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Regional Labor Mobility in Spain

by Lucy Qian Liu

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I N T E R N A T I O N A L M O N E T A R Y F U N D

**IMF Working Paper**

European Department

**Regional Labor Mobility in Spain**

**Prepared by Lucy Qian Liu<sup>1</sup>**

Authorized for distribution by Andrea Schaechter

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**Abstract**

This paper studies the main factors that explain the low regional mobility in Spain, with a view to identifying policy options at the regional and central level to promote labor mobility. The empirical analysis finds that house prices, labor market conditions, and the pervasiveness of labor market duality at the regional level are the main determinants for Spain's regional mobility, while labor market institutions and policies play an important role at the national level. Policies that facilitate wage setting flexibility and reduce labor market duality could help enhance the functioning of the labor market, thereby promoting labor mobility. There may be also room for policies to incentivize people to move and provide support through targeted active labor market policies.

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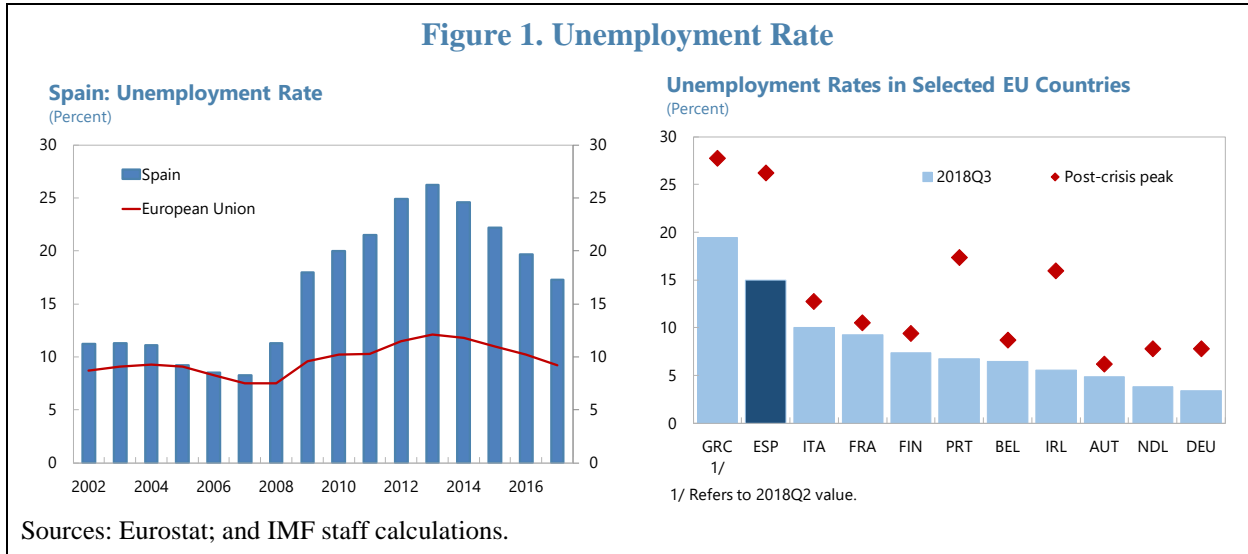
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## I. INTRODUCTION

Spain's unemployment has long been one of the highest in the European Union (EU). Even during the economic boom years, the unemployment rate stood above 8 percent, higher than the EU average (Figure 1). Following the double-dip recession, Spain's jobless rate more than tripled to a peak of 26 percent in 2013. Despite a strong economic recovery and solid job creation in recent years, the unemployment rate remained elevated at 15 percent in 2018:Q3 (Figure 1), with the structural unemployment estimated at around 12–16 percent.<sup>2</sup>



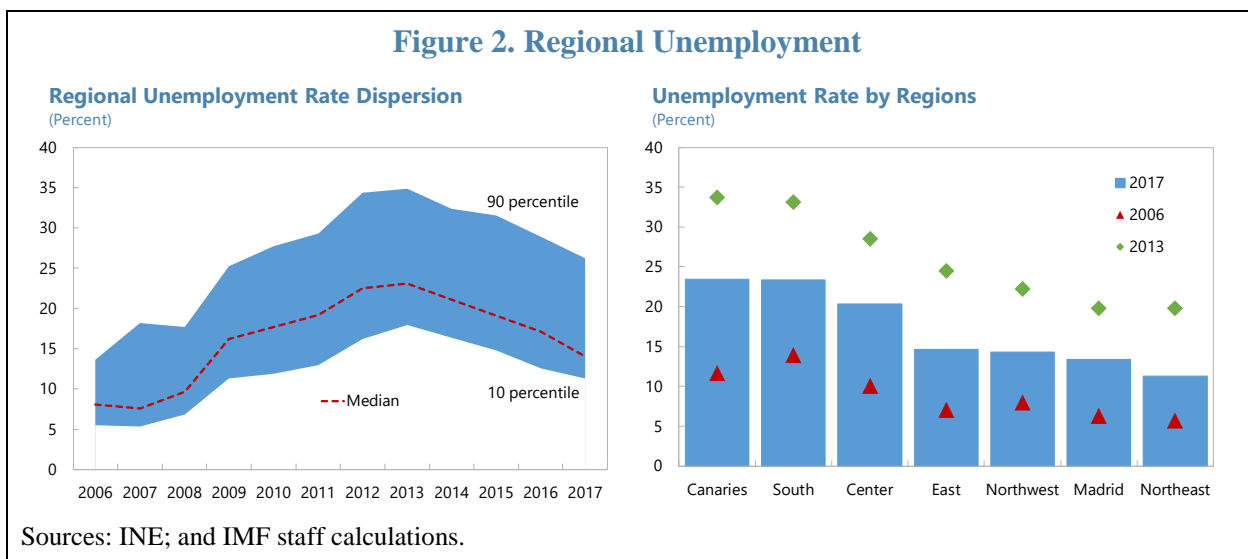
Beneath the high unemployment at the national level, there are large and persistent disparities in labor market performance across regions. Over the past decade, the differences in the unemployment rates between the top (90 percentile) and bottom (10 percentile) regions ranged from 8 percentage points during the pre-crisis booms years to 18 percentage points at the height of the crisis (Figure 2, left panel). The dispersion has declined since then but remained at 15 percentage points in 2017. Regions in the Northeast were consistently the best performers with an average unemployment rate ranging from 5 to 20 percent during 2006–17, whereas the jobless rates in the Canary Islands and the South were consistently the highest during this period (around 12–32 percent). Their labor market outcomes were also more volatile than those in other regions, as reflected in the large swings of the unemployment rates during the crisis and the recovery periods (Figure 2, right panel).

The literature has extensively documented the link between unemployment and regional labor mobility.<sup>3</sup> Theoretically, differentials in the conditions of labor markets, such as

<sup>2</sup> See the IMF Country Report No. 18/330 for the 2018 Article IV Consultation.

<sup>3</sup> The paper uses the terms of mobility, migration, and movement interchangeably, as often the practice in the literature. In the case where the discussion refers to migration or mobility of working-age population, the term “labor” will be explicitly added to the context.

unemployment rates, are one of the factors that motivates workers to move (Harris and Todaro, 1970). These differences may be triggered by asynchronous regional shocks or structural heterogeneity across regions. In equilibrium, the adjustment provided by interregional labor movement helps limit the impacts of economic shocks and minimize labor market volatility in the short run, as well as reduce regional disparities and structural unemployment in the long run (Blanchard and Katz, 1992). Empirical studies largely focused on the role of labor mobility as an adjustment mechanism and found positive response of migration to region-specific labor demand shocks in both Europe and the United States (Dao et al., 2014, Arpaia et al., 2014, and Beyer and Smets, 2015). Most of these papers studied internal migration in a single country or currency union. Nevertheless, the cross-country data seems to also suggest a negative correlation between the unemployment rate and the internal migration rate within a country (Figure 3, left panel).

