Effects of Short-time Work Schemes on firm survival during the Covid-19 crisis: insights from new Spanish data

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Abstract

This paper analyses the aggregated survival rates of more than a million employers followed quarterly from April 1st, 2020 to April 1st, 2021, using the Company Demographic Profile database, a new experimental statistic provided by the Spanish National Statistics Institute. Our approach makes use of fractional regression methods to explain the survival rate by region, sector, size and whether or not a Temporary Workforce Reduction Scheme (also Short-Time Work Scheme) had been used within the firm. These public schemes, known as ERTEs in Spain, were widely used during the pandemic and temporarily subsidised employee´s wages, relieving labour adjustment costs to the employers. Our main results, based on the computed average marginal effects, show that the survival rate was significantly higher for those firms which take up ERTE programs among their employees. Nevertheless, this effect was not homogeneous, particularly benefiting the most vulnerable firms. These firms were, as expected, the smallest –from 1 to 5 employees– and the ones which operate in some service sectors as leisure, education, tourism and hospitality.

- **JEL:** J08, J38, J65, E65, L10.
- **Keywords:** Firm survival, Covid19, ERTE, STW, business closings.

Highlights

- This analysis explores a new Spanish database which links Short-time Work use with firm survival during the pandemic.
- As a key result, firms whose employees were sent to ERTE schemes are significantly correlated with higher survival rates, controlling by their main characteristics. However, this ERTE positive effect seems to be small in magnitude and heterogeneous by sector and size.
- As expected, education, leisure-related services and micro-enterprises experienced the lowest survival rates during the pandemic. Conversely, industrial sectors and larger businesses were the most resilient profiles.

Statements and declarations

The authors have no competing interests to declare that are relevant to the content of this article.

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1 Introduction

From an economic perspective, the survival of the companies is one of the most important issues which governments have dealt with during the pandemic, since the generalized lockdown and the social distancing measures led to the sudden closing of many firms. Nonetheless, despite being generalized throughout the whole economy, the impact of this shock has not been equal for all companies. In this regard, the economic sector or the company size may have been crucial. In addition, the widespread use of job retention schemes in the onset of the sanitary crisis might have affected the prospects of the firms. Generally speaking, these job retention schemes seek to preserve jobs during an adverse shock, via subsidizing temporarily the employees' wages while they are not working or their hours have been reduced. Despite many different terms are used to refer to these schemes (furlough schemes, short-time work schemes, work reduction programs, wage subsidies...), most developed countries have implemented its own program with distinctive features during the pandemic (see Drahokoupil and Müller, 2021), all them being transitory mechanisms that introduce flexibility and encourage labor market adjustments.

In absence of a public program, the Spanish labor market usually relies on layoff strategies to adjust, which are costly for both employers and employees. The former, often has to assume redundancy costs and other costs associated with the adjustment in terms of hours. Likewise, employees lose their jobs or may see their hours reduced drastically, with the uncertainty and welfare loss that implies. Using work reduction policies, the adjustment cost is essentially assumed by the public administration. Traditionally, these schemes have been used and treated as instruments which aim to preserve jobs during a crisis. However, since the firms are not assuming the adjustment costs (labor or redundancy costs), this policy may avoid business closings and help them overcome transitory shocks via the introduction of labor demand flexibility.

These programs were intensively used during 2020, peaking in the second quarter when it covered around 20% of the employees in Spain, being a common and easy option for employers to adjust their workforce. This wide coverage was unprecedented since the eligibility criteria was relaxed in order to cover any firm which may be struggling due to the pandemic. In this context, evaluating its consequences on firms become essential.

Until now, various authors have tried to evaluate these programs in different countries, but focusing on employment and labor market implications, especially analyzing the Great Recession period. By contrast, our current question is whether or not this job retention scheme may have braked the business exit during the sanitary crisis, and if so, in what extent. Furthermore, the delay in the traditional data release have forced many researches to seek alternative data sources in the midst of this unprecedented shock in order to measure the impact of the Covid-19 crisis. Nonetheless, as far as we are concerned no study has been published using this Spanish Company Demographic Profile database so far. All in all, our main contribution comes from the use of this new database to measure the heterogeneity in the firm survival rate in Spain during the pandemic. Additionally, as these data is linked to the information about job retention scheme take-up, we also contribute to the literature by finding a relationship of the Spanish work reduction program (henceforth ERTE) with firm survival rates.

