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PAPER

Title: The uneven geographic impact of COVID-19 on the economic crisis and the recovery. The case of Spain

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Subject area: *(please, indicate the subject area which corresponds to the paper)*

Crecimiento, convergencia y desarrollo (1)
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Abstract: *(maximum 300 words)*

This paper investigates the regional economic disparities in the impact of the COVID-19 crisis in Spain. Using data from social security records and Google Trends, we develop a novel methodological approach to account for the different sources and channels through which the pandemic has affected employment dynamics, used as a proxy for economic activity. The main results show the important negative effect of restrictions and the relevant role of government actions to attenuate its geographically adverse economic effects. These findings highlight the need for coordination among different levels of administrations because COVID-19 spillovers exceed the administrative borders.

Keywords: *(maximum 6 words)* COVID-19, regional impact, public support policies, Spain
JEL codes: E2, E24, R10,

1. INTRODUCTION

The literature on the COVID-19 economic impacts is evolving rapidly (Brodeur et al., 2021)[1]. Most contributions have centred on analysing the economic and labour market effects, sometimes as a proxy of the economic activity, on the onset of the pandemic, focusing mainly on the United States. Several conclusions can be drawn from this early evidence. 1) The COVID-19 outbreak does not explain per se the economic disruption. While several studies have found that the demand shock provoked by the COVID-19 contributes to deteriorating economic activity (Barrot et al., 2020; Forsythe et al., 2020), stay-at-home, business closure mandates and other restrictions have played a role too. Although useful to contain the widespread effects of the virus, restrictions have been shown to worsen the economic environment (Baek et al., 2020; Dreger and Gros, 2021; Gupta et al., 2020; Juranek et al., 2021; Marcén and Morales, 2021). On top of it, the asymmetry between activities affected by those measures (the so-called essential vs. non-essential services) have fostered the heterogeneity impact across industries and occupations in this early stage of the pandemic. 2) Businesses characterised by face-to-face operations have received the greatest toll (Beland et al., 2020; Kim and Kim, 2021). The close physical contact between workers and clients and the difficulty of working remotely make industries such as accommodation or restaurants especially vulnerable to the social distancing guidelines imposed by the government and health authorities. 3) There is no strictly direct relationship between the geographical spread of COVID-19 and its effect on the economy. Although it is found that local economic conditions explain COVID-19 diffusion patterns (Ascani et al., 2021; Bourdin et al., 2021), it seems that the most affected areas in terms of COVID-19 cases are not always the same in terms of economic losses (Pieroni et al., 2021; Cerqua and Letta, 2022). 4) Small businesses have been greatly affected. Employment losses are concentrated in small-sized businesses even after controlling for composition effects by industry (Aum et al., 2021; Dueñas et al., 2021). Whereas larger firms are more productive and with more savings, small firms are characterised by financial fragility, making them more exposed to temporal economic disruption (Bartik et al., 2020).

[1] A summary of the literature on the effects of COVID-19 on economic activity can be found in Table A.1 in the Appendix.

Regarding the economic impact of COVID-19 in Spain, several papers coincide in pointing out a series of characteristics that make Spain more vulnerable than other countries to the pandemic effects, i.e., the severity of the disease, the economic structure, the mobility restrictions, and business lockdown mandates (de la Fuente, 2021; Dolado et al., 2021). On the one hand, Spain has been one of the most affected countries regarding the number of cases and deaths among the European countries. The intensity of the virulence of the disease during the first waves of the COVID-19 pandemic put Spain in the spotlight. Moreover, the sectoral and occupational structure with a high weight of the tourism sector, its working-age population characterised by lower education attainment and skills for teleworking, and the large proportion of small firms, make Spain especially vulnerable not only to the economic impact of COVID-19 but also worsen the economic consequences of state-at-home and business closure mandates. Lastly, the larger proportion of temporary contracts has concentrated the bulk of the employment losses in those types of labour contracts (Dolado et al., 2021).

All in all, there is still a paucity to evaluate the economic impact of the COVID-19 pandemic. First, we propose a novel methodology to identify both jointly the sources of the effects caused by COVID-19 on the economic activity (the pandemic intensity, restrictions on mobility and economic activity, furlough schemes and firm support), as well as their transmission channels (the productive structure, the intrinsic characteristics of territories and corresponding labour markets). This mixed perspective is doubly relevant if it is included in the empirical regression specification model to improve the estimates' precision and estimate the differential effects across regions.

Second, we have access to a monthly employment dataset at the regional level (NUTS 3). The richness of this data allows us to investigate how some geographical specific characteristics, such as their productive structure or some other idiosyncratic features, have influenced the regional impact of COVID-19. In addition, we intend to disentangle whether the differential regional impact could have affected the Spanish regional economic dynamics.

Third, we design an indicator to identify government actions (restrictions and public support programs) from the data provided by Google Trends. Since our proposed synthetic indicator is very general, it could be applied to different settings and thus contributes methodologically to the indirect measurement of variables not available in official or administrative datasets.

Fourth, we focus on a European country heavily affected during the first COVID-19 wave and the entire pandemic period. As Gros et al. (2021) point out, the impact of COVID-19 on labour market outcomes may be different between Europe and the United States due to the spread of short-term employment schemes in mainly all European countries.

The following section analyses the impact of the pandemic in Spain and the implemented public policies to mitigate its caused health and economic effects. The third section describes the data, highlighting the use of Google Trends to measure the intensity of imposed restrictions and firm support during this period, in the absence of homogenous and reliable databases for these variables. The theoretical framework and the empirical model are then presented. The regression model, by introducing different term interactions, distinguishes between the sources of the effects and their transmission channels. The fourth section presents the main results, emphasising the regional dimension and its potential influence on the Spanish regional economic dynamics. The article ends with the usual conclusion section.

2. COVID-19 PANDEMIC IN SPAIN

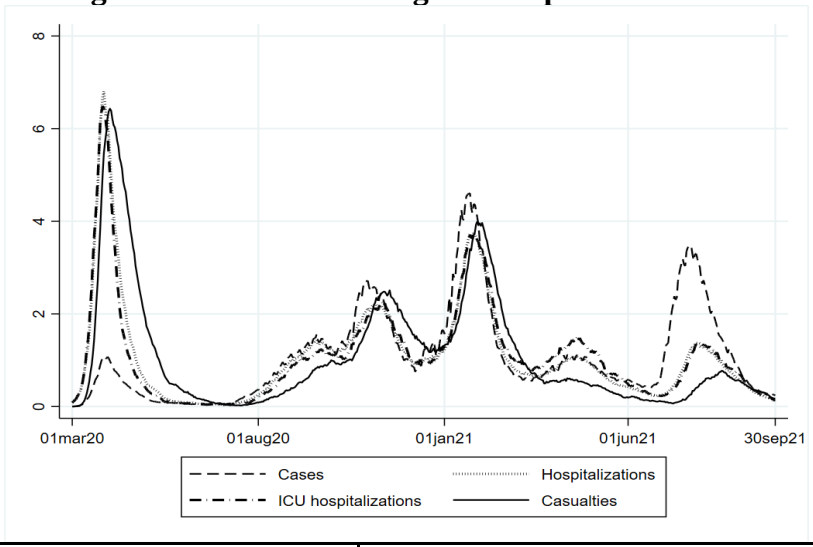
2.1. PHASES OF COVID-19 PANDEMIC

Five different waves of the COVID-19 pandemic have occurred in Spain until the end of September 2021 (see Figure 1.1). The first and most intense wave occurred between March 2020 and June 2020. The severity of the pandemic, which was originally unforeseen by the authorities and the lack of diagnostic tests, impede an accurate measure of the pandemic intensity along with this first wave in terms of incidence cases. The second wave started after the summer and lasted until the end of the year, followed by the third one, which began just after the Christmas break. During these three waves, infections, hospitalisations, intensive care unit (ICU) hospitalisations and deaths, went together with a logical time delay between them in the stated order. The vaccination slowly started in January 2021 and went at a moderate rate until almost the end of the spring season, attaining nearly 90% of the population over 12 years old and around 80% of total residents (Ministry of Health, 2021). This has contributed to the fact that, in the following waves, infections were not followed by hospitalisations and deaths with the same intensity. Thus, in the fourth wave, after the 2021 Easter vacation, the lowest of all, the intensity of hospitalisations was reduced by 25% in relation to infections and by 50% concerning death tolls. The fifth wave after the 2021

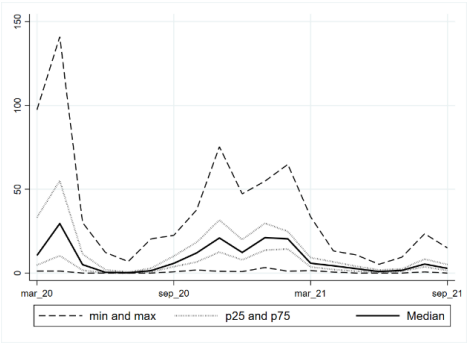
summer, in the presence of a high vaccination rate, registered a fall in the intensities of 60% and 80%, respectively.

Figure 1. COVID-19 pandemic intensity in Spain

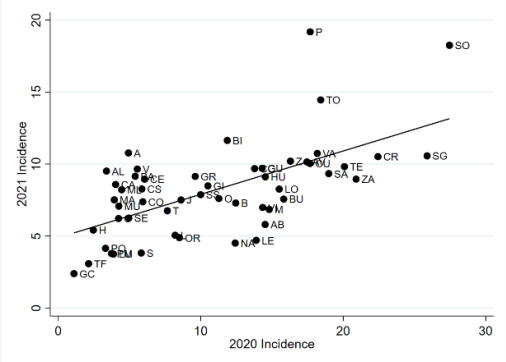
1.1 Number of COVID-19 cases, hospitalisations, intensive care unit hospitalisations and deaths in Spain (March 2020 to September 2021). Variables normalised by the time average of each variable along the complete time horizon.



