The unemployment effects of closing the non-essential activities during the COVID-19 lockdown: The case of 8,108 Spanish municipalities

Serra, Laura and Silva, José I. and Vall·llosera, Laura

Universitat de Girona

24 February 2022

The unemployment effects of closing the non-essential activities during the COVID-19 lockdown: The case of 8,108 Spanish municipalities[ℵ]

Laura Serra[*]   José I. Silva[**]   Laura Vall-llosera[***]

February 24, 2022

Abstract

We study the labour market impact of the confinement measures implemented in Spain to halt the spread of the COVID-19 pandemic in the first quarter of 2020. We use data from 8,108 municipalities to quantify the short-term impact of the temporary shutdown of non-essential activity on local unemployment rates. Ordinary least squares regressions show that an increment of 10 percentage points in the share of firms with non-essential activities increases the unemployment rate between 0.08 and 0.22 percentage points, depending on the population size of the municipalities. We only find this positive effect in municipalities above 2,395 inhabitants. The lockdown explains around 50% of the observed increase in the unemployment rates of these municipalities. We also look at the impact by gender and age and find that the lockdown of these activities affects males and workers between 25 and 45 years old by relatively more.

Keywords: COVID-19, lockdown, unemployment, non-essential activities, municipalities.

JEL classification: J18, J64, R23

1. Introduction

While COVID-19 spread across European countries during the first quarter of 2020, the authorities adopted a series of measures to mitigate the health effects of the pandemic. The lockdown measures taken to contain the spread of COVID-19 generated important labour market effects beyond the contraction of GDP. For example, Palomino et al. (2020) estimated for 29 European countries an average increase in the headcount poverty index of around 5 percentage points during the first two months of the lockdown. Similarly, Bauer and Weber (2020) evaluated the short-term labour market impact of the COVID-19 lockdown measures in Germany and found that 60 percent of the increase of inflows to unemployment in April 2020 were due to these shutdown measures. In turn, Guven et al. (2020) studied the short-term labour market effects of COVID-19 and the associated national lockdown in Australia. They found that the national lockdown decreased labour force participation by 3.3%, increased unemployment by 1.7%, and decreased weekly working hours by 2.5%. Similarly, Kong and Prinz (2020) and Dreger and Gros (2021) provided state-level evidence on the short run impact of social distancing measures on unemployment and found a strong and positive impact of the lockdown on unemployment.[1]

During the lockdown, governments defined a set of occupations considered essentials, implying that all workers of non-essential activities were forced to stay home. Hence, using data from European Union (2020), Torrejon et al (2020) and Palomino et al. (2020) showed that the labour market impact of COVID-19 related to the lockdown measures was higher in countries in which the share of sectors forcefully closed was higher. Thus, we expect that the pre pandemic distribution of employment across different categories of sectors plays an important role during the lockdown.

In this paper, we study the labour market impact of the confinement measures implemented in Spain to halt the spread of the coronavirus pandemic in the first quarter of 2020. In contrast with most of the existing papers, we depart from aggregate data and use 8,108 municipalities to quantify the short-term impact of the temporary shutdown of non-essential activity on

---

[1] See Brodeur A. et al. (2021) for a recent survey of the empirical literature on the socioeconomic consequences of the COVID-19 and its contingent measures.

local unemployment rates. As Torrejon et al (2020) mentioned, Spain is an interesting case of study because it was the country where the most restrictive measures were adopted in terms of employment. According to these authors, around 56% of employment was in sectors that were considered non-essential and, therefore, were mandatory closed during the lockdown. This proportion was much lower in the cases of Germany (45%) or Italy (38%). Moreover, Figure 1 shows important differences in the percentage of firms providing essential services across the Spanish municipalities, suggesting the presence of heterogeneous effects of the lockdown in local unemployment rates.

Figure 1 Percentage of firms with essential services at municipal level (January 2019)
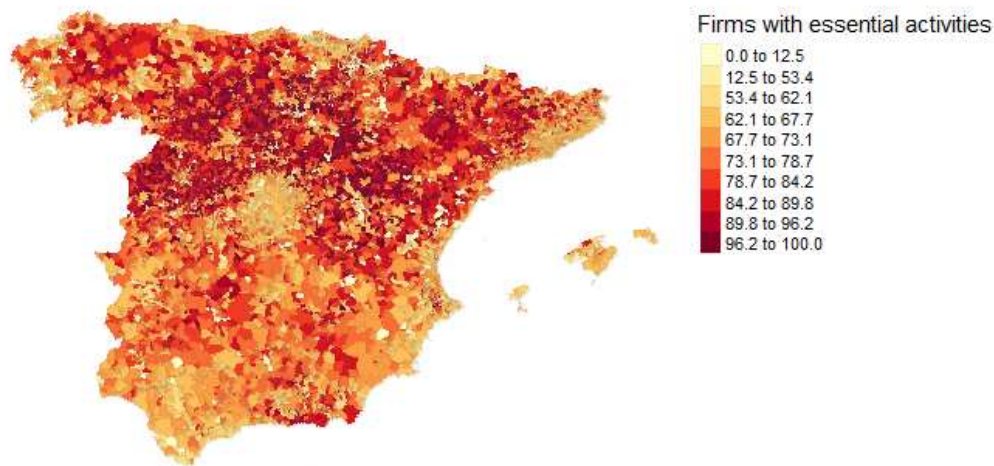
Source: Spanish National Institute of Statistics (INE)