The next pages are organized as follows: In section 2 we review some of the related literature; section 3 introduces the database; section 4 explains and justifies the econometric approach developed in the analysis; section 5 contains a descriptive analysis followed by the main results of the regressions performed; section 6 summarizes the main conclusions about the results; and finally, a discussion about the contributions and limitations is presented in section 7.

2 Related literature

Most literature that studies the Covid-19 early impact on firms comes from the US and agrees with the unprecedented nature of the shock and the significant damage to the businesses. At the beginning of the pandemic, Bartik et al. (2020) conducted a survey to quantify the early impact of the Covid-19 outbreak on US small businesses, finding massive layoffs and shutdowns as a result. Similarly, Fairlie (2021) observed an unprecedented drop in active business owners in early 2020 using US Current Population Survey data. Shortly afterwards, Fairlie and Fossen (2021) analyzed the huge drops in business sales during the second quarter of 2020, using administrative data from California. However, these effects seem to be very heterogeneous: According to the latter study, sale losses were largest in businesses affected by mandatory lockdowns such as accommodation (-91%), in contrast to other businesses which experienced large gains, such as online sales (+180%). By the same token, Crane et al. (2020) discovered that the US business exit during the early outbreak was elevated for certain sectors but lower than usual for other industries. Bloom et al. (2021), despite reporting overall negative impacts of Covid-19 on US firms‘ sales, observed that it depends significantly on the firm size, the percent of the online revenue and the business owner´s demographics. Additionally, using small business data from Oakland, Bartlett and Morse (2020) found noticeable differences in the firm survival capability during the pandemic, especially by its size. These differences also affected the effectiveness of business assistance programs, such as the US Payroll Protection Program (PPP).

So far, a measurement of the effects of the pandemic on firms using Spanish data comes from Fernández Cerezo et al. (2021). They use business data from a Bank of Spain survey to measure variations in company sales and employment, finding great heterogeneity mainly among sectors and firm size too.

By contrast, most of the literature related to job retention schemes (also short-time work schemes, STW furlough schemes and similar terms) use pre-Covid data and do not focus its attention on the implications for firms, but employees and capability to keep their positions.

In this regard, most analyses exploit their cross-country variability to measure the effects of these schemes on labour outcomes from a macro-level perspective. A representative example come from Hijzen and Venn (2011), who designed a natural experiment for 19 OECD countries in order to estimate the causal effects of STW on preserving jobs in the Great Recession, finding overall but not widespread positive effects. Afterwards, in Hijzen and Martin (2013), they remarked the crucial role of good timing in the application of these public policies. Other studies such as Cahuc and Carcillo (2011) and Boeri and Bruecker (2011) agree on the potential positive effects of these schemes under certain circumstances but find some inefficiencies in their use when the design is not cautiously tuned.

Another interesting lesson can be found in the recent contribution of Cahuc et al. (2021). Using French data they measured the heterogeneous effects of STW at saving jobs and increasing total hours of work considering the Great Recession period. Their results pointed out the effectiveness of STW for firms hit by strong negative revenue shocks. On the contrary, for firms facing a limited decrease in revenues this policy would only have been some sort of “windfall effect”. On the other hand, covering the pandemic period, Osuna and Pérez (2021), used a dynamic general equilibrium model to estimate these effects for the Spain´s ERTEs reaching similar conclusions as the previous studies: the policy design is the key to balance potential benefits and deadweight costs.

Some other studies exploited firm or establishment data to carry out propensity score matching approaches to compute the average treatment effects of these programs. In this regard, Kruppe and Scholz (2014) did not find significant employment effects of German STW during the financial crisis, while Calavrezo et al. (2010) found that for French firms the business exit rate even increased one year after the take-up.

However, there are some recent evaluations of the STW effects on firm performance. Kopp and Siegenthaler (2021) made use of Swiss data to compare establishments that successfully applied for STW versus the unsuccessful counterfactual, finding that STW increased their survival and prevented

dismissals during the Great Recession. Conversely, Biancardi et al. (2022) found negative but small effects on firm´s profits when they analyzed the Italian STW in the metallurgy industry, covering the same period and using an IV approach to instrument the STW take-up. Furthermore, Giupponi and Landais (2020) used administrative data from the same country and period in a comprehensive assessment also instrumenting the STW take-up, but this time finding positive results on employment and, most related to this contribution, on firm survival probability.