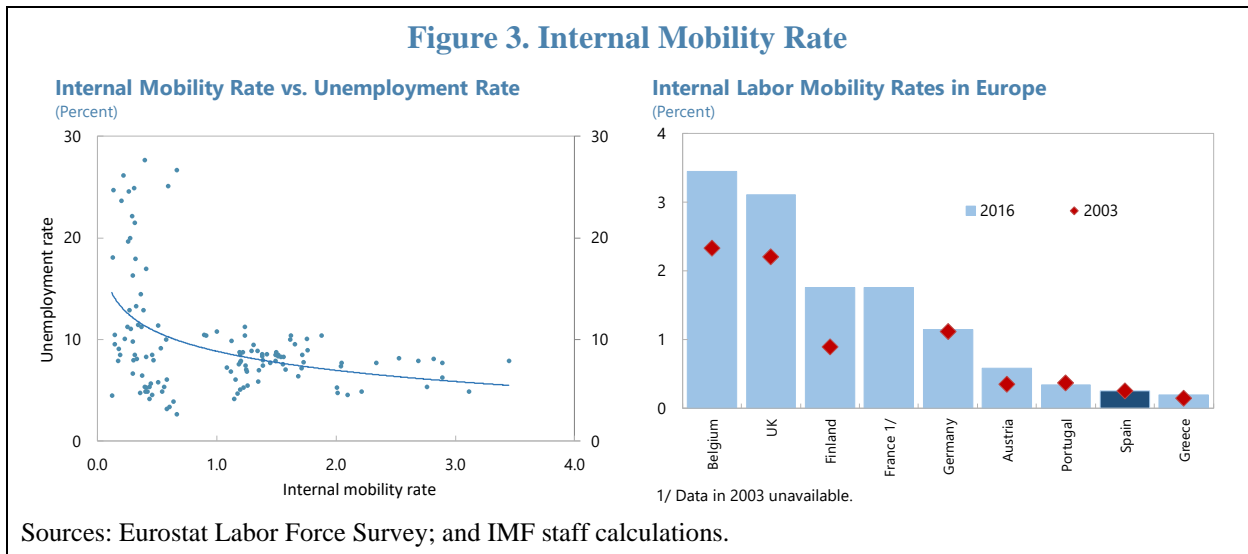


Spain's high structural unemployment and persistent regional labor market disparities are often associated with its low labor mobility across regions. Figure 3 (right panel) presents a comparison of internal migration rate among selected European countries using Eurostat Labor Force Survey data.<sup>4</sup> In 2016, the gross flows of internal migration accounted for only 0.3 percent of the working age population in Spain, in contrast to 1.2 percent in Germany and 2.4 percent in the UK. The migration rate had not improved since the early 2000s.

A large strand of the literature has analyzed the factors that explain Spain's low internal mobility. Studies in the 1990s generally found that Spanish internal migration was not very responsive to traditional labor market variables such as wages and unemployment (e.g.

<sup>4</sup> As discussed in the data description section, the level of internal migration is highly sensitive to the data source used. In this paper, the cross-country analysis uses Eurostat Labor Force Survey data to ensure consistency among countries, but the internal migration rates for Spain calculated using this data is systematically lower than those based on Spain's internal data on regional mobility. Hence, the numbers cited here are mostly for comparison purposes.

Bentolila and Blanchard, 1990; Antolin and Bover, 1997; and De La Fuente, 1999), possibly explained by the overall high level of structural unemployment and widespread rigidities in the labor markets. Recent studies using migration data since 2000s, however, found increasing roles of labor market conditions, particularly for the period after the global financial crisis, for instance, Gutiérrez-Portilla et al. (2018), Clemente et al. (2016), and Mulhern and Watson (2009).



This paper studies the determinants of interregional mobility in Spain during 2000–16. It first uses regional data of bilateral migration flows to answer the following questions: (i) What are the stylized facts of Spanish regional migration flows?; (ii) What are the regional-level factors that explain Spain’s low internal mobility over the past decades?; and (iii) How do the impacts of these factors vary before and after the crisis, and among Spaniards and immigrants? Second, the paper investigates the determinants of internal labor mobility at the macro level using a cross-country panel of 11 European countries. The empirical results suggest that at the *regional level*, housing prices, labor market conditions, and the pervasiveness of labor market duality play an important role in explaining Spain’s internal migration flows, particularly since the onset of the global financial crisis. At the *country level*, labor market institutions and policies are the main factors driving internal mobility in European countries.

The main contributions of the paper to the literature are two-fold. First, the paper fills the literature gap by presenting a cross-country panel analysis on the determinants of internal mobility in European countries. It allows us to compare Spain’s regional labor mobility with peers and examine the roles of macro and labor variables at the national level. Second, the regional-level regression includes a few labor market variables that have rarely been explored in the previous studies, such as labor market duality and the education level of the labor force. These variables are particularly relevant for Spain’s labor market issues and have policy implications.

The remainder of the paper is organized as follows. Section II describes the regional and cross-country level data and presents some stylized facts of Spain's regional migration flows. Section III outlines the regional-level regression model and summarizes the empirical results of estimations using various samples. Section IV presents the cross-country analysis and its empirical findings. Finally, Section V concludes with a discussion of policy implications.

## II. DATA AND STYLIZED FACTS

### A. Data

In Spain, several government agencies publish regional-level migration data with various coverage and measurement of interregional migration flows. Annex I describes these data and compares the trends of the internal mobility rate—calculated as the ratio of gross (labor) migration flows across regions and the overall (working age) population—for each dataset. Most series follow a similar declining trend after the global financial crisis, despite their differences in the coverage of migration flows. To maximize the size of the sample, the empirical analysis Section II and the regional-level regressions in Section III use the bilateral flow data of the Residential Variation Statistics (RVS) published by Spain's statistical agency INE. The series are constructed by aggregating the number of cases where people report change of residence with the Municipal Registers from one region to another and covers the period from 1998 to 2016.

One issue of these data series is that the migration flows of the working age population (16–64 years old) is only readily available from INE by either origin or destination regions, but not by origin and destination regions. As a result, the econometric analysis in Section III—which uses bilateral flows between regions—reflects interregional mobility of the overall population rather than the labor force per se. Nevertheless, as illustrated in Figure 4, the working age population constitutes a major share (more than three quarters) of the gross interregional migration flows.<sup>5</sup> Furthermore, a comparison of the aggregate internal mobility rates between the overall and working age population suggests that they follow a very similar trend during the sample period. Data of the explanatory variables are mostly from INE, except the housing price series is from the Ministerio de Fomento.

The migration data for the cross-country analysis in Section IV are derived from the Eurostat Labor Force Survey. The advantage of our dataset is that the coverage and measurement of interregional migration flows are consistent across countries, which is crucial for cross-country comparison and panel regressions. More specifically, the gross migration flows are calculated by aggregating the number of people reporting a region (NUTS 2 level) of residence in the current year different from the region (within the same country) in the

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<sup>5</sup> An alternative source to derive the data of labor mobility across regions is to calculate the regional mobility flows using the micro data of Spain's Labor Force Survey. However, we found that the calculated series include many data gaps and it is difficult to distinguish whether they are due to zero migration flows or missing observations (as often the case with survey data), which could lead to estimation bias.

previous year. Hence, the data correspond to intra-country migration among the working age population only and do not include cross-border migration flows. The regression sample covers the period of 2003–16 and includes 11 European countries: Austria, Belgium, Finland, Germany, Greece, France, Portugal, Slovenia, Slovakia, Spain, and the UK. The panel is unbalanced. Data of the independent variables are mostly from Eurostat, except the index of house price to income ratio, which is from OECD Analytical House Prices Indicators dataset.

## B. Stylized Facts

Interregional mobility in Spain grew steadily during the economic boom years but declined following the crisis in 2008. Much of the underlying trend was driven by internal labor movement of foreigners that migrated from abroad, whereas the mobility rate of Spaniards was relatively stable (Figure 4, upper panels). Supported by a fast expansion of the immigration population in the early 2000s, the internal mobility rate of immigrants rose rapidly from 6 percent in 1998 to 12 percent in 2002. As a result, the share of foreigners in the population that moved between regions soared from about 4 percent in 1998 to 30 percent in 2008. It stayed at that level throughout the economic boom years but declined after the crisis. On average, interregional mobility among immigrants was around three times higher than that of Spaniards.<sup>6</sup> This is consistent with the hypothesis that migrants who moved from abroad have less ties to their residing regions, and thereby are more willing to move, particularly for job-related reasons.<sup>7</sup>

The interregional migration flows are largely dominated by the working-age population, while the gender distribution is relatively balanced. At the aggregate level, more than three quarters of internal migrants were between 16 and 64 years old (Figure 4, lower panels). About 85 percent of the foreigners that moved between regions belonged to the working age population, compared to 74 percent for Spaniards. The share of working age population in total interregional mobility declined somewhat after the crisis, reflecting mostly the increase in the share of the retiree population (65 years old and above) among Spaniards. Looking at the gender composition, the shares of male and female Spaniards that moved across regions were broadly even. In contrast, female immigrants contributed about 44 percent to the internal movement during 1998–2005, but their share has been growing steadily since then, reaching 48.5 percent in 2016.

