The results obtained are discussed after a description of the data used to estimate this equation and the modifications they have imposed on the specific estimation of the model.

4.4 DESCRIPTION OF THE DATA

The data we have used for the estimation of the relevant equation are the data used by Bentolila and Dolado (1991), to whom we are grateful for providing the database, and it covers the period 1962 to 1986.

The interregional migration flow matrices are obtained from the Spanish national statistics office, **I.N.E.**, and they refer to population, both active and non-active, who have changed their place of residence[9]. Consequently, this excludes from the migration flows all those temporary moves that do not imply a change of permanent residence. On the other hand, the information provided by the **I.N.E.** and used here is not restricted to labour force movements, but rather includes anyone who changes their place of residence, irrespective of their status with respect to the labour market[10].

Therefore, in order to capture the behaviour of these individuals with reasons to move other than those related to the labour market variables, and following Pissarides and McMaster (1990) and others, there has been included a set of dummy variables which are related to the origin and destination regions. These dummy variables also include all those effects that might affect the migration flows and that remain practically unchanged over the years included in the sample to be studied here.

It is worth noting that for those years ended in **1** and **6**, the official data presents a sharp fall because of the coincidence with the renovation of the Census[11]. We could have dropped these years from the analysis, however we have preferred to perform an analysis of intervention. Thus, following Bentolila and Dolado (1991), the data corresponding to these years have been replaced by a linear interpolation.

For each year there is information on the number of migrants between any two Autonomous Communities, or regions, within Spain, denoted by M_{ij}, where **i** refers to the origin region and **j** to the region where people go to. This gives a total of **272** observations per year, as Spain has 17 regions and the movements within the same region have been excluded. The number of observations for the pooled sample of **25** years for the estimation

of the required equation would be therefore **6800.**

As it has already been said in the previous section, the dependent variable for this study is the migration rate between any two regions M_{ij}/L_i, where L_i refers to the labour force in region **i**[12]. This is one of the main differences of the present study with respect to that of Bentolila and Dolado (1991). In their analysis of Spanish migration, they use as the dependent variable the net immigration rate. On this point, they argue that the flow of migrants between regions in Spain during the period considered is quite unidirectional so that it would not make much of a difference whether gross and net migration equations are estimated. However, our opinion is that by using gross flows, we should be able to capture certain peculiarities of the data. In this respect, Jun and Chang (1986) also indicate that the use of net migration implies the loss of some information included in gross values but not in net values; and Frees (1992) goes a bit further and says that "it is generally accepted that modelling net migration can be misleading"[13].

In this sense, for regions in Spain like Cataluña, net migration behaves almost identically to immigration; while for regions like Castilla-La Mancha, it is the out-migration rate the one that sets the pattern for net migration. There are, however, some regions for which the pattern for net migration changes over time. Thus, País Vasco has a net flow rate following the inflow rate until the late 70's, and from then on, it follows the outflow rate. On the other hand, Murcia has a pattern of net flows opposite to the one just described for País Vasco, changing from in to out-migration[14]. These cases are illustrated in **Figures 4.5, 4.6, 4.7** and **4.8** respectively. Furthermore, from the mid-seventies onwards there is a marked decline in the interregional flows in all cases, which makes it much more difficult to distinguish clearly the unidirectionality of these flows.

Apart from these empirical observations, the use of gross migration flows is also consistent with the theoretical model developed in the previous chapter of this thesis. As we saw there, one of the conclusions obtained within the framework of the matching model is that, even with equilibrium in the regional labour markets, there will always be migration flows in both directions between any two regions. Therefore, when we want to estimate empirically an equation related to this model, it seems only natural to consider gross flows

explicitly, even if some of the flows between any two regions are small.

The change in the dependent variable from net flows to gross flows has some further implications in the comparison of the two studies. When Bentolila and Dolado express variables in relative terms, they refer to the value of the variable in a region relative to the national value of that variable. However, in the case of gross flows, relative variables refer to the ratio between the value of the variable in a certain region **i** and its values in a different region **j**, referring to the origin and destination regions involved in the particular flow considered.

Let us move now to the explanatory variables. Starting with the regional unemployment rates, they perform, in general, much like the national unemployment rate, reported in **Figure 4.3**. If we compare them, as reported in **Table 4.1**, with the regional out-migration rates (**Table 4.2**), it appears that, in general, and specially during the first years reported, those regions with high unemployment rates have also high out-migration rates. However, it also should be noted that there are exceptions: certain regions, like Castilla-La Mancha and Castilla-León, have high out-migration rates despite having relatively low unemployment rates.

Regional wages have been calculated as the ratio between total employees' compensation and the number of wage-earners in each region[15]. These are nominal wages and as it was indicated earlier, nominal wages across regions have converged over time (**Figure 4.4**). It also reflects the fact that during the last years of the 70's and the first ones of the 80's a new system of nationwide wage agreements became common practice, with the legalisation of the Trade Unions[16].

The Consumer Price Index would allow, quite easily, the translation of these nominal wages into real values. Nevertheless, it has been a preferred option the introduction of prices separately and test for the significance of each of these two variables on their own.

We have also considered relative rental housing prices as an explanatory variable as there has been a lot of work done, especially by Hughes and McCormick (1981,

1987) and also by Bover, Muellbauer and Murphy (1989) using British data, about the importance of the housing market in the migration decision and about its interaction with strictly labour market variables[17]. Equally, Bentolila and Dolado (1991) found a small effect of the relative housing prices, though scaled by the national unemployment rate.

Apart from including these relative regional wages contemporaneously with the dependent variable, we have also included as a regressor the change in this variable, as people could consider the evolution of regional wages as an important source of information about the future.

Concerning the data on vacancies, regrettably in the case of Spain it is unavailable over the sample period used here. In fact, there is no information at all over this variable over any period. In its place, we have used relative regional employment growth as a proxy for regional labour demand. The use of this proxy variable implies that in order to construct it, we loose the data for the year 1962, reducing this way the sample to 24 years and 6528 observations.

In fact, we could have proxied the variable of regional vacancies by using, instead, the number of vacancies reported in the Employment Offices. However, our opinion is that there are two kinds of problems associated to the use of this kind of data. The first one is that, generally, firms use alternative ways of filling their vacancies. However, as all job-contracts have to be formalized through the Employment Offices, firms will report their vacancies, although most of them are accompanied by the name of the person that is going to fill it up. The second reason not to use this information to construct a proxy for regional vacancies is the lack of homogeneity between the data provided by the Employment Office about registered unemployment and the data used along this paper, obtained from the information provided by the Labour Force Survey.

The study of the significance of these variables is especially interesting. According to the model described in the previous chapter, we should include them together with the regional unemployment rates as these variables measure different economic effects. Therefore, we should expect significant coefficients on all the variables. Turning again to the

comparison with the study carried out by Bentolila and Dolado (1991), there is an added interest as they found that relative employment growth was not a significant variable in their analysis.

It is clear that some, if not all, of these variable show a trend during the period considered. In order to avoid the possibility that the estimated coefficient on some of them reflects, at least in part, a common trend with the dependent variable, we have considered explicitly a trend variable (**yr**) as another regressor in the equation to estimate. Gordon (1985) also introduces an upward secular trend in mobility as a factor explaining the rate of movement as a reflection of changing levels of education, specialisation and other factors associated to higher levels of mobility.

Finally, we have also included in some specifications a variable measuring distance in Km. between each pair of regions. In the case of the isles, what has been done is to assume two routes of access to the mainland from Canarias, which are the cities of Sevilla (Andalucía) and Madrid. Equally for Baleares we have considered the cities of Valencia and Barcelona (Cataluña) as the entry points. Then, all we have done is to compute the shortest route to any other region via any of the access points.

The inclusion of the variable "distance" amongst the regressors could give us some insight into the process of interregional migration. There is an important literature on this topic. It plays an important role in explaining migration flows, not only in this model based on job-hiring, but also in other place-to-place migration models. Generally speaking, the distance variable is used as a proxy for various determinants of migration which turn out to be difficult to measure. These are, amongst some others, costs of moving, uncertainty and risk-aversion or quality and quantity of information transferred between regional labour markets (see Shields and Shields (1989) for a general survey on this topic, and also Herzog et al. (1993) for some references on the importance of labour market information in job-search models). We are particularly interested in checking the two following hypothesis:

1.- It is clear that the technology of information has developed faster lately, allowing not only a quicker spread of news, but also easier contacts between any two points apart.

2.- Better communications mean lower search costs in a distant place as there will be

no need to physically go to a certain region to search for a job.

4.5 EMPIRICAL RESULTS

4.5.1 Effects of distance

As indicated earlier, the model used to estimate the migration equation is a fixed effects model which consists of a set of dummies related to interregional migration flows. There is no constant in the regression as, otherwise, it would be subject to perfect multicollinearity. The role of these fixed effects is that of controlling for those effects that have hardly changed along the period considered. In particular, they could well serve as an appropriate way to pick up the effect on migration of certain location-specific amenities, such as climate or other geographical aspects that could characterize a region, like those mentioned by Cushing (1986).

There are two alternative procedures to follow in the specification of the set of dummies within the fixed effects model for the migration equation. The first one would be to consider a dummy for each possible flow of migrants, which means a dummy for each possible pair of regions ($\mathbf{F_{ij}}$). The second procedure consists of an specification of a dummy variable for each of the origin and another one for each of the destination regions ($\mathbf{F_i}$ and $\mathbf{F_j}$). It means that each flow is characterized by two dummies, with the peculiarity that all flows proceeding from the same region would share the same origin dummy variable.

In order to model properly the fixed effects in the case of bilateral flows, as we have here, it is probably more adequate to include a dummy for each one of the flows. Thus, we would have **16x17** origin-destination dummies, $\mathbf{F_{ij}}$. This is the procedure followed by Jackman and Savouri (1991). The use of separate origin and the destination dummies could have two main advantages over the full set of dummies. The first one is that, in the case of applying this equation to Spanish data, it is important to consider that the number of exogenous variables, dummies included, would have been very high. This is so because we have to take into account that there are 17 regions in Spain: 272 variables only for the fixed

effects. The introduction of origin and destination dummies reduces the number of these variables to just 33. It is clear that the use of the set of flow dummies could mean a considerable reduction of the degrees of freedom with respect to the use of the origin and destination dummies. However, this is hardly a problem in our case as the size of the sample we are using is well over 6,000 observations.

The second advatange lies in the consideration that there would have been some problems had we included the origin-destination dummies $\mathbf{F_{ij}}$ together with the distance variable between any two pair of regions both as explanatory variables. This is so because in that case we would have had two explanatory variables that remain constant along the years considered in the sample for each bilateral flow, i.e. for each observation of the endogenous variable.

Consequently, in order to evaluate the importance of the distance between regions as an element that affects the migration process, we have chosen the origin and destination set of dummies. Nevertheless, we have also run the regression with the full set of $\mathbf{F_{ij}}$ dummy variables, but without the distance variable, so as to be able to compare the results obtained in both cases.

To assess the significance of distance in the migration equation, we have started the analysis by estimating one cross-section equation for each year from 1963 till 1986 using the origin and destination fixed effects and then adding the distance variable, in logarithmic form, as the only regressors. This will also give us the way the impact of distance on migration has evolved over the years covered by the sample.