Overall, the short-time work schemes effects on firm´s performance are unclear and the literature is yet limited, particularly during the pandemic period. Additionally, to the best of our knowledge, no study uses this particular period to link the intensive use of STW we have witnessed, with firm performance and their survival prospects.

3 New Company Demographic Profile database

In order to analyze the survival of the companies during the first year of the Covid-19 pandemic in Spain, we retrieved data from the new experimental statistics of Company Demographic Profile (CODEM), by the Spanish National Statistics Institute (INE).[1] These data gather aggregated information about the number of surviving companies across a year and its rate regarding an initial cohort. For the purpose of our analysis, we chose the first cohort of legal employer units that contains information about work reduction program take-up after the Covid-19 outbreak, thus the April 1st cohort. This cohort begins with 1,102,738 employers and is followed from April 1st, 2020 to April 1st, 2021, on a quarterly frequency.

To understand the nature of the database, it consists of an aggregated panel where we are monitoring the fraction of surviving companies from an initial cohort, which in our case comprises 1,102,738 firms from April 1st 2020, a few days after the state of alarm statement in Spain. The cross-sectional dimension is defined by a given region, ERTE situation and sector or size category, while observed in each of the 4 following periods. However, the main limitation of the data is twofold: On one hand, we cannot access the firm-level microdata with the 1,102,738 observations, accessing only to its aggregation by sector or size instead. On the other, we cannot combine the sector dimension with the firm size because the data is provided separately. As a consequence, we will be simultaneously conducting an analogous analysis for both datasets, the first, considering the sector aggregation, and the second, considering the size aggregation. In spite of these limitations, the main point of this new database is the possibility to link the information about ERTE take-ups and firm survival rates, allowing the introductory analysis of a hypothetical relationship between them, via the theoretical mechanism we described in the introduction.

Hence, the first dataset (henceforth referred to as Sector aggregation) contains the aggregated survival rates for the initial quarter (t=0 for April 2020) and the 4 following ones (t=1 for July 2020, t=2 for October 2020, t=3 for January 2021 and t=4 for April 2021); 17 regions (Spanish Autonomous Communities); 81 sectors of the National Classification of Economic Activities (CNAE) which were aggregated into 16 main sectors for interpretive purposes; and an ERTE dummy —it takes 1 if there is at least one employee in a work reduction program within the firm and 0 otherwise—[2]. For the second dataset (henceforth referred to as Size aggregation), we were forced to drop the industrial dimension to include a categorical number of employees, as a proxy of the company size. The categories are from 1 to 5, from 6 to 9, from 10 to 99, from 100 to 249 and more than 250 employees.

Although we do not have firm-level observations, we do have the number of firms which are represented in each aggregated observation. Therefore, we will use this information in order to weigh our observations, ensuring a fair representation of the original sample. To sum up, any single observation represents the rate of companies which did not close over the initial cohort, observed in a given period,

[1] `https://ine.es/experimental/codem/experimental_codem.htm` (last consult April 5th, 2022).

[2] Unfortunately, we do not have precise information on the intensity of use within the firm, so we can only consider a yes/no indicator for the use of the program.

region, ERTE status and either sector or size, as shown in the example of tables 1 and 2. Afterwards, the initial observation of April 2020 (t=0) was dropped for the econometric analysis as it does not provide any variability (survival rate=1 by definition). The remaining sample counts on 2,164 observations for the sector aggregation and 680 observations for the size aggregation, which turns to 4,007,839 when using as frequency weights the number of firms they represent.

Table 1: Example for data visualization in the sector aggregated dataset.

	Region	Sector	Erte	t	Firms	Survival rate
1	Andalucía	Extractive industry	0	0	211	1
2	Andalucía	Extractive industry	0	1	200	.9406
3	Andalucía	Extractive industry	0	2	194	.9300
4	Andalucía	Extractive industry	0	3	189	.8812
5	Andalucía	Extractive industry	0	4	186	.8554
...	...	...	...	...	...	...
2,716	La Rioja	Other services	1	0	64	1
2,717	La Rioja	Other services	1	1	62	.9861
2,718	La Rioja	Other services	1	2	62	.9861
2,719	La Rioja	Other services	1	3	60	.9535
2,720	La Rioja	Other services	1	4	58	.9210

Data source: CODEM.

