The Welfare Implications of Stricter Disability Screening*

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Abstract

In the disability determination process medical factors as well as vocational factors (such as age, education and past employment) are used to determine an applicant's ability to work. The use of vocational factors can lead to significant discontinuities in the strictness of eligibility criteria for benefits as a function of applicants' characteristics. For example, in the U.S. Social Security Disability Insurance (DI) program applicants 55 years of age or older face relaxed eligibility criteria and as a consequence the award rate exhibits a discontinuous jump at that age cutoff (Chen and van der Klaauw, 2008). Very little is known how reforming these vocational criteria would affect disability enrollment and application behavior of individuals. This paper helps to fill this gap by exploiting a reform in Austria's DI program, which shares several similarities with the U.S. program. The reform increased the age cutoff for relaxed access to disability benefits from age 57 to age 60 in three steps. We find that this reform significantly reduced DI awards among older workers. Most of the reduction is due to a mechanical effect, capturing that fewer applicants qualify for benefits under the stricter rules. However, also a self-screening effect, capturing that less people apply for benefits, is relevant. We develop a sufficient statistic for optimal DI screening and find that eligibility criteria for older workers were too lenient.

Keywords: Disability insurance, screening, policy reform

JEL Codes: J14; J26; J65.

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1 Introduction

In many countries, the share of individuals receiving Disability Insurance (DI) has increased significantly during the last two decades. For example, in the United States 2.6 percent of individuals in the age group of 20 to 64 were receiving DI benefits in 1992, but by 2012 this fraction had risen to 5.3 percent. The rapid expansion of the beneficiary population has generated substantial interest by policy makers and economists in measures that reduce growth in program caseloads and expenditures.

One potential way to slow program growth is to adapt more rigorous eligibility criteria. Specifically, many DI programs determine eligibility of applicants based on how medical and vocational factors such as age, education, and work experience affect the work capacity. The use of vocational factors can lead to significant discontinuities in the strictness of eligibility criteria for benefits as a function of applicants' characteristics. For example, in the U.S. applicants 55 years of age or older face relaxed eligibility criteria and as a consequence the award rate exhibits a discontinuous jump at that age cutoff (Chen and van der Klaauw, 2008). In 2010, 42.8 percent of initial DI application decisions were made using vocational factors (Wixon and Strand, 2013). Therefore, changes in the consideration of vocational factors could have important effects on DI caseload and expenditure growth. Yet, there is little empirical evidence on this topic.[1] This project helps to fill this gap by examining the impact of stricter DI eligibility criteria on disability enrollment and labor market participation in Austria.

Studying the Austrian case has several advantages. *First*, we can use the Austrian Social Security Administration database (ASSD) which contains the complete labor market and earnings histories of all private-sector workers in Austria dating back to 1972. Additionally, we have detailed information on the various stages of the application process for all DI applications since 2004. *Second*, we are able to exploit exogenous variation in DI eligibility criteria which is generated by several policy reforms. More specifically, prior to 2013 DI eligibility standards were significantly relaxed for workers above age 57 relative to those below age 55. In 2013 the Austrian government increased the age threshold for relaxed DI access from age 57 to age 57, followed by further increases to age 59 in 2015 and age 60 in 2017. The combination of detailed labor market and application

[1] In the United States, revisions to the consideration of these vocational factors are currently subject to intense discussions: the SSA and the Congressional Budget Office proposed to tighten the age criteria (Mann et al., 2014).

data and quasi-experimental policy variation gives us the unique opportunity to study the impact of tighter eligibility criteria on DI enrollment and labor force outcomes. *Third*, certain features of the Austrian labor market and social protection systems are similar to those of the United States. In particular, as described in more detail below, the Austrian reforms we are exploiting are comparable to reforms that have been proposed in the United States.

Our identification strategy is a difference-in-differences design, which exploits quasi-experimental variation in DI eligibility strictness that was introduced by the policy reform based on the date of birth. For example, the increase in the age threshold for relaxed DI access from age 57 to age 58 in 2013 tightened eligibility standards at age 57 for individuals born in or after December 1955 relative to those born before. The insights from our empirical analysis can be summarized by three broad conclusions. *First*, DI awards are responsive to changes in DI eligibility criteria. We estimate that tightening DI eligibility standards at a certain age reduces DI awards at that age by 1.5–2.7 percentage points (43–54 percent). Yet, we find a significant increase in DI awards at the later age when eligibility standards are relaxed again, suggesting that many individuals simply postpone their application to the new age threshold for relaxed DI access. *Second*, using data on DI applications we can decompose the reduction in DI awards into a behavioral effect, capturing that less people apply for benefits, and a mechanical effect, capturing that fewer applicants qualify for benefits under the stricter rules. We find that the bulk of the reduction in awards is due to the mechanical effect (between 50 and 67 percent depending on gender) while the behavioral effect is less important (accounting for 33 to 50 percent of the reduction in awards). Third, a one-year increase in the age threshold for relaxed DI access did not increase employment among affected individuals. Rather, they substituted the loss of DI benefits with either unemployment or sickness insurance benefits.

To explore the welfare consequences of stricter DI eligiblity criteria, we develop a sufficient statistic .[2]

The *second* aim of this paper is to explore the welfare consequences of extended UI benefits for older workers. We follow the sufficient statistics approach proposed by Chetty (2006a) and use information on received transfer payments (UI, DI, and other transfers) associated with REBP

[2]Recent applications of the sufficient statistic approach for optimal UI design include Shimer and Werning (2007), Chetty (2008), Kroft (2008), Landais et al. (2010), Kroft and Notowidigdo (2011), Schmieder et al. (2012), and Landais (2012). See the article by Chetty and Finkelstein (2013) for a detailed discussion of this literature.

eligibility.[3] Using this model, we incorporate both program complementarity and program substitution effects into the social welfare calculation. We find that, given the Austrian early retirement rules of the late 1980s and early 1990s, the extension of UI benefits was welfare-improving only if the degree of risk aversion exceeds 2.25. The value of risk aversion remains disputed and a growing body of literature suggests that risk preferences are context-specific (Chetty and Szeidl (2007), **?**, Einav et al. (2012)). Studies that use labor supply elasticities to estimate risk aversion come closest to our setting. These studies typically find values of risk aversion below 1 (Chetty, 2006b). We conclude that extended UI through the REBP was most likely a suboptimal policy.