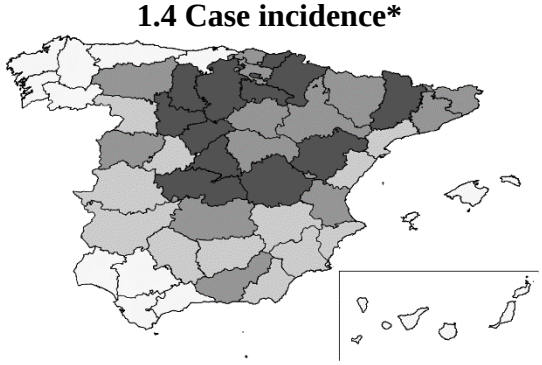
1.2 Regional dispersion of death tolls' incidence



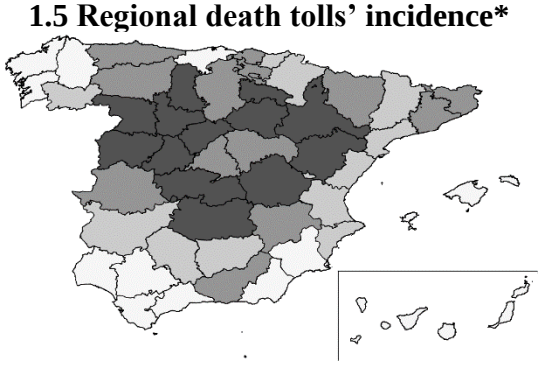
1.3 Relationship between the death tolls' incidence in 2021 and 2020



1.4 Case incidence*



1.5 Regional death tolls' incidence*



**A darker colour means a higher incidence (quartiles)*

The different behaviour of the four variables analysed justifies the use of death tolls as the best measure of incidence, not just because they account for the most critical effect of the pandemic but also because of the accuracy with which this variable is measured (Amdaoud et al., 2021). The official number of deaths, even with its possible measurement difficulties, solves some problems of measurement error of other variables capturing COVID-19 intensities such as excess mortality that includes comorbidity.

Although the general behaviour of the pandemic is repeated across territories, it is also true that substantial intensity differences are observed. Figure 1.2 shows significant dispersion levels in incidence rates based on death tolls', which increase with the peaks of the different waves. For the entire considered period, the highest incidence has occurred in the centre of the country, especially around Madrid, which was the epicentre of the infection in Spain during the first wave. There are also significant differences between areas with high case incidence rates (Figure 1.4) and deaths (Figure 1.5). Factors such as the population age (older in rural areas) and the availability and quality of healthcare services (especially the availability of ICUs) could explain regional differences in the pandemic behaviour. There is also a significant correlation between the average incidence of 2021 and that of 2020, at least in terms of death tolls (Figure 1.3). The persistent geographic behaviour of the virus probably responds to the characteristics of the articulation and configuration of the territory and the nature of physical and social connections (i.e., density, how infrastructures are connected and the type of social relations, etc.). Also, the kind of productive activity that may favour or hinder virus expansion (Ascani et al., 2021; Bourdin et al., 2021), as well as the climatic determinants (e.g., the South, where most of the social activity is carried out outdoors, has been affected to a lesser extent).

2.2. GOVERNMENT ACTIONS

The government of Spain decreed two States of Alarm in response to the health crisis. The first one started on March 14, 2020 and was extended until June 21, 2020. It was the hardest, it included strict home confinement until the end of May and the restrictive measures were applied equally throughout the whole Spanish territory, with time schedules and capacity limitations, preference for and often compulsory teleworking, lockdown of accommodation, restaurant and leisure activities, and transport and mobility restrictions. The second State of

Alarm lasted between November 9, 2020, and May 9, 2021. On this occasion, co-governance was established between the central government of Spain and that of the different Autonomous Communities (NUTS 2). The State of Alarm established the legal basis for the measures taken by the Autonomous Communities. Only occasionally and mainly during particular vacation dates, citizen mobility restrictions between regions were imposed in a coordinated manner by regional and central governments. During this second State of Alarm, the restrictions were much less strict than during the first, and they were not homogenous across regions. The sharp geographic and temporal disparities in both the implementation of the restriction measures and the incidence levels across regions allow identification of one effect from another. During this period, there have been schedule and capacity limitations in commercial establishments, curfews, a preference for partial teleworking and opening restrictions in establishments linked to leisure and restaurants. Moreover, the general mobility restrictions were gradually being relaxed, exerting specific closures of health areas where incidence was relatively high and applying regional mobility restrictions during bank holidays to limit mobility. Finally, since the end of the State of Alarm and under judicial supervision, the regional governments have been responsible for deciding the restrictions to be applied.

On the other hand, to alleviate the negative consequences of the pandemic on the labour market, furlough schemes (ERTE in Spanish) were strengthened and made more flexible. Specifically, the affected workers received a benefit equivalent to 70% of their salary. In addition, companies were exempted from paying Social Security contributions, although they were obliged to retain employment for the following six months. The successive extensions of these furlough schemes have focused on the partial and gradual elimination of the exemption of Social Security contributions to encourage rapid reincorporation of workers (Izquierdo, Puente and Regil, 2021). A second type of public interventions approved in March 2020 corresponds to 140,000 million euros financial aid to firms through bank guarantees granted by the Spanish Official Credit Institute to facilitate liquidity and meet companies' financing needs. Two-thirds of these funds were destined for the self-employed workers and the small and medium-sized enterprises (SMEs), reserving a specific amount for the tourism sector due to its high vulnerability. The guaranteed loans were granted through

financial entities in less than a month. Although these mentioned interventions include the main direct aid issued by the state, extraordinary measures worth almost 50,000 million euros to support business solvency has been further approved, primarily by the central government. However, some regional governments (Autonomous Communities) have created exceptional aid funds.

3. MATERIALS AND METHODS

3.1. DATA

Employment information

This paper evaluates to what extent COVID-19 has affected economic activity differently across regions. At this level of disaggregation and at that recent time span, the best available variable to analyse the evolution of economic activity is employment (Baek et al., 2020 and Aum et al., 2021). This variable has undoubted advantages over others, the main one being its availability with full homogeneity in terms of long-time horizons and the periodicity and the level of geographical disaggregation. We, therefore, use the statistics of Social Security affiliation. There is information on both the workers affiliated with the general regime and the self-employed ones. Workers affiliated with public systems (around one-third of public employees) and other special regimes are excluded. The data is available monthly and it is disaggregated for the 52 Spanish provinces (NUTS 3) and 21 sectors of economic activity along the period from January 2009 to September 2021. There are 167,076 observations, of which 20,748 are affected by the pandemic (since March 2021).

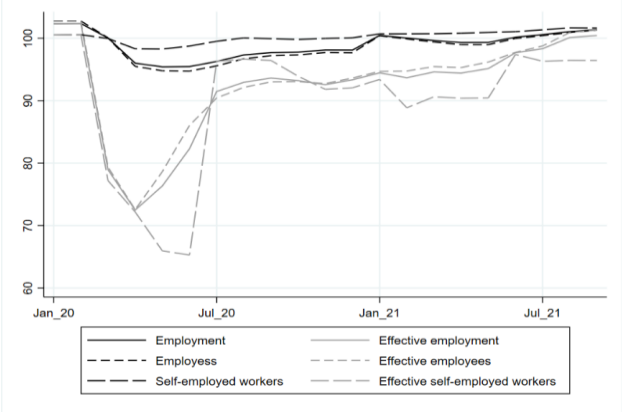
We also have the same type of data for furlough employees under the general system of the Social Security and the self-employed ones. Likewise, information is available on the type of contractual relationship between workers and companies (permanent, permanent seasonal and temporary contracts for workers under the general regime).

With this information, we define six different groups of workers. Employees (workers of the general regime), self-employed workers and total employment (the sum of the two mentioned groups). Then effective employees (discounting those furlough employees) and effective self-employed workers (discounting those who had temporarily ceased their activities). Finally, the group that is considered most relevant for this research, effective employment (the sum of effective employees and effective self-employed workers). Figure 2 shows the

evolution of these six variables for Spain, setting equal to 100 the value that each series had in the same month of 2019, which is taken as a base.

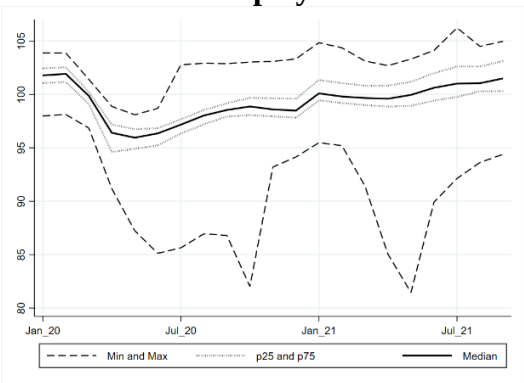
Figure 2. Time series of the different employment typologies (Same month in 2019 = 100)

2.1 Aggregate employment measures at the national level

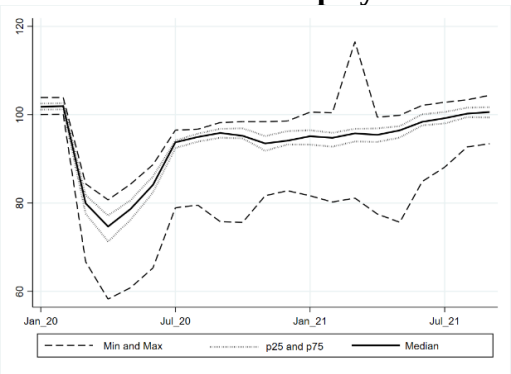


Employment dispersion by provinces

2.2 Employment

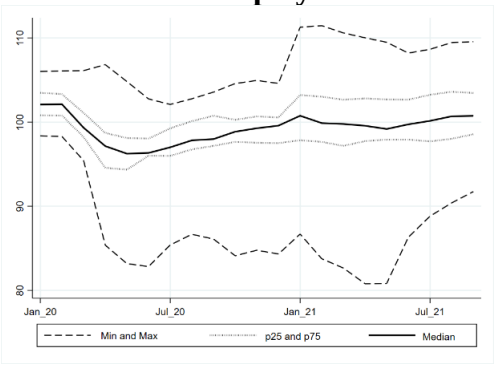


2.3 Effective Employment

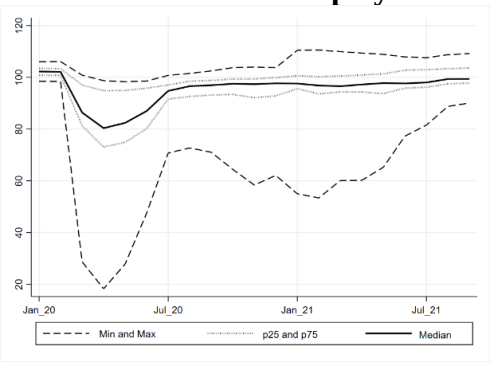


Employment dispersion by economic activity sectors

2.4 Employment



2.5 Effective Employees



The first thing that stands out in Figure 2.1 is the difference between the evolution of employment and effective employment. This difference is more prominent in the self-employed workers than in the case of the general regime ones. The observed disparities in the evolution of these variables suggest that effective workers should better approximate labour activity (Fernández-Cerezo et al., 2021). On the other hand, there is a significant dispersion in the geographic behaviour, which is much greater in the case of effective employment (Figure 2.3) than in the case of employment (Figure 2.2). This illustrates the role of furlough schemes to alleviate the effects of the pandemic on the labour market. In addition, the dispersion is greater when the effective evolution between sectors is considered compared with the regional one, reflecting that the pandemic has particularly stricken certain economic activities, specifically tourism and those leisure-related activities.