To quantify the short-term impact of the temporary shutdown of non-essential activity on local unemployment rates, we estimate the effect of the percentage of non-essential firms affected by the lockdown implemented in March and April of 2020 on the variation of unemployment rates across municipalities. We use this variable to identify the effect of closing non-essential activities on unemployment rates because we show that it had no impact on unemployment before the implementation of the Spanish lockdown. We analyse this impact in two different periods, from February 2020 to April 2020 and, like robustness we also analyse the effect between Abril 2019-Abril 2020.

Controlling for province fixed effects and the variation in the number of contracts at the municipality level, we find that an increase in 10 percentage points in the share of firms with

non-essential activities increases unemployment rate between 0.08 and 0.22 percentage points, depending on the population size of the municipalities. Nevertheless, we estimate no significant effects in municipalities with population of fewer than 2,395 inhabitants. In turn, the unemployment effect is positive and significant only in those municipalities with more than 2,395 inhabitants.

To put these numbers in perspective, the positive unemployment effect of increasing the percentage of non-essential firms during the lockdown in municipalities with more than 9,267 inhabitants represents half of the impact of reducing the number of contracts by similar magnitude. In other words, a 10-percentage point decrease in the ratio of contracts to the population size increases the unemployment rate by 0.40 percentage points. Additionally, given that around 30% of the non-essential activities were lockdown in municipalities with more than 2,395 inhabitants, we observe that this policy increases the average unemployment rate of these municipalities by around 0.60 percentage points, which represents 50% of the average increase observed in their unemployment rate (1.2 percentage points).

One reason why the lockdown in non-essential activities had no impact on unemployment of smallest municipalities is because the agricultural sector, which was consider an essential sector during that period, has higher importance in their economic activity. More in detail, the share of contracts in that sector falls from 36.3% to 16.8% when the municipality size increased from less than 152 to more than 9,266 inhabitants.

Finally, we look at the impact by gender and age and find the lockdown of the non-essential activities increase the unemployment rate of both males and females only in those municipalities with more than 2,395 inhabitants, being this positive effect bigger on males. In turn, a one percentage increase in the percentage of firms with non-essential activities increases unemployment rate of younger (less than 25 years old), middle (between 26 and 45 years old) and elderly (more than 45 years old) groups of people by 0.12, 0.23 and 0.20 percentage points, respectively. When looking at the municipality size, we also observe bigger effects in municipalities above 2,395 inhabitants.

Our work is related to Gutiérrez and Moral-Benito (2020), who also used municipal-level information to quantify the short-term effects of the Spanish lockdown implemented in March and April of 2020 on employment. They showed that those municipalities most affected by the non-essential activity shutdown endured higher reductions in employment. In contrast to these authors, we look at the local impact on unemployment rates, capturing both the labour supply and demand effects of shutting down the non-essential activities during the lockdown. Additionally, we also study the asymmetric response by gender, age groups and compare the importance of the population size of these municipalities. To our knowledge, our paper is the first one that uses data at the municipality level to study the unemployment effects of shutting down the non-essential activities during the COVID lockdown.

Our results could be valuable in guiding policies in other lockdown situations in times of disaster, pandemics or social upheaval. As Bailey et al. (2020) mention, a regional analysis is essential to fully understand and manage the unequal impacts of the current pandemic, not least because Covid-19 is unlikely to be the last of its kind. Therefore, policy makers should evaluate the relative importance of the activities that are planning to lockdown as well as the heterogeneous effects across municipalities. This heterogeneous impact also calls for territorialised policy responses and for inter-municipal coordination.

2. Data

We consider statistical information for 8,108 Spanish municipalities between 2019 and 2020. The descriptive analysis has been split according to gender, age and the number of inhabitants of the municipalities. We have selected the threshold of each population group according to the quantile distribution of the municipalities, being the fifth group the one that corresponds to the last 10% of the sample. The groups of the municipalities for the whole sample are the following: less than 152 inhabitants; from 153 to 516 inhabitants; from 517 to 2,394 inhabitants; from 2395 to 9,266 inhabitants and, finally, more than 9,267 inhabitants.

The dependent variable of the study corresponds to the variation in percentage points in the unemployment rate of each municipality between February and April of 2020.[2] This variable is taken from the Spanish Public Employment Service Estatal (SEPE). To construct the unemployment rate, we divide the number of unemployed workers registered at the Spanish Employment Office by the total population in each municipality in 2019. Our dependent variable is called variation *in unemployment (pp)* in Table 1. This table shows an average increase of 0.85 percentage points during the lockdown with a clear positive relationship with the size of the municipality. For example, the average increase in the unemployment rate of municipalities with more than 9,267 inhabitants double the observed one in those with less than 152 inhabitants (1.29 versus 0.52 percentage points).

