

IMF Working Paper

© 1998 International Monetary Fund

**MASTER FILES
ROOM C-525**

0441

This is a *Working Paper* and the author(s) would welcome any comments on the present text. Citations should refer to a *Working Paper of the International Monetary Fund*. The views expressed are those of the author(s) and do not necessarily represent those of the Fund.

WP/98/77

INTERNATIONAL MONETARY FUND

European I and Research Departments

**How Do the Skilled and the Unskilled Respond to Regional Shocks?
The Case of Spain**

Prepared by Paolo Mauro and Antonio Spilimbergo¹

Authorized for distribution by Jacques Artus and Peter Wickham

May 1998

Abstract

Are there any differences in how workers of different skill levels respond to regional shocks? This paper addresses that question using the methodology of Blanchard and Katz (1992) and a unique data set on working-age population, labor force, and employment for five educational groups (ranging from the illiterate to the college-educated) over 1964-92 for the 50 Spanish provinces. The paper finds that the high-skilled migrate very promptly in response to a decline in regional labor demand, while the low-skilled drop out of the labor force or stay unemployed.

JEL Classification Numbers: E24, J61

Keywords: regional unemployment, skill level, Spain

Author's E-Mail Address: Pmauro@imf.org; Aspilimbergo@imf.org

¹We gratefully acknowledge helpful comments and suggestions by Jacques Artus, Maria Carkovic, Jörg Decressin, Enrica Detragiache, Martin Hardy, Alexander Hoffmaister, Michael Mussa, Eswar Prasad, Danny Quah, Peter Wickham, Charles Wyplosz, and seminar participants in the European I and Research Departments, and high-quality research assistance by Madhuri Edwards. We are highly indebted to *Instituto Valenciano de Investigaciones Economicas* and Miguel Angel de Castro of the *Instituto Nacional de Estadística* for making data available for us.

Contents	Page
Summary	3
I. Introduction	4
II. Geographic Differences in Unemployment Rates, and Their Persistence	6
III. Potential Adjustment Mechanisms	10
IV. To What Extent Do Wages Adjust?	12
V. How Does the Labor Market Adjust to Shocks?	15
VI. Current Arrangements that Hinder Labor Market Adjustment	19
A. Labor Market Policies and Institutions	20
B. Housing Market Arrangements	23
C. Policies and Institutions in Goods and other Factor Markets	23
VII. Conclusions	23
 Text Tables	
1. Spain: Unemployment Persistence by Educational Group, 1977-92.	10
2. Spain: Real Wage and Unit Labor Cost differentials, and Their Sources	13
 Figures	
1. Spain: Unemployment Rate by Province, 1997, Second Quarter	5
2. Spain: Persistence of Unemployment, 1980-95	8
3. Spanish Provinces: Unemployment Rates, by Skill Level, 1977 and 1992	9
4. Spain: Response to One Percent Negative Employment Shock in a Given Province	17
 Appendixes	
I. Data Description	25
II. Technical Issues	26
A. Characteristics of Individual Series	26
B. Technical Issues on the VAR System	28
 Appendix Table	
3. Individual Series Average Levels and Covariance with the National Variables	27
References	29

SUMMARY

Spain is characterized by large and persistent geographic unemployment differences, which suggest that the labor market adjusts exceedingly slowly to past shocks. The present study argues that under current labor market arrangements there is no tendency for geographic unemployment differences to be reduced in the period ahead. In particular, the current wage-bargaining system tends to yield uniform wage increases across the country, regardless of local labor market conditions. With similar real wages and unit labor costs in high-unemployment and low-unemployment areas, neither workers nor capital have sufficient "price" incentives to move.

This study also analyzes how workers with different skill levels respond to local labor demand shocks. That question is addressed using a unique data set on working-age population, labor force, and employment for five educational groups (ranging from the illiterate to the college-educated) over 1964-92 for the 50 Spanish provinces. The high-skilled are found to migrate very promptly in response to a decline in local labor demand, whereas the low-skilled drop out of the labor force or stay unemployed for a long time. In other words, the results suggest that labor market adjustment is particularly sluggish among the low-skilled. Therefore, labor market and other structural policies should devote particular attention to promoting the mobility of the low-skilled.

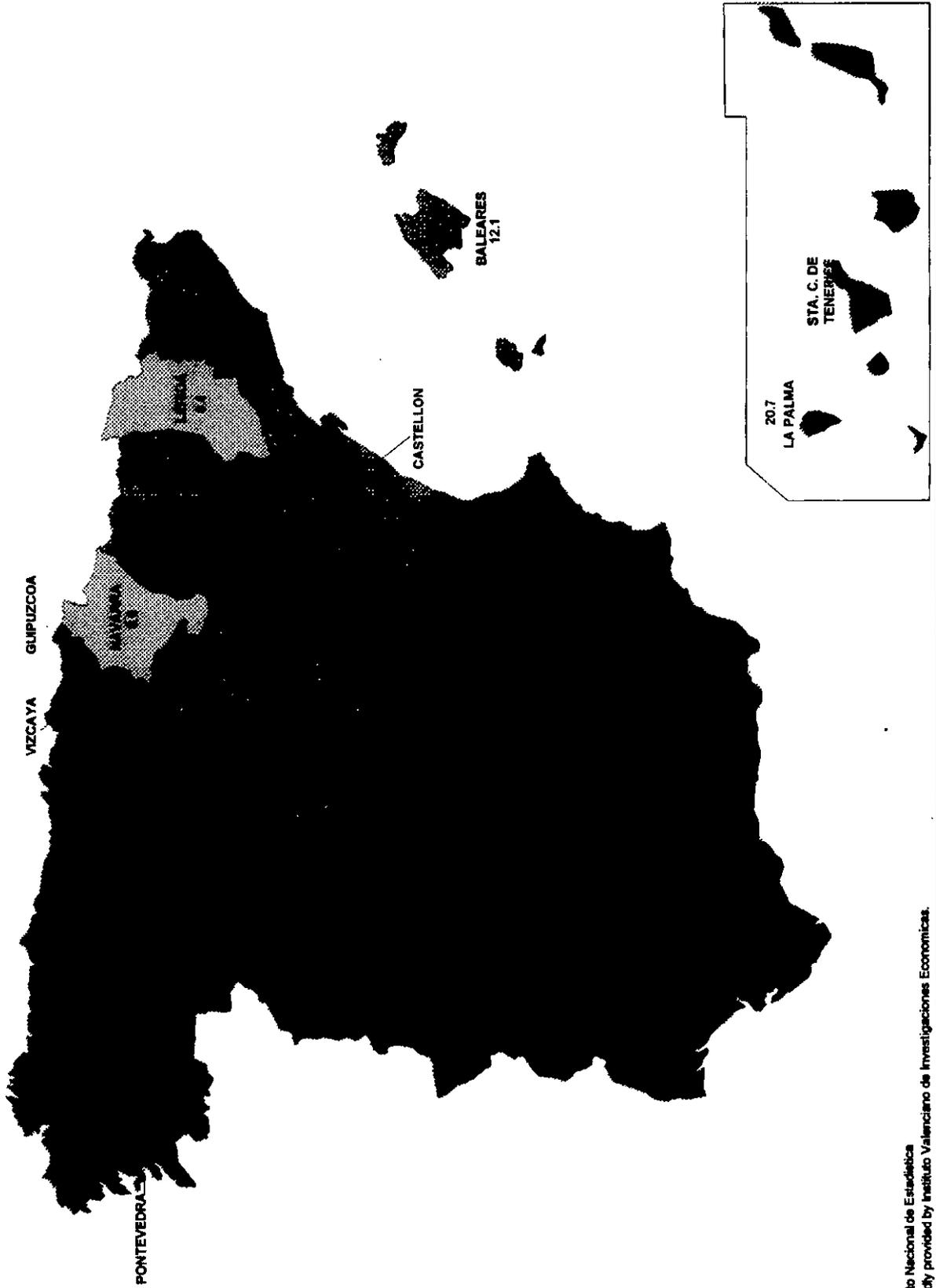
I. INTRODUCTION

Spain's unemployment rate, at a staggering 21 percent in 1997, is the highest among industrial countries. Similarly striking is the variation of unemployment rates among its 17 regions, ranging from less than 14 percent in the Balearic Islands to more than 32 percent in Andalucía. Considering a finer level of geographical disaggregation, namely that of the 50 provinces (provinces are subsets of regions), unemployment rates vary even more widely, ranging from 8 percent in Lleida, Cataluña, to 36 percent in Jaén, Andalucía (Figure 1). In addition, these differences have persisted for several years and show no sign of abating.