There is a growing empirical literature studying the effects of DI on labor market outcomes (e.g. (Autor and Duggan, 2003; de Jong, Lindeboom, and van der Klaauw, 2011; Staubli, 2011; Maestas, Mullen, and Strand, 2013; Moore, 2015; Gelber, Moore, and Strand, 2016)) but empirical evidence on the effect of eligibility criteria on DI application behavior is scarce. Also, from a theoretical perspective relatively little is known about how imperfect information on disability status should be used to solve the incentive-insurance trade-off in the DI program. Diamond and Sheshinski (1995) and Parsons (1996) discuss medical screening in a static environment. More recently, Denk and Michau (2013) and Low and Pistaferri (2015) assess the optimal screening stringency in a dynamic environment and both conclude that screening stringency is too strict in the U.S. This paper builds on this literature and adds to it by exploring how changes in eligibility criteria affect DI application behavior and labor market outcomes of applicants. In particular, we are able to examine the relative impact of stricter eligibility criteria on DI enrollment due to more people being denied benefits under the stricter rules as opposed to more people self-screening, i.e. seeking DI benefits.

The paper is organized as follows. In the next section we review the institutional background of Austria. In particular, we discuss the disability insurance program and the different reforms to the eligibility criteria for disability benefits. In Section 3 we describe our data and provide some preliminary descriptive evidence of the impact of relaxed eligibility criteria for DI benefits. Section 4 lays out our identification strategy. In Section 5 we discuss our main results. Section 6 draws some policy conclusions.

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2 Institutional Background and Policy Reforms

We begin with a short discussion of the Austrian disability insurance (DI) program. We then describe the different policy reforms to the disability determination process. These changes generate quasi-random variation in disability screening among similar individuals which we use in our research design to estimate the labor market consequences of stricter disability screening.

The Austrian DI Program. The Austrian DI program is part of the larger social security system that is financed by a payroll tax on earned income and provides partial earnings replacement to workers below the full retirement age who have accumulated at least 5 insurance years within the last 10 years. Insurance years include both contribution years (i.e., periods of employment, including sick leave) and non-contributory periods of labor force participation (e.g., unemployment). The required insurance years to be eligible for DI benefits increase by one month for every two months above age 50 up to a maximum of 15 insurance years. The insurance years requirement does not apply if the disability is job-related; for each occupation there exists an explicit list of qualifying impairments. DI benefits are subject to income and payroll taxation and replace approximately 70 percent of pre-disability net earnings up to a maximum of about €4,500. The level of DI benefits received are based on an individual's earnings history and age. Younger applicants with limited work experience qualify for a special increment to supplement their benefits. DI beneficiaries may continue work, but those earning more than 485 Euros per month lose up to 50 percent of their benefits, depending on their earnings.[4]

To apply for DI benefits, an individual must submit an application to the local DI office. Employees at the DI office first check whether the applicant has not reached the full retirement age and meets the prior contribution requirement. DI eligibility is not conditioned on earnings, so applicants are not required to stop working in order to apply for benefits. In a second step, a team of disability examiners and physicians assesses the severity of the medical impairment and the applicant's earnings capacity. An impairment is considered to be severe if it lasts at least six months and limits the applicant's mental or physical ability to engage in substantial gainful activity. The assessment of the applicant's *residual* earnings capacity depends on the vocational

[4]Ruh and Staubli (2016) show that this policy induces DI beneficiaries to keep their earnings below the extempt threshold in order to retain benefits.

factors age and work experience. Unskilled applicants below age 60 are awarded benefits if the earnings capacity has been reduced to less than half of the earnings capacity of a healthy person in any occupation in the economy the individual could be expected to carry out. Eligibility standards are less strict for semi-skilled and skilled applicants below age 60, whose set of occupations is more limited.[5] They are awarded benefits if their earnings capacity has been reduced to less than half of the earnings capacity of a healthy person with comparable education in any occupation in the same occupational group.

For applicants who have worked in a similar occupation for 10 years in the last 15 years, eligibility criteria are substantially relaxed at age 60 by changing the comparison from a healthy worker performing any type of work in the economy to a healthy worker in a similar occupation. An occupation is considered similar if the following requirements are identical: manual and mental demands, amount of responsibility, posture, concentration, endurance, required care, and stress level (Wörister, 1999). Thus, older applicants are significantly more likely to be awarded benefits, as they are only compared to healthy workers in their occupation. As a consequence of this relaxation, disability enrollment rises significantly beginning at the age threshold.[6]

According to official statistics, the acceptance rate for initial DI applications in 2014 was just below 40 percent. About 60 percent of rejected applicants appeal, of whom 20 percent are ultimately awarded benefits, implying an ultimate award rate of 47 percent. Once benefits are awarded, DI beneficiaries receive monthly payments until their return to work, medical recovery or death. DI benefits can be granted for a temporary period if the beneficiary's health condition is expected to improve. However, very few claimants (fewer than 4 percent) ever leave the DI rolls.

Reforms of Eligibility for Relaxed DI Screening. The relaxed screening age (RSA) threshold in the disability determination process has been modified several times in the past. As a response to deteriorating labor market conditions for older workers, the Austrian government first introduced relaxed DI eligibility standards for unskilled workers above age 55 in January 1981 and for all workers above age 55 in January 1984. In September 1996, as part of an effort to reduce expenditures in the public pension systems and foster employment among older workers, the Austrian government

[5] To be classified as semi-skilled or skilled, an applicant must have worked in a semi-skilled or skilled occupation for 7.5 years or more in the most recent 15 years.

[6] Access to disability insurance is also relaxed in other countries at older ages, including Australia, Canada until 1995, Denmark, Sweden until 1997 (Karlström et al., 2008), and the United States (Chen and van der Klaauw, 2008).

increased the RSA threshold by two years for men only. However, the European Court of Justice ruled in May 2000 that different DI eligibility criteria for men and women would violate EU law and in response the government decided to increase the RSA threshold for to age 57 for men and women.

In March 2012, the Austrian government announced the 2nd Stability Act, which generally reduced the generosity of old age pension benefits. The only change in the DI program was an increase the age threshold for relaxed DI access by 3 years. The increase was phased-in gradually over time. More specifically, the RSA was increased to age 58 in 2013, followed by further increases to age 59 in 2015 and age 60 in 2017. This implies that the 2013 increase tightened disability screening at age 57 for all individuals born in or after December 1955. These individuals turned 57 years old in or after December 2012 and their application would be assessed under the new rules, effective January 1, 2013, because applications are assessed using the rules of the first of the month after filing. In contrast, men born in or before November 1955 could still apply for disability benefits under the old, less stringent rules. Similarly, the 2015 (2017) increases tightened disability screening at age 58 (59) for individuals born ind or after December 1956 (1957). Individuals who had not worked in a similar occupation for 10 years in the last 15 years were not affected by this increase because they were not eligible for relaxed access to DI benefits.

