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Later Retirement and the Labor Market Re-Integration of Elderly Unemployed Workers

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Abstract

This paper studies the impact of raising the eligibility age of early retirement on the re-integration into the labor market of elderly unemployed workers. I exploit two Austrian pension reforms increasing the early retirement age step-wise for different quarter-of-birth cohorts. Empirical results based on Austrian administrative data reveal a substantial gender difference in how unemployed workers are affected by the policy change. While unemployed women only benefit little with shorter unemployment duration, modest higher re-employment probability as well as labor income after unemployment, unemployed men benefit in several aspects: although unemployment duration remains unaffected, re-employment chances, labor income and participation in active labor market policies significantly increase. Elderly unemployed workers closer to their early retirement age are systematically assigned to programs increasing their job application and job search skills, while workers more than five years away from their early retirement age are more likely to participate in programs increasing their skills. The gender difference may be explained by the nature of the pension reforms. From a policy perspective, these results suggest that increasing the early retirement age is not only a feasible way to improve the financial sustainability of public pension systems but also improves the re-integration of elderly unemployed male workers.

JEL Classification: J14, J26, J68
Keywords: pension reform, early retirement, active labor market policies, unemployment

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1 Introduction

A lot of societies face a demographic transition to an increasing share of older people in the population. This particularly challenges the financial sustainability of public pension systems. As a response, governments react with policies and reforms to raise the participation in the labor market of elderly workers. Such policy changes focus on offering financial incentives for longer employment or raising the eligibility age of (early) retirement. These policies, however, primarily affect a rather vulnerable group of workers with less promising labor market perspectives; the labor market participation rate of workers above 55 among OECD countries is only 73% for men as compared to 90.1% of prime-age workers in 2018. This paper uses data from Austria, where the labor participation rate of elderly workers of 63.5% is substantially below OECD average and these workers are particularly affected by long-term unemployment.[1]

The re-integration of unemployed elderly workers is challenging. Ichino et al. (2017) report that elderly workers also face a higher probability of a transition to early retirement in particular when they are unemployed. In this context, it is important to study and understand how raises in the (early) retirement age affect these workers. Theoretically, there are two obvious channels through which such a policy reform could affect employment prospects of elderly unemployed workers. First, Hairault et al. (2010) argue that the probability of older workers' employment is affected by the distance to retirement. A raise in the eligibility age of early retirement extends the expected time to retirement and could therefore support the re-integration of unemployed workers. Second, retirement reforms may increase the returns to (on-the-job) training for elderly workers. Standard neo-classical human capital theory would predict that later early retirement should have positive effects on human capital formation because the period in which benefits from human capital investments may materialize, is longer (Becker, 1975). Less surprisingly, training of older workers is often promoted as a policy to keep older workers employed or bring them out of unemployment (Mayhew and Rijkers, 2004).

This paper directly connects to these two channels. I study how raising the eligibility age of early retirement affects unemployment duration, the re-integration on the labor market and the participation in active labor market policies (ALMP) as a potential mechanism. I exploit a natural experiment in the Austrian pension system as an exogenous variation in early retirement age. In two pension reforms, the eligibility age of early retirement was increased stepwise for different quarter-of-birth cohorts from 60 to 65 for men and 55 to 60 for women. I use comprehensive social security data and detailed data on active la-

[1] Data from the Austrian Public Labor Agency (AMS) show that the average unemployment duration for male workers aged 30-34, for example, is 122 days in comparison to 197 days of workers aged 55-59.

bor market policy participation of unemployed people in Austria between 2000 and 2013. Based on a sample of unemployed workers due to plant closures and mass layoffs I find a significant gender gap in how workers are affected by a raise in the early retirement age. While unemployment duration is unaffected for men and lower for women, men benefit from an enforced later retirement in terms of larger re-employment probabilities and better subsequent job quality (measured by days in employment and labor income after unemployment) as compared to women. In terms of participation in active labor market policies (ALMP), men are more likely to be assigned to training programs, which primarily focus on improving job search/application skills rather than job qualification trainings. The latter effect is, however, not homogenous for all workers. There are no such effects observable for women.

This paper contributes to several strands in the literature. First, it relates to the extensive economic literature on the labor market effects of pension reforms. These studies find – consistently across countries and nature of pension reforms – positive employment effects as a response to retirement policies which restrict access to (early) retirement or reduce financial incentives for earlier retirement.[2]

Second, the paper contributes to the literature on unemployment, job displacement and retirement decisions. Ichino et al. (2017), Hairault et al. (2010) or Marmora and Ritter (2015) document that unemployment of elderly workers affects retirement timing and re-employment probabilities. Using the Regional Extended Benefits Program in Austria, Inderbitzin et al. (2016) show that extending unemployment insurance for older workers generates a substantial increase in the incidence of early retirement. Tatsiramos (2010) shows that in countries with more generous unemployment insurance provisions for older unemployed workers including a pathway to early retirement, displaced older workers have lower re-employment and higher retirement rates.

Finally, the paper also supplements the strand of literature about training and older workers' employment. To avoid skill obsolescence of older workers, investment in training is recognised as an important element to the benefit of workers and employers (Picchio, 2015). Particularly the ongoing fast technological progress prevalent in many sectors

[2]For Germany, Engels et al. (2017) and Hanel (2010) exploit raises in the NRA and actuarial deductions and find significant postponement of retirement and no substitution into unemployment. For Austria, Staubli and Zweimüller (2013) and Manoli and Weber (2016) show substantial labor supply effects as a response to increases in the eligibility age of early retirement. Mastrobuoni (2009) for the US and Cribb et al. (2016) for the UK document an increase in the mean retirement age and employment rate following increases in the eligibility age for retirement, Hanel and Riphahn (2012) for Switzerland and Hernaes et al. (2016) for Norway find positive labor supply effects due to changes of financial incentives. Vestad (2013) shows that a reduction in the lower age limit leads to earlier retirement and generates substantial costs.

makes training of the older workforce a useful policy. Existing studies focus on employed workers and on-the-job training, which is typically (partly) funded by employers, and find positive effects on older workers' employment (e.g. Belloni et al. (2015), Picchio and van Ours (2013), Berg et al. (2017)).[3] Only a few papers study the relationship between (early) retirement institutions and on-the-job training of employed workers: Fouarge and Schils (2009) show that generous early retirement schemes discourage older workers from taking part in training, while more flexible schemes encourage. Brunello and Comi (2015) show that an increase in the minimum retirement age in Italy substantially increased training participation by private sector employees aged 40-54. Montizaan et al. (2010) exploit a Dutch pension reform reducing pension rights and find significant increases in training course participation among older employees in large organizations. However, there is no study so far looking at re-training of unemployed workers and – closely related – for publicly funded training programs.

The contribution of this paper is therefore twofold: it is the first paper to study the effect of a pension reform on unemployed elderly workers, and shows how raising the eligibility age of early retirement affects the re-integration of these workers in terms of employment and job quality. Second, this paper also considers a potential mechanism for re-integration into the labor market and provides first evidence on whether public labor market institutions react to pension reforms and adapt their policies to improve skill set of workers and re-employ elderly workers. Thus the paper also complements the literature on on-the-job training by studying training participation of unemployed workers in publicly funded training programs.

The paper is organized as follows: Section 2 provides an overview of the institutional background in Austria and describes the pension reforms implemented in Austria. Section 3 presents the empirical model, data and descriptive statistics, Section 4 summarizes the empirical findings and results from a heterogeneity analysis, and Section 5 concludes.

2 Institutional background

The Austrian pension system The public pension system in Austria covers all private-sector workers and provides early retirement, old-age and disability pensions, and is by far the most important pillar in old-age financial provision for retirees in Austria. The pension depends on the number of insurance months collected during one's working life

[3]However, there is no evidence that specific training for old employees is associated with higher relative productivity of these employees (Göbel and Zwick, 2013) and mixed evidence regarding the training wage premium (Belloni and Villosio, 2015). Zhang et al. (2020) show that on-the-job training has a significantly positive effects on job match quality. Stenberg et al. (2012) look at more general adult schooling and find no effects on the timing of retirement.

and income histories. For most individuals in the sample the assessment base of the pension is based on the 15 best annual earnings years.[4]

Austria is associated with a low labor force participation of elderly workers: although the statutory retirement age is 65 for men and 60 for women, the factual retirement age including disability pensions for men (women) in 2018 is 61.3 (59.3) years. An important factor for the gap between statutory and factual retirement age for men is disability. Without disability pensions, average retirement age of men is 63.5 years in 2018. Access to disability pension requires a medical examination to assess the degree of physical or mental health impairments[5]. In 2018 approximately 14% of all accepted pension claims are disability pensions, of which a third is due to psychiatric problems (e.g. burn-out) (Hauptverband, 2019). Particularly among blue-collar workers, almost a third leaves the labor market through disability pensions (Frimmel et al., 2018).