COVID-19 intensity measures

Regarding the pandemic intensity measures (number of affected individuals out of population, monthly data), we consider data from the four main used indicators: number of infected, hospitalised, hospitalised in the ICU and deaths. As mentioned in Section 2.1, we consider incidence based on death tolls the best of all four measures due to the significant underestimation of the remaining three indicators during the first wave (Amdaoud et al., 2021). In the first months of the existence of COVID-19, those three indicators had measurement problems due to the lack of official diagnosis of many patients and the collapse of the healthcare system. This has probably significantly underestimated the phenomena captured by each of the mentioned indicators compared to the one based on death tolls. On the other hand, the intensity of the pandemic and the perception of its severity have decreased with the number of death tolls, which has reduced significantly as vaccination advanced.

Government actions

The other variables considered of interest are those relating to restrictions and public aid granted to companies. In the absence of indicators that measure the degree of restrictions or support in each territory throughout the pandemic, we follow the idea behind the proposal used in Timoneda and Vallejo (2021) and Ajbor, Boumaaza and Ajbor (2021), that use Google Trends searches as a mechanism to measure political and health aspects related to COVID-19. In our case, we use Google Trends searches to measure restrictions and public support. Google Trends allows obtaining over time (since 2004, although we only use data

since 2009) the evolution of searches for a given term in a particular geographical context, setting equal to 100 the observation where a greater amount of searches has been requested. A crucial restriction is that while Google Trends enables a geographical disaggregation up to Autonomous Communities (first-level political and administrative division in Spain), it does not allow temporal comparisons of search profiles across territories, although it does at the cross-sectional level. However, most of the restrictions and support to companies are homogeneous across all the provinces belonging to an Autonomous Community since they share the same regional government, which regulates certain economic and mobility issues. To appropriately measure the proposed aspects, following expression [1], we compute an aggregate indicator for each of the two variables:

$$I_{it} = \sum_{k=1}^{K} \gamma_i \vartheta_k T_{kit} \qquad [1]$$

We must establish some criteria in relation to (i) the search terms (T_k) and the number (K) of those terms to be considered, and (ii) the procedure to establish relative intensities between the different regions (γ_i) and between the different analysed terms (ϑ_k).

In the case of restrictions, the search terms have been: "restriction/s", "time schedule/s", "measure/s", "closure/s", "perimeter closure/s", "suspension", "mobility restriction/s", "cancellation/s", "capacity/capacities", "meeting/s", "commuting", "prohibition/s", "limitation/s" and "state of alarm" adding either “coronavirus” or “COVID” at the beguining of the referred search terms. Some of these terms have not got enough searches and consequently, Google Trends does not provide information. Moreover, we only consider the terms that have information for at least 14 of the 19 Spanish regions, setting those unavailable observations equal zero. Given that there is high correlation between the selected terms, we end up using only the three following terms that are representative of all of them, i.e. “coronavirus measure”, “coronavirus closure” and “coronavirus state of alarm”.

In the case of public support to companies, special attention is required so that the pursued interventions are not confused with the subsidies to the self-employed workers for interruption of their activity — a measure similar to furloughs but for self-employed workers—. For this reason, we only choose terms that make clear reference to firms or to support instruments other than furloughs. The original list is shorter in this case: "aid/s to company/companies", "ICO credit/s" (ICO stands for Spanish Official Credit Institute), "ICO loan/s", "tax rescheduling", "direct aid/s". In this case, these terms, and these same ones but

with the word COVID or coronavirus added are considered. For a term to be accepted, must have no search records before March 2020. The final chosen terms correspond to “ICO loans”, “tax rescheduling” and “ICO coronavirus loans”.

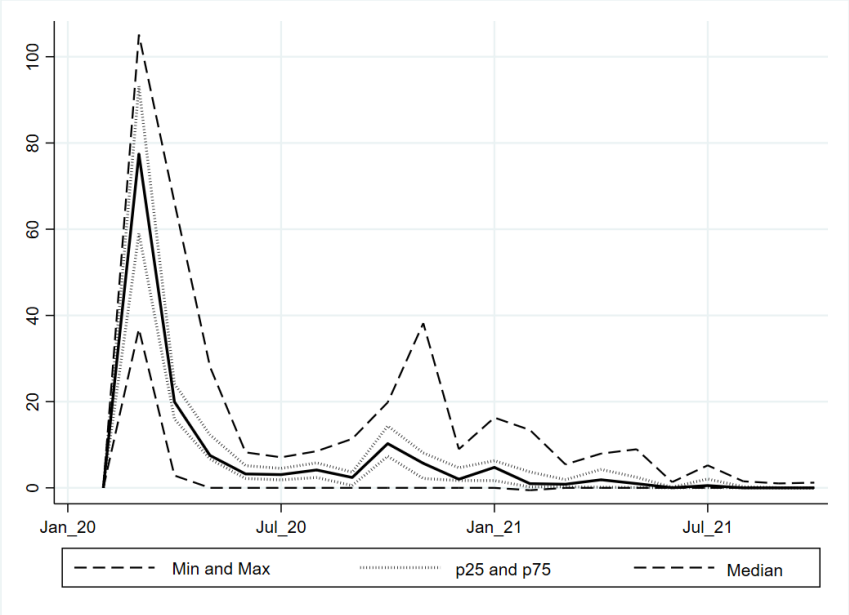
The terms have been searched for each Autonomous Community separately. Different time profiles are observed across regions, although certain similarities also arise. To establish the relative importance of the search terms among the different regions (γ_i), we use the relative intensity indicator for sub-regional areas offered by Google Trends when the search for each term is carried out for Spain. These mentioned search intensities, also expressed in the form of cross-sectional indexes, indicate the relative popularity of the term in each sub-region, i.e., the percentage of times that the word is searched in relation to the total number of searches carried out in the corresponding location. Given these relative search intensities for a period and comparable time series between regions, we set each Autonomous Community's time-series average to equal the relative search intensities between Autonomous Communities. In the case of provinces, we assume the same search profile of the Autonomous Community where the province belongs to.

Finally, to establish the relative importance between the different terms (ϑ_k), Google Trends allows simultaneous searches of up to five terms, which permits, keeping one constant, to establish relative search intensities of the terms in a specific geographical area. In this case, we use only Spain to establish the relative importance between terms. The aggregate indicators of restrictions and firms’ support for each Autonomous Community are constructed as weighted averages of the three terms selected in each case, using the relative search intensities between terms described in the previous paragraph as weights, therefore normalising the time series average to unity.

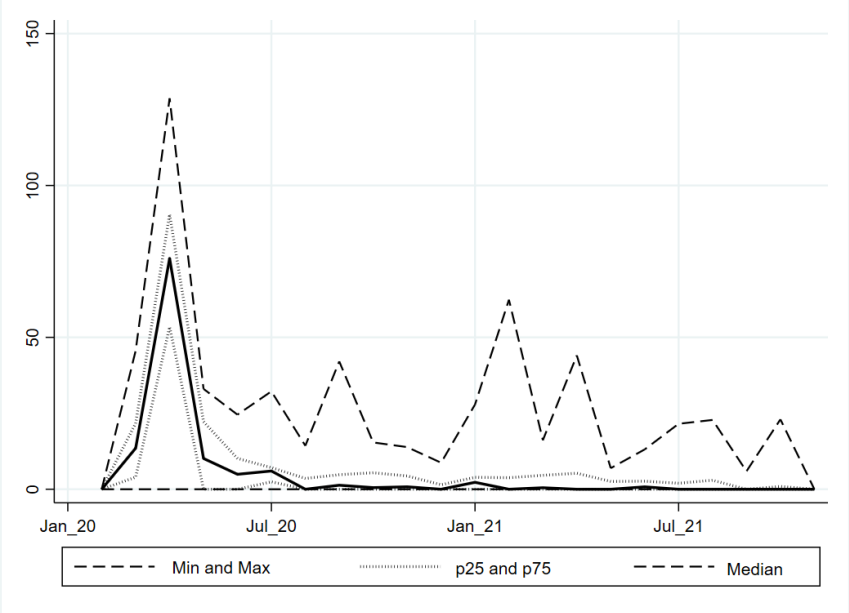
As shown in Figure 3, which depicts the regional dispersion in the aggregate indicators of restrictions and firms' support, dispersion is larger in the case of firms' support. From the time series perspective, the highest levels of dispersion correspond to the first and third waves in both cases. In addition, the effect of restrictions, incredibly intense in March and above all, in April and May 2020, is observed in the initial impulse, followed by a month's lag, by the peak associated with firms' subsidies. Table A.2 in the Appendix shows the statistics of all the variables used in this article.

Figure 3. Time series for regional dispersion (across Autonomous Communities) in the indicators for restrictions and firms' support constructed from Google Trends.