Such large, persistent differences in unemployment rates may be considered a problem for three reasons. First, in the early stages of a recovery, wage pressures will arise in areas with relatively low unemployment. With limited labor mobility, high unemployment in other areas will not moderate those pressures, and higher inflation may soon spread to the whole country, with no commensurate decline in unemployment. In other words, large geographic differences in unemployment rates may cause the nonaccelerating inflation rate of unemployment (NAIRU) to be higher than otherwise. Second, persistent unemployment imbalances constitute evidence that the labor market does not function properly, in that adjustment to past shocks is exceedingly slow. They also suggest that there may be scope for reducing unemployment in those areas where it is more severe, thereby lowering the nationwide unemployment rate. Third, for a given national unemployment rate, the overall human cost of unemployment may be higher if the unemployed are not distributed evenly over the country's territory. In fact, social welfare is lower if one family has two members unemployed and another has both members employed than if both families have only one member unemployed.

This study analyzes the sources of the persistence of geographical unemployment imbalances and low speed of adjustment to regional labor demand shocks. It argues that, under present labor market arrangements, these imbalances are unlikely to be corrected in the near future. In particular, the current wage bargaining system appears to be excessively centralized and to result in nationally set wages that are too high to reduce unemployment in high-unemployment areas. To support that claim, this study provides new evidence that there are no significant differences in unit labor costs and real wages between high-unemployment and low-unemployment areas, resulting in muted incentives for firms to migrate and implying that incentives for workers to migrate are only provided by differences in unemployment. This study also estimates in detail how different groups of workers (five groups sorted by skill level, ranging from the illiterate to college graduates) respond to regional labor demand shocks, and relates their respective speed of adjustment to current features of the labor

Figure 1. Spain: Unemployment Rate by Province - 1997, Second Quarter



Source: Instituto Nacional de Estadística
Map frame kindly provided by Instituto Valenciano de Investigaciones Económicas.

market. It makes policy suggestions to reduce the NAIRU and promote faster adjustment to regional shocks. It argues that the wage bargaining system should be decentralized to the individual firm level. It also suggests a number of measures that are likely to have the greatest impact on the low skilled, where the problems are most serious.

II. GEOGRAPHIC DIFFERENCES IN UNEMPLOYMENT RATES, AND THEIR PERSISTENCE

There is a wide range of unemployment rates among Spanish regions, though **patterns** in their distribution are not easy to identify. A broad generalization could be that the Southern, agricultural regions, such as Andalucía and Extremadura, and some of the Northern regions with declining industries, such as País Vasco, Cantabria, and Asturias, tend to have higher unemployment. At the same time, the geographical distribution of unemployment rates in Spain is not as straightforward as in other countries characterized by large regional differences.² In Spain, there is no clear North/South divide; there is no simple relationship between unemployment rates and proximity to the markets of the rest of continental Europe; the sectoral composition of output provides only a partial explanation for unemployment differences; and, finally, and perhaps most interestingly, the correlation between unemployment rates and GDP per capita or productivity is relatively low, as shown in Section IV.

Nevertheless, even though generalizations may not be easy, it is clear that a regional dimension of the unemployment problem exists: in fact, regional dummies explain individuals' employment status to a significant extent when controlling for personal characteristics such as age, gender, and education (Blanchard et al., 1995). In addition to the large differences among regions, there is also substantial variation in unemployment rates among provinces *within* regions. Again, it is difficult to identify clear patterns, but provinces dominated by large cities seem to have somewhat higher unemployment rates than provinces with only small urban centers.

Whatever the determinants of the geographic distribution of unemployment rates, however, there is compelling evidence that the current pattern has **persisted** for a long time. The sharp increase in unemployment experienced by the country as a whole since the late 1970s has affected all areas of the country. There have been almost no changes in the regions' or the provinces' ranking by the unemployment rate, and absolute differences in unemployment rates have widened considerably. Scatter plots of the average survey unemployment rates in 1980 and 1995 for provinces reveal a remarkable correlation between the provinces that have higher unemployment rates today and those that had higher

²The picture in Spain is not as clear as in Italy, for instance, where unemployment is higher in the Southern regions, which are further from the markets of the rest of Europe, more agricultural, and less prosperous.

unemployment rates one and a half decades ago (Figure 2, top panel).³ In other words, areas that suffered from above-average unemployment in the past continue to have above-average unemployment today. These correlations are much higher in the case of Spain than for the United States, and somewhat higher than for other European countries, especially the United Kingdom, (Blanchard and Katz, 1992, Decressin and Fatás, 1994, Obstfeld and Peri, 1998). These persistent imbalances in unemployment rates constitute *prima facie* evidence that something is not functioning properly in the Spanish labor market.

There is little doubt that geographic unemployment differences are large and persistent, in spite of uncertainties surrounding the “real” unemployment rate and the size of the underground economy in Spain. At the same time, a brief discussion on the **reliability of the data** is in order. The most important question in this context is whether high *measured* unemployment in certain areas might simply reflect a larger underground economy. In that respect, the most widely used measure of unemployment—that based on the National Statistical Institute’s survey, which is conducted along internationally accepted guidelines—seems reliable. Workers in the underground economy are not asked, nor have any incentive to, report themselves as unemployed in the survey. Nevertheless, in light of the extremely high unemployment rate—21 percent for the country as a whole—estimated by the survey, it has been argued that the registered unemployment rate, which amounts only to 13 percent, might be a more reliable measure. In principle, those employed in the underground economy could well register themselves as unemployed, but in practice the checks conducted by the unemployment benefit offices may help reduce this problem. Using data from this alternative source, the same pattern of large and persistent geographic unemployment differences remains quite striking (Figure 2, bottom panel). Registered unemployment rates ranged from 11 percent in Rioja to more than 20 percent in Andalucía among Spain’s 17 regions, and from 7 percent in Lleida, Cataluña, to 24 percent in Cádiz, Andalucía, among Spain’s 50 provinces, in 1995.⁴

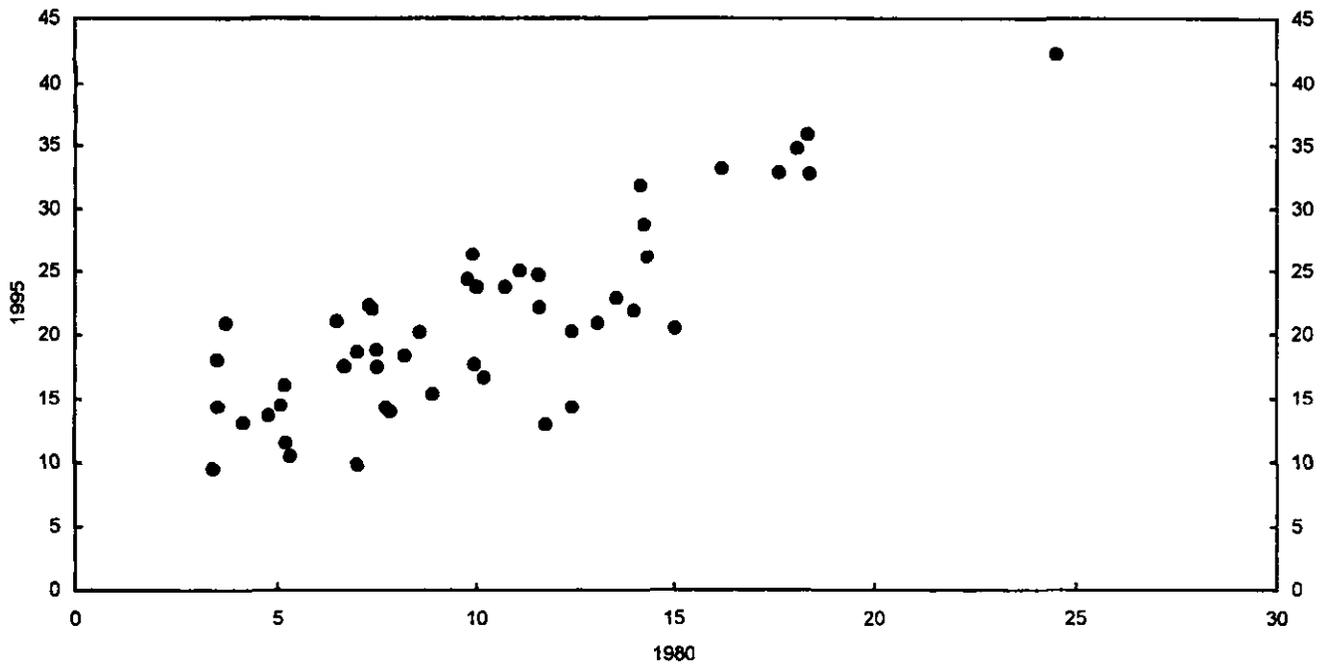
The degree of persistence of geographical differences in unemployment varies depending on the labor force participants’ **skill levels**, providing clues as to the policy measures that would help reduce unemployment imbalances. On the whole, based upon a unique data set produced by the *Instituto Valenciano de Investigaciones Económicas* (see Appendix I), the low skilled seem to display greater unemployment persistence than the high skilled, as shown by scatter plots of the unemployment rate in 1977 and 1992 (the last year for which data are available) in the 50 Spanish provinces for five groups of labor force participants: illiterate, primary-school educated, middle-school educated, high-school educated, and college educated (Figure 3). The relationship between unemployment in the

³The scatter plots are similar for the case of the regions.