At the same time, the Austrian public pension system offers a generous gross pension replacement rate of 76.5% in 2018 as compared to the OECD average of 49% (in 2018) (OECD, 2019), and has long been criticised as actuarially unfair (e.g. Hofer and Koman (2006) or Hanappi (2012)). To smooth the transition into retirement, the Austrian government introduced partial retirement schemes for older employees in the early 2000s, where the working time reductions of elderly workers are subsidized. Also employers influence their workers' behavior by offering special severance payments (i.e., golden handshakes) to workers for earlier job exits if wage costs of older workers are too high (Frimmel et al., 2018).

Pension reforms To ensure the fiscal sustainability of the public pension system, the Austrian government implemented several pension reforms during the sample period of 2000–2013. This paper focuses on the two pension reforms in 2000 and 2003. Later reforms affect older workers in the sample only marginally given the typically long transition periods of implementation of reforms.

The key element of the reforms in 2000 and 2003 is the gradual increase in the eligibility age for early retirement.[6] The first reform increased eligibility age from 60 to 61.5 for men, and from 55 to 56.5 for women. This raise was implemented stepwise for different birth-quarter cohorts.[7] More precisely, men born before October 1940 were still eligible for early retirement at the age of 60, whereas for men born in the fourth quarter of 1940,

[4] In 2004, the system gradually changed to a pension account system, which considers lifetime income.

[5] Disability pensions are granted for 2 years but can be extended in case of ongoing reduced work capacities. Practically, a return to the labor market of older workers after a disability pension was once granted, is extremely rare.

[6] Further relevant changes on account of the reforms included a stepwise extension of the assessment base, from the best 15 earning years to lifetime earnings and increased penalties for early retirement, from 2% to 4% of the pension per year (capped at 10%).

[7] Note that the step-wise increase for birth cohorts was implemented for all cohorts at the same time in 2000 and 2004 respectively.

the eligibility age was increased by two months. For every subsequent birth quarter, the eligibility age was raised until the total increase of 1.5 years was reached. The same stepwise increase applies to women, where women born after September 1945 had a two-month higher eligibility age than women born before. The second reform in 2003, further increased the eligibility age for early retirement, from 61.5 to 65 years for men and from 56.5 to 60 years for women, via a similar stepwise increase for each birth-quarter cohort. Figure 1 shows the development of the early retirement age over birth quarters, for men and women. Workers with at least 40 social insurance years were allowed to retire at age 62 via the so-called corridor pension. Thus, the gradual increase in early retirement age for men is practically capped at age 62 (see horizontal red line in figure 1). Also men (women) with more than 45 (40) insurance years, or workers with heavy labor were exempted from the reform and remained at age 60 (55) as the earliest possible retirement age.

The effect of the reform on employment, unemployment and retirement is illustrated in Figure 2 where I compare workers of three different birth cohorts, each associated with a one-year difference in the eligibility age of early retirement, ranging from 60 to 62 for men, and 55 to 57 for women. For both, men and women, I consistently find a shift with the eligibility age to a higher share in employment during the extended working age period (see sub-figures (a) and (b)), e.g. men with an eligibility age of 61 have a higher employment rate between 60 and 61 as compared to the cohort with the unchanged eligibility age of 60. A very similar pattern can be observed for the share of unemployed workers (sub-figures (c) and (d)) as well as the share of retired workers (sub-figures (e) and (f)). Sub-figures (c) and (d) also suggest that the reform might lead to increased unemployment during the extended working life period, but there is no – descriptive – evidence that later cohorts are associated with a different unemployment risk before the age of 60. Generally, all three cohorts show identical trends and shares in employment, unemployment and retirement before the original eligibility age of early retirement of 60 and 55, respectively.

This graphical evidence is more thoroughly discussed in Staubli and Zweimüller (2013) and Manoli and Weber (2016). Staubli and Zweimüller (2013) find that the increase in the early-retirement eligibility age increased employment by 9.75 percentage points for men and 11 percentage points for women. The reforms generated substantial spillovers on the unemployment insurance program but not on disability pensions. Using a regression-kink design and a slightly different sample of more labor market attached workers, Manoli and Weber (2016) find that a one-year increase in the early retirement age increased the average job exit age by 0.4 years.

The Austrian unemployment insurance system The Austrian public unemployment insurance offers a universal coverage for unemployment benefits for all private-sector em-

ployees and apprentices.[8] The system is financed by withholding 3 percent of income from employers and 0-3 percent from employees (depending on their income). In case of unemployment, workers receive unemployment benefits which amount to 55-60 percent of prior net income plus possible additional payments for family members. The duration for receiving unemployment benefits depends on age and collected social insurance years; generally, unemployment benefits are granted for 20 weeks, which increases to 30 weeks in case of 156 collected social insurance weeks. Unemployed workers older than 40 years with 312 weeks of social insurance within the last 10 years receive unemployment benefits for 39 weeks. For unemployed workers above 50 and 468 weeks of social insurance during the last 15 years, unemployment benefits duration is extended to 52 weeks. The duration may also be extended for rehabilitation purposes.

The Austrian labor agency is responsible for the payments of unemployment benefits. Apart from these financial benefits, the Austrian Labor Agency offers various labor market activating programs and subsidies to support unemployed workers finding new jobs or to improve their skills. Table 1 summarizes the most important unemployment subsidies and active labor market policies offered by the Austrian Labor Agency. The spectrum reaches from training programs to increase skills or programs for job applications and job interviews up to programs specifically designed for firm founders

3 Research design

3.1 Data

The empirical analysis is based on two Austrian administrative data sources. All labor market and retirement-related information is drawn from the Austrian Social Security Database (ASSD), which is a matched employee–employer dataset collected to verify pension claims for all Austrian private-sector workers (Zweimüller et al., 2009). It contains detailed information on workers' employment and earnings histories and basic socioeconomic characteristics (e.g. age, broad occupation, experience, and tenure). The ASSD also contains information on the start of the pension, as well as pathways into retirement (i.e. disability pension, early retirement, or regular old-age retirement). Information on the first jobs after unemployment is also drawn from the ASSD. I use days in employment, and daily labor income as proxies for job quality.

The ASSD is merged to data from the Austrian Labor Agency comprising detailed information on the receipt and duration of unemployment benefits, training and qualification programs, outplacement trusts or job integration subsidies between the years 2000

[8] Marginally employed workers are excluded, while self-employed can voluntarily opt into unemployment insurance since 2009.

to 2014. Apart from unemployment duration, I use information on all labor market activating programs described in Table 1. Since the focus of this study is on older workers, the sample consists of all unemployment spells of male and female private-sector workers born between 1938 and 1955 - cohorts directly affected by the stepwise increase of eligibility age of early retirement - and who become unemployed in the period between 2000 until 2013. I also exclude unemployment spells of individuals who are already eligible for early retirement, i.e. all unemployment spells beyond age 60 for men and 55 for women are ignored. So workers cannot directly move from unemployment to (early) retirement except for disability reasons. This also rules out effects of the reform on direct retirement and inflow to unemployment[9].

As entry into unemployment is likely selective, I focus on a more exogenous inflow into unemployment, and restrict the sample to individuals subject to plant closures or mass layoffs.[10] There is no evidence that the increase in early retirement age is associated with plant closures or mass layoffs (Frimmel, 2020). If individuals were affected by plant closures or mass layoffs in several years, they enter the data multiple times.[11] Overall, the sample consists of $94,648$ individual unemployment spells for men and $45,063$ unemployment spells for women. This unbalanced panel corresponds to $66,128$ men and $35,602$ women.

