Unemployment Benefits for Self-employed Workers: An Evaluation Using Survival Analysis

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Abstract

This paper examines the effect of the Cessation of Activity Benefit (CAB)—a government policy aimed at self-employed workers—on non-employment spell durations in Spain. Using data from the Spanish Continuous Sample of Working Lives (MCVL), we apply flexible semiparametric survival models to address limitations of standard duration analysis. Our results show that self-employed individuals who receive the CAB experience non-employment spells approximately 4 to 6 months longer than their non-recipient counterparts. The extended duration appears largely driven by a moral hazard effect, as many beneficiaries remain out of work until the maximum benefit period (12 months) expires. These findings suggest that while the CAB provides valuable income support, it may inadvertently discourage timely re-entry into the labour market.

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I. Introduction

What are the effects of receiving unemployment benefits on the return to the labour market? This paper investigates this question by applying survival analysis to self-employed workers in Spain, focusing on the Cessation of Activity Benefit (CAB). We aim to determine whether the outcomes observed for salaried workers also hold for the self-employed. Specifically, we examine how receiving CAB affects the duration of non-employment spells and explore whether the benefit encourages opportunistic behaviour[1]. In particular, we assess whether beneficiaries tend to extend their non-employment periods due to adverse selection and moral hazard effects.

Social insurance for self-employed workers presents several challenges. Many self-employed individuals, especially those without employees, lack the protections available to salaried workers despite having similar employment conditions. Surveys in the US, UK, and Italy reveal high demand for such protections among this group (Boeri et al., 2020), particularly when workers depend heavily on a single client or rely solely on gig work. Financing social security for the self-employed through general revenues raises fairness concerns compared to low-wage employees and can become costly due to moral hazard (Boeri & van Ours, 2021). Eligibility is difficult to assess given irregular incomes and the control self-employed workers have over their payment timing, which is why many countries exclude them from unemployment insurance. Attempts to curb moral hazard by raising contributions can lead to adverse selection in voluntary systems or reduce self-employment in low-wage sectors if made compulsory. In Sweden, increased premiums led primarily lower-risk workers to exit the system (Kolsrud, 2018).

Although various studies have analysed different aspects of self-employment and its implications for the Spanish labour market—both from a microeconomic perspective (e.g., Cueto and Mato, 2006; Cueto et al., 2017) and a macroeconomic one (e.g., Congregado et al., 2010; Congregado et al. 2012; Cueto et al., 2015)—none has addressed the specific topic examined in this paper. To date, the only study that explores the effect of the Cessation of Activity Benefit (CAB) on the unemployment duration of self-employed workers in Spain is Moral-Arce et al. (2019). However, that study does not account for the time-dependent nature of the outcome variable.

Thus, our contribution is twofold. First, we shed new light on a topic that has received little attention in the literature. Second, we apply an econometric methodology developed by Royston and Parmar (2002), which accounts for the time-dependent nature of our outcome variable. Addressing this feature is essential to obtain reliable estimates, which conventional survival models would be unable to provide.

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[1] Throughout the paper, unemployment and non-employment spells will be used as synonyms since we do not have information about the job-search behaviour of the individuals in our database.

II. Data

This study uses data from the *Muestra Continua de Vidas Laborales* (MCVL), a Spanish administrative dataset launched in 2004 under the direction of the Secretary of State for Social Security, then part of the Ministry of Employment and Immigration. The MCVL provides detailed information on the population based on socioeconomic attributes recorded in Social Security registers. This allows for the reconstruction of individual employment histories, which is essential for our analysis.

We use the 2015 wave of the MCVL, focusing on affiliation episodes to the *Régimen Especial de Trabajadores Autónomos* (RETA, Special Regime for Self-Employed Workers) between 2011 and 2015[2]. Our main variable of interest, "days until contribution" (DUC), is defined as the logarithm of the number of days between deregistration from RETA and the beginning of a new registration period, either as self-employed or salaried. The explanatory variables used in the analysis are detailed in Appendix 1. The final sample consists of 3,541 non-employment spells.

