A Work Project, presented as part of the requirements for the Award of a Master's degree in Economics from the Nova School of Business and Economics.

Career Changes and Active Labour Market Program Participation

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17/05/2024

Active Labour Market Programs participation and Job Changes
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Determinants and Survival Analysis

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Abstract:
This thesis explores the efficacy of Active Labor Market Policies (ALMPs) in Portugal focusing on the *Vida Activa* (VA) program. It tries to unveil demographic patterns among participants and assesses the program's employment outcomes. The results reveal that participants were predominantly older adults, females, and individuals seeking to up-skill rather than re-skill. Educational attainment and the desire for a different job negatively affected participation, while prior occupational alignment positively influenced it. The survival analysis indicated higher hazard rates for females and foreigners, suggesting lock-in and competition effects affecting employment outcomes.

Keywords: Active labour market programs, survival analysis, training, matching

This work used infrastructure and resources funded by Fundação para a Ciência e a Tecnologia (UID/ECO/00124/2013, UID/ECO/00124/2019 and Social Sciences DataLab, Project 22209), POR Lisboa (LISBOA-01-0145-FEDER-007722 and Social Sciences DataLab, Project 22209) and POR Norte (Social Sciences DataLab, Project 22209).

♣ I would like to thank Professor Pedro Martins for all the invaluable help and patience. Additionally, I want to thank Isabel Geraldes for sharing with me her master's thesis and allowing me to start from there. I want to thank my family for all the support they have given me, and my friends for understanding the struggle and helping me laugh through it. A special thanks to Francisco Martins for always being there for me.

I. Introduction

Portugal faced a deep economic crisis following the financial crisis of 2008, that gravely affected the labour market. Total employment dropped by 15% from mid-2008 to early 2013, and unemployment rates exceeding 15%, peaking at 16.8% in 2013. However, by 2017, unemployment had fallen to 6.9%. Furthermore, emigration skyrocket from 2012 to 2014, resulting in 12.9 people for every 1000 inhabitants leaving Portugal in 2014. And it decreased to 7.8 by 2017.

Naturally, the job market became severely weakened during this period, as it was characterized by a large proportion of temporary workers (Pedroso, 2014) and low-skilled labour supply (ILO, 2018). The government responded with reforms that involved new or redesigned Active Labor Market Policies (ALMPs). These include training programs, job placement services, wage subsidies, and entrepreneurship support, aimed at enhancing jobseeker activation and align vocational training with labour market needs.

This thesis addresses the questions of who participates in these programs and if they reached the desired effect of keeping people employed. This is done empirically by analysing a program called *Vida Activa* (VA) in the third largest job centre in Portugal - *IEFP Amadora* - from December 2012 until October 2019. It builds on Baião et al. (2024), that studied the long-term effects of *Vida Activa*.

This paper expands on the literature as it studies who tends to participate in these programs and if they help unemployed people sustain employment. Furthermore, it considers the case where people want to change careers, studying if the VA program was helpful in these cases.

The main hypotheses are: 1) older and less educated people are the ones that most often resort to these kinds of solutions; 2) AMLPs can have a positive effect in decreasing the

likelihood of returning to unemployment, although it is hard to assert their true impact; and 3) to support career changes, AMLPs need to be targeted to certain groups, and not created to answer the needs of the general population.

This paper is structured as follows: Chapter II contains the Literature Review; Chapter III describes the dataset, with the respective descriptive statistics; Chapter IV presents the methodology used to find out the determinants of AMLP participation and its results; Chapter V presents the methodology and results of the survival analysis; Chapter VI is where the results are discussed, as well as the limitations and possible extensions; finally, Chapter VII concludes the paper.

II. Literature Review

Active labour market policies (ALMPs) are meant to shift labour market expenditures to active measures which mobilise labour supply, improve the quality of the labour force, and strengthen the search process in the labour market. The main reason why they were heavily promoted by the OECD member countries was to face the persistent challenges of high unemployment (Wulfgramm, et al., 2013). They include Public Employment Services (PES) or other publicly funded services for jobseekers. As such, public spending on labour markets usually represents a substantial share of a country's GDP (in 2021, it represented 2.1% of Portugal's GDP according to OECD data[1]).

The effects of the ALMPs can be direct or indirect, which includes macroeconomic effects, as well as general equilibrium effects (Brown, et al., 2015), and can be felt both on the short and long-run. The direct effects on employment, unemployment and earnings surge through an improved matching process, an increased and bettered labour supply, and a higher labour demand (Calmfors, 1994). The indirect effects of ALMPs are many and spread across

[1] This value includes spending on public employment services and administration, training, employment incentives, sheltered and supported employment and rehabilitation, direct job creation, start-up incentives, out-of-work income maintenance and support and early retirement.

different dimensions. Brown, et al. (2015) describes a total of twelve indirect effects, of which the most relevant for this essay are: (i) lock-in effect; (ii) skill-acquisition effect; (iii) competition effects; (iv) transition effect; and (v) screening effects.

Lock-in effects occur when the ALMP participants face a lower probability of finding a job compared to the unemployed who are not in ALMPs, as they have less time or are less inclined to search for a job (van Ours (2004), Calmfors (1994), Martin and Grubb (2001)). The *skill-acquisition effects* describe the event where ALMPs negatively impact skill-acquisitions, as they may provide an incentive to low-skill or unskilled workers to further invest on their human capital gains, diminishing the wage differential between unskilled and skilled workers. Oskamp and Snower (2006) show that positive short-run employment effects can be outweighed by the longer-run consequences of this effect. The *competition effects* of ALMPs may strengthen foreigners' position on the labour market relative to natives, which may exert a downward pressure on wages, in addition to a labour supply effect, thus, raising employment (Calmfors, 1994). The *transition effects* say that bringing unemployed workers back into work via ALMPs will increase their employment probabilities, particularly for long-term unemployed, whose skill withered, as ALMPs will appreciate their human capital (Brown et al. (2011), Kluve et al. (2008) and Martin and Grubb (2001), Jirjahn et al. (2009) and Bernhard et al. (2008a, 2008b). And Heckman et al. (2002) point out, bringing workers into employment can have longer run impacts on workers' human capital and employment path. Finally, the *screening effects* show that ALMPs enables employers to collect information on the productivity of workers, meaning ALMPs can indirectly improve the matching on the labour market by enabling firms to experience workers' productivity (Gerfin and Lechner (2002), Lehmann and Kluve (2010) and Hujer et al. (2006)).

Different ALMPs produce different results and, therefore, be considered to have different effectiveness levels. Their impact also varies if it is evaluated in the short term, the

medium term, or the long term. Henceforth, the complex nature of ALMP outcomes, especially for programmes that are integrated and holistic (such as *Vida Activa*), and the need to find counterfactual evidence, requires the use of diversified analytical approaches (ETF, 2022).

A study Svabova et al. (2021) regarding the active labour market policy "Contribution to the Graduate practice" in Slovakia, using a counterfactual approach. The program was targeted at younger people. They found that the program had a positive impact on the employability and sustainability of its participants, but rather in short-term or maximum long-term. And that the non-treated individuals were better financially evaluated and so the Graduate practice did not guarantee better salary to its participants.

Training programs' evidence is particularly positive in the long run, especially for on-the-job training and policies targeted at disadvantaged outsiders (Brown, et al., 2015). In the short-run, lock-in effects negatively impact the probability of employment (Wulfgramm, et al., 2013). However, in the long run, training programmes lead to better employment stability. Studies have found long-run positive effects of these type of ALMPs on employment stability for East Germany (Lechner et al. 2007), West Germany (Lechner et al. 2011), France (Crépon et al. 2012) and Denmark (Munch and Skipper 2008).

An analytical paper promoted by the European Commission in 2014 found that PES indeed contribute to the increased exit rate from unemployment, a reduction in the number of long-term unemployed, and a decrease in the average duration of unemployment, as well as increased jobseekers' and employers' satisfaction.

Heinesen et al. (2013) conducted a study to estimate the effect of active labour-market programmes on the exit rate to regular employment for non-western immigrants in Denmark who receive social assistance, using the timing-of-events duration model and rich administrative data. They found large positive post-programme effects, and that most in-programme effects are positive. They also found that the relative effects on the hazard rate to

employment – are generally larger for women than for men, but the initial level of the hazard rate to employment is considerably lower for women than for men.

In Andalusia, Sánchez-Cañizares et al. (2020) studied the discounted flat rate for self-employed workers. This ALMP consists of a series of reductions and subsidies applied to the social security contributions of self-employed people when they start their activity. The study compared the survival of a group of self-employed workers who benefited from this subsidy with another group that did not benefit from it. Their results suggest the survival of the group with the subsidy surpasses that of the group without, although the positive effects of the measure disappear over the long term.

A mandatory experimental activation programme in Denmark, where job seekers had to, first, receive a notification letter, then participate in a job search program and finally participate in an ALMP; found that unemployment duration decreased by 2.5 weeks and transitions to employment increase by 30% (Graversen et al., 2008).

A study by Strandh et al. (2008) in Sweden, where they followed unemployed citizens for ten years, found positive effects of ALMP participation concerning both the probability of reaching pre-unemployment incomes and a reduction in the hazard of exiting the labour market.

Bocciardi et al., (2017) found that career adaptability is essential, especially in times of dramatic changes. The ability to adapt and cope with sudden changes and instability in the labour market could also motivate a person to change careers if their current path does not offer the flexibility or resilience required in a rapidly changing job landscape. Their results show that work self-efficacy, search for work self-efficacy and education play a significant role in predicting career adaptability. Surprisingly, professional development-related features and professional status do not seem to have a relevant influence.

All the previous literature emphasises that ALMPs are designed to boost labour market efficiency and aid those struggling with employment. Despite initial concerns about lock-in

effects, ALMPs, especially those focusing on training, show positive long-term impacts on employment stability and income. The effectiveness of ALMPs is influenced by their design, the characteristics of participants, and the broader economic context, highlighting the need for tailored approaches. Overall, while ALMPs present complexities in evaluation and implementation, they offer significant potential for addressing labour market challenges and supporting individual well-being.