Table 4.3 gives the distance in Km. between every pair of regions. For this purpose we have taken as the reference point for each region the main city within that region (usually the administrative capital of the Autonomous Community). Thus, the distance between the regions of Andalucía and Cataluña, for example, is given by the distance in Km. between Sevilla and Barcelona.

Table 4.4 reports the estimates of the coefficients of the distance variable in

column 2, together with the $\mathbf{R^2}$ for the level of significance of the equation for each year in **column 3**. The last column gives the values of the $\mathbf{R^2}$ of the equations fitted only with the origin and destination fixed effects.

The first thing to note is that the incorporation of distance means a considerable increase in the explanatory power of the equation of the behaviour of the dependent variable for every single year. The $\mathbf{R^2}$ goes from an average of **60%** to around **78%**.

The second point affects the coefficients of the explanatory variable. Firstly, they are highly significant for every year of the sample, with t-statistic values well above, in absolute terms, the critical t-value in each case. Furthermore, they take negative values, as it should be expected according to the assumed discouraging effects of distance implied by the reasons given previously. It means that people are more likely to move, other things equal, to the nearest possible region to fill up a vacancy.

Finally, looking at the evolution over time of the estimated coefficients it can be noticed that they indicate a fall in the size of the effect of distance on the migration rates, as the coefficients are lower, in absolute values, with the years. It means that people find it now less inconvenient to move to a distant place.

In relationship to the two hypotheses put forward in the previous section, the reduction of its coefficient means that distance is now a much less important barrier from the point of view of the transmission of information than a few years ago, as the development of the technology has made possible easier contacts between any two points apart. This will also reduce the costs of carry out some search out of the own region.

With respect to the cost of moving, it is clear that only by considering the general improvement over time in the different means of transport, including the conditions of roads, it is possible to realize that though the distance between any two cities is the same in 1986 as it was in 1963, the actual costs of going from one to another are now much lower. This is also reflected in the reduction of the coefficient of distance in the migration equation

over the years.

4.5.2 Effects of economic variables

Let us examine now the results obtained when introducing the economic variables as regressors. The procedure consists of pooling the cross-section data over the **24** years that covers the sample to estimate the equation by ordinary least squares[18]. The dependent variable is the deviation of the bilateral migration rate from the average migration rate for Spain. It means imposing a coefficient equal to one on the overall migration variable, as made explicit in the section about some theoretical considerations.

As indicated at the beginning of the previous section, there are two possibilities of modelling the fixed effects. One would assign a dummy to the region of origin (**Fi**) and another dummy to the region of destination (**Fj**) for each flow. There would be, then, 33 dummy variables. This one would allow the presence in the regression of the "distance" as a further variable. The other possibility consists in considering one dummy for each flow (**Fij**), giving a total of 272 dummy variables. The latter seems to be more adequate than the former, however it excludes the distance variable.

In fact, we have tried separately, of course, both sets of dummy variables in the regression. **Table 4.5** reports the estimates of the coefficients obtained when different specifications have been tried with the origin and destination dummies (**Fi** and **Fj**) and also the distance variable (**Ln(dij)**). Before we continue with the analysis, it is worthy just to mention the negative effect of distance, already commented for the cross-section regressions, and how significant the coefficient is. On the other hand, **Table 4.6** reports the results obtained for the same specifications but with the 272 flow dummies (**Fij**) and no distance variable.

When looking at both tables, it turns out that the coefficients of the economic variables are almost identical in each one of the specifications tried for each of the sets of dummies. The main difference that arises between these two tables lies in the value of the $\mathbf{R^2}$:

it is almost **75%** in the case of the origin and destination dummies plus the distance variable, and around **88.2%** in the case of the flow dummies. The standard errors associated to the estimation of the coefficients are also smaller in this latter case, giving, as a consequence, larger t-values. This result means that, as expected, it is a better procedure to include a dummy variable for each one of the possible flows of migrants, as the variance of the dependent variable explained by this regression is greater. Nevertheless, it is also clear that the use of origin and destination dummies plus the distance variable is also a good approach, as far as its use does not induce any change in the estimated values of the coefficients of the economic variables that appear in the regression.

In all the specifications that have been tried the trend variable appears to be statistically significant and positive, what means that there is a continuous growth of the migration flows in Spain over the years, although it may not seem so when looking at the graphs because of the adverse impact of certain economic variables during the various phases of the business cycle.

With respect to the overall migration rate, in its role as a proxy for the total number of engagements, we can see that the estimated coefficient in all the specifications is clearly positive and quite close to one, as the theory points out. In fact, according to the F-value of the associate statistical test, this coefficient turns out to be not different from one at the 5% level in regressions 1 and 3 of **Table 4.5** and at the 1% level in regressions 2 of this table and 3 of **Table 4.6**.

We have also included year dummies in order to capture specific macro effects for certain years on migration. The special interest in having year dummies in the regression is a consequence of an attempt to explain the effect of the origin unemployment rate variable, as will come clear later in the text. Of the 24 dummies, the first and the last one have been dropped as otherwise they would be capturing the same effect as the trend variable. It is clear that the overall migration rate and the full set of year dummies are perfectly correlated, so that we should not include all these variables on the right hand side of the equation to estimate. In order to solve this problem, we have moved the overall migration rate to the left hand side with a coefficient of one, so that we have been able to identify those year dummies that are

significantly different from zero at the 5% level in the different specifications that are included in the tables. This way we have included as regressors both the overall migration rate and the year dummies which are relevant. This procedure did not have any effect on the rest of the coefficients of the economic variables.

Let us turn now to the analysis of the economic variables related to the regional labour markets and their impact on the bilateral migration flows.

Starting with the unemployment variables, where there are some interesting points to comment. First of all, the interpretation of regional unemployment is different in the job-hiring model to that implied by human capital approaches. These approaches introduce regional unemployment rates as a way of measuring regional differences in employment opportunities. For the present approach, on the other hand, the significance of the rates is a sign of the higher intensity of the unemployed when job-searching. With respect to the actual results obtained for Spain, the functional form in which the unemployment rate for the region of origin is introduced in the specification certainly makes a difference to some of the estimated coefficients.

The specification reported in the first column of both tables considers the regional unemployment rate as implied by the theoretical considerations. In this case, the coefficient for **U(i)** is negative but statistically not significant. It means that out-migration is statistically independent of the unemployment rate in a region. However strange and opposite to the predictions of the theory, this result has also been found in a number of previous studies. On the other hand, the coefficient for the destination region is significant at the **5%** level and takes on the right sign, according to what should be expected from the theory, as it turns out to be negative.

Column 2 refers to the specification in which $\mathbf{U(i)^2}$ has been included. The result is that the coefficient for **U(i)** is now **0.054**. It appears within the context of this specification that this coefficient is highly significantly different from zero. Therefore, when $\mathbf{U(i)^2}$ is included, the empirical result for **U(i)** falls into line with the theory. If we take the point estimates of this coefficient, it turns out that an increase in one percentage point in the

unemployment rate of a certain regions leads to an increase of **5.55%** in the out-migration rate from that region, assuming that all the other variables, including the national migration rate, remain constant. In any case, it implies that the unemployment rate in the region of origin is of significant importance in the explanation of the deviations of the bilateral flows of migration from the national rate.

However, this effect is partly offset as the coefficient of $\mathbf{U(i)^2}$ is negative and also significant, though much smaller in absolute value than the coefficient for **U(i)**. It means that, as the unemployment rate in region **i** is larger, its impact on the bilateral outflows from that region is smaller. In fact, according to the point estimates obtained here, when the unemployment rate in the region of origin reaches **15%**, any further increase in that rate will lead, assuming that all the other exogenous variables remain unchanged, to a fall in the bilateral flow of people out of that region.

With respect to the unemployment rate of the region of destination, the introduction of $\mathbf{U(i)^2}$ does not change things very much in the sense that its coefficient goes on being significant and negative. The point estimate obtained remains very similar, although the t-statistic is now larger, in absolute value, implying an improvement in the precision of the estimate. The interpretation of this results is that regions with high unemployment are not attractive as destination of migration because the competition to fill a vacancy will be harder. The point estimate indicates that an increase in one percentage point in the unemployment rate of a certain region implies, ceteris paribus, a fall in the out-migration rates from the rest of the regions to that one of around **3.34%**. We also tried to introduce $\mathbf{U(j)^2}$ in the specification but it failed completely to be significantly different from zero, concluding therefore, that the deviation in the functional form of the regional unemployment rates from that implied by the theory affects only the region of origin, not the one of destination.

The next variable to comment on is relative wages. These are relative nominal wages, and as it can be seen, they have a negative and significant effect on migration rates. As indicated earlier, we have tried prices separately from nominal wages, but they consistently failed to be significant, so that they were withdrawn from the specification. On the other hand, the change in this variable affects also significantly migration rates, with a negative effect.

According to the way this variable has been introduced in the model, it can be interpreted as the difference in the growth rates of wages between origin and destination regions[19]. The signs of these coefficients imply that people tend to go not only to those regions with higher wages, but also to regions where wages are growing faster. If all the regions had the same rate of growth in wages (or, alternatively, in the long run), then according to the estimates of the coefficient the elasticity of the dependent variable with respect to current relative regional wages would be almost **-1.6**. The interpretation of this results indicates that a rise of relative wages by **1%**; which, when **w(i)<w(j)**, means that the regional wages are more similar; leads to almost a **1.8%** fall in the migration rate from region **i** to region **j** for a given national rate. This result is important as it confirms what was anticipated from **Figures 4.2** and **4.4** about a close relationship between the fall in the interregional migration rates and the fall in the coefficient of variation of nominal wages across region. In this respect, the result is quite different to the case of the U.K., where a perverse wage effect has been found by Jackman and Savouri (1991).

Nevertheless, in the short run, when relative wages vary from one period to the next one, the elasticity of interregional migration rate with respect to current relative wages is larger (in absolute value): around **-2.25%**, although in this case we should also take into account the opposite effect past relative wages have on migration. It is also possible to say that, if all the other variables remain unchanged, an increase in one percentage point in the rate of growth of wages in a certain region will lead to a fall of almost half percentage point in the outmigration rate from that region.

Let us analyze now the regional employment growth variables, acting as a proxy for regional vacancy rates. As there could be some problems concerning the endogeneity of these variables, we have instrumented them using the same variables lagged two periods as instruments. However, the results are practically equal to those obtained when the variables are not instrumented, not only in terms of the sign of the coefficients but also with respect to the point estimates. Thus, we have reported just the coefficients that appeared as the result of using O.L.S. without instrumenting these variables. This result coincides with those obtained by Jun and Chang (1986) and by Izraeli and Lin (1984) when they conclude that in models with two simultaneous equations for migration and employment change the

former does not enter as a significant regressor in the equation to explain the latter variable. On the other hand, Greenwood et al. (1986) argue in their analysis that employment change is effectively an endogenous variable.