3.1 Restrictions



3.2 Firm support

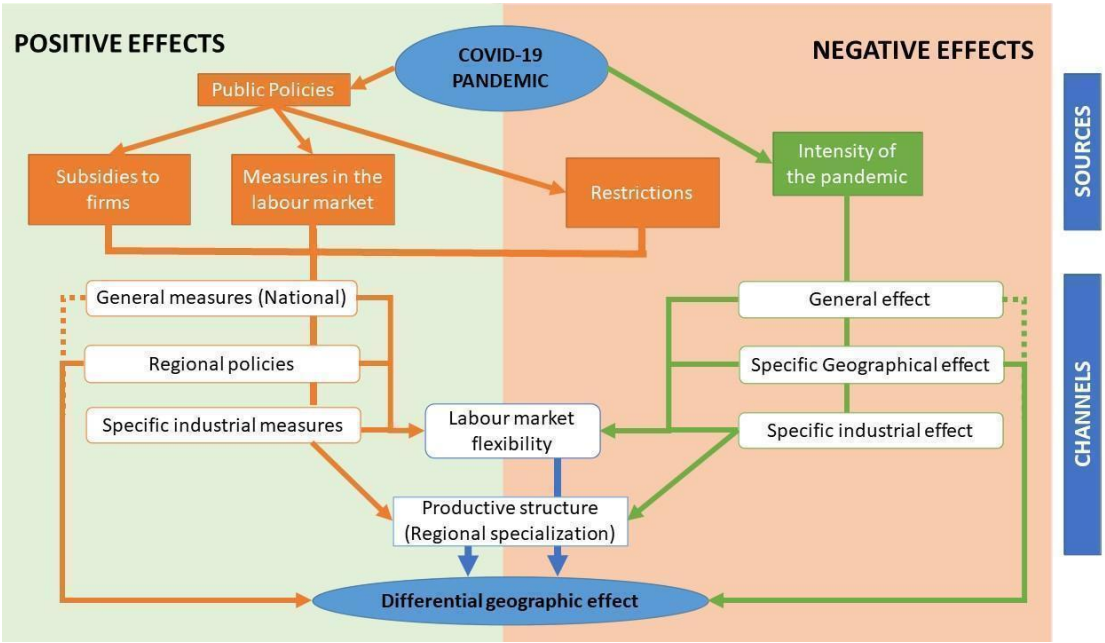


3.2. METHODOLOGY

Theoretical framework

The aim of this paper is to evaluate the differential geographic impact of the possible causes and transmission channels of both the intensity and the policies linked to COVID-19 in Spain. To do this, we develop a theoretical framework that considers the channels identified in the literature by which the different aspects related to the pandemic affect economic activity (Figure 4). There are two main elements to take into consideration, (i) the intensity of the pandemic and (ii) the different public policies carried out to fight against it, either from a public health perspective (basically restrictions and non-pharmaceutical interventions) or from an economic perspective (to maintain employment and support firms). We consider four sources of the effects that coronavirus has on economic activity: (i) the intensity of the pandemic, (ii) mobility restrictions and those that directly affect the economic activity, i.e., closure of activities, limitations of opening hours and capacity, etc., which should all presumably affect economic activity negatively. On the other hand, the interventions positively affect economic activity, such as (iii) employment support measures mainly via furlough schemes and (iv) other forms of firms' support to maintain economic activity.

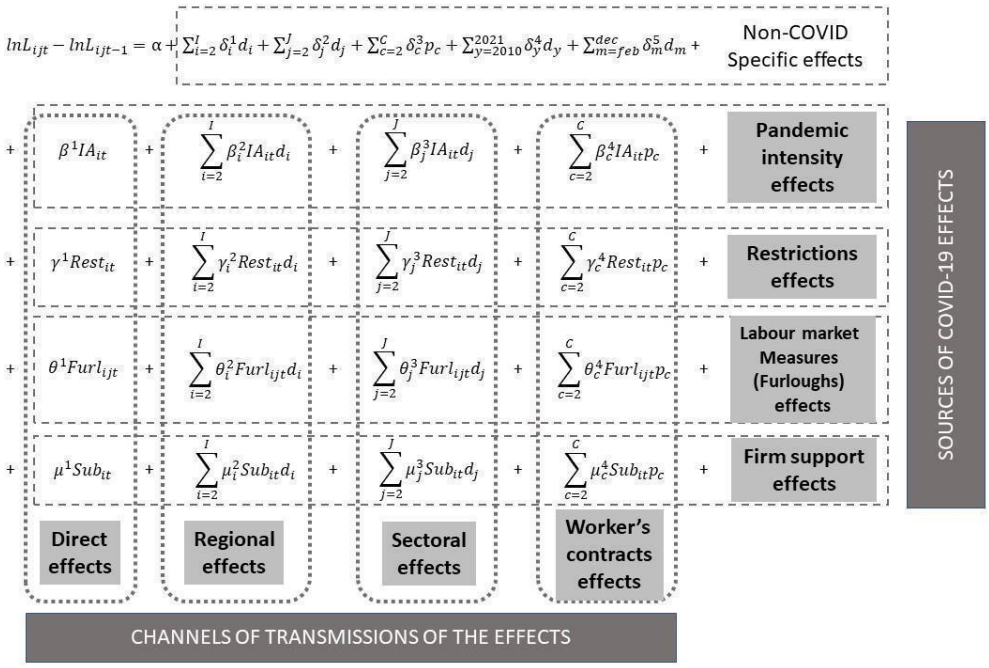
Figure 4. Sources and distribution channels of the possible effects derived from COVID-19



These four potential sources are transmitted through four mechanisms that qualify or intensify their effect on employment in each activity and territory. (i) A general effect; (ii) a specific geographic effect, derived from its particular natural peculiarities, its economic configuration and institutional conditions; (iii) a specific industrial effect since not all productive activities have been affected in the same way, either by the form in which the service is provided or because the service is essential; finally, (iv) the types of worker contractual relationships which allow for more or less flexible labour adjustments that shape the economic activity differently. Therefore, we may expect workers with more stable contracts and higher firing costs to become furlough employees, provided that the required conditions are fulfilled. On the contrary, stronger adjustments will take place in the case of temporary workers, although to a lesser extent, of the self-employed workers, who may cease their activities temporarily or even permanently.

Model specification and empirical strategy

Expression (2) shows the proposed empirical model to estimate the potential effects and their possible transmission channels,



[2]

where $lnL_{ijt} - lnL_{ijt-1}$ is the approximate proportional growth rate of employment in province i, sector of economic activity j and month t. IA_{it} is the relative incidence of the pandemic in province i and month t. $Rest_{it}$ is a restrictions indicator in province i and month t; $ERTE_{ijt}$ represents the percentage of furlough employees or self-employed workers who ceased their activity in sector j, province i and month t-1. Sub_{it} is an indicator for subsidies and support to firms in province i and month t. Subscripts i, j and c correspond to the I provinces, J sectors of economic activity and C contractual forms, excluding one of each group to avoid collinearity. The variables d_i and $d_j$represent province and sector dummies, respectively, and p_c refers to the proportion of workers who have the contractual form c. d_y and d_m are year and month indicator variables that identify year and seasonal effects, respectively. The sample time horizon exceeds the COVID period so that the variables linked to COVID will be equal to 0 before the start of the pandemic.

Therefore, the model establishes that the month-on-month employment growth rate, once province, sector, the proportion of workers in each type of contractual relationship, year and month (the last row of expression [1]) effects have been controlled for, is affected by the intensity of the pandemic (coefficients β), the restrictions (coefficients γ), and the interventions designed to support the labour market (coefficients θ) and the firms (coefficients μ). These four effects spread through four transmission channels, (i) direct effects (β^1, γ^1, θ^1, μ^1), (ii) specific province effects (β^2, γ^2, θ^2, μ^2), (iii) specific industrial effects (β^3, γ^3, θ^3, μ^3) and (iv) and specific effects linked to the type of labour contracts (β^4, γ^4, θ^4, μ^4).

Based on the estimation of these coefficients, it is possible to estimate the COVID aggregate effect on employment across each region and its potential causes and transmission channels.

The coefficients obtained from the estimation of equation [2] are difficult to interpret, since the direct effect, i.e. the one that is not interacted with the different transmission channels, depends on the reference observation used for each indicator variable[2], as well as the remaining coefficients. Additionally, each of the sources of influence has indirect transmission channels and thus, the aggregate effect could differ from the pure direct effect. Consequently, the relevant point is to estimate the global effect that each of the sources

[2] The reference province is Álava, the sector of economic activity is agriculture, the type of contract is the permanent one, the year is 2009 and the month is January.

related to COVID-19 has on job variation[3]. On the contrary, the aggregate effect of each of the channels does not have a direct interpretation. In this case, the only relevant analysis corresponds to the differences in the aggregate magnitudes between the three indirect channels: sectoral, geographical (provincial) and the one relative to the type of employment contract. The inclusion of these terms achieves higher goodness of fit of the regression model and results in more precise estimates of the effects of each of the sources. Nonetheless, their interpretation is far from direct, except for potential comparisons between the different elements within each of the three channels (sectors, provinces, and type of employment contract).

A very different issue is that the potential sources and transmission channels may have their particular realisation in each geographical area (or sector of economic activity). They can be measured by adding the direct effects, the sectorial (provincial) and those derived from the type of employment contracts within each territory (sector). Consequently, the transmission channels introduced in the regression model to improve estimates' precision should not be confused with the total effects obtained in each territory (sector) for the four identified sources and the four transmission channels.

3. RESULTS

3.1. EFFECTS BY SOURCE

The total average aggregate effect of COVID-19 in Spain, from March 2020 to September 2021, is negative (cf. Table 1). This is because the fall in employment derived from the incidence and restrictions is not offset by the positive effects of furlough schemes and firm subsidies. The negative impact due to restrictions stands out well above that caused by incidence. Hence, those regions that had the most severe restrictions, the incidence is the same, are those that have suffered the highest effect (Baek et al., 2020; Gupta et al., 2020; Dreger and Gros, 2021; Juranek et al., 2021; Marcén and Morales, 2021). Although incidence and restrictions could seem to go along the same path, some regions, such as Madrid, have applied looser restrictions despite having very high incidence rates. This has been so especially from June 2020 onwards, when co-governance between the central and regional

[3] The global effect of each of the sources of influence or channels is obtained from the corresponding terms of expression [2], multiplying the value of the estimated coefficients by the realisations of the independent variables (sources). Therefore, the calculated effects are additive since they are estimated from a linear expression.

governments took place, being the latter the one responsible for imposing restrictions on mobility and economic activity.

Table 1. Effects on effective employment of incidence and public policies linked to COVID-19, and effects by their transmission channel. Spain, March 2020 to September 2021

Effects by source		Effects by transmission channel	
COVID-19 incidence	-0.01406*** -0.00021	General	0.19640*** -0.00171
Restrictions	-0.09702*** -0.00163	Province	0.00208*** -0.00028
Furlough schemes	0.02844*** -0.00039	Industry	-0.08555*** -0.001
Subsidies to firms	0.04840*** -0.00088	Type of contracts	-0.14717*** -0.00197
		Total effect	-0.03424*** -0.00194

Regarding the specific implemented policies, essentially furlough schemes —including support to self-employed workers— and direct subsidies to companies, the effect is larger in the latter case. The average result for the period is the consequence of two phenomena. The first is that both, furlough schemes and the support to the self-employed workers, may have negatively affected employment creation as these interventions have delayed the reincorporation of workers, especially in times and sectors of economic activity under high uncertainty (e.g. tourism sector). The second explanation is its positive effect on firm survival, which makes furlough schemes less necessary and reduces worker layoffs which may be costly for firms. Additionally, it has to be noted that not all firms and economic activities were allowed to sign in for furlough schemes. The obtained results may be sensible to the selected employment variable. For this reason, in the Appendix B we compare the results obtained considering some of the other five magnitudes of employment. The results are maintained in general terms and only expected changes are observed between the total and effective magnitudes.

