

# The Blessing of Leisure or the Curse of Unemployment? Effects of Unemployment Insurance Duration on Health\*

Alexander Ahammer<sup>a</sup>      Analisa Packham<sup>b</sup>

<sup>1</sup>*Department of Economics, Johannes Kepler University Linz*

<sup>1</sup>*Department of Economics, Vanderbilt University and NBER*

## Abstract

Using administrative data for Upper Austrian workers from 2003–2013, we show that an extension in unemployment insurance (UI) duration increases unemployment length and impacts worker physical and mental health. These effects vary by gender. Specifically, we find that female workers eligible for an additional 9 weeks of UI benefits fill fewer opioid and antidepressant prescriptions and experience a lower likelihood of filing a disability claim, as compared to non-eligible unemployed female workers. We posit that these effects are driven by female workers matching to higher-paying and less physically demanding jobs. Moreover, estimates indicate beneficial within-household spillovers for young children. For male workers, we find that extending UI benefit duration increases the likelihood of a cardiac event and eventual disability retirement filing, potentially due to increased stress and/or smoking behavior.

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# 1. Introduction

In recent months several countries have passed policies to extend the maximum duration of unemployment insurance (UI) benefits. Although it is well-documented that providing unemployed workers with UI benefits lengthens unemployment duration, one understudied aspect of extending UI, with substantial importance for policymaking, is the potential impact on health.<sup>1</sup> For example, the replacement of income due to UI and increase in potential search time could allow workers the time and money to invest in healthy behaviors and preventative care for themselves or their children, resulting in more preventative screenings and greater overall levels of health and well-being.<sup>2</sup> Moreover, extending the duration of UI benefits could significantly affect mental health by reducing the time pressure of the job search and related stress and anxiety. Lastly, if workers use short-term opioid therapy or other pain medications due to existing physical stressors of their job, unemployment may provide temporary pain relief, and extended UI duration could result in workers matching to a less painful job, leading to reduced dependence on opioids and a lower likelihood of opioid misuse in the future.

Conversely, for individuals that rely on their occupation for personal fulfillment and sense of self, more time out of the labor force resulting from extended UI duration could lead to worse mental health outcomes. Additionally, supplemented leisure time may cause individuals to engage in more risky behavior, including smoking, alcohol consumption, and substance abuse. Existing research shows that both job displacement and conditional cash transfers (CCTs) affect health and risky behavior, with women *more* likely to engage in healthier behaviors and men *less* likely to engage in such behaviors (Kohler and Thornton, 2012; Black, Devereux, and Salvanes, 2015; Lindo, Schaller, and Hansen, 2018).<sup>3, 4</sup>

In this paper, we test whether longer UI duration leads to changes in worker labor market and health outcomes using administrative data for a large sample of Upper Austrian workers. To do so, we exploit a policy in Austria that extends UI benefits for workers aged 40 and older from 30 to 39 weeks, but does not change benefit levels. We first replicate the approach from Nekoei and Weber (2017) and show that more

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<sup>1</sup>For a review of this extensive literature on how UI affects unemployment duration, see Card, Chetty, and Weber (2007b).

<sup>2</sup>We note that extending UI benefit length has not been shown to improve future job match in all instances (e.g., Card, Chetty, and Weber, 2007a and Card, Chetty, and Weber, 2007b), and we expand on this discussion below.

<sup>3</sup>Specifically, in the unemployment literature, Black, Devereux, and Salvanes (2015) analyze workers in Norway and find that job displacement led to a decline in cardiovascular health, driven by increase in smoking behavior. Furthermore, Lindo, Schaller, and Hansen (2018) find that unemployment is linked to adverse health conditions for children. Using data on job layoffs from the Great Recession they find that maltreatment increases when men are unemployed but they find no such effects for female unemployment.

<sup>4</sup>Additionally, in the CCT literature, there are a number of papers showing that transfers to women, and mothers in particular, improve nutrition and health outcomes for their children (Schady and Rosero, 2008; Angelucci and Attanasio, 2013; Armand, Attanasio, Carneiro, and Lechene, 2016). Similarly, when looking at the effect of CCTs on risky behavior, Kohler and Thornton (2012) perform a RCT in Malawi granting individuals financial incentives for one year to abstain from risky sexual behavior. They find that men who received the cash transfer were 9 percentage points more likely and women were 6.7 percentage points less likely to engage in risky sex.

generous UI time limits lead to increases in unemployment duration.<sup>5</sup> In doing so, we present evidence that employers do not strategically hire or fire employees just before they reach the age-40 threshold, implying that workers just ineligible for the UI extension provide a good comparison group for workers that are just eligible for additional benefits. We then build on this work by estimating effects on job match by gender, and show that female workers drive observed increases in job search time and average wage gains. Then, using linked administrative data on hospitalizations, prescriptions, and disability claims for unemployed workers and their children, we use a regression discontinuity approach to estimate the extent to which more generous UI benefit duration affects physical and mental health and test whether such policies generate spillovers within households.

We present new evidence that extending UI benefits for an additional 9 weeks generates significant health consequences that vary by gender, mirrored by gender differences in time unemployed. In particular, we find that eligible female workers remain unemployed 8 days longer than ineligible unemployed female workers, but take an additional 35 days to match to their next job, while eligible male workers remain unemployed 3 days longer than ineligible male workers, on average. Despite these relatively small effects on days spent unemployed, we find that the eligibility for additional UI benefit weeks create a positive health shock for women and their children. Estimates indicate that female workers just eligible for longer UI benefit duration are 33.3 percent less likely to be prescribed opioids, 8.7 percent less likely to be prescribed antidepressants, and 12.5 percent less likely to eventually claim disability pension. We also present evidence of spillovers within the household. In particular, young children under the age of 6 of unemployed eligible mothers experience reduced outpatient and drug spending.

When analyzing effects for male workers, we find that those marginally eligible for an additional 9 weeks of UI benefits are 0.05 percentage points, or 41.7 percent, more likely to experience a heart attack in the 9 months following unemployment and are 8.1 percent more likely to eventually file a disability claim as compared to marginally ineligible unemployed male workers. This corresponds to approximately 134 additional hospitalizations for acute cardiac events annually, and 610 more workers eventually filing for disability. In line with previous research on job loss and risky behaviors, we posit that this increase in cardiac events and disability claims for male workers is due to additional mental stress and increased smoking behavior as a result of increased time unemployed.

Generally, we find that these health outcomes last during the months unemployed, before returning to pre-period levels. However, some health effects, including declining opioid and antidepressant use for

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<sup>5</sup>We note that Nekoei and Weber (2017) use data from all Austrian workers, while we focus on Upper Austria due to health data availability.

female workers and health care expenses for children, persist even 12–18 months after the unemployment spell. We present new evidence suggesting that these effects are driven by an improvement in wages and job match for female workers. We find no evidence that male workers match to a higher-paying or less physically demanding job as a result of the UI extension, and find that some male workers experience wage losses, indicating that income effects are likely partially responsible for our main results.

While much recent work analyzes the effects of job loss or UI generosity on health, we study the link between UI *duration* on health and contribute to the related literature in a number of ways. First, we note that while many studies have analyzed the effects of unemployment on health more broadly, these findings often rely either on widespread macroeconomic shocks (Ruhm, 2000, 2015; Hollingsworth, Ruhm, and Simon, 2017; Musse, 2020), or shocks common to small, local areas, like plant closures, to identify effects (Ruhm, 1991; Elison and Storrie, 2006; Sullivan and von Wachter, 2009; Browning and Heinesen, 2012; Venkataramani, Bair, O’Brien, and Tsa, 2020).<sup>6</sup> Furthermore, US data on health outcomes and well-being is often self-reported, drawing concerns over whether employees systematically report poorer health when they temporarily lose health insurance coverage.<sup>7</sup> Additionally, many of the existing estimates of job loss and health are cross-sectional, implying that they may not represent true causal effects if recently laid off workers are different than their peers in both observable and unobservable characteristics. For example, many studies do not control for firm-level worker characteristics, which could bias the estimate of health and mortality effects upwards.<sup>8</sup>

To overcome these limitations, we use exogenous sources of variation across individuals using a large sample of workers and objective measures of health in the months following job loss in a setting in which workers cannot manipulate their UI eligibility, do not lose health insurance, and are not granted more generous benefits due to a recession.<sup>9</sup> Importantly, these data track individuals over time, allowing

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<sup>6</sup>In particular, while Ruhm (2000) shows that unfavorable health conditions follow macroeconomic growth, Ruhm (2015) suggests that total mortality has shifted away from being strongly pro-cyclical to being unrelated to macroeconomic shocks, with the exception of some conditions, like deaths from cardiovascular events. However, Hollingsworth, Ruhm, and Simon (2017) show that rising unemployment rates increase opioid-related deaths, primarily among White individuals, which is consistent with Case and Deaton (2015), who show that deterioration in economic conditions corresponds to increases in “deaths of despair”. Other recent work estimates the elasticity of labor shocks on opioid use and finds that during economic expansions the demand for pain relief medication increases and is related to jobs in high injury industries (Musse, 2020).

<sup>7</sup>For example, Kuka (2018) finds that more generous UI increases health insurance coverage and health care utilization, and leads to higher self-reported health. Cylus, Glymour, and Avendano (2015) find that higher maximum UI benefit payments improves self-reported health outcomes 2 years after job loss. Schaller and Stevens (2015) use data from the Medical Expenditure Panel Survey (MEPS) and find that job loss leads to worse self-reported health and mental health. Fu and Liu (2019) use data from the 1995–2011 Current Population Survey-Tobacco Use Supplement data and find that more generous UI benefits lead to smoking cessation. Deb, Gallo, Ayyagari, Fletcher, and Sindelar (2011) analyze responses to the Health and Retirement Study and find that unemployment exacerbates unhealthy behavior for workers already at risk prior to job loss.

<sup>8</sup>See Bloemen, Hochguertel, and Zweerink (2015) for a discussion of controlling for firm-level worker characteristics in the context of the existing literature on job loss.

<sup>9</sup>This latter point is especially important, given the relative stickiness of wages that has been well-documented in the Austrian labor market (Dickens, Goette, Groshen, Holden, Messina, Schweitzer, Turunen, and Ward, 2007). For example, Jäger, Schoefer, and Zweimüller (2019) exploit changes in UI benefit levels in Austria in the 1980s and 1990s and find that

us to observe trends in health conditions, hospitalization, disability, and prescription take-up prior to and following unemployment. By comparing unemployed workers that are similar on all observed characteristics but vary by UI duration eligibility, these data allow us to get a better sense of how UI duration affects an individual's physical and mental health.

Our findings build on recent work documenting the adverse health consequences of unemployment and UI on men, and extend these findings beyond mortality, self-reported health, and mental health effects (Sullivan and von Wachter, 2009; Elison and Storrie, 2006; Kuhn, Lalive, and Zweimüller, 2009). Furthermore, unlike many existing studies which focus only on men, we measure effects for female workers and their children during a period when female labor force participation is at an all-time high and in an era where Austrian women report spending more time on childcare and housework.<sup>10, 11</sup>

Our analysis focuses on UI benefits in a European context, where previous work on job loss and health has shown mixed results in terms of mortality and mental health (Elison and Storrie, 2006; Kuhn, Lalive, and Zweimüller, 2009; Böckerman and Ilmakunnas, 2009; Browning, Dano, and Heinesen, 2006; Browning and Heinesen, 2012; Bloemen, Hochguertel, and Zweerink, 2015).<sup>12</sup> However, we note that Austria is more similar to the US than Scandinavia in terms of work hours and views of traditional gender roles, implying that our findings can inform policy in many different settings and countries (EVS, 2017). Moreover, we are able to isolate health effects for a set of workers whose health insurance coverage is unaffected by job loss.<sup>13</sup> We note that any findings on adverse health consequences of longer UI duration will appear in *spite* of Austria's universal health care system, yielding important policy implications for discussions on optimal UI duration determination in the presence of relatively generous safety net

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wages are relatively unresponsive to UI generosity. This insensitivity holds even among low-wage earners, frequent job switchers, and those with high predicted unemployment duration (Jäger, Schoefer, Young, and Zweimüller, 2019).

<sup>10</sup>In particular, Austrian women's total paid and unpaid working time exceeds men's total work by 21 minutes per day, on average. This average is identical to the difference in men and women's reported time usage in the US. For information on time spent in paid and unpaid work, by county and by sex, see <https://stats.oecd.org/index.aspx?queryid=54757>.

<sup>11</sup>Unlike some European countries, Austria does not offer free public childcare for children under the age of 6, and there exists considerable excess demand for subsidized childcare. Less than 20 percent of Austrian children under the age of 3 participated in center-based early childhood education and care (ECEC) in 2017, below the EU average of 33 percent (European Commission, 2019).

<sup>12</sup>Specifically, Elison and Storrie (2006) look at plant closures in Sweden in the late 1980s and find negative effects on mortality for men, whereas Browning, Dano, and Heinesen (2006) use Danish data and find no stress-related health effects of unemployment. However, for Danish men with strong labor attachment, Browning and Heinesen (2012) find that job loss increases overall mortality, alcohol-related diseases, and mental illness. Bloemen, Hochguertel, and Zweerink (2015) analyze Dutch plant closures and find a 0.60 percentage point increase in mortality in the following five years. Böckerman and Ilmakunnas (2009) use Finnish survey data from the European Community Household Panel and find that workers that become unemployed have a lower baseline level of health, implying that unemployment itself does not affect worker health. Kuhn, Lalive, and Zweimüller (2009) study the effects of plant closures in Austria from 1998–2002 and find that job loss reduces the mental health of men.

<sup>13</sup>Although supplementary private health insurance is available in Austria (it covers very specific inpatient services, e.g., free physician choice and the right to stay in a double room), we find no evidence of unemployment leading to reductions in public insurance coverage. Importantly, 99 percent of people living in Austria have full health care coverage regardless of job status (Hofmarcher and Quentin, 2013).

programs.

Finally, because we test the effects of UI duration on prescription drug use, our findings can speak to programs that may affect opioid misuse in the wake of the opioid crisis. This is especially important, given both the magnitude and reach of the crisis, and also the unclear causal channel between employment and drug use. For example, [Krueger \(2017\)](#) finds that the increase in opioid prescriptions spanning 1999–2015 could account for up to 43 percent of the decline in US labor force participation for men during that time.<sup>14</sup> Alternatively, for workers that need pain medication to perform the daily functions of their jobs, unemployment may lessen opioid prescriptions and the probability of misuse, while extending UI benefit duration may allow workers to match to a new job that is associated with less physical pain. Given that Austria leads the world in per capita morphine consumption ([United Nations, 2018](#)), these findings are especially relevant in our context.<sup>15</sup>

Our findings have several implications for policy. First, the magnitudes of the estimates indicate that extending UI benefit duration eligibility by 9 weeks increases UI benefit duration by 2 days, and nonemployment duration by 20 days, on average, with even larger effects for female workers, and that this corresponds to changes in physical and mental health. Since these effects vary both in sign and magnitude depending on gender, our findings suggest differential health costs of work on men and women and have important implications for addressing gaps in labor force participation. Second, we find suggestive evidence to support the conclusions of [Krueger \(2017\)](#) and [Savych, Neumark, and Lea \(2018\)](#) implying that men engage in more risky behavior after job loss, and are more likely to remain out of the labor force and claim disability in the longer run. Because our estimates are largest for workers with children, our findings reinforce the notion that gender-specific economic shocks have important effects on within-household bargaining and have the potential to affect children's outcomes ([Lindo, Schaller, and Hansen, 2018](#)).<sup>16</sup> Most importantly, when evaluating the main mechanisms responsible for our effects, we find that female workers are able to increase their earnings and match to a less physically demanding job when eligible for additional weeks of UI benefits, providing evidence for the idea that this increased job search time allows women take better care of their health and the health of their children. Taken

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<sup>14</sup>Relatedly, [Rege, Telle, and Votruba \(2009\)](#) find that both men and women are likely to receive disability insurance following a plant closing, while [Savych, Neumark, and Lea \(2018\)](#) documents that longer-term opioid prescribing for lower back pain increases the duration of temporary disability.

<sup>15</sup>While the rate of opioid overdose deaths in Austria is low compared to countries like the US and the UK, Austria ranks above Switzerland, Germany, and France in terms of drug-related deaths, with a drug-related mortality rate of 37 per million population ([United Nations Office on Drugs and Crime, 2019](#)). Opioid prescribing behavior is one factor contributing to these statistics; estimates from a large randomized control trial indicated that the mortality risk of opioid treatment in Austria is 4.5 times that of the general population with the same age and gender distribution ([European Monitoring Centre for Drugs and Drug Addiction, 2019](#)).

<sup>16</sup>Unfortunately, we are unable to directly observe whether workers are married or single; therefore, we focus on parenthood as an indicator of family status.

together, our results suggest that there is scope for government to do more to help workers face pain in their day-to-day jobs, while mitigating incentives for risky behavior. In doing so, targeted policies could reduce direct and external costs to taxpayers and communities.

Lastly, we note that our main effects are driven by parents, low-skill workers, and workers in physically strenuous jobs, which sheds some light on the relationships between economic circumstances, occupational demands, and worker health, and the role that pain medication takes in everyday life. These findings are especially relevant as countries continue to address the ongoing pandemic and/or face new declines in life expectancy for young men as a result of the opioid crisis.

## 2. Unemployment Insurance in Austria

Austria's unemployment insurance program is compulsory, with workers paying a 6 percent payroll tax. UI benefits are related to previous after-tax earnings, with a 55 percent minimum replacement rate and baseline eligibility of 20 weeks.<sup>17, 18</sup> Similar to the UI system in the US, applicants for UI benefits must be willing to accept reasonable employment or undergo retraining.

Benefits for laid-off workers are payable immediately upon entry into unemployment; for job quitters there is a one-month waiting period.<sup>19</sup> Although baseline UI duration is 20 weeks, the total duration for UI benefits increases discontinuously with age. For workers up to 39 years old, the maximum baseline UI benefit period is 30 weeks, for workers aged 40–49 years old, benefits are extended to 39 weeks, conditional on a sufficient contribution period. To qualify, workers must meet an experience requirement of having worked at least 6 out of the last 10 years. After age 50, benefits are extended up to a year.<sup>20</sup>

In this analysis, we focus on the jump in UI benefit duration from 30 to 39 weeks at age 40.<sup>21</sup> We do so for three main reasons. First, this age group gives us a large sample of workers with a high density around the age cutoff. Second, the eligibility extension at age 50 does not often represent a sharp change in benefit duration eligibility for workers receiving UI benefits. Third, the other potential UI duration extension in Austria (from 20 to 30 weeks) is not binding at a particular age, limiting our ability to

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<sup>17</sup>Replacement wages are calculated using the last six months' income. Maximum and minimum benefit levels are adjusted annually. Total UI replacement rates cannot exceed 60 percent for single claimants without dependents, or 80 percent for a claimant with dependents. See <http://www.oecd.org/els/soc/29725351.PDF> for more information.

<sup>18</sup>To qualify for baseline benefits, workers must have contributed at least one out of the last two years.

<sup>19</sup>In our sample, only 9.4 percent of workers are job quitters. We include these workers in an attempt to show more conservative baseline estimates.

<sup>20</sup>Specifically, for workers up to age 39, UI benefits can span 30 weeks only after 156 weeks (3 years) of work in 5 years. For those over 40, workers must have contributed for 6 of the last 10 years to have UI benefits for 39 weeks. UI benefit duration is 52 weeks for workers over the age of 50 with a 9 out of 15 years contribution record, although older workers may also qualify for a special benefit scheme to top up benefits by up to 25 percentage points.

<sup>21</sup>See Figure A1 for a visual representation of why the cutoff at age 50 is not ideal to study in this context, as this threshold is not a true binding constraint for workers receiving UI benefits.



compare workers in a causal framework. Below, we further discuss the extent to which focusing on this cutoff affects both internal and external validity.

### 3. Data

To analyze the effects of UI benefit duration on health, we use administrative data on all workers in Upper Austria spanning 2003–2013.<sup>22</sup> These data include information on an employee’s age, which is critical to the research design, as well as their gender, migrant status, and residence location. Because of the existence of another UI cutoff at age 50, described above, we follow [Nekoei and Weber \(2017\)](#) and include only workers that are between 30–50 years old upon entering unemployment, and meet the experience criterion of having worked at least 6 of the last 10 years.<sup>23</sup>

For information on past fertility, prescriptions, and hospitalizations, we use data containing information on both workers and nonworkers from the Upper Austrian Health Insurance Fund (UAHIF) database linked to social security records from the Austrian Social Security Database (ASSD).<sup>24</sup> The UAHIF is the main statutory health insurance provider in Upper Austria, covering 99 percent of the total population. Importantly, unemployed workers continue to be insured with the UAHIF, irrespective of their former employment. We additionally link workers to their children using birth certificate data to analyze effects of an additional 9 weeks of benefit eligibility on child health to address the potential for within-household spillovers.<sup>25</sup>

Prescription data include the names and doses of every medication which requires a prescription in Austria. Specifically, we analyze diagnoses using ATC code N medications (“nervous system”) and ICD-10 code F diagnoses (“mental and behavioral disorders”).<sup>26</sup> Diagnoses are only available if an individual has either an inpatient hospital stay or a sick leave, which excludes regular doctor’s visits where no sick leave is certified. Therefore, we will not be able to measure outpatient diagnoses.

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<sup>22</sup>Upper Austria is a state in northern Austria. The population is approximately 1.5 million, or 17 percent of the total inhabitants of Austria. The largest city is Linz.

<sup>23</sup>We emphasize that we employ different panel data, as compared to [Nekoei and Weber \(2017\)](#). While [Nekoei and Weber \(2017\)](#) use a panel for all Austrian workers from 1998–2011, which contain only employment and wage outcomes, we use data on Upper Austrians linked to health outcomes for workers and their children from 2003–2013. Our data additionally contains information on individuals that are out of the labor force, as well as retirement and disability outcomes. For comparison, due to the inability to link health data for all Austrians, our estimates are based on approximately 380,000 observations, compared to 1.7 million observations in [Nekoei and Weber \(2017\)](#).

<sup>24</sup>[Zweimüller, Winter-Ebmer, Lalive, Kuhn, Wüellrich, Ruf, and Büchi \(2009\)](#) provide a detailed description of these data.

<sup>25</sup>In the following analyses we focus primarily on mother-child linkages, as we do not have full matching information on fathers if they are not present for the birth, which may lead to selection bias. Moreover, we only have information on children born in Austria. We note that childlessness in Austria is 35 percent for females aged 30–39 and 18 percent for those aged 45–49.

<sup>26</sup>N02A are opioid analgesics, including fentanyl, N05 contain benzodiazepines and other sleeping and antianxiety pills, N06 contain antidepressants, and N07BC are medications used for opioid dependence like methadone, morphine, and buprenorphine. For reference on ATC codes, see [https://www.whocc.no/atc\\_ddd\\_index](https://www.whocc.no/atc_ddd_index).



Moreover, the data do not contain information on over-the-counter drugs, implying that any estimates on drug use may be understated. However, we note that many drugs typically sold over-the-counter in the US, like Acetaminophen, are commonly prescribed by a physician in Austria.<sup>27</sup> Importantly, there are no prescription refills in Austria, which allows us to capture all possible prescriptions during our sample period.

Hospitalization data from the UAHIF contains individual-level information on inpatient and outpatient visits, including information on total physician visits and fees paid, and occurrence of acute cardiac events, such as heart attacks or strokes. These data will allow us to track whether unemployed workers experience more serious health conditions or spend more on physician visits after job loss. Hospital data do not include information on emergency department visits.

Additionally, these linked data contain information on individual-level disability claims. These data allow us to track whether a worker files a disability claim prior to or following job loss. We consider a disability claim to be active if a worker has filed for disability prior to December 31, 2018, which is the latest sample date we can observe labor market status. Importantly, filing a disability claim in Austria is a form of retirement, we therefore refer to disability claims as “disability retirement” throughout.<sup>28</sup>

Summary statistics for Upper Austrian workers are shown in Table 1. We present descriptive statistics for the pooled set of workers (Columns 1–2) and also present these means by gender (Columns 3–4). In Column 5 we present estimates from a *t*-test showing whether the means for female and male workers are statistically different for each outcome. Notably, unemployed workers aged 30–50 in Austria are more likely to be male and have 17 years of job experience, on average. Splitting these descriptive statistics by gender, female workers are more likely than male workers to visit a physician and are more likely to have an opioid and/or antidepressant prescription. Male workers, on the other hand, earn approximately 26.5 Euros more per day, and become employed again 18 days earlier than female workers.

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<sup>27</sup>This data feature allows us to focus on more serious forms of pain treatment. In Austria it is common to prescribe milder pain drugs, such as tramadol and codeine, which are substitutes to Tylenol. Therefore we also consider effects on prescriptions for “weak” opioids below.

<sup>28</sup>Workers bear the burden of proof of inability to work. In Austria, disability pension is paid for an assessed loss of more than 50 percent of earning capacity for workers with at least 60 months of paid contributions. Although the claimant has the burden of proving inability to work due to a physical or mental impairment, there need not be direct medical evidence of subjective events like chronic pain (Federal Ministry Republic of Austria, 2018). See <https://www.ssa.gov/policy/docs/progdesc/ssptw/2008-2009/europe/austria.html> for more information on the interworkings of the disability pension system.

## 4. Methodology

Our empirical strategy exploits the discontinuous jump in UI benefit duration from 30 to 39 weeks at age 40. This regression discontinuity design (RDD) is motivated by the idea that characteristics of unemployed workers related to behaviors and outcomes of interest are likely to vary smoothly through the age threshold; that is, any discontinuity in prescription drug use, health care utilization, or disability claims can be reasonably attributed to the change in benefit length. We operationalize this identification strategy by estimating the following OLS models:

$$y_i = \beta_0 + \beta_1 UIextend + f(age_i) + \alpha t + \eta_i, \quad (1)$$

where  $y_i$  represents the main outcome variables of interest such as individual-level prescriptions for opioids and other painkillers, antidepressants, and benzodiazepines, as well as hospitalizations and cardiac events, and whether a worker  $i$  ever claimed disability retirement.  $f$  represents some smooth function of our running variable, worker age.  $UIextend$  is a binary indicator variable for whether a worker is at least 40 years old at the time of layoff. To construct our preferred estimates we adopt a quadratic specification for the function of our running variable and allow the slope term to be flexible on each side of the UI eligibility threshold, although we additionally fit models where the running variable enters the equation linearly and cubically. In our preferred specifications we also include quarter-year fixed effects,  $\alpha t$ , to control for any cyclical or economic trends in unemployment over time.<sup>29</sup> We highlight estimates from a specification that uses a one-sided bandwidth of 10 years, following [Nekoei and Weber \(2017\)](#), although we additionally present results from a wide range of bandwidths, including a MSE-optimal bandwidth, as suggested by [Calonico, Cattaneo, Farrell, and Titiunik \(2016\)](#). Standard errors are clustered on the running variable, worker age bin. Estimates from this reduced-form specification represent intent-to-treat effects.

In all specifications, we estimate effects using information for unemployed workers only. Our approach therefore compares unemployed workers that are under the age of 40 and are just-ineligible for the 9-week UI benefit extension to those that become unemployed just after turning 40 and are eligible for the additional UI benefit weeks.<sup>30</sup> The identification assumption underlying this model is that no

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<sup>29</sup>This is especially important in light of the fact that our data from 2003–2013 span the years of the global financial crisis. We note that omitting 2007–2009 from our analysis to account for the Great Recession yields estimates that are statistically similar to our baseline estimates at the 1 percent level.

<sup>30</sup>Below, we additionally consider comparisons restricting our sample to just female workers on either side of this cutoff and just male workers on either side of this cutoff separately.

other income transfers, employment shocks, or other related events occur concurrently at the age-40 benefit extension eligibility threshold. The fact that individuals have no control over their age alleviates potential selection concerns. However, hiring and firing powers are held with the firm, which may be aware of an individual's birth date and may be incentivized to discharge workers just before (or just after) this UI extension cutoff.

UI benefits in Austria are not experience-rated, implying that there is no strategic advantage to the firm to either delay or speed up layoffs, based on the UI system. Moreover, firms report the date of layoff, so workers cannot delay claims to UI benefits just after they turn 40. Nonetheless, below we provide formal evidence that there are no discontinuities in worker unemployment at age 40, and provide support that gender, education, urbanicity, migrant status, job experience, parental status, and prior job characteristics do not drive the discontinuities we observe in unemployment duration or health outcomes.