III. Vida Activa Program

In 2012, the Portuguese government took action to modernize public employment services. The *Vida Activa* (VA) program was one of those initiatives. It sought to enhance the alignment between vocational training and the needs of job seekers in the labour market by boosting their professional, social, and entrepreneurial skills. Additionally, it granted the participants official recognition of previous expertise and qualifications. VA was designed to be a short-term program. It also addressed concerns raised by an evaluation report that there were numerous long-duration training courses with low participation rates at completion due to dropouts, retirements, and transitions into employment - resulting in high costs per participant.

VA was structured to include a) Short term modular training courses; b) On-the-job training, to complement earlier modular training or skills; and c) Official validation and certification of skills acquired in previous formal or informal experiences. It was accessible for all registered jobseekers, but those who had been jobless for more than six months; low-educated jobseekers; and single guardians or families where one of the guardians is unemployed were prioritized in the program. In December 2013, a fresh initiative was added to the program, the *VA Jovem* (VA Youth), which aimed at enhancing entrepreneurship abilities for people between 18 and 29 years old.

A Personal Employment Plan was created for all registered jobseekers in Portugal, and it comprised a bundle of steps required for work advertise (re)integration. Training programmes were part of this arrange; consequently, VA was one of the possible routes to take. By own initiative or recommended by an employment counsellor, the candidate had to pre-enrol in a course, specifying their interests and goals. After the application period, the (private or public) training provider creates the training groups (classes of 20 up to 30 individuals) with a particular subject, that meets the labour market needs, considering the interface, the earlier aptitudes, and profiles of the candidates (IEFP, 2013).

In accordance with the VA regulation (IEFP, 2013), the PES had to assess the program with respect to the integration process; target population; skills increase; reinforcement of the active job search and aiming to increase the effectiveness of VA. Nevertheless, there is no PES report freely published nowadays. Only the OECD, in 2017, published a preliminary assessment of the Portuguese ALMP (OECD, 2017), including an evaluation of this programme.

IV. Data

The data used for this essay comes from the third largest jobcentre in Portugal – Amadora's *Centro de Emprego e Formação Professional*, a local branch of the Public Employment Services (*IEFP*) of Portugal. With 1 118 692 data points, the dataset was built from three comprehensive administrative databases covering all the historical individual information of each jobseeker from December 2012 to October 2019. This includes jobseeker registrations in each month, job placement information, unemployment cancellations (driven by reasons other than becoming employed), and training (in the Vida Activa Program and others) records (course participants, start/end dates, area, and reason for leaving course). Additionally, the main data set also includes social demographic information, namely birth date, sex, nationality, schooling, previous job, and desired job. You may find more details on the database in Baião et al. (2024).

In Portugal, the *Classificação Portuguesa das Profissões* (CPP, 2010)[2] is used to categorize occupations with a code varying from 1 digit to 5 digits based on the level of detail. It was established in 2010 and aligns with ESCO, the European Skills, Competences, and Occupations classification. Before 2010, Portugal used the *Classificação Nacional de Profissões* (CNP) [3]. The dataset contains information for both; some observations have data for only one classification while others have information for both[4]. Amongst the five common levels in both classifications, only Large Group (1-digit code) is consistent in both, with 10 levels.

i. Descriptive Statistics

From the 1 118 692 observations, 87 095 observations represent each individual at the time of their first record with the jobcentre. 7 818 of those were looking for their first job[5]. 27 152 people participated in the VA in their first unemployment spell (the months they spent unemployed after the start of the observation period) and 15 295 wanted to change occupations. The dataset includes both people already registered in the jobcentre before December 2012 and those who registered afterwards. These were used to describe the sample in an initial stage [***Table I***].

About 49% of job seekers are male, and 51% female. 31.18% of job seekers participated in the VA program. 47.7% of the males and 52.3% of the females participated in the VA. From those who wanted to change occupations, 47.6% were male and 52.4% were female. The sample is fairly balanced, and the data seems to imply that women are more likely to partake in such programs and wanting to change jobs.

The sample was divided in age cohorts, following the unemployment benefits framework (Segurança Social, 2022): less than 29, 30 to 39, 40 to 49 and more than 50. 28.7%

[2]You may find more information in Portal do INE.
[3] Prior to 2010, Portugal utilized the *Classificação Nacional das Profissões* (CNP), which served a similar purpose as CPP but had more extensive classifications and deviated further from the European code.
[4] There are 49 459 observations using CNP codes and 21 051 using CPP codes.
[5] Naturally, for these individuals, there is no information for previous job; thus, they were considered as not wanting to change occupations.

of the people in the sample have less than 29 years; 20.3% are aged between 30 and 39 years; 16.6% belong to the 40 to 49 years interval; and 34.4% are over 50 years. The average age of the sample is approximately 37 years old. The average age of those who participated in the VA program is 41 years old; implying that older people are more prone in participating. 9.5% of the people in this group have less than 29 years; 9.4% are aged between 30 and 39 years; 10.3% belong to the 40 to 49 years interval; and 70.8% are over 50 years. The average age of those who wanted to change occupations is 31 years old. 58 % of those have less than 29 years; 19% are aged between 30 and 39 years; 12.44% belong to the 40 to 49 years interval; and 10.6% are over 50 years. This suggests that older people are more interested in participating in the VA and younger people more prone to desire a different occupation.

The average number of schooling years is 5.58. VA's participants average is 5.41 years, and people who wanted to change careers' is 6.13. Which suggests that people who participate in the program are less educated than those who do not and that more educated people want to switch jobs[6]. 77.9% are Portuguese, and 22.1% foreigners[7]. 84.1% of those who participated in the VA program during their first unemployment spell are Portuguese, and 77.2% of those who wanted to pursue a different career are also nationals.

The average number of unemployment spells is 1.51; 1.21 for the people who participated in the VA program and 1.47 for those who wanted a different career. This seems to indicate that the VA program helped decrease the likelihood participants becoming unemployed again. Finally, the average number of months people spent unemployed on the first spell is 15.91; but increases to 28.97 for participants in the VA and 7.25 for those who wanted to change jobs. This is a clear indication of lock-in effects.

[6] You may find a more detailed description of the education levels in the Appendix, below ***Table I***.

[7] From the foreigners, most are from Cape Vert (7,49%), Guinea-Bissau (3,81%), Brazil (3,63%) and Angola (2,06%).

The data also presents the individuals' previous occupations and their desired ones. The correlation between previous CNP and desired CNP is 0.8098 and the correlation between previous CPP and desired CPP is 0.7381. This is only a suggestive result that seems to indicate that the most useful type of ALMPs are up-skilling programmes, designed to boost an individual's career and/or education in their professional area rather than change it.

Table II's information allows the analysis of the distribution and characteristics of individuals in different occupations based on various demographic and employment-related factors, considering the Large Group 1 digit code. The detailed description can be found on ***Appendix A***. ***Appendix B*** presents the most desired jobs.

The findings suggest a balanced sample with slightly more female participation. Age is significant, with older individuals being more likely to participate in the VA. Younger individuals are more inclined towards changing jobs, based on demographic nuances within the sub-sample analysis. Additionally, the VA program appears to reduce multiple spells of unemployment, but has noticeable lock-in effects. Educational attainment is also found to influence job change inclination. These findings highlight complex dynamics in unemployment and vocational assistance, offering insights for policymakers and practitioners designing interventions for labour market challenges.

V. Determinants of AMLP Participation

i. Methodology

The base model aims to predict what influences one's decision to participate in the *Vida Activa* Program, considering their desire to change jobs (M_i) and other demographic characteristics (X_i). The fixed effects base line model follows the regression:

$$VA_i = \alpha M_i + \beta X_i + \varepsilon_i \text{ (I)}$$

The dependent variable - VA_i- takes value 1 if an individual participated in the VA program in their first unemployment spell and 0 otherwise. $M_i$is a dummy variable representing

the desire to change jobs (value 1 if individual wanted to change occupations, 0 otherwise). α is the parameter of interest, as it represents the effect that wanting to change one's career path has in the likelihood of participating in the VA. However, its interpretation needs to be careful, since there are many factors that can influence M_i and that are not controlled for. Therefore, to minimise this bias, the model controls for demographic characteristics X_i. Finally, the error term - ε_i- encompasses additional factors that could influence the dependent variable but are not accounted for in the analysis and are clustered by individual.

It is important to consider how the previous occupation may affect the participation in the VA. The following models consider only individuals who have had a previous job characterized with the CPP code. This high-dimensional fixed effects model[8] can effectively control for the variation associated with this variable. Specifically, the model incorporates fixed effects for each previous occupation (here, defined by Base Group, a 4-digit code), thereby capturing and mitigating any potential confounding effects stemming from these categorical factors. Henceforth, the model is extended to consider the previous occupation:

$$VA_i = \alpha M_i + \beta X_i + \delta prev\_job_i + \varepsilon_i \quad \text{(II)}$$

In addition, the interaction between the previous job and the desire to change occupations enables the assessment of whether the influence of the desire to change occupations on participating in the VA program varies depending on an individual's previous job. This is particularly intriguing because individuals with diverse previous job experiences may possess varying skill sets, motivations, or barriers to employment, which could potentially interact with the resources or support offered by the VA program.

$$VA_i = \alpha M_i + \beta X_i + + \delta prev\_job_i + \theta prev\_job * M_i + \varepsilon_i \quad \text{(III)}$$

[8] This linear model was defined with many levels of fixed effects, following the methodology that Sergio Correia developed regarding estimation with fixed effects (2015). This model allows for the absorption of categorical variables which ensures that the estimated coefficients of the previously mentioned variables are robust to potential biases arising from unobserved heterogeneity across the individuals, enhancing the validity and reliability of our results.