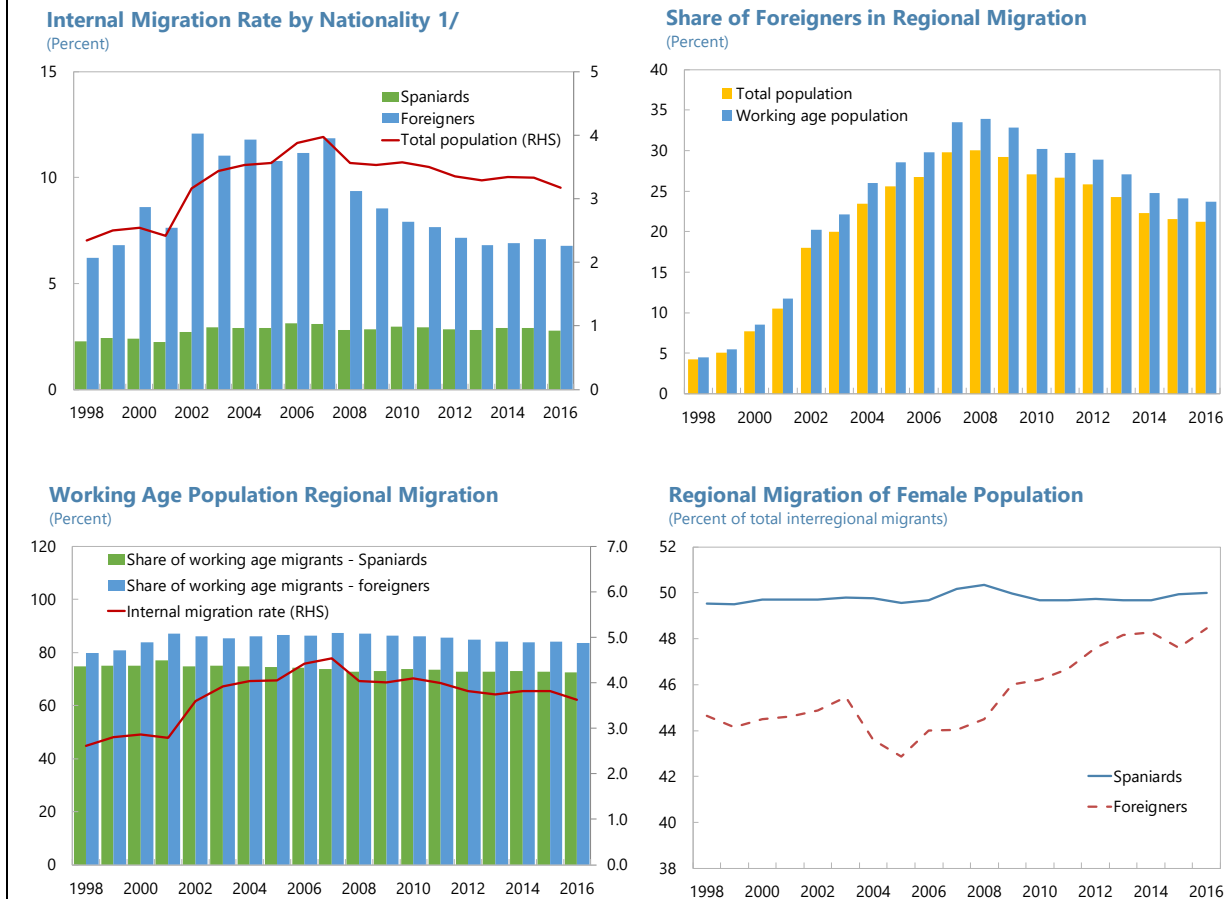
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<sup>6</sup> The finding that foreigners are more mobile within Spain than natives is consistent with the results from the previous literature, for instance, Gutiérrez-Portilla et al. (2018) and Izquierdo et al. (2015).

<sup>7</sup> There is also another hypothesis that immigrants from the same origin countries may prefer to stay clustered due to network consideration. Thus, they may be less willing to move once they settle in a region with sizeable population from their home country.



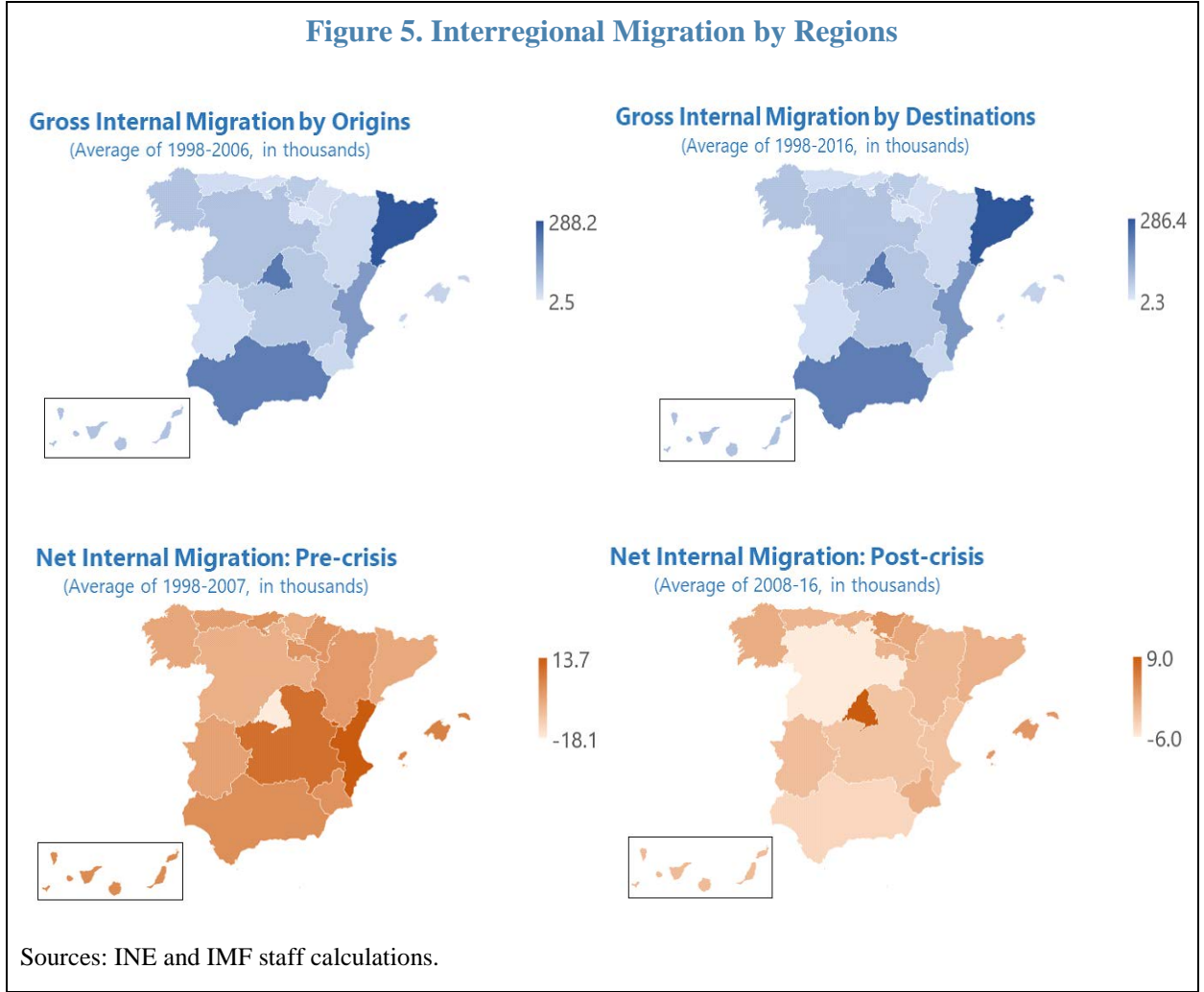
Figure 4. Interregional Migration



Sources: INE and IMF staff calculations.

1/ Calculated as the number of residential variations within Spain divided by the size of the corresponding population.

Internal migration inflows and outflows were both concentrated in a few regions. In absolute terms, Catalonia, Madrid, and Andalusia were consistently the top regions sending and receiving internal migrants (Figure 5), partially reflecting their large population size. Relative to regions' population, the Balearic Islands, Catalonia, and the Canary Islands have the highest internal migration rate on average. Many regions have broadly balanced migration in and out-flows. In net terms, only a few regions have been consistently a net receiver (e.g. Navarra and the Balearic Islands) or net sender (Aragon and Extremadura). The crisis has brought a few noticeable changes to the pattern of mobility flows, with some regions (e.g. Madrid and the Basque Country) switching from net senders before the crisis to net receivers afterwards, and others (e.g. Valencia and Castile-La Mancha) transitioning from net receivers to senders. These changes were largely driven by the movements of the working-age population, which could be potentially motivated by the economic situations in these regions before and after the crisis.



### III. REGIONAL-LEVEL ANALYSIS

#### A. Regression Model

The regional-level analysis employs a gravity model of migration to identify the determinants of regional mobility. Using bilateral migration flow data for the period of 2001–16, we estimate the role of demographic, geographic, and economic factors in determining regional mobility. Specifically, the model is characterized by the following panel regression:

$$\ln M_{ijt} = \alpha_i + \alpha_j + \alpha_t + \beta_0 \ln Dis_{ij} + \beta_1 \ln P_{it} + \beta_2 \ln P_{jt} + \sum_{s=1}^n (\gamma_s \ln X_{s,it} + \delta_s \ln X_{s,jt}) + \epsilon_{ijt}$$

where  $M_{ijt}$  is the migration flows from origin region  $i$  to destination region  $j$  in year  $t$ ,  $Dis_{ij}$  is the geographical distance between region  $i$  and  $j$ , and  $P_{it}$  and  $P_{jt}$  are the population size in region  $i$  and  $j$  in year  $t$ . Population and distance are standard gravity variables. In general, the destination population size is expected to affect migration flows positively, but the effect of

origin population can be either positive or negative. Larger population in the origin region implies more people are available to move, but it could also be associated with the prosperity of the region, which reduces people's incentive to move. The distance between region  $i$  and  $j$  is a proxy for the transaction cost related to moving, and thereby affects migration negatively. The model also controls for region and time fixed effects,  $\alpha_i$ ,  $\alpha_j$  and  $\alpha_t$ . Finally,  $X_{s,it}$  and  $X_{s,jt}$  include all the economic variables in origin  $i$  and destination  $j$  that could act as push and pull factors for interregional migration.