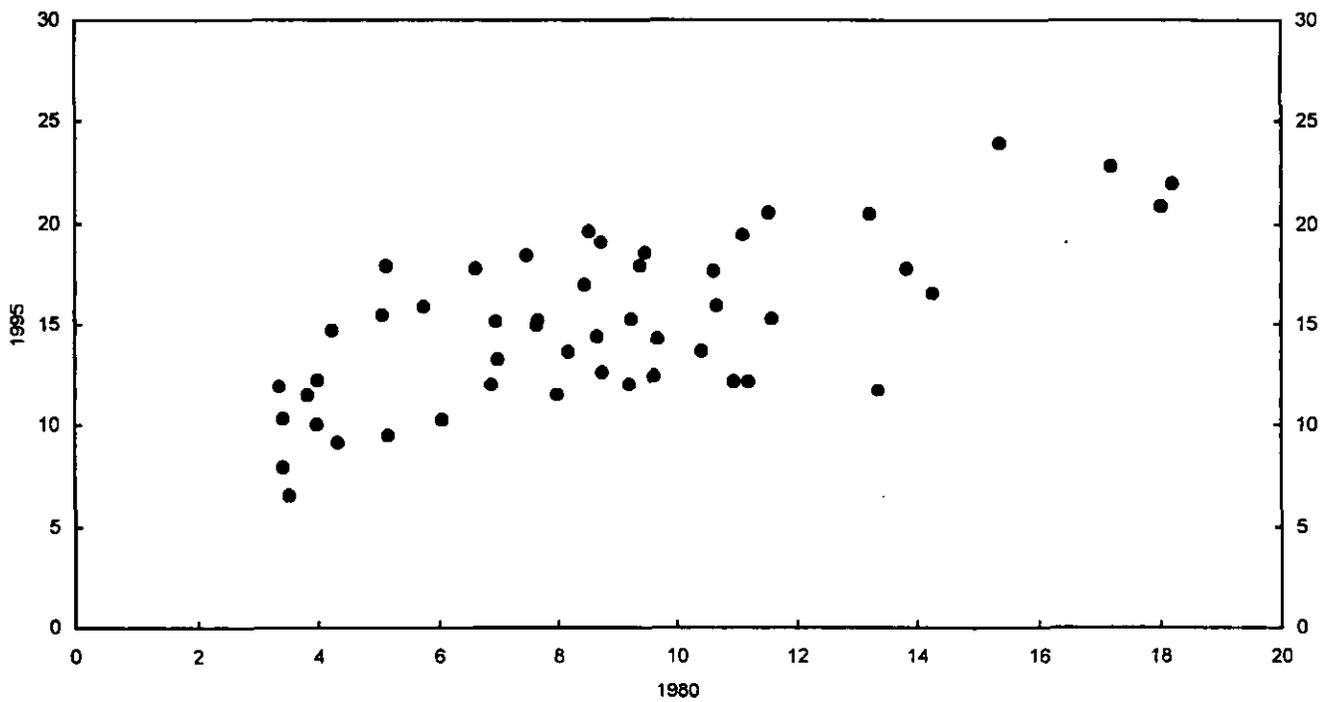
⁴Registered unemployment tends to underestimate the differences in unemployment because it excludes the 250,000 people covered by the rural employment program in Extremadura and Andalucía even at times when they are not working, often a large proportion of the year.

Figure 2. Spain: Persistence of Unemployment, 1980-95

PROVINCES SURVEY

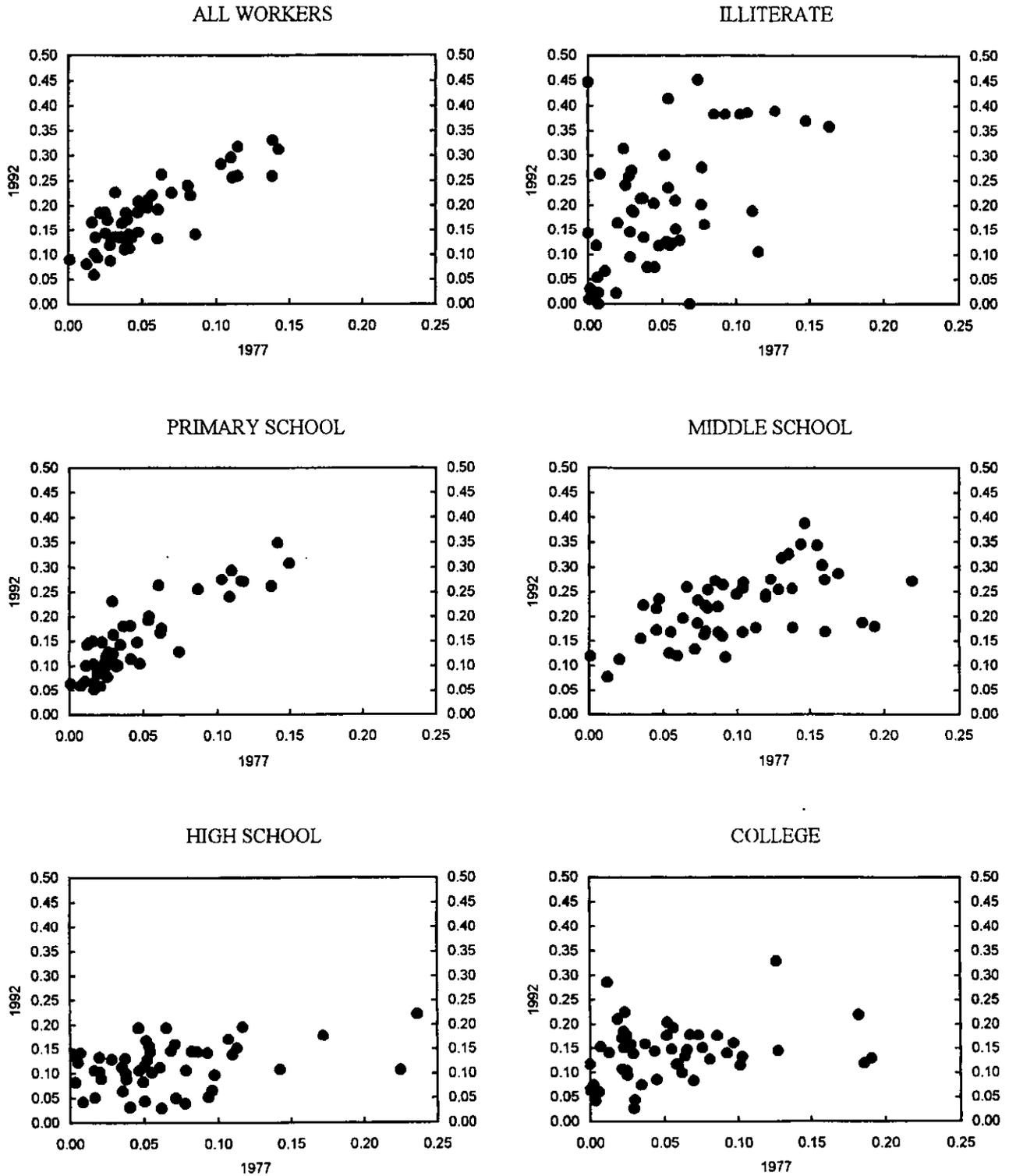


PROVINCES REGISTERED



Sources: Instituto Nacional de Estadística; and Instituto Nacional de Empleo.

Figure 3. Spanish Provinces: Unemployment Rates, by Skill Level, 1977 and 1992



Source: Instituto Valenciano de Investigaciones Economicas.

past and unemployment today tends to be closer among the low-skilled, and looser among the high-skilled. Table 1 reports, for each educational group, the coefficient of correlation between unemployment in 1977 and unemployment in 1992, as well as each group's share of the total labor force in 1977 and 1992.

Table 1. Spain: Unemployment Persistence by Educational Group, 1977-92

Skill Level	Coefficient of Correlation	Share in the Total Labor Force	
		1977	1992
All groups	0.83	100.0	100.0
Illiterate	0.50	4.1	1.4
Primary school	0.88	74.8	43.8
Middle school	0.56	15.1	42.8
High school	0.35	3.4	5.9
College	0.24	2.7	6.1

Sources: *Instituto Valenciano de Investigaciones Economicas*; and Fund staff estimates.

The coefficient of correlation between unemployment in 1977 and unemployment in 1992 tends to be higher, the less educated the labor force participants of a given group, with the exception of the illiterate, a small group for which the quality of the data is the worst.⁵ Since unemployment is most persistent among the low skilled, policy efforts to raise the speed of adjustment of the labor market should focus on the less educated. This finding also provides an additional argument in favor of raising the educational quality of the workforce.

III. POTENTIAL ADJUSTMENT MECHANISMS

In a well-functioning labor market, one would expect that geographical unemployment differences resulting from past shocks be reduced, if not altogether eliminated, relatively quickly. This section briefly describes the potential adjustment mechanisms.