The first thing to note is the significance of the coefficients of both the origin and destination employment growth variables in the first specification. They are signed correctly in the sense that they imply that people are less likely to migrate from regions where employment is growing, which in turn are more attractive to migrants. This result about the significance of the effect of employment growth on migration is maintained in most of the of the specifications considered in this analysis. This seems to contradicts the results obtained by Bentolila and Dolado (1991) about the lack of significance of the ratio of the regional employment growth to the national one. Furthermore, when an F-test is carried out to check whether the two coefficients are equal to each other in absolute value, the result is an F-value of **3.67** in the case of Regression 2 in **Table 4.5** and an F-value of **4.2** in the case of Regression 2 in **Table 4.6**, so that we fail to reject this hypothesis, at least at the 4% level, which means that the theoretical prediction on this question is supported by the empirical analysis. The last columns in **Tables 4.5 and 4.6** show the estimates resulting when the regional employment growth variables are entered as the difference of one from the other, rather than on their own. The point estimates for employment growth show that for each percentage point of increase in employment in a region, there is a reduction of **1.2%** in the out-migration rate from that region, provided everything else remains the same. Equally, there will be an increase of around **1.2%** in the out-migration rates from the rest of the regions towards that one. Alternatively, it is possible to interpret these figures as the elasticity of the deviation of migration flows from the national migration rate with respect to employment in the region of origin, and also with respect to the region of destination, but with a positive sign.

The results commented so far indicate that either the second or the third specifications reported should be the preferred one as all the variables have the sign expected from the theory[20]. Nevertheless, there is this question of the functional form in which the origin unemployment rate is to be included as the coefficient on $U(i)^2$ is negative and significant. The interpretation of this finding within the framework of the theoretical model

used here is that the unemployed of the region of origin search for a job out of the own region less intensively as the unemployment rate rises, and that there is a maximum to the region's aggregate intensity of search.

Before going into the possible explanations of this finding, it seems interesting to check whether the use of a quadratic form for the origin unemployment rate is appropriate or, on the other hand, it is too strong. To this effect, we have tried an specification with the logarithm of this unemployment rate, instead of the quadratic form. It means that this variable has an asymptotic effect, but without reaching the maximum, as it does with the quadratic form. As none of these two alternative hypothesis is a subset of the other, in order to test which one provides a better explanation of the behaviour of the dependent variable, we have performed the Davidson and MacKinnon test for nonnested hypothesis. In order to do it, we have obtained the predictions from the model with the quadratic form (**YHAT1**) and the predictions from the model with the logarithm of the unemployment rate of the region of origin (**YHAT2**). Then, we have regressed the dependent variable against **YHAT1** and the logarithm of **U(i)** and test if the coefficient of this variable is significant. Equally, we have regressed the dependent variable against **YHAT2** and **U(i)** and $\mathbf{U(i)^2}$, and test the significance of the coefficients of these two variables.

Table 4.7 shows the results of the comparison of these two alternative specifications, together with the results of the tests, which are in fact t-tests on single coefficients. The first and third columns give the estimates of the coefficients under the two competing hypothesis: quadratic and logarithmic form respectively. As it can be seen, the values obtained for the economic variables other than the unemployment rate in the region of origin are very much alike in both regressions. The second and forth columns provide the results for the Davidson and MacKinnon J-test. From those two columns, it is quite clear that the coefficient of **Ln{U(i)}** in the second column is not significant, while those on **U(i)** and $\mathbf{U(i)^2}$ in the last column are significantly different from zero, and they are positive and negative respectively. It means that the logarithmic form does not add anything to explain the dependent variable once the quadratic form has been taken into account. However, this logarithmic form leaves something unexplained which is explained by the quadratic form. Therefore, under the outcome of these tests, it seems fair to say that the hypothesis of the

logarithmic form should be rejected in favour of the quadratic form, which is more adequate to explain the variance of the migration flows.

Alternatively, due to the fact that unemployment rates over 15% are concentrated along a few years at the end of the period under analysis, it is also possible that the introduction of the square of the origin unemployment rate variable would be acting as a proxy for some peculiarity of these years. During these years of deep crisis, migration could have been seen as a very risky decision, so that fewer people might have been considering it as a likely option. If this were the case, then $U(i)^2$ would be a proxy for the economic crisis, and, consequently, would have a different interpretation to the one given above. To test this possibility, we can use the results obtained with the set of year dummies, as the role of these dummies is precisely that of capturing certain macro events. Although some of the dummies, those reported in the tables, are statistically significant according to their respective t-tests, they are mainly located among the early years of the period. In any case, the sign, point estimate and significance of the economic variables, including those of $U(i)^2$, were not affected at all.

The first possible explanation concerns the search-intensity of the long term unemployed.

As the unemployment rate for Spain has been increasing, the composition of the unemployment pool has shifted towards the long term unemployed. Of the total number of unemployed, **56.8%** of them had been unemployed for over **12** months in the last quarter of 1985, while in the same quarter of 1976 this percentage was just **17.5%**. Therefore, the increase in the proportion of the long term unemployed, combined with this lower search-intensity could explain the significance of the coefficient of $U(i)^2$.

This explanation has, however, two drawbacks. The first one is that, a priori, there is no reason to expect a change in the attitude towards the intensity of search on the side of the unemployed across regions, other than that derived by the different composition of the unemployment pool, in relation to the own regional unemployment rate. It means that the coefficient of the variable $U(j)^2$ had to be also significant. And this is not the case. On top of

that, Alba-Ramírez and Freeman (1990), in a work based on a survey of the labour force activity in Spain in 1985, discarded the existence of an adverse impact of long term unemployment on job-finding, as they found that the hazard rates linking the chances of job finding to duration of unemployment were constant[21]. The way around these drawbacks is by assuming that the long term unemployed will prefer to concentrate their job search efforts in their own regions. This is compatible with the coefficient on $U(i)^2$ being negative and also compatible with $U(j)^2$ not being significant as the search-intensity of the long term unemployed should not be lower.

The second possible explanation for the lower impact of the unemployment rate of the region of origin as it increases relates also to the composition of the unemployment pool but from a different point of view. As the unemployment rate has increased in Spain, the proportion of unemployed who are head of households has declined from **31.6%** in 1977 to **26.7%** in 1985. This means that secondary workers within a family are now a larger fraction of the unemployed. This group is mainly formed by spouses and young people. With respect to spouses it seems clear that family ties prevent them from being active job-seekers in locations which are far from the family residence. For the young people, on the other hand, this family tie seems to be less obvious. However, in this respect, the proportion in Spain of unemployed youth living at home has substantially increased, which, probably, is due to a greater economic dependence on the rest of the family and, therefore, they are less able to afford the financial costs of moving and settling down in a different region, so that they will not be so much interested in searching for a job in a different region. In any case, the search intensity of both groups for a job in the own region is not affected, so that there is no reason for $U(j)^2$ to be significantly different from zero.

The two reasons given above for considering that the unemployed are less intensive in their search for a job in a different region to that of their own residence are in fact related if we take into account that the compositional shift of the unemployment pool towards non-household heads affects also the long term unemployment. Again, Alba-Ramírez and Freeman (1990) conclude from their study of the survey of the labour force in Spain in 1985 that the long term unemployed are mainly secondary workers (women, older workers and non-household heads) arguing that the family acts as a form of unemployment insurance

for this group of people.

From the empirical point of view, the data also seem to support the hypothesis of secondary earners in a family being less likely to search for a job outside the region. With respect to young people (less than **25** years old), in 1970 they represented **51%** of migrants, and this percentage dropped to just **46%** in 1986. For women, although their share of migration hardly moved, it just went up from **48.5%** in 1970 to **50%** in 1985, this increase did not keep pace with the increase in their participation rate in the labour force, which was **23.7%** in 1970 and went up to **29.4%** in 1980.

Therefore, we can conclude that, as the unemployment rate rises, there seems to be a compositional shift of the unemployed which make them less intensive in their job search out of their own region, though equally intensive in it. Nevertheless, this point is difficult to test empirically, specially within the present framework of analysis, as the bilateral flows between regions are not disaggregated by any category of migrants at all[22].

4.5.3 Analysis of stability of the coefficients

Finally, the last point to comment on this section refers to the stability of the coefficients estimated. The period used in this analysis is a very large one. It covers 24 years with certainly important social changes in Spain, such as the end of the dictatorial regime and the instauration of democracy and the political decentralization, together with also important changes in the economic relationships between the various agents, such as those in the context of the labour market, for example. For that reason, we have split the sample in the middle in order to check the existence of some structural change in the economic determinants of internal migration. Consequently, the first sub-period goes from 1963 till 1974, i.e. the first 12 years of the period and 3222 observations, while the second sub-period goes from 1975 till 1986, i.e. the last 12 years and 3254 observations[23]. This seems to be an appropriate division of the whole period as it was in the mid seventies when the change in the political system took place in Spain.

Table 4.8 shows the results obtained for this purpose. The first two columns correspond to two independent regressions fitted for each of the sub-periods indicated. Using these results, we have run an F-test on the stability of each of the 272 coefficients of the flow dummies, and also on the coefficients of the rest of the variables considered, assuming that they have been obtained from independent samples. Then, we have imposed constancy on those coefficients which do not change from the first sub-period to the second (at the 5% level of significance). Equally, we have allowed the rest of the variables to change their coefficients between the two sub-periods indicated. The economic variables and the trend variable are among the latter. Finally, we have fitted one single regression for the whole period but with a number of dependent variables noticeable increased up to 372 (350 flow dummies, 13 economic variables, 2 trend variables and 7 year dummies significantly different from zero) plus a constant. The results obtained from running this single regression are reported in the last two columns. The column on the left of these two corresponds to the coefficients of the variables for the first sub-period and the column on the right to the coefficients for the second sub-period, but all of them have been obtained within the same regression.

Let us start with the first two columns of this **Table 4.8**. The first thing to notice is that some of the results are a bit puzzling. For example, the unemployment rate of the region of origin has the "wrong" effect on migration, as its coefficient is negative, during the first sub-period. Nevertheless, in the final years, this sign is corrected, and also the coefficient on $\mathbf{U(i)^2}$ becomes significant, and with a negative sign. With respect to the unemployment rate in the region of destination, it is significant and with the expected sign in both sub-periods. The coefficient obtained is larger, in absolute value, in the first years, indicating that it has become a less important determinant of interregional migration flows.

Equally, the relative wage variable has the "wrong" sign in both periods, although it is not significantly different from zero in the first one. This means that migration flows are independent of regional wage differences in the first period, and also that people tend to go to those regions with lower wages during the second period. Therefore, in this case there is also a perverse wage effect as that found by Jackman and Savouri (1991). Nevertheless, the coefficient of the change in relative wages, or the difference in the rate of growth of regional wages, is negative and significant in both periods, indicating that the wage

effect is not that "perverse".

It is also important to notice also that the relative employment growth variable has no effect on interregional migration flows during the last 12 years of the period under consideration. Finally, there is also a reduction in the coefficient of the trend variable, reflecting somehow the lower intensity of the migration flows during the last years of the period analyzed here.

We are not going to extend the analysis of these results as we think that they are inferior to those reported in the other half of this table. The results reported in the last two columns of the table correspond to the fit of a single regression, and have the advantage that some extra information have been used (about the coefficients that do not change over the period) to get them. Consequently, we are able to withdraw some irrelevant variables and our estimates will gain in precision. Therefore we think that these results are more adequate to analyze the question of the stability of the coefficients, and we are going to concentrate on them.