Like Gutiérrez and Moral-Benito (2020), our main regressor of interest corresponds to the percentage of firms in each municipality not providing any type of essential services in January of 2019. The Spanish Institute of Statics (Instituto Nacional de Estadísticas, INE) created this variable to show an indicator of the percentage of economic activity that was affected by the lockdown.[3] The national lockdown started on March 15 of 2020, when all residents were mandated to remain in their normal residences except to purchase food and medicines, work or attend emergencies. Then, the Spanish government ordered the shutdown at the national level of all non-essential activity between 30 March and 12 April of that year. This variable is called *firms with non-essential activities (%)* in Table 1. On average, 21% of the firms do not provide any type of essential services. Likewise, this rate clearly has a positive relationship with the population size, increasing from 10.74% in the smallest municipalities to 34.74% in the biggest ones.

---

[2] For robustness analysis, we also look at the percentage change in unemployment rate between April of 2019 and April of 2020 and observe that the descriptive analysis does not change. In the empirical part, we will study this issue in more detail.

[3] See the technical note (Spanish version only) at https://www.ine.es/covid/nota_tecnica_dirce.pdf.

Table 1. Descriptive Statistics at municipal level: Total

Municipalities	n	Variation in unemployment (pp) February 2020 - April 2020				Variation in contracts (pp) February 2020 - April 2020				Firms with non essencial activities (%) January 2019			
		Mean	sd	Min	Max	Mean	sd	Min	Max	Mean	sd	Min	Max
Total	8108	0.85	2.58	-16.67	96.81	-1.45	7.49	-258.70	89.71	20.99	13.21	0.00	100.00
Less than 152 inhab	2033	0.52	4.08	-16.67	91.11	-1.21	12.70	-258.70	89.71	10.74	13.70	0.00	100.00
From 153 to 516 inhab	2023	0.75	2.55	-3.08	96.81	-1.41	6.14	-181.74	25.88	17.59	11.35	0.00	66.67
From 517 to 2394 inhab	2026	0.95	1.66	-1.39	49.12	-1.44	4.22	-52.81	64.98	23.60	9.43	0.00	63.91
From 2395 to 9266 inhab	1215	1.12	0.67	-0.74	5.55	-1.78	3.10	-36.06	23.30	30.20	7.48	5.95	49.63
More than 9266 inhab	811	1.29	0.72	-0.65	5.69	-1.64	1.91	-29.91	8.87	34.70	5.06	4.55	50.34

Sources: The Spanish Employment Public Service Estatal (SEPE) and The Spanish Institute of Statistics (INE). Both unemployment and contracts are expressed as percentage of the total population in each municipality. Inhab refers to inhabitants and pp to percentage change.

We also include the percentage change in the Social Security registrations taken from SEPE between February and April of 2020 to control for the evolution of employment during the lockdown. Like the unemployment rate, this variable is also expressed as a percentage of the total population in 2019 and is called *variation in contracts (pp)* in Table 1. This table shows an average reduction of 1.45 percentage points in the number of contracts, with somewhat higher reductions in municipalities with bigger populations. In this case, the number of contracts fell from 1.21 percentage points in the smallest municipalities to 1.64 percentage points in the biggest ones.

In turn, Table 2 also shows the average change in unemployment rate by gender as well as three different age groups (from less than 25, from 25 to 44 and more than 45 years old). It shows that the increase in unemployment rate during the lockdown in males (0.94 percentage points) was higher than in females (0.74 percentage points). This relatively higher increase in the males' unemployment rate concerning females also applies when considering municipalities with different population sizes. In turn, we observe a higher increase in the unemployment rate of people aged between 25 and 44 (0.83 percentage points) with respect to the other two groups (0.46 and 0.25 percentage points in the groups of less than 25 and more than 45 years old, respectively).

To sum up, we observe an average reduction in the number of contracts as well as an increment in the unemployment rate of the Spanish municipalities during the lockdown. This increase in unemployment rates is not homogenous across municipalities, increasing by relatively more with the level of population and affecting more males than females and workers between 25 and 45 years old. Additionally, the descriptive statistics also show that

the percentage of firms not providing essential services also increases with the level population, suggesting that those municipalities with the biggest number of inhabitants were the ones that have the highest share of firms with non-essential activities and, therefore, the highest increase in unemployment during the lockdown. Next, we explore this relationship in detail using regression analysis.