Moreover, with any age-based design, it is critical to consider any other treatments at age 40 that may also affect the outcomes of interest. One such example is if health providers recommend certain preventative care treatments at the age of 40 (e.g., mammographies) and we believe that individuals schedule these appointments near or on their birthdays, leading to an increase in diagnoses or prescriptions. Another such example is birthday celebrations. If an individual decides to engage in risky behaviors, like opioid use, on their 40<sup>th</sup> birthday, our estimates will be biased upward.<sup>31</sup> We can address this issue primarily by estimating a "donut RD" which omits observations near the age cutoff, as suggested by [Barreca, Guldi, Lindo, and Waddell \(2011\)](#). Additionally, by analyzing subgroups more prone to opioid use, we can get a better sense of which types of short-lived behaviors are more likely to be age-related and thus related to turning a year older (i.e., celebratory events or actions due to a "midlife crisis") and which are likely to be sustained as a result of job loss.

We primarily focus on effects within 9 months of unemployment, which corresponds to the maximum benefit duration of 39 weeks, noting that only 2.36 percent of female workers and 2.06 percent of male workers fully exhaust their benefits.<sup>32, 33</sup> Therefore, our below analysis investigates to what extent the *opportunity* to receive benefits for an additional 9 weeks affects the ability of workers to match to a higher-paying job or alters their health. We note that health effects during the period right after unemployment and those occurring once a majority of workers are back to work may vary. To track

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<sup>31</sup>We note that no other Austrian cash or in-kind transfer schemes use this same age threshold.

<sup>32</sup>We find no discontinuity in share of workers who exhaust benefits at the eligible cutoff. For a distribution of an individual's unemployment spell, in days, see Figure A2. Importantly, a large majority of workers return to work within the first quarter of unemployment.

<sup>33</sup>This is consistent with recent survey evidence from Germany showing that while unemployed workers increase search effort as UI benefit length wanes, they do not time the start of new employment with the end of their UI benefits ([DellaVigna, Heining, Schmieder, and Trenkle, 2020](#)).

individual outcomes over time, we additionally estimate the above equation for quarters and months prior to and after unemployment separately. This allows us to check whether the discontinuities we observe in health after job loss are attributed to the timing of unemployment or preexisting anomalies of the data and whether health effects persist after workers have matched to a new job. Finally, using a rolling 3-month window, we show how worker health evolves within the 3, 6, 9, and 12 months following job loss.

## 5. Effects on Unemployment Length and Wages

Before presenting our estimated effects on health, we first analyze how the discrete 9-week increase in UI benefit duration for workers aged 40 and older affects the length of UI benefit take-up, and display this evidence in Figure 1. We plot means of individual-level UI duration, using 3-month age bins, for workers meeting the experience criterion unemployed near the age 40 cutoff. We display quadratic fits for the individual-level UI benefit duration, in days. Workers that become unemployed above the age of 40, shown to the right of the vertical line, are eligible for the 39-week UI benefit duration, while those to the left of the vertical line are ineligible and receive benefits lasting a maximum of 30 weeks. In the bottom right corner, we display the coefficient on the main variable of interest from Equation (1) and the corresponding standard error.

Figure 1 shows the first-stage effect of eligibility of prolonged UI benefits on benefit duration for all workers. We define benefit duration as the number of days in which a worker receives UI benefits. Overall, we estimate a statistically significant increase in UI benefit take-up duration by approximately 2 days for those just over the age threshold, suggesting that an extension in UI duration eligibility, but not generosity, incentivizes workers to claim benefits and/or remain jobless longer.<sup>34</sup>

These findings are generally consistent with previous work suggesting that longer UI duration causes longer unemployment (Nekoei and Weber, 2017; Card, Lee, Pei, and Weber, 2015). However, these average effects may mask important heterogeneity by gender. Although we are unable to observe which households have dual earners, we do observe whether individuals are in the labor force or not. In our sample, males are much more likely than females to be employed, and in survey data are more likely to report being the primary household earner (EVS, 2017).

In Figure 2, we address the notion that the impact of UI benefit duration on unemployment is likely to vary by gender. Indeed, the figure displays visual evidence that male workers eligible for an additional 9 weeks of benefits take up UI benefits for a longer period of time than noneligible male workers. In

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<sup>34</sup>Importantly, we find no evidence that benefit amounts change discontinuously over the age eligibility threshold; estimates indicate a statistically insignificant increase in UI benefits amounting to 0.45 percent.

particular, eligible male workers claim UI benefits for nearly 2 additional days, on average. However, the jump in UI benefit duration for female workers is even larger, accounting for approximately 4 additional UI benefit days.

Table 2 formalizes these estimates based on the model described in Equation (1), and presents effects for various measures of time spent out of the labor force. The results include both local average treatments effects for the pooled sample of unemployed workers as well as results by gender separately. In Column 1 we present estimates for UI benefit duration, our baseline measure discussed above. Then, to consider workers who remain out of work even after benefits expire, in Column 2 we present estimates for unemployment duration, defined as the total number of days that a worker remains in the UI system and is considered “unemployed”. This measure includes workers who continue to look for a job even after their UI benefits have expired and is not conditional on a worker finding new employment. Lastly, to investigate the extent to which UI benefit extensions affect the time a worker spends finding another job, in Column 3 we present effects on nonemployment, or the time, in days, until a worker enters another employment spell. If there is no other employment spell, the variable is censored at December 31, 2018.

Estimates largely reinforce the conclusions that can be drawn from the figures—longer UI benefit eligibility leads to longer time spent unemployed, and these effects are larger for female workers. Specifically, estimates indicate a statistically significant and economically meaningful increase in UI benefit duration by 2.4 days, with average effects of 1.7 days for male workers and 4.3 days for female workers. Moreover, we find that female workers eligible for 9 additional weeks of benefits remain unemployed 8 days longer than ineligible female workers, and nonemployment duration increases by 35 days.

Notably, longer unemployment duration and/or job search time due to UI may improve efficiency if workers eventually find a better job match. While there is some evidence to suggest this is indeed the case [Nekoei and Weber, 2017](#), studies to date focus on workers as a whole, without considering differential effects by gender.<sup>35</sup> In Figure 3 we present evidence to support the notion that UI duration does affect job match, as measured by log wages of the first new job after an unemployment spell, and note that this is driven primarily by female workers. Specifically, we find no changes in job quality for male workers, on average. Female workers receive slightly higher wages, although the magnitudes imply only an additional 1 Euro per day, or 371 Euros per year, corresponding to a 2 percent increase.<sup>36</sup>

<sup>35</sup>In the US context, there is less evidence to support the notion that longer benefit duration leads to improved job match ([Card, Chetty, and Weber, 2007a](#)).

<sup>36</sup>These magnitudes are larger, but overall consistent with [Nekoei and Weber \(2017\)](#) who use a search model to show that the discontinuity in UI benefit duration induces Austrian workers to seek higher-wage jobs, but reduces wages by lengthening time unemployed. In particular, [Nekoei and Weber \(2017\)](#) find an increase of 0.00459 log points at age 40. For comparison,

Because few workers use the full 39 weeks to search, and there is heterogeneity in how long workers take to reenter the labor force, in Table 3, we investigate these wage effects further by estimating effects by quartiles of nonemployed days.<sup>37</sup> We find that for unemployed females who match to a job within the first 93 days, wages increase slightly, by 0.5–0.8 percent. For female workers that take near the entire 39 weeks, there is no statistically significant change in wages. In contrast, male workers do not experience this similar increase in wages, but face a small wage penalty for claiming UI past the 14-week window.

Importantly, these findings imply that granting workers an additional 9 weeks to look for their next job allows some female workers the ability to place in a higher-paying position than they would otherwise, even if they do not use the full UI allowance. These findings suggest that while many workers choose not to spend a full 39 weeks claiming UI benefits, the opportunity to do so increases nonemployment duration and affects worker wages, as compared to unemployed workers with only 30 weeks of benefit eligibility. These findings are consistent with recent work suggesting that some workers overestimate their ability to find a new and/or higher paying job, and allowing additional search time can yield better outcomes (Mueller, Spinnewijn, and Topa, 2020). Next, we analyze whether this time extension also affects the physical and mental health of unemployed workers and their children.

## 6. Effects on Worker Health

In this section, we test to what extent prolonged UI benefit duration affects physical and mental health, health care utilization, and drug expenditures.<sup>38</sup> We first present results for all unemployed workers in our sample, then further explore how these effects vary by gender, family status, and occupation.

### 6.1. Opioid Prescriptions

We first estimate the effects of workers receiving an additional 9 weeks of UI benefits on opioid prescriptions, a proxy for opioid use, using the universe of prescription data for Upper Austria from 2003–2013. We do so given the expansive and growing literature suggesting that opioid prescriptions and opioid misuse is related to job performance and/or unemployment.<sup>39</sup> Moreover, there is existing evidence

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our estimates amount to 0.017 log points for female workers and -0.035 log points for male workers. In other words, we find that wages for female workers increase by 4.4 percent of a standard deviation, while wages for male workers fall by 9 percent of a standard deviation.

<sup>37</sup>We acknowledge that this outcome is differentially affected by UI duration and this test requires us to condition on a variable of interest. Nevertheless, given the wide ranges of number of days for our quartiles combined with small average first-stage effects, we believe this is still a useful exercise.

<sup>38</sup>We have also analyzed effects on the most serious health outcome—mortality. We find no evidence of effects of longer UI duration on mortality for either gender ( $p > 0.61$ ). See Figure A3.

<sup>39</sup>See, for example, Krueger (2017), Hollingsworth, Ruhm, and Simon (2017), and Musse (2020).

that income shocks affect consumption of prescription pain relievers and hallucinogens (Carpenter, McClellan, and Rees, 2017) and illicit drugs and alcohol (Dobkin and Puller, 2007).<sup>40</sup>

In our context, average daily per capita opioid use in Austria ranks among the top five countries in the world, and Austria leads the world in per capita morphine consumption.<sup>41</sup> On average, 1.2 percent of our full sample has a prescription for opioid analgesics. Importantly, female workers are prescribed opioids at 1.3 times the rate for male workers.

First, Figure 4 shows the probability of being prescribed an opioid for workers just above the UI extension eligibility cutoff for all years in our sample period (2003–2013). In particular, we include prescribing data for the 9 months (i.e., 39 weeks) following an unemployment event for all workers between ages 30 and 50. Given that a majority of Austrian workers are male, and that we find a differential effect in UI benefit duration by gender, we separately display binned means and quadratic fits for male and female workers. Figure 4 presents suggestive evidence that both male and female workers are less likely to use opioids when benefits are extended from 30 to 39 weeks, with larger effects for female workers.<sup>42</sup>

In Table 4 Column 1, we present the regression discontinuity estimates from Equation (1) for the pooled sample (Panel A) as well as separate estimates for male and female workers (Panels B and C, respectively), which mirrors our estimates from Figure 4. Below each estimate, we present the sample mean for unemployed workers, ages 30–50. Specifically, estimates indicate that female workers are 0.5 percentage points, or 33.3 percent, less likely to use opioids within 9 months of being unemployed, and these estimates drive the decrease in the overall sample. These estimates correspond to approximately 500 fewer opioid prescriptions each year. Estimates for male workers are statistically insignificant and are precise enough to rule out more than a 11.6 percent decrease in the likelihood of being prescribed opioids.<sup>43</sup>

We also consider how these effects evolve within different time windows after unemployment, which

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<sup>40</sup>Carpenter, McClellan, and Rees (2017) analyze the use of prescription pain relievers and hallucinogens increases when people face substantial shocks during economic downturns, while Dobkin and Puller (2007) focus on effects from a cash transfer program.

<sup>41</sup>The top four countries, in order of per capita opioid use, are the United States, Canada, Germany, and Denmark, with average days of opioid use per resident per year spanning 8.3–17.4 (United Nations, 2018).

<sup>42</sup>We note that, based on this figure, there are apparent increases in average opioid prescription take up for women aged 38–40. This may imply that unemployed women just under age 40 may differ in an important, unobserved way as compared to unemployed women just over the age of 40. However, in Figure A4, we replicate this graph using 1-month, instead of 3-month age bins, implying that the perceived “jump” in opioid prescriptions just to the left of the cutoff is spurious. We also note that all regressions are based on the underlying individual-level data, not the age bins themselves, which should provide more reassurance that these observations are not driving the reported decline in opioid prescriptions. Below we provide more sensitivity checks to support the notion that our estimated reduction is not reliant on functional form and holds even when omitting observations close to the cutoff.

<sup>43</sup>In Section 7 we additionally conduct sensitivity analyses and discuss how these estimates vary across bandwidths and functional form.



may be important for several reasons. First, the nature of some health outcomes, like opioid misuse or acute illness may take time to develop, suggesting that these effects may become more apparent and/or grow after job loss. Second, given that a majority of individuals find new jobs within 6 months, looking at the development of short-lived effects and their persistence can more directly speak to the changes in health behavior associated with the stress of unemployment and/or the relief of finding a new job. Third, by presenting estimates of effects in the months prior to unemployment, we can test whether any estimated health effects represent existing trends in behaviors of laid-off workers. In Table 5, Column 1, we present estimates of extended UI benefit duration on opioid prescriptions within 3, 6, 9, 12, 15, and 18 months after job loss, respectively. Estimates indicate that reductions in opioid prescriptions for female workers are similar to our main results within the 18 month-window after job loss.

Moreover, in Figures A6 and A10 we analyze dynamic effects of longer UI duration on health outcomes, including opioid prescriptions, separately by gender. In particular, for each outcome of interest, we display RD coefficients from Equation (1) separately by quarter for the quarter prior to and the 6 quarters following the start of UI benefits on the x-axis, and coefficients on the y-axis. Estimates indicate that opioid prescriptions decline in the quarters following unemployment for women, with large temporary reductions lasting 4 quarters. For male workers we see small, statistically insignificant effects for opioid prescriptions during this period.

Overall, these differential effects by gender motivate the idea that male and female workers face different demands on the job and in the household. Two potential explanations uphold these findings: (i) female workers use opioids while employed due to existing physical stressors and/or (ii) unemployment may provide temporary pain relief. Alternatively, if extending UI duration allows women needed time to match to a less painful job, starting a new position itself may reduce reliance on opioids. As shown in Table 6, estimates are driven by a decrease of “weak,” or low-potency opioids prescribed to female workers, including opioids in ATC categories N02AX, like tramadol, or codeine and dihydrocodeine, versus higher-potency opioids, like morphine or oxycodone.

We have also analyzed whether these effects may be explained by substitution to other less-addictive pain medication, and present evidence supporting this hypothesis in Figure A5. Specifically, we find weak evidence that women substitute to non-opioid analgesics in the 9 months following unemployment. When pooling months together, and/or observing quarterly data, as shown in Figure A6, we find a large and statistically significant positive effect of non-opioid pain prescriptions for female workers in the first quarter (i.e. first 3 months) after unemployment.<sup>44</sup> Therefore, these findings support the idea that

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<sup>44</sup>These effects fade after 3 months, and estimates after 9 months shown in Table 4 Column 2 are statistically insignificant.

some female workers may take low-potency opioids to perform at their jobs, and joblessness allows for a reduction in the use of such drugs.

Furthermore, we note that these average effects may mask differences in opioid use for female workers, which may vary depending on a worker's level of education, lifestyle, and occupation type. To test these possible explanations further, in the first column of Table 7 we investigate additional heterogeneous effects of UI extensions on opioid prescriptions across female worker subgroups.<sup>45</sup> First, we consider the idea that female workers may face more pain while unemployed due to a combination of physical work demands and within-household stressors. These challenges may be even greater for households with children. To explore this possibility, we create an indicator for whether a female worker gave birth before the age of 44 or whether a male worker has been registered as a father before the age of 44, and analyze whether effects are stronger for this subgroup.<sup>46, 47</sup>

In Table 7 Column 1 Panel (a) we present evidence that female workers with children drive our main results. Estimates indicate that women with children experience a up to a 0.9 percentage point, or 60.0 percent, reduction in opioid prescriptions when eligible for an additional 9 weeks of UI benefits.<sup>48</sup> While this reduction is relatively large, we note that only 1.5 percent of female workers fill an opioid prescription each year.

Next, in the first column of Table 7 Panels (b)-(e) we present estimates by occupation type and education to explore whether low-skill, low-educated, or low-income female workers are more likely to experience large gains in health when UI benefits are extended. In particular, we consider effects based on whether a female worker works in a designated "low-skill" occupation, works in a job that is physically taxing, works part-time, and/or has less than a college education, respectively.<sup>49</sup> Estimates indicate that female workers in physically demanding jobs, low-skill jobs, and workers with lower education levels are more likely to reduce opioid use in the 9 months following unemployment.

Importantly, this effect may be largely driven by the types of jobs workers match to when given a 9-week extension in benefits. In the previous section, we show that, conditional upon finding a new job,

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<sup>45</sup>For completeness, subgroup estimates are presented in Table A1 for male workers.

<sup>46</sup>Importantly, fathers are only recorded if the child is born in wedlock, which may bias our estimates for male workers.

<sup>47</sup>For mothers, we define motherhood by age 44 due to data restrictions. Birth register information is available only until 2007. Thus, females who are 50 years old (the maximum age in our baseline sample) in 2013 (the last year of our sample) were only 44 years of age in 2007. Therefore, we can only observe completed fertility up to age 44 for every mother in our main sample.

<sup>48</sup>We have also analyzed whether workers that fully exhaust benefits before returning to work are driving our results. Overall, our results are concentrated in female and male workers that return to work before the end of the 39-week eligibility period, although we note that the sample of workers that fully exhaust benefits represent a smaller sample, and these estimates may be underpowered.

<sup>49</sup>Because not all variables are recorded for all workers in all years, sample sizes vary across panels, although remain relatively similar in size, with no notable systematic non-reporting.

female workers take an additional 35 days, on average, to search for their next position. We also find that average wages increase for female workers eligible for this extension. Next, we analyze whether the conditions of the next job can explain the reduction in opioid use shown in Table 7. In Table A2, we present estimates from Equation (1) and additionally include an interaction term for whether an individual experienced occupational hardship prior to job loss. Estimates indicate that female workers laid off from a physically demanding job are 1.3 percentage points, or 7.4 percent less likely to match to a physically demanding job during their next employment spell when eligible for additional weeks of UI benefits.<sup>50</sup> This estimate corresponds to nearly 1,000 fewer female workers in jobs with hardship, which is twice the estimated reduction in opioid prescriptions.<sup>51</sup>

Overall, these findings have stark implications for the adverse health conditions that many workers face. Female workers, especially mothers, are less likely to use opioids when they experience extended UI benefit eligibility, and these effects are concentrated for low-skilled workers in industries imposing a large physical toll. Low-skilled male workers, on the other hand, experience no change in the probability of being prescribed opioids following unemployment, which is consistent with previous findings suggesting a strong complementary between leisure and opioid use for men but not women (Krueger, 2017; Serdarevic, Striley, and Cottler, 2018). Our findings therefore speak to distinct differences in worker behavior across gender, especially during a time when women are contributing to high rates of female labor force participation but also report engaging in more housework and childcare than their partners (OECD, 2020). In the next section, we further discuss prescription drug usage to analyze effects of UI benefit duration on mental health and/or drug and alcohol dependence.

## 6.2. *Mental Health*

Unemployment is often associated with increased stress, depression, and deteriorated mental health (Kuhn, Lalive, and Zweimüller, 2009; Classen and Dunn, 2012). This could be due to financial insecurity, changed plans or expectations, or perceived loss of purpose. Extending UI duration could lead to improved mental health if employees take more time to relax and rest or find a job with better wages. On the other hand, if prolonged joblessness compounds this mental stress, or results in consumption of goods like

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<sup>50</sup>We note that there is much persistence in job type over time. Female workers unemployed from a physically demanding job are 40 percent more likely to work in a physically demanding job during their next employment spell, as compared to workers in other occupations.

<sup>51</sup>We also note that we find some evidence that male workers do not match to a less physically strenuous occupation when given an additional 9 weeks of UI benefits. Alternatively, these eligible unemployed male workers are slightly *more* likely to match to a physically demanding job, and male workers that exhaust their UI benefits match to a lower-paying job. Therefore, our findings imply that male workers may not be reducing opioid use, on average, due to the existing physical job stressors that female workers no longer face when given an extension in UI benefits.

drugs, alcohol, or other risky behaviors, anxiety or depression may worsen. Similarly, if there is societal or family pressure to remain unemployed longer due to the extension in UI benefits, workers that do feel a sense of meaning when employed may experience more adverse mental health consequences.

In Figure 5 we analyze the effects of UI duration on the uptake of prescription drugs for stress, anxiety, and depression. In particular, we present estimates of the take-up of benzodiazepines, a class of psychoactive drugs primarily used for treating anxiety (top panel), as well as take-up of antidepressants (bottom panel).<sup>52</sup>

We present our formal RD estimates for these health outcomes in Table 4. Overall, we find that female workers eligible for an additional 9 weeks of UI benefits experience decreases in antidepressant prescriptions following unemployment.<sup>53</sup> In particular, estimates indicate that extending UI benefits reduces antidepressant prescriptions by 8.7 percent for female workers. As shown in Table 7 Column 3, effects are largest for full-time workers, low-educated workers, and workers in low-skill occupations.

Moreover, as shown in Column 4 of Table 4, we estimate a statistically significant 25 percent increase in benzodiazepine prescriptions for female workers after unemployment. Effects for both types of prescriptions persist when extending the considered post-unemployment window to 18 months after job loss (Table 5).

There are two potential explanations for these findings. While results for benzodiazepines suggest that female workers seek drugs to help reduce stress and anxiety and increase sleep while unemployed, results for antidepressants at the same time provide support for the idea that relaxing the job search time constraint may improve workers' mental health. One possibility consistent with our results is that when female workers are eligible for longer UI duration they find higher paying, albeit more demanding, jobs leading to more stress. However, these jobs also pay more, which may lead to decreases in depression.

Nevertheless, given that these prescription drugs are often seen as substitutes, these effects may seem surprising. Therefore, in Table 8 we further investigate which types of female workers may be more likely to increase their take-up of benzodiazepines when eligible for 9 additional weeks of UI benefits. Specifically, we test whether these prescriptions vary for the population or workers that receives psychotherapy treatments prior to unemployment, as these patients may be more likely to experience reported stress and anxiety just after job loss.

Despite the fact that less than 2 percent of our total sample of female workers receives psychotherapy, increases in the probability of receiving a benzodiazepine prescription are entirely concentrated in this

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<sup>52</sup>For a list of commonly prescribed benzodiazepines in Upper Austria and their targeted treatment purposes, see Table A3.

<sup>53</sup>We find some evidence that male workers increase use of antidepressants when eligible for longer UI duration. However, this effect is not statistically significant or consistent across bandwidths.

subgroup, and these effects are large enough to drive the overall increase for the full sample. These effects are consistent with evidence in Table 6 indicating that the increase in benzodiazepine prescriptions is largest for the more “potent” drugs, which are potentially more likely to be taken by existing psychotherapy patients, due to potential side effects and withdrawal symptoms of the drugs (Susman and Klee, 2005).

Furthermore, we find that this is not the case for antidepressant prescriptions. For female workers not enrolled in psychotherapy, estimates indicate a 8.8 percent decline in the probability of receiving an antidepressant prescription when eligible for a UI benefit extension. We find no statistically significant effects on benzodiazepine prescriptions for this group. Moreover, we estimate no changes in psychotherapy take-up just before or after job loss, indicating that this is not driven by changes in patient composition at the benefit cutoff.<sup>54</sup>

One remaining question is whether for these types of prescriptions, prescribing behavior is changing most for those with existing prescriptions or for those who previously did not have a prescription for benzodiazepines or antidepressants. In Tables A5 and A6, we investigate the effects of longer UI duration on changes in the level of prescriptions. Table A5 reports results for the total number of packages prescribed, including zeroes, while Table A6 provides estimates for the number of packages prescribed, conditional on receiving a prescription. These estimates are largely insignificant, but imply that longer UI duration does affect patients’ decisions to start or stop taking a prescription drug.<sup>55,56</sup>

### 6.3. Health Care Utilization

In this section, we test the relationship between UI duration and health care utilization. To the extent that UI benefit duration affects risky behaviors, we may observe changes in the number of and/or the intensity of interactions with the health care system. Importantly, Austrian workers do not lose health care coverage after job loss, implying no effects on the intensive or extensive margins of health care utilization due to changes in out-of-pocket costs. Therefore, any observed effects on hospitalizations, doctor’s visits, or prescriptions are likely due to changes in worker health.<sup>57,58</sup>

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<sup>54</sup>See Figure A7. Moreover, we note that estimates in Columns 2 and 4 in Table 8 are statistically different at the 1 percent level.

<sup>55</sup>Additionally, for opioid prescriptions, estimates indicate that changes in the extensive margin drives our main result; that is, having access to a longer period of UI benefits greatly reduces the probability that more female workers start taking opioids.

<sup>56</sup>We have also tested whether an employee eligible for 9 additional weeks of UI benefits is more likely to seek treatment for alcohol or opioid dependence. However, these occurrences are relatively rare. Estimates for alcohol addiction and opioid addiction treatment are statistically insignificant and we can only rule out up to a 39 percent decrease in opioid- and alcohol-dependence prescriptions overall.

<sup>57</sup>UI benefit duration may also affect a worker’s leisure time, leading to more doctor’s visits and/or prescriptions for previously untreated ailments. However, in Austria, many workers participate in sick leave insurance, which compensates workers for lost earnings due to illness, and by law employers must grant time off to see a doctor during working hours (Ahammer, 2018).

<sup>58</sup>When observing hospitalizations at the intensive margin, we find that female workers spend, on average, 1 fewer day in the hospital, which could indicate that these workers are able to visit the hospital at an earlier stage in an illness.

In Figure 6 and Table 9 we consider the average effects of extending UI benefits by 9 weeks on in-patient hospital stays within 9 months after job loss. Overall, we find some evidence for reductions in outpatient expenditures, although estimates are relatively imprecise.<sup>59, 60</sup> For male workers, we find that extending UI benefit duration reduces inpatient days by 12 percent. However, we note that effects on in-patient days for unemployed male workers is not always significant across specifications, and is not statistically significant in any one quarter after unemployment, casting doubt on whether these particular estimates on all aggregated diagnoses represent true causal effects. Below, we further investigate what types of acute illnesses may be more likely to be affected by unemployment specifically and focus our attention primarily on cardiac events.

#### 6.4. Cardiac Events

In this section, we present estimated effects of UI duration on the prevalence of heart attack or stroke, using individual-level data on hospitalizations from the UAHIF. Despite the fact that cardiac events are relatively rare, we focus on these outcomes due to the existing evidence suggesting that unemployment leads to negative effects on cardiovascular health, due to increases in adverse health behaviors, like smoking and/or increases in stress due to job search (Black, Devereux, and Salvanes, 2015; Vogli and Santinello, 2005).<sup>61</sup> While we cannot focus on smoking behavior directly, this possible explanation is especially plausible and important for Austria, which maintains the highest smoking rate for teenagers and ranks 4<sup>th</sup> for adults in OECD countries (OECD, 2019).

Figure 7 shows the mean counts of heart attack or stroke within 9 months after job loss for male and female workers separately just above the UI extension eligibility cutoff. We present our main regression-based estimates in Table 10. Estimates indicate that women are no more or less likely to experience a cardiac event in the months following unemployment, while males are 0.05 percentage points, or 33.3 percent, more likely to experience such an event within 9 months, driven by a 41.7 percent increase in the likelihood of a heart attack.<sup>62</sup>

<sup>59</sup>Similarly, we estimate no increases in physician fees or hospital fees billed or the number of physician visits.

<sup>60</sup>We also consider the possibility that at age 40 women are more likely to go to the doctor for a mammogram. However, we find no evidence that extending UI insurance changes behavior on this margin. See Figure A8. Similarly, we find no discontinuous effect on workers choosing to have a baby after unemployment (i.e. Figure A9).

<sup>61</sup>Specifically Black, Devereux, and Salvanes (2015) estimate a dynamic difference-in-differences model and find that job displacement in Norway for workers in their early 40s led to a decline in cardiovascular health, driven by increase in smoking behavior, although they do not document any other significant health effects. Vogli and Santinello (2005) find that changes in smoking and excessive drinking behaviors are a result of the psychosocial stress suffered by the unemployed.

<sup>62</sup>For heart disease that is less severe, we may also expect to see an increase in prescriptions for heart medications. Indeed, we find that prescriptions for all heart medications, including beta blockers and cholesterol drugs, increase for male workers when they are eligible for 9 additional weeks of UI benefits. We find no such effects for the placebo sample, male workers unemployed near the age 40 cutoff that are not eligible for the extension in benefits.