• **Migration of firms.** Ample availability of unemployed labor in a given area should encourage firms to move there, particularly if widespread, persistent unemployment has reduced wages and this labor is now cheaper (adjusting for differences in productivity) than elsewhere. This is a relatively unexplored mechanism, owing to the limited availability of

⁵The results need to be interpreted bearing in mind that, other things being equal, larger groups (in the present case, the primary-school and the middle-school educated) will tend to show a better fit simply because they are subject to fewer idiosyncratic changes.

information on the migration of firms, but in a well-functioning market it could play a major role in reducing unemployment differences.

- **Creation of new jobs by existing or new local firms.** Following a decline in labor demand, if lower wages were to result from the new availability of unemployed workers, job creation by existing or new local firms would be encouraged, thereby beginning to reverse the initial fall in labor demand.

- **Changes in the labor force participation rate.** When an area is characterized by high and persistent unemployment, it is likely that some unemployed workers will become “discouraged” and drop out of the labor force. Of course, this is a less desirable way to reduce unemployment than through other mechanisms.

- **Migration of workers.** When unemployment is very high in a given area, it is reasonable to expect that unemployed workers will migrate to seek jobs elsewhere. Unemployment itself is obviously the most powerful incentive to migrate. However, if a decline in labor demand were to be accompanied not only by higher unemployment, but also by a decline in wages, the incentives for the unemployed to leave the area would be even greater. Since this last mechanism played an important role through the 1960s, it may be interesting to analyze why it has ceased to do so.

Migration flows, both toward other countries and within Spain, were very large in the 1960s, but they dropped sharply beginning in the late 1970s. The main reason for this decline is likely to be that **absolute unemployment rates** rose in the whole country as well as in the rest of Europe, as it is well known that workers tend not to migrate, regardless of how bad prospects are in their current location, if the chances of finding a job once they reach their destination are low. This phenomenon of falling migration at a time of rising absolute unemployment has been well documented not only in the case of Spain (Bentolila, 1997), but also in other countries, including Germany (Decressin, 1994), Italy (Attanasio and Padoa-Schioppa, 1991), and the United Kingdom (Pissarides and McMaster, 1984). However, the rise of the absolute unemployment rate does not provide a full explanation for labor force participants' reluctance to move, since less than half of unemployed workers declare that they would be willing to fill a vacancy in another region.

In sum, a number of mechanisms could be expected to reduce imbalances in unemployment rates, but they have failed to operate in the case of Spain. Among them, wage flexibility plays a key role, as some decline in wages in high-unemployment areas could spur a sizeable immigration of firms, though migration of workers may be rather insensitive to wage differentials. Section IV analyzes the extent to which wages respond to local labor market conditions.

IV. TO WHAT EXTENT DO WAGES ADJUST?

In spite of large and persistent differences in unemployment, unit labor costs and real wages do not differ much in the high-unemployment and the low-unemployment areas. This is contrary to what one would expect in a well-functioning labor market, in which wages in areas that have been bedeviled by high unemployment for a few years would normally fall to attract firms and encourage workers to leave, thereby correcting unemployment imbalances.

Section II has shown that there are large imbalances in unemployment rates among the Spanish regions and provinces. There are also considerable differences in salaries, prices and productivity among the various parts of the country. For example, consider the differences between the province of Barcelona, one of Spain's most economically advanced cities, which has an unemployment rate of 18 percent, and the province of Badajoz, Extremadura, in the agricultural south, which has an unemployment rate of 32 percent. Nominal wages are 21 percent higher in Barcelona than in Badajoz, but consumer prices are 16 percent higher, resulting in real wages that are only 5 percent higher. Productivity is 37 percent higher in Barcelona than in Badajoz, resulting in unit labor costs that are 16 percent *lower* in the former than in the latter.⁶

The comparison between Barcelona and Badajoz illustrates three simple points. First, there are considerable differences in wages, prices, and productivity, as well as in unemployment rates, among the various parts of the country. Second, even when there are large differences in nominal wages, differences in prices and in productivity can imply that differences in real wages or in unit labor costs are much smaller, or even in the direction of promoting further geographic divergence in unemployment. Third, differences in unemployment rates do not seem to be closely associated with differences in real wages or unit labor costs, as shown below by more systematic analysis.

A simple, systematic way of analyzing the relationship between unemployment and real wages or unit labor costs is to rank the 50 provinces by their unemployment rate, split the sample in half, and observe cross-sectional averages of the variables for the two groups. Using this procedure and previously unexplored data (see Appendix I), it is found that low-unemployment provinces do not have significantly lower real wages or unit labor costs than high-unemployment provinces, in an economic or a statistical sense. This would not be a matter of concern in a country where unemployment rates were fairly uniform or merely temporary, but in a country where unemployment differences are large and persistent, it would be desirable for wages (adjusted for consumer prices and productivity) to reflect such differences. Lower wages in high-unemployment than in low-unemployment areas would constitute a helpful market mechanism to correct unemployment imbalances.

⁶Higher productivity in Barcelona than in Badajoz may reflect a host of factors, including better infrastructure, a more highly qualified workforce, a larger share of advanced sectors in total output, and more modern production plants.

Real wages are only marginally higher in the 25 provinces with lower unemployment than in the 25 provinces with higher unemployment, as slightly higher nominal wages are offset to a considerable extent by higher prices (Table 2).⁷ The real wage differential is insignificant both in an economic and a statistical sense, and is insufficient to encourage workers to move away from high-unemployment provinces.

Table 2. Spain: Real Wage and Unit Labor Cost Differentials, and Their Sources

(Percent differences between low-unemployment and high-unemployment areas, 1989–95 averages)

	Unemp. Rate 1/	Nominal Wages	Prices	Real Wages	Productivity (GDP per worker)	Unit Labor Costs	GDP per person	Employment/ Population Ratio
All 50 Provinces (25 low-un. provinces vs. 25 high-un. provinces)	-10.79 (0.01)	0.49 (0.9)	0.17 (0.89)	0.33 (0.92)	2.06 (0.69)	-1.53 (0.73)	19.81 (0.01)	17.39 (0.01)
17 Provinces with own CPI level data (8 low- un. provinces vs. 9 high-un. provinces)	-8.53 (0.01)	9.22 (0.18)	3.89 (0.05)	5.13 (0.40)	12.13 (0.09)	-2.59 (0.69)	26.40 (0.01)	12.73 (0.01)
All 17 regions (8 low-un. regions vs. 9 high-un. regions)	-7.77 (0.01)	1.86 (0.77)	2.01 (0.32)	-0.14 (0.98)	7.19 (0.34)	-4.97 (0.44)	20.54 (0.01)	12.42 (0.01)

Source: Own calculations from *Instituto Nacional de Estadística* data. See Appendix I for details.

Note: The data are 1989–95 averages. There are 17 regions and 50 provinces in Spain. Provinces are subsets of regions. The numbers presented in bold are the differences (in percent) between the cross-sectional averages for the low-unemployment and high-unemployment groups of provinces (or regions). The numbers in parentheses are p-values of the test of the null that the two cross-sectional averages are equal. The two groups are defined by ranking the provinces (or the regions) on the basis of the unemployment rate, and splitting the whole sample in half. All averages are geometric, to maintain the approximate validity of the identities: real wages=nominal wages-prices, and unit labor costs=nominal wages-productivity, GDP per person=productivity + employment/population ratio for the average of the differences. CPI level comparisons across provinces are only available for 17 provinces. Provinces within the same region are assumed to have the same CPI level. Nominal wages are based on survey data.

1/ Difference in percentage points.

Unit labor costs are even somewhat *lower* in provinces with low unemployment, as higher productivity more than offsets slightly higher wages. Even though the unit labor cost differential only amounts to 1.53 percent and is not statistically significant, the signal to firms is—if anything—to move *away* from high-unemployment areas. The same patterns are

⁷Within price indices, large differences are observed only in the case of housing prices.

observed if the analysis is conducted at the level of regions rather than provinces (Table 2, third row).⁸ Thus, even though sometimes there are large differences in real wages and unit labor costs among Spanish provinces (and regions), these differences are not systematically linked to differences in unemployment rates, so that they do not foster a correction of unemployment imbalances.⁹

These comparisons of unit labor costs must be interpreted with caution, owing to two types of data limitations. First, the data refer to *average*, rather than *marginal*, unit labor costs. The latter are the relevant measure for an entrepreneur choosing where to locate a new firm, and may differ considerably from the former, as in the case of a very modern plant being set up in a relatively backward area. Second, the data refer to overall unit labor costs, rather than to unit labor costs for a particular type of worker in a specific sector.¹⁰ Therefore, there could be significant differences in unit labor costs between high-unemployment and low-unemployment areas for certain types of workers and sectors, though they would be offset by opposite differences for other workers and sectors.