Table 2 Variation in unemployment at municipal level: Gender and Age

Municipalities	n	Variation in unemployment (pp) February 2020 - April 2020			
		Mean	sd	Min	Max
Total	**8108**	**0.85**	**2.58**	**-16.67**	**96.81**
Less than 152 inhab	2033	0.52	4.08	-16.67	91.11
From 153 to 516 inhab	2023	0.75	2.55	-3.08	96.81
From 517 to 2394 inhab	2026	0.95	1.66	-1.39	49.12
From 2395 to 9266 inhab	1215	1.12	0.67	-0.74	5.55
More than 9266 inhab	811	1.29	0.72	-0.65	5.69
Females	**8105**	**0.74**	**2.45**	**-33.33**	**87.50**
Less than 152 inhab	3305	0.59	3.46	-33.33	87.50
From 153 to 516 inhab	1772	0.73	1.99	-3.11	63.31
From 517 to 2394 inhab	1698	0.80	0.92	-1.76	18.91
From 2395 to 9266 inhab	881	0.97	0.62	-0.82	5.32
More than 9266 inhab	449	1.18	0.67	-0.52	4.33
Males	**8107**	**0.94**	**2.55**	**-23.08**	**84.62**
Less than 152 inhab	3092	0.57	3.54	-23.08	84.62
From 153 to 516 inhab	1907	0.93	2.05	-4.74	65.42
From 517 to 2394 inhab	1771	1.23	1.54	-2.27	46.39
From 2395 to 9266 inhab	898	1.39	0.85	-0.51	6.23
More than 9266 inhab	439	1.56	0.79	-0.14	4.62
Less than 25 years old	**7763**	**0.46**	**3.15**	**-10.00**	**81.00**
Less than 152 inhab	1937	0.01	0.17	-1.00	5.00
From 153 to 516 inhab	1942	0.04	0.26	-1.00	5.50
From 517 to 2394 inhab	1943	0.11	0.64	-4.00	13.00
From 2395 to 9266 inhab	1169	0.56	1.90	-9.00	21.00
More than 9266 inhab	770	3.34	9.15	-10.00	81.00
Between 25 and 45 years old	**8068**	**0.83**	**4.66**	**-10.00**	**99.00**
Less than 152 inhab	2031	0.02	0.36	-1.00	13.75
From 153 to 516 inhab	2020	0.05	0.31	-5.00	9.17
From 517 to 2394 inhab	2021	0.27	1.02	-2.00	18.00
From 2395 to 9266 inhab	1207	1.19	4.20	-1.00	64.00
More than 9266 inhab	787	5.81	12.80	-10.00	99.00
More than 45 years old	**8102**	**0.25**	**1.97**	**-1.45**	**82.58**
Less than 152 inhab	2033	4.16E-03	0.07	-0.25	2.00
From 153 to 516 inhab	2023	0.01	0.11	-0.5	3.96
From 517 to 2394 inhab	2026	0.05	0.17	-1.33	2.25
From 2395 to 9266 inhab	1214	0.26	0.62	-1.14	8.17
More than 9266 inhab	804	1.94	5.92	-1.45	82.58

Sources: The Spanish Employment Public Service Estatal (SEPE) and The Spanish Institute of Statistics (INE). Both unemployment and contracts are expressed as percentage of the total population in each municipality. Inhab refers to inhabitants and pp to percentage change.

3. Methodology

To analyse the impact of the non-essential services on variations in unemployment rate we performed an ordinary least squares (OLS) regression analysis. According to the previous section, the dependent variable is the variation *in unemployment (pp)*. In turn, the main explicative variable is *firms with non-essential activities (%)*. Our assumption is that this variable can be used to identify the effect of closing non-essential activities on unemployment rates since it does not affect unemployment before the lockdown. The variable *variation in contracts (pp)* is also included as a controlled variable. In the analysis, the municipalities with variations in their unemployment rate larger than 100% were excluded as they skewed the results.

In the previous section, it was showed that the non-essential services had a different effect on unemployment according to the size of the municipalities. For this reason, the analysis is split according to the number of inhabitants of the municipalities. As mentioned before, we have selected the threshold of each group according to the distribution in quantiles of the variable. We run OLS regressions for two different periods. The first period considers the accumulative variation of unemployment and contracts between February and April of 2020. The second period removes any potential seasonal effect by looking at the annual variation of these two variables between April 2019 and April 2020. We expect that these two periods will show a similar positive effect of closing the non-essential activities on unemployment rates during the lockdown.

The empirical model to estimate is:

$$\Delta u_{i,g,t} = \beta_0 + \beta_1 n_{i,g} + \beta_2 \Delta c_{i,g,t} + p_{i,g} + \epsilon_{i,g,t} \,, \qquad (1)$$

where $\Delta u_{i,t}$ corresponds to the variation in *unemployment (pp)*; $n_{i,t}$ is *firms with non-essential activities (%)*; Δc_i is *variation in contracts (pp)*; and p_i is a dummy variable for each of the 50 Spanish provinces. In turn, the sub index *i* refers to each of the 8,108 municipalities; the sub index *g* includes the five groups of municipalities considered and, finally; the sub index *t* captures the two periods considered (February 2020-April 2020 and April 2019-April

2020). Our central hypothesis is that the coefficient of non-essential services β_1 captures the effect of the lockdown of non-essential activities in local unemployment rates.

4. Results

Table 3 shows the estimated results for the different periods considered. Starting with the whole sample, we observe that controlling for province fixed effects and the variation in the number of contrasts at the municipality level, we find that an increase in the percentage of non-essential firms implies a statistically significant increase in the unemployment rate. More in detail, considering the period from February 2020 to Abril 2020, an increase in 10 percentage points in the share of firms with non-essential activities increases the unemployment rate in 0.08 percentage points (coefficient β_1 in equation (1)). When we consider the size of the municipalities, however, this effect is only significative for the biggest municipalities. That is, for those from 2,395 to 9,266 inhabitants and with more than 9,266 inhabitants. In these two last cases, the effect on the unemployment rate is deeper compared with the results for the whole sample. For an increase of 10 percentage points on the percentage of firms with non-essential activities, unemployment rate increases by 0.19 and 0.21 percentage points, respectively. Therefore, closing the non-essential activities during the two months of the lockdown had a positive effect on unemployment rates, in particular, in those municipalities above 2,395 inhabitants.