To put these estimates into context, tobacco cessation interventions have been shown to reduce cardiac events by 3–5 percentage points (Centers for Disease Control and Prevention, 2017), while job loss has been shown to lead to a 5–6 percent increase in daily smoking for Norwegian workers in their 40s (Black, Devereux, and Salvanes, 2015). If 6 percent of male workers in our sample started smoking daily, that would lead to a 1.8 percent increase in total daily smokers, corresponding to an expected 66 additional smoking-related heart attacks (Woloshin, Schwartz, and Welch, 2008).<sup>63</sup> Given that 20–33 percent of heart attacks are linked to smoking, our estimates account for approximately 48–79 additional heart attacks due to increased smoking behavior (CDC, 2010). Therefore, our estimates are well in line with previous research and provide suggestive evidence that increases in smoking behavior among male workers may be largely responsible for these estimated effects.

We present the dynamic effects of such acute illness in Figure A10, following Black, Devereux, and Salvanes (2015), and we find that these effects for heart attacks for male workers are largest in the 1–2 quarters (i.e. 4–9 months) after job loss, while effects for stroke peak 12–15 months after job loss.<sup>64</sup> These slightly delayed effects of extended UI duration for male workers may be unsurprising given that heart disease triggered by exertion and stress develop slowly, and individuals can have warning signs and symptoms of chest pain weeks in advance. Importantly, none of these effects are present prior to unemployment, providing additional support for the idea that these cardiac events are related to unemployment and not preexisting anomalies of the data.<sup>65</sup>

When we investigate how these effects differ across worker types, estimates in Table 11 indicate that the average increases in cardiac events are driven by parents (Panel (a)), men working full-time jobs (Panel (d)), and men *not* in low-skilled or physically demanding occupations (Panels (b) and (c)).<sup>66</sup> These findings support the idea that male workers experiencing adverse health consequences when UI duration is extended are working stressful office jobs. This is in contrast to effects we find for female workers, which seem to be driven by those in jobs prior to unemployment that are low-skill and require physical pain mitigation.<sup>67</sup> Furthermore, estimates from a specification using a rolling 3-month window, as shown in Table A4, indicate that these cardiac health effects are persistent.

<sup>63</sup>This figure is calculated using the 30 percent base smoking rate for adults in Austria and corresponds to nearly 440 additional daily smokers in Upper Austria per year (Bank, 2020).

<sup>64</sup>Conversely, as shown in Figure A6 the probability of a female worker experiencing a cardiac event decreases over time.

<sup>65</sup>Although these estimates may seem at odds with the *decrease* in in-patient stays for male workers, described in the above section, we note that hospitalizations for cardiac events are relatively rare compared to all types of hospitalizations, but may be most related to stress-inducing job shocks.

<sup>66</sup>While effects for parents are positive and statistically significant across all cardiac outcomes, because we lack full birth certificate information on fathers, this particular panel may represent effects for a biased sample, as described above in Section 3.

<sup>67</sup>Moreover, when we estimate effects for female workers, estimates indicate that some women, namely those without children and those in less physically demanding jobs, have a *lower* probability of experiencing a cardiac event when eligible for 9 additional weeks of UI benefits, suggesting that the extension in job search time may benefit certain types of female workers.



## 7. Testing the Sensitivity of the Estimates

In this section, we explore the sensitivity of our estimates to functional form and various threats to identification. First we note that our findings may overstate the true effects of unemployment on health if firms hire and fire different types of workers based on their knowledge of the age 40 cutoff. Importantly, firms do not receive any type of penalty or reward based on this threshold, and Austrian UI benefits are not experience-rated. Nonetheless, in Figure 11 we present an age distribution of unemployed workers and estimated discontinuity in the number of jobless workers near this cutoff. We find no lumpiness in this age distribution, implying there is no manipulation of the eligibility cutoff in layoff decisions.

Next, we explore whether there exist discontinuities in other types of observable characteristics, including gender, as well as urbanicity, migrant status, education, experience, and log wage. Graphical evidence is presented in Figure 12, and formal estimates are presented in Table A7. Across all outcomes these estimates are statistically insignificant at the 1 percent level, providing additional support that workers on either side of the UI extension eligibility threshold are similar on measurable characteristics.<sup>68</sup>

To further test whether these health effects are simply an artifact of the data, in Table 12 we present effects for the three months prior to unemployment. This is especially important if certain types of workers with physical or mental illness are more likely to be laid off work. All estimates prior to job loss are statistically insignificant at the 5 percent level, providing additional support for the notion that unemployed workers eligible for the UI extension are comparable to unemployed workers that are just below the age cutoff and do not become unemployed due to existing physical or mental health ailments that would be observed even in the absence of the benefit extension.

Relatedly, we test whether omitting observations in a small neighborhood around the age cutoff (i.e., a “donut”) affects our results, as is practice in other age-based designs (e.g., Barreca, Guldi, Lindo, and Waddell, 2011; Barreca, Guldi, Lindo, and Waddell, 2016; and Carpenter and Dobkin, 2009). In Figure 13 we show RD estimates for a sample without female workers who become unemployed within one quarter before and after their 40<sup>th</sup> birthday.<sup>69</sup> These estimates are similar to the baseline results, which mitigates concerns that other events interfere with our identification strategy.

Additionally, we test whether workers that do not meet the criteria to receive 39 weeks of UI benefits (namely, the experience criterion). As discussed above, this eligibility provision requires that workers

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<sup>68</sup>Similarly, when we test whether the compositions of our defined subgroups from Table 7 change differentially across the threshold, we estimate no discontinuities at the eligibility cutoff in whether a worker is a parent, part-time worker, low education, or working with hardship or in a low-skill occupation.

<sup>69</sup>Estimates for other outcome variables and for male workers are also statistically similar to main results at the 1 percent level.

have worked at any job for at least 6 out of the last 10 years. In particular, in Table 13 we show our baseline effects for both female and male workers compared to workers that are laid off at age 40 but *not* eligible for the extension in benefits. We find that female workers eligible for the program are driving the main results, which provides further evidence that the extension in benefits, and not unemployment itself, is responsible for changes in physical and mental health.<sup>70</sup> Similarly, male workers are not more likely to experience cardiac events prior to unemployment.<sup>71</sup>

Finally, we provide evidence that our effects are not sensitive to various functional forms or bandwidths in Tables 14 (female workers) and 15 (male workers). In Column 1 we replicate our baseline results from Equation (1). In Column 2 we present results from a specification that allows the running variable to vary linearly.<sup>72</sup> Column 3 presents estimates from Equation 1 using triangular kernel instead of uniform kernel weighting. Column 4 shows estimates from a model using a smaller MSE-driven bandwidth, instead of our preferred one-sided bandwidth of 10 years.

Estimates in Table 14 Panel (a) are similar to the main results for female workers across specifications for all outcome variables and indicate reductions in opioid prescriptions ranging from 20.0–53.3 percent and reductions in antidepressant prescriptions ranging from 8.5–9.4 percent. In Panel (b) of Tables 14 and 15 we present estimates for health care utilization. Estimates indicate some declines in outpatient expenditures for both female and male workers, although estimates for male workers are not consistent across models and may pick up existing trends (i.e. see Figure A10). Therefore, we rely less on these aggregate estimates to represent true causal effects. Finally, estimates for cardiac events (Table 15 Panel (c)) for male workers estimates are positive and similar in magnitude across columns and indicate effects ranging from 20–35 percent.

Lastly, in Figures A11–A14 we present coefficients and their respective 95% confidence intervals across a wide range of bandwidths, highlighting the MSE-optimal bandwidth for comparison. Estimates are relatively consistent across bandwidths and estimates relying on the MSE-optimal bandwidth reinforce our main findings.<sup>73</sup>

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<sup>70</sup>When estimating effects for eligible workers, using a difference-in-RD approach with the ineligible unemployed workers as a control groups, estimates are similar to these baseline results and indicate reductions in opioid prescriptions, antidepressant prescriptions, and inpatient expenditures.

<sup>71</sup>Although we estimate some small effects on prescriptions for male workers, generally, antidepressant and benzodiazepine as well as health care utilization results for male workers are inconsistent across samples and bandwidths.

<sup>72</sup>We do not present estimates from models including higher-order polynomials given that Gelman and Imbens (2019) suggest these models as these estimates are more likely to be noisy and lead to poor inference.

<sup>73</sup>In Tables A8–A10 we also provide evidence that the inclusion of various fixed effects does not have a meaningful effect on our main estimates. Estimates are statistically similar across columns, suggesting that the inclusion of fixed effects does not drive our results.

## 8. Further Results

### 8.1. Within Household Spillovers

Next, we analyze how a change in a mother's UI benefit length can affect the health of their children. There are two arguments that reinforce the idea that child health will improve with longer UI duration: (i) more leisure time for women could lead to more scheduled and attended well-visits and/or (ii) longer UI leading to a "better match" job with higher wages may allow for less stress within the household and/or a better affordability of complements to health, like more nutritious food.

We present estimates on proxies for child health separately by child age in Table 16 based on their parent's age of unemployment.<sup>74</sup> In Columns 1 and 2 we present estimates for outpatient expenditures and visits, respectively, and in Column 3 we present estimates for a count of total inpatient days. We find that when workers are eligible for longer UI assistance, children under the age of 6 experience decreases in outpatient expenses, amounting to approximately 16 Euros per year (30.1 percent).<sup>75</sup>

When investigating this further, we find that these effects are driven primarily by both lower physician expenses and fewer drug expenses. Estimates for outpatient visits (Column 2) are statistically insignificant for all ages. Similarly, estimates for inpatient stays, shown in Column 3, are statistically insignificant at the 5 percent level, suggesting that there are little effects of UI benefits on total hospitalizations for children. These estimates provide some support for the notion that when parents are unemployed longer, they spend less on their child's health but do not neglect doctor's visits.<sup>76</sup>

In Columns 4 and 5, we additionally present separate estimated effects based on types of outpatient expenditures. In Column 4, we analyze effects of longer UI duration on preventative care visits for children. This includes all screenings, including mother/child well visits. Notably, well visits for young children have a financial incentive for all mothers in Austria, regardless of household income. Therefore, perhaps unsurprisingly, we find no change in the probability that a child will complete a preventative care doctor's visit.

Nonetheless, even if the total number of visits is unchanged, we may be interested in any changes observed as a part of the visits that occur before and after unemployment. In Column 5 of Table 16, we analyze effects on "curative" health expenditures. Again, estimates are statistically significant for

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<sup>74</sup>RDD figures for children of female workers are presented in Figure 8.

<sup>75</sup>We have additionally explored whether the presence of siblings differentially impacts children of unemployed mothers. Estimates indicate that our main effects are driven by children under the age of 6 with no siblings at the time of mother's job loss; however, estimates for children with siblings are relatively imprecise and cannot rule out greater than a 27.7 percent decline in outpatient expenditures.

<sup>76</sup>Unfortunately, our data do not contain information on vaccines, as they are not covered by public health insurance.

children under the age of 6, and suggest lower expenditures of approximately 31.3 percent, similar to the decline in overall health care expenditures. One possible explanation is when parents have access to an additional 9 weeks of UI benefits, they can make time to see the doctor earlier and do not let a child's illness progress to a stage that may be more costly. Notably, across columns and panels we see little to no effects on children above the age of 6. If anything, we see an increase in expenditures for children aged 12–17 (significant at the 10 percent level) which may indicate that either these children are old enough to know when they are sick and can stay home by themselves from school even if their parents are working, or are better able to articulate to their parents what their needs are.

Taken with our previous results, our findings altogether suggest that when mothers are eligible for 9 additional weeks of UI benefits, they are less likely to be prescribed antidepressants and opioids, and are able to find a higher paying, less physically demanding job, potentially leading to improvements in health for young children. Below, we explore additional, long-term effects of extending UI duration and discuss possible mechanisms to explain these results.

## 8.2. *Longer-Term Effects*

Finally, the extension of UI benefit duration may affect retirement decisions in the longer run. For example, to the extent that longer nonemployment duration leads to worsening health outcomes for some workers, these individuals may be more likely to claim disability as a result.<sup>77</sup> Alternatively, if workers experience improved health and/or are able to match to a job with higher earnings in perpetuity, extended UI time limits could prolong working behavior and could reduce incentives for disability filings (Böckerman and Ilmakunnas, 2020). We explore these possibilities in Figures 9 and Figure 10. Specifically, we first test whether unemployed workers eligible for extended UI benefit duration retire at an earlier age than their counterparts and then test whether these workers are more or less likely to claim disability before retirement. We present these results separately by gender.

Figure 9 displays differences in the probability of early retirement.<sup>78</sup> In Austria early retirement implies that workers forfeit pension benefits to retire before the regular retirement age, which is 60 years for females and 65 for males. We estimate a small, positive effect for male workers. Estimates for female workers are statistically insignificant, suggesting that matching to a higher-paying job does not induce female workers to exit the labor market earlier. Therefore, these results support the notion that extending

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<sup>77</sup>See Savych, Neumark, and Lea (2018) for recent work on the effects of opioid prescriptions on disability, which motivates this analysis.

<sup>78</sup>This outcome is especially relevant given the recent evidence that early retirement increases mortality among male workers, but not female workers (Kuhn, Staubli, Wuellrich, and Zweimüller, 2009).

UI benefit duration for female workers leads to higher lifetime wages, on average.<sup>79</sup>

In Figure 10, we test whether workers eligible for the UI extension are more likely to claim disability retirement, which is a longer-term outcome that is more directly linked with health. We find that unemployed female workers eligible for extended UI benefits are 0.7 percentage points less likely to claim disability, while unemployed male workers are 0.6 percentage points *more* likely to claim disability. These effects increase as workers near age 50. This is consistent with work by Sullivan and von Wachter (2009), which suggests that older workers who become unemployed may be close enough to retirement that they fill in the gap of unemployment and retirement with disability.<sup>80</sup> To explore this notion further, in Figure A15 we present event study analogues from an age-based difference-in-differences analysis, comparing male workers to female workers.<sup>81</sup> Estimates indicate that the disability filing wedge between female and male workers is more than 10 percent for workers becoming unemployed at age 50. These results correspond to 700 additional disability claims for male workers, but 700 *fewer* cases for females each year, essentially shifting the administrative costs.

## 9. Potential Mechanisms

Our above results suggest that extending UI benefit duration leads to moderate changes in job search time translating into large positive health and economic benefits for female workers but has some adverse consequences for male workers. In this section, we tie together the interpretations of our findings, investigate whether the marginal changes in time spent unemployed can fully explain these health effect magnitudes, and explore potential mechanisms that explain these gender differences.

### 9.1. Relaxation of Time Constraints

First, we ask: how much of our findings are explained by the increase in leisure time as a result of unemployment? This is akin to asking to what extent are female and male workers differently burdened by other tasks, like household chores and childcare, which may impede a worker's ability to invest in their health. To investigate the relationship between unemployment and time spent on household chores, we use data from the 2018 Austrian Census and Austrian respondents in the *Gender & Gender*

<sup>79</sup>We similarly analyze changes in retirement age, and do not estimate any statistically significant effects for eligible workers.

<sup>80</sup>In related work, Mueller, Rothstein, and von Wachter (2016) find that the expiration of UI benefits does not induce workers to file for disability.

<sup>81</sup>This estimation model takes the form  $y_i = \sum_{k=-10}^{10} \beta_k (female_i \times age_k) + female_i + \sum_k age_k + \varepsilon_{it}$ , where  $y$  represents the outcome "filing for disability retirement" for individual  $i$ ,  $female$  is an indicator variable taking the value 1 if a worker is female, and  $age$  is the age at unemployment.

*Survey* (GGS).<sup>82</sup> These survey data contain information on Austrian households, including information on age, gender, household size, household responsibilities, whether a worker is unemployed, and their unemployment duration.<sup>83</sup> We present simple correlations from OLS models in Table A11.

We find that longer unemployment duration is positively correlated with being married for females. This suggests that in two-earner households, female workers spend longer looking for their next job, potentially due to a smaller change in household income.<sup>84</sup> Moreover, in Figure A16 we present evidence that longer unemployment duration is weakly positively correlated with childcare obligations for females but not for males, consistent with the other evidence showing that, across households, women report spending more time on childcare responsibilities. Finally, we find that working females are 3.3 percentage points more likely to report finding it difficult to concentrate at work due to family responsibilities than males. This descriptive evidence implies that allowing female workers the additional time to search for a new job could lessen stressors at home as well as relieving the time pressure from work, which could explain our estimated health effects, including the reduction in antidepressant prescriptions.

Indeed, given that female workers are more likely to work part-time, earn less income, on average, and are more likely to be a secondary earner, it is possible that the increase in UI duration leads male workers to feel more pressure to find a higher-paying job, leading to more stress.<sup>85</sup> This story could explain the observed increase in antidepressants for male workers shown in Table 4. Moreover, existing evidence shows that male workers engage in more risky behavior when leisure time increases, potentially explaining the increases in cardiac events for these workers (Mullahy and Sindelar, 1996). In Section 6.4 we provide back-of-the-envelope calculations showing that if job loss leads to increases in smoking behavior in Austria at the same documented rate as workers in other European countries, this change in behavior could account for the estimated 0.05 percentage point increase in cardiac events for male workers.

More formally, we have also considered how our coefficients change if we reweight the sample by individual characteristics, like parental status. Therefore, in an attempt to more clearly compare effects for females and males, we use an entropy balancing approach as suggested by Hainmüller (2012). Using this procedure, we construct balancing weights for observable characteristics, including years

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<sup>82</sup>The GGS is a cross-country panel on families, life course trajectories, and gender relations administered by the *Generations and Gender Programme*. We use data on all Austrian respondents from both wave 1 and wave 2.

<sup>83</sup>In this survey, we can tell if a worker is unemployed but do not know whether they are claiming UI benefits.

<sup>84</sup>Indeed, this is consistent with our administrative dataset; when we attempt to classify workers as “married” or “unmarried”, based on available tax information, effects are primarily driven by married workers. See Table A12 for a replication of our main results for married female and male workers. We note that we can identify only half of all married Upper Austrian workers based on tax status alone and do not have data on this characteristic directly.

<sup>85</sup>For example, in the Austrian Census, only 255 women report being a sole earner in the household, as compared to 23,418 men.

of education, citizenship, urban status, outpatient expenditures in year  $t - 1$ , and parental status, to recalculate our RD estimates. This approach thus creates samples where male and female workers have the same covariate distributions.

We present estimates from this reweighting exercise in Figure A17. Estimates are generally similar in sign and magnitude to our main results. This suggests that baseline differences in demographics cannot explain much of the gender differential in our estimates. However, estimates from the balanced sample do indicate that if fewer female workers were parents, on average, the reduction in opioid prescriptions would be much smaller and statistically insignificant, while if more male workers were parents, the effects on cardiac events would be slightly larger. These estimates additionally reinforce our descriptive statistics on the differential mental loads carried by female and male workers and predict that lessening parental burdens on female workers would further reduce prescription take-up, while placing greater household stress on male workers would exacerbate the increase in cardiac events even more.

## *9.2. Reducing Physical Demands*

One striking result from our main analysis is that female workers reduce their dependence on opioid prescriptions. In particular, we estimate approximately 500 fewer females using an opioid prescription each year as a result of the UI benefit extension. Above, we present evidence showing that the period of unemployment (i.e., the 1–2 months after job loss) correspond to a short-term substitution to non-opioid painkillers. However, the reduction in opioids is persistent even after female workers find a new job.

One remaining question is whether the magnitude of our estimates can be explained by the number of women matching to jobs that no longer require physical demands. Indeed, as shown in Table A2, we estimate that over 1,000 unemployed eligible female workers match to occupations without physical hardship, as compared to ineligible female workers. Therefore, the additional search time granted to women over the age of 40 reasonably explains the estimated reduction in pain medications. These findings suggest that many female workers use opioids due to the physical demands of their job and would switch to non-addictive alternatives or use no pain medication if in a different occupation.

Interestingly, we don't observe these same changes in occupation for male workers that we observe for female workers; on the contrary, unemployed male workers over the age of 40 are more likely to switch to a physically demanding job. This likely explains why we do not see a drop in opioid prescriptions for these workers and may explain the corresponding offsetting gender effects in disability retirement, if jobs with hardship are more likely to lead to physical injury.



### 9.3. *Changes in Income*

Lastly, we attempt to better understand how changes in nonemployment duration lead to improvements in job match, which may affect a worker's ability to better invest in their health and well-being. In particular, we note the large gains we find for female workers in terms of wages. We do not find the same gains for male workers; if anything, we find decreases in wages for males that exhaust, or nearly exhaust, their UI benefits. While, on average, gains in wages are relatively small, totaling only 371 Euros per year, we note that for some workers, this wage increase is much larger. Moreover, we find that our main health effects are largest for female workers experiencing an increase in wages, which does indicate that persistent changes in health are due, at least partially, to an income effect.<sup>86</sup> Finally, as shown in Figure A17, smaller UI benefit generosity is associated with a greater probability of antidepressant prescription take-up, indicating that replacing income during unemployment can have positive effects on mental health.

## 10. Discussion and Conclusion

In this paper we study the effects of increased UI benefit duration on worker health. In particular, we exploit a feature of the Austrian UI system, namely that workers between the ages of 40 and 50 are eligible for an additional 9 weeks of UI benefits, and analyze effects of UI duration on unemployment duration and job search time, opioid use, health care utilization, cardiac events, and mental health outcomes. We find that extending UI benefit duration significantly impacts time unemployed, physical health, and prescription purchases, and that these effects vary by gender. Specifically, we find that unemployed female workers eligible for a 9-week extension in UI benefits remain unemployed longer, are less likely to use opioids, less likely to use antidepressants, and less likely to claim disability as compared to ineligible female workers. We show that these effects do not hold for unemployed workers of the same age that are ineligible for the benefits extension, and posit that effects are driven by an improved match to less physically demanding, higher-paying jobs for female workers. We find that these positive health effects for mothers reduce health expenditures for their children under the age of 6.

We find that male workers, on the other hand, are more likely to experience a heart attack or stroke, and more likely to claim disability retirement when eligible for additional weeks of UI benefits. We find no evidence that unemployed male workers that are granted a 9-week extension in UI benefits match to a higher paying or less physically strenuous job. Across physical and mental health outcomes, effects are

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<sup>86</sup>See Table A13, which presents results for female workers with a wage increase and wage decrease, separately.

largest for low-skill workers and parents, and we note that our results can be explained by a combination of existing household burdens and parental duties, stress, smoking behavior, and income effects.

Despite the fact that economic theory suggests that UI should be allocated at the amount where the direct and moral hazard costs equal the beneficial effects of consumption smoothing, we note that existing calculations will be misspecified given the spillover effects to workers themselves.<sup>87</sup> Importantly, only two percent of Austrian workers exhaust their UI benefits, implying that any effects that we estimate are simply a result of the relaxed search time constraint and not a result of prolonged government expenditures. In this paper, we provide new evidence that unemployed female workers achieve higher lifetime wages as a result of increased UI duration, implying large benefits for this sector of the workforce, totaling approximately 42 million Euros each year. Moreover, given the reduction in opioid prescriptions and the number of female workers that switch away from physically demanding jobs, our results suggest large positive benefits in terms of pain mitigation and reductions in the likelihood of potential opioid addiction.

On the contrary, we estimate costs for male workers, driven by those that do exhaust the additional 9 weeks of benefits. For these workers, our effects correspond to 170 additional in-patient visits per year for cardiac-related events, totaling approximately 1.3 million Euros (Bachner, Bobek, Habimana, Ladurner, Lepuschütz, Ostermann, Rainer, Schmidt, Zuba, Quentin, and Winkelmann, 2018).<sup>88</sup> We argue that the magnitudes we calculate are in line with previous studies showing that job loss for men is associated with increases in stress and smoking behavior (Kuhn, Lalive, and Zweimüller, 2009; Browning and Heinesen, 2012; Black, Devereux, and Salvanes, 2015; Fu and Liu, 2019).

Moreover, although we estimate some increases in antidepressant use for male workers, this is more than offset by the significant and persistent reductions in antidepressant use for female workers, suggesting large positive net benefits in terms of productivity and attendance (Centre for Mental Health, 2010; Greenberg, Kessler, Birnbaum, Leong, Lowe, Berglund, and Corey-Lisle, 2003). Taken together with the evidence that net disability expenditures do not change much as a result of extended UI, we find that the benefits far exceed the costs of offering workers an additional 9 weeks of potential benefits.

Overall, our findings shed light on the effects of UI duration on health in the context of a universal health care system. Moreover, we measure how UI duration affects male and female workers differently and to what extent there exist externalities within the household. At a time when female labor force

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<sup>87</sup>For work on optimal UI payments and inefficiency, see, for example, Chetty (2008); Lalive, Landais, and Zweimüller (2015); Kroft and Notowidigdo (2016); Landais, Michailat, and Saez (2018).

<sup>88</sup>This figure is based on the fact that 18 percent of total health care costs are paid by the patient out-of-pocket, and we estimate an average in-patient cost of 970,000 Euros per year for heart attack or stroke diagnoses, based on our Upper Austrian administrative data.

participation is at an all-time high, and women are still disproportionately engaging in more work in the household, these results have important implications for gender-neutral policies including paid family leave, medical leave, and sick leave. Finally, we note that any calculations of the optimal allocation of UI timing that fails to consider differential effects by gender will understate the true lifetime benefits of UI benefit extensions for female workers.