Table 2: Example for data visualization in the size aggregated dataset.

	Region	Employees	Erte	t	Firms	Survival rate
1	Andalucía	From 1 to 5	0	0	112,454	1
2	Andalucía	From 1 to 5	0	1	105,398	.9373
3	Andalucía	From 1 to 5	0	2	100,022	.8894
4	Andalucía	From 1 to 5	0	3	94,762	.8427
5	Andalucía	From 1 to 5	0	4	90,023	.8005
...	...	...	...	...	...	...
846	La Rioja	More than 250	1	0	6	1
847	La Rioja	More than 250	1	1	6	1
848	La Rioja	More than 250	1	2	5	.8333
849	La Rioja	More than 250	1	3	5	.8333
850	La Rioja	More than 250	1	4	5	.8333

Data source: CODEM.

4 Econometric approach

Following a first descriptive observation of the data which suggested differences in the survival rate by sector, size, region and ERTE situation, some fractional logit regressions with robust default standard errors were carried out to estimate the relationship of each of these characteristics with the survival rate. The choice of this technique is justified by the fractional nature of the outcome variable, survival rate. As it takes continuous values within the close interval [0, 1], the effect of any particular covariate cannot be constant throughout the range of the vector x and the predicted values from an OLS regression can never be guaranteed to lie in the unit interval. In addition, by using this technique we can relax some of the assumptions of the linear regressions regarding linearity, normality and homoscedasticity.

This fractional regression method, initially proposed by Papke and Wooldridge (1996), simply solves these issues using a quasi-likelihood estimator and a logistic distribution for the conditional mean of the dependent variable. As a consequence, we performed the following estimations.

4.1 1st regression: sector aggregation

For this regression the conditional expectation function is estimated as follows:

$$E(y_{rts}|Erte) = G(\alpha + \mu_r + \mu_t + \mu_s + \beta Erte) \tag{1}$$

where $E(y_{rts}|Erte)$ is the expected survival of a cohort of firms in a given region r, time t and sector s, conditioned by the Erte status of their employees (1 if there is at least one in a temporary reduction scheme, 0 otherwise). This conditional mean of survival was estimated as a logistic function $G(.)$ –thus $exp(x_{it}^{'}\beta)/\{1 + exp(x_{it}^{'}\beta)\}$–, considering a constant term α –the baseline survival–, fixed effects by region, time and sector $-\mu_r, \mu_t, \mu_s$ respectively–, and the Erte status. We therefore estimated a saturated regression model since all the explanatory variables are of discrete nature, being all dummies by sector, regions, quarters and ERTE, therefore the model includes a separate parameter for all possible values taken on by the explanatory variables. This particular type of regression fits perfectly the conditional expectation function and this time may allow us to catch the heterogeneity in the company survival rate among sectors, regions, time and finally the ERTE estimated effect via the computed marginal effects of each covariate. Note that since we only considered factor levels, the marginal effects will represent discrete changes from the baseline. In this specification, the baseline –omitted categories– were hospitality and tourism sector, trend dummy=1, Andalusia and no ERTE.

4.2 2nd regression: size aggregation

Likewise, the second regression was based on the same structure as the previous one but replaced the sector by size. Then, the marginal effects may differ from the first regression and the size effects on survival rate will be quantified too. For this regression, the baseline –omitted categories– were 1-5 employees size, trend dummy=1, Andalusia and no ERTE.

$$E(y_{rts}|Erte) = G(\alpha + \mu_r + \mu_t + \mu_s + \beta Erte) \tag{2}$$

As mentioned, regression 2 replicates the same structure of regression 1, but for the index s which now refers to the size of the firm instead of the sector.

5 Results

5.1 ERTE take-up and firm survival

As we explained in the introductory section our point is that temporary work reduction programs could be acting as a source of flexibility for the labour demand adjustment, transferring the adjustment costs from the employers and employees to the public administration. As a result, those firms whose employees are involved in reduction schemes during an adverse shock –as the recent pandemic– might improve their prospects. By contrast, the absence of these schemes might entail potential risk to the firm survival as long as they may have to face the adverse shock assuming high costs.

