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Postal Address:
Institut d'Economia de Barcelona
Facultat d'Economia i Empresa
Universitat de Barcelona
C/ Tinent Coronel Valenzuela, 1-11
(08034) Barcelona, Spain
Tel.: + 34 93 403 46 46
Fax: + 34 93 403 98 32
ieb@ub.edu
http://www.ieb.ub.edu

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THE EFFECTS OF UNEMPLOYMENT BENEFITS ON MIGRATION IN LAGGING REGIONS [*]

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ABSTRACT: In this paper we analyze the unintended effects on mobility of a national place-based policy (SIPTEA) that provides greater unemployment protection in two lagging regions of southern Spain (namely, *Extremadura and Andalucía*). Using a border identification strategy and (1981 and 1991) census data at the municipal level, we estimate the effects of SIPTEA on population growth, the probability of staying and in-migration in rural areas that are experiencing high unemployment and significant out-migration flows. The results indicate that the policy mitigated population losses by increasing both the probability of staying and in-migration, although the locational inefficiencies implied are not particularly large. We also explore the effects of greater unemployment protection on labor market outcomes. Here, the results indicate that the policy led to a 10- to 13-percentage point increase in unemployment.

JEL Codes: H73, J6, R23

Keywords: Unemployment protection, migration, mobility, place-based policy, lagging regions

Jordi Jofre-Monseny
Universitat de Barcelona & IEB
Facultat d'Economia i Empresa
Avda. Diagonal 690
08034 Barcelona, Spain
E-mail: jordi.jofre@ub.edu

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1. Introduction

There is ample evidence that one unintended consequence of the receipt of unemployment benefits is increased unemployment. Katz and Meyer (1990) and Bover et al. (2002), for example, document spikes in the probability of exiting unemployment as unemployment benefits near expiration in the US and Spain, respectively. Unemployment benefits may distort migration decisions, too. First, they can limit the net gains of migrating to areas with better labor market conditions. Second, geographical variation in pay can attract welfare prone individuals to areas offering higher benefits.

In this paper, we study the migration effects of a national place-based policy (*Sistema Integrado de Protección de los Trabajadores Eventuales Agrarios* - SIPTEA) that provides greater unemployment protection in *Extremadura* and *Andalucía*, two lagging regions in southern Spain. We focus primarily on migration patterns between 1981 and 1991, a period that coincides with the expansion of this program following the victory of the Social Democrats in the 1982 national election. In these years, the unemployed of *Extremadura* and *Andalucía* were entitled to receive 4.5 months of the national minimum wage, if they had worked a minimum of 60 days in the agricultural sector in the previous year. In 1991, eight percent of the labor force in these two regions received this unemployment benefit. In addition, the program also provided many (albeit short-term) jobs in local infrastructure projects which could, in turn, be used to fulfill the 60-day work requirement.

SIPTEA creates a geographic discontinuity in unemployment protection that, coupled with municipality level data drawn from the 1981 and 1991 population censuses, can be used to estimate the mobility effects of the policy. Specifically, we compare migration outcomes of treated vs. control municipalities lying along the policy border. These municipalities are rural, suffer high unemployment rates and experience high population losses – in our sample of border municipalities, the average unemployment rate in 1991 was 25 percent and the average 1981-91 decennial population growth rate was -15 percent. Hence, we estimate the extent to which greater unemployment protection can mitigate out-migration and population losses in lagging rural areas.

We find that SIPTEA reduced the negative population growth rate between 1981 and 1991 by three percentage points. The effect is explained both by a decrease in out-migration and by an increase in in-migration. Although the data indicate that small flows of cross-border migrants do exist, returned migrants from non-border regions account for most of the increase in in-migration. Reassuringly, the estimated effects are strongest for the demographic group with the lowest levels of educational attainment and, thus, the highest probability of being recipients

of unemployment benefits. Moreover, panel data estimates suggest that the results are not driven by the presence of time-invariant confounding factors. Our examination of the effects of SIPTEA on labor market outcomes indicates that the policy caused a large increase in unemployment of between 10 and 13 percentage points. The effect is similar for males and females although the mechanisms differ starkly. While the increase in male unemployment is fully explained by a decrease in the employment rate, the effect for females is driven by an increase in the participation rate.

Earlier empirical studies have analyzed the effect of unemployment benefits on mobility, and include papers that have examined the probability that those that are unemployed will migrate. Using US data, Goss and Paul (1990) conclude that receiving unemployment benefits decreases the probability of migrating. The same conclusion has been reached by Antolín and Bover (1997) and De la Roca (2013) using micro data from Spain.

Other studies have analyzed whether or not generous unemployment benefits attract welfare prone individuals in fiscally decentralized settings. Most US applications, including Gelbach (2004) and McKinnish (2005, 2007), focus on interstate differentials in the generosity of the Aid to Families with Dependent Children (AFDC) program[1]. Using data from the 1980 and 1990 censuses, Gelbach (2004) performs a 'difference-in-differences' analysis by comparing poor single mothers to suitable control groups, noting that the effect of welfare benefit generosity on migration gains is a function of children's ages. For the 1980 census sample, the author finds that the probability of out-migration decreases with welfare generosity more markedly among the poor single mothers than it does among the controls. The results for 1990 are less conclusive. McKinnish (2005) focuses on short-distance moves between counties at state borders. If geographic distance reflects mobility costs, out-migration from low-benefit (AFDC) states should be higher in border counties than it is in interior counties. The pattern is confirmed but the implied effects are small. In a follow-up paper, McKinnish (2007) combines this 'border' approach with the 'difference-in-differences' analysis used in Gelbach (2004). The results of this 'triple-differences' model confirm that AFDC causes a (modest) reduction in out-migration. Studies conducted outside the US include Edmark (2009), De Giorgi and Pellizzari (2009) and Fiva (2009). Edmark analyzes the introduction of stricter rules for receiving welfare benefits in Stockholm, but finds no effect on out-migration rates. De Giorgi and Pellizzari examine the migration decisions of non-EU migrants, focusing on welfare generosity as a factor determining destination choices across EU countries. Their results indicate that, conditional on moving, more

[1] Earlier studies include Enchautegui (1997) and Levine and Zimmerman (1999).

generous benefits may act as a magnet. Fiva tests whether Norwegian municipalities offering more generous welfare benefits attract welfare recipients. He finds a substantial effect and stresses the need to account for policy endogeneity.

To the best of our knowledge, however, this is the first evaluation of the effects on mobility of a large place-based policy that increases unemployment protection in an area characterized by high unemployment and significant out-migration flows and population losses. Methodologically, this paper is similar to McKinnish's (2005, 2007) in that it uses geographic discontinuities in unemployment protection to provide credible estimates of the effects of interest[2]. Since AFDC targets poor, single mothers with children, the literature examining this program is concerned with the mobility of a specific population group, i.e., poor single mothers. This paper complements this US literature by examining a more general unemployment benefit that, in contrast to AFDC, can be accumulated over the entire lifecycle.

This paper is also related to studies dealing with the effects of public policy on the location of economic activity. Blanchard and Katz (1992), Decressin and Fatas (1995) and Jimeno and Bentolila (1998) study the dynamic adjustments that follow regional economic shocks. In contrast to results for the US reported in Blanchard and Katz (1992), Decressin and Fatas (1995) and Jimeno and Bentolila (1998) conclude that migration does not play a prominent role in the adjustment processes of the typical European and Spanish region, respectively. One hypothesis forwarded is that the larger public sectors in the European economies might mute migration responses. Using a spatial equilibrium framework, Albouy (2009) studies the effect of federal income taxes on the location of economic activities across the US. Since higher wages in more productive cities partly offset higher costs of living, taxing nominal income generates uneven tax burdens across US cities. Simulation results indicate that federal income taxes reduce long-run employment in high-wage areas by 13 percent.

Following on from this introduction, the rest of the paper is organized as follows. In section 2 we describe SIPTEA and unemployment benefits in Spain in depth. Section 3 presents the main econometric specifications and Section 4 describes the data and the variables used. Section 5 presents and discusses the econometric results and Section 6 provides a summary and some concluding remarks.

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[2] Lalive (2008) uses a 'border' approach to study the effects of unemployment insurance on unemployment in Austria. A reform temporarily extended insurance pay to workers aged 50 or more in some regions. This reform is not likely to affect mobility because workers would need to move well in advance of their eventual layoff and, therefore, it is well suited to study the effects of unemployment insurance on unemployment.

2. Institutional background

Description of SIPTEA: In Spain, the agrarian unemployment benefit (or *subsidio agrario*) has been available exclusively to residents of *Extremadura* and *Andalucía* since 1984. The benefit forms part of a broader national policy (*Sistema Integrado de Protección de los Trabajadores Eventuales Agrarios* - SIPTEA) that seeks to protect the temporary agricultural workers of these two southern regions. Besides unemployment benefit, SIPTEA includes a program that hires local population for (minor) infrastructure projects (*Plan de Empleo Rural*)[3]. Map 1 shows the location of *Extremadura* and *Andalucía* within Spain. The bordering regions are *Castilla-León*, *Castilla-la Mancha* and *Región de Murcia*.