III. Methodology

Cox Proportional Hazards (PH) regression has become the standard tool for analysing survival data. While the Weibull model also belongs to the PH family, it is often criticized for its limited flexibility in capturing the shape of the baseline hazard, which must be either monotonically increasing or decreasing. The log cumulative hazard function, incorporating covariates, can be expressed as **Equation (1)**:

$$ln\{H(t|x_i)\} = \ln\{H_o(t)\} + x_i\beta = ln(\lambda) + \gamma ln(t) + x_i\beta \qquad (1)$$

The covariates x represent individual characteristics of self-employed workers, t denotes time, λ, γ, and β are parameters to be estimated, associated with the baseline hazard, time, and individual characteristics, respectively. The Cox model assumes that covariate effects act proportionally on the baseline hazard and are independent of time. Under this proportional hazards assumption, the survival functions generated from a single estimation cannot cross. To address this limitation, we use flexible semiparametric models as proposed by Royston and Parmar (2002). These models transform the survival function using a link function $s(\cdot)$. The baseline log cumulative hazard in a PH model is specified as a restricted

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[2] The selection of this period is based on three main reasons. First, there were no CAB beneficiaries in Spain prior to 2011. Second, the high unemployment rates between 2011 and 2015 (peaking at around 27% in 2013) provide a relevant context for studying an unemployment insurance scheme. Third, a major legal reform in 2015 significantly altered the incentive structure of the CAB for self-employed workers (although the beneficiaries could collect the subsidy for 12 months since then).

cubic spline function of $ln(t)$, with knots k_0, written as $s\{ln(t) \mid \gamma, k_0\}$, leading to the following formulation:

$$ln\{H(t|x_i)\} = \eta_i = s\{\ln(t) \mid \gamma, k_0\} + x_i\beta \qquad (2)$$

The first term in **Equation (2)** is estimated using restricted cubic splines. One of the main advantages of the flexible parametric approach is its ability to easily accommodate time-dependent effects, which can be modelled through interactions between the spline terms and the covariates of interest. If there are D time-dependent effects, the model can be specified as:

$$ln\{H(t|x_i)\} = s\{\ln(t) \mid \gamma, k_0\} + \sum_{j=1}^{D} s\{\ln(t) \mid \delta_k, k_j\}x_{ij} + x_i\beta \qquad (3)$$

Equation (3) is the specification we use to estimate the effect of the CAB on the non-employment duration spells of self-employed workers.

IV. Results

Using the sample of non-employment spells for self-employed workers during the period 2011–2015, **Figure 1** presents the non-parametric Kaplan-Meier survival functions for the variable DUC, comparing individuals who received the CAB (treated group) with those who did not (control group). Each curve was estimated using a separate subsample, as this is an exploratory analysis.

[Figure 1]

Figure 1 shows the proportion of self-employed workers who remain in non-employment over time, until they change their employment status (i.e., return to work). In the early months, the probability of exiting non-employment is lower for the treated group than for the control group. However, both survival curves intersect at around 12 months—the maximum duration for which CAB can be collected. This suggests that the effect of receiving CAB is time-dependent. Consequently, the Cox Proportional Hazards model is not suitable for estimation, as it assumes proportionality—that is, the hazard functions for both groups should remain proportional over time and not intersect.

To estimate the effect of receiving the benefit on the duration of non-employment among self-employed workers, we use the flexible parametric model specified in **Equation (3)**. In addition to the treatment variable, we include a set of control variables capturing individual characteristics that may influence the time until re-entry into the contribution system (see **Appendix 1** for details).

The estimation results are presented in **Table 1**. The coefficient associated with the CAB variable is statistically significant and negative, indicating that receiving the benefit is associated with longer non-employment spells. In other words, the CAB appears to discourage a prompt return to work among beneficiaries.

[Table 1]

Based on the estimation of **Equation (3)**, **Figure 2** displays the predicted survival functions for the treatment and control groups. The predicted curves closely match the empirical Kaplan-Meier estimates shown in **Figure 1**. This strong model fit supports the adequacy of the flexible parametric specification and reinforces the credibility and reliability of the inference derived from the model.

[Figure 2]

V. Discussion

Our findings are consistent with existing literature on the effects of unemployment benefits for salaried workers (e.g., Martín-Román, 2022), suggesting that similar behavioural responses may also emerge among the self-employed. This is particularly relevant given the distinct status of self-employed individuals, whose irregular income streams and control over the timing of payments complicate the assessment of eligibility for unemployment benefits. The results highlight the inherent difficulties in designing unemployment protection schemes for this group: while such benefits are crucial as a safety net, they may also generate unintended disincentives to return to work. Policymakers must therefore face a delicate balance between offering adequate social protection to a vulnerable segment of the labour market and preserving both the financial sustainability and the incentive structure of the system.

VI. Conclusions

This study provides empirical evidence on the impact of the CAB on the duration of non-employment spells among Spanish self-employed workers. The main finding is that receiving CAB significantly extends the duration of non-employment, primarily due to a moral hazard effect, as beneficiaries tend to remain inactive until the maximum benefit period (12 months) is exhausted. This behavioral response underscores the complexities involved in designing effective unemployment protection for the self-employed.