At a first glimpse, the descriptive results are consistent with this idea, revealing a potential relationship between the survival rate and the ERTE take-up. As observed in table 3 and figure 1, non-ERTE firms experienced lower survival rates across the whole year with a difference that ranges from 2 to 5 percentage points. Nevertheless, the cautious reader may realize that this naive result only can be taken as a potential relationship since we are just comparing the mean in survival for both groups –ERTE and non-ERTE firms– without controlling for any other variable or considering any bias which might be implicit to the ERTE assignment. As a result, our next step will try to control by some characteristics of the firms using the econometric approach that was previously explained in the corresponding section in order to approximate more to the real impact of the ERTE policy on firm survival.

Table 3: Number of firms and quarterly survival regarding the initial cohort of April, 2020. By employees ERTE situation comparison.

Employees	Apr2020	Jul2020		Oct2020		Jan2021		Apr2021	
situation	Firms	Firms	%	Firms	%	Firms	%	Firms	%
No ERTE	852,306	812,240	95.30	781,490	91.69	753,187	88.37	724,018	84.95
ERTE	250,432	247,138	98.68	241,124	96.28	233,298	93.16	225,996	90.24
Total	1,102,738	1,059,378	96.07	1,022,614	92.73	986,485	89.46	950,014	86.15

Source: CODEM.

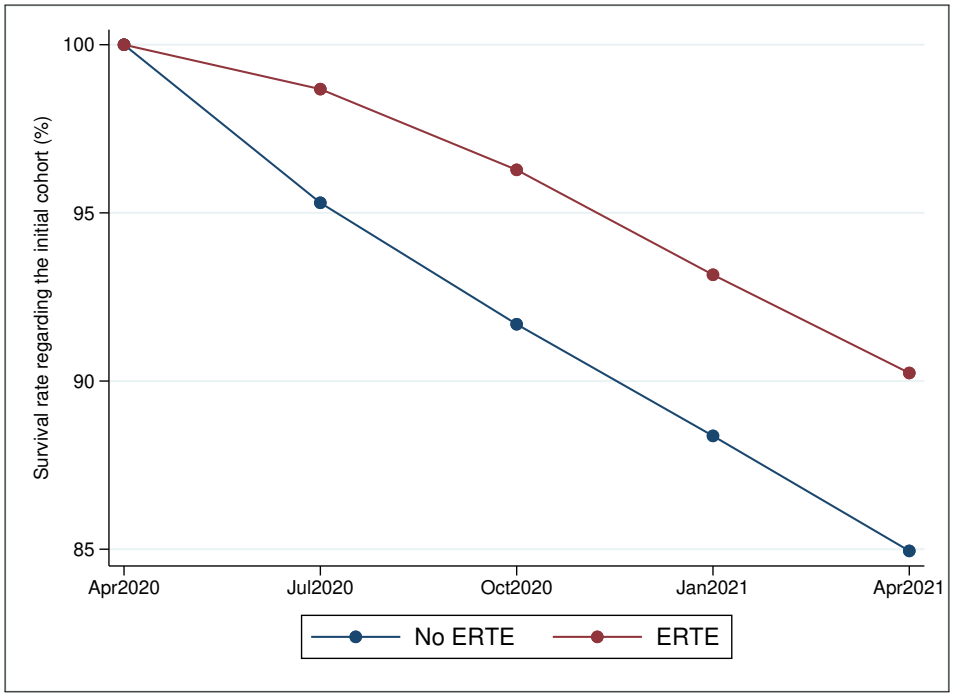

Figure 1: Percentage of surviving firms by ERTE take-up, regarding an initial cohort of 1,102,738 firms in April 2020, Spain. Source: CODEM.

5.2 Average marginal effects

As mentioned before, we performed two fractional logit regressions which allow us to control for the main features of the firms, getting a more precise estimation of the ERTE effect on survival rates. As the fractional logit regression output[3] is not directly interpretable, we are focusing on the computed average marginal effects. Table 4 shows the average marginal effects for both regressions. All these effects have been tested significant and represent a discrete change from the baseline survival outcome since they are associated with factor variables. Thus, they can be interpreted as increments or decrements of percentage points (shorten as p.p.) in baseline survival rate.