The first thing to note is that some of the coefficients are not statistically different from zero. Among those, we find the coefficient of $\mathbf{U(i)^2}$ for the first years. This results is hardly surprising as the unemployment rates during that time remained at relatively low levels. The coefficient on the employment growth variable for the second sub-period is also not different from zero. In this case, the reason for that lies in the fact that this period corresponds to the period of the economic crisis, and employment growth was, if positive, very limited in all regions. In particular, as it was already analyzed in **Chapter 1**, the estimated annual growth rate of regional employment was negative for all regions during the period 1977-1985 (**Table 1.8**).

In this regression, we have allowed for a change in the coefficient of the overall migration rate variable. However, the results show that there is not an structural change in the effect of this variable, as the test on the equality of the coefficients gives an F-value of **0.05**. Furthermore, both coefficients are statistically equal to one at the 5% level, as the theory indicates. On the other hand, the trend variable shows an statistically significant

reduction in the coefficient (as given by the F-value), going from **0.077** in the first sub-period to **0.062** in the second one. This result is related to the contraction of the migration flows during the last years.

With respect to the unemployment variables we can see that there is a change in all the coefficients (the corresponding F-values are reported at the end of **Table 4.8**), which means that, effectively, there is a structural break in the people's response to these variables in the present context. Starting with the unemployment in the region of origin **U(i)**, there is an important change, as during the first years the coefficient is negative and significant, turning to be positive and significant in the second half of the period. Following the job-hiring model we propose here, this negative sign means that unemployed people are less intensive in their search for a job in a different region. It shows a change in the attitudes of the people which is of great relevance. As Olano (1990) has pointed out, the migratory movement during the 60's is mainly a rural-to-urban phenomenon. According to it, people moved to a different region not only to get a job, but also to get a more stable and better paid job. It means, that currently employed people were actively looking for jobs out of their regions. This is consistent with the negative sign found for the unemployment rate in the region of origin during the first sub-period. In the second sub-period, the sign on **U(i)** is positive and the coefficient of $\mathbf{U(i)^2}$ is negative and significant, which is in accordance to what was found when no structural change was allowed (**Tables 4.5 and 4.6**) so that we will not extend now any more, as the comments already made in the previous sub-section apply also here.

The coefficient of the unemployment rate in the region of destination takes a negative sign in both periods, as should be expected according to the theory. It implies that those regions with high unemployment are less attractive to migrants as the competition to fill a vacancy will be harder. Despite the sign being the same in both periods, i.e. negative, there is also an structural change in the effect of this variable. In this case, the effect on migration is much smaller, in absolute value, in the later years, which means that people are now less worried about the degree of competitiveness when looking for a job, probably because of the high unemployment rates everywhere. Alternatively, the existence of return migration flows could have also induced a reduction in this coefficient[24].

The analysis of the effect of the wage variables on interregional migration is more complex in this context, specially because it turns out that the coefficients on relative wages are positive and significantly different from zero in both sub-periods, showing a significant "perverse" effect. However, the coefficients of the difference in growth rates of regional wages are negative in both periods. We have tried instrumenting relative wages using as instruments this variable and relative employment lagged, in case there were a problem of simultaneity. But the results are not significantly different, so that we have reported those obtained with O.L.S.. It is possible that this particular results could be related to the timing of the structural change. From **Figure 4.4** we can see that it is in the decade of the 70's when the reduction in the wage inequality index took place. By considering 1975 as the year of the structural change, we are breaking into two this period of high variability in this variable, so that we are left with two sub-periods with a much less reduced variability in relative regional wages. This problem is more acute in the second period, as the coefficient of this variable is positive and much larger. However, it is likely that this effect appears as a consequence of the presence of return migration flows. This is not inconsistent with the obtained negative sign of the difference in growth rates. In this respect, it is worth mentioning that wages are more homogenous in the 80's than in the 60's in Spain, as it is shown by the coefficient of variation in **Figure 4.4**, mainly as a consequence of the change in the way wages were negotiated. After 1977, the negotiations took place for some years at a national level between the main trade unions and the main confederation of employers, with the presence of the Government in some cases. This process towards a greater homogeneity of wages implies that regions with lower wages experienced a greater rate of growth. Therefore, if some of the migrants are returning to their regions of origin, which initially had lower relative wages, it means that they are going to regions with higher rates of growth. This way, the wage effect as a whole during the second period could explain the return migration and the reduction in the net flows that has taken place since the mid-seventies.

With respect to the structural break in the wage variables we see that, from the F-values reported at the end of **Table 4.8**, there is a clear change in the coefficient of the relative wage variable. However, this break is not that clear in the case of the coefficients of the change of relative wages. With an F-value of **4.59**, the estimated coefficients for the two sub-periods are statistically different at the 5% level, but not at the 1%. Furthermore, if we

consider the presence of an structural break for the full effect of current relative wages on migration, which would be given by the sum of the coefficients of the two wage variables considered, then it appears that we reject the hypothesis of an structural break.

Finally, employment growth loses its effect on migration in the later years of the period. During the first years it has a negative and significantly different from zero coefficient, as already expected according to the theory, indicating that people prefer those regions where there are better chances to get a job, as far as employment growth is acting as a proxy for vacancies. The lack of any effect in the second period is probably due to the behaviour of this variable during the economic crisis, as has been said earlier.

It is clear that there is a structural change around the mid-seventies in the migratory movements. However, this results should not be surprising at all for various reasons. In the first place we have that 1975 saw the death of Franco, putting an end to the dictatorship, and starting the transition towards democracy. Furthermore, in the following year, 1976, Trade Unions became legal. Although all this process of transition was relatively easy and quick, it originated undoubtedly a number of social changes.

Together with these political and social changes, there is also a considerable structural change from the economic point of view. This change is not only the consequence of the economic crisis that took place worldwide during the seventies. The model for economic growth applied during the seventies in Spain was no longer sustainable, so that it broke down. This model of growth was based on an industrial sector which was dedicated mainly to basic and consumer goods, and lacking a general structure for the production of intermediate products (Segura, 1983). On top of that, there was an extreme fragmentation of the production process, with a number of small firms and businesses (Donges, 1984). Despite having relatively high production costs, firms survived because of relatively low labour costs and also because of the highly protective system from outside competition. According to Fina (1987), the breakdown of the model took place because of the saturation of domestic demand, the decline of unskilled labour force and "the loss of power to control the labour force". Of course, the international economic crisis after the oil shocks made things even worse for the Spanish economy.

The change in the coefficients of the economic variables affecting migration that we have found in our analysis could reflect these two kinds of structural breaks in the Spanish society. However, as Olano (1990), among others, have pointed out, there is a genuine change in the behaviour towards migration followed by the migrants. During the sixties and the first half of the seventies it is possible to find the main characteristics of the rural-to-urban migratory movements. This way, migrations are intensely polarized, with clearly delimited areas of out-migration and areas of in-migration, and mainly unidirectional flows. From that moment on, there is a considerable reduction in the net rates of migration between the different regions in Spain. There is also a change in the sign of these net migration for some regions, with a considerable increase of the return migration. All these things seem to indicate that the traditional system of rural-to-urban migratory movements have come to an end in Spain during the last years of the period considered in this analysis. This change in the system of migration is a consequence, at least to a certain extent, of the change in economic structure, with a service sector being the most important in the economy and a declining industry. But it is also a consequence of the general increase in the levels of education and skills of the labour force.

Therefore, the structural break we have found in our analysis of migration is fully consistent with all the changes that have taken place in Spain during the decade of the seventies. In particular, the changes in the coefficients related to the unemployment rate variables could be explained taking into consideration the change in the system of migration. Recall that the unemployment rate in the region of origin has a negative impact on migration, with a coefficient of **-0.051**, during the first sub-period (1963-1974) and a positive one, with a coefficient of **+0.06**, in the second. Similarly, the unemployment rate in the region of destination has a much lower effect on migration in the last years of the period, as the coefficient goes from **-0.109** to **-0.033**. In the rural-to-urban system, one of the main characteristics is that the migrants are not necessarily unemployed when they move out of the rural areas. This can help to explain the negative sign of **U(i)** during the first years, as seen earlier, but it can also help to explain the larger impact unemployment rate in the region of destination have during these years as these people move from job to job in different areas (the construction sector served as a "bridge" for them) and they could be poorly placed to compete for a job if they have not secured it beforehand, due to the lack of skills or

qualifications. This effect disappears as the general level of education increases everywhere and becomes more homogenous.

4.6 CONCLUSIONS

In the present chapter we have done an empirical study of the migration phenomenon within Spain using data of the migration flows among the 17 regions from 1963 till 1986.

From the analysis carried out here, it seems clear that interregional labour mobility responds to regional labour market variables: unemployment rates, wages and employment growth. In particular, according to the results reported in the last column of **Table 4.5** it does so in a way which suggests that:

1) High unemployment rate in a region tends to increase out-migration because the unemployed search more actively than the employed. This is so with the qualification that for unemployment rate higher than a certain value, there is a relative reduction of this effect.

2) High unemployment rate in a region also tends to discourage in-migration, but without the qualification expressed in the case of out-migration.

3) People prefer to search for jobs in those regions where wages are growing at a relatively higher rate.

4) Regions where employment growth is relatively larger will be more likely to end up with a larger number of in-migrants. If we accept that employment growth is a sufficiently good proxy variable for the vacancy rate, then it is interesting to note that, as commented earlier, both the vacancy rate and the unemployment rate enter the equation and are significant because they play different roles in the process of interregional migration, derived from the view of this process as a particular case of the hiring function.

These general results can be said to be fairly robust, at least in terms of the direction of the effects, as they also hold when the sample is divided by the middle in order to test for stability of the coefficients. In this respect, our results confirm the existence of a structural break in the interregional migration flows, as there is a change in the magnitude of

all the coefficients of the economic variables. However, this is consistent with the evolution of the Spanish political and economic situation, in the sense that in the mid-seventies there is not only a change of the political situation, but also a breakdown of the economic relationships. Although there is effectively a change in the estimated coefficients, it does not invalidate the general results described earlier apart from a couple of qualifications. In the first place the unemployment rate of the region of origin has a negative effect on migration during the period 1963-1974, which can be explained as a consequence of the rural-to-urban system of migration. Secondly, relative employment growth has no statistically significant effect on migration during the period 1975-1986. This lack of any effect can be attributed to the situation of economic crisis which led to negative changes in employment in most of the regions during this period.

However, in the case of Spain, this process has not prevented the increase of the regional differences during the last years, and the migration rate has been falling down when apparently it was more needed to help with the differences. This study suggests that this is due to several factors. In first place, when the rate of unemployment is really high, as it is the case of Spain and its regions during the 80's, the unemployed are less intensive in their search for a job out of their region of residence. This topic of the different search intensity according to the characteristics of the unemployed and also to the distance of the potential job is a very interesting one, which deserves some further research, although in a more general framework than the present one, which is restricted to interregional movements of the labour force.

A second reason lies in the fact that migrants take the rate of growth of regional wages into consideration. Therefore, as long as a process of geographic homogenization of nominal wages has taken place, there have been incentives for people to migrate back to their regions of origin. However, in relation with the effect of regional wages on migration it is important to mention the lack of significance of the variables that reflect the differences in the regional cost of living, which seems a bit surprising.