The push and pull factors are characterized by a wide range of macroeconomic and labor market variables in the model. A closer look at these variables suggests considerable heterogeneity in economic and labor market conditions across Spain's regions (Figure 6), indicating their relevance in explaining regional mobility.<sup>8</sup>

- **Real GDP per capita.** The variable measures the income level and overall prosperity in a region. All else equal, GDP per capita in the origin region are expected to be negatively correlated to migration outflows, whereas an increase in GDP per capita in the destination attracts migration inflows.
- **Housing prices.** Housing cost captures part of the moving cost and a large share of the living expenses. The high share of home ownership in Spain (about 77 percent) indicates that on average Spaniards tend to have a preference toward owning a property rather than renting, making house prices particularly relevant for mobility decisions. Previous studies found that controlling for income levels, house prices are positively correlated with migration outflows and negatively related to inflows (Maza and Villaverde, 2004 and Gutiérrez-Portilla et al., 2018).<sup>9</sup>
- **Unemployment rate.** Labor market condition is an important factor for the degree of mobility of the working-age population. According to economic theory, the unemployment rate generally has a positive effect on migration outflows and a negative effect on migration inflows. However, empirical findings on the influence of unemployment on Spain's internal mobility are inconclusive (Jimeno and Bentolila, 1998, Bentolila and Dolado, 1991, and Mulhem and Watson, 2010). This may be due partially to the endogeneity issue related to the unemployment rate, as labor mobility changes the size of labor force in both source and recipient regions and thus

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<sup>8</sup> In addition to the variables listed below, the literature also identifies a generous welfare system (see De la Roca, 2011 for the study of migration across Spanish cities), home-ownership and risk aversion as determinants of geographical mobility. These factors are excluded from the regional-level regression analysis, as the data is unavailable at the region level. However, unemployment benefit and homeownership will be included in the cross-country level analysis.

<sup>9</sup> We use nominal housing prices as explanatory variables following the literature, but most estimation results are robust to replacing nominal with real housing prices.

unemployment. In our analysis, we try to alleviate the endogeneity concern by using the unemployment rate in the previous year.<sup>10</sup>

**Figure 6. Economic and Labor Market Conditions by Regions**



Sources: Spanish authorities, and IMF staff calculations.  
 1/ Share of labor force at most lower secondary education.

<sup>10</sup> We acknowledge that the choice of lagged variables is not sufficient to address the endogeneity issue. However, it should be noted that the effect of mobility on unemployment works in the opposite direction as that of unemployment on mobility. Hence, finding a statistically significant coefficient for the unemployment rate would indicate an even stronger effect of unemployment on mobility than in the absence of endogeneity.

- **Real wage per worker.** A decrease in labor income is expected to act as a push factor for labor mobility outflows, whereas an increase in real wages would pull the working age population to the destination regions. As with the unemployment rate, real wage is also an endogenous variable, as labor mobility affects the supply of the labor force in both sending and receiving regions and thus the equilibrium wage. Nevertheless, given the potential lagged response of wages to labor supply, we keep the contemporaneous real wage in the regression.<sup>11</sup> One interesting fact to note from Figure 6 is that real wages across regions saw little movement between 2002 and 2016, and their regional dispersion was also relatively small. The average wage in the top region was only about one and half times higher than that in the bottom region. In contrast, variations in the unemployment rate both across regions and across time were large. Indeed, the observed low degree of real wage dispersion is in line with the finding in a previous study (IMF, 2015) that Spain's region-specific wages do not adjust sufficiently to region-specific employment conditions. One potential explanation for the lack of differentiation in wages across regions could be related to the past use of national and sector-level collective bargaining agreements, which limited the flexibility of wage setting.
- **Share of low-educated workers.** Empirical studies that focus on the link between education and mobility generally find a positive correlation between the two. That means workers with low education or low skill levels tend to be less mobile (Machin et al., 2008). This is potentially explained by a lack of information, credit constraint, and relatively high moving cost. Spain's working-age population comprises both a large share of lower educated (with up to lower secondary education), and a large share of higher-educated (with tertiary education). Since 2000, the share of lower educated in the labor force has been declining, reflecting both a general trend of improving education levels and a dropout of low educated from the labor force after the crisis (IMF, 2017). Nevertheless, the share of low-educated in the labor force is still much higher in Spain than on average in the Euro Area. Thus, investigating the connection between education and mobility is particularly relevant for Spain.
- **Share of temporary employment.** The relation between the prevalence of temporary contracts and mobility has been rarely explored in the literature. Given the longstanding labor market duality issue in Spain, we include the share of temporary employment in total employment in our regression.<sup>12</sup> Intuitively, a large share of temporary employment in the destination regions may act as a negative factor for attracting people to move, as the lack of job security makes it difficult to compensate the moving cost. However, from a sending region's point of view, a large share of

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<sup>11</sup> As in the case of the unemployment rate, the effect of mobility on wages also works in the opposite direction as that of wages on mobility.

<sup>12</sup> Due to the availability of the share of temporary employment data, the baseline regression sample is restricted to cover the years from 2002 to 2016.

temporary employment could affect migration outflows in both directions: the lack of job security may act as a push factor for migration outflows, but at the same time, the pervasiveness of labor market duality may impede human capital accumulation and make workers less mobile.

## B. Empirical Findings

The effects of standard gravity variables are all in line with the findings in the literature. As expected, the coefficient of geographic distance is negative, indicating larger mobility flows between regions with shorter distance (Table 1, column 1). Once controlling for income levels, population size matters only for the origin region. The negative coefficient suggests that people are less willing to move out of regions with a large population. Income levels as measured by real GDP per capita are both a strong push and pull factor for mobility, in the sense that lower income encourages migration outflows and higher income attracts inflows. Note that the variations of all these variables affect regional mobility of the overall population, rather than labor force per se.

House prices, labor market conditions, and labor market duality are the main economic factors determining Spain's internal mobility. Most variables with statistically significant coefficients have the expected sign (Table 1, Column 1). All else equal, increases in the average house price and the unemployment rate in the destination regions discourage migration inflows. In contrast, the role of house prices and the unemployment rate as a push factor seems insignificant. From the sending regions' perspective, higher real wages and a larger share of temporary employment have a negative effect on labor mobility. The former reduces incentives to move, while the latter is in line with the argument that pervasive use of temporary contracts hinders human capital accumulation and limits workers' ability to move.

The result of a negative effect of real wages in the destination regions is somewhat puzzling. This could be due to the potential endogeneity issue or driven by certain observations in the sample.<sup>13</sup> As illustrated in Table 1, Column 2, once we introduce an interaction term of real wages and the share of low educated in the destination regions, the coefficient of real wages in the destination regions turns positive, suggesting that the negative effect is likely driven by the regions with a large share of low educated labor force. The positive coefficient for the share of low educated in the origin regions is also surprising, but as shown later, this largely reflects the labor mobility in the post-crisis period, which could be related to the boom and bust cycles of the construction industry. Finally, we find that Spaniards tend to have a strong "home bias"—captured by the negative coefficients of the home region fixed effects—when it comes to migration decisions, which could be attributed to language and cultural factors, such as family and social ties, economic structure, and institutional environment in different

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<sup>13</sup> The results are similar in the regression with one-year lag of real wages. Note that the lack of variation in the real wage data highlighted earlier could also affect the precision of the estimates.

regions (see Table A1). The destination region fixed effects, on the other hand, are mostly statistically insignificant.