Hence, on average, we may conclude that taking up an ERTE is associated with a 6.29 p.p. increase in survival rate according to the first regression. Nonetheless, in the second regression this effect is attenuated to 3.52 p.p. Whatever the case, these results seem to support the hypothesis we previously developed, where a positive ERTE effect on survival was expected.

According to the size effects estimated in the second regression, a company with 6 to 9 employees increases the survival rate by more than 7 p.p. with regard to a 1 to 5 employees firm. However, this increment is marginally declining as we jump to larger businesses. Other computed marginal effects report which were the most vulnerable sectors during the pandemic –education and leisure related

[3]Available upon request.

services, highlighting education as the less likely to survive (6.22 p.p. below the baseline)–. On the other hand, sectors more able to adapt to the pandemic experienced higher survival rates. These sectors were, as expected, industries, followed by health care and other services which do not require a high level of face-to-face interaction. Furthermore, some residual heterogeneity was captured by trend and regional dummies.

Table 4: Average marginal effects on survival rate. Percentage points change from the baseline.

	(reg. 1) Sector aggregation	(reg. 2) Size aggregation
ERTE	6.29***	3.52***
From 1 to 5 employees		-
From 6 to 9 employees		7.09***
From 10 to 99 employees		8.47***
From 100 to 249 employees		9.48***
More than 250 employees		9.62***
Education	-6.22***	
Arts and entertainment	-3.82***	
Hospitality and tourism	-	
Logistics	2.36***	
Construction	2.94***	
Other services	3.33***	
Administrative activities	3.96***	
Telecommunications	4.84***	
Retail	5.27***	
Science and technology	6.35***	
Real estate	6.38***	
Health and social care	6.75***	
Manufacturing	6.80***	
Finance and insurance	6.95***	
Supply industry	8.41***	
Extractive industry	8.42***	
Trend dummies	Yes	Yes
Regional dummies	Yes	Yes
Survival baseline outcome	92.48%	94.13%
Weighted observations	4,007,839	4,007,839

* ($p < 0.05$), ** ($p < 0.01$), *** ($p < 0.001$)

Baseline categories: ERTE=0; Trend dummy=1; 1-5 employees; Hospitality and tourism; Andalucía.

5.3 A deeper look into ERTE marginal effects

Although we have already found a positive ERTE effect in both regressions, we only computed the marginal effect on average so far, this is, considering the average marginal effect over all possible values of the rest of covariates. However, using non-linear regression, the marginal effect of a given covariate may differ across the values of other covariates. Hence, by fixing values of other covariates we can estimate the variability of this effect at different points, interacting the ERTE effect with them. From now on, we are going to explore this possibility by computing the marginal effect of the ERTE take-up by sector and size. This analysis will reveal if the average effects which were obtained in table 4 are stable over sectors and size, uncovering the heterogeneity of the effects.

Table 5 and figure 2 displays the computed marginal effects of the ERTE take-up by size. The estimations, which all tested significant at a 1% level, show important differences in the magnitude of the effect. These results reveal a decreasing pattern for the ERTE effect as long as the firm gets

larger. While the smallest firms –1 to 5 employees– increased around 4.4 p.p. their survival rate when taking up an ERTE, this increment declines sharply for larger firms, remaining slightly above zero for the largest –more than 250 employees–.

By sector, table 5 and figure 3 shows that the ERTE positive effect also seems to be larger for the least surviving sectors, thus education, hospitality/tourism and arts/entertainment. The huge difference in the ERTE positive effect on survival rates by sector reach almost 10 p.p., from slightly above 3 p.p. in the supply industry to more than 12 p.p. in education.

Table 5: Erte average marginal effects on survival rate, interactions with sectors and size. Percentage points change from the baseline.