The results from the first three model specifications are presented in ***Table IV***. You may find model specifications considering the cases for young females, highly educated females, experience, and closeness to desired job[9] in ***Appendix C***. Those results will only be discussed in ***Appendix C***, although their main conclusions are presented in the next section.

ii. Results

VARIABLES	(I) Participated in Vida Ativa Program in first spell	(II) Participated in Vida Ativa Program in first spell	(III) Participated in Vida Ativa Program in first spell
Different Desired Occupation	-0.026***	-0.039***	-0.058***
	(0.003)	(0.005)	(0.015)
Previous Occupation X Different Desired Occupation			0.000
			(0.000)
Female	0.014***	0.020***	0.020***
	(0.003)	(0.006)	(0.006)
< 29	-0.131***	-0.142***	-0.142***
	(0.005)	(0.009)	(0.009)
30-39	-0.095***	-0.117***	-0.117***
	(0.005)	(0.009)	(0.009)
40-49	-0.049***	-0.082***	-0.082***
	(0.005)	(0.009)	(0.009)
50 + = o,	-	-	-
Foreigner	-0.041***	-0.026***	-0.026***
	(0.003)	(0.006)	(0.006)
Cannot read/write	-0.094***	-0.142***	-0.142***
	(0.010)	(0.018)	(0.018)
Read/Write w/school	-0.080***	-0.128***	-0.127***
	(0.009)	(0.017)	(0.017)
4 years = o,	-	-	-
6 years	-0.003	-0.019	-0.020*
	(0.006)	(0.012)	(0.012)
9 years	-0.007	-0.039***	-0.040***
	(0.005)	(0.011)	(0.011)
11 years	0.015*	-0.017	-0.018
	(0.008)	(0.015)	(0.015)
12 years	-0.013**	-0.050***	-0.051***
	(0.005)	(0.011)	(0.011)
Post-Secondary Education	-0.099***	-0.137***	-0.138***

[9] New variable created to measure how significant the job change is desired to be. Considering both the Sub-Group, a 3-digit code, and the Base Group, a 4-digit code, that are used in the CPP classification of occupations, the new variable Closeness to desired job *("prox_prof")"*, takes value 1 if the Sub-Group is the same in the previous and in the desired occupation; and 0 otherwise. This variable helps to determine how much re-learning a person needs to undergo to achieve their desired job.

	(0.020)	(0.030)	(0.030)
Bachelor's Degree	-0.011*	-0.076***	-0.077***
	(0.006)	(0.014)	(0.014)
Master's Degree	-0.032***	-0.082***	-0.083***
	(0.009)	(0.019)	(0.019)
PhD	-0.079*	-0.198***	-0.198***
	(0.047)	(0.051)	(0.051)
Constant	0.257***	0.298***	0.299***
	(0.005)	(0.011)	(0.011)
Observations	71,343	20,994	20,994
R-squared	0.027	0.065	0.065

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

In all three specifications, having a different desired occupations negatively impacts by, respectively, -2.6%, -3.9% and -5.8%, the likelihood of participating in the VA program. These effects are statistically significant at the 1% threshold. The interaction variable between the previous occupation and the desire to change jobs has no impact in the participation in the VA program.

Across models, there is a statistically significant positive association between being female and the likelihood of program participation. These results could stem from various socio-economic and cultural factors, including differential employment opportunities, caregiving responsibilities, or societal expectations regarding career development and reintegration into the workforce.

Regarding the age-dynamics, when comparing with the older cohort, younger individuals exhibit a statistically significant lower likelihood of participating in the VA. This pattern may reflect differing needs, motivations, and barriers to employment faced by the various age groups. Younger individuals might be more proactive in seeking reintegration opportunities, while older cohorts could encounter challenges related to skill obsolescence, age discrimination, or limited access to relevant training and job placement services.

Being of foreign nationality and program participation has a statistically significant negative association across models. This underscores potential barriers faced by immigrants or

non-nationals in accessing employment support initiatives, such as the VA. These barriers may include language proficiency challenges, lack of recognition of foreign qualifications, cultural adjustment difficulties, and discriminatory practices in the labour market.

The relationship of education attainment and program participation is negative, overall. Demonstrating more negative, statistically significant, effects for people with 12 or more years of education. With the absorption of the previous occupation, the magnitude of these effects was accentuated.

From the fourth model results, females with different levels of education (bachelor's, master's, PhD) do not exhibit statistically significant associations with VA Program participation. In the fifth model, the interaction term for females below the age of 29 has a positive coefficient (0.7%), although it is not statistically significant. When considering experience in the sixth model, the results show that individuals with more years of experience are 0.4% more likely to participate in the VA Program. The result is statistically significant at 1% significance level. Finally, from the seventh model, although not significant at any conventional level, the results for Closeness to desired job suggests that individuals whose desired job closely aligns with their previous occupation are significantly 2.1% more likely to participate in the VA Program.

VI. Survival Analysis

i. Methodology

To assess how long it takes for someone to find a job, the dependent variable is the duration of the unemployment spell (t) – which is assumed to have a continuous probability function $f(t)$- and the event is finding a job (either a full-time or part-time job). Thus, the probability that the duration time of the unemployment spell will be less than t is given by:

$$F(t) = Prob\ (T \leq t) = \int_0^t f(s)ds$$

Where $F(t)$ is the cumulative function of $f(t)$. As such, the survival function,

representing the probability that the period of time until finding a job will be at least *t*, is defined as:

$$S(t) = 1 - F(t) = Prob\,(T \geq t)$$

Finally, the hazard rate is the probability that an individual will experience the event (finding a job) at time *t*, while that individual is at risk of experiencing the event (is currently unemployed). It is defined according to the following equation:

$$\lambda(t) = \frac{f(t)}{S(t)}$$

For each individual, the beginning of their unemployment spell is defined, although it does not always coincide with the start of the observation period. The end of the unemployment spell is only defined for some individuals, as many were still unemployed by October 2019 or were censored. The dataset was pre-processed so that there was a single line per spell, with start and end months, while also accounting for censoring cases. The event of interest, denoting reemployment, was coded as "1", while all other instances were designated as "0". The covariates and predictors used in the previous chapter were incorporated into the survival analysis model to ascertain their influence on the hazard of reemployment. Moreover, the individuals were sorted into 2 groups: one comprising those who participated in the VA program and those who did not; and another consisting of people who desired a different occupation and those who did not. [10]

The survival analysis data and models were characterized and analysed with parametric and non-parametric methods.

ii. Results

This section considers all data points available for each individual's unemployment

[10] The data preprocessing included sorting observations by unique jobseeker identifiers (*UteId*) and chronological time (*AnoMes*). Any incomplete records, indicated by missing *UteId*, were removed to maintain data consistency. Temporal features were extracted from the *AnoMes* variable to create a continuous numeric variable representing the number of months since December 2012 (December 2012 being 1). This enabled precise temporal analysis and consequent discerning of the duration of each unemployment spell.

spells from December 2012 until October 2019, amounting to 153 316 data points. The descriptive statistics are presented in ***Table VII***; however, as they are in all similar to the previous ones, they will not be discussed here. A detailed description may be found in ***Appendix D***.

These data points represent 87 095 individuals, 27 131 of which participated in the VA program in their first spell, and 22 162 who wished to change occupations. Only 3 706 individuals that desired to change career paths, participated in the VA program. 84 694 individuals entered the dataset already unemployed and 67 601 were unemployed on their last observation. About 95.75% of the individuals in the sample were censored, due to either follow-up loss or because they reached the end of the study period without experiencing the event.

During the time frame, about 4.73% transitioned to employment at least once in the observed time frame. The mean unemployment spell duration is 6.91 months. The median unemployment is 0 months, while the third quartile is 7 months. This result shows that the unemployment duration is highly irregular within the sample and tends to be of extremes. Most unemployment spells in the dataset last lasted a few months, which skewed the distribution towards the left; but there are many cases of long-term unemployment. Nonetheless, the many censured observations are certainly influencing this. In ***Appendix E***, you will find a box plot graph and histogram of the duration of the unemployment spells.

First, the data is described using non-parametric methods, as seen in ***Figures I* to *IX***. ***Figures IV to VI*** depict the Nelson-Aalen cumulative hazard rates and ***Figures VII to IX*** the Kaplan-Meier Survival functions. These will be described on ***Appendix D***.

In ***Figure I***, the hazard ratio shows the probability of job placement over time. Given the importance that long-term unemployment takes in the sample, the hazard ratio increases through time. During the first 30 periods, the hazard rate is almost constant at 0.2%, afterwards it increases to roughly 0.35% until de 60^{th} period. By the 70^{th} period, the hazard rate reaches

0.7%. ***Figure II*** compares the job placement probability between those who attended the VA program and those who did not. VA participants consistently show lower probabilities, possibly due to their demographical characteristics and lock-in effects. Notably, the VA participants' hazard rate remains almost constant at 0.1% until period 62nd, where it slightly increases roughly to 0.15%. In ***Figure III***, comparing groups based on desire for a different occupation reveals that those seeking change exhibit higher hazard rates, except during periods 20th to 40th. This is likely due to their younger age and the time needed for re-education and skill acquisition, potentially explaining their higher job placement probabilities later on the observation period.

Moving to parametric methods, the model used was the Cox proportional hazards model. The model follows the equation:

$$\lambda(t|x) = \lambda_0(t) * exp(\beta_0 + \beta_1 Female + \beta_2 Age\_Group_{<29} + \beta_3 Age\_Group_{30-39} + \cdots + \beta_{12} M_i + \beta_{13} VA_1) \quad \text{(VIII)}$$

Where $\lambda(t|x)$ is the hazard rate at time t given the predictor vector x. $\lambda_0(t)$ is the baseline hazard rate, which is the hazard rate when all predictors are equal to zero. This function is unspecified in the Cox model and is estimated non-parametrically. $exp(\beta^t x)$ is the exponential transformation of the linear combination of the predictors and their coefficients. It represents the relative hazard associated with the predictor vector. Finally, $\beta^t X$ represents the linear combination of the predictor variables with their corresponding coefficients, where β is the vector of coefficients estimated by the model, X and is the vector of predictor covariates. The covariates used consider the demographic characteristics of each individual, their participation in the VA program and their desire to change occupations. The results are presented in ***Table VIII***.