3.2 Empirical strategy

To analyze the effect of raising the early retirement age, I examine a set of important outcome variables for unemployed workers, i.e. unemployment duration, re-employment, job quality as well as participation and duration in labor market activating measures. The empirical strategy follows Brunello and Comi (2015) and I estimate the following empirical model:

$$outcome_{it} = \beta_0 + \beta_1 era_{it} + \Gamma X_{it} + \gamma_i + \gamma_t + \epsilon_{it}$$

where the set of outcome variables of individual i who became unemployed in year t is regressed on the exogenous individual-specific policy-determined eligibility age of early retirement era_{it}. The variable era_{it} is 60 for men born before October 1940 (55 for women born before October 1945) and increases for every subsequent quarter of birth as summarized in Section 2 and in Figure 1. Note that the eligibility age is not constant for cohorts affected by the reform 2003 if they have unemployment spells before and after the implementation of the reform. Cohort of birth fixed effects γ_i and year fixed effects

[9] Staubli and Zweimüller (2013) show that spillover effects of the reform to the unemployment insurance program mainly occur beyond the age of 60 for men.

[10] Mass layoff is defined as a reduction of the workforce of at least 25 percent.

[11] In robustness checks, I also present results for (i) the sample of all unemployed individuals and (ii) for a sample of the first unemployment spell per worker to check for persistency into unemployment.

γ_t capture cohort, age and business cycle effects. Additionally, local unemployment rates should account for regional labor market conditions. Individual characteristics summarized by the vector X_{it} include industry indicators of the previous job, last gross income, job experience, binary indicator for blue-collar workers (vs. white-collar workers), unemployment spell and regional fixed effects. All binary outcomes are estimated with a probit model, duration outcomes with OLS.

3.3 Descriptive statistics

The sample comprises 66,128 men and 35,602 women born between 1938 and 1955 who were subject to a plant closure or mass layoff during the years 2000 until 2013. Table 2 shows individual characteristics of these men (Column (I)) and women (Column (II)). Based on the cohorts in the sample, the average eligibility age of early retirement is 61.77 for men and 57.3 for women. In comparison, the average age at the beginning of the unemployment spell is 54.63 years for men and 53.25 for women. There is a significant educational gradient, more than 80 percent for both gender have compulsory schooling or apprenticeship as the highest educational attainment. Similarly, 79.2 (59.0) percent of men (women) are blue-collar workers. The average annual gross income before unemployment amounts to 22,840 euros for men and 14,924 euros for women.

Outcome variables are summarized in Table 3. The average duration of unemployment is 185.3 days for men and 203.2 days for women with substantial variation (standard deviation is between 258 and 272 days). For men, approximately 11 percent receive some training, and spend on average 6.4 days in training.[12] A closer look at the types of training program reveals that 50 percent of these trainings (or 5 percent of the entire sample) are programs to increase qualifications, another 4.9 percent deal with active job search. Another 5.7 percent find jobs through the job integration support of the labor agency. Other labor market activating policies are only of minor importance. The pattern for women is very comparable: 12.3 percent receive some training measure, i.e. 6.5 percent for qualifications and 4.4 percent for active labor search. 5.3 percent receive the job integration support.

64.8 percent of men (58.2 percent of women) found a new job after unemployment by the end of 2014, 1.3 (0.8) percent of unemployed become self-employed. 8 percent of men (11.2 percent of women) re-enter the labor market through marginal employment. Job quality is proxied by days of employment within the first two years after unemployment and the daily labor income.[13] The average days of employment for men (women) is 155.5 (157.0) days with an average daily labor income of 32.21 (17.25) euros.

[12]Note that every individual in the sample receives unemployment benefits and potential job offers by the labor agency, but only a relatively small fraction is assigned to a training program. The latter is typically relevant if job vacancy requirements and workers' qualifications do not match.

[13]In case of unemployment, daily labor income and days of employment are set to zero.

Figure 3 compares Kaplan-Meier estimates for males and females with a higher or lower eligibility age of early retirement (ERA). The threshold between high or low ERA is defined at 61.5 years for men and 56.5 years for women, which corresponds to workers affected by the first pension reform in 2000 (low ERA) and the second reform in 2003 (high ERA). Kaplan-Meier estimates in Panel A reveal that the longer unemployment duration for high-ERA men is in the range between 100 and 250 days, while for women this difference is absent. Training duration is only longer for high-ERA males during the first 50 days of training (Panel B), but this pattern reverses with training duration. This might indicate that these unemployed workers tend to receive substantially shorter qualification measures. Re-employment probability for high-ERA males is on average reduced and subsequent days of employment is shorter (Panel C of Figure 3). This could be driven by a greater assignment to training programs. The pattern is less pronounced for unemployed women. Generally, there should not be given any causal interpretation to all these observed differences, e.g. they could simply reflect an age effect, because individuals with higher eligibility age are on average older at unemployment; also seasonal effects may influence the relationship. A regression analysis will control for these potentially distorting effects more thoroughly.

4 Estimation results

This section presents the empirical findings of the model described in Section 3.2. I present the main results for unemployment durations and subsequent employment and job quality in section 4.1. Section 4.2 discusses results for active labor market policies as a potential mechanism through which the re-integration into the labor market is triggered. Section 4.3 summarizes results from a heterogeneity analysis and Section 4.4 provides robustness checks.

4.1 Unemployment duration and re-employment

Unemployment duration Table 4 summarizes results of the effect of the raise in eligibility age (ERA) on unemployment duration of men (Column I) and women (Column II). In line with the descriptive Kaplan-Meier estimators, the point estimates are positive and larger for men, but rather imprecisely estimated. Although this result contradicts evidence on bridging the time between job exit and retirement entry, it has to be considered that the sample comprises individuals being unemployed before the age of 60, so bridging is not feasible.[14] In contrast, unemployment duration of women is lower by approximately 50

[14]The reforms, however, had adverse effects on unemployment after the age of 60. Staubli and Zweimüller (2013) provide evidence of increased bridging due to the reforms. Based on a sample of employed workers, they find an increase in unemployment for workers with higher eligibility age for the extended working period induced by the reforms.

days.

Employment and job quality Ultimately, the question whether raising the eligibility age of early retirement affects re-employment perspectives of unemployed workers is most essential. As stated, the effect can be ambiguous: unemployed workers with a higher ERA are associated with a longer future employment perspective, which could make such workers more attractive for firms to hire. So re-employment should increase. However, if firms generally discriminate elderly workers and do not provide jobs once a certain age is reached, a higher ERA would simply lead to longer unemployment durations at older ages or a higher drop-out rate of the labor force.

Table 5 summarizes estimation results for re-employment probabilities and job quality after unemployment. For men (Panel A), re-employment increases by 14.2 percent, but is only marginally significant.[15] Because the gradual increase of eligibility age is on a monthly basis, the effect size corresponds to a 1.2 percent increase in re-employment for a one-month increase in ERA. Days in employment within 2 years after unemployment[16] is on average 113 days longer. The average daily labor income increases by 16.6 euros, so workers tend to benefit financially. Whether this wage premium is due to a higher training incidence cannot be answered within the presented research strategy. Overall these findings corroborate evidence that firms prefer hiring workers with longer future employment perspectives in the firm, and job quality of elderly workers is improved. Women tend to benefit to a lesser extent from raising the ERA in terms of re-employment and job quality: a one-year raise of the ERA increases employment probabilities by 7.6 percent, marginal employment increases by 3.5 percent, days in employment increase by approximately 35 days and daily labor income by 3.9 euros (Panel B of Table 5).

Gender difference Although women show shorter unemployment durations with a higher eligibility age, men tend to benefit more, particularly with respect to re-employment and labor income. Explanations for this significant gender difference may be manifold. First, the average retirement age of women is generally much closer to the statutory retirement age. For instance, compared to men, where the factual average retirement age is around 5 years below the statutory age of 65, the average retirement age of women with a ERA between 55 and 57.5 years is on average 58.13 years, hence only approximately 2 years below the statutory retirement age of 60. This is mostly due to a lack of social insurance years collected over lifetime, e.g. because of family obligations (parental care for children or informal care for sick relatives). As a result, the response of women to the reform of

[15] When looking at the sample of all unemployed workers, estimates remain quantitatively similar but become more precisely estimated. Results are shown in Column (1) of Table 11.