The current patterns of real wages and unit labor costs therefore do not bode well for a prompt reduction in geographic unemployment imbalances. In this respect, the situation in Spain bears a striking resemblance with the case of Italy, another country characterized by large imbalances in unemployment rates among its regions. In Italy, the unemployment rate stood at 22 percent in the South, compared with 8 percent in the North, in 1996. Unit labor costs were 2½ percent higher in the South than in the North in 1996, implying that firms had—if anything—an incentive to migrate *away* from the South. At the same time, the incentives for firms to migrate away from high-unemployment areas are lower than in Germany, where unit labor costs are about 30 percent higher in the east than in the west, in spite of the fact that the unemployment rate is much higher in the east (18 percent) than in the west (11 percent).

Not only are wage *levels* too similar in high-unemployment and low-unemployment areas to facilitate a correction of unemployment imbalances, but also there are no significant differences in *wage growth rates* between high-unemployment and low-unemployment provinces, suggesting that there is no tendency for the situation to improve. The average wage increases settled over 1992–95 in all agreements between trade unions and entrepreneurs in the 25 provinces with higher unemployment rates was identical to that in the 25 provinces

⁸These patterns are also observed when national accounts data on the total employee wage bill (instead of survey data) are used to compute average wages in the various regions, and when value-added data are used instead of gross domestic product data.

⁹Scatter plots and regression analysis also fail to find a close association between unemployment rates and real wages or unit labor costs.

¹⁰The results are broadly similar when the analysis is conducted on data for industry only.

with lower unemployment rates (both amounted to 5.14 percent).¹¹ This result is consistent with other findings that wage increases do not seem to respond to local labor market conditions.¹²

V. HOW DOES THE LABOR MARKET ADJUST TO SHOCKS?

The previous sections have shown that, especially in the case of the low skilled, geographic unemployment differences are large and persistent, suggesting that the labor market adjusts exceedingly slowly to local shocks. This section analyzes in detail that adjustment process, by estimating the extent to which migration takes place, the unemployment rate rises, and the participation rate falls, in response to a drop in labor demand in a given province. It traces these effects through time, comparing the immediate impact with the outcomes observed after a number of years. It also shows that the role played by the various adjustment mechanisms (migration, and changes in the unemployment rate and the participation rate) depends on the skill level of the workers that lose their jobs.

The questions above are addressed by estimating a vector autoregression system (VAR) of employment growth, the employment rate, and labor force participation, for the 50 Spanish provinces over 1964–92. The framework adopted is identical to that developed by Blanchard and Katz (1992), who first applied it to the United States, and similar to that applied by Decressin and Fatás (1995) to Europe, and Bentolila and Jimeno (1995) to the 17 Spanish regions on quarterly data for 1976–94. As a consequence, the results obtained can be compared to those of the foregoing studies.

The system is the following:

$$\begin{aligned} \text{Employment growth:} & \quad \Delta e_{i,t} = \alpha_{i,1} + \beta_1(L) \Delta e_{i,t-1} + \gamma_1(L) le_{i,t-1} + \delta_1(L) lp_{i,t-1} + \epsilon_{i\Delta e,t} \\ \text{Employment rate:} & \quad le_{i,t} = \alpha_{i,2} + \beta_2(L) \Delta e_{i,t} + \gamma_2(L) le_{i,t-1} + \delta_2(L) lp_{i,t-1} + \epsilon_{i le,t} \\ \text{Labor force participation rate:} & \quad lp_{i,t} = \alpha_{i,3} + \beta_3(L) \Delta e_{i,t} + \gamma_3(L) le_{i,t-1} + \delta_3(L) lp_{i,t-1} + \epsilon_{i lp,t} \end{aligned}$$

where all variables are differences between province i and the national average, in order to focus on developments at the provincial level that are not due to nationwide developments: $\Delta e_{i,t}$ is the first difference of the logarithm of employment; $le_{i,t}$ is the logarithm of the ratio of employment to the labor force; and $lp_{i,t}$ is the logarithm of the ratio of the labor force to the working-age population. There are two lags for each right-hand side variable, to allow for

¹¹The cross-sectional standard deviation of the 1992–95 average wage increase settlements for the 50 provinces amounted to 0.27 percentage point. The data refer to wage increase settlements reported to the Ministry of Labor, which includes the vast majority of agreements signed by trade unions and employers (see Appendix I).

¹²Using data on wages from national accounts at the regional/sectoral level, Bentolila and Jimeno (1995) confirm that wages do not respond to regional unemployment rates, though they respond somewhat to productivity.

feedback effects from labor force participation and the employment rate to employment growth. (For example, a decrease in labor force participation could lower wages, thereby facilitating an increase in employment growth.) The system is estimated by pooling all observations, though allowing for different province-specific constant terms in each equation, since some provinces may have higher average employment growth, employment rates, and labor force participation rates than others, for reasons that are not captured by the explanatory variables.¹³

The effects of a fall in employment can be traced through time by analyzing the impulse response graphs based upon the estimated parameters of the system above. Those effects can be interpreted as resulting from a decline in labor *demand*, under the reasonable assumption that most of the year-to-year changes in employment reflect changes in labor demand, rather than labor supply.¹⁴

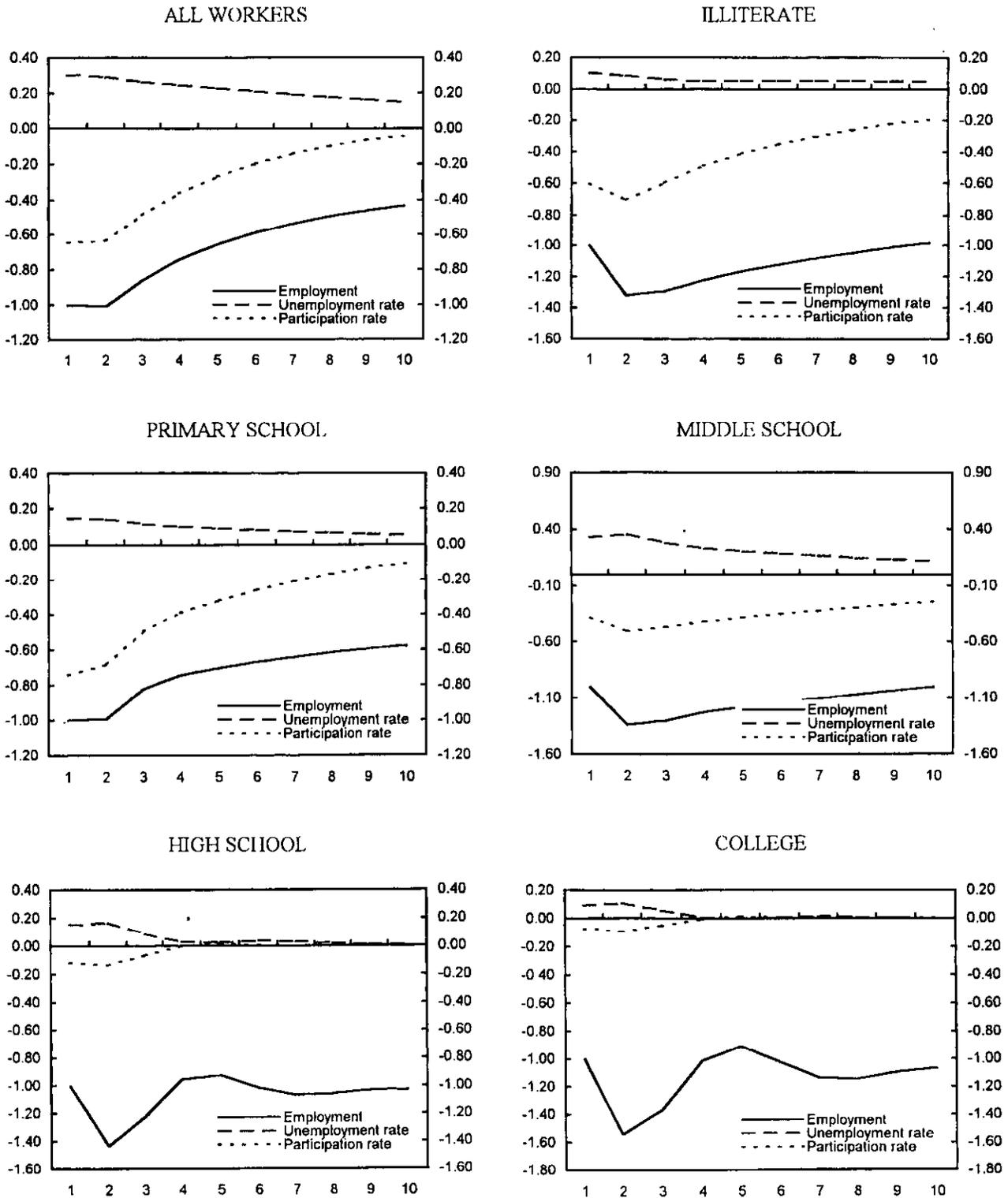
The **immediate response** to a decline in labor demand in a given Spanish province does not differ much from that observed in other countries, though the effects on labor participation are higher in some cases. In response to a one percentage point negative shock to employment growth, the unemployment rate immediately increases by 0.31 percentage point, while the participation rate decreases by 0.65 percentage point (Figure 4). The remaining adjustment to the fall in employment is accounted for by migration. The simultaneous impact on the unemployment rate is similar to that estimated by existing studies for both the United States and Europe. The immediate response of the participation rate is similar to that observed in Europe, but much higher in Spain than in the United States, suggesting that the phenomenon of the “discouraged worker” plays a larger role in the former than in the latter.