Finally, when explaining the fall in the interregional movements over time we cannot forget the general lack of vacancies, as proxied by employment growth, leading to a

fall in the incentives to move to different region or to search for jobs elsewhere. In fact, regional employment growth also has a significant effect on migration, despite not having been found so by Bentolila and Dolado (1991), in what seems to be a better way to capture employment opportunities than the regional unemployment rates, which was the role assigned to them by the human capital approach. In this case, the data seems to support the job-hiring based model described here in the new interpretation given to regional unemployment, when asserting that it means that unemployed are more intensive in the search for a job, so that regions with high unemployment are expected to have high out-migration and low immigration.

In general terms, we can assert that although there are some points which require some further investigation in order to clarify the effect of the economic variables within the framework of this approach, at least when applied to the case of Spain, the analysis carried out in this chapter indicates that there some grounds to believe that the job-hiring model is a good approach to understand the process of interregional migration of the labour force in Spain.

ENDNOTES

1 The process of decentralization has been gradual along the years. Furthermore, not all the Autonomous Communities have gained access to the same level of competencies being transferred at the same time.

2 Following Pissarides and McMaster (1990), p. 816, the index in the case of relative unemployment rates is:

$$100\left[\sum \frac{L_i}{L}\left(\ln\frac{u_i}{u}\right)^2\right]^{1/2}$$

3 They have been already reported in the first chapter of this thesis.

4 Actually, the model by Jackman and Savouri is earlier than the one described in **Chapter 3**, and our model came as a consequence of the need to address some of what we consider weaknesses shown by the former.

5 Herzog et al. (1993) review what they consider the most representative studies published over the past fifteen years on this topic.

6 They also tried unemployment rates in conjunction with wages to construct a variable to measure expected earnings differential, in a similar way to the specification of Harris and Todaro (1970); but this variable turned out to have a coefficient which was not statistically significant.

7 The first two elements would be incorporated into the probability of being in search during a specific period in a particular area, while the other two elements (competition and acceptance) are, respectively, the conditional probabilities 2) and 3) described earlier.

8 This characterization of group of people within the labour market is somehow disturbing from the point of view of the statistics, which only count as unemployed those who are actively looking for a job.

9 The source of the information contained in these matrices is the "Statistic of Residential Variations", which is elaborated from the data provided by the local councils about people that register as new residents and those that cease to be so.

10 In fact, this is not a bad approximation as those people within the labour force are more likely to notify the change of place of residence. At least in Spain, it is generally required to produce a certificate of residence in order to register in the local unemployment office, which is the one that centralizes all the legal job-hirings.

11 Apparently, this is due to the way the data are collected. These figures are obtained from the Statistics of Residential Variations, without taking into account those

variations notified directly through the census.

12 Had the dependent variable been the gross migration flows, then we should have taken into account in estimation that they are always positive. But the **Ln(Mij/Li)** can be either positive or negative.

13. He also mentions a paper by Rogers (1989) with the significant title of "Requiem for Net Migrants".

14 In the case of País Vasco, the dynamic of the migration flows to and from it is deeply affected by the increase in the terrorist attacks.

15 This is the procedure followed by Bentolila and Dolado (1991).

16 This system started in 1977 with the "Moncloa Agreements", but along the 80's it went on loosing relevance as one of the main Trade Unions dropped out of these negotiations. By 1985, this system had lost all its significance.

17 In this respect, there is an important difference between Spain and the U.K. It lies in the fact that there is not a housing market policy by the Spanish local councils, generally speaking.

18 As commented earlier, although the database contains information from 1962 till 1986, the first year is lost when the employment growth variables are created. Furthermore we have to take into account that in a few cases there are no people moving between certain regions. Therefore, of the 6528 observations contained in the 24 years, the sample size is reduced to 6476 data points.

19 The change in the relative wage variable is approximately equal to the difference in the rate of growth of wages of the regions involved in the flow as:

$$\ln\left(\frac{W_i}{W_j}\right)_t - \ln\left(\frac{W_i}{W_j}\right)_{t-1} = \ln\left(\frac{W_{it}}{W_{it-1}}\right) - \ln\left(\frac{W_{jt}}{W_{jt-1}}\right) \approx \frac{W_{it}-W_{it-1}}{W_{it-1}} - \frac{W_{jt}-W_{jt-1}}{W_{jt-1}}$$

20 Strictly speaking, the third specification should be the preferred one because it contains a fewer number of explanatory variables and, therefore, it is more parsimonious.

21 This result is in contrast to what has been obtained by Schmitt and Wadsworth (1990) for the U.K., as they found that the degree of job search of the unemployed declines with duration.

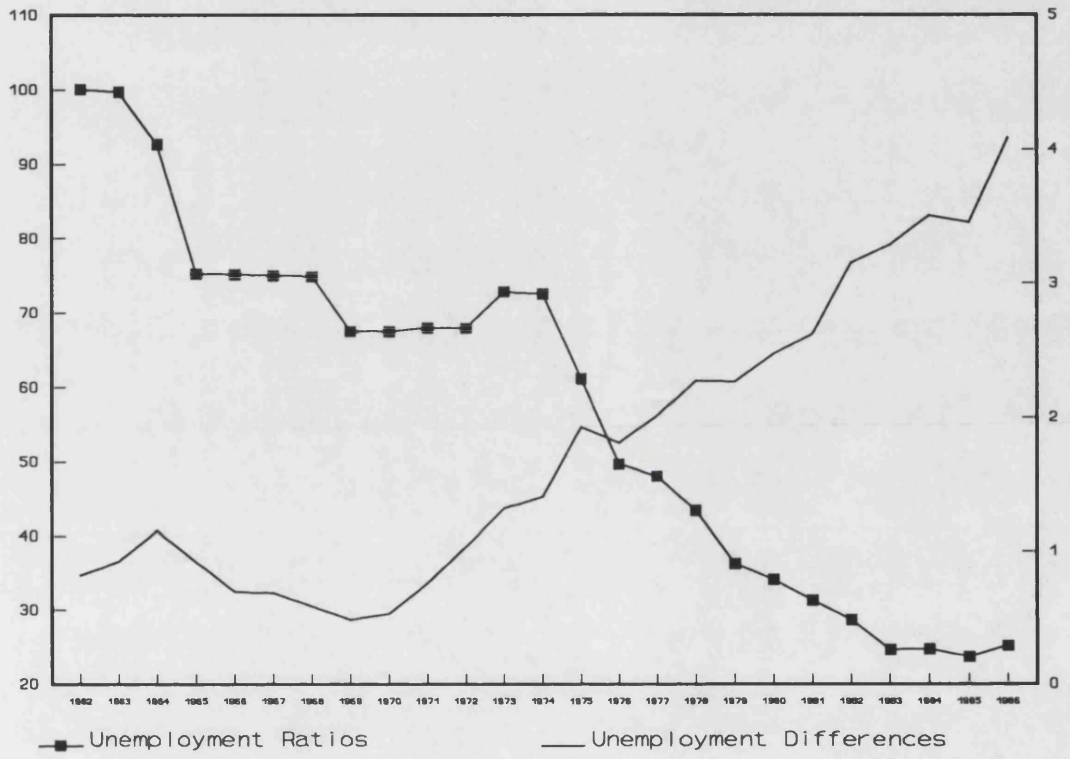
22 Since 1987, the Labour Force Survey includes a question, only in the questionnaire of the second term, about the place of residence during the previous year. It could provide an alternative source of information which could allow to test this hypothesis.

23 Although the theoretical number of observations for each period is 3264, in the first sub-period there are 42 "missing" migration flows, i.e. cases in which there are no migrants between certain regions. In the second sub-period, the number of "missing" flows is just 10.

24 For an analysis of the characteristics of the migrants that return to their place of origin see, for example, DaVanzo (1983) and Morrison and DaVanzo (1986)

-FIGURE 4.1-

UNEMPLOYMENT INEQUALITY INDEX



Notes:

(1) The inequality index for the relative unemployment rates is measured along the Y-axis on the left. It has been calculated according to

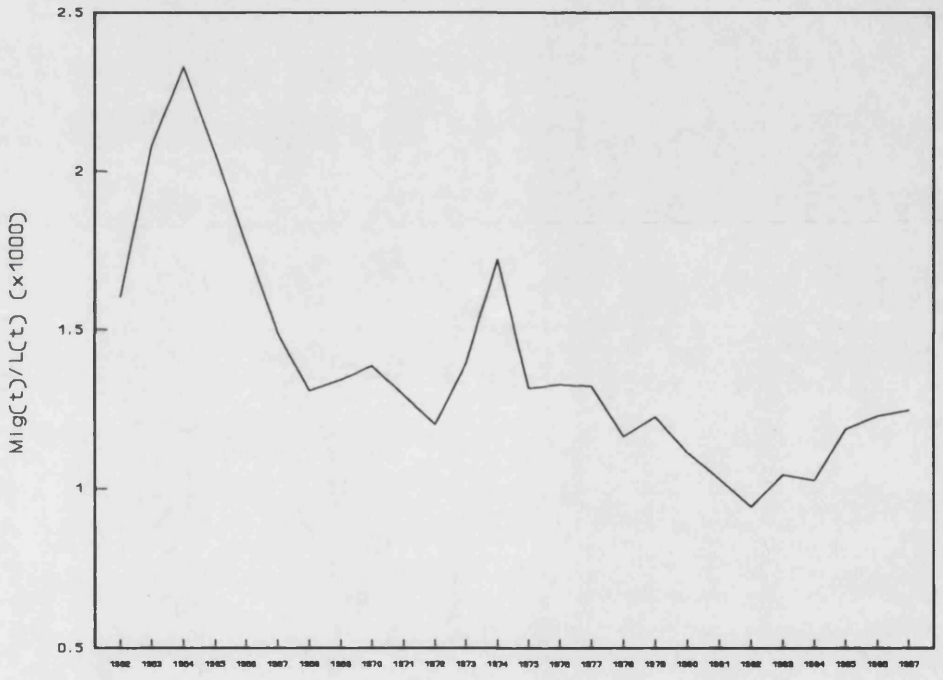
$$100\left[\sum_i \frac{L_i}{L}\left(\ln\frac{u_i}{u}\right)^2\right]^{1/2}$$