[Insert Map 1 here]

The agrarian unemployment benefit (henceforth, Agrarian UB) is only available to workers who, being resident in a municipality of *Extremadura* and *Andalucía*, are in the Special Agrarian Regime of Spain's Social Security. Between 1984 and 1990, workers in the agricultural sector that had been employed for a minimum of 60 days in a given year were entitled to receive the subsidy the following year, provided their total income was below the minimum wage[4]. The yearly subsidy corresponded to 4.5 months of the national minimum wage and as of 1985 a payment of 2.5 months of the minimum wage was introduced for workers that had been employed for between 10 and 60 days. In 1991, 8 percent of the labor force in *Extremadura* and *Andalucía* received the Agrarian UB.

The *Plan de Empleo Rural* (PER) consists of ear-marked grants that flow from the Spanish Unemployment Office to municipalities in the rural areas of *Extremadura* and *Andalucía* with high unemployment rates. In 1987, a total of 237,700 jobs were included in this program. On average each infrastructure project provided 30 jobs with a typical duration of less than a month. The days worked on these projects could be used by workers to fulfill the requirements of the minimum number of days worked, thus making them eligible to receive the Agrarian UB. In

[3] SIPTEA includes a third program that offers short training courses (between 60 and 90 days) with the objective of providing agricultural workers with the necessary skills to become employable in other sectors *(Formación Ocupacional Rural)*. Spending in this third program amounts to roughly 4 percent of the total SIPTEA budget (González, 1990).

[4] Days worked in agriculture elsewhere in Spain or abroad can be used to fulfill this minimum 60-day requirement. From 1991 onwards, the low personal income requirement (income below minimum wage) was replaced by a household requirement (mean household income below minimum wage). At the same time, pay became age-dependent with more generous benefits for older claimants. For those aged 60 or more, the subsidy was as high as 7.5 months of the minimum wage.

practice, and in addition to providing jobs, the objective of the PER has been to qualify its workers for the Agrarian UB (González, 1990). In terms of eligibility, the law stipulates that local unemployed agricultural workers resident in *Extremadura* or *Andalucía* should be given priority.

SIPTEA was introduced in 1984, replacing the *Empleo Comunitario* (EC) program that had been in operation since 1971. The EC program hired workers for infrastructure projects as a means of providing the unemployed of the rural areas of *Extremadura* and *Andalucía* with income. However, these projects were often fictitious, so that the program was, de facto, partly a form of unemployment benefit (González, 1990). The 1984 reform separated the benefit (i.e. the Agrarian UB) from the program for hiring workers for infrastructure projects (PER). The solid line in Graph 1 shows the evolution in (1) the number of workers on the EC program between 1979 and 1983 and (2) the number of recipients of the Agrarian UB between 1984 and 2000. The number of workers on the EC program had increased slowly during the 70s but grew sharply in the early 80s, rising from 53 thousand in 1981 to 159 thousand in 1983. In 1984, the first year of the Agrarian UB, 192 thousand workers received payments, a number that was to increase to roughly 295 thousand in 1989 and 1990[5]. The figure then fell to 236 thousand in 1991 and remained at that order of magnitude throughout the 90s[6].

The expansion of the program coincided with the victory of the Social Democrats at the 1982 national election which saw a left-wing government take office for the first time in 46 years. Indeed, the timing of the program seems to have responded more to the party's political agenda (Felipe González, Prime Minister, and Alfonso Guerra, Deputy Prime Minister, both being native to *Andalucía*) than to asymmetric economic shocks[7]. Graph 2 shows the evolution in the number of workers on the two schemes and in the rates of unemployment of both the treated regions (*Extremadura* and *Andalucía*) and the neighboring untreated regions (*Castilla-León*, *Castilla-la Mancha* and *Región de Murcia*) between 1977 and 1995. Although the unemployment rate in the treated regions was higher for the whole period, the pre-policy trends in both groups of regions seem to be common.

[5] Strictly speaking, this is the number of recipients in any given month (12 month average) and as such underestimates the total number of individuals receiving the benefit in a given year. In 2001, the latter was 37 percent higher than the former (García-Pérez, 2004).

[6] The fall in the number of recipients between 1990 and 1991 coincides with a huge dip (43 percent decrease) in the aggregate number of days worked by individuals within the Special Agrarian Regime of Spain's Social Security. In fact, a drought in 1994 forced the government to reduce the minimum number of days worked to 45 (Corzo, 2002).

[7] Curto-Grau (2013) examines whether the introduction of SIPTEA increased the Social Democrats' share of the vote in subsequent national elections.

[Insert Graph 1 here]

[Insert Graph 2 here]

During the period studied here, there are indications that a significant proportion of the Agrarian UB recipients were not, in fact, genuine agricultural workers. A fraudulent practice involved the assigning of days of work to relatives so as to maximize the unemployment benefits received at the household level (Cansino, 2000). This practice would seem to have been quantitatively significant. The dashed and dotted lines in Graph 1 show the evolution over time in the number of male and female recipients. While the number of male recipients fell by 32 percent between 1984 and 1991, the number of female recipients almost quintupled. In fact, as of 1991, there were more females than males covered by the program. However, this change in the gender profile of the recipient does not coincide with a change in the profile of the agricultural worker in the regions of *Extremadura* and *Andalucía*. According to the Labor Force Survey, the ratio of male to female agricultural workers in these two regions was around 1 to 7 both in 1984 and in 1991. Furthermore, the number of recipients of the Agrarian UB has systematically exceeded the Labor Force Survey figure for the number of unemployed agricultural workers in *Extremadura* and *Andalucía*. In 1991, the number of unemployed agricultural workers stood at 159,850 compared to a total of 236,327 Agrarian UB recipients[8]. Finally, Cansino (2000) and García-Pérez (2004) have looked at the distribution of the number of days worked by the recipients and find a spike at the point representing the minimum number of days worked requirement.

Overall, SIPTEA increased the income of (some) individuals and households in the rural areas of *Extremadura* and *Andalucía* by providing (1) jobs in the PER projects and (2) Agrarian UB. Below, we analyze the extent to which individuals and households responded to these incentives. Census data prior to 1981 are not available at the municipal level and so we draw mainly on data from the 1981 and 1991 Population Censuses. Specifically, we focus on migrations taking place between 1981 and 1991, a period that coincides with the program's expansion. Although the policy is still operative, we do not examine migration patterns between 1991 and 2001 because a 1996 reform extended the PER program to parts of other Spanish regions.

[8] This figure is the number of unemployed in the agriculture sector averaged across the four quarters of 1991.

Unemployment benefits in Spain: As in most European countries, there are two broad types of unemployment benefit in Spain: unemployment insurance (UI) and unemployment assistance[9]. Unemployment insurance is more generous and more closely linked to each worker's past contributions. As for unemployment assistance, there are two programs: the Agrarian UB described above (only available to the residents of *Extremadura* and *Andalucía*) and the national unemployment assistance program (UA).

In 1991, a worker with a tenure exceeding six months who was subsequently laid off was entitled to unemployment insurance for half of period of tenure (to a maximum of two years). Insurance pay was proportional to past wages (with certain caps) and this proportion was reduced over time from 80 to 60 percent. As for the UA, there were typically two instances in which a laid-off worker was entitled to this less generous form of benefit. The first instance arose when the worker had a tenure of between 3 and 6 months. In that case, the unemployed worker received 75 percent of the minimum wage for a period equivalent to that of his or her tenure. This meant that a worker with tenure of between 3 and 6 months received benefits amounting to 2.25 to 4.5 months of the minimum wage. The second instance in which a worker was entitled to unemployment assistance arose when he or she was no longer entitled to unemployment insurance. This only applied to workers aged 45 or more with family dependents. The duration of these benefits ranged from 18 to 36 months and the pay was 75/100/125 percent of the minimum wage for individuals with 1/2/3 dependents.

In our period of interest, the Agrarian UB was more generous than the UA. Whereas under the Agrarian UB scheme a worker needed to have worked for 60 days to be entitled to 4.5 months of the minimum wage, under the UA program a worker needed to have worked for 6 months to receive that same amount. Similarly, whereas under the UA program a worker needed to have worked for a minimum of 3 months to receive some benefit (2.25 months of the minimum wage), under the Agrarian UB scheme a worker only needed to have worked for 10 days to receive a slightly higher amount (2.5 months of the minimum wage). Moreover, days worked on the numerous PER projects could be used to fulfill the minimum number of days that gave access to the Agrarian UB.

In Spain, the number of individuals receiving UI, UA and the Agrarian UB were 616, 575 and 236 thousand, respectively, in 1991. In *Extremadura* and *Andalucía* alone, 108 and 153

[9] For a summary of unemployment benefit reforms in Spain between 1987 and 1994, see Bover et al. (2002). In Spain, unemployment insurance and unemployment assistance are referred to as *'prestación contributiva'* and *'prestación asistencial'*, respectively.

thousand individuals received UI and UA, respectively, in that same year. Notice that all 236 thousand recipients of the Agrarian UB benefits lived in these two regions, and therefore, SIPTEA seems to have significantly increased unemployment protection. The first two rows in Table 1 show the fraction of the unemployed that received UI, UA and the Agrarian UB in the treated regions and in the untreated neighboring regions of *Castilla-León*, *Castilla-la Mancha* and *Región de Murcia*.