Figure 1 displays the RSA for the birth cohorts used in our subsequent analysis. The RSA was 57 for individuals born between November 1952 and November 1955, while the RSA was increased by 3 years for individuals born between December 1955 and November 1958.

Figure 1

3 Data and Descriptive Evidence

Data. The empirical analysis is based on administrative data from two different sources. First, the Austrian Social Security Database (ASSD) contains very detailed longitudinal information for the universe of workers in Austria since 1972. At the individual level the data include gender, nationality, month and year of birth, blue- or white-collar status, and labor market history. Labor histories are summarized in spells; all employment, unemployment, disability, sick leave, and retirement spells are recorded. Spells before 1972 are available for individuals who have claimed a public

pension by the end of 2008. Since we observe individuals entire work history, we can precisely calculate who satisfies the insurance/contribution years requirements to qualify for relaxed screening above the age threshold. The ASSD also contains some firm-specific information: geographic region, industry affiliation, and firm identifiers that allow us to link both individuals and firms. See Zweimüller et al. (2009) for a detailed description of the data. Second, we use data on all DI applications since 2004 which contain detailed information on the date of the application, the date of the decision, the decision itself (i.e. reject or accept), the reported medical impairment of the applicant, and the stage of the application (first application, appeal etc.). Combining these two datasets allows us to track the career of each DI applicant in great detail both before and after the application decision.

Our main sample includes all private sector workers who are covered by the same pension system and hence face the same eligibility restrictions for DI benefits. We exclude self-employed and civil service workers who are covered by a different pension system. Since we can observe complete work histories, we can precisely calculate whether an individual satisfies the insurance and contribution year requirements needed to qualify for relaxed DI screening. In the analysis, we primarily focus on individuals who are eligible for relaxed screening based on their work history, but we use the sample of ineligible individuals for placebo tests; these individuals should not respond to the changes in the age threshold for relaxed DI screening. The first outcome variable of interest is whether an individual is receiving disability insurance benefits within a certain age range. For example, the 2013 increase in the age threshold for relaxed screening from 57 to 58 is likely to reduce DI receipt between ages 57 to 58, but we also examine whether the policy change affected DI receipt before age 57 as well as after age 58. We then examine the impact of raising the age threshold for relaxed DI screening on DI applications and allowances. Here the outcome variable is an indicator for an application or an allowance. The overarching goal of the different reforms was to foster employment among older workers. Therefore, the third outcome variable of interest is whether an individual is working within a certain age range. The fourth set of outcome variables measures whether individuals receive benefits from other social insurance programs such as the unemployment or sickness insurance program. Estimating the magnitude of such spillover effects is important to understand the fiscal and welfare effects of stricter eligibility criteria for disability benefits.

Descriptive Evidence. Preliminary evidence for behavioral responses at the age threshold for relaxed DI access is provided in Figure 2, which shows the DI inflow rate (=the number of DI awards relative to the population) for men and women by age and birth year.[7] The inflow rate exhibits a sharp increase at the age that coincides with a birth cohort's RSA; age 57 for individuals born in 1955 and age 58 for individuals born in 1956. The peak at age 58 is somewhat smaller in magintude than at age 57, especially for women. .

Figure 2

Figure 3 shows the DI application rate (=the number of DI applications relative to the population) for men and women by age and birth year. For men and women born in 1955, we see a peak in the application rate at their RSA (age 57). This peak disappears for younger birth cohorts who have a higher RSA. For men, but not for women, born in 1956, we see a peak at their RSA of 58.

Figure 3

Figure 4 suggests that reaching the realxed screening for DI is associated with a reduction in employment. More specifically, employmnet rate of exhibits a drop as soon as a birth cohort reaches its RSA. The decline is less pronounced for women and also starts at an earlier age for older birth cohorts, possibly because of a general increase in female employment at all ages over time.

Figure 4

Figure 5 shows the percent of men and women by age and birth year who are either registered as unemployed or receiving sick leave benefits. The figure provides evidence for benefit substitution: the percent of individuals registered as unemployed or receiving sick leave benefits drops as soon as a birth cohort reaches its RSA.

Figure 5

4 Identification Strategy

The goal of our paper is to explore the impact of tighter screening for disability benefits on DI inflow, DI applications and labor market participation. To study this question, we exploit the fact

[7] Since increases in the RSA affected individuals born in December and after, we define a birth year from December in the previous year to December this year. For example, the birth year 1955 refers to individuals born between December 1954 and December 1955.

that the 2nd Stability Act changed the strictness of DI eligibility at certain ages depending on the year of birth. For example, the age threshold for relaxed DI access was shifted from age 57 to age 58 for individuals born after November 1955, implying that they faced stricter DI eligiblity criteria at age 57 compared to those born before December 1955. Similarly, individuals born in December 1956 (1957) or after faced stricter eligiblity criteria at age 58 (59) compared to those born before December 1956 (1957). On this basis, the primary estimation approach compares younger and older birth cohorts, who faced different DI eligiblity rules, over time.

This comparison can be implemented by estimating regressions of the following type:

$$y_{ict} = \alpha + \theta_i + \pi_c + \lambda_t + \beta I(age < RSA) + \gamma I(age < RSA + 1) + X'_{ic}\delta + \varepsilon_{ict}, \tag{1}$$

where i denotes individual, t year-quarter, c birth cohort; y_{ict} is the outcome variable of interest (such as a dummy for DI application, a dummy for DI enrollment, and labor supply measures such an indicator for working), θ_i are age-in-year fixed effects to control for age-specific levels in the outcome variable, π_c are year of birth fixed effects to capture time-constant differences across birth cohorts, λ_t are year-qurter fixed effects to capture common time shocks, and X_{ict} represent individual or region specific characteristics to control for any observable differences that might confound the analysis.

The first key variable of interest is $I(age < RSA)$ which is equal to one if an individual's age in year-quarter t is below the RSA and 0 otherwise. Similarly, the second key variable of interest $I(age < RSA + 1)$ is equal to one if the age in year-quarter t is below the RSA+1 year and 0 otherwise. These indicators varies over time and across birth cohorts because the 2nd Stability Act increased the RSA in three one-year steps. For example, for individuals born before December 1955 $I(age < RSA)$ is one if the age is below 57, while for those born in or after December 1955 $I(age < RSA)$ is already one if the age is below 58. Thus, β effectively measures the average causal effect of a one-year increase in the RSA at the age where DI screening became stricter. Similarly, γ measures the average causal effect of a one-year increase in the RSA at the age where DI screening is relaxed. Equation (1) is estimated separately for men and women using data in the age interval seven years prior and three years post the RSA. Standard errors are clustered at the year-month of birth.