**Table 1. Regional-level Regression Results I**

Dependent variable: Migration	(1) Total	(2) Total	(3) Spaniards	(4) Foreigners
Distance	-1.25*** (0.07)	-1.25*** (0.07)	-1.37*** (0.08)	-1.12*** (0.06)
Population_o	-1.47** (0.64)	-1.47** (0.64)	-0.89 (0.90)	-2.08*** (0.60)
Population_d	0.66 (0.79)	0.31 (0.79)	1.57** (0.71)	1.07* (0.54)
Real GDP per capital_o	-1.48*** (0.45)	-1.48*** (0.46)	-0.79 (0.50)	-1.76*** (0.43)
Real GDP per capital_d	1.10*** (0.33)	0.87** (0.34)	1.47*** (0.29)	1.86*** (0.26)
Average house price_o	0.01 (0.14)	0.01 (0.14)	-0.35** (0.13)	0.43** (0.15)
Average house price_d	-0.18** (0.06)	-0.03 (0.06)	-0.36*** (0.05)	0.15 (0.16)
Share of low-educated_o	0.36** (0.16)	0.36* (0.18)	0.59*** (0.14)	-0.30 (0.17)
Share of low-educated_d	-0.27 (0.16)	0.45*** (0.12)	-0.17 (0.15)	-0.40 (0.26)
Real wage per worker_o	-0.99** (0.42)	-0.99** (0.42)	-0.16 (0.37)	-1.00** (0.39)
Real wage per worker_d	-0.41** (0.16)	2.28*** (0.19)	-0.24** (0.08)	-0.43 (0.34)
Unemployment rate (t-1)_o	0.05 (0.04)	0.05 (0.04)	0.06 (0.06)	0.08 (0.07)
Unemployment rate (t-1)_d	-0.22*** (0.04)	-0.17*** (0.04)	-0.11*** (0.03)	-0.50*** (0.09)
Share of temporary employment_o	-0.28** (0.10)	-0.28** (0.11)	-0.14 (0.11)	-0.50*** (0.16)
Share of temporary employment_d	0.13 (0.10)	0.13 (0.09)	0.17 (0.10)	0.05 (0.14)
Real wage_d X Share of low-educated_d		-0.05*** (0.01)		
Observations	4,080	4,080	3,808	3,808
Adjusted R-squared	0.90	0.90	0.89	0.93
Adjusted within R-squared	0.60	0.60	0.62	0.61
Region FE	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes
Cluster region pair and year	Yes	Yes	Yes	Yes

Robust standard errors in parentheses  
\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Next, we compare the migration behavior of Spaniards and foreigners. The estimation results suggest that pull factors tend to be more important for the mobility of Spaniards, whereas push factors matter more for foreigners. More specifically, large population size, high-income level, low house prices, and low unemployment rate in the destination regions all tend to attract Spaniards to move (Table 1, Column 3). In contrast, interregional mobility of foreigners seems to be more motivated by economic and labor market conditions in their home regions (Table 1, Column 4). For instance, smaller population size, lower income level, higher house prices, and lower wage income all contribute to larger migration outflows among foreigners, though low unemployment rate in the destination is also an important pull factor for foreigners. Moreover, the negative effect of the prevalence of temporary employment on migration outflows seems to reflect largely the behavior of foreigners,<sup>14</sup> whereas the surprising results related to lower educated in the origin regions and real wages in the destination regions are mostly driven by Spaniards. Related to the home region fixed effects, “home bias” exists among both Spaniards and foreigners, although it is generally stronger among the latter.<sup>15</sup> This is broadly consistent with the finding above that push factors matter more for foreigners.

In the third model specification, we split the sample between pre- and post-crisis periods and compare the different effects of economic and labor market factors on internal migration in these two episodes.<sup>16</sup> The only variable that maintains the similar effect over time is geographic distance. Population, real GDP per capita, and real wages in the origin regions are consistently significant through different sample periods, although all have a larger marginal effect on mobility in the pre-crisis period. Several factors that affect mobility flows before the crisis seem to have a puzzling sign, for instance, population size, real GDP per capita, house prices, and unemployment in the destination regions (Table 2, Column 1). However, in the post-crisis regression the signs of these variables turn to the expected signs. (Table 2, Column 2).

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<sup>14</sup> Note that the coefficient of the share of temporary employment is still negative in the regression for Spaniards, but statistically insignificant, which indicates that the effect may still exist but could not be precisely estimated.

<sup>15</sup> This may be somewhat surprising as one would expect the language and culture factors matter more for natives than foreigners. Nevertheless, the other aspects of the region fixed effects such as economic structure and institutional environment could affect foreigners and natives differently.

<sup>16</sup> 2008 is treated as the crisis year. The pre-crisis period covers 2002–07 and the post-crisis refers to 2008–16. Thus, the sample size of the pre-crisis regression is smaller than that of the post-crisis.



**Table 2. Regional-level Regression Results II**

Dependent variable: Migration	(1)	(2)	(3)
	Pre-crisis	Post-crisis	Post-crisis
Distance	-1.19*** (0.12)	-1.29*** (0.06)	-1.29*** (0.06)
Population_o	-4.50* (2.23)	-1.43*** (0.00)	-1.82*** (0.01)
Population_d	-3.86* (1.66)	2.98*** (0.00)	3.21*** (0.01)
Real GDP per capital_o	-4.68* (1.89)	-1.11*** (0.04)	-0.75*** (0.03)
Real GDP per capital_d	-2.18 (1.23)	1.04*** (0.06)	0.72*** (0.05)
Average house price_o	0.21 (0.31)	0.33*** (0.04)	0.35*** (0.03)
Average house price_d	0.48** (0.15)	-0.24*** (0.00)	-0.27*** (0.00)
Share of low-educated_o	-0.13 (0.21)	0.45*** (0.06)	0.28*** (0.06)
Share of low-educated_d	-0.01 (0.17)	0.07 (0.04)	0.20*** (0.02)
Real wage per worker_o	-2.62** (0.80)	-0.67*** (0.03)	-0.45*** (0.02)
Real wage per worker_d	-1.92*** (0.15)	0.08 (0.06)	-0.07 (0.05)
Unemployment rate (t-1)_o	-0.08 (0.09)	0.06 (0.06)	0.09** (0.03)
Unemployment rate (t-1)_d	0.14* (0.07)	-0.14* (0.07)	-0.16* (0.07)
Share of temporary employment_o	-0.02 (0.30)	-0.48*** (0.02)	-0.52*** (0.01)
Share of temporary employment_d	0.04 (0.18)	0.00 (0.05)	0.00 (0.03)
Post 2013 X Real wage per worker_o			-0.02 (0.02)
Post 2013 X Real wage per worker_d			0.05*** (0.00)
Post 2013 X Unemployment rate (t-1)_o			0.00 (0.00)
Post 2013 X Unemployment rate (t-1)_d			-0.05*** (0.00)
Post 2013 X Share of temporary employment_o			0.21*** (0.01)
Post 2013 X Share of temporary employment_d			-0.10*** (0.02)
Observations	1,632	2,448	2,448
Adjusted R-squared	0.86	0.93	0.93
Adjusted within R-squared	0.49	0.70	0.70
Region FE	Yes	Yes	Yes
Time FE	Yes	Yes	Yes
Cluster region pair and year	Yes	Yes	Yes

Robust standard errors in parentheses

\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

The positive effect of the labor force education in the origin regions on mobility appears only after the crisis, which could be explained by the possibility that low-educated workers were forced to reallocate after the sharp decline in construction jobs during the crisis. Finally, the effect of temporary employment is only statistically significant after the crisis, whereas the puzzling negative effect of real wage on migration outflows only exists before the crisis.<sup>17</sup> The differences in the determinants of mobility between pre- and post-crisis episodes could be due to the different sample sizes. At the same time, they are also broadly consistent with the findings in the previous literature, in that many studies using the pre-crisis sample find limited roles of labor market variables in explaining Spain's regional mobility (Jimeno and Bentolila, 1998, Bentolila and Dolado, 1991, and De La Fuente, 1999).

Finally, we estimate the effect of the 2012 labor market reforms on regional labor mobility by interacting labor market variables with a post-2013 dummy (Table 2, Column 3).<sup>18</sup> Spain implemented broad-based reforms in 2012 with the goal to enhance its labor market flexibility and reduce duality (see OECD, 2014 and IMF, 2015 for detailed summaries of these reforms and a preliminary assessment of their impact).<sup>19</sup> The estimation results suggest that the reforms may have strengthened the roles of labor market variables. In particular, the connection between labor market duality and migration seems to have been reinforced since 2013, with the effect of temporary employment in the origin regions becoming less negative and the effect of temporary employment in the destination regions turning statistically significant.<sup>20</sup> The effect of real wages (positive) and unemployment in the destination regions also became stronger after 2013.

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<sup>17</sup> Similar to the case in the native/foreigners regressions, the coefficient for the share of temporary employment is also negative in the pre-crisis regression, though statistically insignificant.

<sup>18</sup> The regression uses the post-crisis sample only, but the effects of the 2012 reforms are very similar if one uses the full sample. The cut-off year 2013 is chosen based on the consideration that reforms take time to display an effect, and 2013 is the turning point for the Spanish labor market. We acknowledge that the post-2013 dummy only provides a proxy for the 2012 reforms, as it could capture other economic and policy changes that happened after 2013.

<sup>19</sup> While the 2012 reforms are commonly referred as the major labor market reforms after the crisis, the government first introduced several labor market measures in 2010. To the extent that some of the 2010 reforms might only had impact starting from 2013, they are covered in our estimates.

<sup>20</sup> The intuition behind these results is hard to interpret. The IMF paper (2015) found that the 2012 labor market reforms had a limited impact on reducing duality. Hence, it is not surprising that the share of temporary employment remained statistically significant after 2013. However, the specific channel through which the reforms altered the significance of labor market duality requires further analysis, which is beyond the scope of this paper. In addition, as mentioned earlier, the post-2013 dummy could capture other economic and policy changes that are unrelated to the 2012 reforms, which could also influence how duality affects migration.