(2) The inequality index for the absolute difference in unemployment rates is measured along the Y-axis on the right. It has been calculated as

$$\sum_i \frac{L_i}{L}\,|u_i - u|$$

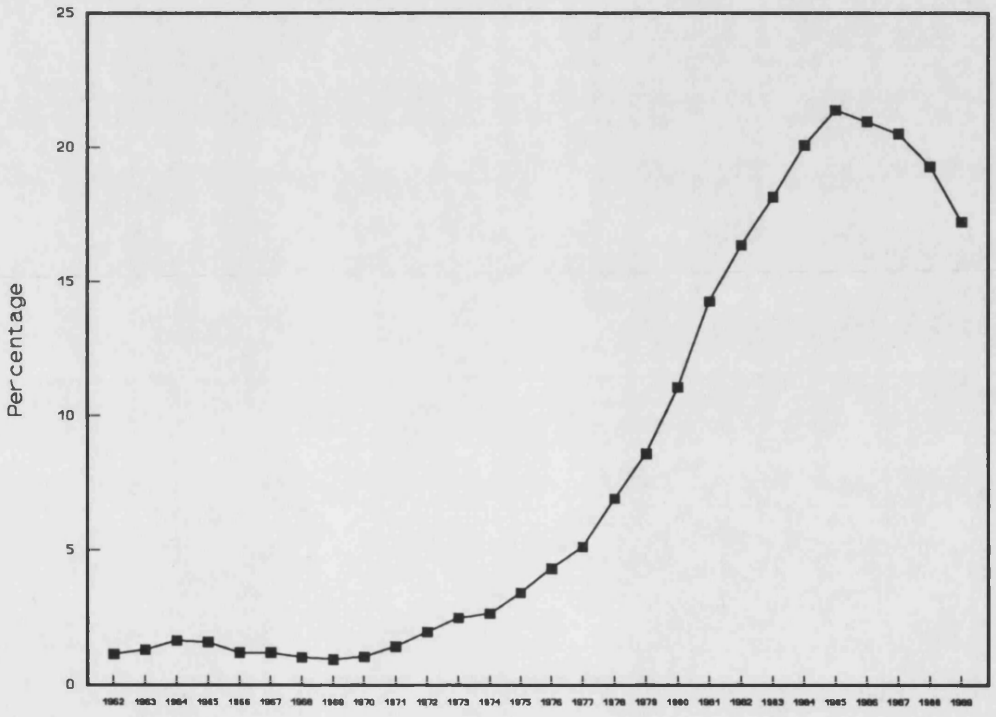
-FIGURE 4.2-

INTERREGIONAL MIGRATION RATE



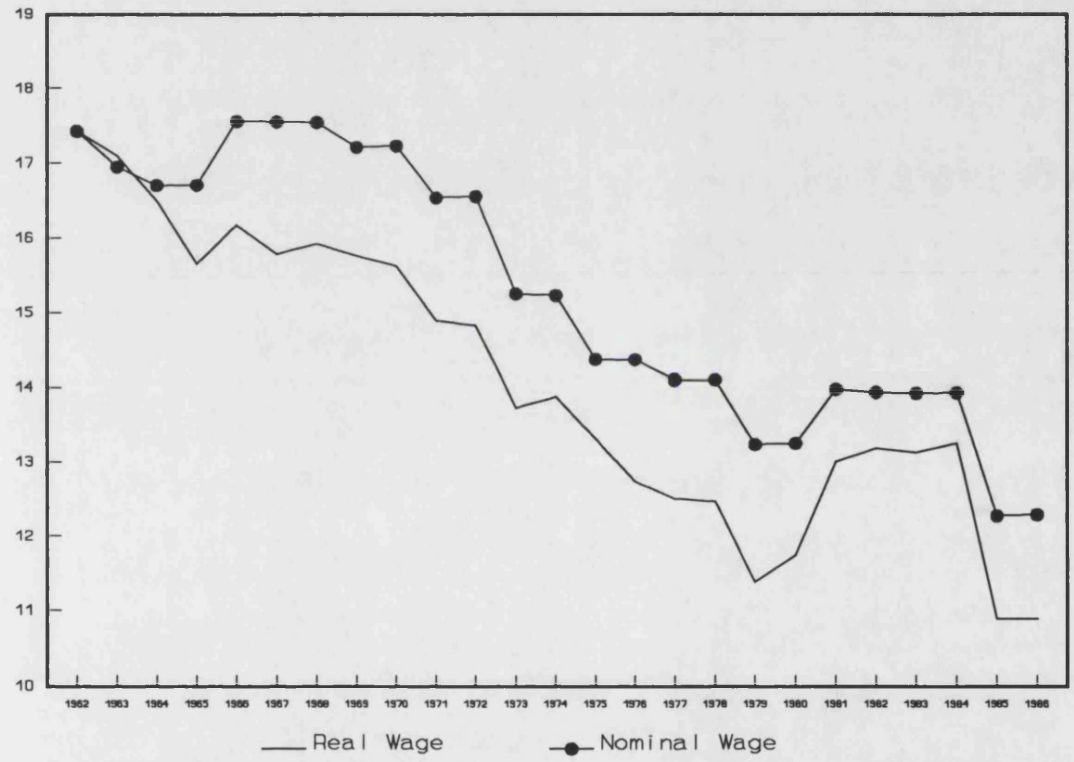
-FIGURE 4.3-

UNEMPLOYMENT RATE



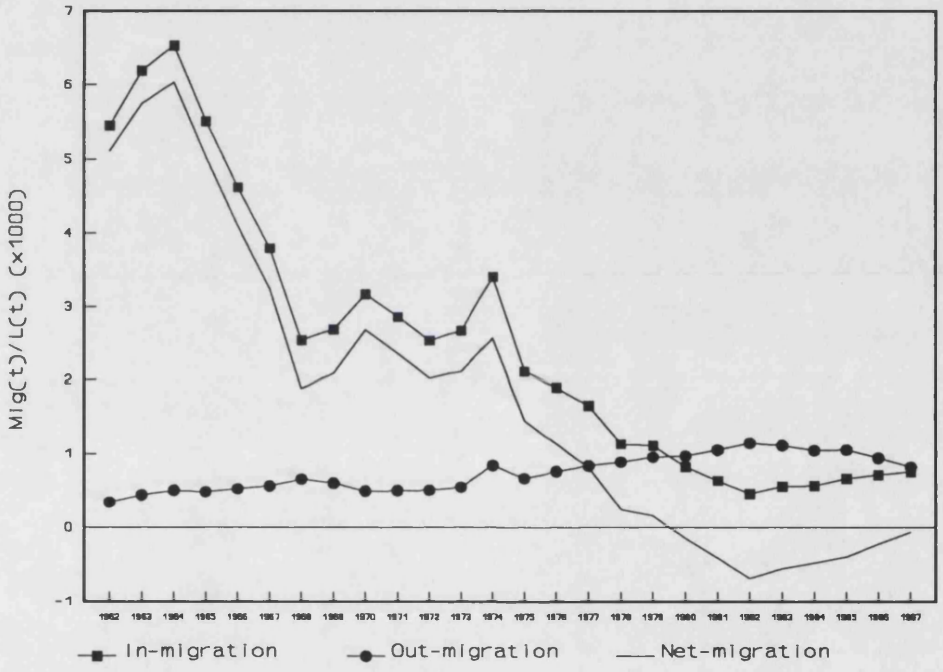
-FIGURE 4.4-

WAGE INEQUALITY INDEX



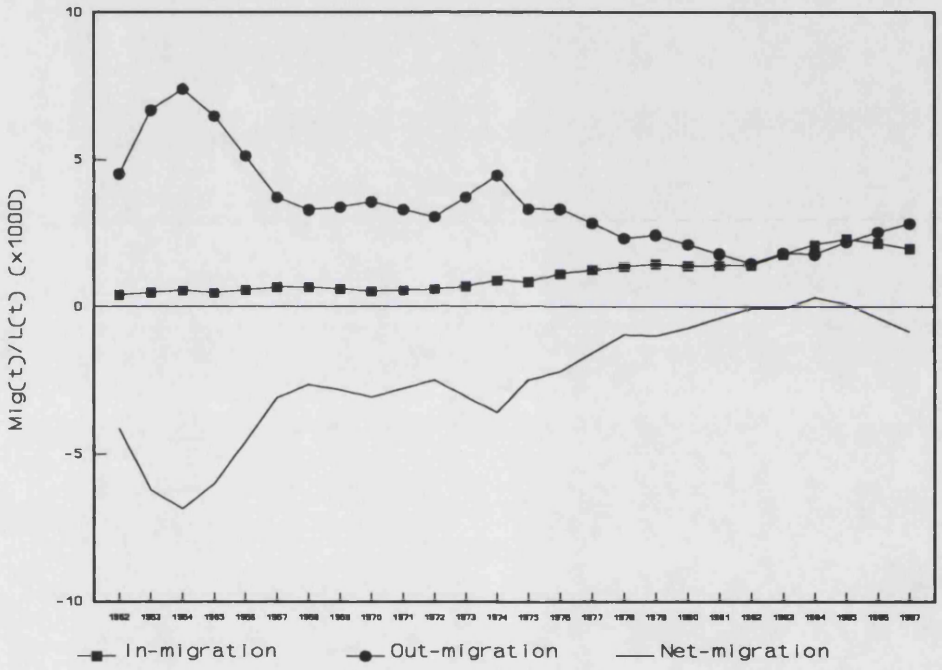
-FIGURE 4.5-

MIGRATION RATE: CATALUÑA



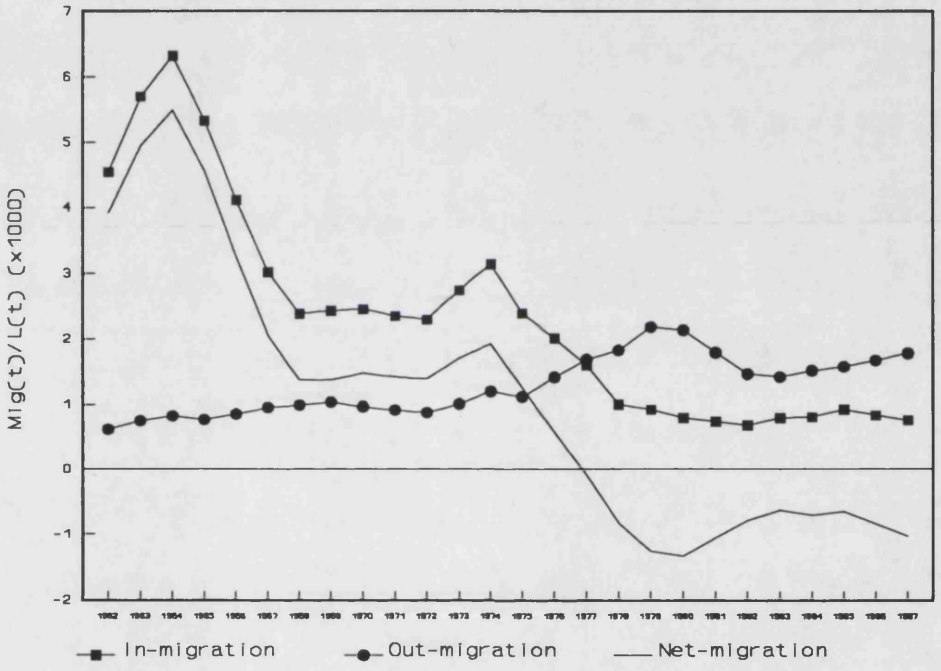
-FIGURE 4.6-

MIGRATION RATE: CASTILLA-LA MANCHA



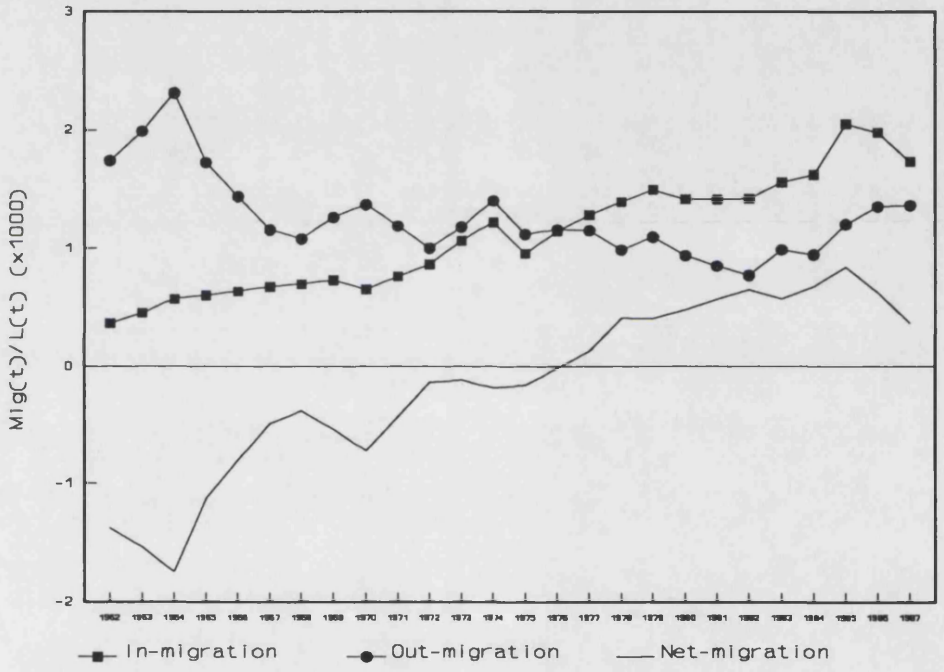
-FIGURE 4.7-

MIGRATION RATE: PAIS VASCO



-FIGURE 4.8-

MIGRATION RATE: MURCIA



-TABLE 4.1-

REGIONAL UNEMPLOYMENT RATES FOR SELECTED YEARS

	1965	1970	1975	1980	1985	1989
ANDALUCÍA	4.15	2.38	8.36	16.37	29.16	27.02
ARAGÓN	0.88	0.74	1.64	8.22	16.89	12.06
ASTURIAS	1.04	0.86	1.78	8.45	18.04	17.81
BALEARES	0.49	0.16	1.45	7.64	13.46	10.66
CANARIAS	1.72	0.63	5.72	12.46	25.66	21.51
CANTABRIA	0.51	0.36	1.68	6.98	15.48	17.83
CASTILLA-LEÓN	0.97	0.64	2.01	8.67	19.16	16.66
CASTILLA-LA MANCHA	0.75	0.30	5.15	10.52	15.62	14.10
CATALUÑA	1.45	0.81	1.73	11.59	21.62	14.28
VALENCIA	1.28	1.13	2.26	9.51	19.98	15.37
EXTREMADURA	2.25	1.25	4.67	13.64	26.90	26.42
GALICIA	0.58	0.59	2.67	4.54	12.44	12.07
MADRID	1.25	1.33	2.77	12.36	21.12	13.25
MURCIA	2.37	1.82	4.91	9.50	18.88	16.17
NAVARRA	0.31	0.23	3.28	10.72	18.76	12.75
PAÍS VASCO	0.35	0.43	1.48	12.30	22.93	19.59
LA RIOJA	0.29	0.18	0.96	5.07	16.45	10.10
SPAIN	1.59	1.05	3.43	11.09	21.40	17.24

Source: Banco de Bilbao

-TABLE 4.2-

REGIONAL OUT-MIGRATION RATES (‰) FOR SELECTED YEARS

	1962	1965	1970	1975	1980	1985
ANDALUCÍA	1.10	1.34	0.91	0.69	0.29	0.27
ARAGÓN	0.84	0.92	0.74	0.53	0.43	0.48
ASTURIAS	0.17	0.23	0.19	0.29	0.28	0.34
BALEARES	0.10	0.18	0.16	0.34	0.27	0.58
CANARIAS	0.06	0.09	0.14	0.25	0.33	0.34
CANTABRIA	0.38	0.49	0.35	0.41	0.33	0.42
CASTILLA-LEÓN	0.99	1.41	0.88	0.95	0.54	0.57
CASTILLA-LA MANCHA	1.68	2.43	1.37	1.24	0.63	0.64
CATALUÑA	0.14	0.20	0.19	0.26	0.37	0.41
VALENCIA	0.17	0.20	0.20	0.23	0.25	0.31
EXTREMADURA	1.56	2.55	1.82	1.75	0.56	0.57
GALICIA	0.28	0.38	0.27	0.27	0.20	0.23
MADRID	0.17	0.16	0.17	0.24	0.38	0.50
MURCIA	0.61	0.59	0.47	0.40	0.29	0.38
NAVARRA	0.49	0.51	0.41	0.48	0.47	0.50
PAÍS VASCO	0.27	0.32	0.38	0.43	0.80	0.59
LA RIOJA	0.99	0.93	0.71	0.56	0.57	0.65
SPAIN	0.63	0.80	0.53	0.50	0.38	0.41

Source: Banco de Bilbao

-TABLE 4.3-

DISTANCES IN Km. BETWEEN THE REGIONS

	ARA	AST	BAL	CAN	CNT	CLE	CLM	CAT	VAL	EXT	GAL	MAD	MUR	NAV	PVA	LRJ
Andalucía (AND)	864	786	945	1377	867	587	455	1021	669	265	940	542	536	953	864	875
Aragón (ARA)	569	501	2087	403	363	392	299	331	621	810	322	557	175	323	171	
Asturias (AST)	1070	2163	210	251	514	899	794	521	325	444	832	465	306	398		
Baleares (BAL)	2322	906	819	539	202	276	914	1228	626	518	636	824	672			
Canarias (CAN)	2163	1958	1832	2386	2046	1642	2317	1765	1913	2176	2160	2098				
Cantabria (CNT)	249	468	704	671	602	535	398	786	270	111	232					
Castilla-León (CLE)	263	662	543	322	441	193	581	327	277	235						
Castilla-La Mancha (CLM)	691	263	268	672	70	379	481	465	403							
Cataluña (CAT)	352	920	1109	621	594	434	622	470								