[16] In case of no re-employment, the variable is set to zero.

the early retirement age was weaker as compared to men.
Second and closely related, firms may not differentiate on the one hand between employment perspectives of women with high or low ERA, because retirement behavior changes to a substantially lesser degree, but on the other hand the increased employment perspectives of men may provide sufficiently large incentives for firms to hire these unemployed workers. A similar argument may arise for the assignment to training programs by the public labor agency (see Section 4.2).
Third, the pension reform affects men and women at different ages. A raise of the ERA between 55 and 60 as for women or between 60 and 65 for men could simply trigger differential responses by the labor agency or firms employing elderly workers.

4.2 Potential mechanism: Active labor market policies

Although unemployment durations for men are unaffected by the increase of the eligibility age of early retirement, it does not imply that activities during unemployment remain unchanged. At the same, the re-integration into the labor market as well as subsequent job quality is improved with higher eligibility age of early retirement. In this section, I study one potential mechanism behind these developments, namely the assignment of unemployed workers into active labor market programs (ALMP). Unemployed workers with different eligibility ages may systematically be assigned to more or less ALMPs and/or spend a different amount of time in such programs. Given unemployment duration, if a higher ERA affects the probability of training during unemployment, this might have an impact on subsequent employment prospects and job quality. Hence, studying ALMP participation may shed some light on how the re-integration into the labor market was implemented. It also provides evidence whether the labor agency adapt their policies to increase workers' skill set as a response to pension reforms.[17]. Although such an analysis provides interesting insights into a potential mechanism for the re-integration process, it cannot be interpreted as a causal analysis about the effectiveness of ALMPs for the re-integration of elderly workers into the labor market.

Table 6 summarizes results for the participation in five different labor-market activating policies: participation in training programs, outplacement trusts, firm founding program, job interview support and job integration support. The last policy is particularly designed for elderly workers. Panel A shows the average marginal effects for men: first, a one-year higher ERA significantly increases the probability to participate in a training program by 16.2 percent (Column (1)), which corresponds to an 1.4 percent increase in training participation per month increase in eligibility age. Panel A of Table

[17]ALMPs are in principle accessible for all unemployed workers and not specifically targeted at elderly workers. These policies already existed prior the reform, hence are independent from the raise in the eligibility age of early retirement.

7 takes a closer look at the type of training program for men, i.e. for qualifications, job orientation or active job search. It turns out, that the positive training effect is entirely driven by increased training for active job search (Column (3) of Table 7), such as job application trainings (plus 18.2 percent). So it seems that the labor agency tries to bring those workers with longer future employment perspectives due to later expected retirement back to the labor market as fast as possible and equip them with the necessary tools to be successful in job applications. They are on average not more likely to receive relatively cost-intensive programs to acquire new qualifications for a new job, although these could pay off more in case of higher expected retirement ages. However, this effect is not homogenous among all male workers (see Section 4.3). Second, the probability of being employed through the job integration support significantly increases by 21.8 percent (Column(5) of Table 6). The job integration support temporarily reduces labor costs for firms if they employ elderly workers. So this result suggests that the temporarily subsidized hiring of elderly workers becomes more attractive, the longer future employment prospects are.

Again, there is a very pronounced diverging pattern between men and women observable, as results for female ALMP participation (Panel B of Table 6) show. A one-year higher ERA does not change the probability of receiving a training program, other programmes are only marginally affected. Only the job integration support increases with the early retirement age by 2.2 percent. Consistently, when looking at the types of training programs (Panel B of Table 7), there are no significant or relevant effects for training types.

I find consistent effects when considering the duration spent in ALMPs (Table 8). Men (Panel A) spent on average 11 days per year more in training programs. There is only a marginal statistical significant change in the duration in the job integration support. For women, ALMP durations only marginally change (Panel B of Table 8).

4.3 Heterogeneous effects

Table 9 for men and Table 10 for women summarize results from a heterogeneity analysis along several pre-determined dimensions, i.e. age before ERA (less/more than 5 years before ERA), occupation (blue-collar/white-collar), level of educational attainment (high/low) and local labor market conditions at unemployment (above/below average local industry-specific unemployment rate). There are several interesting patterns observable. It turns out that the age of getting unemployed due to mass layoffs and plant closures has a substantial influence which type of ALMP workers receive. Male workers who are more than 5 years away from the early retirement age are 9.8 percent more likely

to receive a training in new qualifications while this effect is totally absent for unemployed workers closer to the ERA. These workers are, however, 14.3 percent more likely to receive trainings to support job search but the labor agency refrains from re-training these workers. This is also reflected in re-employment; since training in qualifications is time-consuming, workers further away from the ERA are less likely to be employed after one year of unemployment.

In terms of socio-economic differences, white-collar and more educated workers have a higher propensity to receive a training in job search, while blue-collar workers and workers with a lower educational attainment are more likely to be employed through the job integration support. This is consistent with the observation that particularly firms requiring skilled manual labor make use of the job integration support. Less surprisingly, if the local labor market (measured by the local industry-specific unemployment rate) is tighter, workers participate significantly more in ALMPs.

For women, differences across subgroups are less pronounced. However, women further away from their ERA are much less likely to be assigned to a training program or to receive the job integration support, while women closer to the ERA receive more job integration support and also have higher re-employment chances. There are no remarkable differences in other analyzed dimensions for women.

4.4 Robustness

The baseline sample consists of unemployed workers who were subject to a plant closure or a mass layoff during 2000 and 2013 because of selective entry into unemployment and spillover effects from the pension reform. Table 11 summarizes several robustness checks with respect to the sample in order to check whether and to what extent selective entry into unemployment, the economic crisis in 2008 onwards, the nature of unemployment, i.e. mass layoff vs. plant closure, or persistence in unemployment change the results.

Column (1) of Table 11 extends the sample to all unemployment spells between the years 2000 and 2013. All remaining sample restrictions and the empirical model remain unchanged. Given endogenous selection into unemployment, estimates on this sample cannot necessarily be interpreted causally, but may still be insightful to evaluate the main results of the paper in a potentially wider context. For both, men and women, I do not find any systematic differences of results in comparison to the restricted baseline sample, but estimates are more precisely estimated due to sample size. So, potentially selective entry into unemployment does not seem to significantly alter the main findings and results do not appear to be specifically driven by the exogenous group of unemployed workers.

To check, whether results are specifically driven by the economic downturn in 2008 onwards, I re-estimate the model for a sample of unemployed workers subject to a plant

closure or mass layoff before 2008. Results shown in column (2) of Table 11 do not differ from the results of the main estimation sample, so business cycle effects stemming from the economic crisis do not affect the results. This is not too surprising as unemployment rates of elderly workers were only modestly affected by the crisis.[18]

Column (3) for a sample of plant closures and column (4) for mass layoffs only shed light on whether estimated effects differ between the two different groups of unemployed workers in the sample. Clearly, the number of observations drops, so precision of estimates slightly suffers. In terms of unemployment duration and re-integration into the labor market, the two groups are remarkably similar. With respect to assignment to training, it appears that the effects are driven by the group of workers coming from mass layoffs. This suggests that responses of the labor agency is related to the original cause of unemployment. In fact, particularly plant closures receive a high attention by the public and are often accompanied by specific social plans between employers and workers, which make further actions by the labor agency less relevant.

Finally, columns (5) and (6) of Table 11 deal with potential persistency into unemployment. First note that the empirical model directly controls for unemployment spell fixed effects and standard errors are clustered on individual level. To further address this issue, column (5) restricts the main sample to the first unemployment spell per worker during 2000 and 2013, column (6) excludes workers with the 5 percent most unemployment spells. While for the latter scenario, results do not change at all, the positive training effect for male workers disappears when restricting the sample to the first unemployment spell. This indicates that the public labor agency may assign unemployed workers to cost-intensive training programs to a lesser extent at the first time they get unemployed. The main results for re-employment still remain unchanged in the very restricted sample (column 5) but are less precisely estimated. Estimates for women are mainly unaffected. So persistency into unemployment should not systematically affect the results to a large degree.