## IV. CROSS-COUNTRY ANALYSIS

### A. Regression Model

The cross-country analysis follows a panel regression approach to estimate the roles of national macroeconomic and labor market variables in explaining the cross-country differences in internal migration flows. More specifically, the model is described by the following equation:

$$\ln LM_{ct} = \alpha_c + \alpha_t + \beta_0 \ln GDP_{percapita}_{ct} + \beta_1 Homeown_{ct} + \beta_2 \ln Houseprice_{ct} + \sum_{s=1}^n Labor_{s,ct} + \epsilon_{ct}$$

where  $LM_{ct}$  is the labor mobility flows across regions (NUTS 2 level) within country  $c$  at year  $t$ ,  $GDP_{percapita}_{ct}$  is country  $c$ 's GDP per capita in PPP terms at year  $t$ ,  $Homeown_{ct}$  is the percent of population owning a property in country  $c$  and year  $t$ , and  $Houseprice_{ct}$  is the index of house price to income ratio in country  $c$  and year  $t$ .<sup>21</sup> The regression also considers a set of labor market variables,  $Labor_{s,ct}$ , including dispersions in regional unemployment rates, labor force education level, social benefits related to labor market activity (or unemployment benefit), and labor market policy (LMP) expenditure. Finally, the model controls for country and time fixed effects,  $\alpha_c$  and  $\alpha_t$ .

The variables of particular interest are housing market-related indicators and labor market institutions and policies, as they provide direct policy implications for the promotion of labor mobility. All else equal, the share of home ownership in a country tends to have a negative effect on its internal migration, whereas the effect of housing prices at the national level is ambiguous.<sup>22</sup> Regarding labor market variables, generous unemployment and other labor-related social benefits reduce workers' incentives to move, and thereby hinder labor mobility. In contrast, greater expenditure on LMPs may create favorable conditions for people to move and support labor mobility. Large dispersions in a country's regional unemployment rates motivate workers to move for better job opportunities, but the variable could also be endogenous as active labor mobility may reduce dispersions in labor market performance across regions. Finally, a large share of low-educated workers in the labor force likely has negative effect on labor mobility, as explained in Section IV.

### B. Empirical Findings

Table 3 reports the cross-country regression results. We first estimate a simple specification with macroeconomic and housing market variables only. Controlling for GDP per capita, homeownership has a statistically significant and negative effect on regional labor mobility,

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<sup>21</sup> The model initially includes a country's population size, but the variable is statistically insignificant in most model specifications, possibly due to the lack of variation over time and thereby absorbed by the time fixed effects.

<sup>22</sup> As illustrated in Section III, what matters for labor mobility are housing prices at the regional level, as they act as both a push and pull factor.

whereas the coefficient of housing prices is statistically insignificant (Table 3, Column 1).<sup>23</sup> Next, we add labor-related social benefits and labor market expenditure into the regression. As expected, higher benefits reduce labor movement, while greater LMP expenditure supports interregional mobility (Table 3, Column 2).<sup>24</sup> The coefficient of home ownership, however, becomes insignificant in this specification. These results are robust to further introduction of labor market variables, such as dispersion in regional unemployment rates and the share of low-educated in the labor force (Table 3, Column 3). Note that the coefficients for the labor force education level and the unemployment dispersion both have the expected sign but are statistically insignificant. Finally, replacing unemployment dispersion with the average jobless rate at the national level yields similar results. Labor market protection benefit, and LMP expenditure remained to be the main factors that drove a country's internal labor mobility during 2003–16 (Table 3, Column 4).

**Table 3. Cross-country Regression Results 1/**

Dependent variable: regional labor mobility flows	(1)	(2)	(3)	(4)
GDP per capita in PPP	-2.04*	-3.31**	-2.98**	-2.89
	(1.02)	(1.25)	(1.19)	(1.65)
Home ownership	-0.05**	-0.01	-0.01	-0.01
	(0.02)	(0.02)	(0.02)	(0.02)
House price to income ratio	0.42	0.31	0.33	0.30
	(0.49)	(0.55)	(0.65)	(0.47)
Social protection benefit		-0.76**	-0.91**	-0.95**
		(0.27)	(0.33)	(0.40)
Labor market policy expenditure		0.67*	0.73*	0.93**
		(0.31)	(0.37)	(0.38)
Share of low-educated in labor force			-0.02	-0.02
			(0.02)	(0.02)
Dispersion in regional unemployment rates			0.00	
			(0.01)	
National unemployment rate				0.01
				(0.03)
Observations	124	109	101	109
Adjusted R-squared	0.98	0.98	0.97	0.98
Adjusted within R-squared	0.16	0.20	0.21	0.21
Country FE	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes
Cluster country and year	Yes	Yes	Yes	Yes

Robust standard errors in parentheses

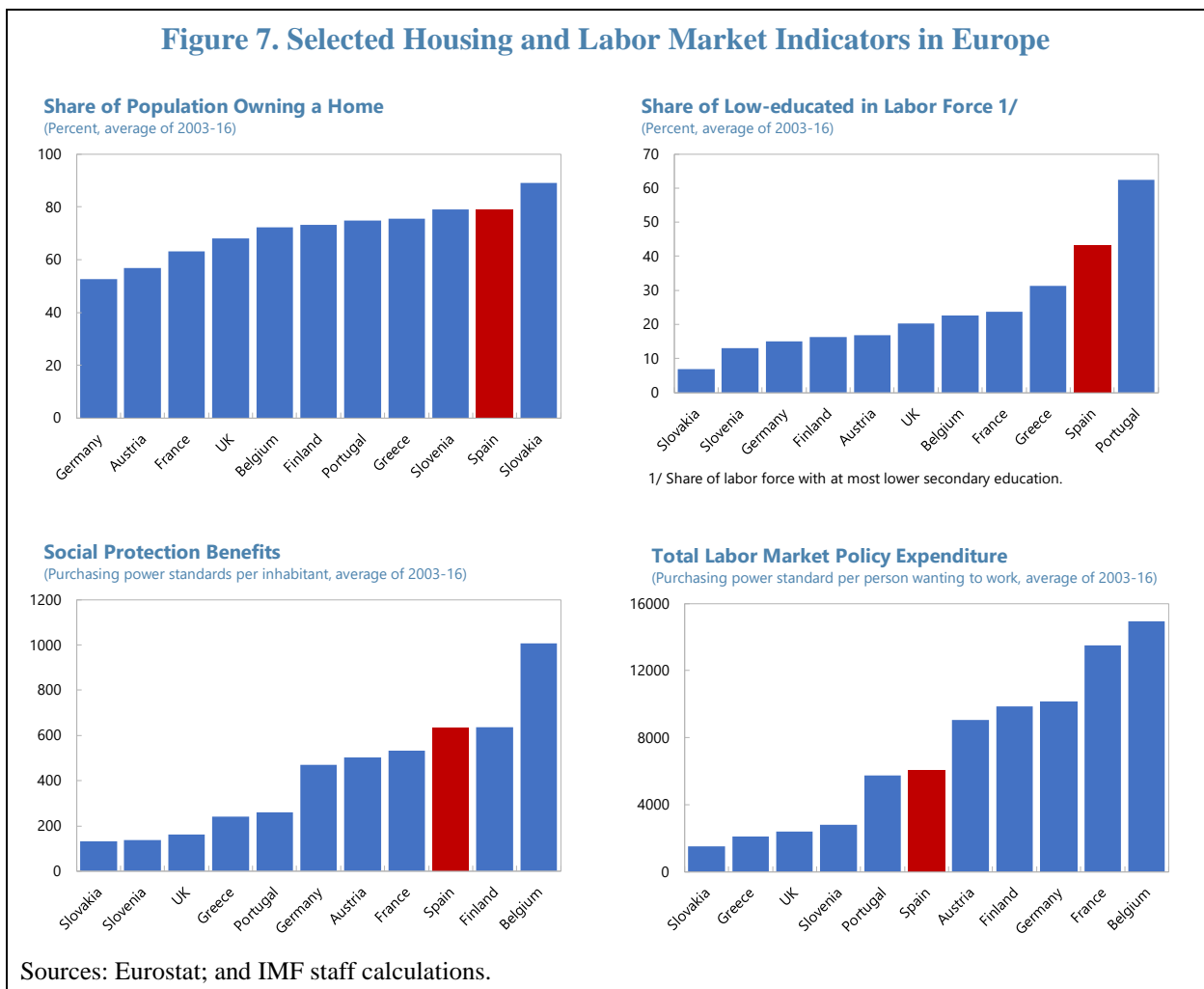
\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

1/ The regression sample covers the period of 2003-16 and includes Austria, Belgium, Finland, Germany, Greece, France, Portugal, Slovenia, Slovakia, Spain, and the UK.