Valencia (VAL)	638	952	350	242	496	626	474									
Extremadura (EXT)	675	299	647	649	599	557										
Galicia (GAL)	602	990	744	631	652											
Madrid (MAD)	388	411	395	333												
Murcia (MUR)	732	783	721													
Navarra (NAV)	159	92														
País Vasco (PVA)	152															
La Rioja (LRJ)																

-TABLE 4.4-

Cross-Section Migration Equations

"Distance" Effect

Dependent Variable: Ln(Mij/Li)

No. Observations per Year: 272

Year	Ln(distance in Km.)	R-squared	R-squared (Fi;Fj)
1963	-1.64 (-12.21)	74.7	58.4
1964	-1.67 (-12.46)	74.9	58.1
1965	-1.62 (-12.28)	76.2	61.1
1966	-1.55 (-13.04)	77.7	61.8
1967	-1.56 (-12.25)	74.1	57.8
1968	-1.50 (-12.93)	76.3	59.7
1969	-1.49 (-13.28)	77.1	60.0
1970	-1.42 (-12.51)	75.6	59.4
1971	-1.34 (-13.26)	78.4	62.4
1972	-1.32 (-12.36)	75.6	60.0
1973	-1.37 (-13.07)	77.5	61.6
1974	-1.37 (-13.37)	78.4	62.3
1975	-1.33 (-13.18)	77.9	62.0
1976	-1.32 (-14.93)	80.8	63.1
1977	-1.33 (-15.13)	80.4	61.7
1978	-1.27 (-16.10)	81.8	62.1
1979	-1.34 (-15.55)	79.7	59.2
1980	-1.32 (-16.40)	81.0	59.7
1981	-1.28 (-17.65)	82.4	59.6
1982	-1.27 (-16.62)	79.8	56.5
1983	-1.40 (-16.26)	78.5	54.7
1984	-1.48 (-17.74)	82.7	59.6
1985	-1.41 (-15.75)	80.4	59.8
1986	-1.32 (-18.93)	84.0	60.0

Notes:

(1) Equations estimated by Ordinary Least Squares, using 16 origin (Fi) and 17 (Fj) destination dummies, with no constant to avoid perfect multicollinearity.

(2) t-statistics in parenthesis.

(3) The R-squared [Fi;Fj] refers to the analysis of variance when the origin and destination fixed effects are used on their own.

-TABLE 4.5-

INTERREGIONAL MIGRATION EQUATIONS

SPAIN: 1963-1986

Dependent Variable: Ln(Mij/Li)

No. of Observations: 6476

Regression with Origin (Fi) and Destination (Fj) Dummies plus Distance

Explanatory Variables	Regression 1	Regression 2	Regression 3
U(i)	-0.0023 (-0.54)	0.051 (5.6)	0.049 (5.44)
$U(i)^2$		-0.0017 (-6.63)	-0.0016 (-6.42)
U(j)	-0.0296 (-6.9)	-0.034 (-7.88)	-0.034 (-7.77)
Ln(Wi/Wj)	-1.751 (-8.07)	-1.586 (-7.29)	-1.594 (-7.32)
$Ln(Wi/Wj)_t$-$Ln(Wi/Wj)_{t-1}$	-0.644 (-2.2)	-0.665 (-2.28)	-0.668 (-2.29)
ΔN(i)	-0.0099 (-2.29)	-0.0075 (-1.73)	
ΔN(j)	0.015 (3.46)	0.0174 (4.0)	
ΔN(i)-ΔN(j)			-0.012 (-3.56)
Ln(M/L)	0.857 (7.57)	0.751 (6.59)	0.782 (6.93)
Yr	0.0842 (14.6)	0.067 (10.7)	0.068 (10.9)
YRDM65	-0.134 (-2.54)	-0.164 (-3.1)	-0.140 (-2.73)
YRDM68	0.113 (2.06)	0.109 (1.98)	0.135 (2.54)
YRDM74	-0.183 (-3.14)		
YRDM81	0.138 (2.5)		
LDIJ	-1.405 (-62.4)	-1.405 (-62.6)	-1.405 (-62.6)
R-squared (%)	74.8	74.9	74.9

Notes:

(1) Equations estimated by Ordinary Least Squares.

(2) t-statistics in parenthesis. Critical values: at 5% for one-sided test, 1.64; at 10% level, 1.28.

(3) Tests on the coefficients of **ΔN(i)** and **ΔN(j)** being equal in absolute value:

Regression 1: **F(1, 6428)=0.99**

Regression 2: **F(1, 6427)=3.67**

(4) Tests on the coefficients of **LMLAB** being equal to **1**:

Regression 1: **F(1, 6428)=1.60**

Regression 2: **F(1, 6427)=4.77**

Regression 3: **F(1, 6428)=3.75**

(5) The residuals appear to be autocorrelated, which means that the variance of the estimates is subject to some degree of error. However, it does not affect the significance of the coefficients.