Notice that this result remains unchanged if we avoid the stationality effects and consider the yearly period from April 2019 to Abril 2020. In this case, an increase of 10 percentage points on the percentage of firms with non-essential activities increases unemployment in 0.22 and 0.20 percentage points in municipalities between 2,395 and 9,266 inhabitants and with more than 9,266 inhabitants, in each case.

To put all these numbers in perspective, the positive unemployment effect of increasing the percentage of non-essential firms during the lockdown in municipalities with more than 9,266 inhabitants represents half of the impact of reducing the number of contracts by similar magnitude. In other words, considering the period from February 2020 to Abril 2020, a 10-

percentage point decrease in the ratio of contracts to the population size increases the unemployment rate by 0.48 percentage points (coefficient β_2 in equation (1)).

Additionally, given that 34.7% of the non-essential activities were lockdown in municipalities with more than 9,266 inhabitants (see Table 1), using the estimated coefficient of $\hat{\beta}_1 = 0.021$ we can infer that this policy increases the average unemployment rate of these municipalities by $34.7\% \times 0.021 = 0.729$ pp. This number accounts for 56.5% of the average increase observed in their unemployment rate (1.29 percentage points). In the case of municipalities between 2,395 and 9,266 inhabitants, the estimated impact of the policy is equal to $30.2\% \times 0.0189 = 0.584$ (52.5% of the 1.12 percentage points increase observed in the average unemployment). Finally, notice that the variation in the number of contracts is always statistically significant independent of the size of the municipality even if the intensity of its effect varies. In all cases, an increase in the number of contracts reduces the rate of unemployment.

Table 3 Determinants of variation in unemployment rates at municipal level

Municipalities	February 2020 -April 2020	April 2019 - April 2020
Total		
% Firms with non essencial activities (p-value)	0.0078*** (0.001)	0.0044* (0.081)
Variation in contracts in pp (p-value)	-0.1029*** (0.000)	-0.1631*** (0.000)
observations	8108	8107
R2	0.126	0.172
Less than 152 inhab		
% Firms with non essencial activities (p-value)	0.0064 (0.243)	0.0040 (0.541)
Variation in contracts in pp (p-value)	-0.0549*** (0.000)	-0.0853*** (0.000)
observations	2033	2029
R2	0.357	0.134
From 153 to 516 inhab		
% Firms with non essencial activities (p-value)	-0.0020 (0.243)	-0.0040 (0.288)
Variation in contracts in pp (p-value)	-0.1664*** (0.000)	-0.3411*** (0.000)
observations	2023	2023
R2	0.238	0.477
From 517 to 2394 inhab		
% Firms with non essencial activities (p-value)	0.0030 (0.4412)	0.0021 (0.641)
Variation in contracts in pp (p-value)	-0.0893*** (0.000)	-0.1700*** (0.000)
observations	2026	2026
R2	0.196	0.2395
From 2395 to 9266 inhab		
% Firms with non essencial activities (p-value)	0.0189*** (0.000)	0.0227*** (0.000)
Variation in contracts in pp (p-value)	-0.0315***(0.000)	-0.0589***(0.000)
observations	1215	1215
R2	0.43	0.493
More than 9266 inhab		
% Firms with non essencial activities (p-value)	0.0211*** (0.000)	0.0202*** (0.000)
Variation in contracts in pp (p-value)	-0.0480***(0.000)	-0.1249***(0.000)
observations	811	811
R2	0.595	0.62

Note: OLS regressions with percentage change of unemployment rate as the dependent variable. Both unemployment and contracts are expressed as percentage of the total population in each municipality. Inhab refers to inhabitants and pp to percentage change. p-values are in parenthesis and *, **, *** measures statistical significance at 10, 5 and 1 percent levels, respectively. All regression control for regional (province) fixed effects.

Figure 2 displays the confidence intervals of non-essential services β_1 in equation (1) (CI at the 95%) for the impact of closing the non-essential services during the months of March and April of 2020. It clearly shows that the policy only has a statistically significant and positive effect on the relatively biggest municipalities (those with more than 2,395 inhabitants).