5 Concluding remarks

The demographic transition towards an older society led to ongoing reforms of public pension systems to ensure future financial sustainability. The need of a higher labor force participation of elderly workers also requires a higher (early) retirement age. In this study, I analyze how an increase in the eligibility age of early retirement affects unemployed elderly workers in Austria, a group particularly vulnerable in the labor market. I exploit two Austrian pension reforms increasing the early retirement age step-wise for different

[18] Microcensus data from Statistics Austria show that the unemployment rate (ILO definition) for men aged 55-64 only marginally increased from 3.4% in 2007 to 4.4% in 2011.

quarter-of-birth cohorts to identify the causal effect of a raise in early retirement age on unemployment duration, re-employment probability and participation in active labor market policies (ALMP) and training programs. Empirical results based on Austrian administrative data reveal a substantial gender difference in how the raise in early retirement age affects unemployed workers. While unemployed women only benefit little with a shorter unemployment duration, modest higher re-employment probability as well as labor income after unemployment, unemployed men below the age of 60 benefit in several aspects: although unemployment duration remains unaffected, re-employment chances and participation in active labor market policies significantly increase. Men also receive larger labor income increases after unemployment. Elderly unemployed workers closer to their early retirement age are systematically assigned to programs increasing their job application and job search skills, workers more than five years away from their early retirement age are more likely to participate in training programs increasing their skills. The result for women not benefiting to a similar degree than males does not necessarily imply that the extended working life for women is not helpful for reintegration at all, but could rather reflect that (i) the Austrian pension reform affects women at a younger age and (ii) women's response to these particular reforms was substantially weaker.
The results are in line with theoretical predictions that an expected longer employment of workers increases the re-integration of elderly workers (Hairault et al., 2010) and supports human capital formation by incentivizing investments to train elderly workers and upgrade their qualifications (Becker, 1975). Public labor agencies adapt their assignments to ALMPs to the extended expected working life by supporting elderly workers for a faster re-integration – either through job application trainings or financial support for firms employing elderly workers – and by upgrading workers' skills in comprehensive training programs. Whether and to what extent these ALMPs contribute to the re-integration of these unemployed workers – the *causal* effect of ALMPs – is beyond the scope of this paper, but is definitely worth studying in future research.

From a policy perspective, these results suggest that increasing the early retirement age is not only a promising way to improve the financial sustainability of public pension systems but also sufficiently incentivizes the re-integration of elderly unemployed workers (below the age of 60). The latter is an important contribution to increase the labor force participation of older workers and to keep the public pension systems financially viable in the future.

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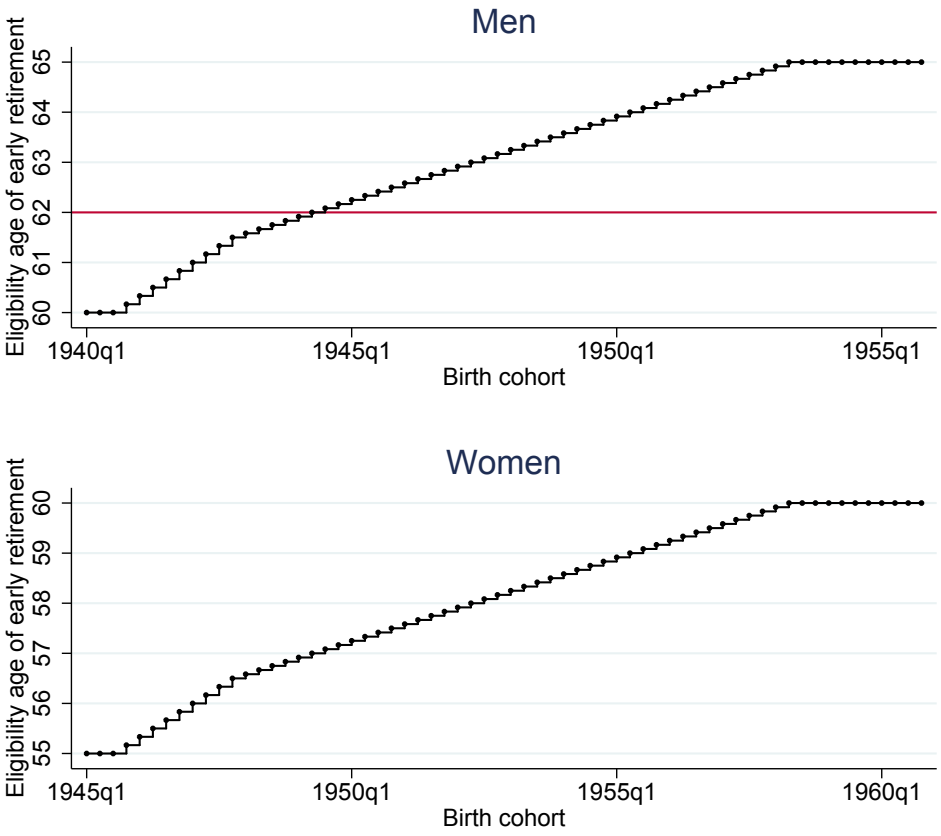
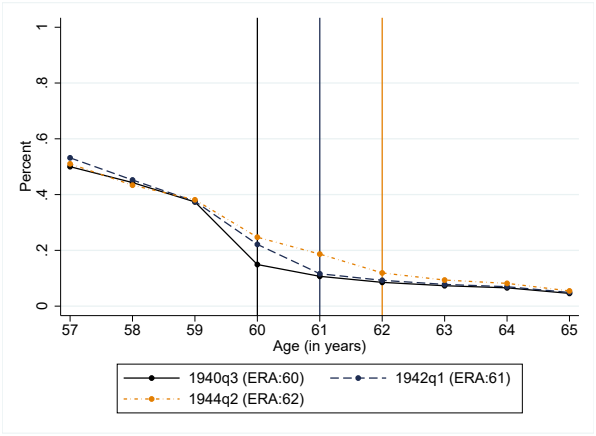
6 Tables and figures (to be placed in the paper)

Figure 1: Eligibility age of early retirement in Austria

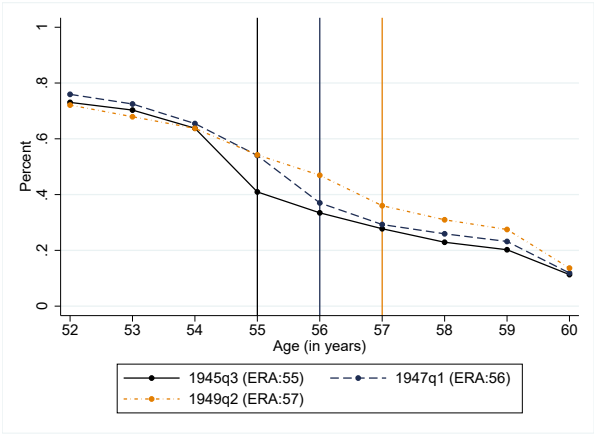


Notes: The figure illustrates the stepwise increase of the eligibility age of early retirement over birth-quarter cohorts for men and women, consistent with the 2000 and 2003 pension reforms. The red horizontal line indicates the corridor pension at age 62 for men.

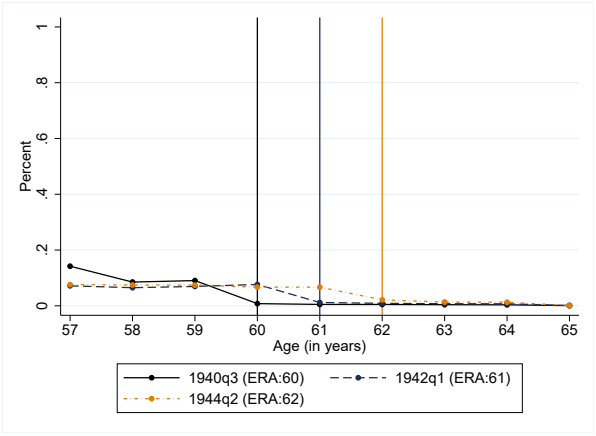
Figure 2: Employment, unemployment and retirement by cohorts