VARIABLES	(VIII) Survival Analysis - Cox Proportional Hazard Model
Female	0.206***
	(0.045)

< 29	0.498***
	(0.076)
30-39	0.637***
	(0.074)
40-49	0.479***
	(0.076)
50 + = o,	-
Nationality	0.265***
	(0.052)
Cannot read/write	-0.220
	(0.181)
Read/Write w/school	0.099
	(0.136)
4 years = o,	-
6 years	-0.010
	(0.087)
9 years	-0.105
	(0.082)
11 years	-0.075
	(0.127)
12 years	0.206***
	(0.079)
Post-Secondary Education	1.299***
	(0.340)
Bachelor's Degree	0.286***
	(0.094)
Master's Degree	0.441***
	(0.151)
PhD	-0.457
	(1.002)
Participated in Vida Ativa Program in first spell	-0.892***
	(0.070)
Different Desired Occupation	0.094*
	(0.050)
Observations	62,806

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The results indicate that being female is associated with an increase in the hazard rate by 0.206 as compared to being male, and the effect is statistically significant at 1% threshold. People who were 29 or less, between 30-39 and 40 - 49 showed a significant increase, at 1%, in the risk of finding a job compared to the omitted group (age 50 and above), of 0.498, 0.637

and 0.479, respectively.

Being a foreigner is associated with a statistically significant (at 1%) increase in the hazard rate, by 0.265, which is unexpected. It could perhaps be that foreigners are less selective than natives, meaning that they are more likely to accept whatever opportunity is given. It could also be the case that the Portuguese people in the sample were older than foreigners, positively influencing their likelihood of finding a job.

The different levels of education have varying impacts on the hazard rate. Comparing with people with only 4 years of schooling, only education levels above 12 years present statistically significant and positive influences in the hazard rate. This suggests that more educated people are able to find a job faster. 12 years of education, increases the hazard rate by 0.206; post-secondary education, increases the hazard rate by 1.299; a bachelor's degree increases the hazard rate by 0.286; and a master's degree by 0.441.

Participation in the VA program significantly decreases the hazard rate by 0.892. This could be the results of, on average, older and less educated people participating in the VA, and also of lock-in effects. Having a different desired occupation is associated with a statistically significant increase, at the 10% level, in the hazard rate of 0.094. This is likely capturing the effect of, generally, younger, and more educated people being the ones who most often desire to change occupations.

VII. Discussion of Results

This thesis delved into the participation dynamics and effectiveness of ALMPs, specifically focusing on the *Vida Activa* (VA) program in Portugal. It aimed at understanding who chooses to participate in these programs and whether they are successful in keeping people employed, particularly in the context of individuals seeking career changes.

The study revealed that participation in the VA program was more prevalent among females and older individuals (50 years or above). Conversely, foreigners were less likely to engage,

suggesting barriers or different needs. The effects of education vary depending on the model specification, but, in general, all education levels presented a negative impact on the likelihood of participating in the program, although the magnitude is generally higher for higher education levels. The analysis also highlighted that experience and the relevance of the desired job to previous employment increased the likelihood of participation, while a desire to change occupations negatively impacted it. This suggests that participants primarily seek to enhance their existing skills rather than acquire new ones, underscoring the need for ALMPs that cater to up-skilling rather than re-skilling needs.

The study further explored the effectiveness of the VA program through a survival analysis, revealing interesting insights. Females had a higher hazard rate compared to males, potentially indicating the program's effectiveness in aiding employment. This result is interesting and could indicate that the participation on the VA was effective in helping people find employment. Younger individuals also presented higher hazard rates, with those in the 40-49 and 30-39 age cohorts showing higher rates than those under 29, possibly due to the larger sample size in these groups.

Interestingly, being a foreigner increased the hazard rate, which could be attributed to competition effects, as theorized by Calmfors (1994). The analysis also found that the desire to change occupations had a negative effect on the hazard rate, which is plausible, as these individuals might need to re-skill, a factor not captured.

Despite the VA program's potential benefits, the study found a negative association between participation and the likelihood of finding a job, indicating limited effectiveness in achieving its primary goal. This suggests that while the program may have certain benefits, its overall impact on employment stabilization is questionable. This is also influenced by the predominance of long-term unemployment.

The results underscore the complexity of labour market dynamics and the need for tailored policy interventions. The study's findings highlight the importance of considering demographic factors, educational background, and career aspirations in the design of future ALMPs. Moreover, the mixed results regarding the program's effectiveness underscore the need for further research and more comprehensive data collection to accurately assess the impact of ALMPs on labour market outcomes.

i. Limitations and extensions

The integrity of the previous models and results relies on the randomness of VA assignment and, given the information available, there is no telling if this pre-requisite was respected or not. Additionally, the individuals could participate in other ALMPs that were not accounted for in this dataset. The main limitations faced were the missing values and the loss of observations for individuals. People were free to leave the jobcentre for whichever reason, so there are long periods where there is no record of an individual, and cases where an individual only has a couple of records. Naturally, this greatly constrained the analysis.

Nevertheless, this dataset has potential for extensions. For example, the same analysis could be conducted considering more than the VA program. Alternative extensions that would be insightful and interesting, could try to assess the cost effectiveness of the program (for which there was no data available in the dataset used) and its impact on earnings of the participants.

VIII. Conclusion

To sum up, this thesis sheds light on Active Labor Market Policies (ALMPs) in Portugal during a period of economic crisis and its subsequent recovery. The study focused on the *Vida Activa* program, introduced on 2012, in the third largest job centre in Portugal. The dataset followed individuals from December 2012 until October 2019.

The findings were insightful in understanding the demographic profile of VA participants and if the policy was successful in getting the participants employed. It was found

that VA participants were skewed towards older individuals, particularly those aged 50 and above, and females. Foreigners were less likely to participate in the program. Educational attainment appeared to have a complex relationship with VA participation but, overall, it displayed a negative impact on the likelihood of participating. Desiring a different job showed negative statistically significant effects on the participation of the VA. Experience positively influenced participation and individuals whose desired job closely aligned with their previous occupation were more inclined to participate, suggesting a preference for up-skilling rather than re-skilling. Henceforth, it looks like people may tend to look for AMLPs to improve their skills in an area, rather than go through re-skilling. Nevertheless, the jobcentre may force participation.

From the survival analysis results, females exhibited a higher hazard rate compared to males; younger individuals faced higher hazard rates than older individuals; foreigners were associated with statistically significant increases in the hazard rate, possibly due to competition effects. The participation in the VA program was associated with a negative effect on the likelihood of finding a job, suggesting that lock-in effects affect employment outcomes. And, given the preference for up-skilling rather than re-skilling, the desire to change occupations had a negative impact on the hazard rate. Nevertheless, this analysis was greatly impacted by the predominance of long-term unemployment and the many censored individuals (95.75%).

Finally, this study faces limitations as it depends on the random participation on the VA program, the dataset had considerable missing values and there were other ALMPs not accounted for. Even so, it also presents opportunities for future research, such as exploring the cost-effectiveness of ALMPs and their impact on earnings.

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X. Appendices

Table I

	Different Desired Occupation								
	No			Yes			Total		
	Participated in Vida Ativa Program in first spell			Participated in Vida Ativa Program in first spell			Participated in Vida Ativa Program in first spell		
	No	Yes	Total	No	Yes	Total	No	Yes	Total
	46 454	25 346	71 800	13 489	1 806	15 295	59 943	27 152	87 095
	53.34	29.10	82.44	15.49	2.07	17.56	68.82	31.18	100.00
Gender									
Male	23 077	4 617	27 694	6 453	826	7 279	29 530	5 443	34 973
	49.7%	48.1%	49.4%	47.8%	45.7%	47.6%	49.3%	47.7%	49.0%
Female	23 377	4 977	28 354	7 036	980	8 016	30 413	5 957	36 370
	50.3%	51.9%	50.6%	52.2%	54.3%	52.4%	50.7%	52.3%	51.0%
Age	37.83	42.15	38.57	30.40	35.51	31.00	36.15	41.10	36.94
Age Group									
< 29	14 292	1 812	16 104	8 104	768	8 872	22 396	2 580	24 976
	30.8%	7.1%	22.4%	60.1%	42.5%	58.0%	37.4%	9.5%	28.7%
30-39	12 595	2 191	14 786	2 545	362	2 907	15 140	2 553	17 693
	27.1%	8.6%	20.6%	18.9%	20.0%	19.0%	25.3%	9.4%	20.3%
40-49	10 072	2 468	12 540	1 581	321	1 902	11 653	2 789	14 442
	21.7%	9.7%	17.5%	11.7%	17.8%	12.4%	19.4%	10.3%	16.6%
50 +	9 495	18 875	28 370	1 259	355	1 614	10 754	19 230	29 984
	20.4%	74.5%	39.5%	9.3%	19.7%	10.6%	17.9%	70.8%	34.4%
Nationality									
Portuguese	35 631	8 117	43 748	10 337	1 465	11 802	45 968	9 582	55 550
	76.7%	84.6%	78.1%	76.6%	81.1%	77.2%	76.7%	84.1%	77.9%
Foreigner	10 823	1 477	12 300	3 152	341	3 493	13 975	1 818	15 793
	23.3%	15.4%	21.9%	23.4%	18.9%	22.8%	23.3%	15.9%	22.1%
Schooling	5.45	5.37	5.44	6.19	5.68	6.13	5.62	5.41	5.58