Figure 2 The effect of non-essential services on unemployment rates at municipal level (Period February 2020 – April 2020)
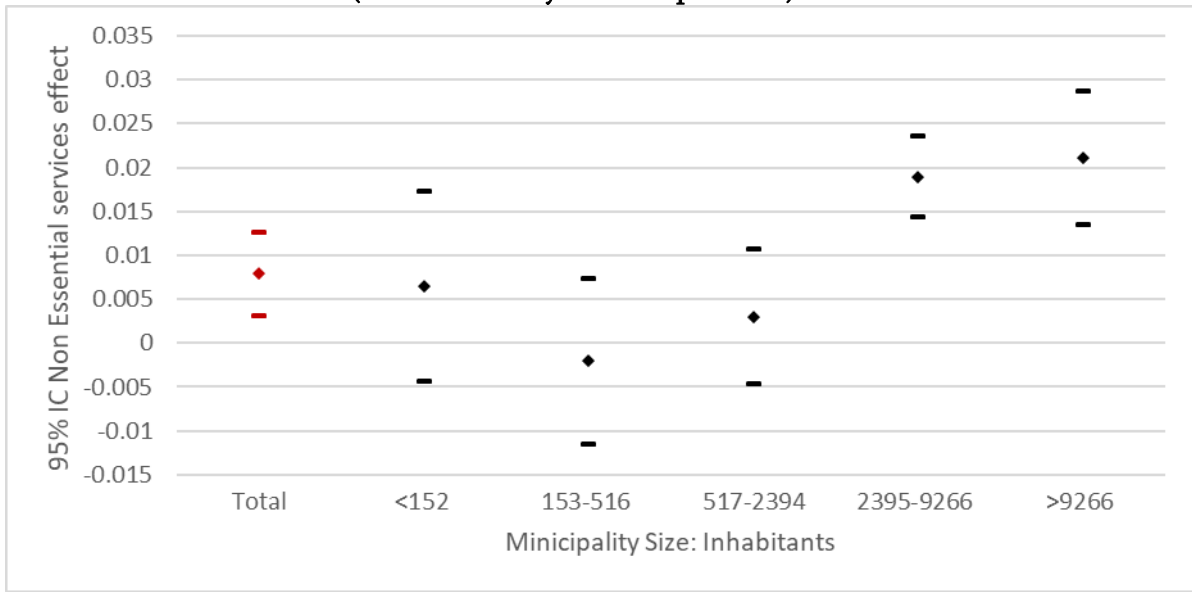
Note: With respect to the number of inhabitants: **<** means *less than*; **>** means *more than*; **-** means <u>between</u>. IC refers to Confidence intervals.

One reason why the lockdown in the non-essential activities had no impact on unemployment of the smallest municipalities is because the agricultural sector, which was considered an essential sector during the lockdown, has higher importance in their economic activity. Along this line, Table 4 shows that not only the percentage of firms with essential activities decreases with the municipality size but this negative relationship also happens when we look at the percentage of contracts in agriculture with respect to the total of contracts. For example, in April 2020 the share of contracts in that sector fell from 36.3% to 16.8% when the municipality size increases from less than 152 to more than 9,266 inhabitants. In the case of firms providing essential services, that percentage fell from 89.2% to 65.3%, respectively. Moreover, it becomes clear that this sector gains importance during the lockdown when comparing the share of contracts in agriculture between April 2019 and April 2020. On average, the share of contracts in the agriculture sector increases from 16.6% in April 2019 to 29.9% in April of 2020.

Table 4 The agricultural sector during the lockdown

Municipalities	Contracts in agriculture: April 2019 (% of total contracts) Mean	Contracts in agriculture : April 2020 (% of total contracts) Mean	Firms with essencial activities (%) Mean
Total	**16.56**	**29.87**	**79.01**
Less than 152 inhab	18.91	36.32	89.26
From 153 to 516 inhab	17.91	35.65	82.41
From 517 to 2394 inhab	18.40	32.98	76.40
From 2395 to 9266 inhab	14.42	25.11	69.80
More than 9267 inhab	9.72	16.82	65.30

Sources: The Spanish Employment Public Service Estatal (SEPE) and The Spanish Institute of Statistics (INE). Contracts in agriculture correspond to both April of 2019 and April of 2020. The percentage of firms with essential activities corresponds to January of 2019.

For the objective of validating our identification strategy, we also estimate equation (1) considering cumulative variation in unemployment and contracts between February and April of 2019. We expect that the percentage of firms not providing essential services has no effects on unemployment variations before the closure of these occupations. Along this line, our falsification test in Figure 3 shows that the percentage of firms with non-essential services has non statically significant effects on unemployment rates just one year before the lockdown. Thus, the effect of non-essential activities on unemployment rates estimated between February and April of 2020 does not capture the presence of previous trends at the municipality level.