There are more important differences between Spain and other countries in the extent and composition of adjustment to a negative employment shock **after several years**. In the case of Spain, migration is not sufficient to bring the unemployment rate back to its pre-shock level even after more than a decade. The participation rate rises back toward its pre-shock level, which it reaches after ten years. These results contrast sharply with those obtained by other studies for both the United States and the rest of Europe, where unemployment rates return to their pre-shock levels after about five years. In the United States, adverse employment shocks result in a relatively small decline in the participation rate, a small increase in the unemployment rate, and rapid migration, in the first few years. After about five years, both the participation rate and the unemployment rate are back at their pre-shock levels, and employment remains permanently at (or below) the level attained through the initial shock, with migration being entirely responsible for that full adjustment. In the rest of Europe, the overall pattern of the response to an adverse employment shock is fairly similar to that

¹³Further technical issues are addressed in Appendix II.

¹⁴Formally, the identifying assumption is that ϵ_{iet} can be interpreted as an innovation in local labor demand. Correspondingly, current innovations in local employment growth are allowed to affect local employment rates and local participation rates, but not vice versa.

Figure 4. Spain: Response to One Percent Negative Employment Shock in a Given Province



Sources: Instituto Valenciano de Investigaciones Economicas; and staff estimates.

observed in the United States, though the effects on the participation rate and the unemployment rate are much larger in Europe than in the United States during the first few years, as migration is more sluggish in the former than in the latter.

The analysis conducted above is also applied to each of the five educational groups for which data are available, showing how workers of different **skill levels** respond differently to local shocks. Five separate systems are estimated, each of which uses data for only one of the educational groups. The results are relevant not only for the case of Spain, but also for other countries, since this is the first study (on any country) that analyzes the response to local labor market shocks *by skill level*, thanks to the unique data set compiled by IVIE. Figure 4 presents the impulse response graphs for each of the five educational groups, based upon the estimated parameters of the corresponding systems, for a one percentage point fall in the respective group's employment.

There are striking differences in the **immediate responses** among the various groups, particularly with respect to the participation rate and migration. In response to a one percentage point fall in employment, the unemployment rate immediately rises by 0.10–0.30 percentage point for all groups. However, while the participation rate drops by 0.60 percentage point or more in the case of the illiterate and the primary-school educated, and 0.40 percentage point in the case of the middle-school educated, it falls only by 0.10 percentage point in the case of the two top educational groups. This result is consistent with the possibility that the less educated are more likely to become “discouraged workers.” Conversely, while some low skilled migrate in response to an adverse labor demand shock, migration takes place much more rapidly among the high-school educated and the college-educated, for whom the opportunity cost of not being employed is larger, since their salaries tend to be higher.¹⁵

Considerable differences can also be observed in the extent and composition of the adjustment to a fall in labor demand, **after several years**. Rapid migration implies that the unemployment rate returns to its pre-shock levels after only three years for the high-school educated and the college-educated. By contrast, in the cases of the illiterate, the primary-school educated, and the middle-school educated, about half of the initial increase in the unemployment rate persists after a decade. In all cases, the participation rate tends to return toward its pre-shock level, but in the case of the high-school educated and the college-educated it reaches it after only three years, perhaps because the initial impact is relatively small, while in the other cases the initial effects are not fully reversed even after ten years.

¹⁵This result is consistent with Antolín and Bover's (1997) finding that, controlling for personal characteristics (including whether unemployed workers are registered or not), higher education implies not only more migration, but also more responsiveness of migration to geographic unemployment differentials.

The different speed of adjustment to local labor demand shocks for different skill groups can be partly explained by the following four factors, all of which are largely outside the control of policy makers.

- First, in a comparison of the costs and benefits of moving, migration is more likely to be an attractive option for the high-skilled than the low-skilled. The benefits of taking up a job in another area of the country compared with remaining unemployed in the area of current residence are much higher for the high-skilled than the low-skilled, since high-skilled workers have higher wages than low-skilled workers, and unemployment benefits are subject to a ceiling. By contrast, the costs of moving are fairly independent of a person's skill level.

- Second, workers with more years of schooling may be better able to adapt to new jobs, including those that are located in different areas of the country.

- Third, information about vacancies in other areas of the country may be much more readily available for jobs that require high skills.

- Fourth, given the remarkable improvement in educational achievement over the past decades, low-skills are associated with old age. In particular, more than three quarters of illiterate and primary school educated labor force participants were 35 or older in 1993, compared one half for the labor force as a whole. As a result, the illiterate and the primary school educated might move less promptly than other groups partially because they tend to be older. However, there is no clear relationship between age and educational attainment for labor force participants that are middle-school educated and above. (Middle-school educated labor force participants are, on average, considerably younger than high-school and college educated ones.) Therefore, speedier labor market adjustment for the high-school and college educated than for the middle-school educated cannot be explained by differences in age.

Section VI analyzes a number of additional factors that are within the control of policy makers.

VI. CURRENT ARRANGEMENTS THAT HINDER LABOR MARKET ADJUSTMENT

The empirical analysis in the previous sections shows that the labor market adjusts exceedingly slowly to shocks and geographical imbalances in unemployment. This section points to those current policies and arrangements that prevent rapid adjustment to shocks. It also relates each of these features of the labor market to the groups of workers (skilled versus unskilled) that they seem to affect the most.

The key barrier to the reduction of existing geographical unemployment differences and the prompt adjustment to local labor demand shocks seems to be the current wage bargaining system. This barrier affects labor force participants of all groups. A number of other current policies and arrangements in the labor market policies hamper the mobility of the low skilled, even though probably not that of other groups. These include programs to help agricultural workers in specific depressed areas (Andalucía and Extremadura), minimum wage legislation, and the unemployment benefit system. Finally, a number of current policies and arrangements in the housing market, and other goods and factor markets also hamper labor market adjustment for workers of all skill levels.

A. Labor Market Policies and Institutions

Policies and institutions that affect all workers

The collective bargaining system

The collective bargaining system, which covers a large majority of workers and firms,¹⁶ plays an important role in preventing wages from falling sufficiently in the areas with high unemployment. Information on exactly how many workers are covered by each type of bargaining arrangement is scarce, but perhaps the most representative type of arrangement is one in which a given economic sector (e.g., banking) has its own national round followed by regional and/or provincial rounds. By international standards, the bargaining system in Spain is considered to have an intermediate degree of centralization.

On the surface, the complex patchwork of national, regional, provincial, and firm-level negotiations might appear to provide ample scope for geographic flexibility of wages, particularly when one considers that more than half (by number of workers) of the agreements that are signed take place at the provincial level, and that there appears to be consensus that the number of bargaining units is, if anything, excessive. However, bargaining takes place according to a *cascading system*, in which the outcomes of agreements at the broader levels are *de facto* accepted as minimum standards for the narrower levels. For example, nationwide sectoral agreements set wage floors that are binding on all firms in the sector. The labor market reform of 1994 made it possible for firms to opt out of these agreements, though only in cases where firms' economic viability would be endangered by applying the sectoral wage increase, and with the mutual consent of employers and workers. Not surprisingly, this opportunity has been used very seldom. In any case, only about 10 percent of wage earners are covered by firm level agreements, while about 65 percent are covered by industry-wide agreements.¹⁷

¹⁶Collective agreements are legally enforceable and apply to all workers in a given firm whether they are unionized or not. It is estimated that about three quarters of firms and workers are covered by collective bargaining agreements, even though the workers' unionization rate (10–15 percent) is low by international standards.

¹⁷This is an approximation, since the data from the Ministry of Labor refer to *all* agreements, with no information on which workers are covered by more than one agreement, as is very often the case.

In addition, to the extent that there is scope for wage flexibility, the bargaining parties may have chosen not to use it to its full extent. Perhaps, the two main trade union confederations (*Unión General de Trabajadores* and *Comisiones Obreras*) have pursued a strategy of “equal work, equal pay,” resulting in a low dispersion of wage-rate increases, even since 1986, when the last economy-wide wage agreement was signed. Employers may have chosen to accommodate this strategy in order to preserve social peace, and to adopt more capital-intensive technologies.

The April 1997 agreement between trade unions and entrepreneurs does not explicitly call for a change in the degree of centralization of the bargaining system, but its implementation could provide the opportunity to make improvements in that area. The social partners agreed in principle to examine ways of streamlining the bargaining system. Their main concern is that, at present, the same aspects of a contract (e.g., working conditions, or wages) are often negotiated at several levels of bargaining (e.g., national/sectoral, provincial/sectoral, and firm-level), which leads to duplication of effort and confusion. The agreement lends itself to various interpretations, but one positive aspect is that it states that negotiations about wages *can* take place at the firm level. Nevertheless, there remains much uncertainty as to how the agreement will be implemented.