Figure 5.1 shows how the effect of firm support has been particularly relevant at the beginning of the pandemic, mainly through the state-backed loan schemes to firms, to support rapid (less than a month granting periods) lending by banks to firms. Furlough schemes, however, have played a smaller role, although it has been long-lasting. Similarly, the negative effect of the restrictions is mainly concentrated along the first months, during the first strict confinement, and in the second and third waves, where measures decreed by regional authorities such as district closures, selective confinements, and restrictions on certain economic activities. The pandemic intensity has significant negative effects, especially in the first months, and to a lesser extent, during the third wave.

Figure 5. COVID-19 effects on effective employment. Spain, March 2020 to September 2021

Figure 5.1 By source

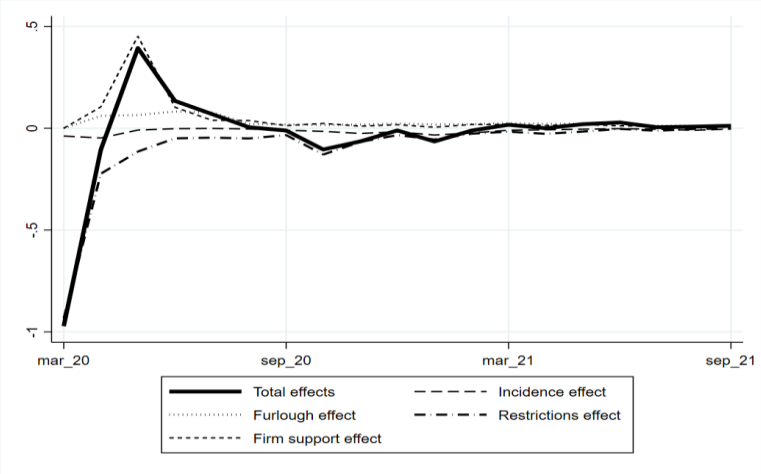
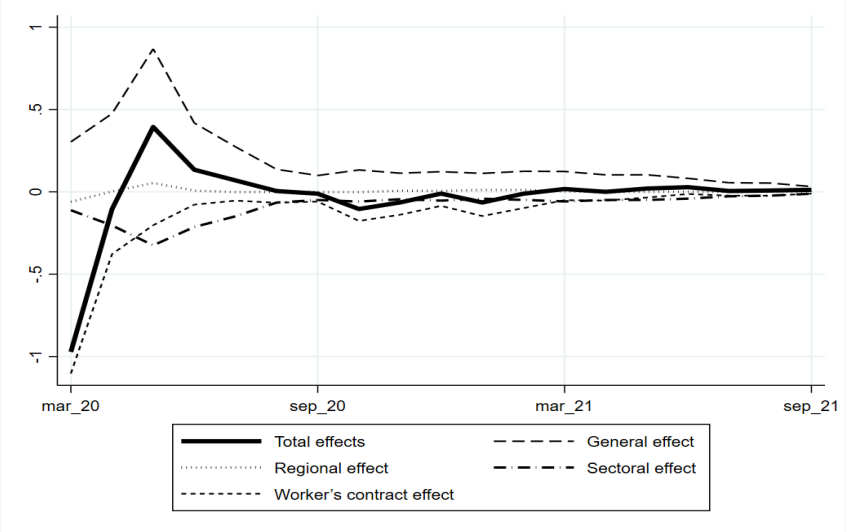


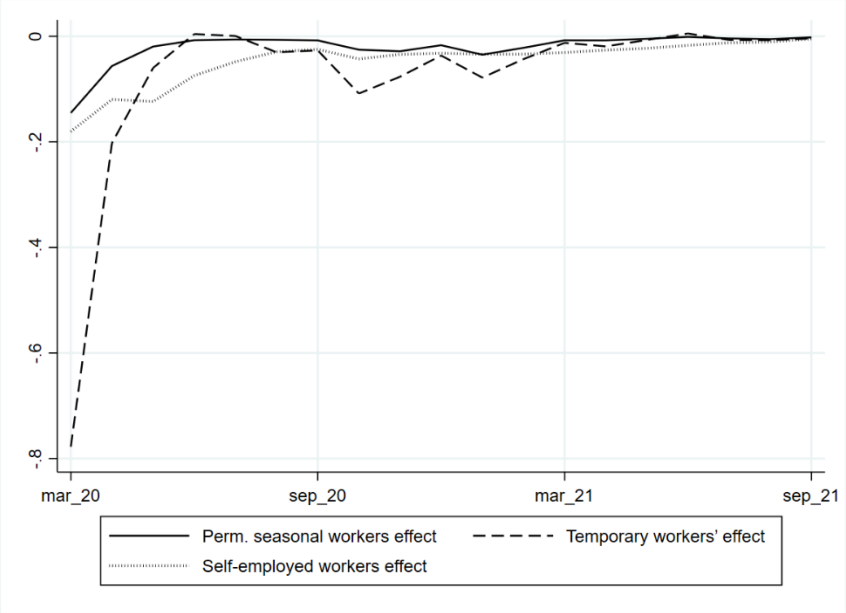
Figure 5.2 By transmission channel



EFFECTS BY TRANSMISION CHANNEL

Regarding the transmission channels (Figure 5.2), it seems that of the three analysed ones, i.e., provinces, sectors of economic activity and type of contract, the one related to the employment contract shows the most important negative effect. As shown in Figure 6, this is due to the dismissal of temporary workers, which takes place together with furlough schemes to adjust effective employment (Fernández-Cerezo et al., 2021). There is also a negative sectorial effect, fundamentally motivated by hotel, restaurant and leisure activities, as they have been most affected by activity and mobility imposed restrictions.

Figure 6. Effect of the different types of worker contractual relationships on employment growth rate.
Reference: Permanent workers



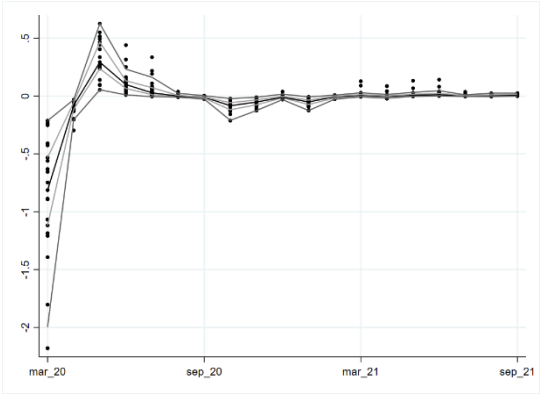
3.2. TOTAL SECTORAL EFFECTS

Although the main objective of this article is to analyse the regional effects of the COVID-19 pandemic, identification of the most affected sectors of economic activity is essential to understand the regional dynamics. This is since some sectors are geographically concentrated and have substantial linkage effects with other sectors of economic activity, which provoke amplified effects that transmit through the regional dimension. Figure 7.1 shows higher dispersion in the effects at the beginning of the pandemic, and in May 2020 due to the recovery of the economic activity. This situation is caused mainly by the activities related to

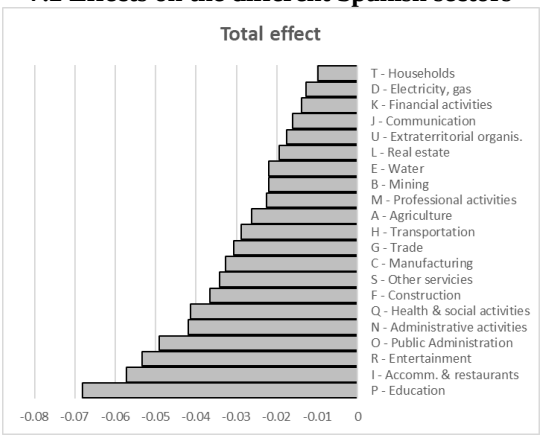
the tourism sector, such as hospitality and recreational activities (Figure 7.2). Its relevance in Spain and its geographical concentration in the eastern and southern coastal areas and the islands simultaneously provoked significant local effects during this first part of the pandemic.

Figure 7. COVID-19 total effects on employment growth across sectors. March 2020 to September 2021

Figure 7.1 Time series Box-plot of the total effects at sectoral level



7.2 Effects on the different Spanish sectors



Some substantial effects of the pandemic are also observed in the education and public administration sectors. Nonetheless, considered effective employment does not include the public contribution schemes and hence, teachers in public education are excluded. Thus, the observed negative effect undoubtedly reflects the pandemic's impact on non-formal education, extracurricular training activities, support tuition, etc. Additionally, an important increase in higher distance education also occurs due to the pandemic, which is significantly less intensive in the use of labour. For instance, the number of students in non-face-to-face universities increased by 13.2% in the 2020-2021 academic year compared to the previous year. Remarkable is the impact of the pandemic on the health and social services sector. Although employment has already recovered along the pandemic period, there was an 8.5% reduction in average employment during the first three months of the pandemic (first wave) with regards to the previous three months, as a consequence of effective employment reductions through furlough schemes and/or layoffs in the private sector. Many of the affected activities provided services not covered by the national health system or private insurances, i.e., dentists, cosmetic operations, etc.

3.3. TOTAL REGIONAL EFFECTS

We turn to evaluate the extent to which the pandemic has had a differentiated impact at the regional level. To do this, the sources and transmission channels defined in expression [2] are analysed at a higher level of geographical disaggregation.

Figure 8 presents, on the one hand, the dispersion of the total effect that COVID-19 has had in the different Spanish provinces throughout analysis (Figure 8.1), and on the other, a map showing the relevance of the average aggregate effect across the different provinces (Figure 8.2). Three main conclusions can be drawn from the results presented in Figure 8. The first one is the evident differential impact of COVID-19 across regions. The second is that geographical dispersion is higher in the periods when the pandemic effects, either negative or positive, have had the greatest impact. The third result is that the main effects on employment are concentrated along the first months of the pandemic, with a clear negative sign during the months of strict confinement which then rebounds to positive, although with a lesser intensity from May 2020 onwards, possibly as a consequence of the return to work, the relaxation of restrictions and the preparation for the summer campaign in the tourism sector.