Figure 3 Falsification Test: The effect of non-essential services on unemployment rates at municipal level (Period February 2019 – April 2019)
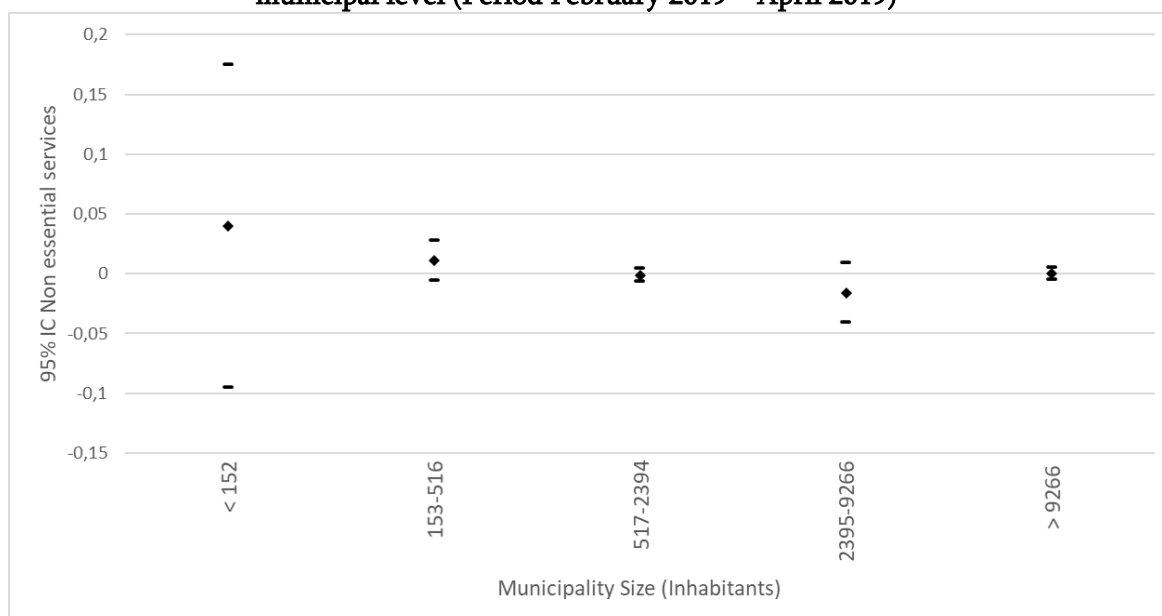
Note: With respect to the number of inhabitants: **<** means *less than*; **>** means *more than*; **–** means between. IC refers to Confidence intervals.

Regarding the differences by gender and age, Figures 4 and 5 show the confidence intervals of non-essential services β_1 in equation (1) at the 95% for each municipality size.[4] Figure 4 shows that the total effect of the lockdown on unemployment has only statistically significant and positive effect in males. More in detail, a 10-percentage increase in the percentage of firms with non-essential activities increases the unemployment rate of males by 0.11 percentage points. When considering the municipality size, the lockdown increases the unemployment rate of both males and females only in those municipalities with more than 2,395 inhabitants. Although the average effect in these municipalities is bigger on males, the confidence intervals only show a clearly bigger positive effect on males living in municipalities between 2,395 and 9,266 inhabitants.

Figure 4 The effect of non-essential services on unemployment rates at municipal level by Gender (Period February 2020 – April 2020)

Note: With respect to the number of inhabitants: **<** means *less than*; **>** means *more than*; **-** means *between*. IC refers to Confidence intervals.

In turn, Figure 5, shows the lockdown impact in unemployment rates for three different groups of ages, with a relatively statistically bigger positive effect in those individuals aged between 26 and 45 years old.[5] More in detail, a one percentage increase in the percentage of

---

[4] We run regressions separately by gender and by each age group.
[5] Due to limitations with the sample size, we only split the municipality size in below and above 2,395 inhabitants.

firms with non-essential activities increases unemployment rate of younger (less than 25 years old), middle (between 26 and 45 years old) and elderly (more than 45 years old) groups of people by 0.12, 0.23 and 0.20 percentage points, respectively. When looking at the municipality size, we observe bigger positive effects in municipalities above 2,395 inhabitants, except for the group of individuals below 25 years old.

Figure 5 The effect of non-essential services on unemployment rates at municipal level by Age (Period February 2020 – April 2020)
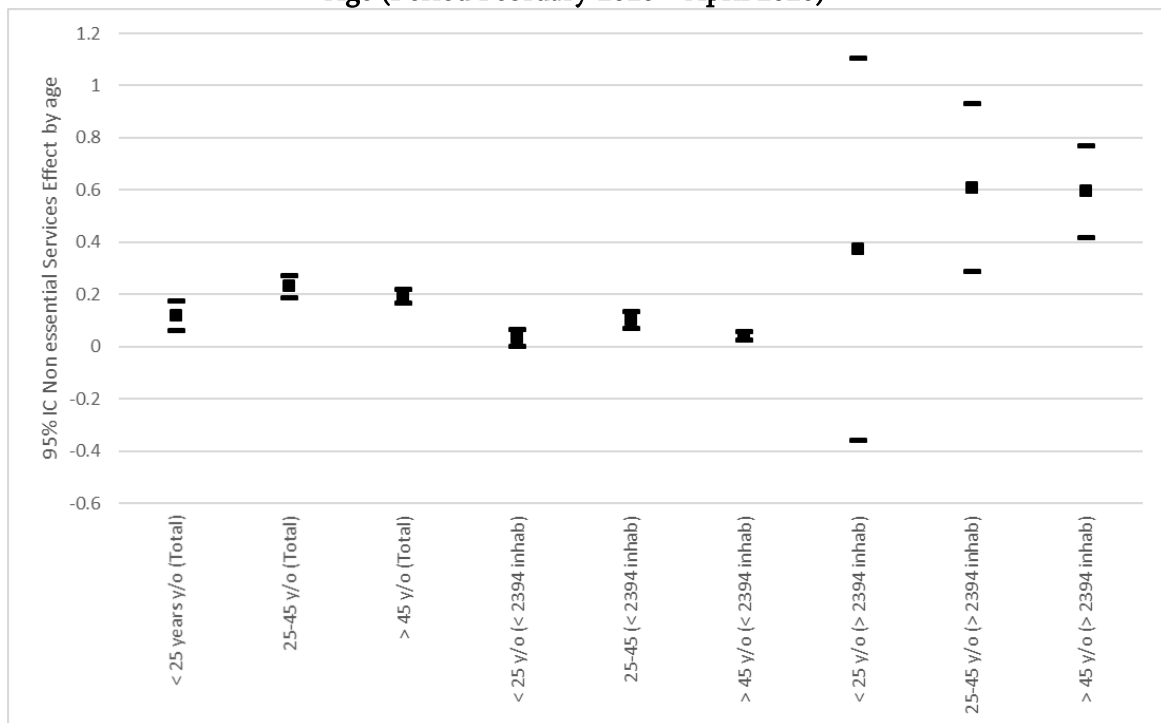
Note: With respect to the number of inhabitants and age: **<** means *less than*; **>** means *more than*; **-** means *between*. IC refers to Confidence intervals while y/o refers to *years old*.