Our results contribute to the broader discussion on the future of social protection in increasingly flexible and fragmented labor markets. The Spanish case offers valuable insights for other countries considering similar schemes and underscores the need for rigorous empirical evaluation when adapting unemployment insurance to non-standard forms of employment.

Acknowledgments

AI Policy Compliance Statement

We confirm that we used a Generative AI tool—ChatGPT (OpenAI, version July 2025)—solely for English language editing during the preparation of the manuscript. The tool was used to review and refine grammar, clarity, and style, but it did not generate original content or contribute to the analysis or interpretation of the research.

Disclosure of potential conflicts of interest

No potential conflict of interest was reported by the authors.

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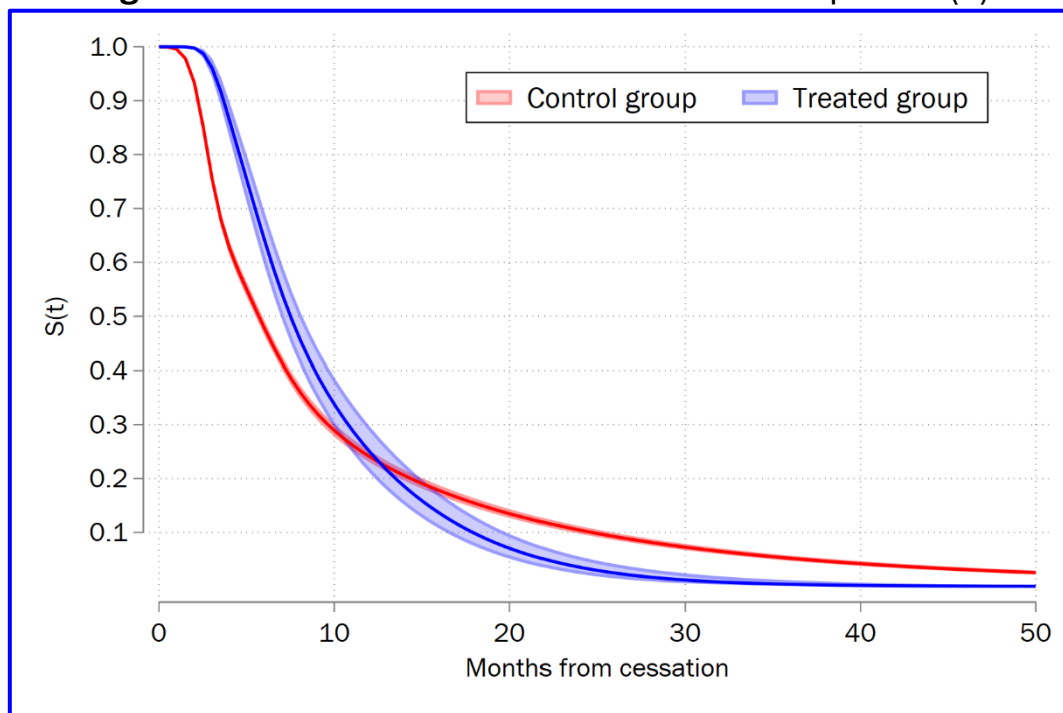
Figure 1. Kaplan-Meier survival estimates
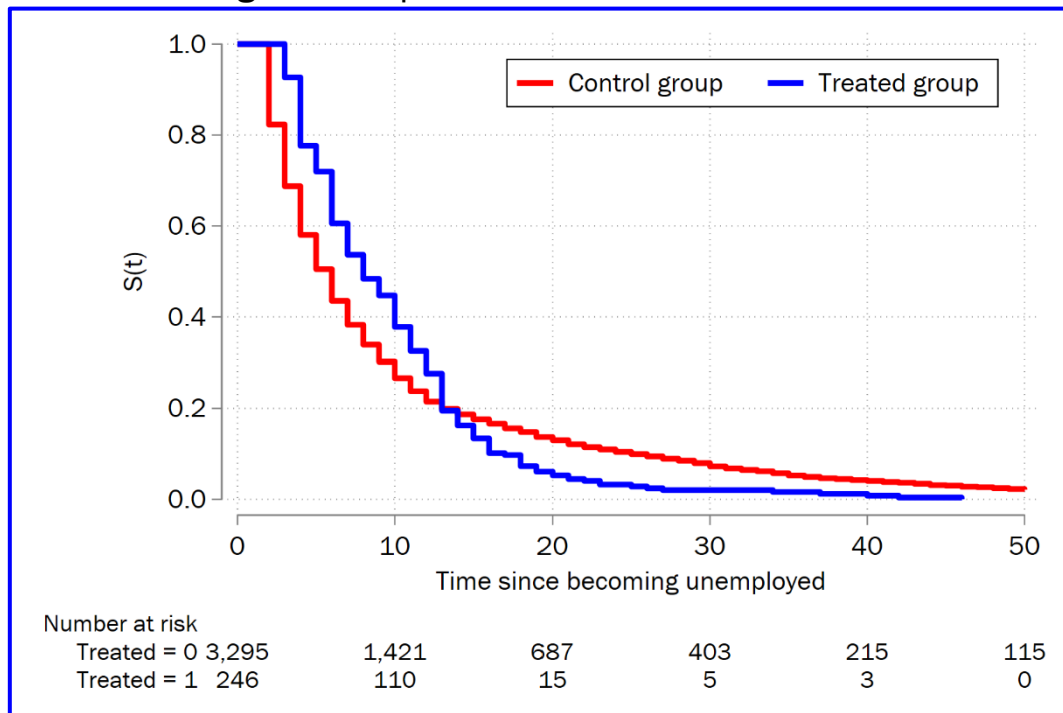
Source: Own elaboration from MCVL
Note: Treated=0 are those self-employed not receiving the CAB (control group). Treated=1 are those self-employed collecting the CAB (treated group).