[Insert Table 1 here]

The proportion of unemployed receiving UI was 0.15 in the treated regions (*Extremadura* and *Andalucía*) and 0.21 in the neighboring regions. As for UA, the corresponding figures were similar (0.21 vs. 0.23). Since 32 percent of the unemployed in the treated regions received the Agrarian UB, the fraction of the unemployed receiving some form of unemployment assistance (UA or the Agrarian UB) was much higher in the treated than in the neighboring regions (0.53 vs. 0.23). These figures are 0.68 and 0.44 if we consider all unemployment benefits together. In the last two rows of the Table we focus on 'border' provinces (see panel B in Map 1). Here, the figures are even starker as 41 percent of the unemployed in the treated provinces received the Agrarian UB. As a result, 0.64 and 0.26 of the unemployed received some form of unemployment assistance in the treated vs. the neighboring provinces (0.79 and 0.48 considering all types of unemployment benefit). Overall, the results in Table 1 seem to indicate that SIPTEA generated a substantial change in unemployment protection.

3. Econometric specification

Our main outcome of interest in this paper is the population growth rate (or related measures such as the probability of staying and the in-migration rate) for the period 1981-91. The baseline econometric specification is:

$$y_{i81-91} = \beta \cdot SIPTEA_i + x'_{i81}\delta + \varepsilon_i \qquad (1)$$

where y_{i81-91} is the population growth rate, the probability of staying or the in-migration rate in the period 1981-91 in municipality *i*. The explanatory variable of interest, $SIPTEA_i$, indicates if the policy aimed at protecting temporary agricultural workers was operative in municipality *i*. Since this national policy was only implemented in the regions of *Extremadura* and *Andalucía*, the variable $SIPTEA_i$ takes a value of one only if the municipality belongs to either of these two southern regions. The error term ε_i reflects population growth shocks over the decade spanning

1981-91. We introduce, as control variables, pre-determined municipality characteristics that might affect subsequent population growth (x'_{i81}). We also study the effects of SIPTEA on unemployment. Here, the baseline specification is:

$$u_{i91} = \varphi \cdot SIPTEA_i + z'_{i91}\lambda + \upsilon_i \tag{2}$$

where u_{i91} is the unemployment rate in municipality *i* in 1991 and υ_i is the corresponding error term. In some specifications, we control for contemporaneous municipal characteristics (z'_{i91}) with the potential of affecting unemployment in the municipality.

Following Holmes (1998) and Black (1999), we choose neighboring municipalities that are on opposite sides of the SIPTEA regional border as our treatment and control groups. This identification strategy is appealing because it controls for confounding unobservables that evolve smoothly over space. We operationalize this strategy by estimating equations (1) and (2) with municipalities that are sufficiently close to the policy border. That is:

$$y_{i81-91} = \beta \cdot SIPTEA_i + x'_{i81}\delta + \varepsilon_i \quad \text{with } db_i \le \overline{db} \tag{3}$$

$$u_{i91} = \varphi \cdot SIPTEA_i + z'_{i91}\lambda + \upsilon_i \quad \text{with } db_i \le \overline{db} \tag{4}$$

where db_i is the distance from municipality *i* to the SIPTEA border and $\overline{db}$ is a threshold distance that we fix alternatively at 15, 20 and 25 km. The distance from municipality *i* to the SIPTEA border is computed as the air distance between the center of municipality *i* and the closest municipality center on the other side of the border[10].

4. Data and variables

Data: We draw primarily on data from the 1991 Population and Housing Census. This census provides a rich data set at the individual level including information about age, gender, municipality of residence in 1991 and 1981, level of educational attainment and labor market status (employed, unemployed, and non-participant). Unfortunately, municipal data at the individual-level that are relevant to this study are not available to researchers[11]. However, we do

[10] An alternative distance is that measured by road, which is a better proxy for transport or mobility costs. However, in this application, we are interested in municipalities that are close in terms of confounding unobservables which determine mobility (and unemployment) in rural areas. In this respect, plain geographic distance seems a more natural metric.

[11] Public-use microdata files for a 10 percent sample of the population in each municipality exceeding 20 thousand inhabitants and for the population in each province that lives in a municipality with fewer than 20 thousand inhabitants are available. Unfortunately, the municipality of residence is not reported for individuals living in municipalities with fewer than 20 thousand inhabitants.

have access to data concerning relevant municipality characteristics such as the number of inhabitants by age group, by gender, by labor market status and by level of educational attainment. We also know the number of individuals in 1991 that were already living in the municipality in 1981 and the number of in-migrants that arrived between 1981 and 1991 by region of origin. Furthermore, we know the number of individuals in each of these migration categories by labor market status and by level of educational attainment. We also draw on some labor market status and mobility data from the 1981 Population and Housing Census. We merge these data on the socio-economic characteristics of the population with non-agricultural employment data from the 1980 and 1970 Censuses of Establishments and with agricultural employment data from the 1982 and 1989 Agrarian Censuses.

Setting bandwidths of 15, 20 and 25 km in equations (3) and (4) gives us estimation samples of 184, 236 and 306 'border' municipalities, respectively. In Table 2 we provide summary statistics for the 236 municipalities that lie within 20 km of a relevant border. The SIPTEA program was operative in 40 percent of these 236 municipalities, which are relatively small with a mean of 1,943 and a median of 754 inhabitants. The municipalities in our sample experience, on average, substantial population losses, with an average negative population growth rate of 15.5 percent over the decade 1981 to 1991. This figure does not differ greatly from -12.7 percent, which is the average rate of municipal population growth in the regions lying along the SIPTEA border (i.e. *Extremadura*, *Andalucía*, *Castilla-León*, *Castilla-la Mancha* and *Región de Murcia*). This negative growth contrasts with a contemporaneous increase (3.1 percent) in the aggregate population of this group of regions. These two figures can be explained by the intensity of intraregional migration flows from rural to urban municipalities[12]. For the municipalities in the top population quartile in 1981, the aggregate population growth over the subsequent decade was 5.1 percent, while it was -9.2 for the municipalities in the other three quartiles. Besides losing population over the 80s, the average municipality in the sample is one in which the 1991 unemployment rate was high (24.3 percent) and the level of education was low. In that same year, only 3.7 percent of 16- to 64-year-olds had completed tertiary education whereas 34 percent had fewer than five years of education.

[Insert Table 2 here]

[12] See Bover and Arellano (2002) for a study of the personal and location determinants of Spain's intraregional migrations over the 1980s and 1990s.

Mobility outcomes 1981-91: The population growth rate between 1981 and 1991 is the first mobility outcome that we consider. Abstracting from mortality and birth rates, we focus on out- and in-migration flows as the sources of population growth. Specifically:

$$\frac{Pop_{i91} - Pop_{i81}}{Pop_{i81}} \approx \frac{Stayers_{i81-91} + In\text{-}migrants_{i81-91} - Stayers_{i81-91} - Out\text{-}migrants_{i81-91}}{Pop_{i81}} \quad (5)$$

and using that $Out\text{-}migrants_{i81-91}$ is Pop_{i81} minus $Stayers_{i81-91}$ yields:

$$\frac{Pop_{i91} - Pop_{i81}}{Pop_{i81}} \approx \frac{Stayers_{i81-91}}{Pop_{i81}} + \frac{In\text{-}migrants_{i81-91}}{Pop_{i81}} - 1 \quad (6)$$

We define the probability of staying as the number of individuals aged 16 to 64 in municipality *i* in 1991 that lived in that same municipality in 1981, divided by the population level in 1981. Analogously, the in-migration rate is defined as the number of individuals aged 16 to 64 in municipality *i* in 1991 that lived somewhere else in 1981, relative to the population level in 1981. Panel A in Graph 3 plots the 1981-91 population growth of the municipalities in provinces that are contiguous to the SIPTEA border (see panel B in Map 1). These municipalities are sorted by distance to the policy border where treated municipalities are assigned positive values. The dots are averages for rank percentile bins, each representing 40 observations, while the solid lines are local linear regression fits estimated separately on either side of the border. Panels B and C show the corresponding plots for the probability of staying and the in-migration rate outcomes.

[Insert Graph 3 here]

Panel A shows that, on average, municipalities experienced negative population growth rates on both sides of the border. However, population losses were smaller in the treated municipalities than they were in the controls (-15 vs. -20 percent). Inspection of panels B and C, respectively, shows that a higher probability of staying and a higher rate of in-migration would appear to account for this difference. The fact that mobility outcomes evolve discontinuously at the SIPTEA border suggests that this policy might have affected migration decisions.

Baseline municipality characteristics in 1981: The border identification strategy that we use is appealing because the estimates of interest will be robust to unobservables that evolve smoothly over space. In order to assess the meaningfulness of this approach in this application, we examine whether observable baseline municipality characteristics that might affect subsequent mobility decisions

evolve smoothly at the border. Ideally, we would like these confounding observables to be pre-determined and, thus, to be measured before 1971 (the year *Empleo Comunitario* was introduced). Unfortunately, for most of the variables that are relevant to us, the first data available are drawn from different censuses conducted around 1981. With this caveat in mind and given that the program expanded dramatically between 1981 and 1991, we still believe it to be an interesting exercise to examine relevant municipality characteristics in 1981, i.e. x'_{i81}.