Cannot read/write	887	104	991	155	16	171	1 042	120	1 162
	1.9%	1.1%	1.8%	1.1%	0.9%	1.1%	1.7%	1.1%	1.6%
Read/Write w/school	1 338	179	1 517	199	17	216	1 537	196	1 733
	2.9%	1.9%	2.7%	1.5%	0.9%	1.4%	2.6%	1.7%	2.4%
4 years	6 613	1 756	8 369	876	262	1 138	7 489	2 018	9 507
	14.2%	18.3%	14.9%	6.5%	14.5%	7.4%	12.5%	17.7%	13.3%
6 years	7 234	1 503	8 737	1 643	307	1 950	8 877	1 810	10 687
	15.6%	15.7%	15.6%	12.2%	17.0%	12.7%	14.8%	15.9%	15.0%
9 years	10 896	2 235	13 131	3 066	377	3 443	13 962	2 612	16 574
	23.5%	23.3%	23.4%	22.7%	20.9%	22.5%	23.3%	22.9%	23.2%
11 years	2 341	574	2 915	608	88	696	2 949	662	3 611
	5.0%	6.0%	5.2%	4.5%	4.9%	4.6%	4.9%	5.8%	5.1%
12 years	11 381	2 095	13 476	4 144	465	4 609	15 525	2 560	18 085
	24.5%	21.8%	24.0%	30.7%	25.7%	30.1%	25.9%	22.5%	25.3%
Post-Secondary Education	63	5	68	57	2	59	120	7	127
	0.1%	0.1%	0.1%	0.4%	0.1%	0.4%	0.2%	0.1%	0.2%
Bachelor's Degree	4 911	1 029	5 940	2 104	215	2 319	7 015	1 244	8 259
	10.6%	10.7%	10.6%	15.6%	11.9%	15.2%	11.7%	10.9%	11.6%
Master's Degree	755	109	864	628	56	684	1 383	165	1 548
	1.6%	1.1%	1.5%	4.7%	3.1%	4.5%	2.3%	1.4%	2.2%
PhD	35	5	40	9	1	10	44	6	50
	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
Number of Spells	1.70	1.19	1.52	1.47	1.49	1.47	1.65	1.21	1.51
Length of 1st spell (months)	15.55	30.98	18.26	5.81	18.01	7.25	13.36	28.97	15.91

Regarding the educational attainments, 1.6% of the individuals in the sample cannot read nor write; 2.4% can read and write, but do not have a school degree; 13.3% did 4 years of

school; 15.0% did 6 years of school; 23.2% did 9 years of school; 5.1% did 11 years of school; 23.3% did 12 years of school; 0.2% have a postsecondary education; 11.6% have a bachelor's degree; 2.2% have a master's degree; and 0.1% have a PhD.

Within the people who participated in the VA, 1.1% of the individuals in the sample cannot read nor write; 1.7% can read and write, but do not have a school degree; 17.7% did 4 years of school; 15.9% did 6 years of school; 22.9% did 9 years of school; 5.8% did 11 years of school; 22.5% did 12 years of school; 0.1% have a postsecondary education; 10.9% have a bachelor's degree; 1.5% have a master's degree; and 0.1% have a PhD.

Of those who desired a different job, 1.1% of the individuals in the sample cannot read nor write; 1.4% can read and write, but do not have a school degree; 7.4% did 4 years of school; 12.6% did 6 years of school; 22.5% did 9 years of school; 4.6% did 11 years of school; 30.1% did 12 years of school; 0.4% have a postsecondary education; 15.2% have a bachelor's degree; 4.6% have a master's degree; and 0.1% have a PhD.

i. Appendix A

Table II

	Previous Occupation				
	Armed Forces professionals	Representatives of the legislature and executive bodies, leaders, directors, and executive managers	Specialists in intellectual and scientific activities	Technicians and mid-level professions	Administrative personnel
	26 492 58.45	1 176 2.59	3 685 8.13	5 459 12.04	8 512 18.78
Gender					
Male	5 367 50.0%	736 62.6%	1 598 43.4%	3 281 60.1%	3 008 35.3%
Female	5 373 50.0%	440 37.4%	2 087 56.6%	2 178 39.9%	5 504 64.7%

Age	25.21	45.08	37.92	40.94	38.90
Age Group					
< 29	8 907	85	776	1 026	2 165
	33.6%	7.2%	21.1%	18.8%	25.4%
30-39	843	312	1 505	1 627	2 617
	3.2%	26.5%	40.8%	29.8%	30.7%
40-49	494	334	866	1 372	1 891
	1.9%	28.4%	23.5%	25.1%	22.2%
50 +	16 248	445	538	1 434	1 839
	61.3%	37.8%	14.6%	26.3%	21.6%
Nationality					
Portuguese	8 254	1 121	3 516	5 146	7 776
	76.9%	95.3%	95.4%	94.3%	91.4%
Foreigner	2 486	55	169	313	736
	23.1%	4.7%	4.6%	5.7%	8.6%
Schooling	6.12	7.42	8.60	6.73	6.48
Cannot read/write	216	0	1	4	4
	2.0%	0.0%	0.0%	0.1%	0.0%
Read/Write w/school	201	0	4	4	17
	1.9%	0.0%	0.1%	0.1%	0.2%
4 years	723	40	10	160	261
	6.7%	3.4%	0.3%	2.9%	3.1%
6 years	1 372	46	17	353	591
	12.8%	3.9%	0.5%	6.5%	6.9%
9 years	2 422	146	107	1 057	1 944
	22.6%	12.4%	2.9%	19.4%	22.8%
11 years	482	52	64	408	627
	4.5%	4.4%	1.7%	7.5%	7.4%
12 years	3 005	352	594	2 139	3 606
	28.0%	29.9%	16.1%	39.2%	42.4%
Post-Secondary Education	31	2	19	23	24
	0.3%	0.2%	0.5%	0.4%	0.3%
Bachelor's Degree	1 670	486	2 359	1 191	1 318
	15.5%	41.3%	64.0%	21.8%	15.5%
Master's Degree	612	48	478	114	118
	5.7%	4.1%	13.0%	2.1%	1.4%
PhD	6	4	32	6	2
	0.1%	0.3%	0.9%	0.1%	0.0%

Number of Spells	1.25	1.38	1.48	1.44	1.50
Length of 1st spell (months)	9.99	17.07	13.24	17.96	20.01

Table II

	Previous Occupation				
	Personal service, security and safety workers and salespeople	Farmers and skilled workers in agriculture, fisheries, and forestry	Skilled industrial, construction and craft workers	Plant and machine operators and assembly workers	Unskilled workers
	15 690	472	8 876	2 326	14 407
	37.56	1.13	21.25	5.57	34.49
Gender					
Male	4 244	362	8 300	2 070	6 007
	27.0%	76.7%	93.5%	89.0%	41.7%
Female	11 446	110	576	256	8 400
	73.0%	23.3%	6.5%	11.0%	58.3%
Age	35.07	39.34	44.09	44.00	38.52
Age Group					
< 29	6 627	120	887	246	4 137
	42.2%	25.4%	10.0%	10.6%	28.7%
30-39	3 978	127	2 177	586	3 921
	25.4%	26.9%	24.5%	25.2%	27.2%
40-49	2 603	125	2 833	691	3 233
	16.6%	26.5%	31.9%	29.7%	22.4%
50 +	2 482	100	2 979	803	3 116
	15.8%	21.2%	33.6%	34.5%	21.6%
Nationality					
Portuguese	12 563	264	6 301	1 988	8 621
	80.1%	55.9%	71.0%	85.5%	59.8%
Foreigner	3 127	208	2 575	338	5 786
	19.9%	44.1%	29.0%	14.5%	40.2%
Schooling	5.53	4.07	4.11	4.63	4.47
Cannot read/write	69	33	257	13	565

	0.4%	7.0%	2.9%	0.6%	3.9%
Read/Write w/school	165	30	526	41	745
	1.1%	6.4%	5.9%	1.8%	5.2%
4 years	1 613	128	2 809	527	3 236
	10.3%	27.1%	31.6%	22.7%	22.5%
6 years	2 482	99	2 053	586	3 088
	15.8%	21.0%	23.1%	25.2%	21.4%
9 years	4 715	110	1 933	677	3 463
	30.1%	23.3%	21.8%	29.1%	24.0%
11 years	822	18	349	86	703
	5.2%	3.8%	3.9%	3.7%	4.9%
12 years	4 705	49	894	362	2 379
	30.0%	10.4%	10.1%	15.6%	16.5%
Post-Secondary Education	17	0	3	2	6
	0.1%	0.0%	0.0%	0.1%	0.0%
Bachelor's Degree	955	4	49	29	198
	6.1%	0.8%	0.6%	1.2%	1.4%
Master's Degree	147	1	3	3	24
	0.9%	0.2%	0.0%	0.1%	0.2%
Number of Spells	1.68	1.70	1.72	1.52	1.73
Length of 1st spell (months)	14.67	17.78	19.11	20.48	16.41

The most common occupations across the data are "Unskilled workers" (34.49%), which includes: cleaning workers, fast food preparers and kitchen assistants; followed by "Personal service, security and safety workers and salespeople" (37.56%), travelling assistants and stewards, public transport inspectors, and cashiers and ticket sellers. The least common occupation is "Farmers and skilled workers in agriculture, fisheries, and forestry" (1.13%).

There is a noticeable gender disparity across occupations. Male workers are more prevalent in roles such as "Skilled industrial, construction and craft workers" (93.5%), as painters, facade cleaners, sheet metal workers, preparers and assemblers of metal structures,

metal moulders, welders and forgers, mechanical locksmiths, and "Plant and machine operators and assembly workers" (89.0%), such as assembly workers, locomotive and similar train drivers and drivers of cars, vans, and motorbikes. On the other hand, female workers dominate roles such as "Personal service, security and safety workers and salespeople" (73.0%) and "Unskilled workers" (58.3%).

Age distribution varies across occupations. Workers under 29 years old are most common in "Personal service, security and safety workers and salespeople" (42.2%) and "Unskilled workers" (28.7%). Older age groups are more represented in "Skilled industrial, construction and craft workers" and "Plant and machine operators and assembly workers," suggesting a possible relationship between experience and specific skilled jobs.

Most workers in the provided data are of Portuguese nationality, around 80% or more across most occupational categories. There is a smaller proportion of foreign workers, but they are more represented in occupations such as "Farmers and skilled workers in agriculture, fisheries, and forestry" (44.1%) and "Unskilled workers" (40.2%).

Regarding educational levels, there is a relatively high level of education in "Specialists in intellectual and scientific activities" with 64.0% holding a bachelor's degree, followed by “Representatives of the legislature and executive bodies, leaders, directors, and executive managers” (41.3%). The occupations with the lowest academic education levels are “Skilled industrial, construction and craft workers” (0.6%) and “Farmers and skilled workers in agriculture, fisheries, and forestry” (0.8%).