The main identification assumption is that, absent the increase in the RSA, the change in y_{ict} at a certain age would have been comparable between birth cohorts not yet eligble for relaxed screening (treatement cohorts) and those eligible (conrol cohorts) after controlling for background characteristics. A potential concern of our estimation approach is that trends in the outcome variable at an age could be changing across birth cohorts over time for reasons unrelated to the RSA increase. Figures 2-5 show that there may be pre-existing trends in some outcome variables, less so for men than women. We run two placebo test to examine the extent to which the dummies are picking up spurious trends. First, we estimate equation (1) for individuals who are not eligible for relaxed DI screening because they have worked leass than 10 years in the past 15 years, and so we expect β and γ to be zero. Second, we agument equation (1) with a series of indicator variables for intervals before and after an individual's RSA. Specifically, we estimate the following regression:

$$y_{ict} = \alpha + \theta_i + \pi_c + \lambda_t + \sum_{k=-7}^{2} \gamma_k I(age < RSA + k) + X'_{ic}\delta + \varepsilon_{ict}, \tag{2}$$

where each γ_k captures the effect of the RSA at age RSA+k. The estimated γ_k-coefficients for $k < 0$ provide placebo specification checks, although they may capture possible anticipation effects to the RSA increase. The γ_k-coefficients for $k \geq 0$ are informative on the dynamic effects of the RSA increases at later ages.

5 Main Results

5.1 DI Inflow and DI Applications

We first examine how the increase in the RSA affected the DI inflow rate and DI applications. To highlight the channels through which stricter eligibility criteria affect the inflow rate, it is useful to write the probability of a DI award as follows $Pr(\text{Award}) = Pr(\text{Award}|\text{Apply}) * Pr(\text{Apply})$. Taking the total derivative gives the following expression:

$$\frac{dPr(\text{Award})}{d\text{Eligibility}} = \underbrace{\frac{dPr(\text{Apply})}{d\text{Eligibility}} Pr(\text{Award}|\text{Apply})}_{\text{behavioral effect}} + \underbrace{\frac{dPr(\text{Award}|\text{Apply})}{d\text{Eligibility}} Pr(\text{Apply})}_{\text{mechanical effect}} \tag{3}$$

Equation (3) shows that the net effect of stricter eligibility criteria on the probability of an award operates through a behavioral and a mechanical effect. The behavioral effect captures that indivduals are less inclined to apply for benefits under stricter eligibility criteria; it is equal to the change in the probability of applying times the probability of an award conditional on applying. The mechanical effect captures that even if there is no behavioral effect awards decline simply because fewer applicants qualify for benefits under the stricter rules; it is equal to the probability of an award conditional on applying times the probability of applying. Disentangling these two effects is also important to assess the welfare implications of stricter eligibility criteria. If the behavioral effect is large relative to the mechanical effect, then stricter eligibility criteria may help to reduce moral hazard cost by deterring non-disabled individuals from applying. Yet, if the behavioral effect is small relative to the mechanical effect, then stricter eligibility criteria may reduce the insurance value by increasing the likelihood of rejecting deserving applicants who are severely work limited.

Our setting allows us to causally identify the total effect on DI awards as well as behavioral. The mechanical effect is simply the difference of the total effect minus the behavioral effect. The first column of Panel A in Table 1 shows a sizeable drop in the DI inflow rate for men at the age where disability screening becomes stricter (I(age<RSA)). We estimate a drop in the DI inflow rate of 3.81 percentage points or about 62 percent of the baseline average (=3.81/6.17), and this effect is robust to controling for addtional covariates (column 2). On the other hand, DI Inflow increases at the new RSA (I(age<RSA+1)) by 1.46 percentage points. Thus, overall DI inflow in this two-year window declines by 2.35 percentage points. Columns 3 and 4 of Panel A show analogous estimates for the sample of individuals who are ineligible for relaxed DI screenig due to insufficient work experience. In this case, all point estimates are insignificant. Columns 4 and 5 show that the reduction in DI inflow at the age where screening became stricter is slightly smaller for women and the rebound at the later age somewhat bigger. Again, for women who are ineligible for relaxed DI screening we find no statistically significant effects.

Table 1

Panel B of Table 1 present estimates of equation (1) for DI applications. There is a clear drop in the probability to apply at the age where screening becamse stricter. The drop is roughly twice as large for men compared to women (minus 2.7 percentage points compared to 1.2 percentage

points). On the other hand, we find a significant increase at the age where screening is relaxed again. Overall, we find that DI applications decline by 1 percentage point among men and increase by 0.8 percentage points among women. The effects are insignificant for men and women who are ineligible for relaxed screening.

Based on the estimates of stricter eligibility criteria on DI inflow and DI applications, we can now decompose the net effect on DI awards into a behavioral and a mechanical effect. Our calculations suggests that the behavioral (mechanical) effect accounts for 53% (47%) of the reduction in DI awards for men. For women we find that the behavioral accounts for 69% of the observed reduction in DI awards, while the mechanical effect accounts for the remaining 31%.

Figures 6 and 7 display the estimated γ_k-coefficients from equation (2). We find that the effects are almost always insignificant for $k < 0$. In $k = 0$, the age when screening became stricter with the RSA increase, there is a drop in DI inflow and applications, followed by an increase in DI inflow and applications at $k + 1$.

Figure 5

Figure 5

5.2 Employment and Benefit Substitution

One of the government's goals by tightening disability eligibility was to encourage employment among older workers. However, DI is only one of several transfer programs in Austria and individuals may substitute towards these other programs rather than continue to work. Table 2 shows estimate of equation (1) for DI enrollment, employment, and benefit substitution, that is whether somebody is registered as unemployed or receives sick leave benefits.

We find that the increases in the RSA led to a significant increase in employment of about 1.3 to 1.5 percentage points at the age where screening became stricter. This increase in employment persists at the age when the screeing is relaxed again, though the effect becomes weaker. Panel C shows that there is also a permanent increase in benefit substituion of 1.2 to 1.7 percentage points. This increase persists for more than a year and overall over the two-year window we find an increase in benefit substitution of 1.8 to 2.3 percentage points.

Table 2

The γ_k-estimates of equation (2) are displayed in Figures 8-10. We find that the estimates for $k < 0$ are in almost all cases not statistically significant, suggesting that our estimates are not cofounded by differential trends across birth cohorts.