In order to determine whether there is a discontinuity in physical conditions for agriculture at the border, panel A in Graph 4 plots the index constructed by Goerlich-Gisbert and Cantarino-Martí (2010) that measures the ruggedness of terrain. Municipalities that are close to the border have a more rugged relief than those located further from it, suggesting that the provincial borders were not randomly fixed in 1833[13]. Nevertheless, there is no evidence that the physical conditions for agriculture change discontinuously at the border. Panel B examines agricultural employment levels by drawing on data from the 1982 Agrarian Census and dividing the number of full-time equivalent jobs in agriculture (including days worked by owners and their relatives) by the 1981 population level. The importance of agriculture can be seen to increase as the border is approached indicating that our average municipality is prominently rural. However, there is no clear indication of a discontinuity. Panels C and D examine the behavior of employment in the industry and services sectors. Both employment levels, constructed using the 1980 Census of Establishments, are expressed relative to the 1981 population level. Although employment in services seems to increase at the border, no clear evidence of a significant discontinuity in these variables is observed. As described earlier, the Labor Force Survey (see Graph 2) indicates that treated and control regions had similar pre-policy trends in unemployment, albeit that their absolute levels differed. In Panel E we examine whether these differences in unemployment persist at the border. To that end, we use unemployment data at the municipality level from the 1981 Population and Housing Census. As expected, unemployment is higher on average in treated municipalities than it is in the controls. However, as we move closer to the SIPTEA border, the unemployment differential shrinks. In fact, the 'bin' averages suggest a smooth evolution of unemployment at the border. Overall, the municipality characteristics analyzed here suggest that economic conditions do not change abruptly at the SIPTEA border.

[13] The (seventeen) Spanish regions (*Comunidades Autónomas*) were created between 1979 and 1981, just after the Constitution was passed in 1978. These regions were constructed as aggregations of provinces created back in 1833. Therefore, regional borders, which in turn determine the geographical scope of SIPTEA, could not have been defined to reflect current economic conditions.

We now turn to examine features related to the concentration of agricultural property, which are known to vary across Spain. In the north, farm land is partitioned in small family-owned estates; in the south, large estates (*latifundios*) employing temporary seasonal workers with no land of their own predominate. Panel F plots the proportion of land on estates with more than 200 ha, whereas panel G shows the share of temporary employees engaged in agriculture (measured in terms of full-time equivalent jobs). On average, the prevalence of land belonging to 'large' estates is higher on the treated side, but this difference disappears at the border. In contrast, the importance of temporary agricultural work increases abruptly at the border – the share of employees in temporary jobs increases by more than 10 percentage points. Finally, and possibly in relation to the concentration of property, the distribution of population in rural areas also evolves with latitude. The population in the rural areas to the north tends to be more scattered, residing in smaller settlements, while in the south it tends to concentrate in fewer but larger municipalities. Panel H examines population size in 1981 and shows that municipalities are larger on the treated side of the border. Hence, and in contrast to the general economic conditions examined above, the prevalence of temporary work and population size are, on average, higher on the treated side of the border. Our general strategy is to include these variables as controls given that their omission might confound the estimates of interest.

[Insert Graph 4]

Unemployment in 1991: Besides analyzing the migration effects of SIPTEA, we also explore the effects of the program on the unemployment rate in 1991. Panel D in Graph 3 shows municipal unemployment rates as taken from the 1991 Population and Housing Census. The unemployment rate increases discontinuously at the SIPTEA border, being around 35 and 20 percent on the treated and control sides, respectively. Notice that this data pattern for 1991 contrasts with the much smoother evolution presented by this variable ten years earlier (see panel E in Graph 4), suggesting that SIPTEA might have increased unemployment significantly. The aggregate year-to-year changes in the unemployment rate of treated and control regions in Graph 2 points in the same direction. While the 1975-1983 trends in unemployment were similar for treated and control regions, the introduction of SIPTEA is associated with a greater increase in unemployment in *Extremadura* and *Andalucía*.

5. Results

Baseline results: The baseline regression results of the effect of SIPTEA on mobility (corresponding to equation 3) are presented in panels A to C in Table 3. Columns 1 and 2, 3 and 4, and 5 and 6 report the results for municipalities that are respectively within 15, 20 and 25 km of the relevant border. Columns 1, 3, and 5 only include regional border fixed effects (i.e. *Extremadura×Castilla-León*, *Extremadura×Castilla-la Mancha*, *Andalucía×Castilla-la Mancha,* and *Andalucía×Región de Murcia*). Columns 2, 4, and 6 include additionally the baseline municipality characteristics described above (x'_{i81}), namely, a terrain ruggedness index, agricultural employment in 1982, employment levels in the industrial and services sectors in 1980, the unemployment rate in 1981, the proportion of agricultural land on estates with more than 200 ha, the share of temporary agricultural jobs in 1982, and the (logged) population size in 1981.

[Insert Table 3 here]

Turning first to the specifications that only contain the regional border fixed effects as control variables, our regression results are closely aligned with the data plots presented in Graph 3. The 20-km bandwidth results presented in column 3 imply that SIPTEA increased population growth by 5.1 percentage points, raised the probability of staying by 4.0 percentage points and increased the in-migration rate by 1.3 percentage points. The inclusion of the baseline municipality characteristics significantly reduces the policy estimates with regards to population growth and the probability of staying outcomes. Thus, according to the 20-km sample estimates, conditioning on baseline municipal characteristics reduces the policy estimates on the population growth rate and the probability of staying to 2.8 and 2.0 percentage points, respectively[14]. The same patterns emerge for the other bandwidth specifications shown in columns 1 and 2, and 5 and 6. Overall, the results indicate that SIPTEA did affect mobility, although the implied effects are modest. Note that a 2.8-percentage point increase in the population growth rate is equivalent to 0.18 and 0.22 of the variable's mean and standard deviation, respectively.

Panel D reports the results on unemployment (corresponding to equation 4). Besides the regional border fixed effects, columns 2, 4, and 6 further include, as control variables (z'_{i91}), the ruggedness index, agricultural employment per 100 inhabitants in 1989, the share of temporary agricultural jobs in 1989, the employment levels in the industrial and services sectors per 100

[14] As expected, the divergence in results between the specification with and without controls is driven by the introduction of the control variables that evolve discontinuously at the border, namely, the share of temporary agricultural employment and the baseline (logged) population level.

inhabitants in 1990 and the (logged) population level in 1991. Here, the inclusion of the controls only results in a slight decrease in the estimates of interest. These estimates imply that SIPTEA increased the unemployment rate by roughly 13 percentage points. This large increase in unemployment is of a similar magnitude to that implied by Graph 3 (panel D).

In Table A1, deferred to the annex, we present a series of placebo estimates of equations (3) and (4). Columns 1 to 3 correspond to specifications with bandwidths of 15, 20 and 25 km respectively in which the policy border has been moved 15, 20 and 25 km to the north. Thus, in these specifications all the observations are in fact controls. Columns 4 to 6 report the analogous exercise where the policy border has been moved to the south, which implies that all municipalities are in fact treated. Only one of the 24 estimates is significant at the 5 percent level, indicating that test size is reasonable.

Panel data estimates: The analysis of baseline municipality characteristics (x'_{i81}) indicated that population size and the share of temporary agricultural workers do not evolve smoothly at the SIPTEA border. Furthermore, the results in Table 3 show that the inclusion of these controls affects policy estimates on mobility. Hence, it might be that other variables that we do not observe (and that are discontinuous at the border) might also be confounding our estimates of interest. To address this concern, we resort to panel data models. Specifically, we use the 1981 Population and Housing Census and compute the population growth, the probability of staying and the in-migration rate for the period 1970 to 1981. Using a pool of 1970-81 and 1981-91 observations, we differentiate equations (3) and (4) to obtain the 'difference-in-differences' models that are robust to time-invariant municipality factors affecting mobility and unemployment. Specifically:

$$y_{it81-91} - y_{i70-81} = \beta \cdot \Delta SIPTEA_i + (x'_{i81} - x'_{i70})\delta + \Delta\varepsilon_i \qquad \text{with } db_i \le \overline{db} \tag{7}$$

$$u_{i91} - u_{i81} = \varphi \cdot \Delta SIPTEA_i + (z'_{i91} - z'_{i81})\lambda + \Delta\upsilon_i \qquad \text{with } db_i \le \overline{db} \tag{8}$$

Imbens and Wooldridge (2008) propose an alternative model that assumes unconfoundedness given lagged outcomes. The model is obtained by introducing the dependent variable of the first period as a right-hand side variable in equations (7) and (8):

$$y_{it81-91} - y_{i70-81} = \beta \cdot \Delta SIPTEA_i + (x'_{i81} - x'_{i70})\delta + \psi \cdot y_{i70-81} + \Delta\varepsilon_i \qquad \text{with } db_i \le \overline{db} \tag{9}$$

$$u_{i91} - u_{i81} = \varphi \cdot \Delta SIPTEA_i + (z'_{i91} - z'_{i81})\lambda + \xi \cdot u_{i81} + \Delta\upsilon_i \qquad \text{with } db_i \le \overline{db} \tag{10}$$

Note that the introduction of the pre-treatment outcome as a right-hand side variable introduces a correlation between this regressor and the error term. Nevertheless, making treated and control observations comparable on pre-treatment outcomes can make the estimates of interest more credible. In fact, Imbens and Wooldridge conclude that the second model is more attractive in practice. We report the results of the two models in Table 4. Columns 1 to 3 show the 'difference-in-differences' for the 15, 20 and 25 km bandwidths, respectively. The remaining three columns show the corresponding results for the 'unconfoundedness' approach.