-TABLE 4.6-

INTERREGIONAL MIGRATION EQUATIONS

SPAIN: 1963-1986

Dependent Variable: Ln(Mij/Li)

No. of Observations: 6476

Regression with Flow (Fij) Dummies

Explanatory Variables	Regression 1	Regression 2	Regression 3
U(i)	-0.0006 (-0.21)	0.054 (9.03)	0.052 (8.80)
$U(i)^2$		-0.0018 (-10.4)	-0.0017 (-10.2)
U(j)	-0.028 (-9.59)	-0.034 (-11.5)	-0.034 (-11.4)
Ln(Wi/Wj)	-1.739 (-11.6)	-1.57 (-10.5)	-1.57 (-10.5)
$Ln(Wi/Wj)_t$-$Ln(Wi/Wj)_{t-1}$	-0.663 (-3.28)	-0.683 (-3.41)	-0.684 (-3.42)
ΔN(i)	-0.0123 (-4.26)	-0.0086 (-2.99)	
ΔN(j)	0.0118 (4.06)	0.0153 (5.29)	
ΔN(i)-ΔN(j)			-0.012 (-5.01)
Ln(M/L)	0.727 (9.03)	0.776 (9.70)	0.823 (10.7)
Yr	0.079 (21.5)	0.066 (17.2)	0.068 (17.9)
YRDM65	-0.102 (-2.66)	-0.172 (-4.48)	-0.161 (-4.23)
YRDM68	0.097 (2.59)	0.112 (3.01)	0.134 (3.74)
YRDM69		0.067 (1.95)	0.076 (2.21)
YRDM74	-0.139 (-3.48)	-0.108 (-2.71)	-0.111 (-2.78)
R-squared (%)	88.0	88.2	88.2

Notes:

(1) Equations estimated by Ordinary Least Squares.

(2) t-statistics in parenthesis. Critical values: at 5% for one-sided test, 1.64; at 10% level, 1.28.

(3) Tests on the coefficients of **ΔN(i)** and **ΔN(j)** being equal in absolute value:

Regression 1: **F(1, 6191)=0.03**

Regression 2: **F(1, 6190)=4.20**

(4) Tests on the coefficients of **LMLAB** being equal to **1**:

Regression 1: **F(1, 6191)=11.46**

Regression 3: **F(1, 6191)=5.35**

(4) The residuals appear to be autocorrelated, which means that the variance of the estimates is subject to some degree of error. However, it does not affect the significance of the coefficients.

-TABLE 4.7-

INTERREGIONAL MIGRATION EQUATIONS

SPAIN: 1963-1986

Test on the functional form of U(i)

Dependent Variable: Ln(Mij/Li)

No. of Observations: 6476

Regression with Flow (**Fij**) Dummies

Explanatory Variables	Regression 3		Regression 4	
YHAT1		0.999 (222.5)		
YHAT2				0.999 (222.4)
U(i)	0.052 (8.80)			0.010 (3.80)
$U(i)^2$	-0.0017 (-10.2)			-0.0005 (-4.23)
Ln{U(i)}		0.0033* (0.75)	0.112 (7.67)	
U(j)	-0.034 (-11.4)		-0.032 (-13.3)	
Ln(Wi/Wj)	-1.57 (-10.5)		-1.55 (-10.4)	
$Ln(Wi/Wj)_t$-$Ln(Wi/Wj)_{t-1}$	-0.684 (-3.42)		-0.73 (-3.63)	
$\Delta N(i)$-$\Delta N(j)$	-0.012 (-5.01)		-0.0118 (-4.94)	
Ln(M/L)	0.823 (10.7)		0.792 (8.64)	
Yr	0.068 (17.9)		0.062 (13.4)	
YRDM65	-0.161 (-4.23)		-0.179 (-4.60)	
YRDM68	0.134 (-3.74)		0.147 (4.02)	
YRDM69	0.076 (2.21)		0.100 (2.85)	
YRDM74	-0.111 (-2.78)		-0.106 (-2.50)	
YRDM78			0.071 (2.16)	
YRDM81			0.076 (2.16)	
R-squared (%)	88.2	88.7	88.2	88.7

Notes:

(1) **YHAT1** are the predictions obtained from the model in **Regression 3.**

(2) **YHAT2** are the predictions obtained from the model in **Regression 4.**

(3) t-statistics in parenthesis.

-TABLE 4.8-

INTERREGIONAL MIGRATION EQUATIONS
SPAIN: 1963-1986

Test on the stability of the economic coefficients

Dependent Variable: Ln(Mij/Li)

Regression with Flow (Fij) Dummies

	2 Independent Regressions		1 Single Regression	
Explanatory Variables	**1963-1974**	**1975-1986**	**1963-1974**	**1975-1986**
U(i)	-0.072 (-2.21)	0.069 (7.81)	-0.051 (-4.3)	0.060 (8.32)
$U(i)^2$	0.0007* (0.13)	-0.0019 (-10.0)	*	-0.0018 (-9.53)
U(j)	-0.064 (-3.81)	-0.033 (-7.96)	-0.109 (-9.52)	-0.033 (-11.3)
Ln(Wi/Wj)	0.302* (1.34)	0.711 (3.42)	0.249 (2.58)	0.897 (8.25)
$Ln(Wi/Wj)_t$-$Ln(Wi/Wj)_{t-1}$	-1.24 (-4.38)	-1.74 (-8.04)	-1.09 (-4.37)	-1.78 (-8.45)
$\Delta N(i)$-$\Delta N(j)$	-0.0134 (-3.51)	0.001* (0.50)	-0.0115 (-3.35)	-0.00* (-0.0)
Ln(M/L)	0.782 (9.86)	0.902 (9.15)	0.885 (12.9)	0.911 (9.51)
Yr	0.074 (14.9)	0.056 (5.27)	0.077 (19.5)	0.062 (12.3)
YRDM65	-0.106 (-3.46)		-0.107 (-3.65)	
YRDM68	0.089 (2.79)		0.113 (3.61)	
YRDM71			0.065 (2.10)	
YRDM72	0.082 (2.27)		0.123 (3.53)	
YRDM73	0.072 (2.18)		0.101 (3.12)	
YRDM76		0.068 (2.29)		
YRDM77		0.098 (3.38)	0.072 (2.42)	
YRDM78		0.102 (3.81)	0.082 (2.91)	
No. of Observations	3222	3254	6476	
No. of Dependent Vbles.	283	282	372	
RSS	564.8	442.6	1087.1	
R-squared (%)	92.7	91.0	91.8	

Notes:

(1) Equations estimated by Ordinary Least Squares.

(2) t-statistics in parenthesis.

(3) The coefficients with an asterisk (*) are not significantly different from zero.

(4) The results of the last two columns have been obtained running one single regression for the whole period, although allowing for changes between the two sub-periods only in those coefficients that are significantly different at the 5% level. More details of the procedure that has been followed are in the text.

(5) Tests on the stability of the coefficients of the economic variables between the two sub-perods, obtained from the regression reported in the last two columns of the Table:

Variable	**F-value**
U(i)	F(1, 6103)=79.7
U(j)	F(1, 6103)=49.3
Ln(Wi/Wj)	F(1, 6103)=93.2
ΔLn(Wi/Wj)	F(1, 6103)=4.59
Ln(Wi/Wj)+ΔLn(Wi/Wj)	F(1, 6103)=0.01
ΔN(i)-ΔN(j)	F(1, 6103)=7.81

CONCLUSIONS

In the present research we have addressed several questions related to the structure and recent evolution of regional labour markets in Spain, together with an analysis of the economic determinants of the migration of the labour force among the various Autonomous Communities.

We started with a study of the employment side of the labour market. Using the sectoral structure of regional employment, we have found that the relative sectoral specialization of the regions plays a significant role in the different evolution of employment. However, when considered on its own, it turns out to be unable to explain the regional growth which took place between 1985 and 1990.

The main conclusion from this study has been that the regional economies are more homogenous, at least with respect to this dimension of the labour market, after the crisis and the subsequent recovery in employment, that started in 1985. Furthermore, idiosyncratic regional growth is responsible for the evolution of the degree of homogeneity across regions in Spain during the period considered.

In the analysis of the evolution of unemployment from 1977 till 1990 across the various regions in Spain, we obtained similar conclusions to those derived from the analysis of employment. In particular, there was an increase in the degree of geographical homogeneity not only in overall unemployment, but also in some of its dimensions such as the economic sector origin of the unemployed, sex, and also the duration structure of the unemployed. We have also found that the geographical dispersion of the unemployment rates is greater for men than for women, because of the fast incorporation of women to the labour force from 1985 onwards.

At the national level, Spain has suffered a considerable persistence of high unemployment rates. A similar pattern is present in almost all the regions, which contradicts the hypothesis that persistence is the consequence of a different timing of the economic process in the various regions.

Finally, we have been able to establish that manufacturing and services are responsible for the regional variations in the evolution of unemployment during the years of the crisis, although only manufacturing affects long term unemployment during this period.

Turning now to the question of interregional migration in Spain, we have shown that it is possible to construct a theory of migration from an approach based upon the ideas of job-search and matching, distinct from the traditional human capital theories. One of the properties of this model is that it is possible to explain bilateral flows of people with similar characteristics. The model also gives a role for regional unemployment together with regional vacancies in the same specification.

Some of the predictions of the model are that unemployment in the region of origin and vacancies in the region of destination are positively related to the migration flow, while unemployment in the region of destination affects migration negatively. Another important conclusion is that even if the regional labour markets are in equilibrium, there will be bilateral migration flows in both directions, contrary to what is predicted under human capital theories.

When this model of migration is applied to Spanish data from 1963 till 1986 we found that migration flows seem to respond to the economic variables in the way that was predicted. In order to explain the fall in the migration rates precisely when regional differences were increasing we have proposed that this is the consequence of 3 main factors

a) the presence of too high regional unemployment rates

b) the process of homogenization in the regional nominal wages that took place in the seventies with great intensity, and

c) a general lack of vacancies during the economic crisis.

We have also found the existence of a structural break in the response of interregional migration to the economic variables around the mid seventies. This is consistent with the change experienced by the entire Spanish society. But it also reflects a change in the pattern of migration followed by the Spanish people.

In the case of Spain, the data seems to support the job-hiring based model developed here as both regional employment growth and regional unemployment rates are found to be important. However, there are some problems in the results obtained. Firstly, the lack of significance of the regional cost of living. In second place is the question of the significance of the coefficient on the square of the unemployment rate of the region of origin.

Before finishing with these comments on the results obtained throughout the present analysis, it could be of some interest to mention some topics for further research, specially the part concerning the internal migration function.

With respect to the theoretical model, the analysis has been slightly simplified, mainly due to the complexity of the expressions. Therefore, the main task ahead is that of relaxing some of the assumptions in order to make the model a more realistic one. Some of these assumptions would be, among others, those of identical separations rate and identical replacement ratio across regions. Equally, it would be interesting to work out the proof of the existence of an interior solution in the case in which regional wages are not equal but within a certain range of variation.

A completely different approach to the issue would be to consider the possibility of firms behaving actively in the process of matching. It means that they would also design a strategy to search for job-applicants with different intensity in different regions. This could also lead to firms potentially "migrating" from one region to another in search of the desired workers. Although this attitude on the part of firms has not often been observed in Spain, there is some evidence in the U.K. that a significant number of firms have changed their place of operations. In this respect, Jackman and Savouri (1991) have found the "wrong" sign on their estimation of the British internal migration function, and they argue that this is due to the fact that the labour demand has moved towards regions with lower wages.

Concerning the estimation of the Spanish internal migration function, we could try to use some alternative sources of information, such as the new **E.P.A.** (Spanish Labour Force Survey), which have appeared recently and provide also some information on the kind of movements of the labour force. In particular, we could explore the differences in the

attitude towards migration of different groups of people (such as young people, women, employed people, long-term unemployed).

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