Figure 8

Figure 9

Figure 10

6 Conclusion

A large body of literature has found that reducing disability benefits will slow the rate at which workers exit the labor force and enter the DI program. Another policy tool to slow program growth that has received less attention is to adapt more rigorous eligibility criteria for disability benefits. In this paper, we seek to understand how stricter eligibility criteria affect disability enrollment and labor market outcomes by exploiting a reform in the Austrian DI program that tightening DI eligibility criteria for older workers. More specifically, before 2013 eligibility criteria for disability benefits were significantly relaxed at age 57. Workers above this age threshold would be awarded benefits if they could not perform work in a similar occupation as their last occupation, while workers below the threshold would only qualify for benefits it they could not perform any type of work in the economy. In 2012, the Austrian government enacted a reform that increased the relaxed screening age (RSA) threshold to age 60 in three steps. The RSA was increased to age 58 in 2013 followed by further increases to age 59 and 60 in 2015 and 2017, respectively. These reforms generated quasi-experimantal variation across birth cohorts in the strictness of DI eligibility criteria at certain ages.

We find that a one year increase in the RSA reduced the DI inflow rate at that age by 3.8 percentage points among men and 2.4 percentage points among women. The net effect of stricter eligibility criteria on DI awards can be decomposed into a behavioral effect, capturing that less people apply for benefits, and a mechanical effect, capturing that fewer applicants qualify for benefits under the stricter rules. We find that the increase in the RSA reduced the probability to apply for benefits by 2.6 percentage points for men and 1.2 percentage points for women. Together

these estimates imply that the mechanical effect accounts for the majority of the reduction in DI inflow (53-69 percent) while the behavioral effect is somewhat less important (31-47 percent).

Overall, our findings suggest that tightening eligibility criteria is an effective tool to reduce DI entry, but whether such a policy is desirable from a welfare perspective is less clear. The fact that the behavioral effect is smaller than the mechanical effect may suggest that moral hazard cost of relaxing eligibility standards might be less important compared to the welfare gains from providing better coverage. In future research, we are planning to make this argument sounder by deriving a sufficient statistics that allows for welfare statements using the estimated reduced-form parameters.

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Table 1: Effect on DI inflow and applications

	Men				Women			
	Eligible		Not eligible		Eligible		Not eligible	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
A. Inflow								
I(age<RSA)	-3.81***	-3.81***	-0.04	-0.04	-2.48***	-2.46***	0.02	0.01
	(0.13)	(0.13)	(0.05)	(0.05)	(0.14)	(0.14)	(0.06)	(0.07)
I(age<RSA+1)	1.46***	1.45***	0	0	1.75***	1.76***	0.01	0.02
	(0.17)	(0.17)	(0.08)	(0.08)	(0.2)	(0.2)	(0.08)	(0.08)
Overall	-2.35***	-2.35***	-0.05	-0.04	-0.72***	-0.7***	0.04	0.04
	(0.21)	(0.21)	(0.09)	(0.09)	(0.22)	(0.21)	(0.1)	(0.1)
R^2	0.010	0.017	0.001	0.017	0.007	0.013	0.001	0.010
Avg. control	6.17	6.17	1.2	1.2	4.24	4.24	1.3	1.3
Obs.	3,348,110		3,500,278		1,638,846		3,306,057	
B. Applications								
I(age<RSA)	-2.66***	-2.66***	0.03	0.03	-1.21***	-1.15***	0.11	0.11
	(0.17)	(0.17)	(0.09)	(0.09)	(0.17)	(0.17)	(0.08)	(0.08)
I(age<RSA+1)	1.67***	1.67***	0.08	0.1	2.02***	2.01***	0.1	0.12
	(0.19)	(0.19)	(0.1)	(0.1)	(0.22)	(0.22)	(0.09)	(0.09)
Overall	-0.99***	-0.99***	0.11	0.13	0.81***	0.86***	0.22*	0.23**
	(0.25)	(0.25)	(0.14)	(0.14)	(0.28)	(0.28)	(0.12)	(0.12)
R^2	0.007	0.022	0.001	0.063	0.009	0.020	0.003	0.031
Avg. control	8.15	8.15	3.18	3.18	5.29	5.29	2.39	2.39
Obs.	3,348,110		3,500,278		1,638,846		3,306,057	

Table 2: Effect on DI enrollment, employment, and benefit substitution

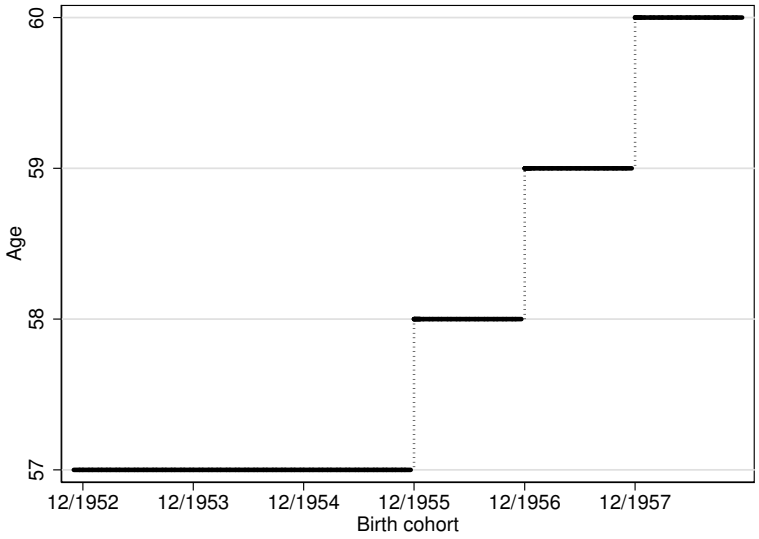
	Men				Women			
	Eligible		Not eligible		Eligible		Not eligible	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
A. Disability enrollment								
I(age<RSA)	-2.96***	-2.95***	-0.06	-0.05	-2.56***	-2.57***	-0.07	-0.09
	(0.12)	(0.12)	(0.06)	(0.06)	(0.13)	(0.13)	(0.08)	(0.07)
I(age<RSA+1)	-1.58***	-1.61***	0.05	-0.03	-1.17***	-1.07***	0.03	-0.08
	(0.13)	(0.13)	(0.14)	(0.11)	(0.16)	(0.16)	(0.13)	(0.11)
Overall	-4.54***	-4.56***	0	-0.08	-3.73***	-3.64***	-0.05	-0.18
	(0.19)	(0.19)	(0.14)	(0.12)	(0.19)	(0.21)	(0.14)	(0.14)
R^2	0.0421	0.0664	0.0025	0.1861	0.0225	0.0696	0.0012	0.1213
Avg. control	16.79	16.79	11.44	11.44	16.91	16.91	10.93	10.93
Obs.	3,348,110		3,500,278		1,638,846		3,306,057	
B. Employment								
I(age<RSA)	1.46***	1.45***	0.05	0.05	1.3***	1.27***	0.14**	0.14**
	(0.11)	(0.11)	(0.06)	(0.06)	(0.15)	(0.14)	(0.06)	(0.06)
I(age<RSA+1)	1.12***	1.13***	0.09	0.12	0.4*	0.34*	0.08	0.11
	(0.13)	(0.13)	(0.09)	(0.08)	(0.2)	(0.18)	(0.08)	(0.08)
Overall	2.57***	2.58***	0.14	0.17*	1.69***	1.61***	0.22**	0.25***
	(0.17)	(0.18)	(0.11)	(0.1)	(0.21)	(0.22)	(0.1)	(0.1)
R^2	0.0351	0.0705	0.0006	0.0661	0.0245	0.0685	0.0012	0.052
Avg. control	77.19	77.19	5.78	5.78	75.03	75.03	6.25	6.25
Obs.	3,348,110		3,500,278		1,638,846		3,306,057	
C. Benefit substitution								
I(age<RSA)	1.67***	1.68***	0.04	0.04	1.15***	1.18***	-0.14*	-0.15**
	(0.11)	(0.11)	(0.06)	(0.06)	(0.17)	(0.16)	(0.07)	(0.07)
I(age<RSA+1)	0.62***	0.64***	-0.11	-0.08	0.68***	0.65***	-0.1	-0.06
	(0.1)	(0.1)	(0.1)	(0.09)	(0.17)	(0.15)	(0.09)	(0.08)
Overall	2.3***	2.31***	-0.07	-0.04	1.84***	1.83***	-0.25*	-0.21*
	(0.16)	(0.16)	(0.12)	(0.11)	(0.24)	(0.25)	(0.13)	(0.13)
R^2	0.0021	0.027	0.0019	0.175	0.005	0.0296	0.0018	0.0885
Avg. control	4.95	4.95	5.57	5.57	6.69	6.69	3.73	3.73
Obs.	3,348,110		3,500,278		1,638,846		3,306,057	