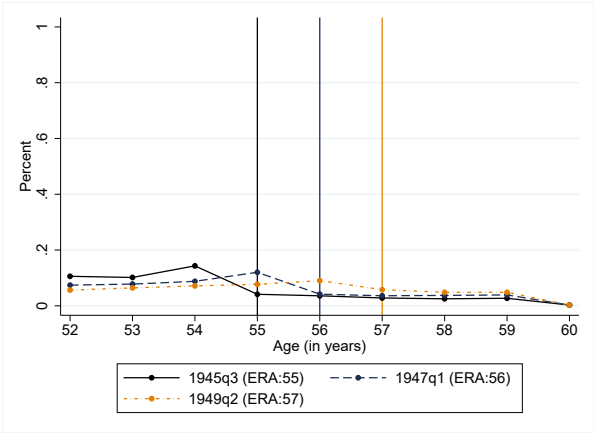
(a) Share of employed men



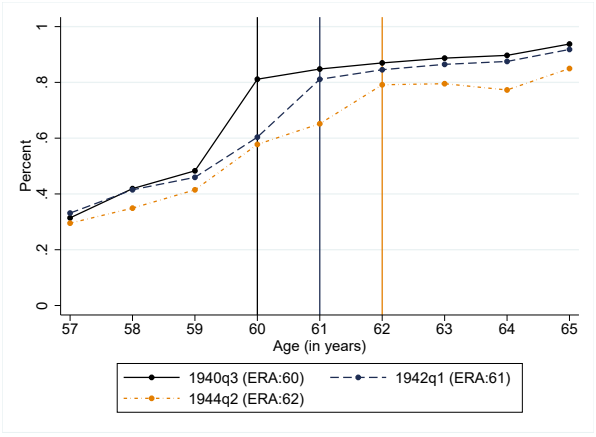
(b) Share of employed women



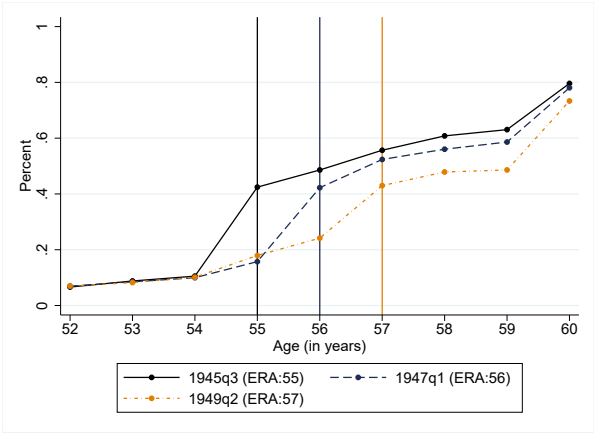
(c) Share of unemployed men



(d) Share of unemployed women



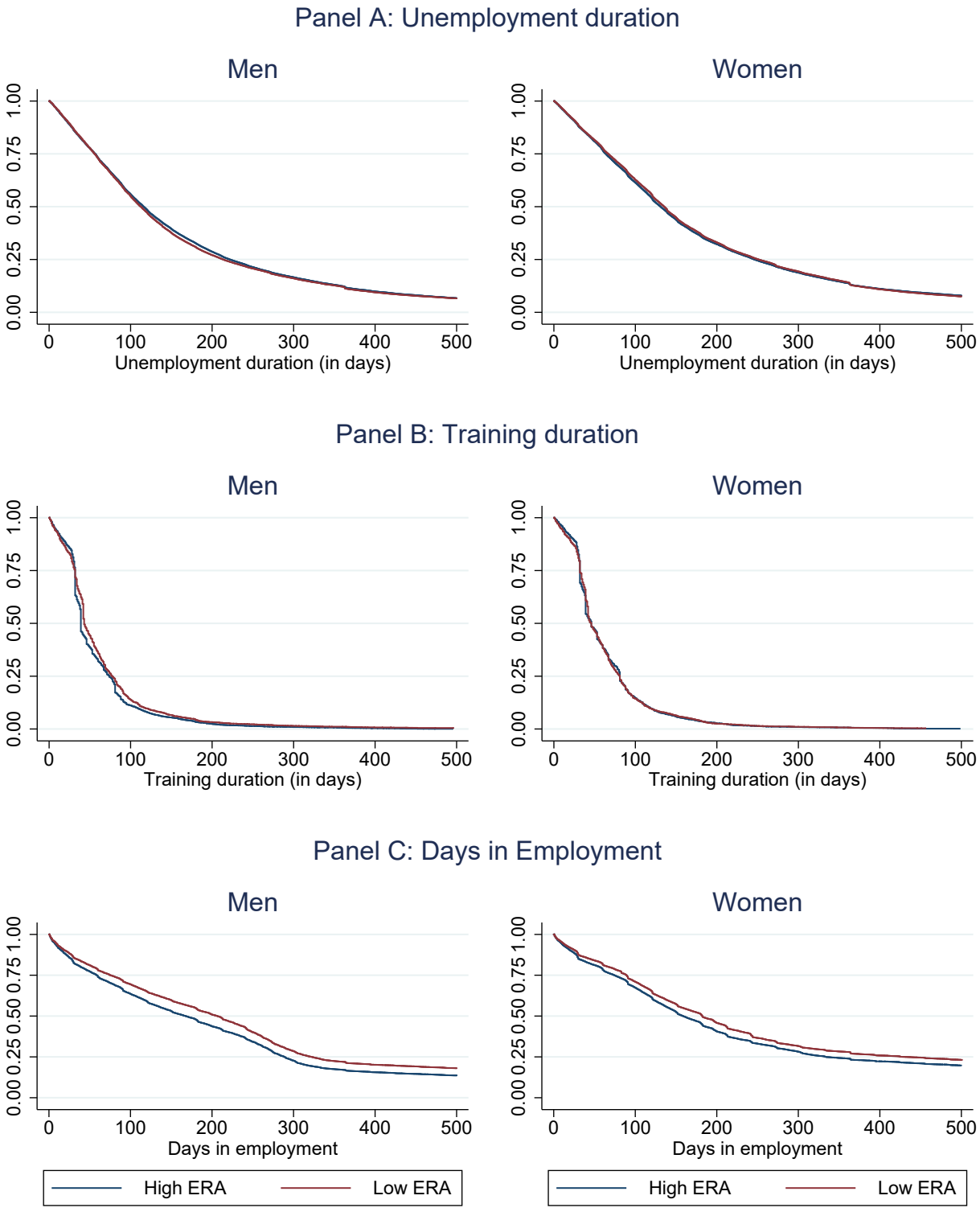
(e) Share of retired men



(f) Share of retired women

Notes: Figures compare the share of employed (*figures (a) and (b)*), unemployed (*figures (c) and (d)*) and retired (*figures (e) and (f)*) men (left) and women (right) for different birth cohorts. These cohorts differ in the eligibility age of early retirement (ERA), e.g. men of cohort 1940q3 (born in third quarter of 1940) have an ERA of 60 years, while cohorts 1942q1 and 1944q2 have an increased ERA of 61 years and 62 years respectively. Equivalently for women, ERA for birth cohorts 1945q3, 1947q1 and 1949q2 is 55, 56 and 57 years respectively. All figures are based on data from the ASSD.

Figure 3: Kaplan-Meier estimates



Notes: Kaplan-Meier estimates are based on sample described in Section 3.1 Panel A shows unemployment duration for men (left) and women (right) with high and low eligibility age of early retirement (ERA). The threshold for high ERA is defined at 61.5 years for men and 56.5 years for women. Correspondingly, Panel B compares training duration and Panel C the duration in the subsequent job after re-employment (conditional on being employed).

Table 1: Overview of Active Labor Market Policies(ALMP)

Subsidy	**Description**
Training	Educational programs to gain new qualifications, to support job orientation or to help in active job search
Qualifications	Certificated training programs and courses specifically offered to increase the qualifications necessary for (new) jobs of unemployed workers.
Job Orientation	Assistance for job orientation or occupational choices, e.g. tests to find out possible appropriate occupational areas, counseling or provision of information to support new job orientation...
Active job search	Training offered to support the active job search, e.g. job application training.
Outplacement trusts	Labor market policy specifically for a larger group of workers who are (expected to be) unemployed due to mass layoffs or plant closures; the focus lies on specific qualification measures, e.g. training programs, job orientation measures, support for active job search or firm founding programs.
Firm founding program	Support for unemployed who become self-employed. Also counseling is offered and there is a possibility to acquire necessary qualifications. Support may be granted up to 9 months.
Job interview support	Partial refund of cost which occur at supra-regional job applications
Job integration support	Job integration support is a program to incentivise firms to employ workers of age 50 or older, often with health restrictions and long unemployment durations or re-entry into labor market. The Labor Agency offers a subsidy to firms who employ older workers. Possible up to 6-12 months.

Notes: This table summarizes the most important unemployment subsidies and active labor market policies of the Austrian Labor Agency.