Figure 8. COVID-19 total effects on employment growth across provinces (NUTS 3) March 2020 to September 2021

Figure 8.1 Time series Box-plot of the total effects at regional (NUTs-3) level

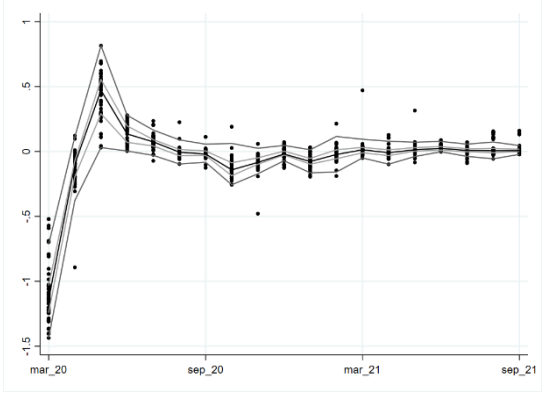
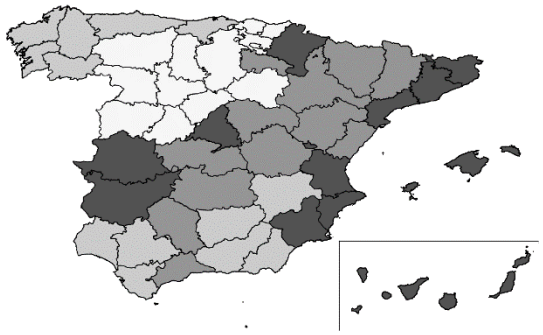


Figure 8.2 Total effects on the different Spanish provinces*



**A darker colour means a higher positive effect (quartiles)*

For the entire pandemic period (March 2020 to September 2021), the most affected areas correspond to Castilla y León, País Vasco and the south coast (Andalucía). On the contrary,

the least effects occur in Madrid, an important part of the east coast, the islands, and even a positive impact in Extremadura.

Figure 9 explores the regional dimension and shows the time series of provincial dispersion of the sources and transmission channels of the COVID-19 effects on employment. The first thing to highlight is the difference in the importance of the different effects throughout analysis. The two most relevant effects derive from restrictions and public support to firms, which show the greatest impact at the beginning of the period, although with the expected opposite sign. The strict social confinement imposed during the first two months of the pandemic was compensated, first by applying furlough schemes from April 2021 and then by the support measures provided to firms from May 2020. In general terms, regional dispersion increases when the pandemic conditions deteriorate, especially during the first and third waves, and decreases as vaccination evolve along the last months of the considered period, with only a minor alteration in the fifth wave.

In this sense, the general pattern observed in the aggregate effect is reproduced in each of the different sources and transmission channels, although some specificities arise. For example, the impact of the incidence is very heterogeneous since the different waves have affected very unevenly throughout the territory. Furlough schemes show a fairly intense positive effect until summer 2020, just when the regulation changes and employers are required to pay part of the social contributions of furlough employees to encourage the reincorporation of these workers. The sectoral effect exhibits a turning point in May 2020, as a result of the timid opening of the economic activity. Finally, the effect of the type of labour contracts tends to smooth out and reduce its impact once the initial and significant adjustment over temporary workers has taken place. In addition, the dispersion generated by the geographical and sectoral effects is similar in terms of their intensity, although they exhibit a very different dynamic behaviour. The geographical dispersion caused by the effects of the different productive structures tends to converge as the pandemic evolves, probably because they have been compensated due to the different policies. On the contrary, the provincial effects, that also have a significant geographical dispersion, present less convergence over time, which in some way indicates that there are idiosyncratic regional characteristics that relatively hinder or favour the intensity of the pandemic effect and its compensatory policies (Ascani et al., 2021; Bourdin et al., 2021).

Figure 9. Time series Box-plot of the sources and transmission channels of the COVID-19 effects on employment at regional (NUTs-3) level. March 2020 to September 2021

Figure 9.1 Incidence effects

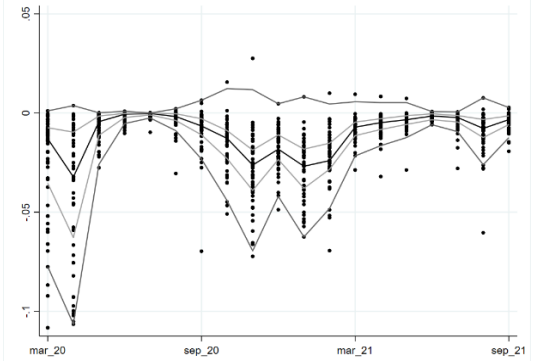


Figure 9.2 General effects

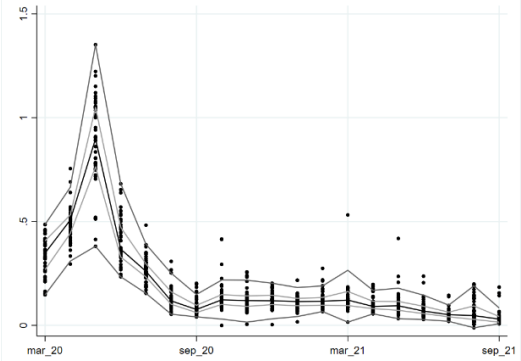


Figure 9.3 Restriction effects

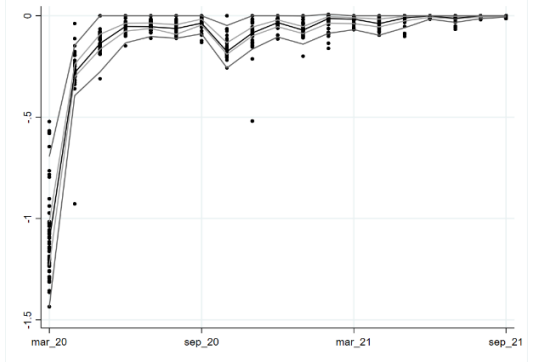


Figure 9.4 Regional effects

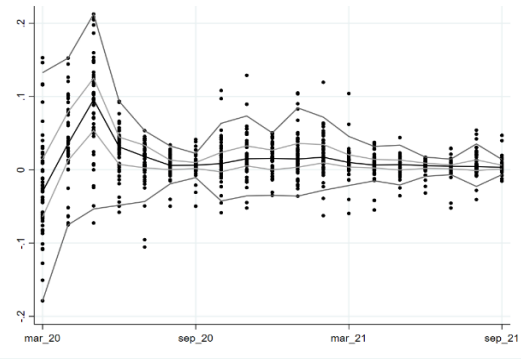


Figure 9.5 Furlough effects

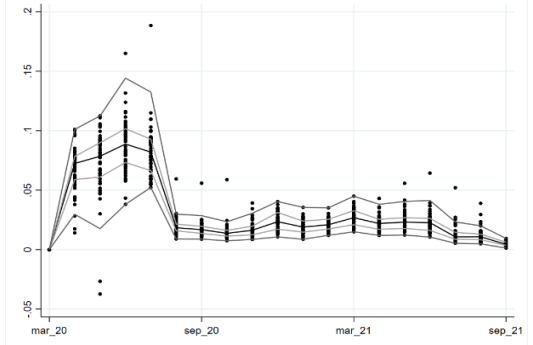


Figure 9.6 Sectoral effects

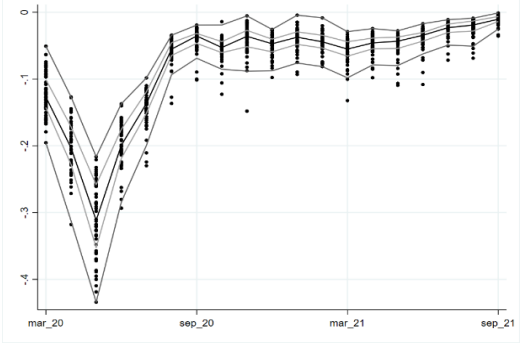


Figure 9.7 Firm support effects

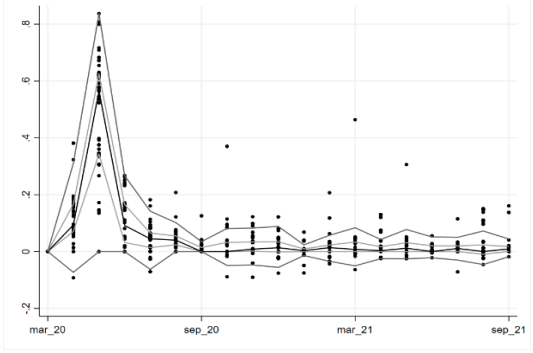


Figure 9.8 Worker's contract effects

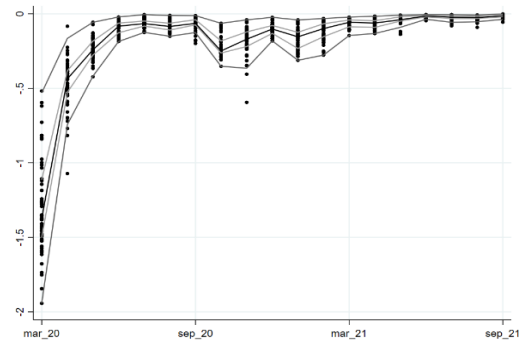


Figure 10 shows the provincial intensities of the different effects for the entire period of analysis. Regarding the intensity of the effects in the different provinces, the incidence had a significant negative effect in the two prominent Spanish cities, Madrid and Barcelona, and in their surroundings with which they share important flows of people. Their corresponding two provinces were among the highest incidences during the first wave and have remained high along the rest of the pandemic. Restrictions have had a significant negative impact, especially in the southern part of the country, due to its tourist dependency on the interior of the country. Also, in the northern provinces of Cantabria and Asturias, whose applied restrictions have been among the toughest of the country. On the contrary, Madrid and the eastern area and the Canary Islands have been the least affected areas due to either their lower levels of restrictions or their lower incidences. No geographical pattern is observed in relation to furlough schemes, except for the higher positive effect throughout most of the provinces of Castilla y León. Finally, with regards to firm support and even though amongst these measures stands the state-backed loan schemes to firms, the higher positive effects are observed along an interior stripe of provinces running from northeast to southwest.

Concerning the transmission channels, negative provincial effects are found in the areas with the highest incidence (Madrid, Barcelona, País Vasco), and positive ones in the remaining interior areas, which are less dependent on tourism employment. The transmission effects associated with the type of employment contracts are greater throughout the coastal areas, where fixed-discontinuous contracts and temporary ones facilitate firm labour adjustments.

These results disaggregated by source and transmission channel, together with the aggregate ones, could be indicating different transmission mechanisms of the effects between territories. These differences could make large cities, despite having great incidences, capable of recovering more quickly, either due to their productive structure (less dependent on tourism), or its superior economic dynamism, or the greater pressure they bear when scheduling restrictions so that the economic activity is not excessively interrupted.