Figure 2: Estimated survival estimates from Equation (3)

Source: Own estimates.

Table 1. Estimation of the Effect of CAB on Non-Employment Duration

	Variable	Coefficient	p-value
Treatment	**CAB**	**-0.826*****	**0.000**
Personal characteristics	Age	-0.004***	0.003
	Male	0.099***	0.004
	Spaniard	-0.123***	0.001
	Schooling	-0.024	0.442
Industry (ref: Other activities)	Agriculture & Fishing	0.252**	0.036
	Manufacturing	-0.020	0.821
	Energy	-0.483	0.339
	Construction	0.067	0.316
	Commerce	0.040	0.528
	Transportation	-0.051	0.623
	Hospitality	0.069	0.309
	IT/Computing	-0.164	0.166
	Banking	-0.101	0.329
	Consulting	0.068	0.360
	Education & Health	0.395***	0.000
Region (ref: Not registered)	Andalucia	0.102**	0.048
	Aragon	0.309***	0.008
	Asturias	0.001	0.994
	Baleares	0.469***	0.000
	Canarias	0.071	0.481
	Cantabria	0.300*	0.089
	Castilla y Leon	0.046	0.608
	Castilla- La Mancha	0.150*	0.062
	Cataluna	0.100*	0.068
	Valencia	0.143**	0.012
	Extremadura	0.078	0.516
	Galicia	-0.071	0.394
	Madrid	0.156**	0.018
	Murcia	0.123	0.256
	Navarra	-0.023	0.922
	Pais Vasco	0.336***	0.000
	La Rioja	-0.029	0.900
Intercept		-0.357***	0.000
Observations		**N= 3,541**	

Source: Own elaboration.

Notes: *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Reference categories: *Industry = Other activities (CNAE > 88); Region = Not registered*.

Appendix 1
Table A.1: Variables used in the study

Variable	DEFINITION
OUTCOME VARIABLE	
Days Until Contribution (DUC)	Logarithm of the duration (in days) between deregistration from RETA and the start of a new registration period, either as a self-employed or salaried worker.
EXPLANATORY VARIABLES	
CAB	Dummy variable equal to 1 if the individual has received the Cessation of Activity Benefit (CAB) at least once; 0 otherwise.
Age	Age of the individual at the time of deregistration from the Social Security system under the CAB scheme.
Male	Dummy variable equal to 1 if the individual is male; 0 if female.
Spaniard	Dummy variable equal to 1 if the individual was born in Spain; 0 otherwise.
Schooling	Dummy variable equal to 1 if the individual has completed secondary or tertiary education; 0 otherwise.
Industry	Eleven industry dummies indicating the sector in which the self-employed worker operates: (1) Agriculture and fishing, (2) Manufacturing, (3) Energy, (4) Construction, (5) Commerce, (6) Transportation, (7) Hospitality, (8) IT/Computing, (9) Banking, (10) Consulting, (11) Education and health. The reference category includes other economic activities (CNAE code > 88).
Region	Seventeen dummy variables representing Spain's Autonomous Communities. Each takes the value 1 if the individual resides in the respective region; 0 otherwise. The reference category includes individuals without a specific region of residence in the dataset.

Source: Own elaboration.