[Insert Table 4 here]

The results of the 'difference-in-differences' and the 'unconfoundedness' approaches are quite similar. In turn, these estimates are similar in sign and magnitude to the cross-sectional estimates of Table 3 although, for population growth and the probability of staying outcomes, the panel data estimates are somewhat larger (in absolute values) than the cross-sectional results. Focusing on the 'unconfoundedness' model for the 20-km bandwidth, the estimates imply that SIPTEA increased the population growth rate and the probability of staying by 3.7 and 3.1 percentage points, respectively. Unfortunately, and due to data restrictions, the analyses below are based on cross-sectional data on mobility (1981-91) and unemployment (1991). In the remaining analyses, we introduce the controls described above as this should bring us closer to the causal effects of interest. In this respect, it is reassuring that the cross-sectional results in Table 3 and the panel data estimates in Table 4 are similar, suggesting that the biases attributable to omitted (time-invariant) variables in these cross-sectional exercises might not be very large.

Cross-border migration: For the US, McKinnish (2007) has documented that welfare migration is most likely among individuals living close to state borders where the discontinuities in welfare generosity are most marked. In order to test if SIPTEA's effect on in-migration is explained by short-distance moves, we decompose the policy effect on in-migration by the geographical origin of the inflow. For each municipality, we know the number of 1981-91 in-migrants (aged 16 to 64 in 1991) that came from each of the 17 Spanish regions (see panel A in Map 1). We consider three categories: (1) migrants from the contiguous region on the opposite side of the policy border, (2) migrants from other Spanish regions and (3) migrants from other municipalities within the municipality's region. The in-migration rate for a given category is the number of individuals (aged 16 to 64) in 1991 in that category that were somewhere else in 1981, divided by the municipality population in 1981. The results are reported in Table 5.

[Insert Table 5 here]

The results indicate that SIPTEA attracted 0.25 cross-border in-migrants in the 1981-91 period per 100 individuals in the destination municipality in 1981. This effect is small if we consider that the policy attracted 1.4 in-migrants when all origins are taken into account (see Table 3). This result is in line with McKinnish's finding that welfare cross-border migration exists but is of limited importance. In our case, the largest inflows of in-migrants originated in non-border regions. Between the end of the 1950s and the early 1970s, there were huge inter-regional flows of migrations in the direction of the more prosperous regions, especially Catalunya, Madrid and the Basque Country. As such, our results suggest that SIPTEA might have caused some 'welfare-induced' return migration.

The estimates in Table 5 have important implications as regards the interpretation and external validity of our exercise. With (short-distance) cross-border migration, an individual registered as an in-migrant in a treated municipality is an out-migrant in a control municipality. Hence, short-distance migrations across the border might explain the discontinuity in both the probability of stay and the in-migration rate. This would imply that policy estimates at the border tend to overestimate the policy effects in interior municipalities. Since the bulk of the effect on in-migration is not driven by (short-distance) cross-border migration, our mobility estimates can reasonably be generalized to the interior municipalities of these lagging regions.

Mobility results by educational level: We now turn to the effects of SIPTEA on mobility for different levels of educational attainment. Specifically, we consider four groups: <5 years of education (including illiterates), 5 to 8 years of completed education (roughly corresponding to primary education), secondary education and tertiary education (more than 12 years of education). The probability of staying for a given educational group is defined as the number of individuals (aged 16 to 64) in 1991 in that group that were in the municipality in 1981, divided by the population in 1981. Likewise, the in-migration rate is the number of individuals (aged 16 to 64) in 1991 in that group that were somewhere else in 1981, divided by the municipality population in 1981. The results of these decompositions are shown in Table 6.

[Insert Table 6 here]

If we start with the probability of staying, our results in panel A indicate that the effect of SIPTEA on out-migration is driven by the behavior of individuals within the lowest educational

group (<5 years of schooling). In fact, the effects for the remaining educational categories are statistically insignificant. As for the in-migration rate, and focusing on the 20-km bandwidth results, the policy brought in 0.59 migrants with <5 years of education per 100 inhabitants in 1981 whereas these figures were 0.62, 0.11 and 0.09 for the 5 to 8 years of schooling, secondary and tertiary education groups. Hence, the policy seems to have attracted a similar amount of in-migrants from the two lowest educational groups. Notice that these demographic groups might differ in size and mobility. If the effect is measured in terms of the variables' mean, it is much larger for the category with <5 years of schooling (0.48) than it is for the remaining categories (0.20 for the group with 5 to 8 years of education and 0.13 and 0.17 for those with secondary and tertiary education, respectively). Panel C reports the policy effect on the share of in-migrants with <5 years of education and reveals that the share increases by about 5 percentage points. Overall, the results in Table 6 are reassuring since they indicate that the effects of SIPTEA have been more marked for the group with the lowest educational level and, thus, the group of people that are more likely to be receiving unemployment benefits.

Further results regarding unemployment: To determine whether in-migration of welfare prone individuals might partly explain the unemployment rate discontinuity at the SIPTEA border, panel A in Table 7 reports the unemployment rate estimates for 'stayers' and in-migrants, respectively. The unemployment rate increases discontinuously at the border for both groups, the effect being slightly larger for 'stayers' than for in-migrants. Hence, 'importing the poor' does not seem to explain the increase in unemployment observed at the border. The results in Table 7 suggest that SIPTEA had stronger mobility effects on the less-educated and, thus, the unemployment change at the SIPTEA border could be the result of sorting by skills. In panel B, we first report the estimates on the unemployment rate including dummies for the shares of the working-age population in each of the four educational groups described above. Then, we show the results of a similar exercise where we hold the shares of the municipal labor force in 18 different occupations fixed. Controlling for the educational level of the working-age population in the municipality leaves the estimated effect of SIPTEA on unemployment virtually unaffected. By contrast, including the share of the labor force in narrowly defined occupations reduces the estimated effect by 41 percent. This result suggests that one channel through which unemployment benefits increase unemployment is by reducing the mobility of workers from high to low unemployment occupations.

[Insert Table 7 here]

Panel C in Table 7 shows the unemployment results for males and females. Here, we define the unemployment rate as the number of unemployed individuals over the relevant working age population. This definition, while reducing unemployment rates, has the advantage that it can be decomposed between employment and participation rates[15]. The results indicate that the effect of SIPTEA on unemployment is slightly greater for males than it is for females. The 20-km bandwidth results imply unemployment rate increases of 9.26 and 7 percentage points for males and females, respectively. Interestingly, the mechanisms driving these unemployment effects vary starkly form men to women. While the increase in unemployment is caused by a reduction in the employment rate for males, an increase in the participation rate fully explains the increased unemployment among females.

6. Summary and concluding remarks

SIPTEA is a national policy providing higher unemployment benefits to the residents of *Andalucía* and *Extremadura*, two lagging regions in the south of Spain. Using a border identification strategy, we have estimated the unintended effects of this large place-based policy on mobility. Specifically, we have estimated the effects of SIPTEA on population growth, the probability of staying and in-migration in rural municipalities experiencing high unemployment and significant migration outflows. Our results indicate that the policy under analysis reduced out-migration and increased in-migration, thus reducing population losses. These results are not explained by short-distance flows of migrants across the SIPTEA border and, hence, can be generalized to the interior of these lagging regions. The effects of the policy are more marked among individuals with the lowest level of educational attainment and, thus, those that are more likely to be recipients of unemployment benefit. Moreover, our panel data estimates show that these results are not driven by the presence of time-invariant factors affecting migration. Quantitatively, our estimates imply that SIPTEA increased the average municipal population growth rate by 3 percentage points between 1981 and 1991. Given that the municipalities lost an average of 15 percent of their population over this period, we can conclude that the effects recorded on mobility are modest. As such, it does not seem that the place-based policy analyzed here has given rise to very large locational inefficiencies.

[15] If U, E, L and P stand for unemployed, employed, labor force and population, the unemployment rate is U/P, the employment rate is E/P and the participation rate is L/P. Hence, U/P= E/P-L/P since L=U+E.

We have also explored the unintended effects of SIPTEA on labor market outcomes. Our estimates indicate that the program has increased unemployment by 10- to 13-percentage points and, thus, the implied distortions are large. Since workers with income above the minimum wage are not entitled to the Agrarian unemployment benefit, incentives to work informally may have increased. Coupled with the self-reported nature of the unemployment data used, we might be overestimating labor market responses to the policy. Hence, an overall evaluation of SIPTEA would depend on the extent to which the increase in unemployment reflects actual behavioral responses.

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Table 1. Unemployment benefits in 'border' Spanish regions and provinces in 1991.

Region	Recipients per unemployed				
	UI (1)	UA (2)	Agrarian UB (3)	(2+3)	(1+2+3)
'Border' regions					
Treated	0.148	0.209	0.322	0.531	0.679
Untreated	0.215	0.228	-.-	0.228	0.443
'Border' provinces					
Treated	0.152	0.230	0.407	0.636	0.788
Untreated	0.221	0.257	-.-	0.257	0.478

Source: *Anuario de Estadísticas Laborales 1991*. Notes: Figures are number of recipients over unemployed individuals aged 16 to 64 (Labor Force Survey figure). Treated regions are *Extremadura* and *Andalucía* while neighboring regions are *Castilla-León*, *Castilla-la Mancha* and *Región de Murcia*. Treated provinces are *Cáceres* and *Badajoz (Extremadura)* and *Córdoba*, *Jaén*, *Granada* and *Almería* (*Andalucía*) while untreated border provinces are *Salamanca* and *Ávila* (*Castilla-León*), *Ciudad Real*, *Toledo* and *Albacete* (*Castilla-la Mancha*) and *Murcia* (*Región de Murcia*).