<sup>23</sup> We also consider introducing a homeownership and housing price interaction term to capture the conditional effect of the two variables, but the results remain broadly unchanged, with the coefficient of the interaction term statistically insignificant.

<sup>24</sup> We use the variable of labor-related social protection benefits per inhabitant to capture the overall benefit package available to workers. This measure covers various unemployment benefit schemes and active labor market policy assistance. Although the measure adjusts for a country's population size, it still may not represent an accurate picture of the generosity of the social protection system, particularly for countries that have a large number of unemployed. Hence, the results should be interpreted with cautions.

To link the above findings from the cross-country analysis to Spain's low internal mobility issue, Figure 7 presents the main housing and labor market indicators for Spain in comparison with those of the other European countries in the sample. The shares of home ownership and low-educated labor force were relatively higher in Spain than in many other European countries. Spain's spending on labor-related social benefits in per capita term ranked third after Belgium and Finland during 2003–16,<sup>25</sup> while its expenditure for LMP, which includes LMP services, LMP measures and LMP supports, was below the sample average. Against this background, to address Spain's low regional mobility issue, policy dialogues at the national level could put a particular emphasis on the design of labor market institutions and policies as well as frictions in the housing market.



<sup>25</sup> As discussed in footnote 23, given Spain's high unemployment rate, the total spending on social protection benefits per inhabitant may not actually reflect the generosity of the benefit system.

## V. CONCLUSIONS AND IMPLICATIONS

This paper first documents the recent trend of Spain's regional labor mobility. Using data from 1998–2016, the paper shows that internal mobility rose steadily during the economic boom years but has been on a declining trend since the onset of the crisis. Much of this underlying trend was driven by movement of immigrants, whereas the mobility of Spaniards has been relatively stable. On average, regional mobility among foreigners was around three times higher than that of Spaniards. At the aggregate level, working age population accounted for more than three quarters of mobility flows across regions.

House prices, labor market conditions, and the degree of labor market duality are found to be the main regional factors explaining interregional migration flows, while labor market institutions and policies play an important role at the national level. In line with the literature, the empirical results suggest that average house prices and unemployment rates are negatively associated with migration *inflows*, whereas average real wages and the share of temporary employment are negatively related to migration *outflows*, particularly after the global financial crisis. Interestingly, the results also reveal a potential “home bias” in people's migration decisions, which could be attributed to language, cultural, and unknown institutional factors. When comparing the migration behavior of Spaniards and foreigners, the empirical analysis finds that pull factors from the destination regions play a more important role in mobility among Spaniards, while push factors in the origin regions matter more for foreigners.

Furthermore, the analysis examines how the determinants of internal migration vary before and after the crisis. Barring the caveat of different sample sizes, the results show that most economic factors play a more important role in explaining regional migration flows in the post-crisis period, with the effects of selected labor market variables becoming even stronger since 2013 after major labor market reforms. Finally, the cross-country analysis finds that at national levels, increases in social and unemployment benefits reduce workers incentives to move, while higher labor market policy expenditure supports regional labor mobility.

Several policy options could be considered to promote regional labor mobility in Spain.

- **Reduce the pervasiveness of labor market duality.** The widespread use of temporary contracts not only impedes the development of workers productivity and thus labor mobility, but also contributes to high structural unemployment in Spain. To address this structural weakness, policy actions should focus on narrowing the gap between the costs for firms to hire permanent and temporary workers, particularly by reducing the hiring costs and severance payments associated with permanent contracts. Specific policy recommendations can be found in IMF Country Reports No. 17/23 and No. 17/319.

- **Facilitate wage setting flexibility.** The limited role of wages in explaining regional mobility and the narrow gap between wages across regions point out a potential issue of insufficient wage flexibility to region-specific economic conditions. In view of this, ensuring wage growth in line with productivity development could promote efficient allocations of labor resources across regions and industries. In particular, wage dynamics should reflect differences in region-, sector- and firm-specific conditions. A previous study (IMF, 2015) found that the 2012 labor market reforms increased macro-flexibility. However, at the time there was little evidence suggesting that the response of wages to region- or sector-specific employment conditions had yet significantly improved. In this respect, further decentralizing wage setting and allowing collective bargaining opt-out could provide the needed flexibility for firms and workers to adjust to temporary and regional-specific shocks.
- **Enhance incentives for geographical mobility.** The findings of the negative home region fixed effects on regional migration indicates a potential role played by cultural and other unknown institutional factors. To overcome these obstacles, there may be room for policies to provide additional incentives for workers to move. For instance, the Mobility Assistance Program (MAP) adopted in Germany has been found to be effective in encouraging distant job search and promoting regional labor mobility (Caliendo et al., 2017).<sup>26</sup> In addition, given the important role of housing prices and home ownership in determining migration flows, policies could be considered to provide temporary and targeted housing assistance, particularly in regions that face a high house price-income ratio or an underdeveloped rental market.
- **Provide support through more effective active labor market policies (ALMPs).** To promote labor mobility, specific ALMP programs could be introduced to facilitate effective information sharing of job opportunities across regions, provide individualized support and demand-driven skills training, and increase the employability of low-skilled and long-term unemployed.

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<sup>26</sup> The MAP in Germany is part of the active labor market policy (ALMP) program, and it provides financial support to distant job search, such as subsidies for travel expenses of distant job interviews and cost of reallocation.

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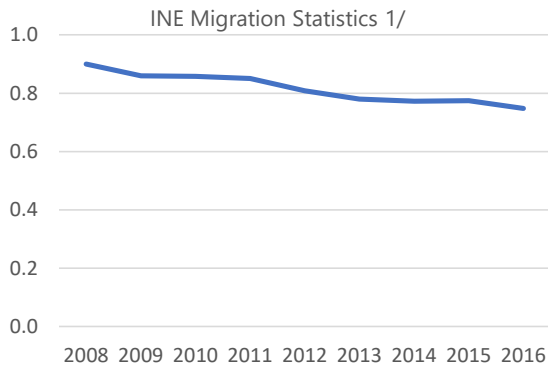
## Annex I. Description of Different Mobility Data Sources

*Various regional mobility flow data is available in Spain, each with different coverage and time span. Out of the five series four report a declining trend in regional migration rate since the onset of the global financial crisis, with one showing a small rebound in 2016 (data from the tax authority). The one exception is the mobility series from the Public Services of State Employment (SEPE), which displays an upward trend during 2009–17. The migration rate from this series is also much higher than the rates from other data sources. Below is a summary of each data series.*

- INE migration statistics. The data provides a quantitative measurement of the overall migration flows, including flows within the country, as well as migrations into and out of Spain. For the within-country flows, data is available for both inter-autonomous communities and inter-provinces. The series covers the overall population and starts from 2008.
- Labor mobility data from the tax authority. The information is obtained from the employee records contained in the Annual Summary Declaration of Withholdings and Income for tax filing. The data includes geographical migration flows (both between autonomous communities and between provinces), as well as mobility across industries. Due to the existence of special tax regime, the data excludes Navarre, Basque Country, and autonomous cities of Ceuta and Melilla. The series covers mobility of workers only and starts from 2005.
- INE labor and geographical mobility data. The data combines the information obtained from the Municipal Register Database in INE and that from the labor force survey (the Economically Active Population Survey). Only flows between autonomous regions are available. The series covers mobility of the population aged 16 years old or over who reside in main family dwellings and starts from 2010.
- SEPE basic mobility data. The data uses the information obtained from the database of contracts registered in the public employment services of Spain. Mobility is defined when a worker's work place is different from his or her previous domicile, regardless of whether this difference is permanent or temporary. This may be one of the reasons behind its high migration rate. The data includes mobility between both regions and provinces. Given the source of the information, the data covers workers that already have a contract registered in the public employment services and starts from 2001.
- INE Residential Variations Statistics. The data is compiled using the information regarding registrations and cancellations due to changes of residence registered in the Municipal Registers. One caveat of this data is that residential variations referred in this data do not correspond to the number of persons involved in a residential variation, but to the number of variations made, as an individual may change his/her residence more than once in a year. The data includes information of both internal

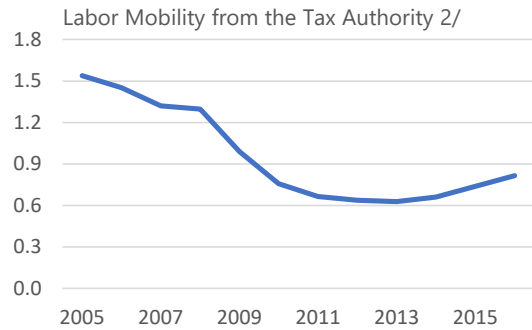
and external residential variations and has breakdowns by both inter-region and inter-province flows. The series covers mobility of the overall population and starts from 1998.