Figure 10. The provincial intensity of the sources and transmission channels of the pandemic's effects on employment dynamics. March 2020 to September 2021

Figure 10.1 Incidence effects*

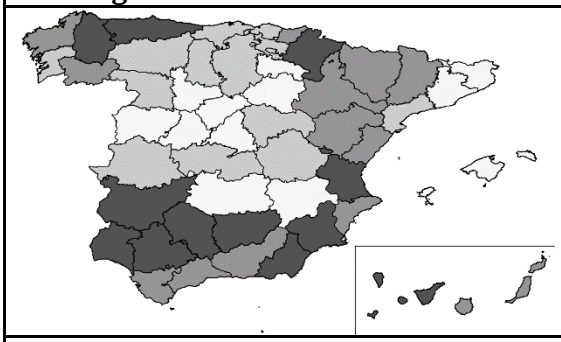


Figure 10.2 General effects*

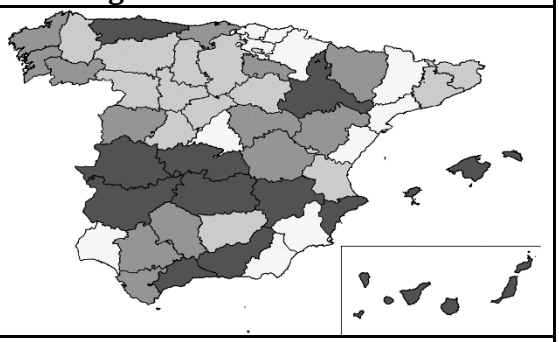


Figure 10.3 Restriction effects*

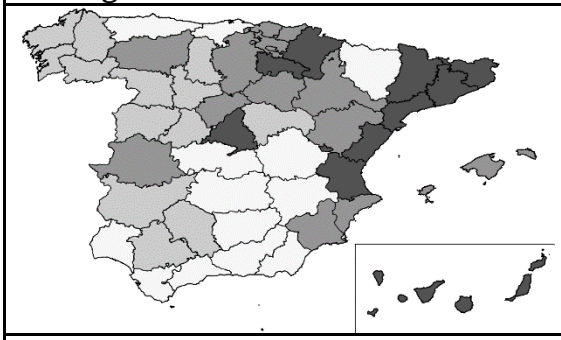


Figure 10.4 Regional effects*

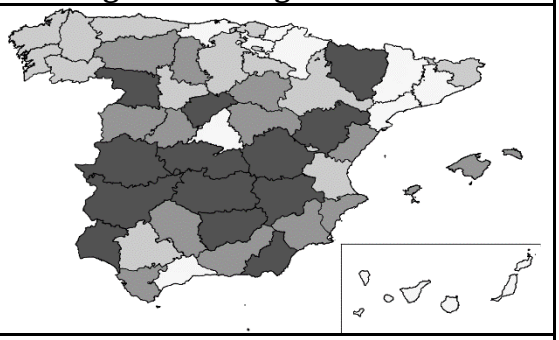


Figure 10.5 Furlough effects*

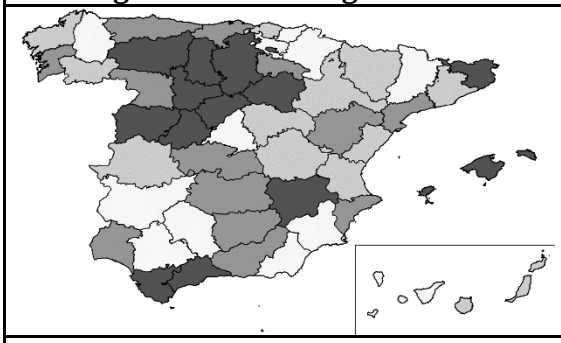


Figure 10.6 Sectoral effects*

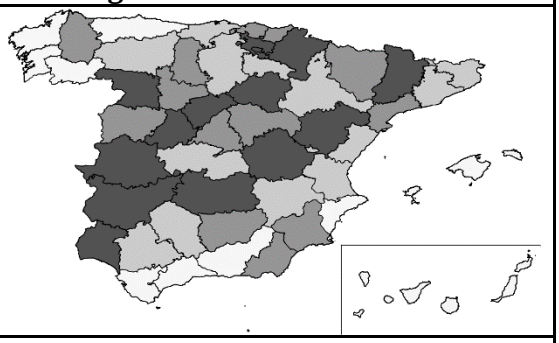


Figure 10.7 Firm support effects*

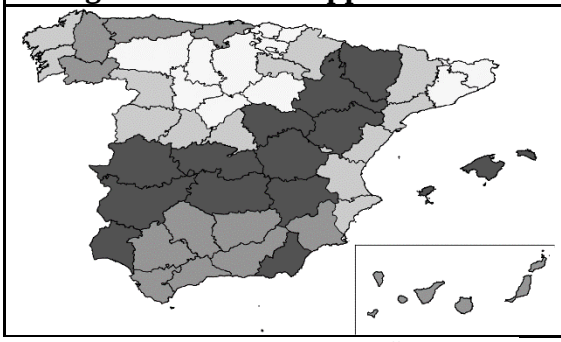
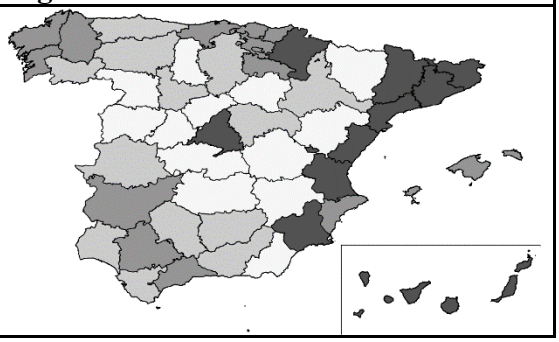


Figure 10.8 Worker's contract effects*



**A darker colour means a higher positive effect (quartiles)*

In order to determine if the observed important regional differences have generated a process of territorial inequality, we carry out basic β-convergence tests from the estimation of expression [3],

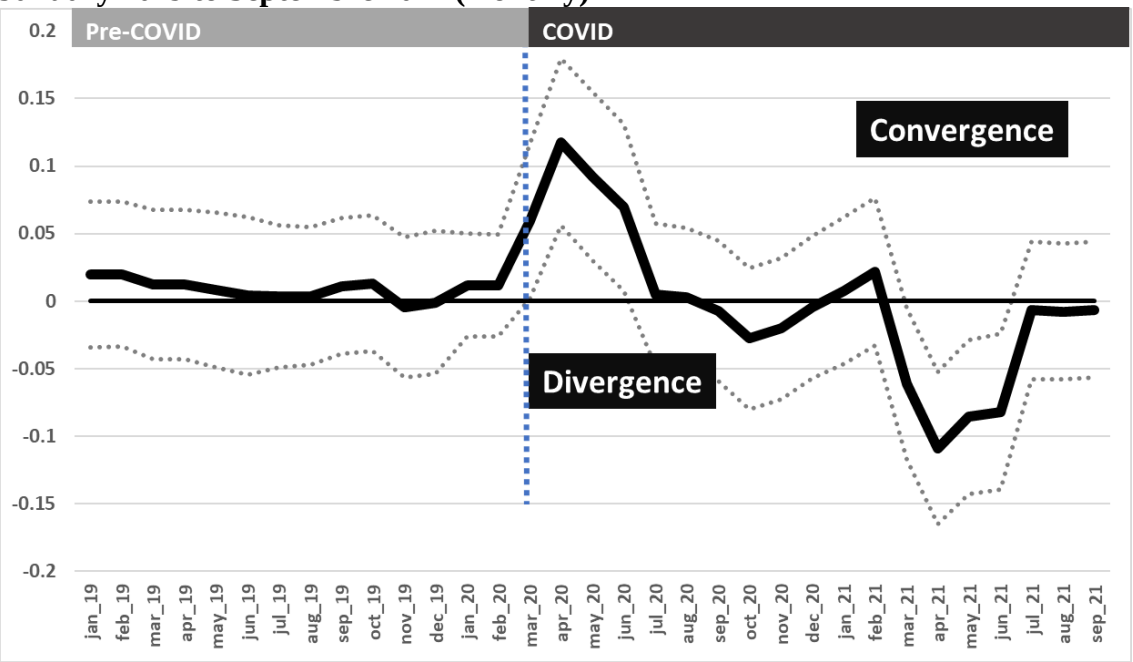
$$lnL_{it} - lnL_{it-1} = \alpha + \alpha^c COVID_t + \beta lnY_{it-1} + \beta^c COVID_t lnY_{it-1} \quad [3]$$

The dependent variable corresponds to the year-on-year growth rate of employment, where lnL_{it-1} is the natural logarithm of per capita income in the previous year. $COVID_t$ is an indicator variable of the pandemic months. β is usually the coefficient of interest in β-convergence analyses indicating regional convergence/divergence when statically significant and negative/positive. β^c is our parameter of interest in the proposed hypothesis testing strategy. It captures the existence of specific trends for the corresponding month that in principle, could be attributed to the behaviour of employment induced by the pandemic. The estimation uses data from 2009 to 2021. Nonetheless, expression [3] is estimated separately for each of the twelve months of the year. In other words, whilst the dependent variable corresponds to the year-on-year employment growth rate calculated with monthly data, the independent income variable is calculated as the average of the variable along the previous year. In addition, the consecutive estimates vary in both the month of the analysis and the considered period. Specifically, we consider that the last month corresponds to each of the ones that constitute the entire COVID-19 period (from March 2020 to September 2021), and hence, there is a unique pandemic time span for each month.

Furthermore, to rule out the existence of short-term convergence or divergence prior to the pandemic, we also set the last month equal to the ones between January 2019 and the beginning of the pandemic, assuming that the pandemic was also present in that month. In this way, we obtain a coefficient β^c for each month from January 2019 to September 2021, which captures the specific convergence trend for that given month. The corresponding values and associated 95% confidence intervals are depicted in Figure 11. As shown in this figure, there is not statistically significant β^c coefficients in the pre-COVID period. During the pandemic period, we only find statistically significant β^c coefficients between March 2020 and June 2020, which are positive and thus indicate the existence of regional divergence. This implies that the destruction or lower employment creation occurs with greater intensity in the poorest regions. This situation is compensated between March 2021 and June 2021, where the year-on-year growth rates for the regions that were possibly most

affected in the same period of 2020 are much higher. For the entire period of time, no process of convergence or divergence is observed. In other words, we find a crisis recovery which is more or less symmetrical. This result would indicate, on the one hand, the suitability of the policies implemented by both the central and regional governments, as lost employment is basically recovered. On the other hand, despite the differences in incidents and in the policies applied by regional governments to alleviate the effects of COVID (restrictions and firm support), there is no effect on regional dynamics during this period.