Table 3: Benefit elasticity estimates

	Men		Women	
	Applications	DI Inflow	Applications	DI Inflow
	(1)	(2)	(3)	(4)
A. Age 55-59				
Log benefit	0.0454***	0.0223***	0.0293***	0.00887***
	(0.0089)	(0.0050)	(0.0052)	(0.0023)
F-test	52.35	33.24	44.19	19.75
Prob>F	< 0.001	< 0.001	< 0.001	< 0.001
Observations	1,992,981	1,992,981	1,411,616	1,411,616
R^2	0.077	0.040	0.049	0.036
Avg. dependent variable	0.0760	0.0470	0.0467	0.0231
Implied elasticity	0.597***	0.474***	0.627***	0.384***
	(0.118)	(0.107)	(0.111)	(0.101)
B. Above threshold				
Log benefit	0.0363***	0.0144***	0.0174***	0.00829***
	(0.0085)	(0.0035)	(0.0036)	(0.0022)
F-test	41.81	47.41	35.82	20.45
Prob>F	< 0.001	< 0.001	< 0.001	< 0.001
Observations	887,037	887,037	519,249	519,249
R^2	0.081	0.037	0.035	0.029
Avg. dependent variable	0.0869	0.0565	0.0310	0.0174
Implied elasticity	0.418***	0.256***	0.562***	0.476***
	(0.0974)	(0.0625)	(0.115)	(0.127)

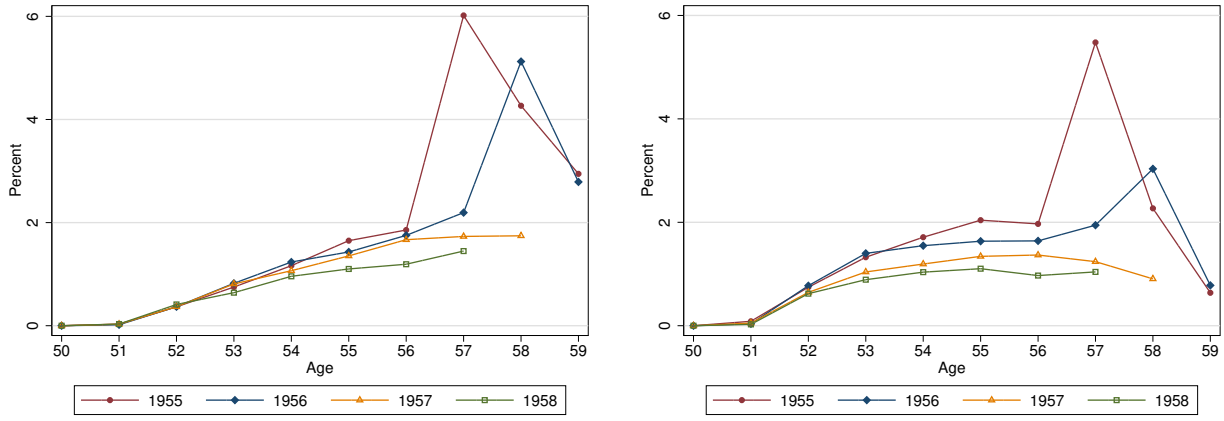
Notes: Tabe presents estimates of the application and benefit elasticity, respectively, using the empirical approach specified in Mullen and Staubli (2016).

Figure 1: Increase in the RSA



Notes: This figure displays all birth cohorts that are used in our subsequent analysis. The 2012 2nd Stability Act implemented an increase in the relaxed screening age (RSA) for DI benefits to age 60.
Source: Austrian federal law (Bundesgesetzblatt) no. 35/2012.