The average number of unemployment spells varies slightly across different occupations, with a general range between 1.25 and 1.73 spells. The occupations with the highest number of unemployment spells are “Unskilled workers”, followed by “Skilled industrial, construction and craft workers”. The occupations with the smallest number of unemployment spells are “Armed Forces professionals”, followed by “Representatives of the

legislature and executive bodies, leaders, directors, and executive managers".

The average length of the first unemployment spell also varies, with occupations such as are "Armed Forces professionals" (9.99 months) and "Specialists in intellectual and scientific activities" (13.24 months) workers having a shorter average spell compared to other occupations. "Plant and machine operators and assembly workers" and "Administrative personnel" are the occupation with the longest unemployment spell with 20.48 and 20.01 months.

ii. Appendix B

The most desired jobs by those who wanted to change occupations were General office worker (6.74%), Shop assistants (6.50%), Cleaning workers in private homes (5.56%), Food counter assistants (4.32%), Fast food preparers (3.66%), Supply and warehouse clerks (3.60%), Unskilled goods loaders and unloaders (2.83%), Childcare assistants (2.73%), Light car, taxi and van drivers (2.38%) and Cashiers and ticket sellers (2.22). And for those who wanted to change jobs and participated in the VA program in their first unemployment spell the most desired occupations were: General office worker (9.19%), Shop assistants (6.07%), Supply and warehouse clerks (4.51%), Cleaning workers in private homes (4.33%), Childcare assistants (4.16%), Food counter assistants (3.47%), Couriers, baggage handlers and distributors (3.12%), Fast food preparer (2.95%), Cashiers and ticket sellers (2.60%) and Light car, taxi and van drivers (2.60%).

iii. Appendix C

Table IV

The following models consider specific cases, such as being a female with higher education (a bachelor's degree or more), being a young female (less than 29 years old) and substituting age by experience, a proxy variable obtained by: $Exp = Age - 6 - Schooling\ years$.

$$VA_i = \alpha M_i + \beta X_i + + \delta prev\_job_i + \gamma fem\_lic_i + \vartheta fem\_mast_i + \rho fem\_phd_i + \varepsilon_i \text{ (IV)}$$

$$VA_i = \alpha M_i + \beta X_i + + \delta prev\_job_i + \tau fem\_young_i + \varepsilon_i \text{ (V)}$$

$$VA_i = \alpha M_i + \beta X_i + + \delta prev\_job_i + \varphi exp_i + \varepsilon_i \text{ (VI)}$$

VARIABLES	(IV) Participated in Vida Ativa Program in first spell	(V) Participated in Vida Ativa Program in first spell	(VI) Participated in Vida Ativa Program in first spell
Different Desired Occupation	-0.039***	-0.039***	-0.037***
	(0.005)	(0.005)	(0.005)
Female	0.023***	0.017**	0.019***
	(0.007)	(0.008)	(0.006)
< 29	-0.142***	-0.146***	
	(0.009)	(0.010)	
30-39	-0.117***	-0.117***	
	(0.009)	(0.009)	
40-49	-0.082***	-0.082***	
	(0.009)	(0.009)	
50 + = o,	-	-	
Foreigner	-0.026***	-0.026***	
	(0.006)	(0.006)	
Cannot read/write	-0.143***	-0.142***	-0.158***
	(0.018)	(0.018)	(0.018)
Read/Write w/school	-0.128***	-0.128***	-0.136***
	(0.017)	(0.017)	(0.017)
PhD	-0.211***	-0.198***	-0.151***
	(0.032)	(0.051)	(0.051)
6 years	-0.019	-0.019	-0.015
	(0.012)	(0.012)	(0.012)
9 years	-0.039***	-0.040***	-0.030***
	(0.011)	(0.011)	(0.011)
11 years	-0.017	-0.017	-0.005
	(0.015)	(0.015)	(0.016)
12 years	-0.050***	-0.050***	-0.035***
	(0.011)	(0.011)	(0.012)
Post-Secondary Education	-0.137***	-0.137***	-0.115***
	(0.030)	(0.030)	(0.031)
Bachelor's Degree	-0.061***	-0.076***	-0.051***
	(0.017)	(0.014)	(0.014)
Master's Degree	-0.101***	-0.083***	-0.051***
	(0.025)	(0.019)	(0.020)
4 years = o,	-	-	-
Females with a bachelor's degree	-0.024		
	(0.015)		

Females with a master's degree	0.028		
	(0.028)		
Females with a PhD	0.029		
	(0.094)		
Females with less than 29 years		0.007	
		(0.010)	
Experience			0.004***
			(0.000)
Constant	0.297***	0.300***	0.071***
	(0.011)	(0.011)	(0.014)
Observations	20,994	20,994	20,994
R-squared	0.065	0.065	0.064

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

The fourth model aimed at exploring the influence of gender and educational attainment on individuals' participation in the Vida Ativa (VA) Program during their initial spell of unemployment.

As before, individuals that expressed a desire to change occupations are significantly less likely to participate in the VA Program (-3.9%). Being female is associated with a 2.3% higher likelihood of participation in the program.

Consistent with previous models, younger age categories (<29, 30-39, 40-49) exhibit a negative association with VA Program participation, with the oldest age cohort serving as the reference category. Foreign individuals continue to exhibit a lower likelihood of participating in the program (-2.6%).

Higher levels of education are associated with a decreased likelihood of participating in the VA Program. Specifically, coefficients for bachelor's degree, master's degree, and PhD are all negative (-6.1%, -10.1% and -2.11%, respectively) indicating a diminishing likelihood of participation as educational attainment increases.

The coefficients for females with different levels of education (bachelor's, master's, PhD) do not exhibit statistically significant associations with VA Program participation, as evidenced by their high p-values.

The fifth model goal is to extract the effect of being a young female on individuals' participation in the Vida Ativa (VA) Program during their initial spell of unemployment. The results are consistent with the previous ones.

The desire to change occupations is associated with a 3.9% lower likelihood of participate in the VA Program. Foreign nationality and higher levels of education are associated with a decreased likelihood of participating in the VA Program. Females, overall, are more likely to participate in the program and younger people (under 29 years) are statistically more likely not to participate in the VA program. Interestingly, the interaction term for females below the age of 29 has a positive coefficient (0.7%), although it is not statistically significant.

The sixth model considers experience instead of age, as it is likely that more experienced individuals have different motivations or barriers to program participation. Once more, the results are consistent and fairly similar to the previous ones. A different desired occupation, foreign nationality, lower educational attainment, and higher levels of education are associated with a decreased likelihood of participating in the VA Program. While females are statistically more likely to participate.

The experience variable indicates that individuals with more years of experience are 0.004 more likely to participate in the VA Program. The result is statistically significant at 1% significance level. This suggests that as individuals gain more work experience, they perceive the program as a valuable resource for career development or reintegration into the labour market.

Table V

Considering now the variable closeness to desired job ("*prox_prof*")", that takes value 1 if the Sub-Group is the same in the previous and in the desired occupation; and 0 otherwise. The model to assert the influence it asserts on the VA program is:

$$VA_i = \alpha M_i + \gamma prox\_prof_i + \beta X_i + + \delta prev\_job_i + \varepsilon_i \quad \text{(VII)}$$

VARIABLES	(VII) Participated in Vida Ativa Program in first spell
Different Desired Occupation	-0.019
	(0.020)
Closeness to desired job	0.021
	(0.020)
Female	0.020***
	(0.006)
< 29	-0.142***
	(0.009)
30-39	-0.117***
	(0.009)
40-49	-0.082***
	(0.009)
50 + = o,	-
Foreigner	-0.026***
	(0.006)
Cannot read/write	-0.143***
	(0.018)
Read/Write w/school	-0.128***
	(0.017)
PhD	-0.198***
	(0.051)
6 years	-0.019
	(0.012)
9 years	-0.039***
	(0.011)
11 years	-0.017
	(0.015)
12 years	-0.050***
	(0.011)
Post-Secondary Education	-0.137***
	(0.030)
Bachelor's Degree	-0.075***
	(0.014)
Master's Degree	-0.082***
	(0.019)
4 years = o,	-
Constant	0.277***
	(0.023)
Observations	20,994
R-squared	0.065

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

This model aims to understand how closely aligned the desired job is to the individual's previous occupation and how this proximity influences participation in the Vida Ativa (VA)

Program.

The results for Closeness to desired job suggests that individuals whose desired job closely aligns with their previous occupation are significantly 2.1% more likely to participate in the VA Program. Although, this result is not significant at any conventional level, this suggests that individuals seeking a job change that requires minimal re-learning are more inclined to participate in the program.