Table 2: Descriptive statistics of sample

	(I) Men	(II) Women
Early retirement age	61.77	57.32
	(0.257)	(1.002)
Age at unemployment	54.63	53.25
	(4.128)	(3.660)
Educational attainment		
Compulsory schooling	0.397	0.518
Apprenticeship	0.494	0.298
Matura	0.074	0.146
Academic	0.035	0.038
Occupation		
Blue-collar	0.792	0.590
White-collar	0.208	0.410
Experience (in years)	22.34	18.32
	(8.705)	(8.133)
Annual gross income	22,840.7	14,924.3
	(25,197.3)	(14,392.5)
Observations	94,648	45,063
# of individuals	66,128	35,602

Notes: Descriptive statistics for men (column (I)) and women (column (II)) are based on the sample described in Section 3.1. Standard deviations for non-binary variables in parentheses.

Table 3: Descriptive statistics of outcome variables

	(I) Men	(II) Women
Unemployment duration (in days)	185.3	203.2
	(272.1)	(258.7)
ALMPs		
Training	0.108	0.123
Outplacement trusts	0.010	0.010
Firm founding program	0.005	0.003
Job interview support	0.009	0.005
Job integration support	0.057	0.053
Type of training program		
Qualifications	0.049	0.065
Job orientation	0.010	0.013
Active job search	0.049	0.044
Duration in ALMP		
Days in training	6.402	7.830
	(28.16)	(30.31)
Days in outplacement trusts	3.595	3.102
	(52.13)	(41.31)
Days in firm founding program	0.838	0.543
	(14.16)	(11.39)
Days with job integration support	2.081	2.440
	(26.72)	(28.39)
	(29.30)	(24.34)
Subsequent employment		
Employed	0.648	0.582
Self-Employed	0.013	0.008
Marginal employment	0.080	0.112
Not employed	0.259	0.298
Job quality (2 yrs after unemployment)		
Days in employment	155.5	157.00
	(214.40)	(233.17)
Daily labor income	32.21	17.25
	(37.10)	(25.32)
Observations	94,648	45,063

Notes: Descriptive statistics for men (column (I)) and women (column (II)) are based on the sample described in Section 3.1. Duration in ALMP and job quality variables are set to zero if they do not apply. Standard deviations for non-binary variables in parentheses.

Table 4: Unemployment duration (in days)

	(1) Men	(2) Women
Early retirement age	34.960	-49.518***
	(55.987)	(4.223)
Educational attainment (baseline: compulsory schooling):		
Apprenticeship	12.714***	5.068*
	(1.718)	(2.822)
Matura	54.119***	16.905***
	(4.247)	(3.953)
Academic degree	59.731***	44.134***
	(6.377)	(8.791)
White-collar worker	25.929***	7.193***
	(2.547)	(2.734)
Experience	-0.001***	-0.001***
	(0.000)	(0.001)
Gross income	-0.000***	-0.000
	(0.000)	(0.000)
Previous industry affiliation FE	Yes	Yes
Regional FE	Yes	Yes
Local unemployment rate	Yes	Yes
Unemployment year FE	Yes	Yes
Cohort of birth FE	Yes	Yes
Unemployment spell FE	Yes	Yes
Number of observations	94,648	45,063
Mean of dep. var.	175.83	200.48

Notes: The sample consists of all unemployed workers due to plant closures or mass layoffs between 2000 and 2013. Estimates are based on OLS estimation. Standard errors are clustered on individuals; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 5: Employment and job quality

	Employment			Job quality	
	(1)	(2)	(3)	(4)	(5)
	Employment	Self-employment	Marginal Employment	Days in employment	Daily labor income
Panel A: Men					
Early retirement age	0.142*	-0.004	0.028	81.913***	14.022***
	(0.082)	(0.027)	(0.052)	(32.463)	(5.458)
Covariates	Yes	Yes	Yes	Yes	Yes
Previous industry affiliation FE	Yes	Yes	Yes	Yes	Yes
Province FE	Yes	Yes	Yes	Yes	Yes
Unemployment year FE	Yes	Yes	Yes	Yes	Yes
Cohort of birth FE	Yes	Yes	Yes	Yes	Yes
Unemployment spell FE	Yes	Yes	Yes	Yes	Yes
Number of observations	94,648	94,648	94,648	94,648	94,648
Mean of dep.var.	0.70	0.01	0.07	173.36	35.55
Panel B: Women					
Early retirement age	0.076***	0.002	0.035***	34.740***	3.941***
	(0.007)	(0.001)	(0.005)	(3.613)	(0.366)
Covariates	Yes	Yes	Yes	Yes	Yes
Previous industry affiliation FE	Yes	Yes	Yes	Yes	Yes
Province FE	Yes	Yes	Yes	Yes	Yes
Unemployment year FE	Yes	Yes	Yes	Yes	Yes
Cohort of birth FE	Yes	Yes	Yes	Yes	Yes
Unemployment spell FE	Yes	Yes	Yes	Yes	Yes
Number of observations	45,063	45,063	45,063	45,063	45,063
Mean of dep.var.	0.66	0.01	0.12	186.05	20.35

Notes: The sample consists of all unemployed workers due to plant closures or mass layoffs between 2000 and 2013. Estimates for binary employment outcomes are average marginal effects based on a probit estimation. Estimates for job quality are based on an OLS estimation. Outcome variables are set to zero if not assigned to a programme. Educational attainment, occupation, gross income,work experience before unemployment and local unemployment rates are included as covariates. Standard errors in parentheses are clustered on individuals; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 6: Active labor market policies

	(1) Training	(2) Outplacement trusts	(3) Firm founding program	(4) Job interview support	(5) Job integration support
Panel A: Men					
Early retirement age	0.162**	0.049*	0.040	0.033	0.218***
	(0.073)	(0.028)	(0.032)	(0.034)	(0.073)
Covariates	Yes	Yes	Yes	Yes	Yes
Previous industry affiliation FE	Yes	Yes	Yes	Yes	Yes
Province FE	Yes	Yes	Yes	Yes	Yes
Unemployment year FE	Yes	Yes	Yes	Yes	Yes
Cohort of birth FE	Yes	Yes	Yes	Yes	Yes
Unemployment spell FE	Yes	Yes	Yes	Yes	Yes
Number of observations	94,648	94,648	94,648	94,648	94,648
Mean of dep.var.	0.11	0.01	0.00	0.01	0.06
Panel B: Women					
Early retirement age	0.003	0.008***	0.004***	0.003**	0.022***
	(0.005)	(0.002)	(0.001)	(0.001)	(0.003)
Covariates	Yes	Yes	Yes	Yes	Yes
Previous industry affiliation FE	Yes	Yes	Yes	Yes	Yes
Province FE	Yes	Yes	Yes	Yes	Yes
Unemployment year FE	Yes	Yes	Yes	Yes	Yes
Cohort of birth FE	Yes	Yes	Yes	Yes	Yes
Unemployment spell FE	Yes	Yes	Yes	Yes	Yes
Number of observations	45,063	45,063	45,063	45,063	45,063
Mean of dep.var.	0.14	0.01	0.00	0.01	0.06

Notes: The sample consists of all unemployed workers due to plant closures or mass layoffs between 2000 and 2013. Estimates are average marginal effects based on a probit estimation. Educational attainment, occupation, gross income, work experience before unemployment and local unemployment rates are included as covariates. Standard errors in parentheses are clustered on individuals; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 7: Training program types

	(1) Qualifications	(2) Job orientation	(3) Job search
Panel A: Men			
Early retirement age	-0.027	0.038	0.182***
	(0.046)	(0.038)	(0.058)
Covariates	Yes	Yes	Yes
Previous industry affiliation FE	Yes	Yes	Yes
Province FE	Yes	Yes	Yes
Unemployment year FE	Yes	Yes	Yes
Cohort of birth FE	Yes	Yes	Yes
Unemployment spell FE	Yes	Yes	Yes
Number of observations	94,648	94,648	94,648
Mean of dep.var.	0.05	0.01	0.05
Panel B: Women			
Early retirement age	0.004	0.002	-0.006**
	(0.004)	(0.002)	(0.003)
Covariates	Yes	Yes	Yes
Previous industry affiliation FE	Yes	Yes	Yes
Province FE	Yes	Yes	Yes
Unemployment year FE	Yes	Yes	Yes
Cohort of birth FE	Yes	Yes	Yes
Unemployment spell FE	Yes	Yes	Yes
Number of observations	45,063	45,063	45,063
Mean of dep.var.	0.07	0.02	0.05