**Figure A1. Spain: Inter-region Mobility Rates – Data Comparison**



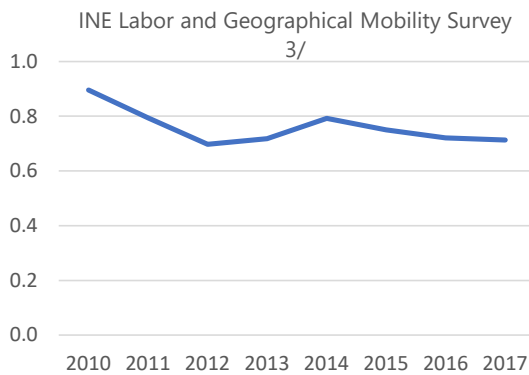
1/ Calculated as the percentage of the population that changed region of residence over the year.

Source: INE Migration Statistics



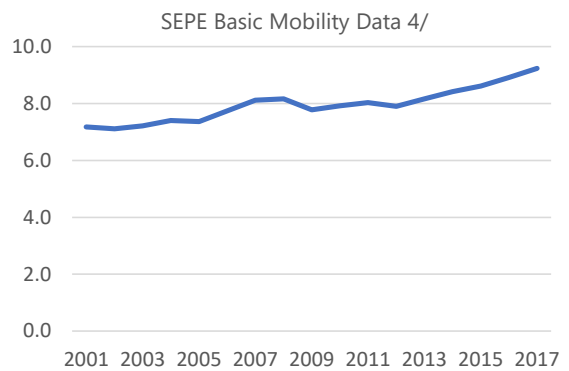
2/ Calculated as the percentage of the workers (registered for tax purposes) that changed region of residence over the year; exclude Navarre, Basque Country, and autonomous cities of Ceuta and Melilla

Source: Agencia Tributaria, Movilidad del Mercado de Trabajo en las Fuentes Tributarias



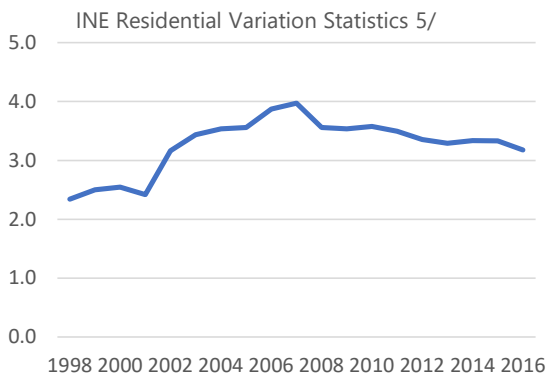
3/ Calculated as the percentage of the total labor force that changed region of residence over the year.

Source: INE Labor and Geographic Mobility Survey



4/ Calculated as the percentage of employed persons that changed region of residence over the year.

Source: Ministry of Employment, SEPE



4/ Calculated as the percentage of total population that changed region of residence over the year.

Source: INE, Residential Variation Statistics

**Table A1. Regional-level Regression Results of Region Fixed Effects 1/**

Dependent variable: Migration	(1)	(2)	(3)	(4)	(5)
	Total	Spaniards	Foreigners	Pre-crisis	Post-crisis
Aragon_o	-4.04*** (0.97)	-3.27** (1.41)	-5.09*** (1.01)	-8.47*** (3.26)	-4.19*** (0.06)
Asturias_o	-4.66*** (1.16)	-3.45** (1.68)	-6.48*** (1.19)	-10.07** (3.94)	-4.77*** (0.07)
Balearic Islands_o	-3.64*** (1.14)	-2.45 (1.64)	-5.35*** (1.20)	-8.82** (3.83)	-3.87*** (0.09)
Canary Islands_o	-1.25 (0.92)	-0.15 (1.26)	-2.66*** (0.87)	-5.30* (2.94)	-1.24*** (0.11)
Cantabria_o	-6.24*** (1.56)	-4.65** (2.23)	-8.37*** (1.56)	-13.47*** (5.23)	-6.39*** (0.06)
Castile and León_o	-2.66*** (0.69)	-2.02** (0.98)	-3.58*** (0.68)	-5.56** (2.19)	-2.71*** (0.05)
Castilla-La Mancha_o	-3.44*** (0.86)	-2.87** (1.22)	-4.05*** (0.81)	-7.62** (2.98)	-3.40*** (0.07)
Catalonia_o	0.47* (0.27)	0.22 (0.31)	0.30 (0.20)	1.91** (0.82)	-0.02 (0.09)
Valencia_o	-1.16*** (0.28)	-1.06*** (0.39)	-1.24*** (0.28)	-2.18*** (0.80)	-1.22*** (0.08)
Extremadura_o	-5.24*** (1.39)	-4.04** (1.97)	-6.64*** (1.21)	-11.72** (4.67)	-5.04*** (0.10)
Galicia_o	-2.59*** (0.67)	-1.84** (0.94)	-3.69*** (0.63)	-5.55** (2.17)	-2.65*** (0.10)
Madrid_o	0.52* (0.30)	0.37 (0.30)	-0.03 (0.26)	1.63** (0.73)	-0.05 (0.08)
Murcia_o	-4.20*** (1.10)	-3.71** (1.57)	-4.62*** (0.99)	-9.43** (3.75)	-4.12*** (0.08)
Navarre_o	-5.52*** (1.33)	-4.46** (1.98)	-7.14*** (1.39)	-11.62** (4.56)	-5.74*** (0.08)
Basque Country_o	-2.45*** (0.47)	-1.86*** (0.72)	-4.06*** (0.73)	-4.59*** (1.67)	-2.99*** (0.09)
La Rioja_o	-7.53*** (1.91)	-6.00** (2.74)	-9.34*** (1.87)	-16.28** (6.43)	-7.65*** (0.09)
Observations	4,080	3,808	3,808	1,632	2,448
Adjusted R-squared	0.90	0.89	0.93	0.86	0.93
Time FE	Yes	Yes	Yes	Yes	Yes
Cluster region pair and year	Yes	Yes	Yes	Yes	Yes

Robust standard errors in parentheses

\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

1/ The main dependent variables are omitted here to save space. See table 1 for the results.

**Table A1. Regional-level Regression Results of Region Fixed Effects1/ (concluded)**

Dependent variable: Migration	(1) Total	(2) Spaniards	(3) Foreigners	(4) Pre-crisis	(5) Post-crisis
Aragon_d	-1.28 (1.24)	0.24 (1.11)	-0.88 (0.86)	-7.92*** (2.38)	3.08*** (0.07)
Asturias_d	-0.97 (1.48)	0.98 (1.32)	-0.73 (1.03)	-9.19*** (2.86)	3.93*** (0.07)
Balearic Islands_d	-0.04 (1.47)	1.90 (1.33)	-0.01 (1.09)	-8.26*** (2.78)	4.76*** (0.09)
Canary Islands_d	1.47 (1.11)	2.99*** (0.99)	1.41* (0.78)	-4.66** (2.09)	4.84*** (0.11)
Cantabria_d	-1.24 (1.93)	1.25 (1.73)	-0.79 (1.32)	-12.21*** (3.77)	5.05*** (0.06)
Castile and León_d	-0.86 (0.83)	0.23 (0.74)	-0.83 (0.54)	-5.19*** (1.58)	2.01*** (0.06)
Castilla-La Mancha_d	-0.66 (1.05)	0.51 (0.93)	-0.10 (0.68)	-6.65*** (2.14)	2.52*** (0.08)
Catalonia_d	-0.45** (0.20)	-0.53*** (0.19)	-0.80*** (0.11)	0.80* (0.45)	-0.18* (0.09)
Valencia_d	-0.42 (0.33)	-0.12 (0.30)	-0.13 (0.21)	-1.92*** (0.60)	0.80*** (0.07)
Extremadura_d	-0.72 (1.66)	1.19 (1.48)	-0.17 (1.02)	-10.00*** (3.30)	3.96*** (0.11)
Galicia_d	-0.65 (0.80)	0.49 (0.72)	-0.83 (0.52)	-5.00*** (1.56)	2.03*** (0.11)
Madrid_d	-0.55*** (0.18)	-0.37** (0.16)	-1.32*** (0.14)	0.27 (0.34)	0.19*** (0.07)
Murcia_d	-0.74 (1.36)	0.47 (1.23)	0.42 (0.86)	-8.24*** (2.69)	3.32*** (0.07)
Navarre_d	-1.52 (1.75)	0.56 (1.57)	-0.89 (1.23)	-10.93*** (3.38)	4.58*** (0.09)
Basque Country_d	-1.27* (0.71)	-0.24 (0.64)	-1.41** (0.64)	-5.23*** (1.30)	2.02*** (0.07)
La Rioja_d	-1.52 (2.37)	1.21 (2.12)	-0.41 (1.60)	-14.64*** (4.64)	6.09*** (0.08)
Observations	4,080	3,808	3,808	1,632	2,448
Adjusted R-squared	0.90	0.89	0.93	0.86	0.93
Time FE	Yes	Yes	Yes	Yes	Yes
Cluster region pair and year	Yes	Yes	Yes	Yes	Yes
Robust standard errors in parentheses					
*** p<0.01, ** p<0.05, * p<0.1					
1/ The main dependent variables are omitted here to save space. See table 1 for the results.					