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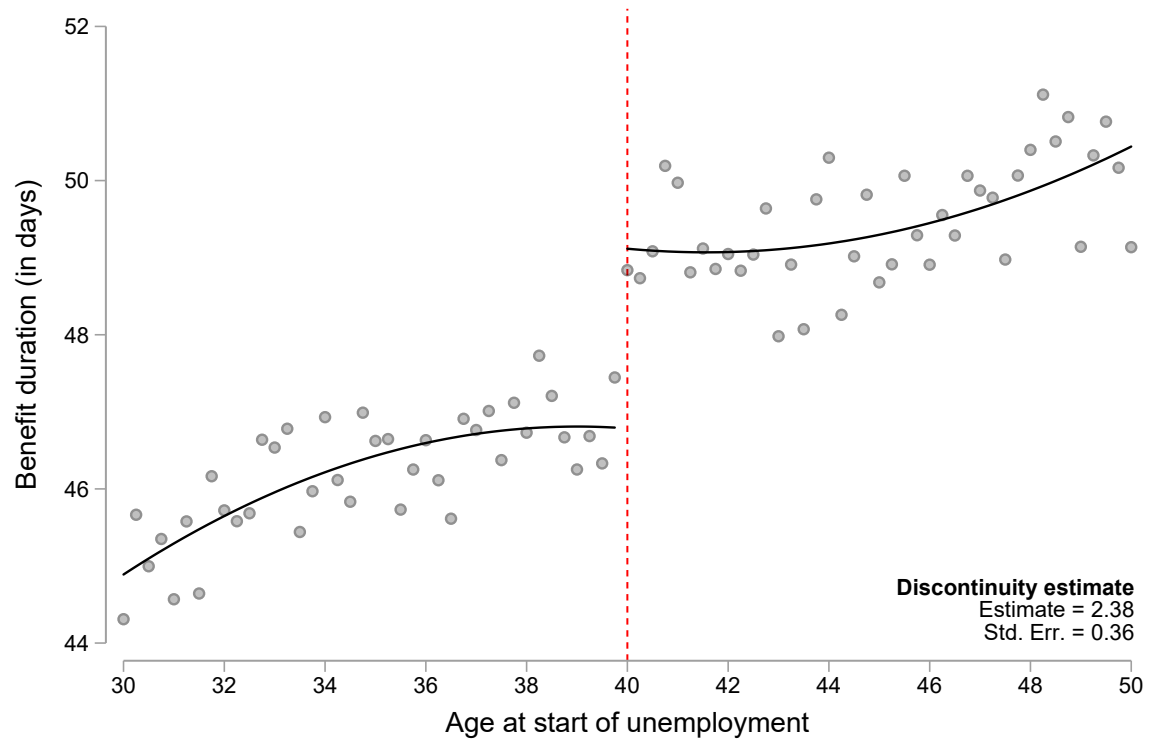
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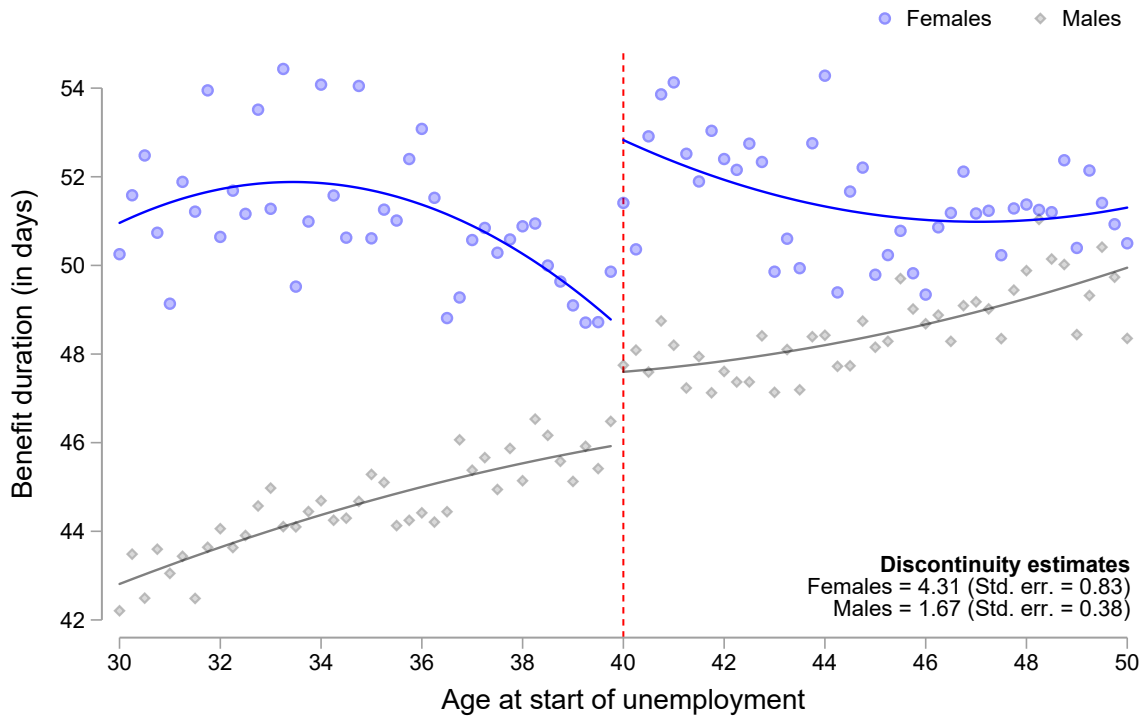
## 11. Figures and Tables

FIGURE 1 — Effects of UI Extensions on Benefit Duration



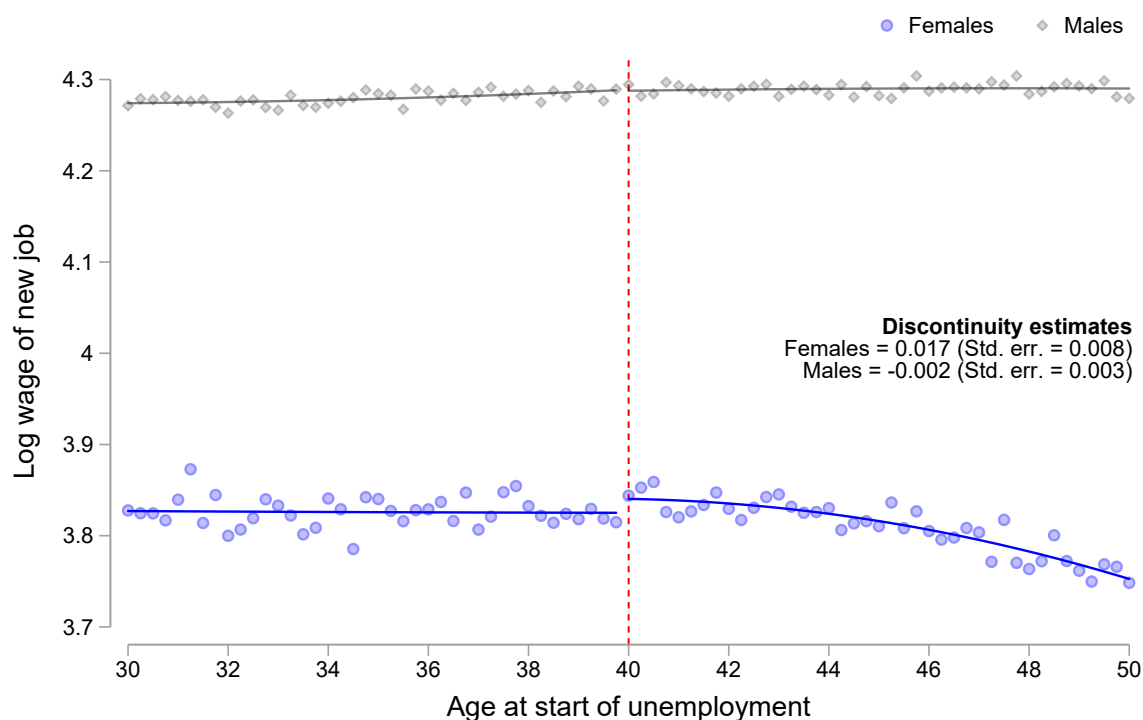
Notes: Individual-level data on unemployment insurance health events is from linked Upper Austrian Health Insurance Fund database files and Austrian Social Security Database files from 2003–2013. Scatters represent the mean residual of the listed outcome variable (UI benefit duration, in days) net of quarter-year fixed effects for each 3-month age bin. The vertical line represents the age at which workers are eligible for an additional 9 weeks of UI benefits. On either side of the cutoff, we display quadratic fits. Age is calculated based on month of birth.

FIGURE 2 — Effects of UI Extensions on UI Benefit Duration by Gender



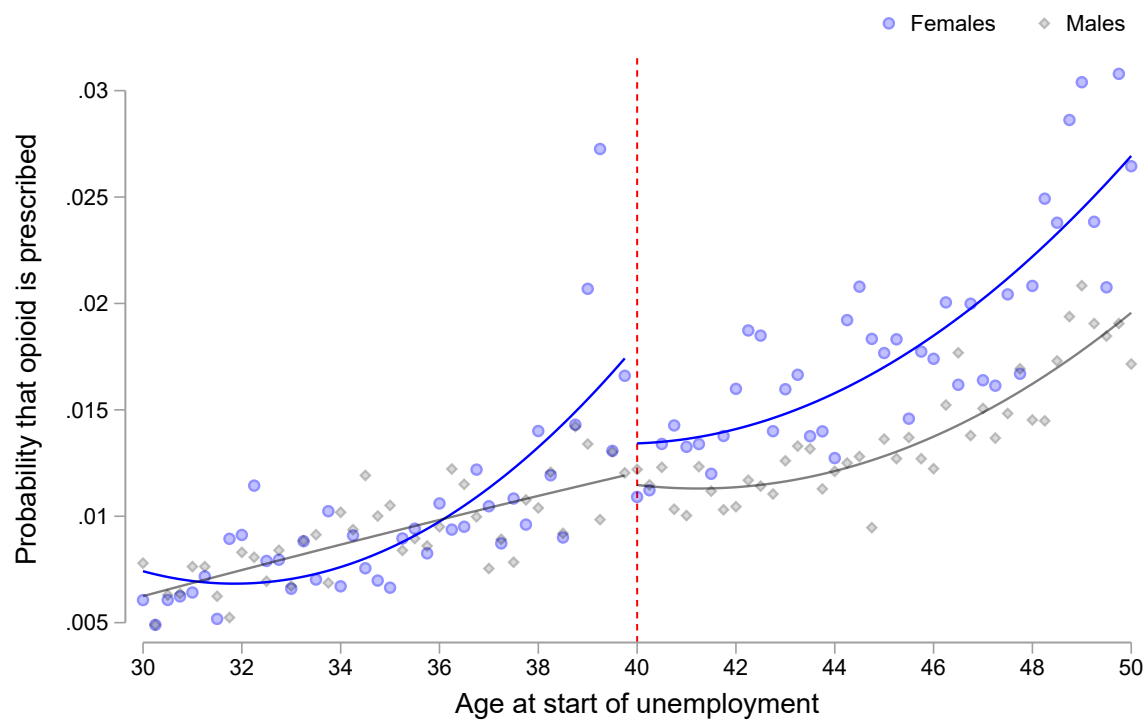
Notes: Individual-level data on unemployment insurance health events is from linked Upper Austrian Health Insurance Fund database files and Austrian Social Security Database files from 2003–2013. Scatters represent the mean residual listed outcome variable (UI benefit duration, in days) net of quarter-year fixed effects for each 3-month age bin. The vertical line represents the age at which workers are eligible for an additional 9 weeks of UI benefits. On either side of the cutoff, we display quadratic fits. Age is calculated based on month of birth. Circles represent averages for female workers, while diamonds represent averages for male workers.

FIGURE 3 — Effects of UI Extensions on Job Quality



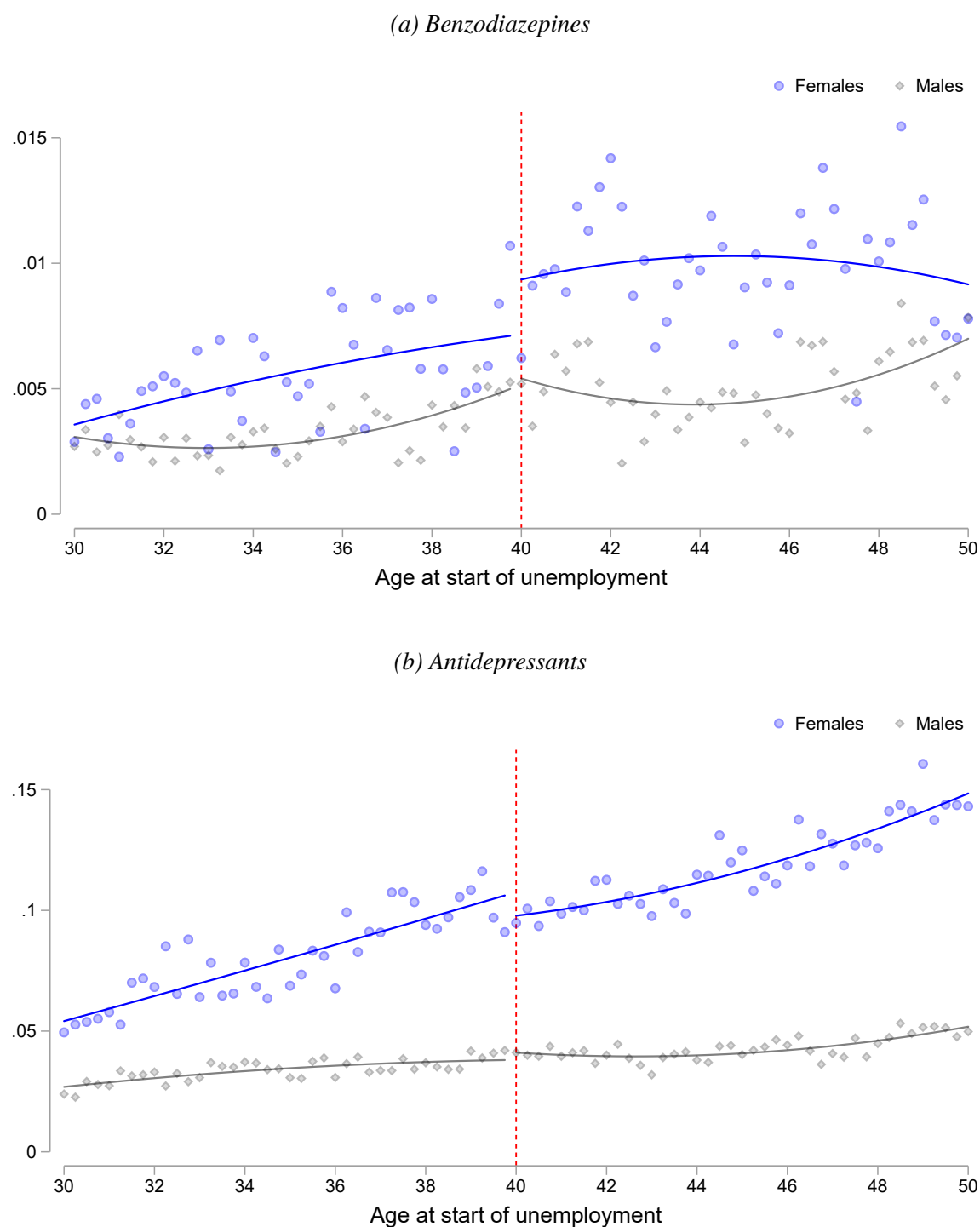
Notes: Individual-level data on unemployment insurance health events is from linked Upper Austrian Health Insurance Fund database files and Austrian Social Security Database files from 2003–2013. Scatters represent the mean residual of the listed outcome variable (log wage of the first job after an unemployment spell) net of quarter-year fixed effects for each 3-month age bin. The vertical line represents the age at which workers are eligible for an additional 9 weeks of UI benefits. On either side of the cutoff, we display quadratic fits. Age is calculated based on month of birth. Circles represent averages for female workers, while diamonds represent averages for male workers. We present the main estimate and the corresponding standard error, based on our main RD approach described by Equation (1).

FIGURE 4 — Effects of UI Extensions on Opioid Prescriptions



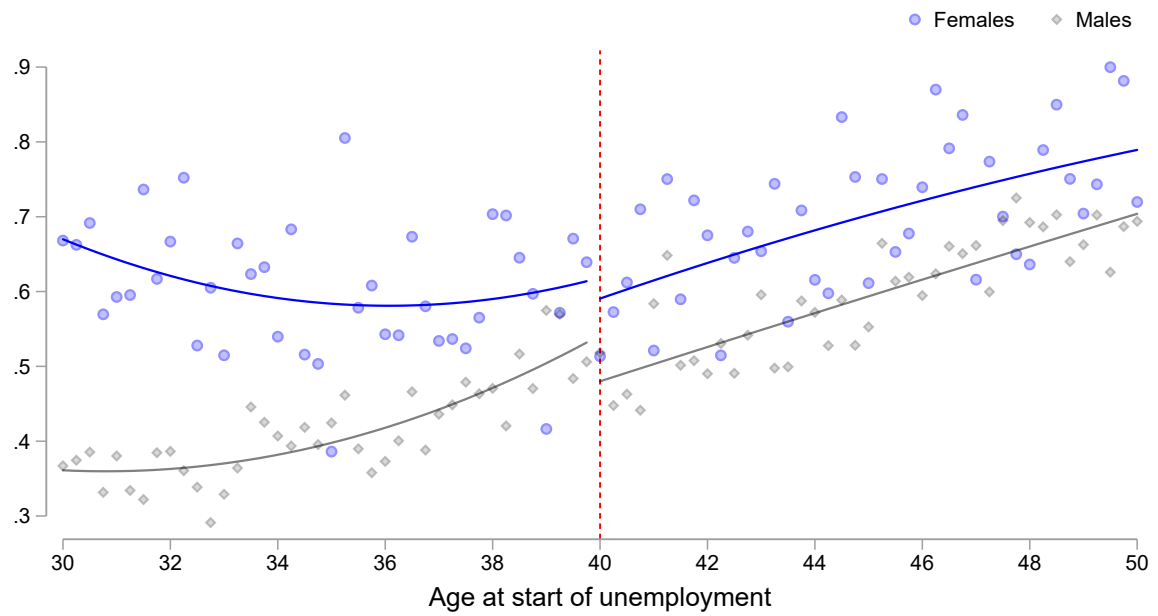
Notes: Individual-level data on unemployment insurance health events is from linked Upper Austrian Health Insurance Fund database files and Austrian Social Security Database files from 2003–2013. Scatters represent the mean residual of the listed outcome variable (whether a worker received an opioid prescription within 9 months after job loss) net of quarter-year fixed effects for each 3-month age bin. The vertical line represents the age at which workers are eligible for an additional 9 weeks of UI benefits. Age is calculated based on month of birth.

FIGURE 5 — Effects of Extended UI Benefit Duration on the Probability of Being Prescribed Drugs for Anxiety or Depression



Notes: See notes for Figure 4. Prescription categories are defined by ATC codes, where N05 indicates benzodiazepines and other sleeping and antianxiety pills, and N06 indicates antidepressants. For a full list of ATC code N medications, see [https://www.whooc.no/atc\\_ddd\\_index](https://www.whooc.no/atc_ddd_index).

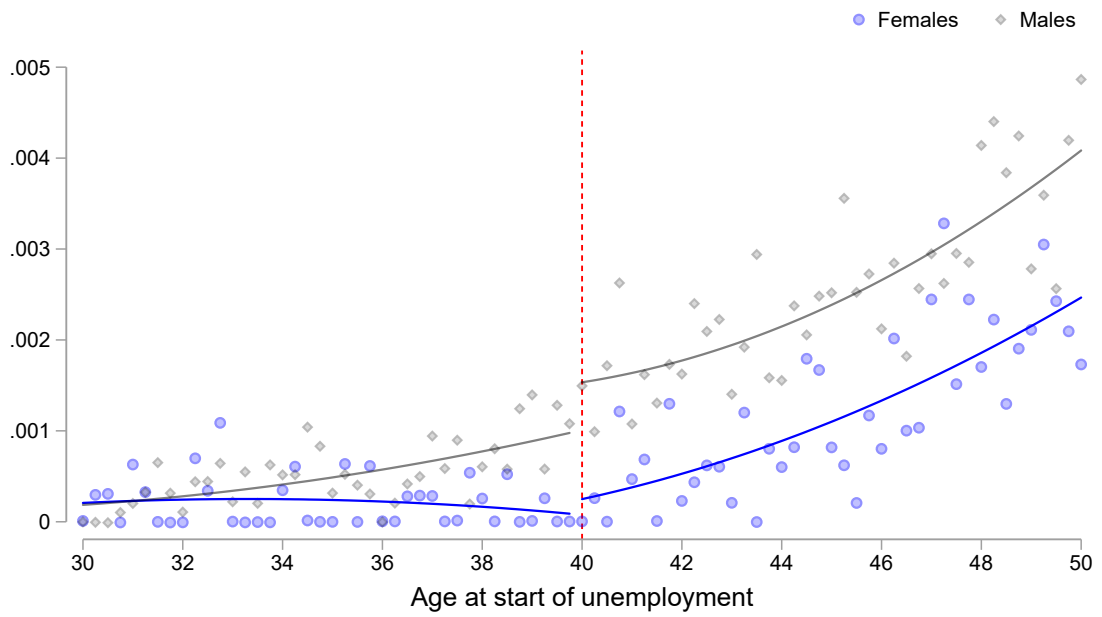
FIGURE 6 — Effects of Extended UI Benefit Duration on Health Care Utilization



Notes: See notes for Figure 4. The outcome is the total number of inpatient hospital stays for unemployed workers within 9 months of job loss.

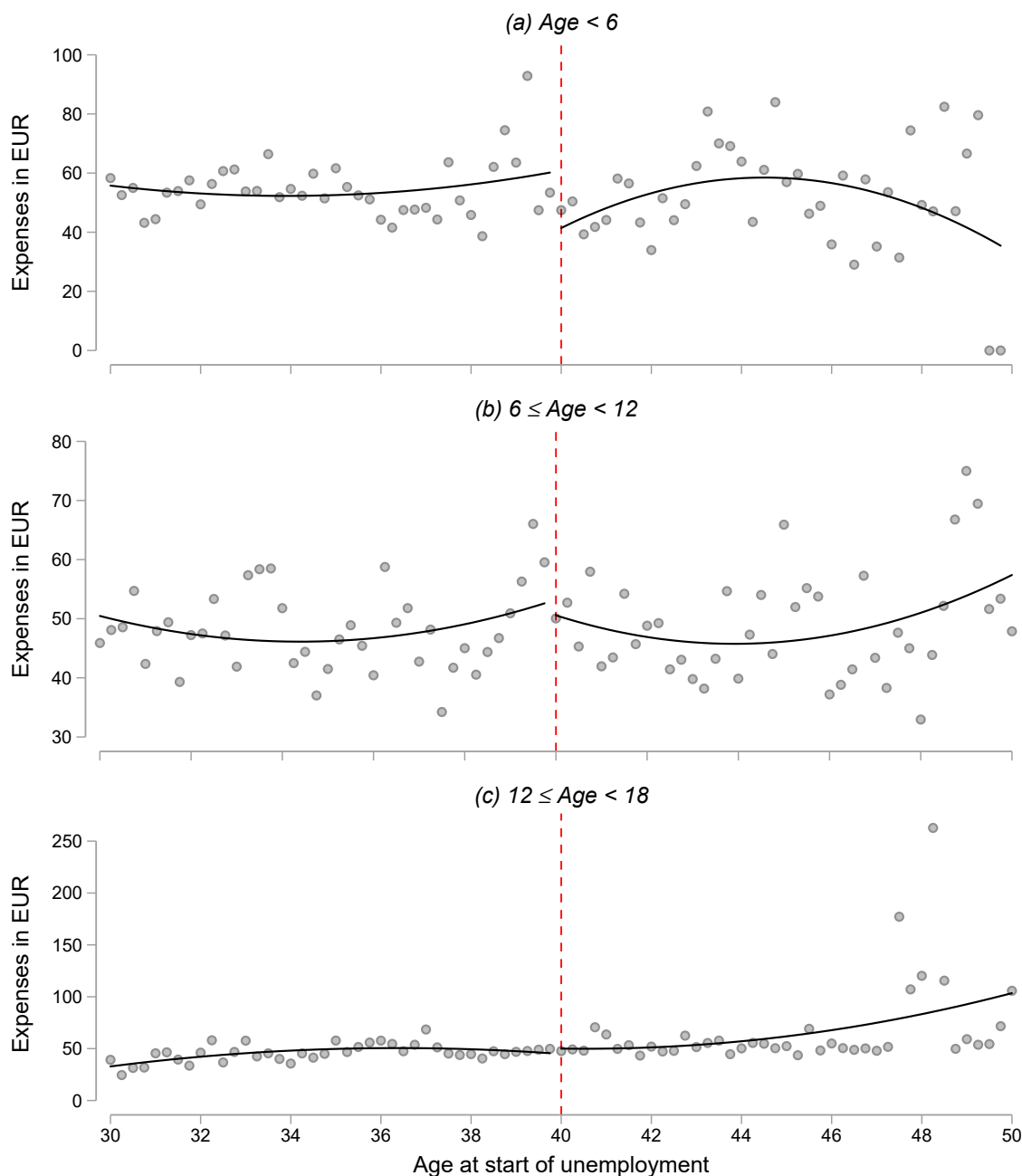


FIGURE 7 — Effects of Extended UI Benefit Duration on Cardiac Events



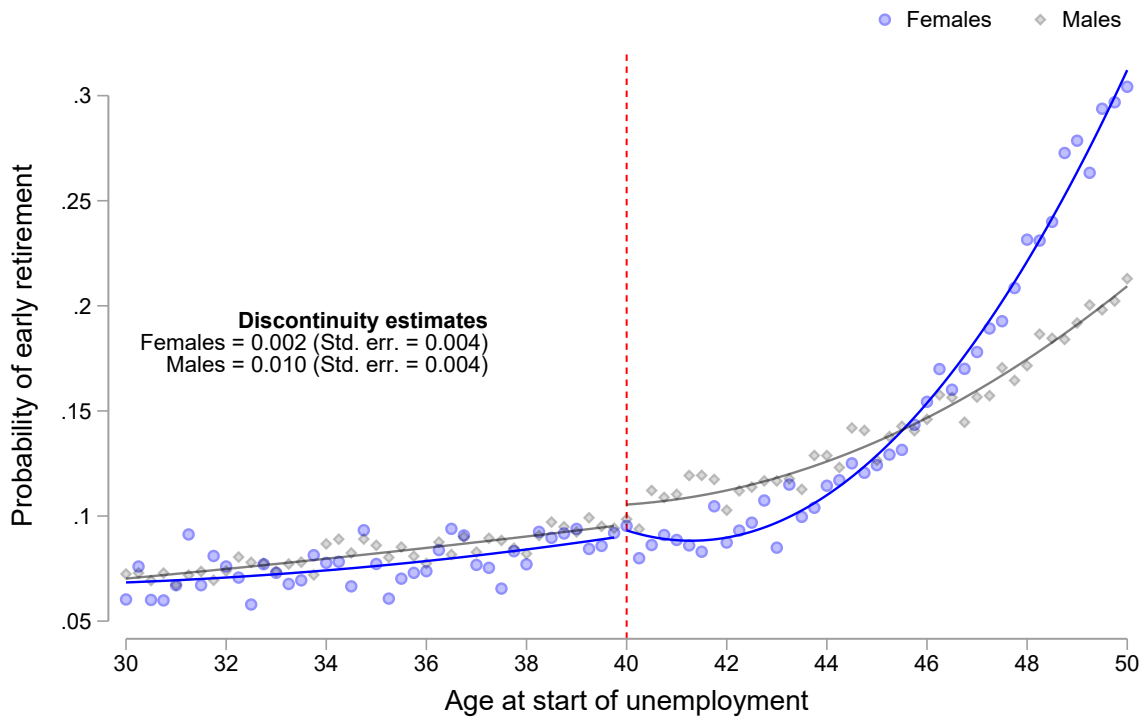
Notes: See notes for Figure 4. Cardiac events include heart attack and stroke.

FIGURE 8 — Effects on Outpatient and Drug Expenditure for Children of Unemployed Female Workers, by Child Age



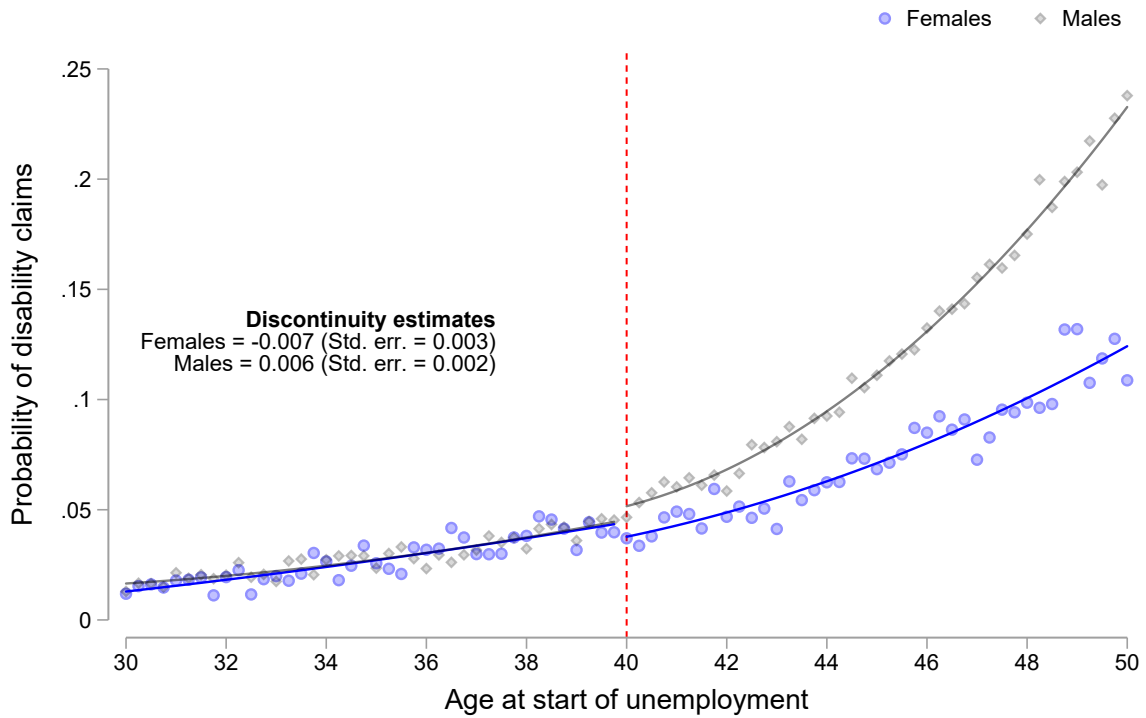
Notes: Individual-level data on unemployment insurance health events is from linked Upper Austrian Health Insurance Fund database files and Austrian Social Security Database files from 2003–2013. The vertical line represents the age at which workers are eligible for an additional 9 weeks of UI benefits. Age is calculated based on month of birth. Scatters represent the average residual of outpatient expenditures for each listed age group net of quarter-year fixed effects for each 3-month age bin.