Notes: The sample consists of all unemployed workers due to plant closures or mass layoffs between 2000 and 2013. Estimates are average marginal effects based on a probit estimation. Educational attainment, occupation, gross income, work experience before unemployment and local unemployment rates are included as covariates. Standard errors in parentheses are clustered on individuals; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 8: ALMP duration

	(1) Training	(2) Outplacement trusts	(3) Firm founding program	(4) Job integration support
Panel A: Men				
Early retirement age	11.195***	5.355	0.477	6.771*
	(3.233)	(3.890)	(1.114)	(3.800)
Covariates	Yes	Yes	Yes	Yes
Previous industry affiliation FE	Yes	Yes	Yes	Yes
Province FE	Yes	Yes	Yes	Yes
Unemployment year FE	Yes	Yes	Yes	Yes
Cohort of birth FE	Yes	Yes	Yes	Yes
Unemployment spell FE	Yes	Yes	Yes	Yes
Number of observations	94,648	94,648	94,648	94,648
Mean of dep.var.	6.42	3.59	0.86	2.36
Panel B: Women				
Early retirement age	0.997**	2.136***	0.440**	1.599***
	(0.468)	(0.535)	(0.202)	(0.409)
Covariates	Yes	Yes	Yes	Yes
Previous industry affiliation FE	Yes	Yes	Yes	Yes
Province FE	Yes	Yes	Yes	Yes
Unemployment year FE	Yes	Yes	Yes	Yes
Cohort of birth FE	Yes	Yes	Yes	Yes
Unemployment spell FE	Yes	Yes	Yes	Yes
Number of observations	45,063	45,063	45,063	45,063
Mean of dep.var.	8.60	3.58	0.64	2.95

Notes: The sample consists of all unemployed workers due to plant closures or mass layoffs between 2000 and 2013. Estimates are based on an OLS estimation. Outcome variables are set to zero if not assigned to a programme. Educational attainment, occupation, gross income, work experience before unemployment and local unemployment rates are included as covariates. Standard errors in parentheses are clustered on individuals; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 9: Heterogeneous effects for male unemployed workers

	Age		**Occupation**		**Education**		**Local labor market**	
	>5 years before ERA	<5 years before ERA	Blue-collar worker	White-collar worker	High	Low	Low unemployment rate	High unemployment rate
Training	0.073**	0.113	0.030	0.580***	0.356*	0.118	-0.005	0.203**
	(0.031)	(0.070)	(0.079)	(0.162)	(0.210)	(0.078)	(0.141)	(0.085)
in qualifications	0.098***	-0.053	-0.078	0.074	0.085	-0.073	-0.160	0.023
	(0.018)	(0.051)	(0.054)	(0.098)	(0.151)	(0.053)	(0.103)	(0.057)
in job search	-0.033	0.143***	0.084	0.521***	0.337**	0.151**	0.127	0.193***
	(0.026)	(0.051)	(0.060)	(0.158)	(0.144)	(0.064)	(0.135)	(0.065)
Job integration support	0.108***	0.161**	0.204**	0.300***	0.130	0.305***	0.171	0.244***
	(0.024)	(0.071)	(0.100)	(0.119)	(0.132)	(0.102)	(0.158)	(0.076)
Employment	-0.471***	0.142	0.008	0.496***	0.293	0.112	0.320	0.098
	(0.036)	(0.105)	(0.094)	(0.174)	(0.220)	(0.088)	(0.220)	(0.088)
Number of observations	53,771	40,877	74,060	20,588	10,937	83,711	21,499	73,149

Notes: The sample consists of all male unemployed workers between 2000 and 2013. Estimates are average marginal effects based on a probit estimation. Educational attainment, occupation, gross income, work experience before unemployment and local unemployment rates as well as industry, province, unemployment year,cohort of birth and unemployment spell fixed-effects are included in all estimations. Standard errors in parentheses are clustered on individuals; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 10: Heterogeneous effects for female unemployed workers

	Age		**Occupation**		**Education**		**Local labor market**	
	> 5 years before ERA	< 5 years before ERA	Blue-collar worker	White-collar worker	High	Low	Low unemployment rate	High unemployment rate
Training	-0.266***	0.021*	-0.005	0.016*	0.011	0.002	0.001	0.004
	(0.066)	(0.012)	(0.006)	(0.008)	(0.013)	(0.005)	(0.009)	(0.006)
in qualifications	-0.075*	0.014	0.001	0.007	0.020*	0.001	0.002	0.004
	(0.041)	(0.009)	(0.004)	(0.006)	(0.011)	(0.004)	(0.008)	(0.004)
in job search	-0.216***	0.002	-0.011***	0.001	-0.012	-0.004	0.001	-0.008**
	(0.055)	(0.006)	(0.004)	(0.005)	(0.008)	(0.003)	(0.006)	(0.003)
Job integration support	-0.134***	0.030***	0.017***	0.030***	0.028***	0.022***	0.022***	0.023***
	(0.050)	(0.009)	(0.004)	(0.008)	(0.010)	(0.004)	(0.007)	(0.004)
Employment	0.022	0.049***	0.070***	0.084***	0.102***	0.069***	0.079***	0.075***
	(0.062)	(0.017)	(0.009)	(0.011)	(0.016)	(0.008)	(0.013)	(0.008)
Number of observations	11,160	33,903	26,458	18,605	8,289	36,774	12,330	32,733

Notes: The sample consists of all female unemployed workers between 2000 and 2013. Estimates are average marginal effects based on a probit estimation. Educational attainment, occupation, gross income, work experience before unemployment and local unemployment rates as well as industry, province, unemployment year, cohort of birth and unemployment spell fixed-effects are included in all estimations. Standard errors in parentheses are clustered on individuals; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 11: Robustness checks

Outcome	(1) All spells	(2) Before 2008	(3) Plant closures	(4) Mass layoffs	(5) Only 1^{st} spell	(6) Exclude top-5%
Panel A: Men						
Unemployment duration	74.650**	31.760	65.443	6.742	-92.483	32.198
	(23.923)	(56.281)	(117.75)	(59.794)	(166.02)	(56.142)
Training	0.141***	0.158**	-0.010	0.189**	-0.070	0.163**
	(0.031)	(0.073)	(0.107)	(0.090)	(0.190)	(0.074)
Employed	0.183***	0.126*	0.124	0.168**	0.053	0.152*
	(0.036)	(0.076)	(0.143)	(0.094)	(0.268)	(0.084)
Daily labor income	16.682***	13.126**	13.940	13.570**	14.689	13.101**
	(2.397)	(5.497)	(9.857)	(6.188)	(10.809)	(5.472)
Number of observations	566,216	71,942	38,214	65,813	12,614	87,189
Panel B: Women						
Unemployment duration	-46.687***	-41.779***	-45.823***	-53.451***	-30.315***	-50.905***
	(1.633)	(4.357)	(6.754)	(5.011)	(9.763)	(4.382)
Training	0.008***	-0.006	0.011	0.002	0.012	0.003
	(0.002)	(0.005)	(0.007)	(0.006)	(0.011)	(0.005)
Employed	0.070***	0.066***	0.075***	0.074***	0.097***	0.079***
	(0.003)	(0.006)	(0.011)	(0.008)	(0.016)	(0.007)
Daily labor income	3.794***	3.556***	3.769***	3.961***	3.570***	3.898***
	(0.162)	(0.377)	(0.574)	(0.441)	(0.870)	(0.377)
Number of observations	291,016	36,753	18,391	31,084	9.129	43,350

Notes: Column (1) consists of all unemployed workers between 2000 and 2013, column (2) consists of all unemployed workers due to plant closures or mass layoffs before the economic crisis in 2008, column (3) considers only unemployed workers due to plant closures between 2000 and 2013, column (4) only unemployed workers due to mass layoffs between 2000 and 2013. Column (5) restricts the main sample to the first unemployment spell between 2000 and 2013 per individual, and finally column (6) excludes individuals above the 95 percentile in the number of unemployment spells. Estimates for the binary training and employment outcome is an average marginal effect based on a probit estimation. Estimates for unemployment duration and daily labor income are based on an OLS estimation. Educational attainment, occupation, gross income, work experience before unemployment and local unemployment rates as well as industry, province, unemployment year, cohort of birth and unemployment spell fixed-effects are included in all estimations. Standard errors in parentheses are clustered on individuals (except for column (5)); * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$