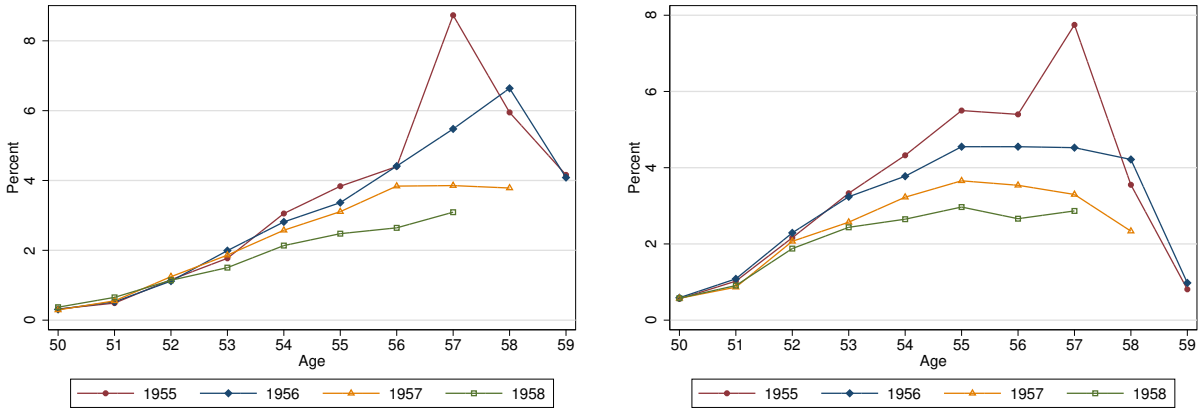
Figure 2: DI inflow rate by age and birth year



(a) Men (b) Women

Notes: Figure shows DI inflow rates age and birth year for men and women.
Source: Own calculations, based on Austrian Social Security Data.

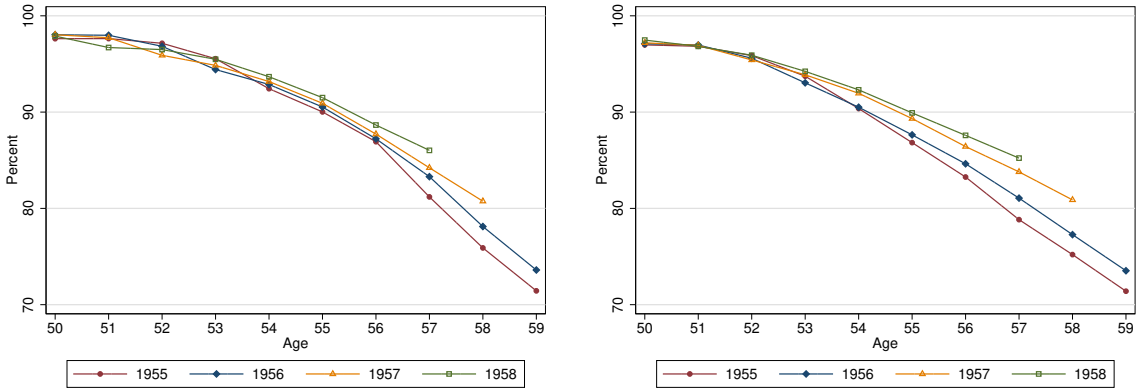
Figure 3: DI application rate by age and birth year



(a) Men (b) Women

Notes: Figure shows DI inflow rates age and birth year for men and women.
Source: Own calculations, based on Austrian Social Security Data.

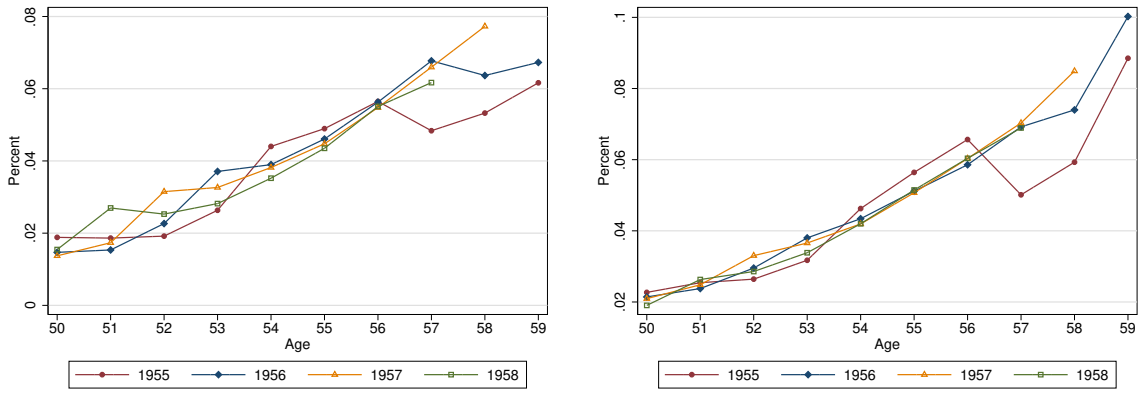
Figure 4: Employment by age and birth year



(a) Men (b) Women

Notes: Figure shows DI inflow rates age and birth year for men and women.
Source: Own calculations, based on Austrian Social Security Data.

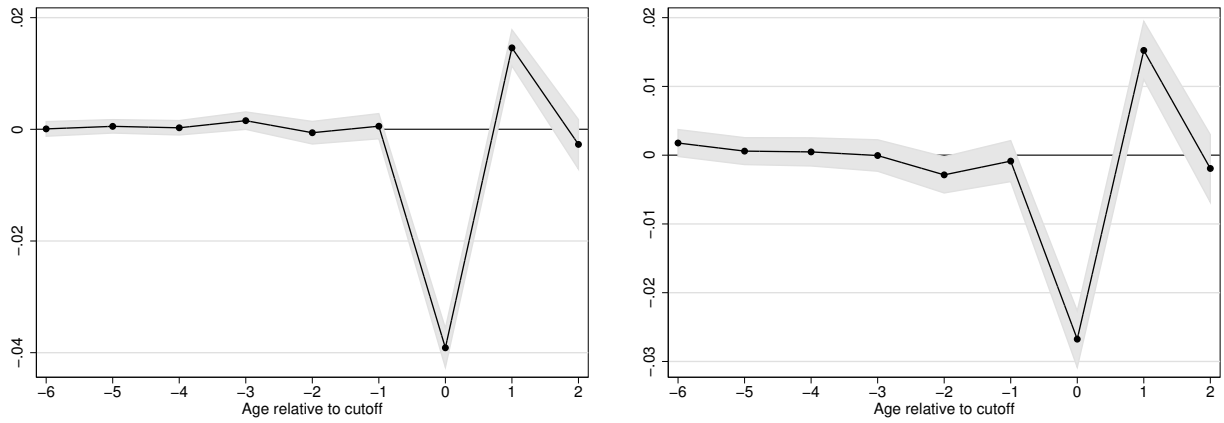
Figure 5: Registered unmployment and sick leave by age and birth year



(a) Men (b) Women

Notes: Figure shows DI inflow rates age and birth year for men and women.
Source: Own calculations, based on Austrian Social Security Data.