Policies and institutions that affect low-skilled workers

Programs to help workers in depressed areas

Programs to help workers in depressed areas reduce incentives for these workers to accept lower wages (thereby attracting new firms) or to seek jobs elsewhere. An example is the agricultural employment plan (*Plan de Empleo Rural*), which provides farm workers in Andalucía and Extremadura with temporary jobs in state-financed infrastructure projects and unemployment assistance for a substantial portion of the remainder of the year. Under that program, which covers about 250,000 workers and accounts for about 5 percent of total expenditure on unemployment benefits in Spain, as few as 40 days’ work a year entitle workers to 75 percent of the statutory minimum wage for 40–360 days a year (depending on their age). This program reduces workers’ willingness to migrate or to take up low-paying jobs in sectors other than agriculture, and represents an institutional barrier to labor market adjustment with important consequences on the low skilled in the regions where it is available.

Minimum wage legislation

Spain’s statutory, minimum wage, currently at 32 percent of the average adult wage (after gradually declining from 40 percent in 1985),¹⁸ is not high by international standards.¹⁹ Nevertheless, it may play some role in preventing wages from falling sufficiently to encourage

¹⁸Workers of ages 18 and under who are employed under training contracts can be paid 85 percent of the statutory minimum wage.

¹⁹It is well below the average—of more than 50 percent of the average adult wage—for EU countries that have a statutory minimum wage. It is also below the average of the minimum wages set through collective agreements in EU countries that do not have a statutory minimum wage.

the creation of new jobs at the low end of the pay scale. Its importance in determining labor force participants' willingness to take up jobs is increased by the fact that it affects the level of unemployment assistance and the ceiling and floor for unemployment benefits. Moreover, Spain's minimum wage is nationwide, with no adjustments for differences in the cost of living in the various areas of the country. While this institutional feature of the labor market is probably of little consequence for the high skilled, it may have important consequences for the low skilled, particularly in areas where productivity and the cost of living are low.

The unemployment benefit/assistance systems

Spain's unemployment benefit system is fairly generous by international standards, though not sufficiently to explain why Spain's unemployment rate is higher than in other countries.²⁰ Gross replacement rates are higher than the EU average in the first month of unemployment, and net replacement rates are close to the EU average in the first month of unemployment, but below the EU average in the sixtieth month of unemployment. Unemployment benefit duration is equal to one third of the last job's tenure, up to a maximum of two years;²¹ therefore, it does not stand out compared with other countries. Benefits amount to 70 percent of the previous wage for the first 6 months, and 60 percent thereafter (with a floor of 75–100 percent of the minimum wage, and a ceiling of 170–220 percent, depending on the number of children). Once eligibility for unemployment benefits expires, workers are entitled to means-tested unemployment assistance for another 3–30 months (depending on age, number of years' work prior to dismissal, and number of children), which amounts to 75 percent of the statutory minimum wage. The Spanish unemployment compensation system is rendered particularly generous by the possibility of cumulating unemployment benefits paid by the State with sizable dismissal benefits paid by the employer.²²

Unemployment protection reduces unemployed workers' job search efforts and raises the participation rate, thereby contributing to high unemployment and low labor mobility. Antolin and Bover (1997) find that, after controlling for personal characteristics, the unregistered unemployed, who do not receive unemployment benefits, are more mobile than

²⁰In particular, a thorough comparison between the unemployment benefit systems and other labor market institutions in Spain and Portugal reveals that the differences between these two countries are rather limited, raising the puzzle of why unemployment is so much worse in the former than in the latter (Blanchard and Jimeno, 1995). Bover, García-Perea, and Portugal (1998) argue that Portugal's better labor market performance can be attributed to its much lower unemployment compensation prior to 1985.

²¹A worker must have been employed for at least 12 months in the past 6 years to be eligible for unemployment benefits.

²²Permanent workers hired before May 1997 typically receive their full salary for 45 days per year worked, up to a maximum of 42 weeks, if they are dismissed for "unjustified" economic causes, which tends to be the majority of cases.

the employed and the registered unemployed. Such adverse effects are particularly important among the low skilled, because benefits are capped. One positive feature of the current design of the unemployment benefit system is that benefits are determined as a percentage of the previous wage. Therefore, if policy measures such as the decentralization of the wage bargaining system were to be undertaken, resulting in lower wages in high-unemployment areas, unemployment benefits in those areas would fall correspondingly.

B. Housing Market Arrangements

Current arrangements in the housing market also contribute to limiting the geographic mobility of labor. In particular, the market for rental housing is relatively undeveloped and illiquid in Spain, with more than three quarters of the population living in owner-occupied housing, compared with about 60 percent in a sample of more than twenty OECD countries (Oswald, 1997). The most striking restriction is that the minimum duration of a rental contract is five years. Illiquid rental markets make it difficult for workers to move, especially for the less affluent groups of workers, that is, typically the low skilled.²³

C. Policies and Institutions in Goods and Other Factor Markets

While it is difficult to assess the flexibility of goods markets and the degree of capital mobility in Spain relative to other countries, some current institutional obstacles seem to be important. To take just one example, it is often difficult to obtain permits to open new large retail outlets. Such rigidities in goods and factor markets also matter in determining the speed of adjustment to labor demand shocks. For instance, suppose that the demand for labor falls in a given region, and wages fall as a result. Lower wages might attract new firms to that area, but if there are institutional obstacles to this (as would be the case for large retail outlets), then adjustment to the initial shock will take a long time.

VII. CONCLUSIONS

There are large and persistent differences in unemployment rates among Spanish regions, and there are no signs that these differences can be reduced in the near future under current policies and arrangements. Labor market adjustment to shocks is sluggish, especially among the low skilled. This study has identified a number of measures that would facilitate reducing unemployment in depressed regions and foster the speedy adjustment to shocks.

Several labor market institutions should be reformed to make it easier for the labor market to respond to shocks and for unemployment differences to be corrected rapidly. The

²³On the basis of cross-country regressions, Oswald (1997) has suggested that undeveloped markets for rental housing may contribute to explaining higher unemployment rates, because workers find it more difficult to move to a new location where jobs might be available. However, his results may be due to the fact that high unemployment reduces migration, implying that a higher share of the population lives in owner-occupied housing.

most important reform seems to be the decentralization of the wage bargaining system to permit wages to fall in high-unemployment areas, thereby attracting firms there and providing an additional incentive for the unemployed to migrate. A successful reform to decentralize the wage bargaining system could only be undertaken with the consensus of the social partners, who would have to implement it. This measure would benefit workers of all skill levels. It becomes even more urgent as Spain joins EMU and consolidates its low-inflation environment, where relative wage adjustment may become more difficult.

In order to permit a better informed choice of policies to reform the wage bargaining system, it is necessary to establish exactly its current degree of centralization (e.g., by estimating more precisely the proportion of wage settlements that are affected by negotiations at the national level). To that end, it would be very useful for the trade unions and the entrepreneurs' associations to undertake a census of bargaining practices in Spain, a project that is needed anyway, if the social partners wish to implement effectively their agreement in principle to streamline the bargaining system.

Other measures to reform the labor market can be initiated by the government and can have significant effects among the low skilled, where the problem is worst, even if they have little impact on the high skilled. To provide the right incentives for people to take up employment, it would be desirable to eliminate programs that help workers in specific sectors in depressed areas, continue reducing the minimum wage as a ratio of the average wage, and tighten further the eligibility for unemployment benefits. These actions could be combined with targeted social welfare programs to protect the truly needy sections of the population.

Enhanced competition in other goods and factor markets would also help speed up the adjustment to new labor market shocks and the correction of past shocks, thereby contributing to the reduction of geographic unemployment differentials. In particular, liberalization should be undertaken in the housing market, especially at the low end of the market, where restrictions may be higher and which would benefit the low skilled. Finally, the evidence presented in this study provides an additional reason to promote an increase in the educational level of the workforce.

A decentralization of the wage bargaining system combined with the other foregoing measures would lead to a considerable decline in wages in Spain's high-unemployment areas, with a corresponding decline in unit labor costs. Entrepreneurs would exploit this new opportunity by setting up new firms in those areas, leading employment to increase. Eventually, unit labor cost differences would disappear, but in the meantime unemployment differences would be reduced, too.

DATA DESCRIPTION

This chapter makes use of a number of relatively unexplored data sets on the Spanish provinces, including on nominal wages, prices, and productivity; on wage settlements by province; and on population, labor force and employment data by province and skill level.