Conclusions.

During the lockdown occurred in the first quarter of 2020 as a policy response of COVID-19 spread across countries, governments define a set of occupations considered essentials, implying that all workers of non-essential activities were forced to stay home. Some recent empirical studies show that the labour market impact of COVID-19 related to the lockdown measures was higher in countries in which the share of sectors forcefully closed was higher.

In this paper we study the unemployment impact of the confinement measures implemented in Spain to halt the spread of the COVID-19 pandemic in the first quarter of 2020. In contrast

with most of the existing papers, we depart from aggregate data and use 8,108 municipalities to quantify the short-term impact of the temporary shutdown of non-essential activity on local unemployment rates. The main explicative variable is the percentage of non-essential firms in January of 2019. We show that this variable can be used to identify the effect of closing non-essential activities on unemployment rates since it did not affect unemployment before the lockdown. According to the OLS regressions, we find that an increase of 10 percentage points in the share of firms with non-essential activities increases the unemployment rate between 0.08 and 0.22 percentage points, depending on the population size of the municipalities. We estimate no significant effects in municipalities below 2,395 inhabitants and positive effects for the rest of them. Given that around 30% of the non-essential activities were locked down in municipalities with more than 2,395 inhabitants, we observe that this policy generates 50% of the average increase observed in their unemployment rate (1.2 percentage points).

One of the reasons why the lockdown in the non-essential activities had no impact on unemployment of the smallest municipalities is because the agricultural sector, which was considered an essential sector during the lockdown, has higher importance in their economic activity. Along this line, we show that not only the percentage of firms with essential activities decrease with the municipality size, but this negative relationship also happens when we look at the percentage of contracts in agriculture with respect to the total of contracts.

From a policy perspective, our results could be useful in implementing policies in other lockdown situations. In particular, the observed heterogeneous effect across municipalities call for territorialised policy responses and for inter-municipal coordination.

Bibliography

[1] Bailey, D., Clark, J., Colombelli, A., Corradini, C., De Propris, L., Derudder, B., Fratesi,U., Fritsch, M., Harrison, J., Hatfield, M., Kemeny, T., Kogler, D., Lagendijk, A., Lawton, P., Ortega-Argilés, R., Iglesias C., and Usai, S., (2020): "Regions in a time of pandemic, Regional Studies", 54:9, 1163-1174.

[2] Bauer, A., and Weber, E. (2020): The unemployment impact of the COVID-19 shutdown in Germany. IAB discussion paper 16/2020.

[3] Brodeur A., Gray, D., Islam, A., and Bhuiyan S., (2021): "A literature review of the economics of COVID-19". Journal of Economic Surveys, vol 35(4), pp. 1007-1044.

[4] Dreger, C., and Gros, D. (2021): "Lockdowns and the US unemployment crisis". Economics of Disaster and Climate Change, 5, pp. 449-463.

[5] Fana, M., Tolan, S., Torrejon Perez, S., Urzi Brancati, M.C. and Fernandez Macias, E., (2020): "The COVID confinement measures and EU labour markets, Publications Office of the European Union, Luxembourg, ISBN 978-92-76-18812-4, doi:10.2760/079230, JRC120578.

[6] Gutiérrez, E., and Moral Benito, E. (2020): "Containment measures, employment and the spread of the COVID-19 in Spanish Municipalities". Banco de España, Occasional Paper 2022.

[7] Guven C., S., Sotirakopoulos, P., and Uker, A (2020) : "Shortterm Labour Market Effects of COVID-19 and the Associated National Lockdown in Australia: Evidence from Longitudinal Labour Force Survey". GLO Discussion Paper, No. 635, Global Labor Organization (GLO), Essen.

[8] Kong, E., and Prinz, D., (2020): "Disentangling policy effects using proxy data: Which shutdown policies affected unemployment during the COVID-19 pandemic? ". Journal of Public Economics (189), 104257.

[9] Palomino, J., Rodríguez, J., and Sebastian R. (2020): "Wage inequality and poverty effects of lockdown and social distance in Europe". European Economic Review, 129 (103564).