	(reg. 1) Sector aggregation	(reg. 2) Size aggregation
ERTE interaction with		
From 1 to 5 employees		4.34***
From 6 to 9 employees		1.57***
From 10 to 99 employees		0.97***
From 100 to 249 employees		0.51***
More than 250 employees		0.45***
Extractive industry	3.23***	
Supply industry	3.24***	
Finance and insurance	4.30***	
Manufacturing	4.41***	
Health and social care	4.45***	
Real estate	4.71***	
Science and technology	4.73***	
Retail	5.48***	
Telecommunications	5.77***	
Administrative activities	6.36***	
Other services	6.76***	
Construction	7.01***	
Logistics	7.38***	
Hospitality and tourism	8.80***	
Arts and entertainment	10.89***	
Education	12.06***	
Survival baseline outcome	92.48%	94.13%
Weighted observations	4,007,839	4,007,839

* ($p < 0.05$), ** ($p < 0.01$), *** ($p < 0.001$)

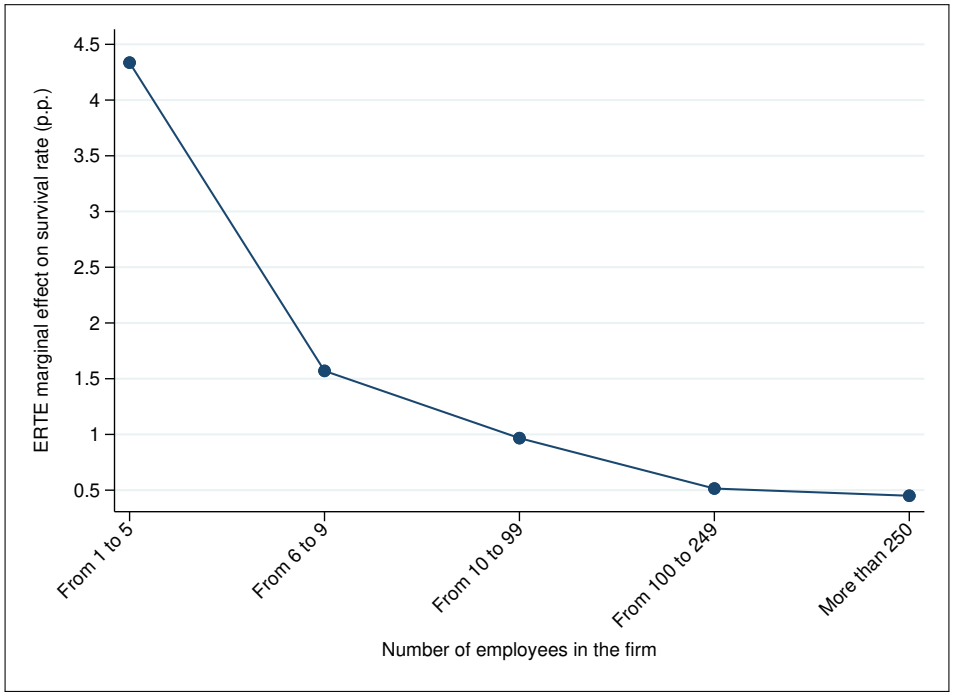

Figure 2: Erte marginal effects on the conditional mean of survival rate by size.