FIGURE 9 — Effects of Extended UI Benefit Duration on the Probability of Early Retirement



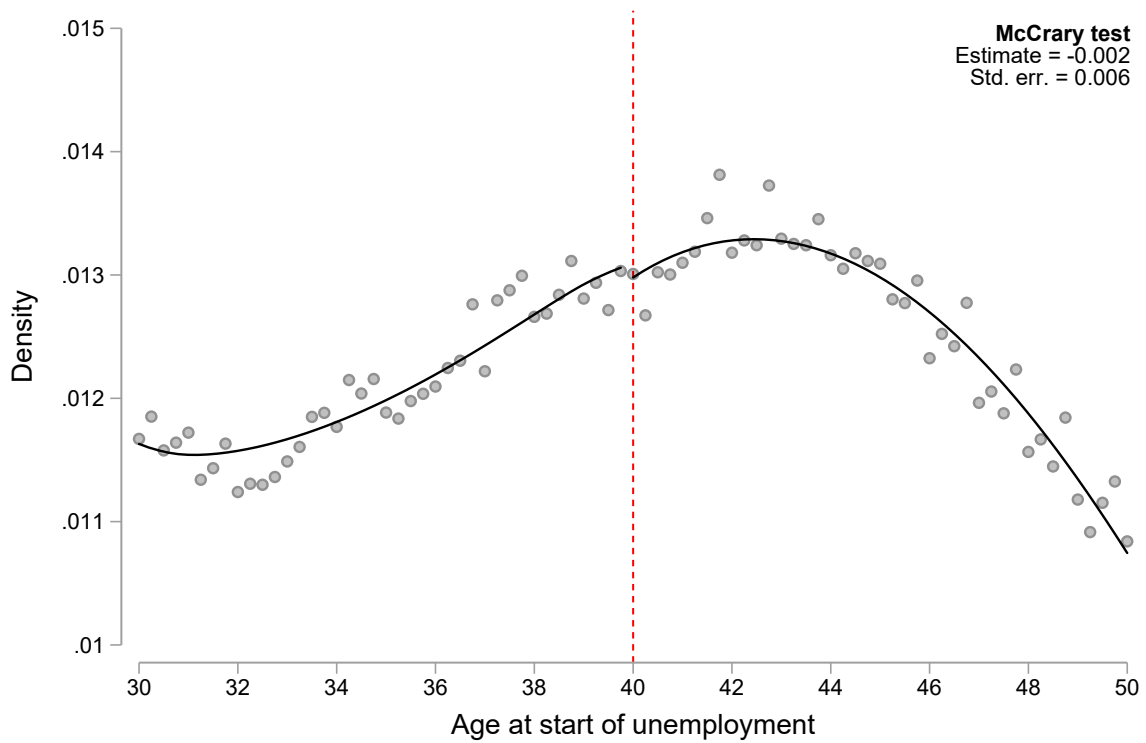
Notes: Individual-level data on unemployment insurance health events is from linked Upper Austrian Health Insurance Fund database files and Austrian Social Security Database files from 2003–2013. The vertical line represents the age at which workers are eligible for an additional 9 weeks of UI benefits. Age is calculated based on month of birth. Scatters represent the average residual of the listed outcome variable net of quarter-year fixed effects for each 3-month age bin. Circles represent averages for female workers, while diamonds represent averages for male workers. Our main variable of interest is an indicator variable equal to one if a worker retires before the “normal retirement age” set by the Social Security Administration between the time unemployed and the end of our sample, December 31, 2018, and zero otherwise. We present estimates and their respective standard errors for these two samples (female and male workers, respectively), based on our main RD approach described by Equation (1).

FIGURE 10 — Effects of Extended UI Benefit Duration on the Probability of Disability Claims



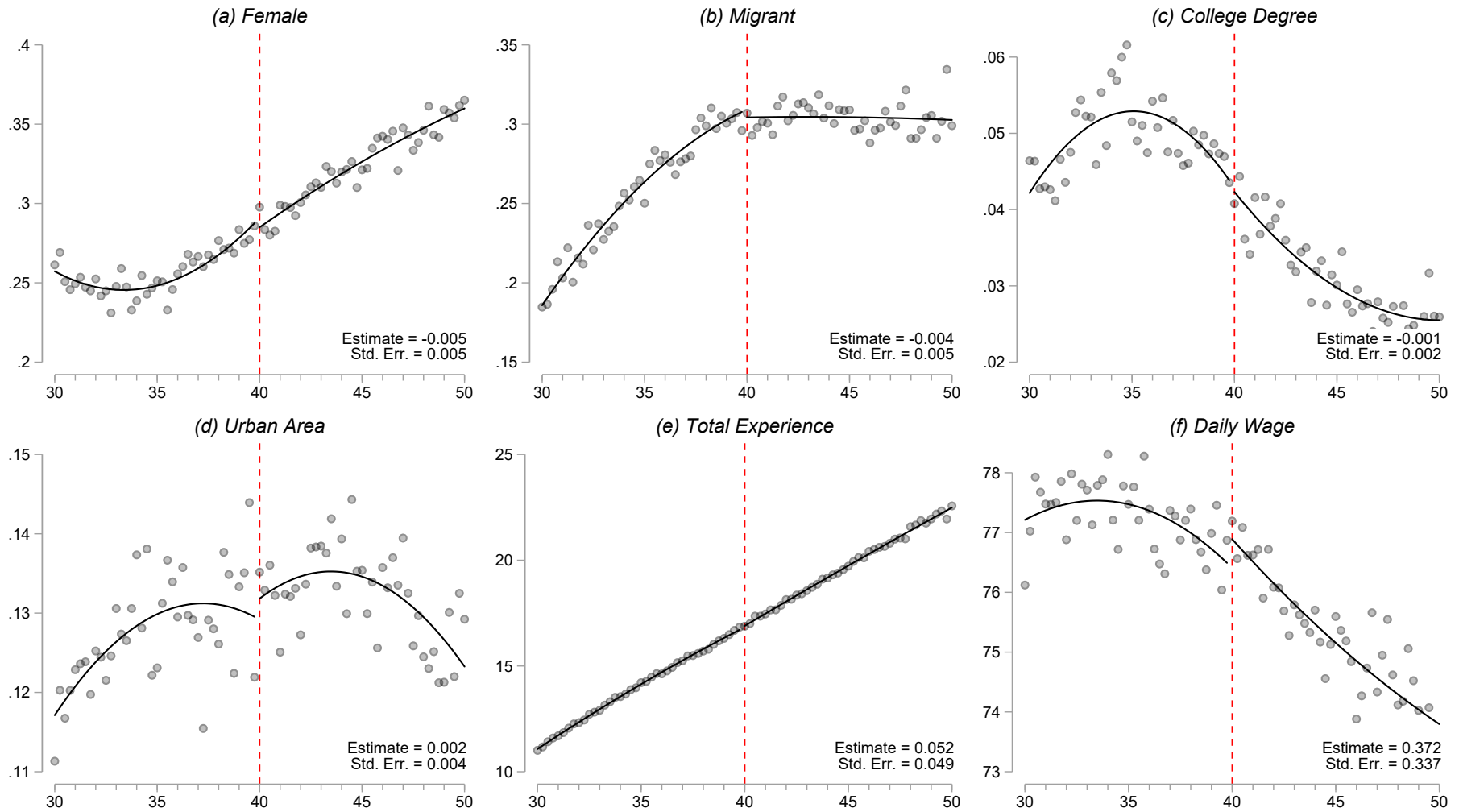
Notes: Individual-level data on unemployment insurance health events is from linked Upper Austrian Health Insurance Fund database files and Austrian Social Security Database files from 2003–2013. The vertical line represents the age at which workers are eligible for an additional 9 weeks of UI benefits. Age is calculated based on month of birth. Scatters represent the average residual of the listed outcome variable net of quarter-year fixed effects for each 3-month age bin. Circles represent averages for female workers, while diamonds represent averages for male workers. Our main variable of interest is an indicator variable equal to one if a worker claims disability pension between the time unemployed and the end of our sample, December 31, 2018, and zero otherwise. On average, 6.9 percent of workers (5.6 percent of females and 7.4 percent of males) in our sample ever claim disability pension. We present estimates and their respective standard errors for these two samples (female and male workers, respectively), based on our main RD approach described by Equation (1).

FIGURE 11 — Age Distribution



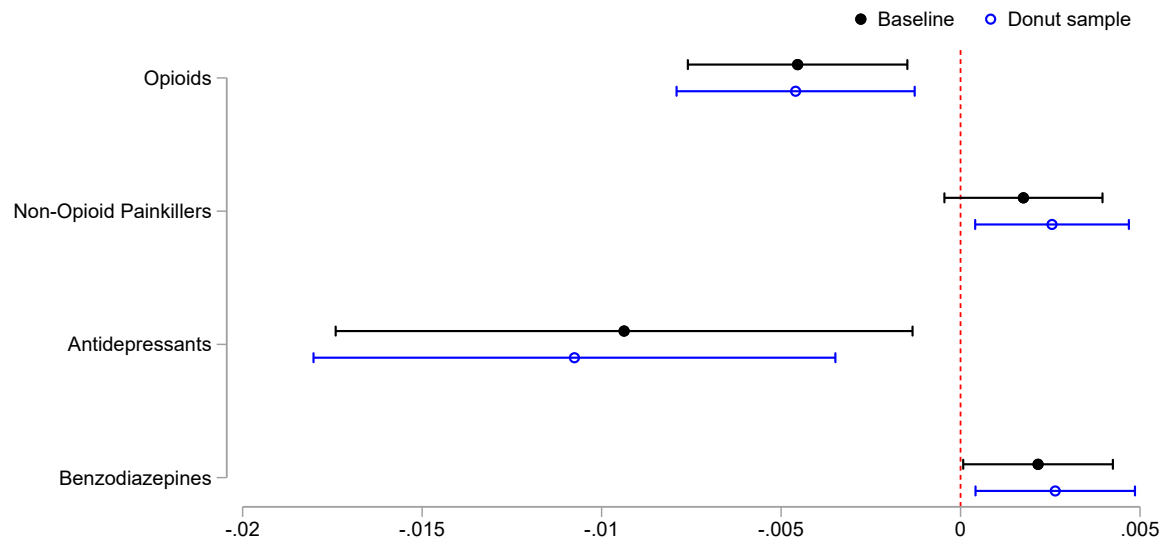
Notes: Individual-level data on unemployment insurance health events is from linked Upper Austrian Health Insurance Fund database files and Austrian Social Security Database files from 2003–2013. The vertical line represents the age at which workers are eligible for an additional 9 weeks of UI benefits. Age is calculated based on month of birth. Scatters represent the age density for each 3-month age bin. We present a discontinuity estimate and corresponding standard error, based on our main RD approach described by Equation (1).

FIGURE 12 — Testing Discontinuity of Socioeconomic and Labor Market Characteristics



Notes: Individual-level data on unemployment insurance health events is from linked Upper Austrian Health Insurance Fund database files and Austrian Social Security Database files from 2003–2013. The vertical line represents the age at which workers are eligible for an additional 9 weeks of UI benefits. Age is calculated based on month of birth. Scatters represent the average residuals for each 3-month age bin for the listed outcome variables. In panels (a)–(d) we consider indicator variables equal to one for workers who are female, migrants, have a college degree, live in an urban area and zero otherwise. In panels (e) and (f) we present residualized binned means of worker experience, in years, and worker’s daily wage in Euros. In each panel we present discontinuity estimates and standard errors, based on our main RD approach described by Equation (1).

FIGURE 13 — Difference in RD Estimates on Prescriptions Leaving out a Donut Sample (Female Workers)



Notes: Individual-level data on unemployment insurance health events is from linked Upper Austrian Health Insurance Fund database files and Austrian Social Security Database files from 2003–2013. The donut sample omits workers that become unemployed withing a one-quarter-year window around the cutoff. The solid black dots resemble the baseline estimates from Table 4, panel (b). The hollow blue dots are RD estimates based on the donut sample. Each regression includes quarter-year fixed effects. Bars indicate 90% confidence intervals.



TABLE 1 — Descriptive Statistics

	Full Sample		By Gender		
	Mean (1)	Std. dev. (2)	Females (3)	Males (4)	Difference (5)
<i>Prescriptions</i>					
Opioids	0.012	0.111	0.015	0.011	−0.004***
Non-Opioid Painkillers	0.006	0.077	0.008	0.005	−0.003***
Antidepressants	0.058	0.233	0.104	0.038	−0.066***
Benzodiazepines	0.005	0.073	0.008	0.004	−0.004***
<i>Health Care Utilization</i>					
Outpatient Expenditure	95.3	259.4	134.2	79.0	−55.1***
Outpatient Visits	5.8	18.5	9.2	4.4	−4.8***
Inpatient Days	0.5	3.9	0.7	0.5	−0.2***
<i>Cardiac Events</i>					
Any Cardiac Event	0.0013	0.0361	0.0008	0.0015	0.0007***
Heart Attack	0.0010	0.0315	0.0005	0.0012	0.0007***
Stroke	0.0003	0.0178	0.0003	0.0003	0.0000
<i>Disability Claims</i>					
Disability Pension Claim	0.069	0.253	0.056	0.074	0.018***
<i>Socioeconomic Information</i>					
Female	0.29	0.46			
Migrant	0.28	0.45	0.22	0.31	0.09***
College Degree	0.04	0.20	0.06	0.03	−0.03***
Urban Area	0.13	0.34	0.15	0.12	−0.03***
Total Experience (years)	17.05	5.99	16.24	17.38	1.14***
Daily Wage (Euros)	69.17	27.28	50.29	76.79	26.50***
<i>Unemployment Spell Information</i>					
Benefit Duration (days)	47.9	40.2	51.0	46.7	−4.4***
Nonemployment Duration (days)	75.0	97.5	87.5	69.8	−17.7***
Search Time (days)	290.1	809.8	394.1	247.0	−147.1***
UI Claims (Euros)	29.3	7.2	24.7	31.2	6.6***

Notes: Individual-level data on unemployment insurance health events is from linked Upper Austrian Health Insurance Fund database files and Austrian Social Security Database files. Descriptive statistics include the means and standard deviations for the listed outcomes from 2003–2013 for all workers and workers split by gender separately, measured in the month of the start of the unemployment spell, with one exception. The outcome variable “Disability Pension Claim” alternatively measures an indicator variable equal to one if we observe a worker claim disability pension prior to December 31, 2018. Columns (1) and (2) present means and standard errors for all workers, respectively, while Columns (3) and (4) present means for male and female workers separately. In Column (5), we provide the difference in means of the respective variable between females and males according to a two-sample *t* test.  $N = 380,634$

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

TABLE 2 — Effects of Extending UI Benefit Eligibility on Benefit, Unemployment, and Nonemployment Duration

	Benefit (1)	Unemployment (2)	Nonemployment (3)
Pooled	2.38*** (0.36)	4.13*** (0.88)	19.93*** (7.55)
Females	4.31*** (0.83)	7.99*** (2.13)	34.49** (17.49)
Males	1.67*** (0.38)	2.71*** (0.99)	14.04 (8.95)

Notes: RD estimates are based on individual-level data on unemployment insurance health events from linked Upper Austrian Health Insurance Fund database files and Austrian Social Security Database files from 2003–2013. Each regression includes quarter-year fixed effects. Benefit duration is defined as the number of days in which a worker receives UI benefits. Unemployment duration is the number of days that a worker remains in the UI system and is considered “unemployed”. Nonemployment duration is the time, in days, until the worker enters another employment spell, conditional on a worker finding new employment or filing for retirement. Robust standard errors are clustered on the age bin level and are shown in parentheses.  $N = 380,634$

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

TABLE 3 — Wage Effects, by Nonemployment Duration Quartiles

	Quartile 1 (1–22 Days) (1)	Quartile 2 (23–50 Days) (2)	Quartile 3 (50–93 Days) (3)	Quartile 4 (94–273 Days) (4)
<i>(a) Females</i>				
Discontinuity	0.03*** (0.01)	0.02* (0.01)	0.03*** (0.01)	0.01 (0.01)
Sample mean	3.84	3.84	3.80	3.80
<i>(b) Males</i>				
Discontinuity	0.00 (0.00)	0.01 (0.00)	0.01* (0.00)	–0.02*** (0.01)
Sample mean	4.28	4.30	4.30	4.25

Notes: RD estimates are based on individual-level data on unemployment insurance health events from linked Upper Austrian Health Insurance Fund database files and Austrian Social Security Database files from 2003–2013. Each regression includes quarter-year fixed effects. Columns 1–4 present separate estimates for workers' nonemployment days in quartile bins. Robust standard errors are clustered on the age bin level and are shown in parentheses.

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

TABLE 4 — Effects of Extending UI Benefits on Prescriptions within 9 Months of Job Loss

	Opioids (1)	Non-opioid Painkillers (2)	Antide- pressants (3)	Benzodia- zepines (4)
<i>(a) Pooled</i>				
Discontinuity	-0.002** (0.0008)	0.0004 (0.0005)	-0.0005 (0.002)	0.0009 (0.0006)
Sample mean	0.012	0.006	0.058	0.005
Observations		380,634		
<i>(b) Females</i>				
Discontinuity	-0.005** (0.002)	0.002 (0.001)	-0.009* (0.005)	0.002* (0.001)
Sample mean	0.015	0.008	0.104	0.008
Observations		112,214		
<i>(c) Males</i>				
Discontinuity	-0.0006 (0.0009)	-0.0002 (0.0006)	0.003* (0.002)	0.0004 (0.0007)
Sample mean	0.011	0.005	0.038	0.004
Observations		268,420		

Notes: RD estimates are based on individual-level data on unemployment insurance health events from linked Upper Austrian Health Insurance Fund database files and Austrian Social Security Database files from 2003–2013. Each estimate presents separate effects of an additional 9-week eligibility of UI benefits for the 9 months following unemployment for the listed outcome. Each regression includes quarter-year fixed effects. Panel (a) presents estimates for all workers experiencing an unemployment spell, Panel (b) presents estimates for the sample of unemployed female workers, and Panel (c) presents estimates for the sample of unemployed male workers. Robust standard errors are clustered on the age bin level and are shown in parentheses.

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

TABLE 5 — Effects of Extending UI Benefits on Prescriptions within 18 Months of Job Loss,  
Using a 3-Month Rolling Window

	Opioids (1)	Non-opioid Painkillers (2)	Antide- pressants (3)	Benzodia- zepines (4)
<i>(a) Female Workers</i>				
3 Months	−0.004* (0.002)	0.005*** (0.002)	−0.01* (0.005)	0.003** (0.002)
6 Months	−0.003* (0.002)	0.003* (0.002)	−0.009* (0.005)	0.002* (0.001)
9 Months	−0.005** (0.002)	0.002 (0.001)	−0.009* (0.005)	0.002* (0.001)
12 Months	−0.005** (0.002)	0.0008 (0.001)	−0.01** (0.005)	0.002* (0.001)
15 Months	−0.005** (0.002)	0.0008 (0.001)	−0.01** (0.005)	0.002 (0.001)
18 Months	−0.004** (0.002)	0.0009 (0.001)	−0.01*** (0.005)	0.002* (0.001)
<i>(b) Male Workers</i>				
3 Months	0.0004 (0.001)	0.0004 (0.0008)	0.004* (0.002)	0.0005 (0.0007)
6 Months	−0.0004 (0.001)	0.0004 (0.0006)	0.004* (0.002)	0.0003 (0.0007)
9 Months	−0.0006 (0.0009)	−0.0002 (0.0006)	0.003* (0.002)	0.0004 (0.0007)
12 Months	−0.0002 (0.0009)	−0.0007 (0.0006)	0.004** (0.002)	0.0006 (0.0007)
15 Months	−0.00002 (0.0009)	−0.0008 (0.0006)	0.004** (0.002)	0.0006 (0.0007)
18 Months	0.0005 (0.0009)	−0.0007 (0.0006)	0.004** (0.002)	0.0005 (0.0006)

Notes: RD estimates are based on individual-level data on unemployment insurance health events from linked Upper Austrian Health Insurance Fund database files and Austrian Social Security Database files from 2003–2013. Each estimate presents separate effects of an additional 9-week eligibility of UI benefits for the 9 months following unemployment for the listed group of workers. Each regression includes quarter-year fixed effects. Panel (a) presents estimates for female workers, while Panel (b) presents estimates for male workers, based on a rolling 3-month window after an unemployment spell. Robust standard errors are clustered on the age bin level and are shown in parentheses.

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

TABLE 6 — Effects of UI Extensions on Opioid and Benzodiazepine Prescribing, by Potency

	Opioid Potency		Benzodiazepine Potency	
	Low (1)	High (2)	Low (3)	High (3)
<i>(a) Pooled</i>				
Discontinuity	−0.0013* (0.0008)	−0.0002 (0.0002)	−0.0006 (0.0004)	0.0011** (0.0005)
Sample mean	0.0114	0.0010	0.0026	0.0030
Observations	356,684			
<i>(b) Females</i>				
Discontinuity	−0.0025** (0.0012)	−0.0002 (0.0006)	−0.0002 (0.0009)	0.0025*** (0.0009)
Sample mean	0.0138	0.0012	0.0049	0.0037
Observations	104,558			
<i>(c) Males</i>				
Discontinuity	−0.0008 (0.0009)	−0.0002 (0.0002)	−0.0008** (0.0004)	0.0006 (0.0005)
Sample mean	0.0104	0.0009	0.0017	0.0027
Observations	252,126			

Notes: See Table 4. “Weak” opioids include opioids in ATC categories N02AX, like tramadol, and “strong” opioids, including those categorized by N02AA, like morphine or oxycodone (but not codeine and dihydrocodeine, which are also in N02AX but we classify as “weak”). “Weak Benzodiazepines” are defined according to government regulations that inform judicial sentencing, and include Triazolam, Lorazepam, Bromazepam, and Alprazolam.

$p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

TABLE 7 — Effects of Extending UI Benefits on Health Outcomes within 9 Months of Job Loss, by Subgroup (Female Workers)

	Opioids (1)	Non-opioid Painkillers (2)	Antide- pressants (3)	Benzodia- zepines (4)
<i>(a) Parent</i>				
Yes ( <i>n</i> = 70,301)	−0.009*** (0.003)	−0.0004 (0.001)	−0.006 (0.006)	0.0002 (0.001)
No ( <i>n</i> = 41,913)	0.004 (0.003)	0.006*** (0.002)	−0.01 (0.008)	0.005*** (0.003)
<i>(b) Low-Skilled Occupation</i>				
Yes ( <i>n</i> = 100,022)	−0.004** (0.002)	0.002* (0.001)	−0.009* (0.005)	0.003* (0.001)
No ( <i>n</i> = 12,192)	−0.006 (0.004)	−0.004 (0.002)	−0.01 (0.017)	−0.003 (0.004)
<i>(c) Job with Hardship</i>				
Yes ( <i>n</i> = 45,761)	−0.009*** (0.002)	0.0008 (0.002)	−0.001 (0.006)	0.006*** (0.002)
No ( <i>n</i> = 54,613)	0.003* (0.002)	0.002 (0.002)	−0.004 (0.007)	−0.0004 (0.002)
<i>(d) Part-Time</i>				
Yes ( <i>n</i> = 54,242)	−0.005*** (0.002)	−0.0005 (0.002)	0.007 (0.006)	0.003* (0.002)
No ( <i>n</i> = 46,118)	0.001 (0.002)	0.004*** (0.002)	−0.02** (0.007)	0.002 (0.002)
<i>(e) Low Education</i>				
Yes ( <i>n</i> = 89,512)	−0.006*** (0.002)	0.002 (0.001)	−0.01** (0.005)	0.003** (0.001)
No ( <i>n</i> = 17,701)	0.004 (0.003)	−0.0003 (0.002)	−0.02* (0.012)	−0.003 (0.003)

Notes: RD estimates are based on individual-level data on unemployment insurance health events from linked Upper Austrian Health Insurance Fund database files and Austrian Social Security Database files from 2003–2013, although hardship and part-time indicators are not available for 2013. Each estimate presents separate effects of an additional 9-week eligibility of UI benefits for the 9 months following unemployment for the listed group of workers. “Parent” is an indicator variable equal to one if a worker has at least one child. “Low-Skilled Occupation” is defined based on the International Standard Classification of Occupations (ISCO) code of an individual’s last occupation. “Job with Hardship” is an indicator variable equal to one if a worker receives an allowance due to working a job that is hazardous or otherwise physically demanding. “Part-time Worker” indicates an employee that works less than 35 hours per week. “Low Education” is an indicator equal to one if a worker has not met criteria to attend college. Robust standard errors are clustered on the age bin level and are shown in parentheses.

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .



TABLE 8 — Effects on Antidepressants and Benzodiazepines by Whether Workers are in Psychotherapy (Female Workers)

	No Psychotherapy		In Psychotherapy	
	Antidepressants (1)	Benzodiazepines (2)	Antidepressants (3)	Benzodiazepines (3)
Discontinuity	−0.008* (0.004)	0.002 (0.001)	−0.052 (0.053)	0.037** (0.017)
Sample mean	0.09	0.01	0.57	0.02
Observations	110,027		2,187	

Notes: See notes for Table 4. Columns 1 and 2 present estimates for a sample of workers that did not enroll in psychotherapy treatments prior to the unemployment spell. Columns 3 and 4 present estimates for for a sample of workers that did receive psychotherapy treatments prior to the unemployment spell.

TABLE 9 — Effects of Extending UI Benefits on Health Care Utilization within 9 Months of Job Loss

	Outpatient Expenditure (1)	Outpatient Visits (2)	Inpatient Days (3)
<i>(a) Pooled</i>			
Discontinuity	-1.3 (2.5)	0.2 (0.09)	-0.05** (0.03)
Sample mean	95.3	5.8	0.5
Observations		380,634	
<i>(b) Females</i>			
Discontinuity	-0.3 (6.5)	0.3 (0.2)	-0.03 (0.05)
Sample mean	134.2	9.2	0.7
Observations		112,214	
<i>(c) Males</i>			
Discontinuity	-1.8 (2.5)	0.1 (0.08)	-0.06* (0.03)
Sample mean	79.0	4.4	0.5
Observations		268,420	

Notes: See notes for Table 4. "Outpatient Expenditure" denotes the total amount spent, in Euros, on doctor's visits. "Outpatient Visits" include the number of visits to a physician. "Inpatient Days" include the number of days spent in a hospital.

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

TABLE 10 — Effects of Extending UI Benefits on Cardiac Events within 9 Months of Job Loss

	Any Cardiac Event (1)	Heart Attack (2)	Stroke (3)
<i>(a) Pooled</i>			
Discontinuity	0.0004** (0.0002)	0.0003** (0.0002)	0.0001 (0.00009)
Sample mean	0.0013	0.0010	0.0003
Observations		380,634	
<i>(b) Females</i>			
Discontinuity	0.0001 (0.0002)	-0.00008 (0.0001)	0.0002 (0.0001)
Sample mean	0.0008	0.0005	0.0003
Observations		112,214	
<i>(c) Males</i>			
Discontinuity	0.0005** (0.0002)	0.0005** (0.0002)	0.00007 (0.0001)
Sample mean	0.0015	0.0012	0.0003
Observations		268,420	

Notes: See notes for Table 4. Cardiac events include recorded hospitalizations for heart attacks and strokes.

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

TABLE 11 — Effects of Extending UI Benefits on Cardiac Events within 9 Months of Job Loss,  
by Subgroup (Male Workers)

	Any Cardiac Event (1)	Heart Attack (2)	Stroke (3)
<i>(a) Parent</i>			
Yes ( <i>n</i> = 122,382)	0.001*** (0.0004)	0.0007** (0.0004)	0.0005*** (0.0001)
No ( <i>n</i> = 146,038)	−0.0002 (0.0003)	0.0002 (0.0003)	−0.0003 (0.0002)
<i>(b) Low-Skilled Occupation</i>			
Yes ( <i>n</i> = 188,607)	0.0004 (0.0003)	0.0003 (0.0003)	0.0002 (0.0001)
No ( <i>n</i> = 79,813)	0.0009 (0.0006)	0.001** (0.0005)	−0.0001 (0.0002)
<i>(c) Job with Hardship</i>			
Yes ( <i>n</i> = 181,598)	0.0004 (0.0003)	0.0002 (0.0003)	0.0001 (0.0002)
No ( <i>n</i> = 73,021)	0.0004 (0.0005)	0.0009* (0.0005)	−0.0003 (0.0003)
<i>(d) Part-Time</i>			
Yes ( <i>n</i> = 33,409)	−0.0008 (0.0007)	−0.0005 (0.0006)	−0.0003 (0.0005)
No ( <i>n</i> = 221,180)	0.0006* (0.0003)	0.0006** (0.0003)	0.00004 (0.0001)
<i>(e) Low Education</i>			
Yes ( <i>n</i> = 224,902)	0.0005* (0.0003)	0.0004 (0.0002)	0.0001 (0.0001)
No ( <i>n</i> = 36,826)	0.001 (0.0008)	0.002** (0.0008)	−0.0003 (0.0003)

Notes: See notes for Table 7. Estimates are for a sample of unemployed male workers. Cardiac events include heart attacks and strokes.

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

TABLE 12 — Effects of Longer UI Duration on Health Outcomes 3 Months Prior to Job Loss

	Opioids (1)	Non-opioid Painkillers (2)	Antide- pressants (3)	Benzodia- zepines (4)	Inpatient Days (5)	Cardiac Event (6)
<i>(a) Pooled</i>						
Discontinuity	−0.0002 (0.001)	−0.0002 (0.001)	−0.0006 (0.002)	0.0007 (0.000)	0.03 (0.026)	0.0003 (0.000)
<i>(b) Females</i>						
Discontinuity	0.0009 (0.002)	0.001 (0.002)	−0.008 (0.007)	−0.0009 (0.002)	−0.03 (0.074)	0.0005 (0.000)
<i>(c) Males</i>						
Discontinuity	0.002 (0.001)	−0.0002 (0.001)	0.005* (0.002)	0.0009 (0.001)	0.01 (0.043)	0.0003 (0.000)

Notes: See Table 4. The sample includes only observations during the three months prior to the unemployment spell. Standard errors clustered at the age-bin level are in parentheses.