The data on working age (16–65) **population, labor force and employment** by province, by skill level, for 1964–1992, are drawn from Mas, M., F. Pérez, E. Uriel, and L. Serrano, 1995, *Capital Humano, Series Históricas, 1964–1992*, Fundación Bancaja, Spain. This is a unique data set, in that nothing comparable to it exists for other countries. It provides working-age population, active population and employment data for the 50 Spanish provinces, for people belonging to 5 groups of people with different skill levels: illiterate, primary school, middle school, high school, and college and above. The data are based on a very comprehensive data collection project conducted by the *Instituto Valenciano de Investigaciones Económicas (IVIE)*. Since 1977, the basic source of information used for that project are the individual replies to the labor force survey by INE. These individual replies include information on the respondent's educational attainment, which is typically not reported with any geographical disaggregation by the INE, but constitutes the focus of the IVIE study. Prior to 1977, the information is based on less disaggregated information from the labor force survey, and other sources including censuses and statistics on schooling. All in all, while some judgment may have been applied (particularly for the illiterate in the period prior to 1977) to correct the series obtained from such a wide range of sources, the data seem very reliable.

Nominal **wages** data for 1989–1995, which are published only by region, were kindly supplied by province by Mr. Miguel Angel de Castro of the *Instituto Nacional de Estadística (INE)* for this project.

The data on relative **prices** at a given point in time are only available by region and were drawn from the *Encuesta Regional de Precios 1989*, and kindly supplied by INE. The data for 1989–1995 by province were constructed using the provincial price indices relative (time-series) to 1990=100, assuming as a starting point for each province the relative (cross-sectional) price index in 1989.

Data on **productivity** by province for 1989–95 are drawn from *Contabilidad Regional de España 1989–95, INE*.

The data on **wage settlements** by province, for 1992–1995, are drawn from *Anuario de Estadísticas Laborales*, Ministerio de Trabajo, Madrid, Spain. They refer to the average of all wage settlements reported to the Labor Ministry.

TECHNICAL ISSUES

This appendix describes some key features of the individual series of employment growth, the unemployment rate, and the participation rate, and addresses a number of technical issues related to the estimation of the VAR system in Section V.

A. Characteristics of Individual Series

This section provides summary statistics on employment growth, the unemployment rate, and the participation rate for all workers and the five educational groups, and estimates the extent to which individual provincial series covary with national ones. It also reports the results of unit root tests.

The 1964–92 average employment growth was lowest for the illiterate and the primary-school educated, as the working-age population belonging to these groups decreased sharply during the past decades. Unemployment rates did not differ systematically by educational group over the period as a whole, since in the 1960s and early 1970s unemployment rates were extremely low for the low skilled. This is in sharp contrast to the current situation, where high unemployment rates are strongly associated with low education. The participation rate has always been much higher, the higher the educational level, ranging from 19 percent for the illiterate to 81 percent for the college educated over the period (Table 3).

Changes in employment growth, the unemployment rate, and the participation rate at the provincial level can be decomposed into a **national and a provincial component**. To determine the relative magnitude of the provincial components, the following regression is run for each of the 50 Spanish provinces:

$$X_{i,t} = \alpha_i + \beta_i X_t + \eta_{i,t} \quad \text{where } I = 1 \dots 50$$

Where $X_{i,t}$ is the provincial variable (namely, employment growth, the unemployment rate, and the participation rate) at time t , and X_t is the same variable at the national level. Table A1 reports the weighted average (by each province's share of Spanish population) of the adjusted R^2 for the 50 regressions, for each variable, and each group of labor force participants.

Table 3. Individual Series Average Levels and Covariance with the National Variables

	All workers	Illit.	Pr. Sch.	Mid. Sch.	High Sch.	Coll.
Employment growth						
Average empl. gr. (%)	2.8	-6.0	-2.0	9.0	4.0	5.0
Average of adjusted R ²	.46	.37	.39	.56	.32	.34
Unemployment						
Average un. rate (%)	11	11	9	16	8	8
Average of adjusted R ²	.94	.76	.93	.93	.88	.88
Participation rate						
Average part. rate (%)	50	19	49	49	65	81
Average of adjusted R ²	.50	.91	.84	.95	.53	.31

In the case of all workers, the average adjusted R² amounts to 0.46 for the employment growth rate, 0.94 for the unemployment rate, and 0.50 for the participation rate. In other words, only about half of the changes in provincial employment growth and the participation rate are explained by movements in the corresponding national variables.²⁴ By contrast, unemployment rates at the provincial level are extremely highly correlated with nationwide unemployment rates, suggesting that unemployment rates seem to vary in near-unison throughout the country, though some provinces have always much higher unemployment rates than others. The covariance of provincial and national variables is similar for all educational groups in the case of employment growth and the unemployment rate, but is much higher for the low skilled than for the high skilled in the case of the participation rate.

Augmented Dickey-Fuller **unit root tests** yield the following results. Employment *levels* are integrated of order one. Unemployment rates typically have a unit root, another sign that they are persistent over time.²⁵ The evidence on whether participation rates have unit roots is rather mixed.

²⁴For the 50 U.S. states, Blanchard and Katz (1992) find an average adjusted R² of .60, suggesting that aggregate shocks explain local developments to a slightly greater extent in the United States than in Spain.

²⁵This result is consistent with Bentolila and Jimeno (1995), who find high persistence in local Spanish unemployment rates. It contrasts sharply with the evidence on the United States, where unemployment rates are not persistent.

B. Technical Issues on the VAR System

The specification of the VAR system estimated in Section V follows exactly Blanchard and Katz (1992), to permit international comparison of the results. Nevertheless, a number of alternative specifications were estimated to show that the results are robust to specification changes. The results are broadly similar if the system is estimated by using differences rather than levels of the employment rate, or differences of employment growth and levels of the other two variables. The results are very similar to the ones reported in Section V if three or four lags of all the variables are used, instead of two lags.

Finally, current innovations in provincial employment growth are allowed to affect provincial employment rates and provincial participation rates but not vice versa, consistent with the interpretation of $\epsilon_{i_e,t}$ as an innovation in provincial labor demand. The covariance matrix of the residuals confirms that the contemporaneous correlation between $\epsilon_{i_e,t}$ with the innovations in the employment rate, $\epsilon_{i_u,t}$ and in the participation rate, $\epsilon_{i_p,t}$ is very low by comparison with the variation in $\epsilon_{i_e,t}$. In other words, the first elements of the second and third row in the covariance matrix reported below are very small compared with the first element in the first row.

Covariance Matrix of the Residuals (all educational groups)

7.4514e-004		
3.3023e-007	1.7100e-004	
-3.2700e-007	-1.6334e-004	1.8686e-004

The covariance matrices for the other systems for the five educational groups are similar to the one reported above.

REFERENCES

- Antolín, Pablo and Olympia Bover, 1997, "Regional Migration in Spain: The Effect of Personal Characteristics and of Unemployment, Wage and House Price Differentials Using Pooled Cross-Sections," *Oxford Bulletin of Economics and Statistics*, Vol. 2 No. 59, pp. 215-35.
- Attanasio, Orazio, and Fiorella Padoa-Schioppa, 1991, "Regional Inequalities, Migration and Mismatch in Italy," in *Mismatch and Labor Mobility*, ed. by Fiorella Padoa-Schioppa, Cambridge University Press, pp. 237-320.
- Bentolila, Samuel, 1997, "La Inmovilidad del Trabajo en las Regiones Españolas," *Papeles de Economía Española* 72, pp. 168-77.
- and Juan F. Jimeno, 1995, "Regional Unemployment Persistence (Spain, 1976-94)," CEPR Discussion Paper No. 1259, October.
- Bover, Olympia, Pilar García-Perea, and Pedro Portugal, 1998, "A Comparative Study of the Portuguese and Spanish Labour Markets," Working Paper No. 9807, Bank of Spain
- Blanchard, Olivier Jean, et al., 1995, "Spanish Unemployment: Is there a Solution?," Center for Economic Policy Research, London.
- and Juan F. Jimeno, 1995, "Structural Unemployment: Spain versus Portugal," *American Economic Review Papers and Proceedings*, No. 85, pp. 212-18.
- and Lawrence F. Katz, 1992, "Regional Evolutions", *Brookings Papers on Economic Activity*, Part 1, pp. 1-61.
- Decressin, Jörg, 1994, "Internal Migration in West Germany and Implications for East-West Salary Convergence", *Weltwirtschaftliches Archiv*, Vol. 130 No. 2, pp. 231-57.
- and Antonio Fatás, 1995, "Regional Labour Market Dynamics in Europe", *European Economic Review*, Vol. 39 No. 9, pp. 1627-55.
- Layard, Richard, Stephen Nickell, and Richard Jackman, 1991, *Unemployment: Macroeconomic Performance and the Labor Market*, Oxford University Press.
- Obstfeld, Maurice, and Giovanni Peri, 1998, "Regional Nonadjustment and Fiscal Policy," mimeograph, University of California at Berkeley.
- Oswald, Andrew, 1996, "A Conjecture on the Explanation for High Unemployment in the Industrialized Nations", Economic Research Papers No. 475, University of Warwick.
- Pissarides, C. A., and I. McMaster, 1984, "Regional Migration, Wages and Unemployment: Empirical Evidence and Implications for Policy," Discussion Paper 204, Centre for Labor Economics, (London School of Economics).