All other results are consistent with previous models. Females are statistically more likely to participate in the program, lower levels of educational attainment (e.g., inability to read/write, lower schooling years) are associated with a decreased likelihood of participating in the VA Program. Interestingly, having a PhD also decreases the likelihood of participation, suggesting potential career stability or alternative opportunities for highly educated individuals. The only modification is that a different desired occupation, although still negative, is not statistically significant.

iv. Appendix D

Table VI

	Participated in Vida Ativa Program in first spell								
	No			Yes			Total		
	Different Desired Occupation			Different Desired Occupation			Different Desired Occupation		
	No	Yes	Total	No	Yes	Total	No	Yes	Total
	41 487	18 456	59 943	23 446	3 706	27 152	64 933	22 162	87 095
	47.63	21.19	68.82	26.92	4.26	31.18	74.55	25.45	100.00
Gender									
Male	20 551	8 924	29 475	3 858	1 699	5 557	24 409	10 623	35 032
	49.7%	48.4%	49.3%	48.5%	45.8%	47.6%	49.5%	47.9 %	49.0%
Female	20 825	9 532	30 357	4 101	2 007	6 108	24 926	11 539	36 465
	50.3%	51.6%	50.7%	51.5%	54.2%	52.4%	50.5%	52.1 %	51.0%
Age	38.79	32.81	36.95	44.09	38.24	42.23	39.65	33.72	37.81

Age Group									
< 29	11 618	9 461	21 079	1 200	1 219	2 419	12 818	10 680	23 498
	28.0%	51.3%	35.2%	5.1%	32.9%	8.9%	19.7%	48.2 %	27.0%
30-39	11 286	3 966	15 252	1 738	823	2 561	13 024	4 789	17 813
	27.2%	21.5%	25.4%	7.4%	22.2%	9.4%	20.1%	21.6 %	20.5%
40-49	9 192	2 660	11 852	1 999	779	2 778	11 191	3 439	14 630
	22.2%	14.4%	19.8%	8.5%	21.0%	10.2%	17.2%	15.5 %	16.8%
50 +	9 391	2 369	11 760	18 509	885	19 394	27 900	3 254	31 154
	22.6%	12.8%	19.6%	78.9%	23.9%	71.4%	43.0%	14.7 %	35.8%
Nationality									
Portuguese	32 188	14 387	46 575	6 813	3 090	9 903	39 001	17 477	56 478
	77.8%	78.0%	77.8%	85.6%	83.4%	84.9%	79.1%	78.9 %	79.0%
Foreigner	9 188	4 069	13 257	1 146	616	1 762	10 334	4 685	15 019
	22.2%	22.0%	22.2%	14.4%	16.6%	15.1%	20.9%	21.1 %	21.0%
Schooling	5.47	6.01	5.63	5.38	5.55	5.43	5.45	5.93	5.60
Cannot read/write	741	263	1 004	60	47	107	801	310	1 111
	1.8%	1.4%	1.7%	0.8%	1.3%	0.9%	1.6%	1.4%	1.6%
Read/Write w/school	1 246	460	1 706	216	98	314	1 462	558	2 020
	3.0%	2.5%	2.9%	2.7%	2.6%	2.7%	3.0%	2.5%	2.8%
4 years = o,	5 794	1 612	7 406	1 374	599	1 973	7 168	2 211	9 379
	14.0%	8.7%	12.4%	17.3%	16.2%	16.9%	14.5%	10.0 %	13.1%
6 years	6 404	2 344	8 748	1 257	560	1 817	7 661	2 904	10 565
	15.5%	12.7%	14.6%	15.8%	15.1%	15.6%	15.5%	13.1 %	14.8%
9 years	9 653	4 106	13 759	1 833	796	2 629	11 486	4 902	16 388
	23.3%	22.2%	23.0%	23.0%	21.5%	22.5%	23.3%	22.1 %	22.9%
11 years	2 042	773	2 815	461	157	618	2 503	930	3 433
	4.9%	4.2%	4.7%	5.8%	4.2%	5.3%	5.1%	4.2%	4.8%
12 years	10 357	5 286	15 643	1 840	890	2 730	12 197	6 176	18 373
	25.0%	28.6%	26.1%	23.1%	24.0%	23.4%	24.7%	27.9 %	25.7%
Post-Secondary Education	60	60	120	4	2	6	64	62	126
	0.1%	0.3%	0.2%	0.1%	0.1%	0.1%	0.1%	0.3%	0.2%

Bachelor's Degree	4 376	2 710	7 086	813	457	1 270	5 189	3 167	8 356
	10.6%	14.7%	11.8%	10.2%	12.3%	10.9%	10.5%	14.3 %	11.7%
Master's Degree	667	830	1 497	96	100	196	763	930	1 693
	1.6%	4.5%	2.5%	1.2%	2.7%	1.7%	1.5%	4.2%	2.4%
PhD	36	12	48	5	0	5	41	12	53
	0.1%	0.1%	0.1%	0.1%	0.0%	0.0%	0.1%	0.1%	0.1%
Number of unemployment spells	1.63	1.68	1.65	1.16	1.52	1.21	1.46	1.65	1.51
Length of 1st spell (months)	15.05	10.68	13.71	29.40	26.47	28.47	17.37	13.32	16.12

In the beginning of the observation period, 35 032 individuals were male (49%) and 36 465 were female (50%). 47.6% of the VA participants were male and 52.4% were female. 47.9% of those who wanted to change jobs were male and 52.1% were female.

The average age was 37.81 years. Those who participate in the VA program in their first unemployment spell were, on average, 42.23 years, and those who desired different occupations, 32.72 years. 27.0% of the individuals in the sample had less than 29 years, 20.5% were in the 30 to 39 years interval, 16.8% were between 40 and 49 years old, and 35.8% were 50 years or more. Of those who participated in the VA program, 8.9% were 29 years old or less, 9.4% were between 30 and 39 years old, 10.2% were between 40 and 49 years old, and 71.4% were 50 years old or more. From those who desired to change occupations, 48.2% were 29 years old or less, 21.6% were in the 30 to 39 years of age interval, 15.5% were between 40 and 49 years old, and 14.7% were 50 or more.

79% were Portuguese and 21% foreigners. 84.9% of the people who participated in the VA in their first unemployment spell were Portuguese and 15.1% were from other nationalities. 78.9% of those who desired a different career path were Portuguese and 21.1% foreigners.

The average schooling of the sample was 5.60 years, 5.43 for those who participated in

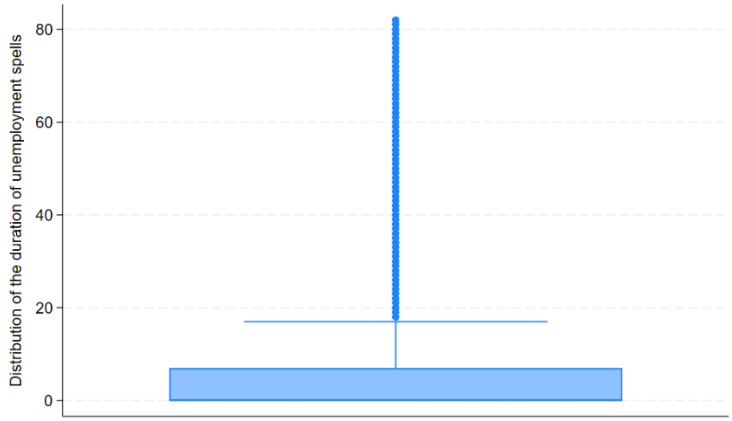
the VA program and 5.93 for those who wanted to change jobs. In the sample, 1.6% of the people could not read nor write, 2.8% could read and write, but had no formal education, 13.1% had 4 years of schooling, 14.8% had 6 years of schooling, 22.9% 9 years of formal education, 4.8% 11 years of schooling, 25.7% 12 years of formal education, 0.2% had Post-Secondary Education, 11.7% had a bachelor's degree, 2.4% had a master's degree and 0.1% held a doctorate degree.

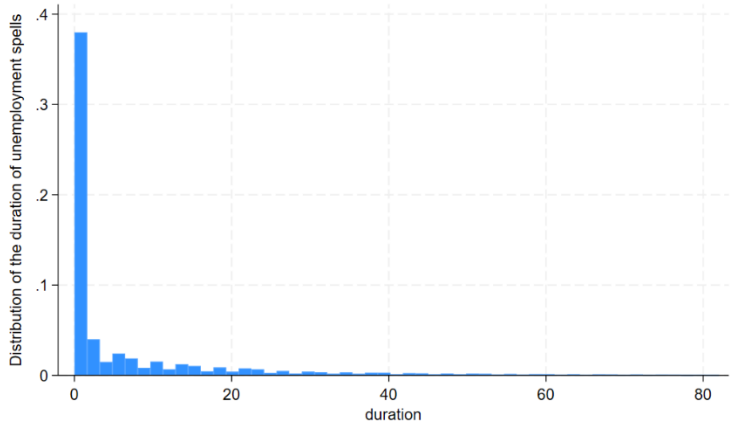
From those who participated in the VA in their first spell, 0.9% of the people could not read nor write, 2.7% could read and write, but had no formal education, 16.9% had 4 years of schooling, 15.6% had 6 years of schooling, 22.5% 9 years of formal education, 5.3% 11 years of schooling, 23.4% 12 years of formal education, 0.1% had Post-Secondary Education, 10.9% had a bachelor's degree, 1.7% had a master's degree and 0.0% held a doctorate degree.

In the group that wanted to change occupation, 1.4% of the people could not read nor write, 2.5% could read and write, but had no formal education, 10.0% had 4 years of schooling, 13.1% had 6 years of schooling, 22.1% 9 years of formal education, 4.2% 11 years of schooling, 27.9% 12 years of formal education, 0.3% had Post-Secondary Education, 14.3% had a bachelor's degree, 4.2% had a master's degree and 0.1% held a doctorate degree.