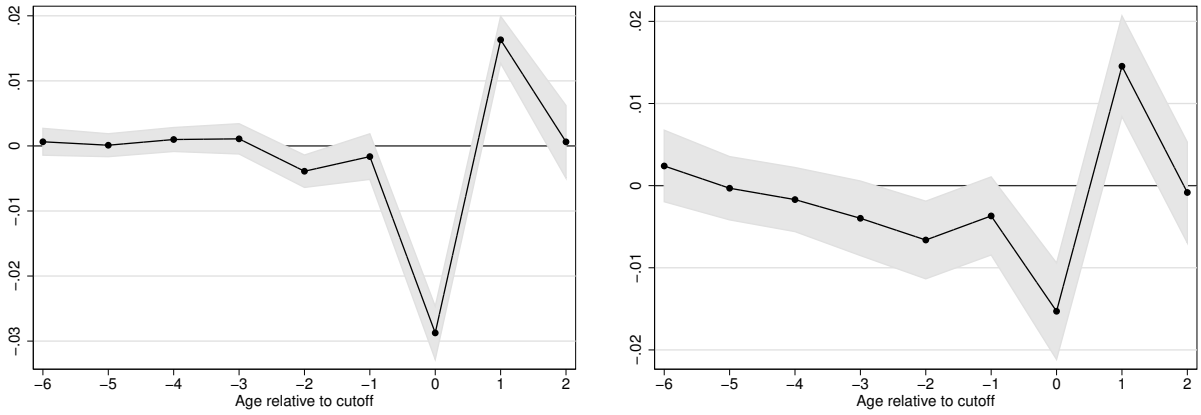
Figure 6: Estimates for DI inflow



(a) Men (b) Women

Notes:
Source: Own calculations, based on Austrian Social Security Data.

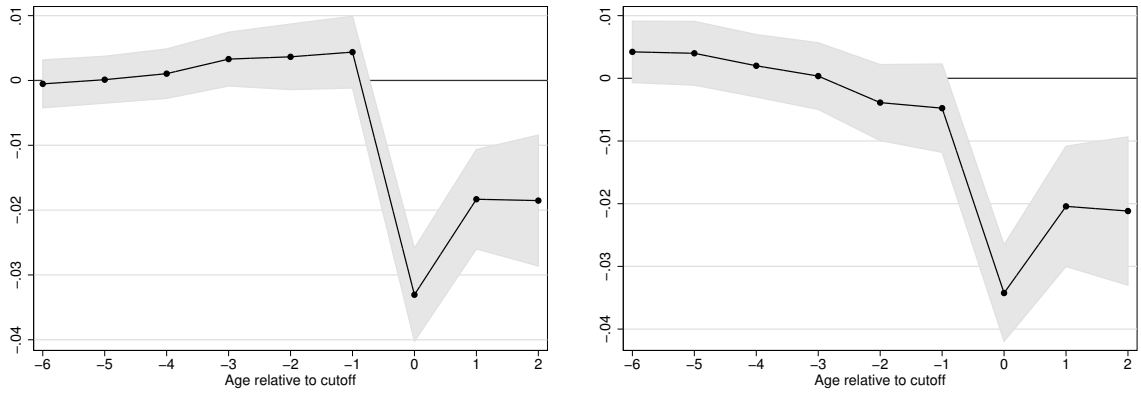
Figure 7: Estimates for DI applications



(a) Men (b) Women

Notes:
Source: Own calculations, based on Austrian Social Security Data.

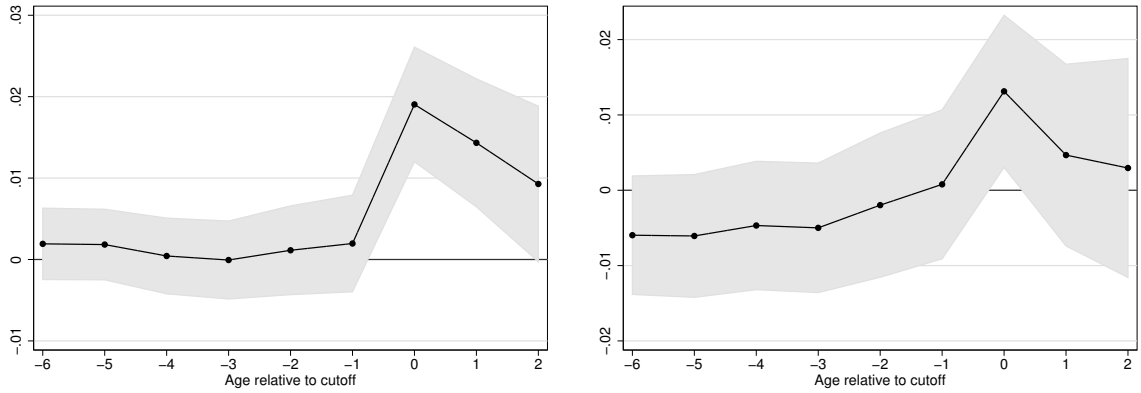
Figure 8: Estimates for DI enrollment



(a) Men (b) Women

Notes:
Source: Own calculations, based on Austrian Social Security Data.

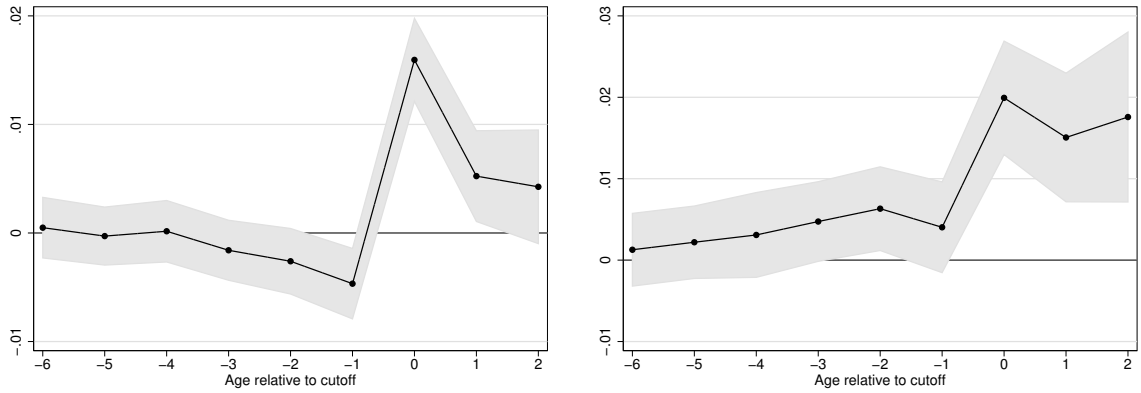
Figure 9: Estimates for employment



(a) Men (b) Women

Notes:
Source: Own calculations, based on Austrian Social Security Data.

Figure 10: Estimates for benefit substitution



(a) Men (b) Women

Notes:
Source: Own calculations, based on Austrian Social Security Data.