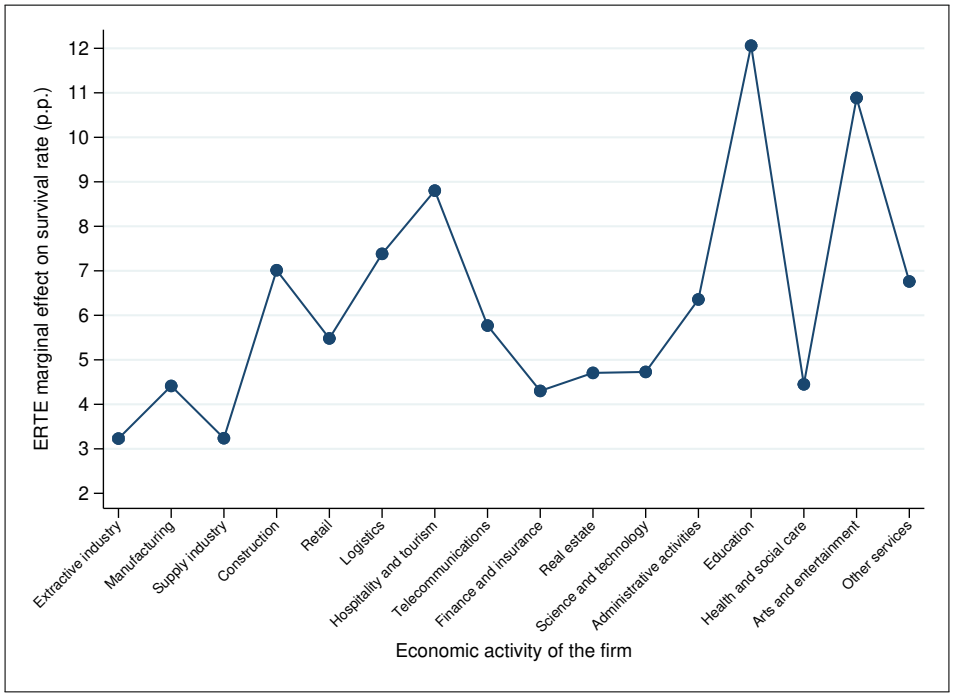

Figure 3: Erte marginal effects on the conditional mean of survival rate by sector.

6 Conclusion

In this paper we have analyzed the survival rate of companies during the first year of Covid-19 in Spain, trying to measure the heterogeneity among sectors, sizes and regions, quantifying somehow the effects of the Spanish Temporary Workforce Reduction Scheme (ERTE) on it. For this purpose, we made use of a new Spanish database provided by the National Statistics Institute –called Company Demographic Profile–, which implies a novel contribution to the topic, allowing us to link the ERTE take-up with the survival of more than a million firms, followed quarterly from April 2020 to April 2021. The main analysis consists of a set of fractional logit regressions, performed in two different datasets due to the limitations for crossing variables in the aggregated data provided by the source.

As a result, we found a significant association between an ERTE take-up and firm survival which support our preliminary intuition of these programs as a tool that introduces labour demand flexibility in the market, adjusting it while avoiding high costs to the employers, and therefore helping them to overcome transitory shocks without closing. However, this positive ERTE marginal effect seems to be slight and very heterogeneous by sector and size. In addition, it also suggests some sort of positive convergence effect of the ERTE, since the more vulnerable sectors were those that took the higher benefits, while the impact on the strongest sectors was also positive, to a lesser extent. The most resilient firm profiles were, as expected, mainly industrial sectors, while education and leisure-related services were the most vulnerable ones. Likewise, the smallest companies experienced lower survival rates than their larger counterparts, finding a noticeable leap between 1-to-5 and 6-to-9 employees firms, but less relevant leaps in survival for subsequent sizes.

7 Discussion and caveats

Our results about firm survival in Spain during the pandemic point at the same direction as the reviewed literature for the US, this is, there was great heterogeneity and a significant part of it can be explained by the sector and size of the company. On the other hand, our characterization of the effect of a job retention scheme on firm survival by different types of firms suggests that its heterogeneity should be taken into account when designing these job retention mechanisms. Moreover, the association found between job retention schemes and firm survival opens the door for the study of a potential causal relationship.

Nevertheless, despite obtaining some interesting results, we should be cautious in their interpretations. Firstly, it should be reminded that an ERTE might be approved only for a few employees within a company and also it could be either part or full-time. Hence, the different characteristics of this policy may bias this result, since we are assuming a homogeneous ERTE scheme. Furthermore, we found some other troubles we could not overcome in the analysis: we suspect the ERTE adoption may not be exogenous at all since companies with fewer survival expectations might be more likely to take up an ERTE –selection bias–; and also there might be relevant omitted variables in our models which cannot have been included due to the few control variables available. Besides, the techniques we have used are not able to infer any causality effect beyond correlation. Therefore, some public evaluation techniques, e.g. the use of counterfactual scenarios, are needed in order to properly evaluate these effects. Additionally, had we accessed microdata registers, richer techniques like duration models could have been performed in order to estimate the survival of any firm by its characteristics. Unfortunately, none of these approaches has been possible this time with aggregated data.

Being aware of all these limitations, this paper is only aiming to introduce some preliminary insight on the Covid-19 impact on the company‘s survival in Spain, as well as provide useful information about the possible role of job retention schemes in this topic. As far as we are concerned, further research is needed as it is a new topic with few available data, but of utmost importance nowadays. We will keep working on the following issues for future research: the use of firm-level data to improve regression performance and other estimation methods; the comparison of these firm survival rates during the

pandemic with pre-pandemic data to confront these data with a baseline reference; the possibility of merging these data with other sources to consider new variables in the analysis which might explain the regional survival heterogeneity –e.g. industry composition shares or bureaucratic and transaction costs for companies–; and finally, the design of a causal evaluation for these schemes.

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