Table 2. Descriptive statistics (municipalities within 20 km of the border; N=236).

Variable	Mean	S.D.	Min.	Max.
SIPTEA	0.398		0	1
Population growth, 1981-91 (%)	-15.496	12.692	-57.778	20.368
Probability of staying, 1981-91	48.082	8.091	21.875	64.622
In-migration rate, 1981-91	5.781	3.185	0	15.868
Unemployment rate, 1991 (%)	24.256	14.486	0	81.429
Individuals with <5 years of schooling, 1991 (%)	33.824	18.154	0	80.562
Individuals with 5 to 8 years of schooling, 1991 (%)	52.731	17.686	13.583	92.308
Individuals with secondary education, 1991 (%)	9.773	4.080	2.222	25.926
Individuals with tertiary education, 1991 (%)	3.672	2.239	0	13.333
Ruggedness (logged)	3.482	0.570	1.579	4.591
Agricultural employment per 100 inhabitants, 1982	15.748	9.009	0.037	57.568
Industrial employment per 100 inhabitants, 1980	1.851	2.604	0	22.500
Services employment per 100 inhabitants, 1980	6.104	3.017	0.978	22.813
Unemployment rate, 1981 (%)	13.591	13.911	0	91.270
Share of land on estates with >200 ha, 1982 (%)	0.532	0.278	0	0.973
Share of temporary work in agriculture, 1982 (%)	13.741	16.187	0	85.765
Population in 1981	1,943.0	5,188	45	60,627

Notes: Data sources and definitions as in the text.

Table 3. The effects of SIPTEA on mobility 1981-91 and on the 1991 unemployment rate.

	<15km		**<20km**		**<25km**	
A: Population growth 1981-91						
	4.274**	2.346	5.151***	2.786**	5.646***	3.230**
	(1.733)	(1.586)	(1.548)	(1.409)	(1.356)	(1.325)
B: Probability of staying 1981-91						
	2.622**	1.299	4.048***	1.987*	4.273***	2.048*
	(1.147)	(1.211)	(1.031)	(1.100)	(0.950)	(1.102)
C: In-migration rate 1981-91						
	1.493***	1.527***	1.316***	1.406***	1.971***	2.412***
	(0.454)	(0.467)	(0.415)	(0.430)	(0.497)	(0.627)
D: Unemployment rate in 1991						
	14.051***	13.253***	14.790***	13.233***	16.378***	14.697***
	(2.032)	(1.954)	(1.878)	(1.887)	(1.562)	(1.575)
Control variables		√		√		√
N	184		236		306	

Notes: Robust standard errors in parentheses. ***, ** and * statistically significant at 1, 5 and 10%. All specifications include regional border fixed effects. In panels A to C, control variables include terrain ruggedness, agricultural employment per 100 inhabitants in 1982, the employment levels in the industrial and services sectors per 100 inhabitants in 1980, the unemployment rate in 1981, the proportion of agricultural land on estates with >200 ha in 1982, the share of agricultural employment in temporary jobs in 1982 and the (logged) population level in 1981. In panel D, control variables are the (logged) ruggedness of terrain, agricultural employment per 100 inhabitants in 1989, the share of agricultural employment in temporary jobs in 1989, the employment levels in the industrial and services sectors per 100 inhabitants in 1990 and the (logged) population level in 1991.

Table 4. The effects of SIPTEA on mobility and unemployment. Panel data estimates.

	Differences-in-Differences			**Unconfoundedness approach**		
	<15km	**<20km**	**<25km**	**<15km**	**<20km**	**<25km**
A: Population growth 1981-91						
	3.216*	3.669**	4.315***	3.270*	3.731**	4.364***
	(1.690)	(1.522)	(1.369)	(1.724)	(1.560)	(1.390)
B: Probability to stay 1981-91						
	2.282	3.198**	3.317**	2.120*	3.121***	3.220***
	(1.544)	(1.400)	(1.295)	(1.148)	(1.038)	(0.975)
C: In-migration rate 1981-91						
	1.064**	0.502	0.930*	1.327***	1.024**	1.557***
	(0.493)	(0.487)	(0.539)	(0.430)	(0.402)	(0.511)
D: Unemployment rate in 1991						
	12.167***	10.830***	12.247***	13.000***	12.869***	14.585***
	(2.312)	(2.050)	(1.765)	(1.838)	(1.711)	(1.466)
N	184	236	306	184	236	306

Notes: Robust standard errors in parentheses. ***, ** and * statistically significant at 1, 5 and 10%. Columns 1-3 are estimates of equations (7) and (8) whereas columns 4-6 correspond to equations (9) and (10). All regressions include time dummies interacted with regional border dummies. In panels A to C the vector x contains the logged population level and the employment levels in the industrial and services sectors per 100 inhabitants in the base year. In panel D, z contains the contemporaneous (logged) population level, the employment levels in the agricultural, industrial and services sectors per 100 inhabitants and the share of agricultural employment in temporary jobs.

Table 5. The effects of SIPTEA on the in-migration rate 1981-91 by the geographic origin of the inflow.

	<15km	**<20km**	**<25km**
A: In-migration rate 1981-91, cross-border regions			
	0.252**	0.250**	0.257***
	(0.128)	(0.112)	(0.091)
B: In-migration rate 1981-91, other-regions			
	1.006***	0.949***	1.140***
	(0.325)	(0.299)	(0.298)
C: In-migration rate 1981-91, same region			
	0.283	0.215	0.979**
	(0.201)	(0.189)	(0.465)
N	184	236	306

Notes: Robust standard errors in parentheses. ***, ** and * statistically significant at 1, 5 and 10%. These regression results correspond to specifications with the control variables identified in Table 3.

Table 6. The effect of SIPTEA on the probability of staying and the in-migration rate by level of education.

	<15km	**<20km**	**<25km**
A: Probability of staying 1981-91 by educational level			
		≤5 years of schooling	
	2.790**	3.027**	3.847***
	(1.255)	(1.171)	(1.080)
		5 to 8 years of schooling	
	-1.810	-1.360	-2.159**
	(1.283)	(1.183)	(1.063)
		Secondary education	
	0.165	0.166	0.197
	(0.273)	(0.263)	(0.229)
		Tertiary education	
	0.154	0.154	0.163
	(0.134)	(0.123)	(0.114)
B: In-migration rate 1981-91 by educational level			
		≤5 years of schooling	
	0.581***	0.587***	0.956***
	(0.200)	(0.181)	(0.243)
		5 to 8 years of schooling	
	0.646**	0.617**	1.044***
	(0.279)	(0.258)	(0.311)
		Secondary education	
	0.196**	0.109	0.283**
	(0.091)	(0.088)	(0.109)
		Tertiary education	
	0.104*	0.093	0.128**
	(0.059)	(0.058)	(0.059)
C: Share of in-migrants 1981-91 with < 5 years of education			
	4.016**	4.726***	5.864***
	(1.969)	(1.798)	(1.658)
N	184	236	306

Notes: Robust standard errors in parentheses. ***, ** and * statistically significant at 1, 5 and 10%. These regression results correspond to specifications with the control variables identified in Table 3.

Table 7. The effects of SIPTEA on unemployment, employment and participation rates in 1991.

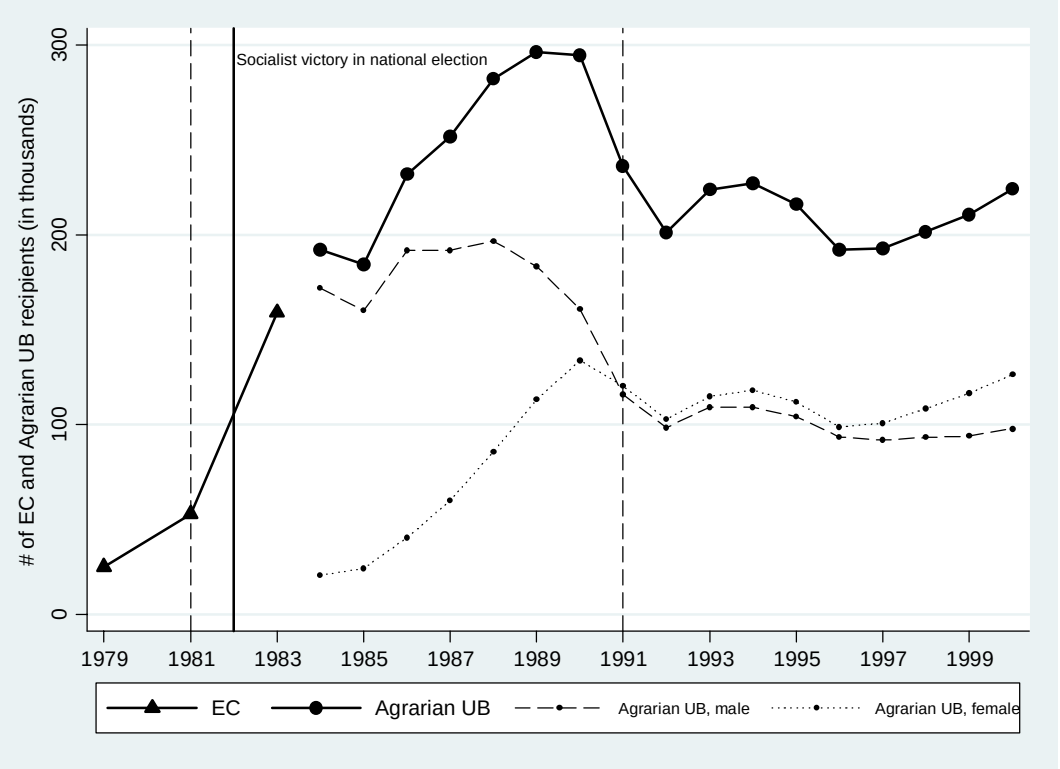
	<15km	**<20km**	**<25km**
A: Unemployment rate for 'stayers' and 'in-migrants'			
		Stayers	
	13.269***	13.283***	14.932***
	(2.034)	(1.950)	(1.628)
		In-migrants	
	10.475***	11.218***	11.989***
	(2.450)	(2.264)	(2.066)
B: Unemployment rate with educational and occupational group dummies			
		Dummies for educational groups	
	12.941***	12.878***	14.212***
	(1.947)	(1.902)	(1.593)
		Dummies for occupational groups	
	7.473***	7.693***	8.724***
	(2.295)	(1.996)	(1.741)