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

TABLE 13 — Placebo Tests with Unemployed Workers Who do Not Fulfill the Experience Criterion

	(1)	(2)	(3)	(4)
<i>(a) Prescriptions</i>				
	Opioids	Non-opioid Painkillers	Antide- pressants	Benzodia- zepines
Females	0.0009 (0.002)	0.001 (0.002)	-0.008 (0.007)	-0.0009 (0.002)
Males	0.002 (0.001)	-0.0002 (0.001)	0.005** (0.002)	0.0009 (0.0007)
<i>(b) Health Care Utilization</i>				
	Outpatient Expenditure	Outpatient Visits	Inpatient Days	
Females	-3.7 (5.4)	-0.1 (0.3)	-0.03 (0.07)	
Males	4.8 (3.3)	0.4** (0.2)	0.01 (0.04)	
<i>(c) Cardiac Events</i>				
	Any Cardiac Event	Heart Attack	Stroke	
Females	0.0005 (0.0004)	0.0003 (0.0002)	0.0002 (0.0003)	
Males	0.0003 (0.0004)	0.0006 (0.0004)	-0.0002 (0.0002)	

Notes: Notes: See Table 4. Estimates are for the sample of workers that do not meet the experience criterion of working 6 out of 10 years prior to unemployment, i.e. workers that are not eligible for the 9-week UI extension.

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

TABLE 14 — Testing Alternative Specifications (Female Workers)

	Different polynomials		Robust CIs	
	Quadratic (Baseline) (1)	Linear (2)	Triangular kernel (3)	Optimal bandwidth (4)
<i>(a) Prescriptions</i>				
Opioids	−0.005** (0.002)	−0.004*** (0.001)	−0.004*** (0.001)	−0.006*** (0.001)
Non-Opioid Painkillers	0.002 (0.001)	0.0005 (0.001)	0.001 (0.001)	0.0009 (0.001)
Antidepressants	−0.009* (0.005)	−0.01*** (0.002)	−0.01*** (0.002)	−0.01*** (0.003)
Benzodiazepines	0.002* (0.001)	0.003*** (0.001)	0.002*** (0.001)	0.003*** (0.001)
<i>(b) Health Care Utilization</i>				
Outpatient Expenditure	−0.3 (6.542)	−8.4*** (2.017)	−4.3* (2.637)	−2.7 (4.154)
Outpatient Visits	0.3 (0.250)	−0.3 (0.184)	0.005 (0.144)	−0.2 (0.228)
Inpatient days	−0.03 (0.053)	0.02 (0.029)	−0.0002 (0.032)	−0.03 (0.045)
<i>(c) Cardiac Events</i>				
Any Cardiac Event	0.0001 (0.000)	−0.0001 (0.000)	0.000002 (0.000)	0.0003* (0.000)
Stroke	0.0002 (0.000)	0.000007 (0.000)	0.0001 (0.000)	0.0003** (0.000)
Heart Attack	−0.00008 (0.000)	−0.0001 (0.000)	−0.0001 (0.000)	−0.00009 (0.000)

Notes: RD estimates are based on individual-level data on unemployment insurance health events from linked Upper Austrian Health Insurance Fund database files and Austrian Social Security Database files from 2003–2013. Each regression includes quarter-year fixed effects. The sample includes only unemployed female workers. Column 1 replicates the baseline estimates for workers experiencing an unemployment spell, Column 2 presents estimates from specifications that allow the running variable to vary linearly, and Column 3 presents the baseline estimates using triangular kernel instead of uniform kernel weighting. Column 4 shows estimates from a model using a smaller MSE-driven bandwidth, instead of our baseline one-sided bandwidth of 10 years. Robust standard errors are clustered on the age bin level and are shown in parentheses.

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .



TABLE 15 — Testing Alternative Specifications (Male Workers)

	Different polynomials		Robust CIs	
	Quadratic (Baseline) (1)	Linear (2)	Triangular kernel <sup>†</sup> (3)	Optimal bandwidth <sup>‡</sup> (4)
<i>(a) Prescriptions</i>				
Opioids	−0.0006 (0.001)	−0.002*** (0.000)	−0.002*** (0.001)	−0.002** (0.001)
Non-Opioid Painkillers	−0.0002 (0.001)	−0.0003 (0.000)	−0.0002 (0.000)	−0.0003 (0.001)
Antidepressants	0.003* (0.002)	−0.002** (0.001)	0.0007 (0.001)	0.002 (0.001)
Benzodiazepines	0.0004 (0.001)	−0.00002 (0.000)	0.0001 (0.000)	0.0003 (0.001)
<i>(b) Health Care Utilization</i>				
Outpatient Expenditure	−1.8 (2.500)	−3.4*** (1.075)	−2.0* (1.145)	−3.2* (1.616)
Outpatient Visits	0.1 (0.084)	0.04 (0.060)	0.1** (0.055)	0.2** (0.087)
Inpatient days	−0.06* (0.033)	−0.02 (0.017)	−0.04* (0.019)	−0.05* (0.026)
<i>(c) Cardiac Events</i>				
Any Cardiac Event	0.0005** (0.000)	0.0003** (0.000)	0.0004** (0.000)	0.0003 (0.000)
Stroke	0.00007 (0.000)	−0.00006 (0.000)	−0.000005 (0.000)	0.0001 (0.000)
Heart Attack	0.0005** (0.000)	0.0004*** (0.000)	0.0004*** (0.000)	0.0003* (0.000)

Notes: RD estimates are based on individual-level data on unemployment insurance health events from linked Upper Austrian Health Insurance Fund database files and Austrian Social Security Database files from 2003–2013. Each regression includes quarter-year fixed effects. The sample includes only unemployed male workers. Column 1 replicates the baseline estimates for workers experiencing an unemployment spell, Column 2 presents estimates from specifications that allow the running variable to vary linearly, and Column 3 presents the baseline estimates using triangular kernel instead of uniform kernel weighting. Column 4 shows estimates from a model using a smaller MSE-driven bandwidth, instead of our baseline one-sided bandwidth of 10 years. Robust standard errors are clustered on the age bin level and are shown in parentheses.

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

TABLE 16 — Effects of Extending UI Benefits on Child Health

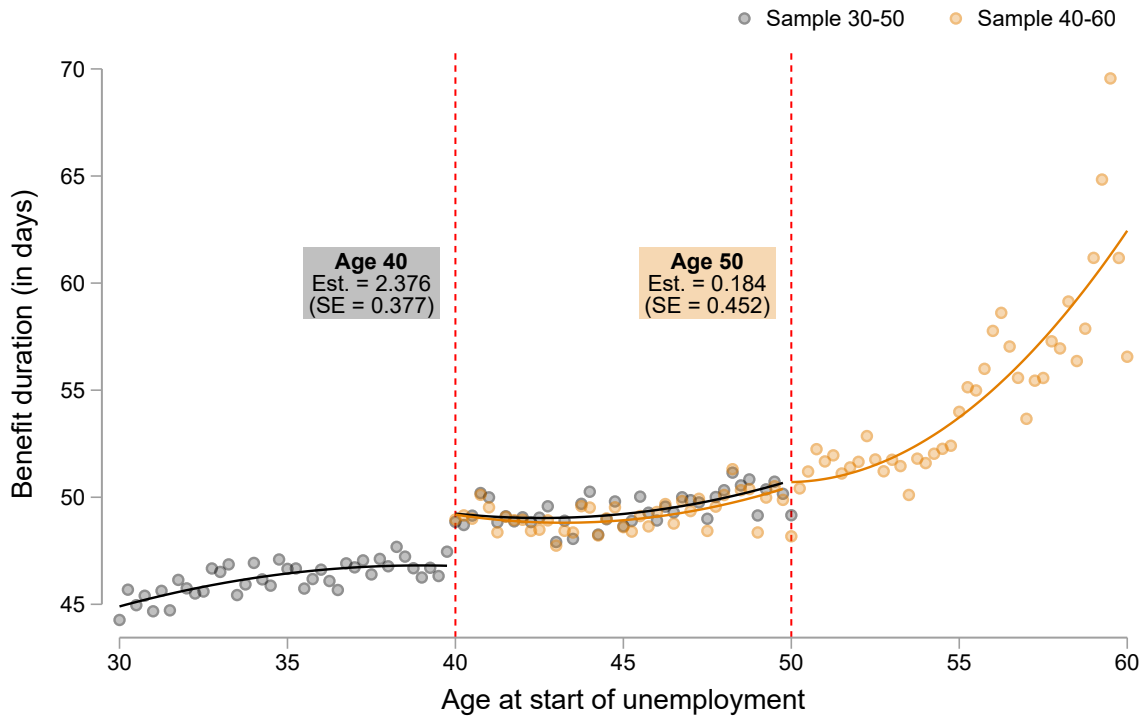
	Outpatient Expenditure (1)	Outpatient Visits (2)	Inpatient Stays (3)	Disentangling Outpa- tient Expenditure	
				Preventative (4)	Curative (5)
<i>(a) Mothers</i>					
Child Age < 6	−16.184** (7.355)	−0.053 (0.254)	−0.002 (0.074)	−0.515 (0.331)	−15.669** (7.332)
Sample mean Observations	53.70	3.61	0.13 8,822	3.72	49.98
6 ≤ Child Age < 12	−1.824 (4.486)	−1.177 (0.776)	−0.161 (0.135)	2.027 (1.469)	−3.851 (4.363)
Sample mean Observations	47.99	2.75	0.16 16,497	0.24	47.76
12 ≤ Child Age < 18	10.321* (5.539)	0.115 (0.302)	0.043 (0.032)	0.216 (0.330)	10.106* (5.581)
Sample mean Observations	56.53	3.54	0.22 32,092	0.26	56.27
<i>(b) Fathers</i>					
Child Age < 6	−0.020 (0.549)	0.143 (0.134)	0.003 (0.003)	−0.074 (0.051)	0.055 (0.525)
Sample mean Observations	3.43	0.24	0.01 48,840	0.29	3.14
6 ≤ Child Age < 12	−1.034* (0.551)	−0.103 (0.107)	−0.001 (0.006)	−0.001 (0.001)	−1.033* (0.551)
Sample mean Observations	4.20	0.32	0.01 82,423	0.00	4.20
12 ≤ Child Age < 18	−0.440 (0.609)	−0.056 (0.045)	0.016* (0.008)	−0.051 (0.037)	−0.389 (0.606)
Sample mean Observations	6.89	0.45	0.03 58,642	0.04	6.85

Notes: See notes for Table 4. Panel (a) presents estimates for the sample of children with unemployed mothers, while Panel (b) presents estimates for the sample of children with unemployed fathers. Estimates are from separate regressions for each listed child age group. "Outpatient Expenditure" denotes the total amount spent, in Euros, on doctor's visits. "Outpatient Visits" include the number of visits to a physician. "Inpatient Days" include the number of days spent in a hospital. "Preventative" visits include any type of screening or mother/child well visits, excluding vaccinations (due to data limitations). "Curative" visits include visits to the doctor's office that are not primarily for a sick visit, and do not include any type of preventative care.

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

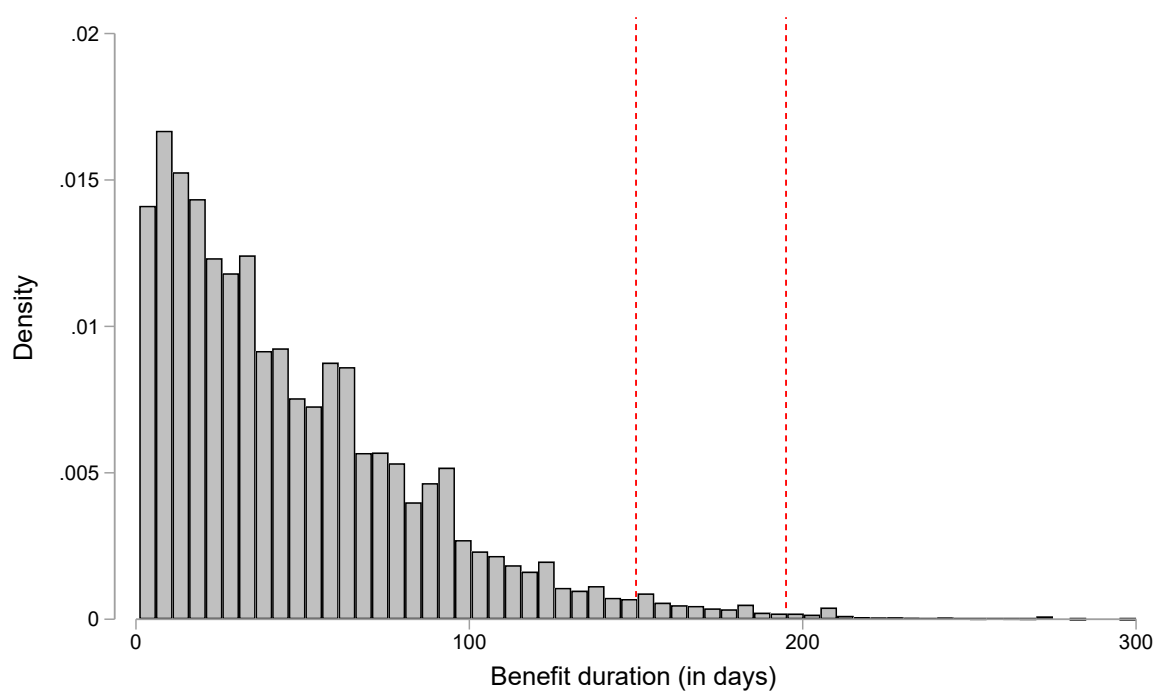
## Appendix

FIGURE A1 — Testing an Alternative Discontinuity at Age 50 on UI Benefit Duration, in Days



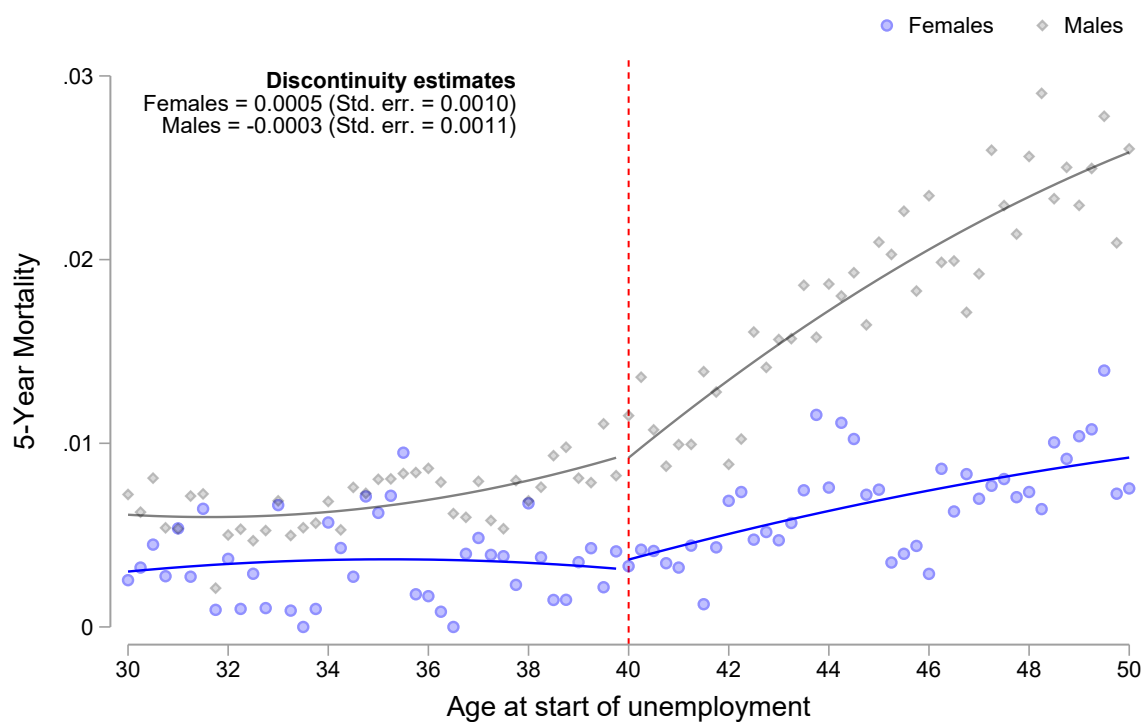
Notes: Individual-level data on unemployment insurance health events is from linked Upper Austrian Health Insurance Fund database files and Austrian Social Security Database files from 2003–2013. We build two samples, each being symmetric around the respective discontinuity at age 40 (our defined treatment cutoff) and age 50 (an alternative cutoff). For each cutoff we present estimates and their respective standard errors for these two samples, based on our main RD approach described by Equation 1.

FIGURE A2 — Density of UI Benefit Duration Length, in Days



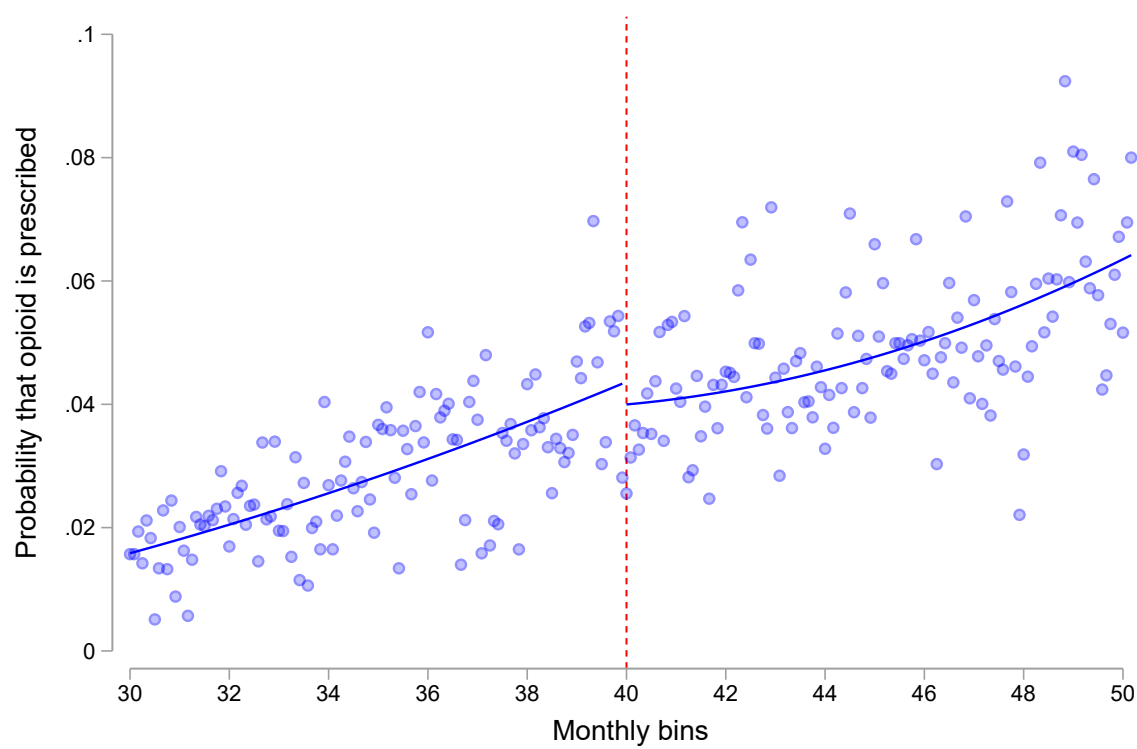
Notes: Individual-level data on unemployment insurance health events is from linked Upper Austrian Health Insurance Fund database files and Austrian Social Security Database files from 2003–2013. Bars represent the frequency of UI benefit duration, in days, for the full sample of unemployed workers. The vertical lines represent 30 and 39 weeks of UI benefits (paid 5 days per week).

FIGURE A3 — Effects on Mortality, Within 5 years of Receiving UI Benefits



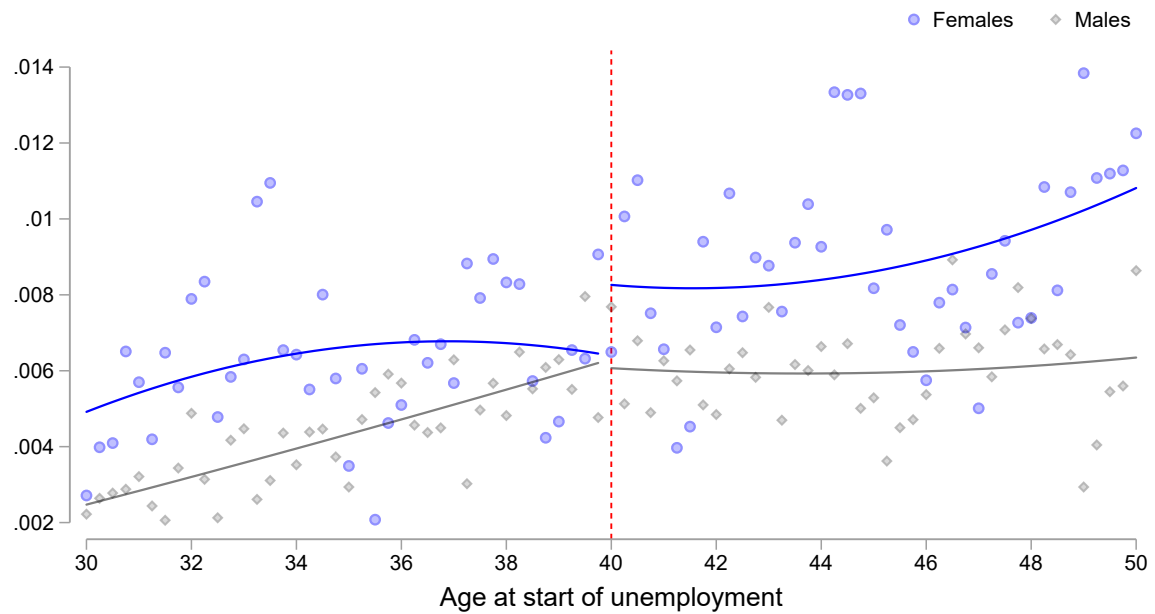
Notes: See notes for Figure 4. The outcome variable is whether a worker dies within five years of receiving UI payments.

FIGURE A4 — Effects of UI Extensions on Opioid Prescriptions, Using 1-Month Bins



Notes: See notes for Figure 4. Data are plotted using 1-month age bins.

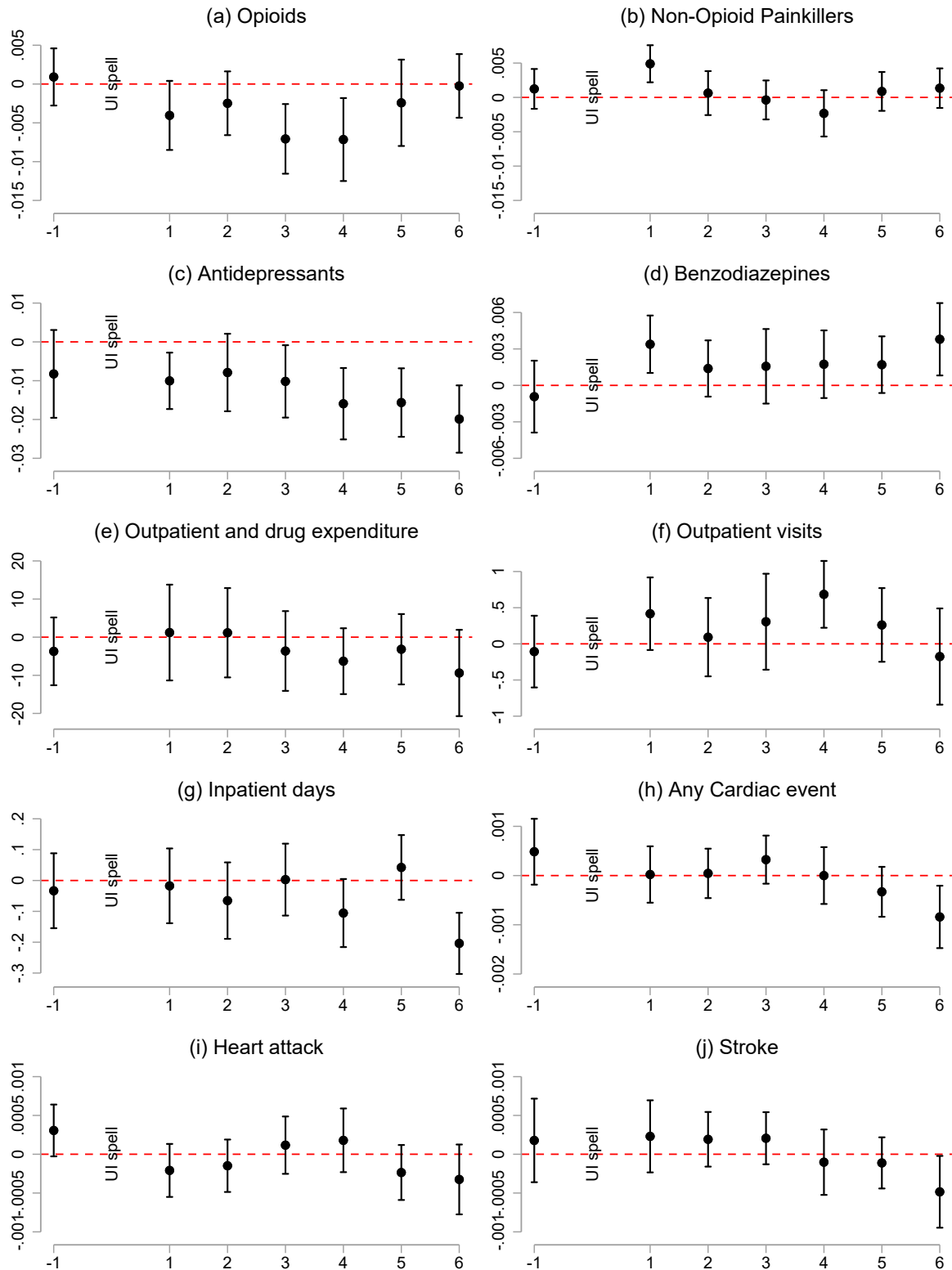
FIGURE A5 — Effects of Extended UI Benefit Duration on the Probability of Being Prescribed Non-Opioid Pain Drugs



Notes: See notes for Figure 4. Non-opioid analgesics include non-habit-forming pain medication such as nonsteroidal anti-inflammatory drugs and acetaminophen. For a full list of ATC code N medications, see [https://www.whocc.no/atc\\_ddd\\_index](https://www.whocc.no/atc_ddd_index).