The average number of unemployment spells was 1.51, 1.21 for those who participated in the VA program and 1.65 for those who desired different jobs. The average length of the first unemployment spell was 16.12 months, 28.47 months for those who participated in the VA program, and 13.32 months for those who wanted to change occupations. This indicates lock-in effects.

iv. Appendix D





v. Appendix E

Figure I

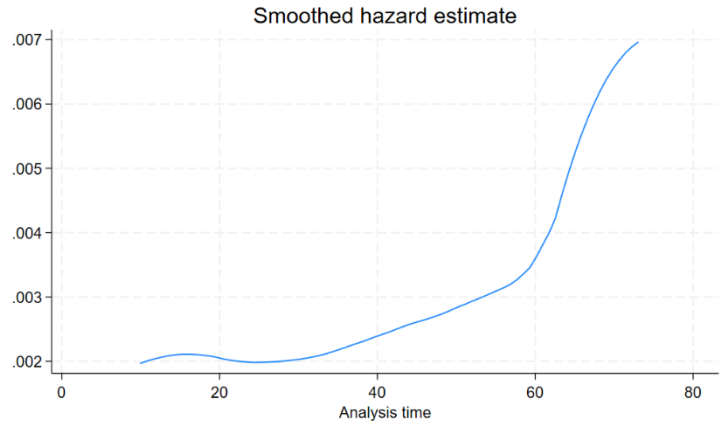


Figure II

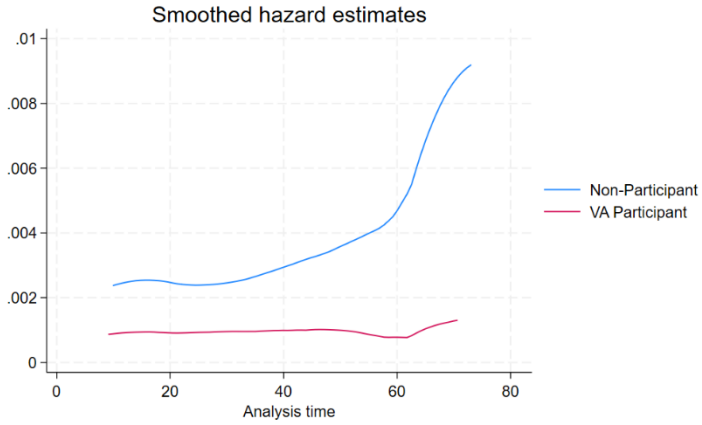


Figure III

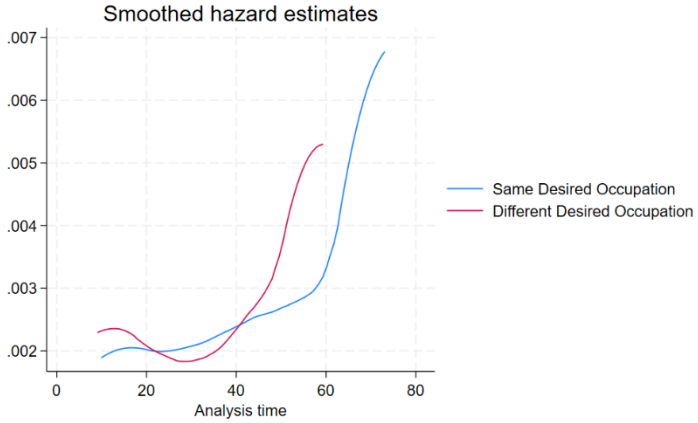


Figure IV

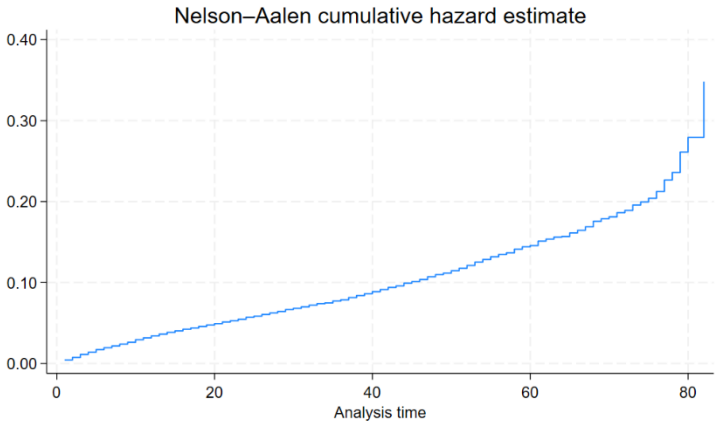


Figure V

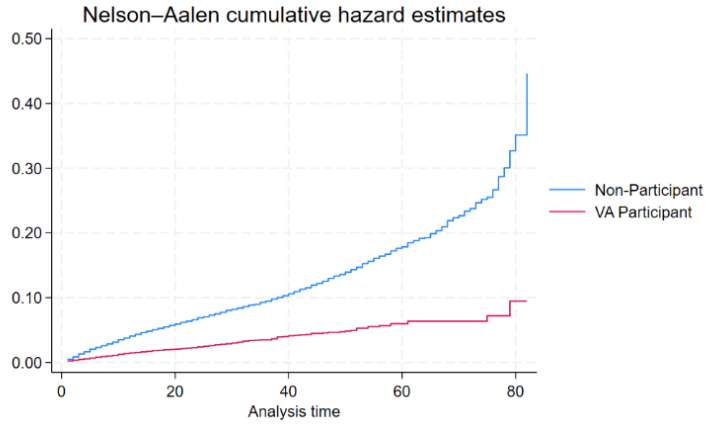
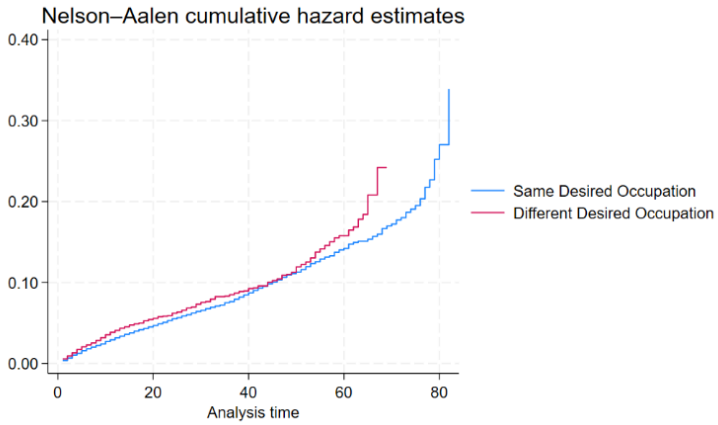


Figure VI



In ***figures IV to VII***, the Nelson-Aalen cumulative hazard rates are presented, the first presenting the general case of this sample, and the other two comparing the groups previously mentioned. The Nelson-Aalen cumulative hazard function estimates the cumulative hazard rate over time. It represents the accumulated risk of the event of interest (i.e., job placement) up to a given point in time. It considers both the occurrence of events and censoring (i.e., individuals who are still under observation without experiencing the event).

For the VA participants, the Nelson-Aalen cumulative hazard rates are always lower than for the comparison group and increase much slower. In fact, for VA participants the survival probability at time 83 is roughly 90%, which means that the probability of finding a

job is 10%, by the end of the observation period.

For the people who wanted to change jobs, the Nelson-Aalen cumulative hazard rates are always higher than for the comparison group but increase in similar ways. By the end of the observation period, the probability of finding a job is about 25%. Those values compare with the base line case where, by October 2019, the probability of finding employment if roughly 35%.

Figure VII

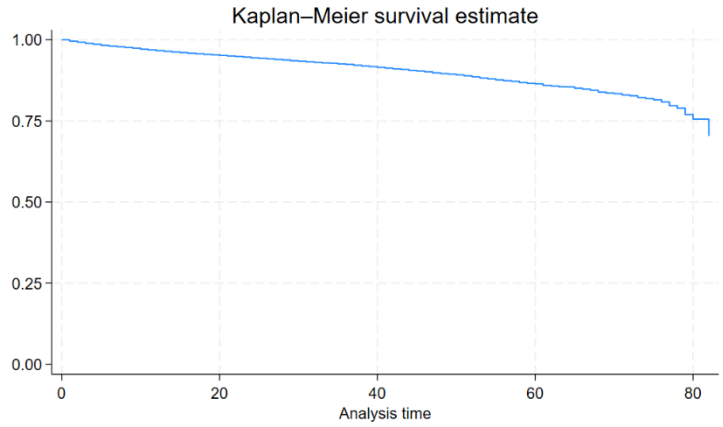


Figure VIII

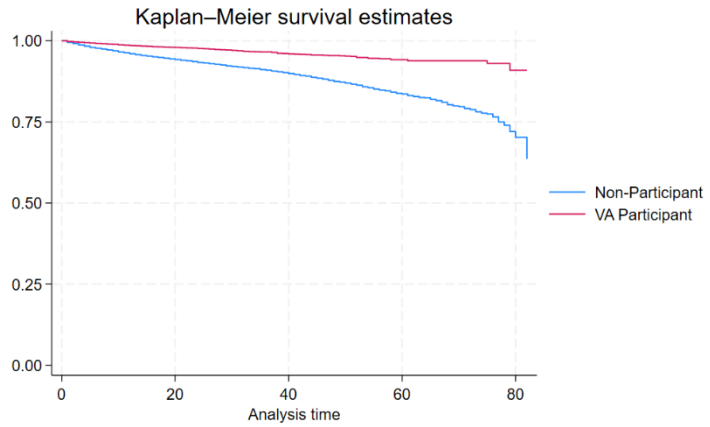
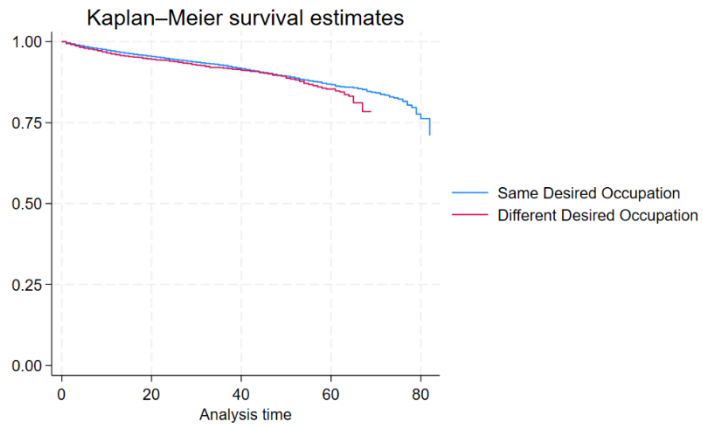


Figure IX



The Kaplan-Meier estimator is a non-parametric method used in survival analysis to estimate the probability of surviving (not experiencing the event of interest) up to a certain time**.** ***Figures VII to IX***, present the Kaplan-Meier survival estimates from the base line case and comparing the two groups. The Kaplan-Meier survival estimates between participants in the VA those who wanted to change occupations and those who did not, are always higher than the estimates for the base line case. The most striking case is for people who wanted a different occupation, as it clearly shows that the probability of survival (not finding a job) is higher than for those who did not want to change occupations.

Overall, at the end of the observation period, the probability of finding a job is 30%. For those who participated in the VA in their first unemployment spell survived is about 80%, which means, the probability of finding a job by that time is about 20%. For the people who wanted to change careers, the probability of finding employment is about 25%, which is only slightly inferior to the probability of finding a job for the people who wanted the same occupation (30%).