C: Unemployment, employment and participation rates for men and women[1]

Men	**Women**	**Men**	**Women**	**Men**	**Women**
		Unemployment rate			
9.002***	7.007***	9.256***	7.003***	10.365***	7.244***
(1.610)	(1.099)	(1.529)	(1.046)	(1.270)	(0.943)
		Participation rate			
-1.105	7.296***	-0.878	7.138***	-1.123	7.019***
(0.817)	(1.766)	(0.747)	(1.669)	(0.699)	(1.472)
		Employment rate			
-10.107***	0.289	-10.134***	0.135	-11.488***	-0.225
(1.747)	(1.138)	(1.652)	(1.094)	(1.433)	(0.930)
N	184	236		306	

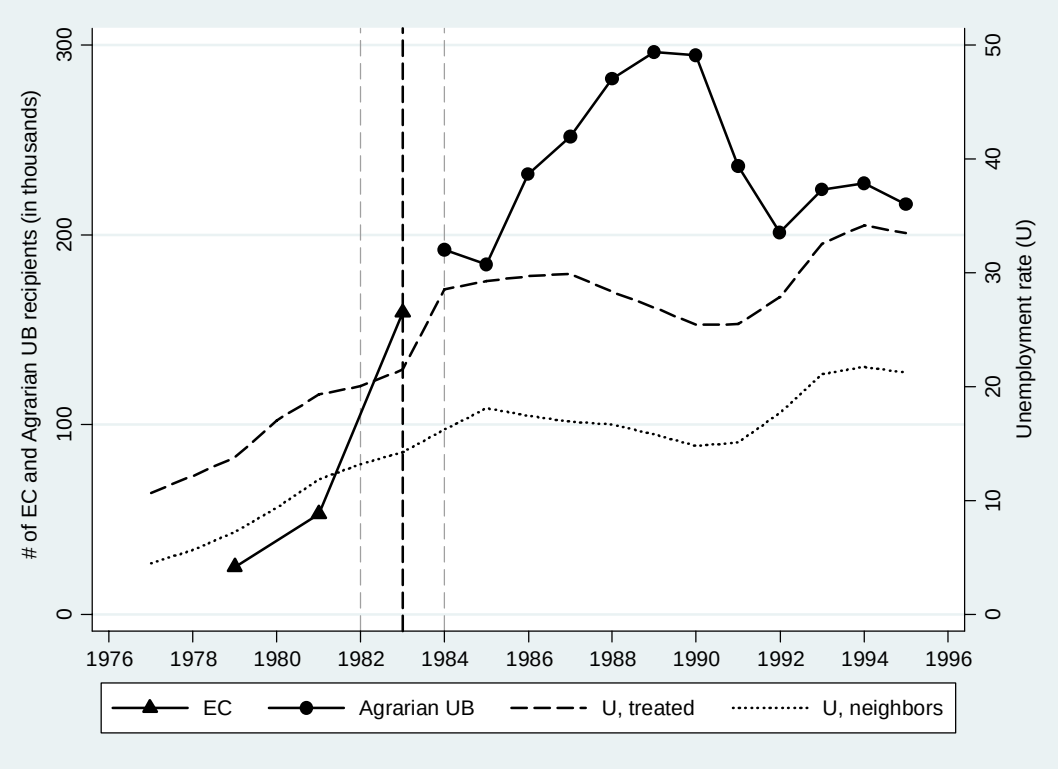
Notes: [1] Unemployment rate in panel C defined as unemployed over population aged 16 to 64. Employment rate defined as employed over population aged 16 to 64 and participation rate as (employed+unemployed) over population aged 16 to 64. Robust standard errors in parentheses. ***, ** and * statistically significant at 1, 5 and 10%. These regression results correspond to specifications with the control variables identified in Table 3. Panel B further includes dummies for the share of the population aged 16 to 64 in four educational categories (first row) and in 18 occupation categories (second row).

Graph 1. Number of workers on the *Empleo Comunitario* (EC) scheme and number of recipients of the Agrarian Unemployment Benefit (Agrarian UB), 1979-2000.



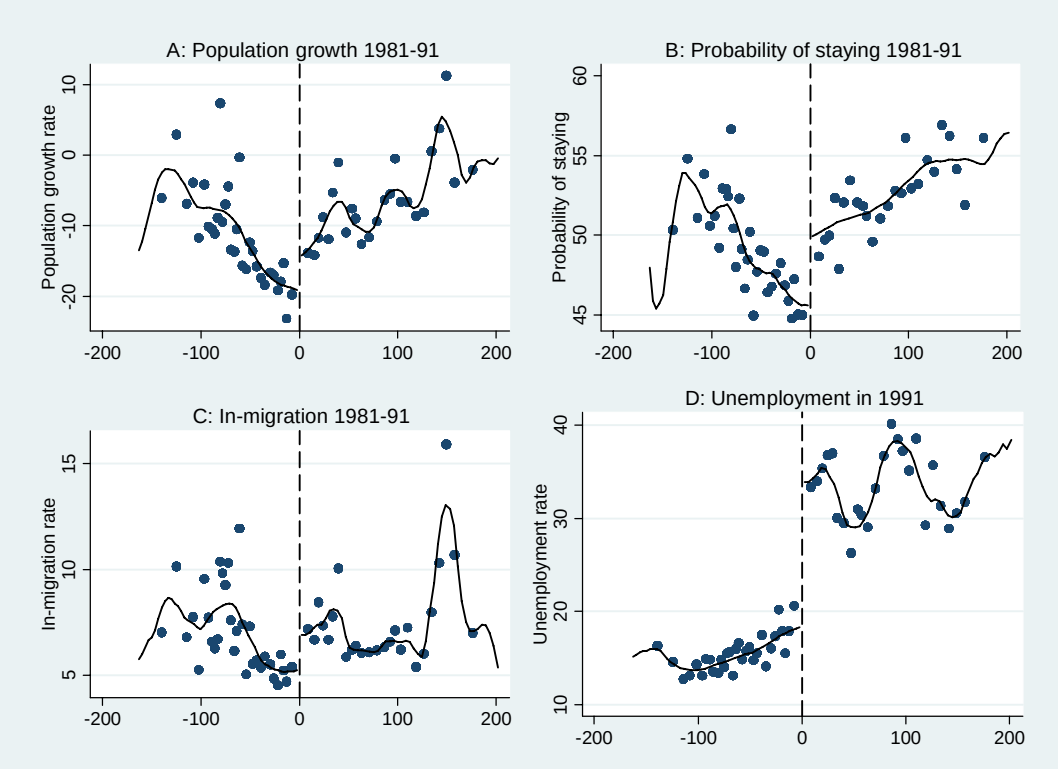
Source: *Boletín de Estadísticas Laborales* and González (1990).

Graph 2. Number of employees in the *Empleo Comunitario* (EC) scheme, recipients of the Agrarian unemployment benefit (Agrarian UB) and unemployment rates (U), 1977-1995.