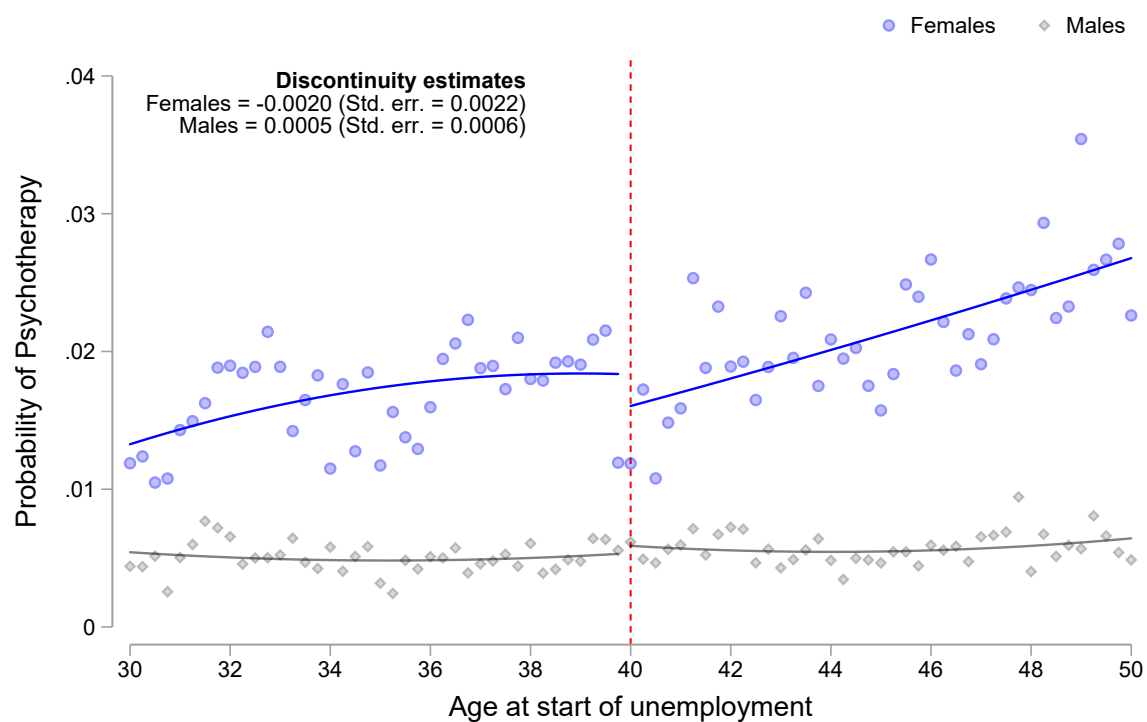


FIGURE A6 — Effects of UI Extensions on Health Over Time, Female Workers



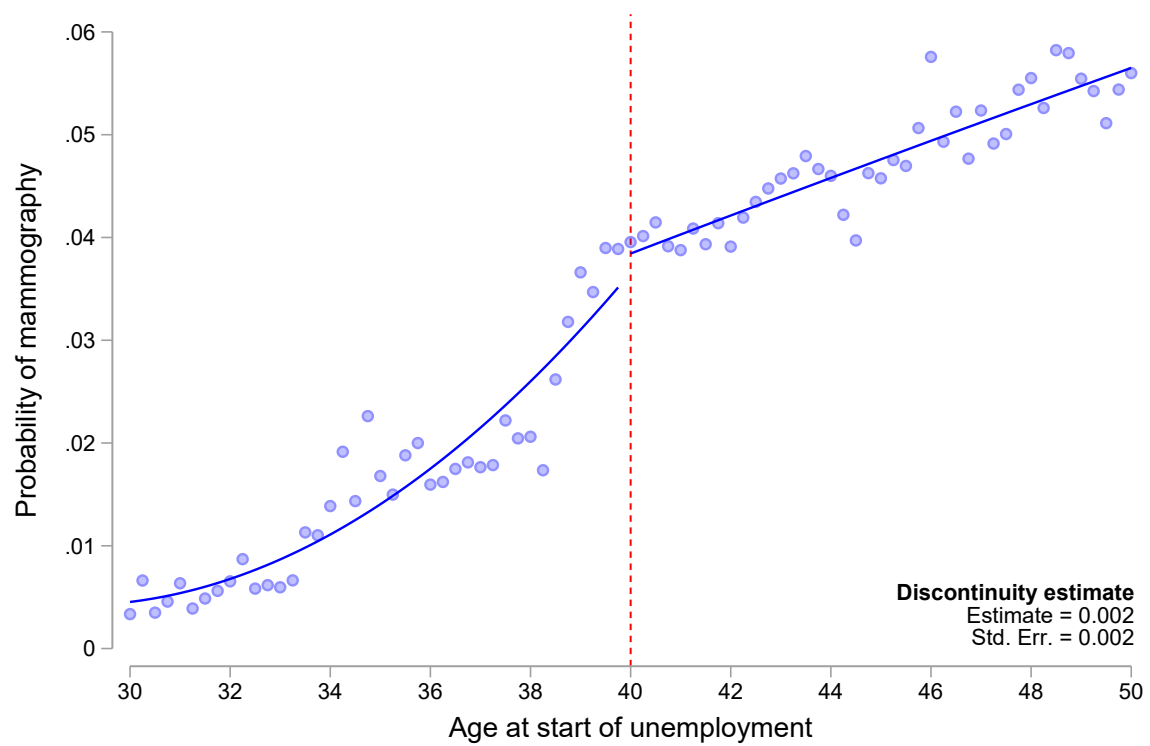
Notes: Individual-level data on unemployment insurance health events is from linked Upper Austrian Health Insurance Fund database files and Austrian Social Security Database files from 2003–2013. Each scatter represents a coefficient of the main variable of interest from Equation 1, using quarterly data. The vertical lines represent corresponding 95% confidence intervals based on age-bin clustered standard errors. An x-axis value of “ $i$ ” where  $i = -1, 0, 1, \dots, 6$  indicates an estimate from our main RD analysis comparing the listed outcome for unemployed workers around the UI eligibility threshold for quarter  $i$  only, where  $i = 0$  represents the quarter of unemployment,  $i = 1$  represents one quarter after unemployment, and so on. Each panel displays estimates for the listed outcome variable of interest using a sample of only female workers.

FIGURE A7 — Probability of Seeking Psychotherapy



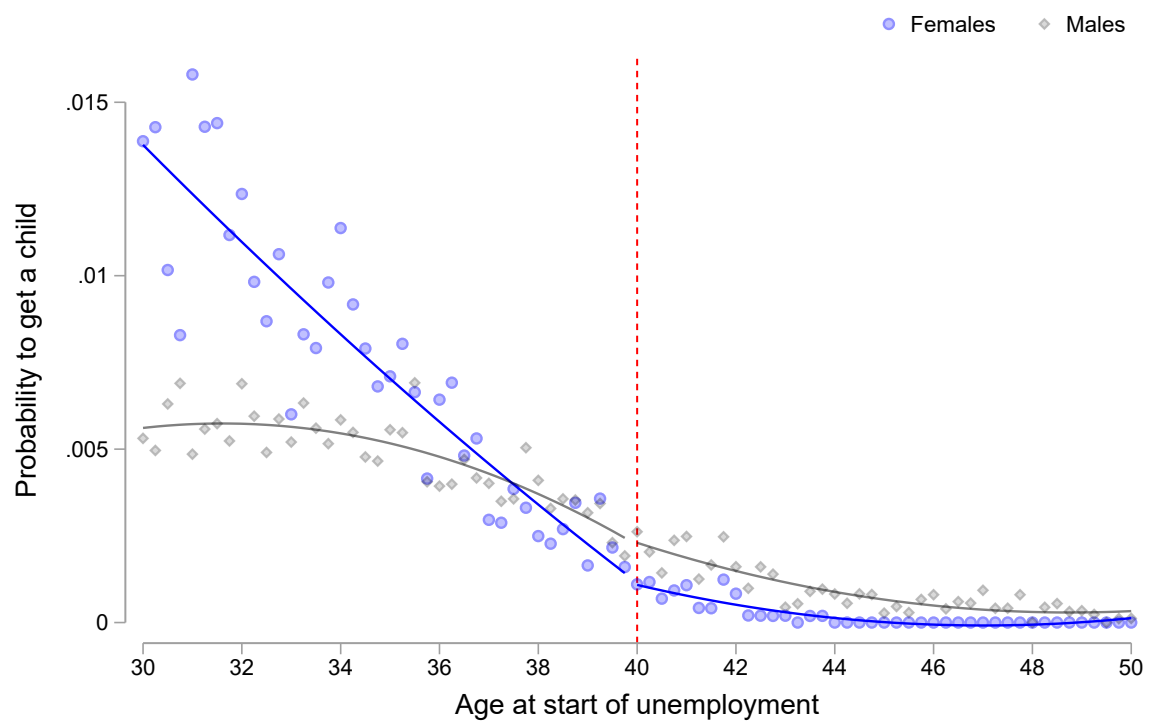
Notes: See notes for Figure 4. The outcome variable is an indicator variable equal to one if a worker received psychotherapy treatments prior to the unemployment spell and zero otherwise.

FIGURE A8 — Probability of Mammography (Female Workers)



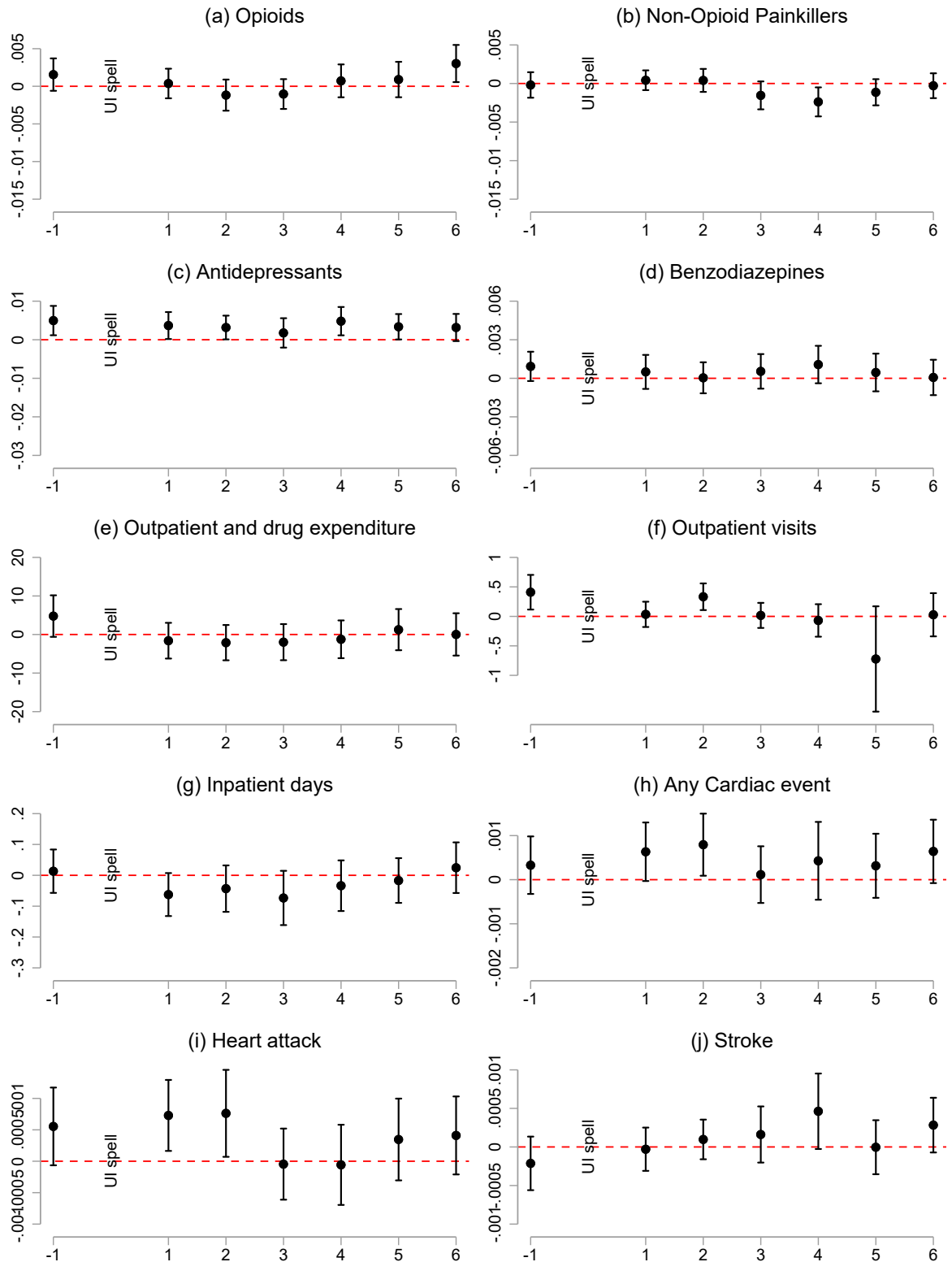
Notes: See Figure 4. Mammographies are recorded in the data and are considered under “screenings”, or preventative care.

FIGURE A9 — Probability of Having a Baby



Notes: See Figure 4. The outcome variable is an indicator variable equal to one if a worker (male or female) was registered on newborn's birth certificate during the sample period.

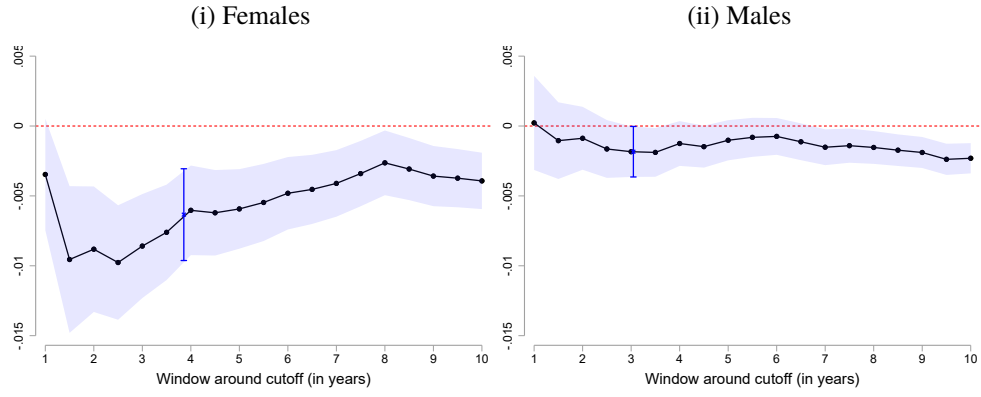
FIGURE A10 — Effects of UI Extensions on Health Over Time, Male Workers



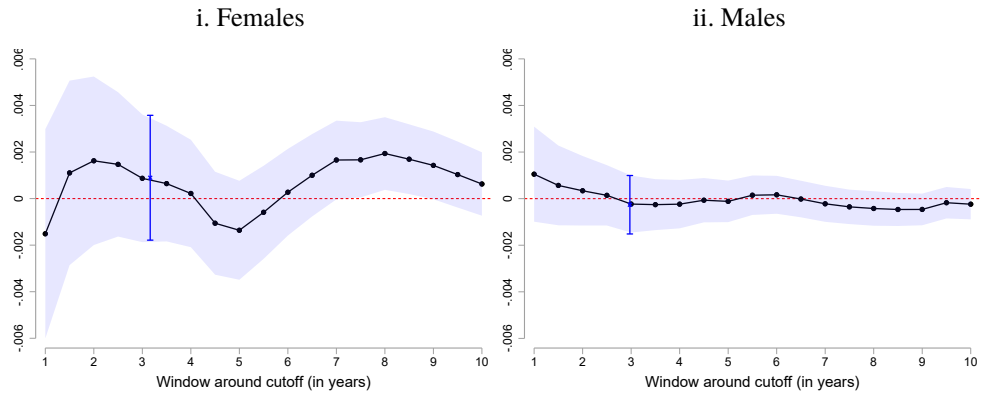
Notes: Individual-level data on unemployment insurance health events is from linked Upper Austrian Health Insurance Fund database files and Austrian Social Security Database files from 2003–2013. Each scatter represents a coefficient of the main variable of interest from Equation 1, using quarterly data. The vertical lines represent corresponding 95% confidence intervals based on age-bin clustered standard errors. An x-axis value of “ $i$ ” where  $i = -1, 0, 1, \dots, 6$  indicates an estimate from our main RD analysis comparing the listed outcome for unemployed workers around the UI eligibility threshold for quarter  $i$  only, where  $i = 0$  represents the quarter of unemployment,  $i = 1$  represents one quarter after unemployment, and so on. Each panel displays estimates for the listed outcome variable of interest using a sample of only male workers.

FIGURE A11 — Estimated Effects on Prescriptions Across Bandwidths

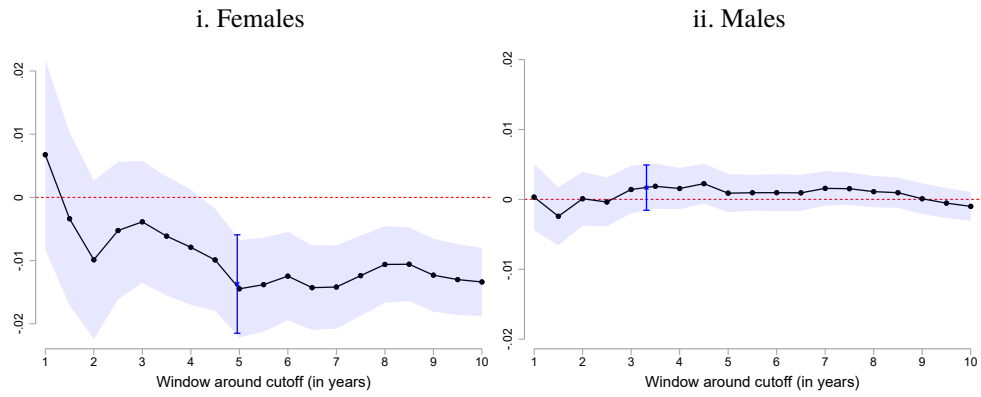
(a) Opioids



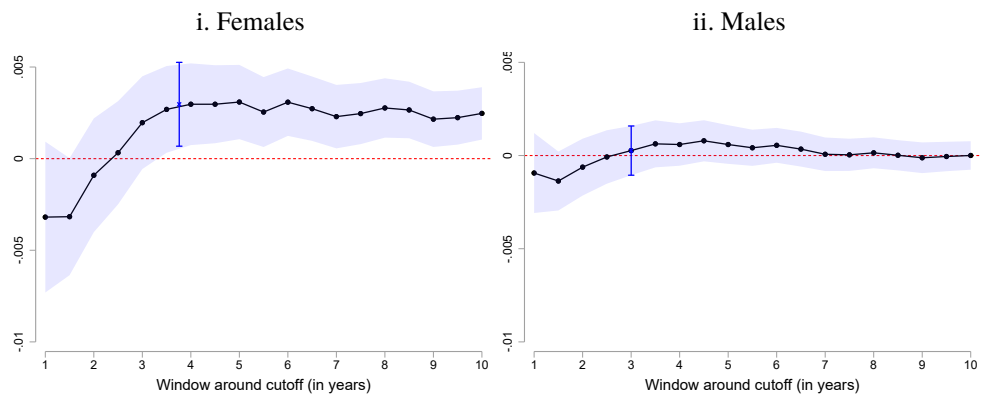
(b) Non-opioid Painkillers



(c) Antidepressants

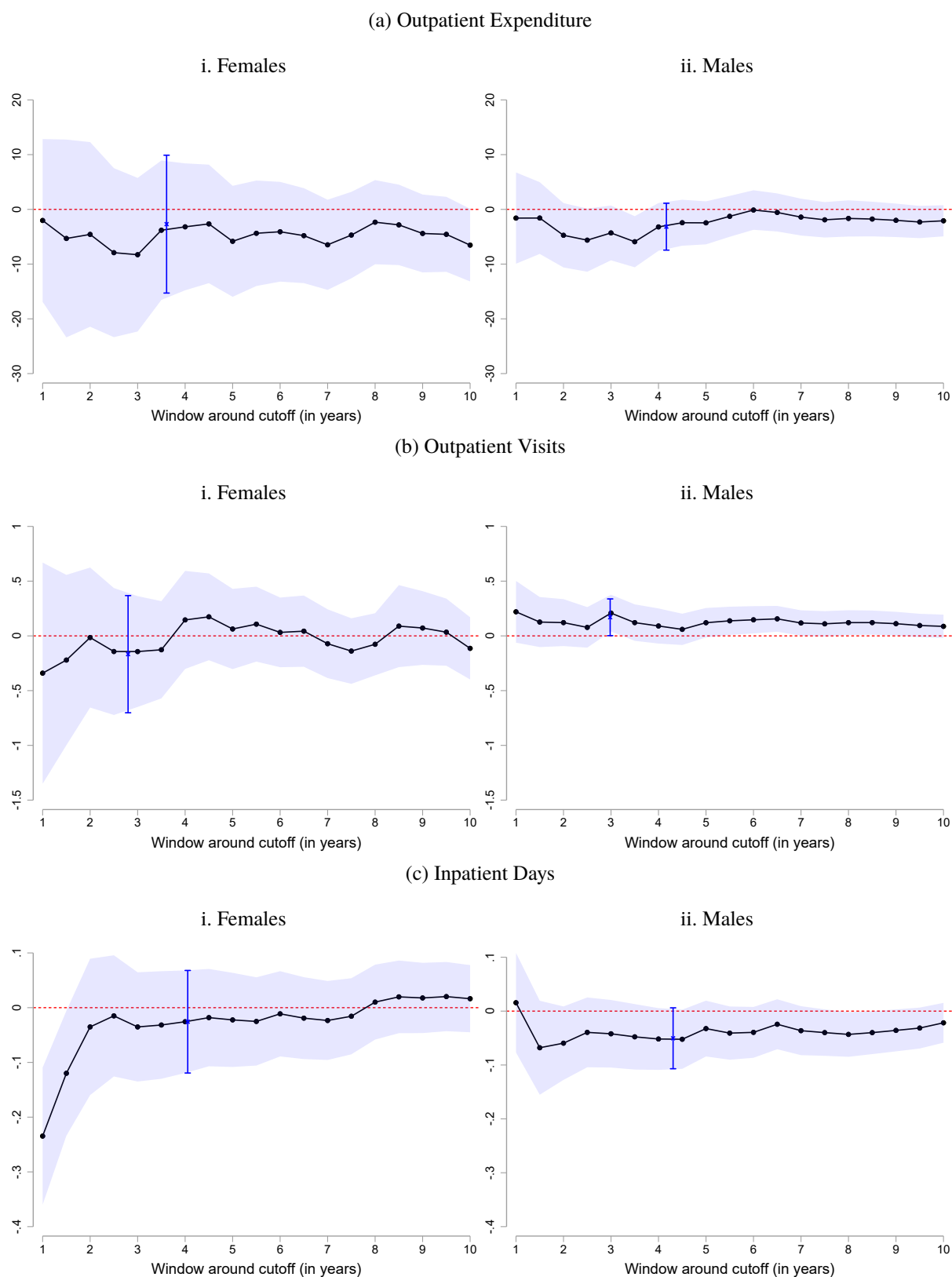


(d) Benzodiazepines



Notes: Individual-level data on unemployment insurance health events is from linked Upper Austrian Health Insurance Fund database files and Austrian Social Security Database files from 2003–2013. Each figure shows estimates and their 95% confidence intervals from our preferred specification (Equation 1) using a uniform kernel for a range of bandwidths. The vertical line shows the estimate and corresponding confidence interval using the MSE-optimal bandwidth.

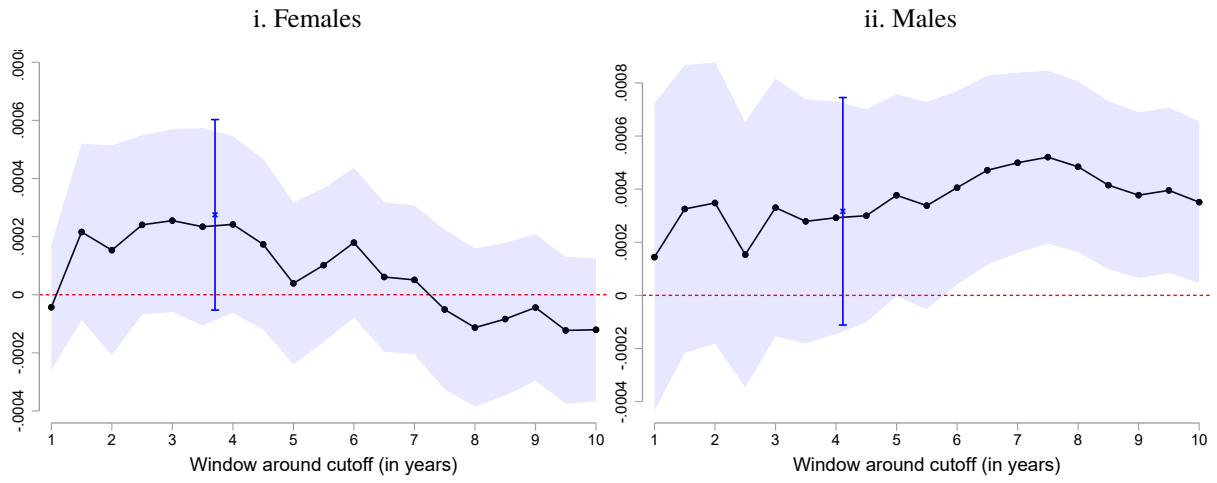
FIGURE A12 — Estimated Effects on Health Care Utilization Across Bandwidths



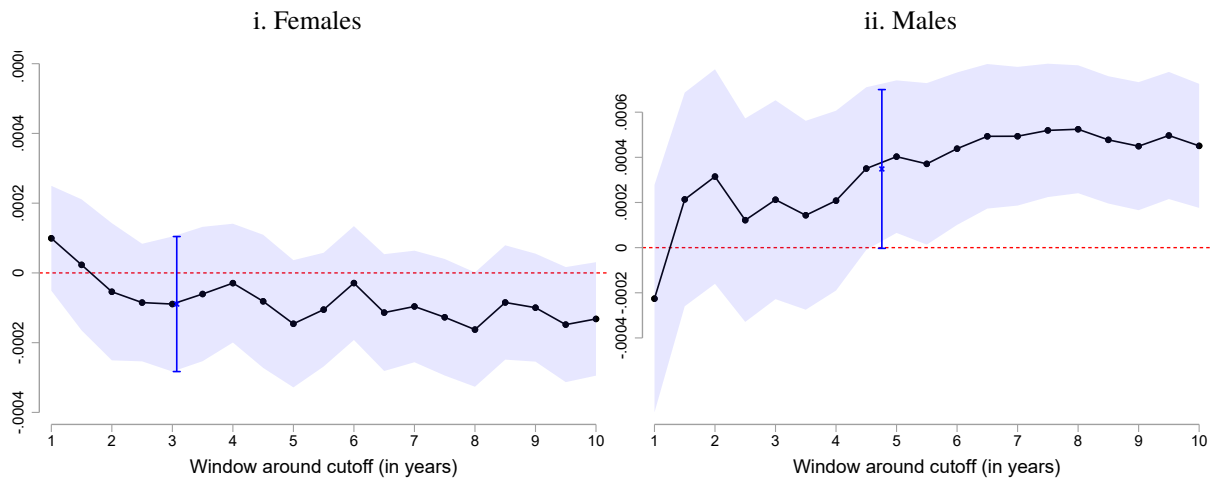
Notes: See notes for Figure A11. “Outpatient Expenditure” denotes the total amount spent, in Euros, on doctor’s visits. “Outpatient Visits” include the number of visits to a physician. “Inpatient Days” include the number of days spent in a hospital.

FIGURE A13 — Estimated Effects on Cardiac Events Across Bandwidths

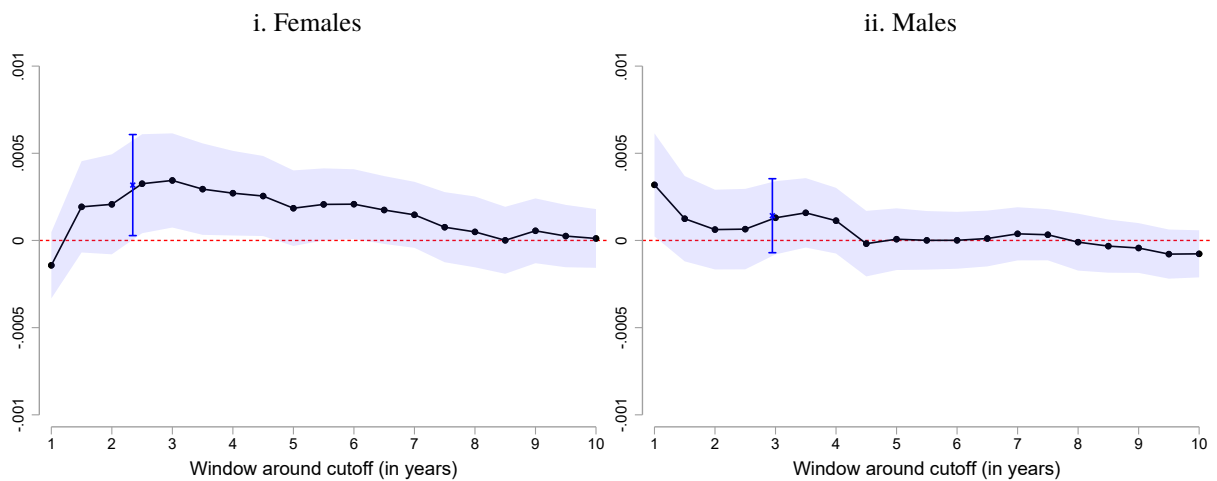
(a) Any Cardiac Event



(b) Heart Attack



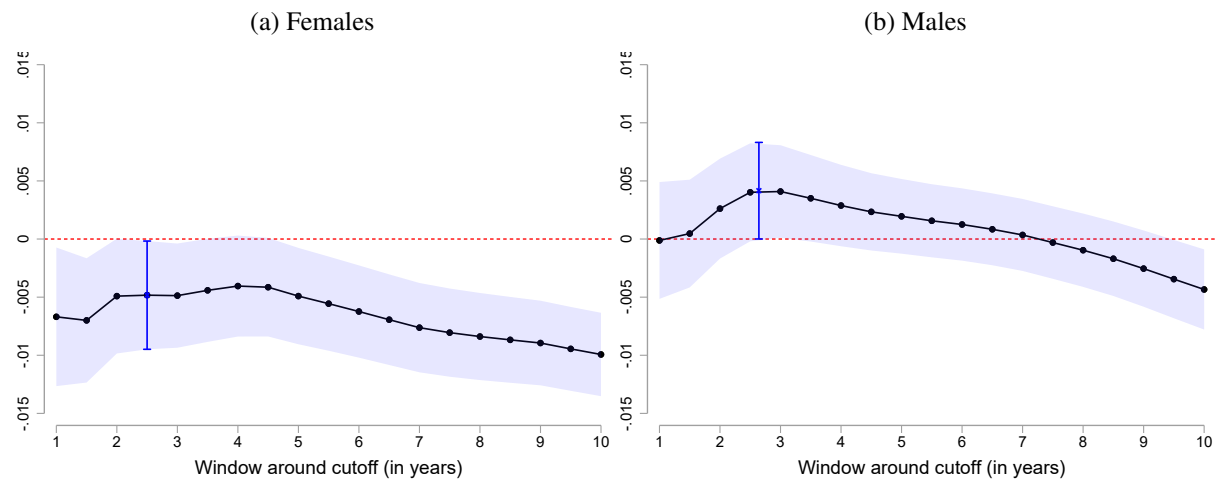
(c) Stroke



Notes: See notes for Figure A11. Cardiac events include recorded hospitalizations for heart attacks and strokes.