Figure 11. β^c coefficients and corresponding 95% confidence intervals between January 2019 to Septembre 2021 (monthly)



4. CONCLUSIONS

This paper analyses the regional economic impact of COVID-19 in Spain using employment growth as a proxy of economic activity. To this end, we propose a theoretical framework that differentiates between the sources of the effects derived from COVID-19, i.e., the intensity of the pandemic on the one hand, and on the other, the set of public policies aimed at mitigating the effects on public health (restrictions, nonpharmaceutical interventions) and economic activity (furlough schemes and firm support). Furthermore, by formulating a regression model that introduces term interactions, we also analyse the channels through which the effects are transmitted towards the dependent variable, i.e., employment growth (direct,

provincial, sectoral and the type of employment contracts). The data used is based on information on social security contributors and their characteristics. We also use Google Trends to measure both the intensity of the restrictions in each region and the public support to companies.

The obtained conclusions can be summarised along the following six points: (i) The regional effects are more intense and diverse at the beginning of the pandemic and when the pandemic intensifies, and tend to be offset over time; (ii) There is clear evidence that the negative effects are caused to a greater extent by the restrictions than by the intensity of the pandemic.; (iii) Furlough schemes have fulfilled the function of allowing the early incorporation of workers to economic activity, as well as their social role. Nonetheless, they have been less effective for the economic recovery than other kinds of public support to firm, such as the state-backed loan schemes to firms, which were rapidly granted and posed accessible conditions regarding their loan terms and repayment possibilities; (iv) Amongst the transmission channels, the role of temporary hiring is evidenced as one of the mechanisms, together with furlough schemes, to reduce effective employment, nonetheless associated to higher social costs and no guarantees of workers return to firms. (v) There is also evidence of the greater relevance of sectoral effects than the idiosyncratic regional ones. Part of the total regional effects results from the productive structure, especially those-dependent tourism regions. (vi) Finally, there is no evidence of changes in regional dynamics along the whole period of analysis since the regional divergence observed at the beginning of the pandemic is eventually offset once the economic activity is reactivated.

Worth highlighting is the unique role that large cities have played in the pandemic, as large centres of high incidence, which have transmitted the disease to their surroundings. At the same time, they have suffered the pandemic effects to a lesser extent than their less populated neighbouring regions, on the one hand, because they have implemented restrictive laxer policies and, on the other, because of their more dynamic economic activity. This set of results, and especially the fundamental role played by the state policies, seems to suggest the need for coordinated health and economic policies during the pandemic episodes and at the time to implement their potential solutions. This need for coordination exceeds the national limits, and perhaps, this evidence is behind the design of the NextGenerationEU funds or

some other measures that the European Commission pretends to promote to coordinate the different state responses.

Nonetheless, the results obtained also highlight the relevance of idiosyncratic regional effects. Then a combination of coordinated policies at the European, state and regional levels may be a pending issue that must be undertaken in the coming years, given the regional nature of this crisis (Bailey et al., 2020).

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APPENDIX A

Table A1: COVID-19 effects on economic activity. Literature review

Reference	Country	Spatial unit	Dependent variable	Key variables
Baek et al. (2020)	USA	States, counties	Cumulative Unemployment claims, change in employment	COVID-19 cases, excess deaths, share Age 60+
Barrot et al. (2020)	USA	Commuting Zones	Firms profits, employment, health outcomes	% workers shutdown workers
Bartik et al. (2020)	USA	Survey data	Firm expectations	Firm characteristics
Beland et al. (2020)	USA	Survey data, state-level	Unemployment rate, hours of work, labour force participation, hourly wages	Number of COVID-19 cases, indexes specific occupation and industries
Cowan (2020)	USA	Survey data	Labour-market transitions	Set of workers, occupations and industry characteristics
Forsythe et al. (2020)	USA	States	Unemployment Insurance claims, vacancy posting data	States and sectors
Gupta et al. (2020)	USA	Survey data	Unemployment, hours and earnings	Essential vs. non-essential, workers characteristics, time dummies
Aum et al. (2021)	Korea	Regions	Change in monthly employment and employment over population	Industry effects
Dolado et al. (2021)	Spain	Survey data	Employment transitions	Worker characteristics
Fernández-Cerezo et al. (2021)	Spain	Survey data	Sales and employment growth	Firm characteristics
Gros et al. (2021)	USA	Country-level and state	Unemployment rate	Lagged (2 months) Index of restrictiveness of NPI
Guaitoli & Tochev (2021)	USA	Counties	Unemployment-to-population ratio and employment	Spatial X-lags
Hershbein & Holzer (2021)	USA	Survey data and state-level	Employment rate, share of permanent job loss and total Weekly hours worked	COVID cases and deaths, restriction index and lags and cumulative means
Juranek et al. (2021)	Nordic	Country-regions	New unemployment and furlough spells	Region and time fixed effects
Kim & Kim (2021)	Korea	Provinces (17)	New, closures and establishments and workers & unemployment beneficiaries	cumulative COVID-19 cases per 1000 and population
Marcén & Morales (2021)	USA	Survey data	Propensity of being employed, number of hours worked	NPI index, worker characteristics
Cerqua & Letta (2022)	Italy	Local labour markets	Employment and business births and deaths	Excess of mortality rates

Table A.2. Descriptive statistics

Variable		Pre-COVID			COVID	
		Jan 2009-Feb 2020			Mar 2020-Sep 2021	
		Mean	Std. Dev.		Mean	Std. Dev.
Employment						
- National level		16,410,166	921,324		17,822,231	340,968
- Provincial level		315,580	478,735		342,735	529,654
- Industry level		781,437	762,252		848,678	799,451
- Industry and provincial level		15,723	35,853		16,687	38,371
Effective Employment						
- National level		16,410,166	921,324		16,504,771	1,470,258
- Provincial level		315,580	478,735		317,399	493,612
- Industry level		781,437	762,252		785,942	749,354
- Industry and provincial level		15,723	35,853		15,460	35,845
% Permanent workers						
- National level		52.3	1.2		54.2	1.1
- Provincial level		48.6	5.7		50.4	5.7
- Industry level		60.3	37.6		59.3	19.4
- Industry and provincial level		53.3	18.5		55.6	18.7
% Permanent seasonal workers						
- National level		1.8	0.3		1.8	0.2
- Provincial level		1.7	1.6		1.7	1.6
- Industry level		1.3	1.8		1.5	2.0
- Industry and provincial level		1.3	2.2		1.4	2.4
% Temporary workers						
- National level		24.9	1.4		24.5	0.6
- Provincial level		26.4	4.5		26.5	4.2
- Industry level		23.1	14.7		19.9	12.4
- Industry and provincial level		23.4	13.3		21.5	14.8
% Self-employed workers						
- National level		19.3	0.7		17.6	1.1
- Provincial level		22.5	4.3		20.2	3.7
- Industry level		18.4	18.2		18.1	17.5
- Industry and provincial level		22.0	19.3		21.5	18.7
COVID-19 cases incidence (monthly basis)		-	-		542.2	570.3
COVID-19 hospital incidence (monthly basis)		-	-		45.9	52.9
COVID-19 ICU incidence (monthly basis)		-	-		4.6	4.9
COVID-19 deceased incidence (monthly basis)		-	-		10.8	15.2
% Furlough employees						
- National level		-	-		6.5	6.7
- Provincial level		-	-		5.9	6.7
- Industry level		-	-		5.6	10.8
- Industry and provincial level		-	-		6.1	10.4
% Furlough self-employed						
- National level		-	-		11.4	9.9
- Provincial level		-	-		10.9	9.8
- Industry level		-	-		10.3	11.6
- Industry and provincial level		-	-		10.2	11.8
Restrictions indicator (monthly basis)		-	-		8.1	17.3
Subsidies to firms indicator (monthly basis)		-	-		8.1	18.9

APENDIX B. RESULTS OBTAINED WITH DIFFERENT MEASURES OF EMPLOYMENT

The obtained results may be sensible to the selected employment variable. As pointed out, effective employment excludes furlough employees and self-employed workers who ceased working. Consequently, we estimate regression model of expression [2] for

alternative measures of employment, results being registered in Table 2: total employment (column 2), employees and self-employed workers(columns 3 and 4, respectively), and the effective measures for employees and self-employed workers (columns 5 and 6, respectively). As shown by these results, signs are maintained in most cases and modified in others, some of these changes being expected. Amongst unchanged results regardless of the employment chosen variable are the effects of pandemic incidence (negative sign), the support to firms (positive), and the effects derived from the productive structure (negative). In addition, the signs of the restriction effects (negative), the general effect (positive), and the effect associated with the type of employment contract (negative) are maintained in five of the six estimated specifications, only changing in the case of effective self-employed workers. Precisely, this is the group with the lowest number of individuals. In the case of furlough employment, the sign varies with the specification, being positive when considering the effective measure of the variable and turning negative otherwise. This change in sign is explained in terms of the role played by furlough schemes in signalling the sectors most affected by the pandemic, which will show no employment growth when workers re-join. On the contrary, when considering the effective measure of employment, the positive sign indicates that those economic activities that had a higher proportion of furlough workers in the previous month will also create a larger number of effective jobs through the incorporation of furlough employees and thus fulfilling the objective of this policy.

Table B.1. Effects over the different variables of employment of incidence and public policies linked to COVID-19, and effects by their transmission channel. Spain, March 2020 to September 2021

	Effective employment	Total employment	Employees	Self-employed workers	Effective employees	Effective self-employed workers
	-1	-2	-3	-4	-5	-6
By source						
COVID-19 incidence	-0.01406***	-0.00226***	-0.00265***	-0.00231***	-0.01033***	-0.03197***
Restrictions	-0.09702***	-0.01075***	-0.00909***	-0.00404***	-0.17725***	0.03709***
Furlough schemes	0.02844***	-0.00091***	-0.00131***	-0.00011***	0.02069***	0.06234***
Subsidies to firms	0.04840***	0.01766***	0.02224***	0.00229***	0.06252***	0.06176***
By transmission channel						
General	0.19640***	0.06428***	0.10725***	0.00414***	0.38930***	-0.18131***
Province	0.00208***	0.00694***	0.00702***	0.00439***	-0.00439***	0.04844***
Industry	-0.08555***	–0.01821***	-0.05220***	-0.00402***	-0.14103***	-0.03784***
Contracts	-0.14717***	-0.04927***	-0.05287***	-0.00869***	-0.34826***	0.29993***
Total effect	-0.03424***	-0.00374***	0.00920***	-0.00417***	-0.10437***	0.12922***