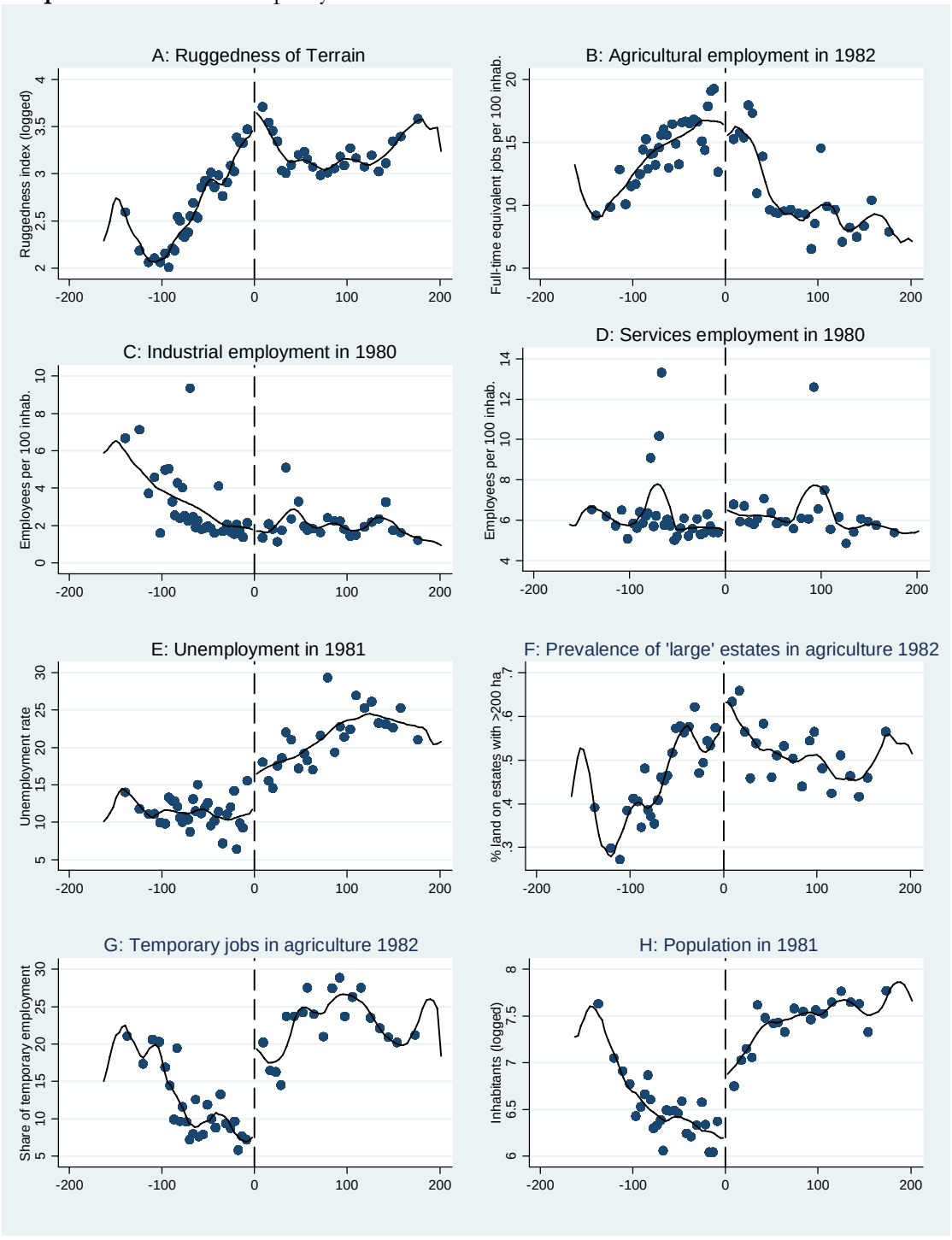
Source: *Boletín de Estadísticas Laborales*, González (1990) and Labor Force Survey (EPA). Unemployment rates (U) in treated (*Extremadura* and *Andalucía*) and neighboring regions (*Castilla-León*, *Castilla-la Mancha* and *Región de Murcia*) are annual averages of quarterly Labor Force Survey unemployment rates.

Graph 3. Population growth, probability of staying and in-migration rate 1981-91, and the unemployment rate in 1991.



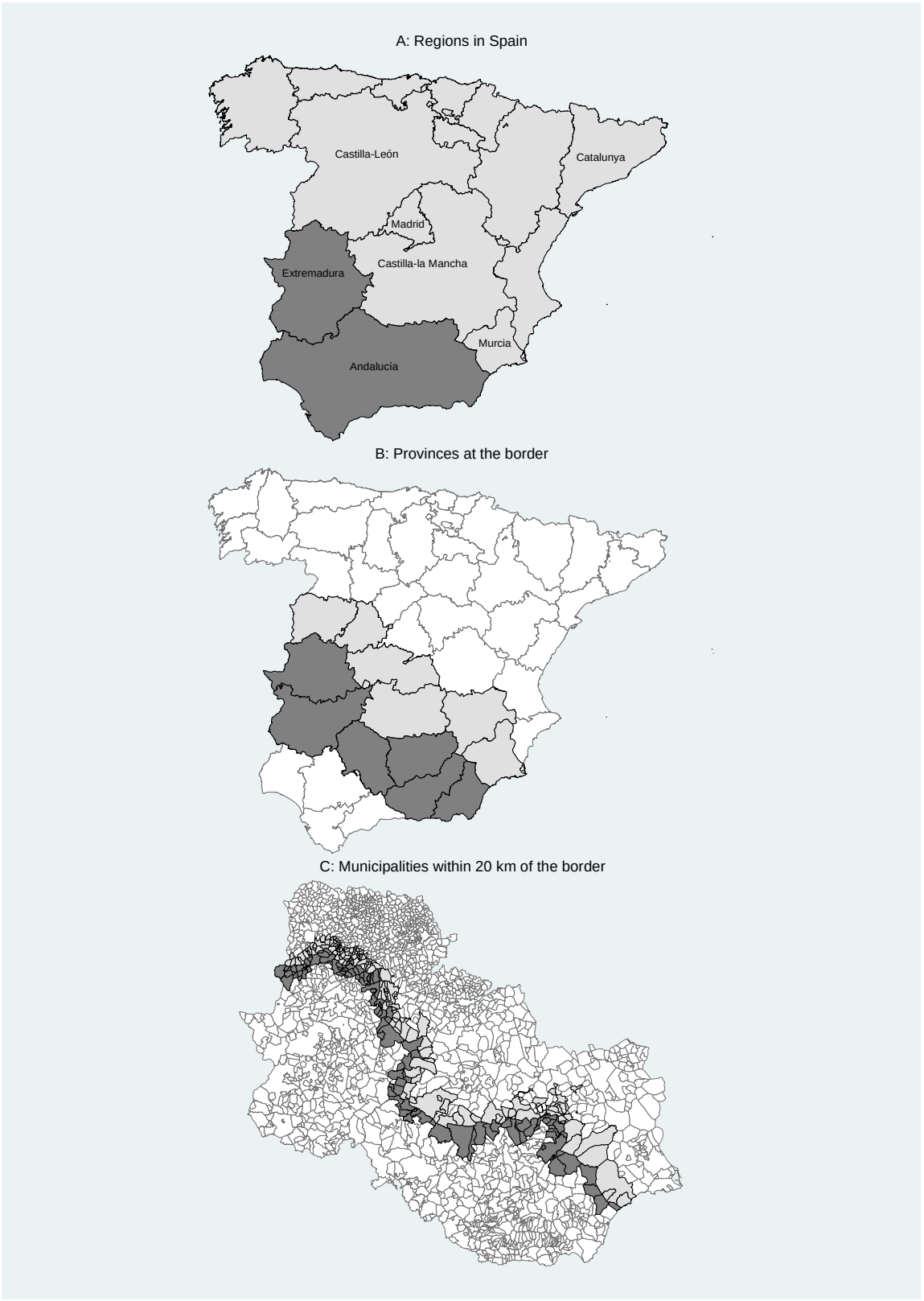
Notes: The horizontal axis is the distance to the border, with treated municipalities being assigned positive values. The dots are averages for rank percentile bins, each representing 40 observations, while the solid lines are local linear regression fits estimated separately on either side of the border. The sources of the variables and their definitions are given in the text.

Graph 4. Baseline municipality characteristics in 1981.



Notes: The horizontal axis is the distance to the border, with treated municipalities being assigned positive values. The dots are averages for rank percentile bins, each representing 40 observations, while the solid lines are local linear regression fits estimated separately on either side of the border. The sources of the variables and their definitions are given in the text.

Map 1. SIPTEA regional implementation and 'border' municipalities.



Notes: From left to right in panel B, the provinces that are contiguous to the SIPTEA border are *Cáceres*, *Badajoz*, *Córdoba*, *Jaén*, *Granada* and *Almería* (treated areas in dark grey) and *Salamanca*, *Ávila*, *Toledo*, *Ciudad Real*, *Albacete* and *Murcia* (control areas in light grey). There are 1,801 municipalities in these 12 provinces. Within these provinces, 236 municipalities lie within 20 km of the border (Panel C).

Annex

Table A1. The effects of SIPTEA on mobility 1981-91 and on the 1991 unemployment rate. Placebo estimates.

	Border shifted to the north by			**Border shifted to the south by**		
	15km	**20km**	**25km**	**15km**	**20km**	**25km**
A: Population growth 1981-91						
	-1.488	0.049	-0.940	2.419	2.376	-0.902
	(1.671)	(1.493)	(1.421)	(2.114)	(2.809)	(1.965)
B: Probability of staying 1981-91						
	-0.257	-0.668	-0.815	1.361	-0.103	-0.838
	(1.028)	(0.934)	(0.921)	(1.806)	(1.572)	(1.193)
C: In-migration rate 1981-91						
	-0.069	0.439	-0.356	1.222	1.928	-0.391
	(0.430)	(0.384)	(0.370)	(0.975)	(1.213)	(0.790)
D: Unemployment rate in 1991						
	0.406	1.416	2.332**	3.490	3.207	-0.627
	(1.584)	(1.209)	(0.964)	(2.837)	(2.125)	(1.805)
Bandwidth	±15km	±20km	±25km	±15km	±20km	±25km
N	212	281	365	145	200	242

Notes: Robust standard errors in parentheses. ***,** and * statistically significant at 1, 5 and 10%. These regression results correspond to specifications with the control variables identified in Table 3.

2011

2011/1, Oppedisano, V; Turati, G.: "What are the causes of educational inequalities and of their evolution over time in Europe? Evidence from PISA"
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