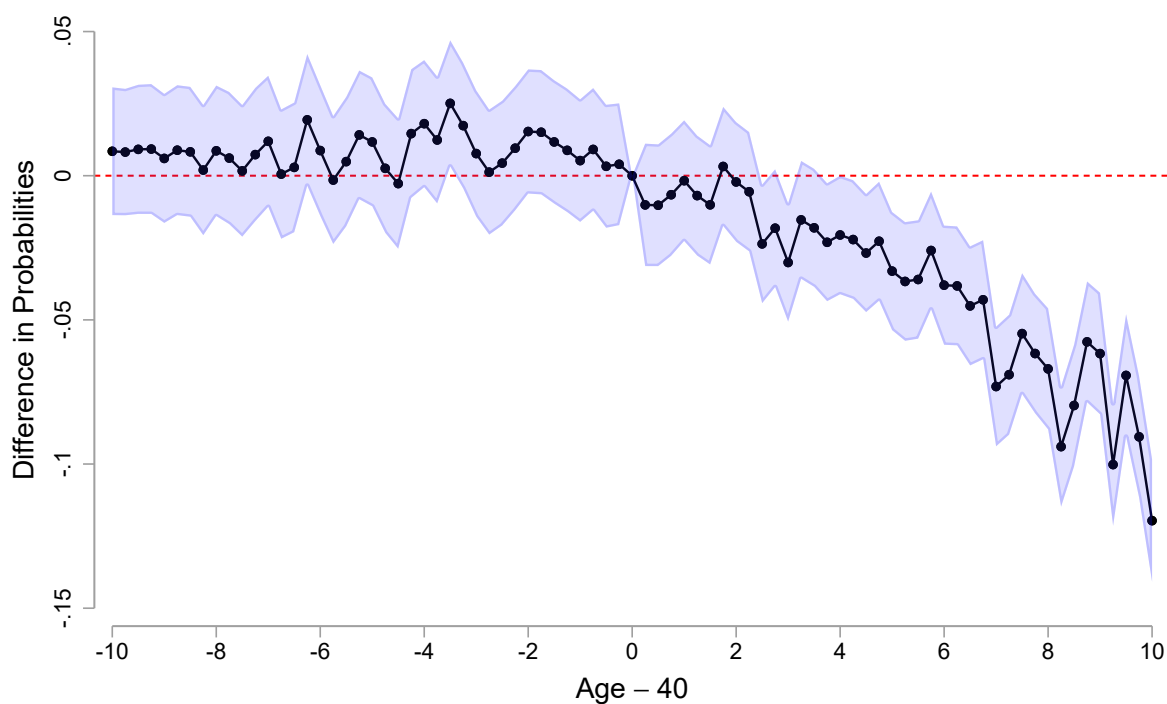


FIGURE A14 — Effects of Extended UI Benefit Duration on the Probability of Disability Claims with Different Bandwidths



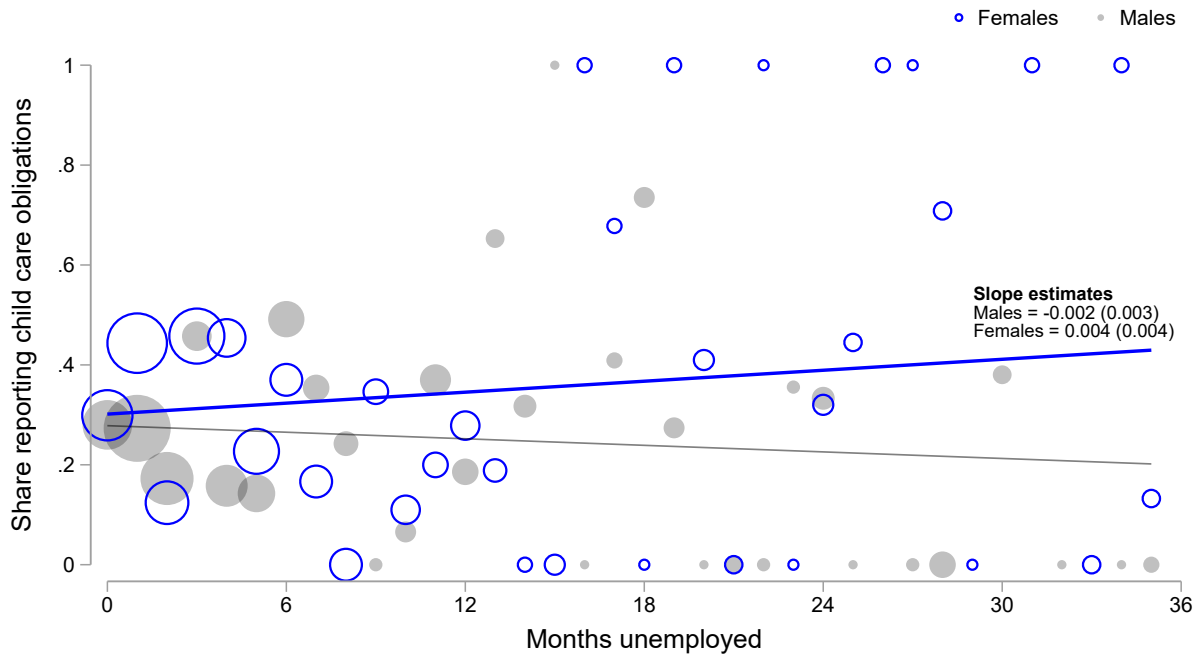
Notes: See notes for Figure A11.

FIGURE A15 — Differences in Probabilities of Filing a Disability Claim, by Age and Gender



Notes: Event study coefficients and their respective 95% confidence intervals are generated from the following regression estimated using OLS:  $y_i = \sum_{k=-10|t \neq -1}^{10} \beta_k (female_i \times age_k) + female_i + \sum_k age_k + \epsilon_{ik}$ , where  $y$  represents the outcome “filing for disability retirement” for individual  $i$ , and  $female$  is an indicator variable taking the value 1 if a worker is female, and  $age$  is the age the worker becomes unemployed, centered around 40. Our main variable of interest is an indicator variable equal to one if a worker claims disability pension between the time unemployed and the end of our sample, December 31, 2018, and zero otherwise.

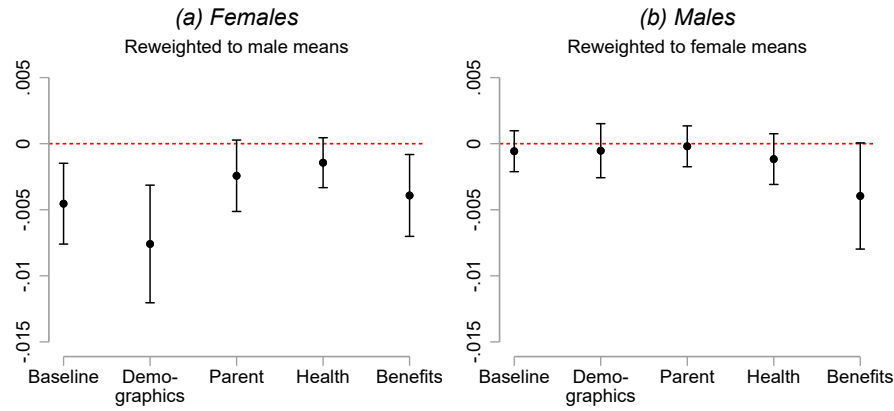
FIGURE A16 — Gender Differences in Childcare Obligations



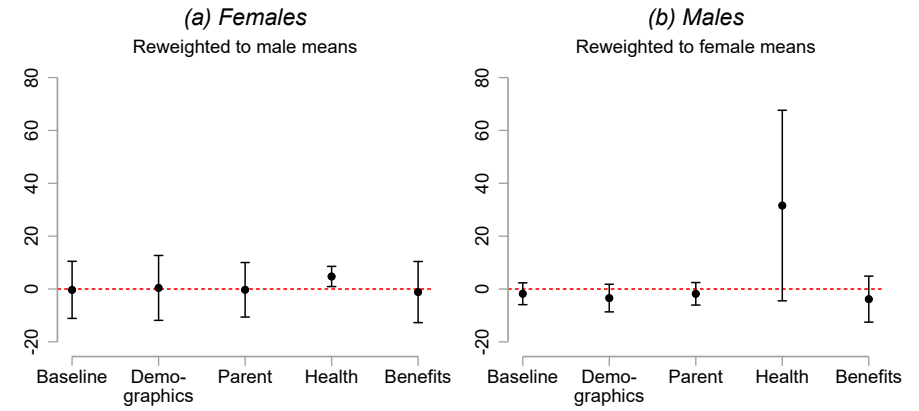
*Notes:* Data from the 2018 Austrian Microcensus, only people who participated in the ad hoc module “Reconciliation of work and family” ( $N = 22,604$ ). Note that participating in the census is mandatory, while answering the ad hoc module is not. This figure plots means for answers to the question “Do you have any childcare obligations?” within unemployment duration bins, weighted by the number of unemployed people in each bin.

FIGURE A17 — RDD Estimates Based on Across-Gender Balanced Samples

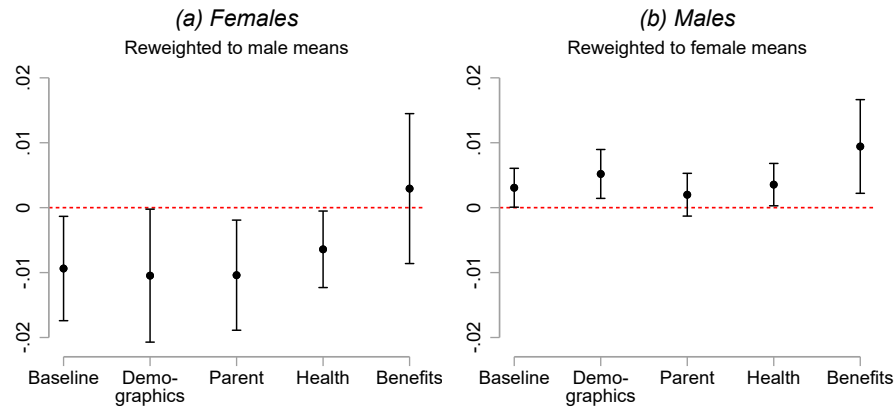
### I. Opioid Prescriptions



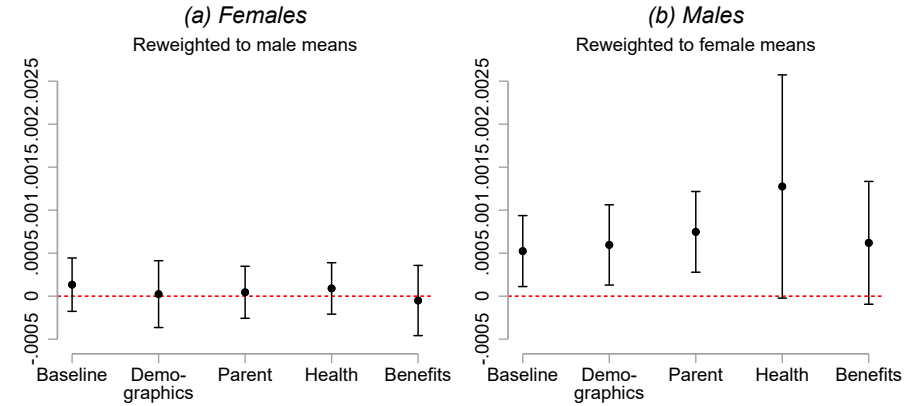
### III. Outpatient Expenditures



### II. Antidepressant Prescriptions



### IV. Cardiac Events



Notes: See Figure 4. We follow the entropy balance procedure from [Hainmüller \(2012\)](#). Panel (a) presents results for female workers and Panel (b) presents results for male workers for each listed outcome. Each estimate and its 95% confidence interval represents the RDD estimate from Equation (1), using a sample reweighted by the listed control variables for the opposite gender (e.g., the estimate for “Parent” in Panel (I.a) of the top row displays the RDD coefficient on opioid prescription take up for female workers, after reweighting the sample such that females are parents with the same likelihood as males).

TABLE A1 — Effects of Extending UI Benefits on Health Outcomes within 9 Months of Job Loss, by Subgroup (Male Workers)

	Prescriptions				Health Care Utilization		
	Opioids (1)	Non-opioid Painkillers (2)	Antide- pressants (3)	Benzodia- zepines (4)	Outpatient Expenditure (5)	Outpatient Visits (6)	Inpatient Days (7)
<i>(a) Parent</i>							
No ( <i>n</i> = 146,038)	−0.002 (0.001)	−0.002** (0.001)	0.006** (0.003)	0.0003 (0.001)	−1.9 (3.442)	0.2 (0.138)	−0.05 (0.051)
Yes ( <i>n</i> = 122,382)	0.0007 (0.001)	0.001 (0.001)	−0.00004 (0.003)	0.0006 (0.001)	−1.8 (3.336)	0.1 (0.128)	−0.06 (0.038)
<i>(b) Low skilled occupation</i>							
Yes ( <i>n</i> = 188,607)	0.0002 (0.001)	0.00003 (0.001)	0.003 (0.002)	−0.0005 (0.001)	0.7 (3.044)	0.2* (0.106)	−0.07* (0.036)
No ( <i>n</i> = 79,813)	−0.002* (0.001)	−0.0006 (0.001)	0.003 (0.003)	0.002* (0.001)	−7.4* (4.176)	0.01 (0.137)	−0.03 (0.058)
<i>(c) Receives hardship allowance</i>							
Yes ( <i>n</i> = 174,642)	0.0002 (0.001)	0.0003 (0.001)	−0.0009 (0.002)	−0.0009 (0.001)	−3.2 (3.074)	0.1 (0.087)	−0.02 (0.030)
No ( <i>n</i> = 70,622)	−0.0007 (0.002)	−0.002 (0.002)	0.008** (0.004)	0.002 (0.002)	−0.05 (4.853)	0.1 (0.167)	−0.1* (0.065)
<i>(d) Part-Time</i>							
Yes ( <i>n</i> = 31,996)	−0.009** (0.004)	−0.0002 (0.002)	−0.008 (0.007)	−0.002 (0.003)	−1.7 (6.367)	−0.5** (0.203)	−0.2*** (0.080)
No ( <i>n</i> = 213,243)	0.001 (0.001)	−0.0005 (0.001)	0.003 (0.002)	0.0001 (0.001)	−2.5 (2.780)	0.2** (0.087)	−0.02 (0.033)
<i>(e) Low Education</i>							
Yes ( <i>n</i> = 224,902)	−0.001 (0.001)	−0.0003 (0.001)	0.0003 (0.002)	0.0003 (0.001)	−3.8 (2.790)	0.02 (0.098)	−0.07** (0.035)
No ( <i>n</i> = 36,826)	0.01*** (0.004)	0.006*** (0.002)	0.02*** (0.008)	0.003 (0.002)	33.8*** (9.204)	1.4*** (0.372)	0.03 (0.102)

Notes: See notes for Table 11. Estimates are for the sample of unemployed male workers.

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

TABLE A2 — Effects on Jobs with Hardship: Previous vs. Next Job

	(1)	(2)	(3)
<i>(a) Females</i>			
Last job with hardship	0.373*** (0.002)	0.359*** (0.002)	0.373*** (0.002)
Age $\geq 40$			-0.001 (0.001)
Last job with hardship $\times$ age $\geq 40$			-0.013*** (0.003)
<i>(b) Males</i>			
Last job with hardship	0.464*** (0.001)	0.503*** (0.001)	0.464*** (0.001)
Age $\geq 40$			-0.006*** (0.001)
Last job with hardship $\times$ age $\geq 40$			0.039*** (0.002)

Notes: RD estimates are based on individual-level data on unemployment insurance health events from linked Upper Austrian Health Insurance Fund database files and Austrian Social Security Database files from 2003–2013, although hardship indicators are not available for 2013. Each estimate presents separate effects of an additional 9-week eligibility of UI benefits for the 9 months following unemployment for the listed group of workers. “Last job with hardship” is an indicator variable equal to one if a worker receives an allowance due to working a job that is hazardous or otherwise physically demanding prior to job loss. *age*  $\geq 40$  is an indicator variable equal to 1 if an individual is at least 40 years old at the time of layoff, corresponding to the coefficient of interest from Equation 1. Robust standard errors are clustered on the age bin level and are shown in parentheses.

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

TABLE A3 — Descriptions of Most Commonly Prescribed Benzodiazepines in Upper Austria

Drug	Onset	Elimination	Uses	# Prescribed
Triazolam (Halcion)	Fast	Short	Insomnia	300,114
Oxazepam (Serax)	Slow	Short	Anxiety, alcohol withdrawal	226,790
Lorazepam (Ativan)	Intermediate	Intermediate	Anxiety, insomnia, seizures	206,847
Bromazepam (Lexotan)	Intermediate	Long	Anxiety, insomnia, seizures	177,918
Flunitrazepam (Rohypnol)	Fast	Short	Insomnia	139,959
Alprazolam (Xanax)	Intermediate	Intermediate	Anxiety, panic	133,732
Diazepam (Valium)	Fast	Long	Anxiety, seizures, alcohol withdrawal	126,064
Clonazepam (Klonopin)	Intermediate	Long	Anxiety, insomnia, seizures, panic	21,325

Notes: This is a list of the 8 most prescribed benzodiazepines in Upper Austria between 2003 and 2013. Information on the drug characteristics are from [https://www.health.harvard.edu/mind-and-mood/benzodiazepines\\_and\\_the\\_alternatives](https://www.health.harvard.edu/mind-and-mood/benzodiazepines_and_the_alternatives), <https://www.drugs.com/mmx/bromazepam.html>, and <https://link.springer.com/article/10.2165/00003495-198020050-00002>. “# Prescribed” indicates aggregate prescriptions from 2003–2013 in Upper Austria.

TABLE A4 — Effects of Extending UI Benefits on Cardiac Events within 18 Months of Job Loss,  
Using a 3-Month Rolling Window

	Any Cardiac Event	Heart Attack	Stroke
<i>(a) Female Workers</i>			
3 Months	0.00002 (0.0003)	-0.0002 (0.0002)	0.0002 (0.0003)
6 Months	0.00004 (0.0002)	-0.0002 (0.0001)	0.0002 (0.0002)
9 Months	0.0001 (0.0002)	-0.00008 (0.0001)	0.0002 (0.0001)
12 Months	0.0001 (0.0002)	-0.00001 (0.0001)	0.0001 (0.0001)
15 Months	0.00003 (0.0002)	-0.00005 (0.0001)	0.00009 (0.0001)
18 Months	-0.0001 (0.0002)	-0.00010 (0.0001)	0.000002 (0.0001)
<i>(b) Male Workers</i>			
3 Months	0.0006 (0.0004)	0.0007** (0.0003)	-0.00003 (0.0002)
6 Months	0.0007** (0.0003)	0.0007*** (0.0003)	0.00003 (0.0001)
9 Months	0.0005** (0.0002)	0.0005** (0.0002)	0.00007 (0.0001)
12 Months	0.0005** (0.0002)	0.0004* (0.0002)	0.0002 (0.0001)
15 Months	0.0005** (0.0002)	0.0004* (0.0002)	0.0001 (0.00010)
18 Months	0.0005** (0.0002)	0.0004* (0.0002)	0.0002* (0.00009)

Notes: RD estimates are based on individual-level data on unemployment insurance health events from linked Upper Austrian Health Insurance Fund database files and Austrian Social Security Database files from 2003–2013. Each estimate presents separate effects of an additional 9-week eligibility of UI benefits for the 9 months following unemployment for the listed group of workers. Each regression includes quarter-year fixed effects. Panel (a) presents estimates for female workers, while Panel (b) presents estimates for male workers, based on a rolling 3-month window after an unemployment spell. Robust standard errors are clustered on the age bin level and are shown in parentheses. Cardiac events include recorded hospitalizations for heart attacks and strokes.

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .



TABLE A5 — Effects of Longer UI Duration on Total Prescriptions

	Opioids (1)	Non-opioid Painkillers (2)	Antide- pressants (3)	Benzodia- zepines (4)
<i>(a) Pooled</i>				
Discontinuity	−0.0001 (0.002)	0.001 (0.0009)	−0.003 (0.006)	0.006** (0.002)
Sample mean	0.025	0.009	0.138	0.012
Observations		380,634		
<i>(b) Females</i>				
Discontinuity	−0.004 (0.005)	0.005* (0.002)	−0.03* (0.02)	0.008* (0.005)
Sample mean	0.029	0.013	0.251	0.018
Observations		112,214		
<i>(c) Males</i>				
Discontinuity	0.001 (0.003)	0.00004 (0.0009)	0.006 (0.005)	0.005* (0.003)
Sample mean	0.023	0.008	0.090	0.010
Observations		268,420		

Notes: See Table 4. The outcome variables in each column represent the total number of packages prescribed for each type of drug, including zeroes.

TABLE A6 — Effects of Longer UI Duration on the Number of Packages Prescribed,  
Conditional on Receiving a Prescription

	Opioids (1)	Non-opioid Painkillers (2)	Antide- pressants (3)	Benzodia- zepines (4)
<i>(a) Pooled</i>				
Discontinuity	0.19 (0.15)	0.07 (0.07)	−0.04 (0.06)	0.74** (0.33)
Sample mean	2.11	1.57	2.39	2.28
Observations	2,964	1,502	8,035	1,189
<i>(b) Females</i>				
Discontinuity	0.26 (0.27)	0.14 (0.16)	−0.04 (0.07)	0.86 (0.65)
Sample mean	2.01	1.65	2.42	2.19
Observations	1,105	551	4,106	570
<i>(c) Males</i>				
Discontinuity	0.18 (0.18)	0.05 (0.08)	−0.03 (0.08)	0.77** (0.34)
Sample mean	2.17	1.52	2.36	2.35
Observations	1,861	951	3,940	621

Notes: See Table 4. The outcome variables represent marginal effects, conditional on a patient receiving at least one prescription.

TABLE A7 — Balancing of Socioeconomic Variables

	Samples		
	Pooled (1)	Females (2)	Males (3)
<i>Socioeconomic variables</i>			
Female	−0.007 (0.005)		
Migrant	−0.006 (0.005)	−0.004 (0.008)	−0.007 (0.006)
College degree	0.000 (0.002)	0.003 (0.004)	−0.001 (0.002)
Urban area <sup>†</sup>	0.002 (0.004)	−0.005 (0.007)	0.006 (0.004)
<i>Labor market variables</i>			
Total experience <sup>†</sup>	0.059 (0.050)	0.012 (0.089)	0.061 (0.057)
Log wage <sup>†</sup>	0.372 (0.337)	0.588 (0.502)	−0.029 (0.393)

Notes: Individual-level data on unemployment insurance health events is from linked Upper Austrian Health Insurance Fund database files and Austrian Social Security Database files from 2003–2013. The listed socioeconomic and labor market variables are measured in the year prior to the start of the unemployment spell. Standard errors in parentheses are clustered on the age bin level.

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

TABLE A8 — Testing Different Specifications (Prescription Drugs)

	(1)	(2)	(3)	(4)
<i>(a) Females</i>				
Opioids	−0.005** (0.002)	−0.005** (0.002)	−0.005** (0.002)	−0.005** (0.002)
Non-opioid Painkillers	0.002 (0.001)	0.002 (0.001)	0.002 (0.001)	0.002 (0.001)
Antidepressants	−0.010* (0.005)	−0.009* (0.005)	−0.009* (0.005)	−0.009* (0.005)
Benzodiazepines	0.002* (0.001)	0.002* (0.001)	0.002* (0.001)	0.002* (0.001)
Year FEs	No	Yes	Yes	No
Quarter FEs	No	No	Yes	No
Year × quarter FEs	No	No	No	Yes
<i>(b) Males</i>				
Opioids	−0.001 (0.001)	−0.001 (0.001)	−0.001 (0.001)	−0.001 (0.001)
Non-opioid Painkillers	0.000 (0.001)	0.000 (0.001)	0.000 (0.001)	0.000 (0.001)
Antidepressants	0.003* (0.002)	0.003* (0.002)	0.003* (0.002)	0.003* (0.002)
Benzodiazepines	0.000 (0.001)	0.000 (0.001)	0.000 (0.001)	0.000 (0.001)
Year FEs	No	Yes	Yes	No
Quarter FEs	No	No	Yes	No
Year × quarter FEs	No	No	No	Yes

Notes: RD estimates are based on individual-level data on unemployment insurance health events from linked Upper Austrian Health Insurance Fund database files and Austrian Social Security Database files from 2003–2013. Each estimate presents separate effects of an additional 9-week eligibility of UI benefits for the 9 months following unemployment. Column 1 includes no fixed effects, Column 2 includes only year fixed effects, Column 3 includes year and quarter fixed effects, and Column 4 includes year-by-quarter fixed effects. Panel (a) presents estimates for unemployed female workers and Panel (b) presents estimates for unemployed male workers.

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

TABLE A9 — Testing Different Specifications (Health Care Utilization)

	(1)	(2)	(3)	(4)
<i>(a) Females</i>				
Outpatient Expenditure	-0.63 (6.59)	-0.18 (6.53)	-0.21 (6.54)	-0.32 (6.54)
Outpatient Visits	0.25 (0.25)	0.28 (0.25)	0.28 (0.25)	0.28 (0.25)
Inpatient Stays	-0.03 (0.05)	-0.03 (0.05)	-0.03 (0.05)	-0.03 (0.05)
Year FEs	No	Yes	Yes	No
Quarter FEs	No	No	Yes	No
Year $\times$ quarter FEs	No	No	No	Yes
<i>(b) Males</i>				
Outpatient Expenditure	-1.53 (2.53)	-1.69 (2.51)	-1.81 (2.50)	-1.79 (2.50)
Outpatient Visits	0.16* (0.09)	0.14* (0.08)	0.13 (0.08)	0.13 (0.08)
Inpatient Stays	-0.06* (0.03)	-0.06* (0.03)	-0.06* (0.03)	-0.06* (0.03)
Year FEs	No	Yes	Yes	No
Quarter FEs	No	No	Yes	No
Year $\times$ quarter FEs	No	No	No	Yes

Notes: See Table A8. "Outpatient Expenditure" denotes the total amount spent, in Euros, on doctor's visits. "Outpatient Visits" include the number of visits to a physician. "Inpatient Days" include the number of days spent in a hospital.

$p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

TABLE A10 — Testing Different Specifications, Cardiac Events

	(1)	(2)	(3)	(4)
<i>(a) Females</i>				
Cardiac Event	0.0001 (0.0002)	0.0001 (0.0002)	0.0001 (0.0002)	0.0001 (0.0002)
Heart Attack	-0.0001 (0.0001)	-0.0001 (0.0001)	-0.0001 (0.0001)	-0.0001 (0.0001)
Stroke	0.0002 (0.0001)	0.0002 (0.0001)	0.0002 (0.0001)	0.0002 (0.0001)
Year FEs	No	Yes	Yes	No
Quarter FEs	No	No	Yes	No
Year × quarter FEs	No	No	No	Yes
<i>(b) Males</i>				
Cardiac Event	0.0005** (0.0002)	0.0005** (0.0002)	0.0005** (0.0002)	0.0005** (0.0002)
Heart Attack	0.0005** (0.0002)	0.0005** (0.0002)	0.0005** (0.0002)	0.0005** (0.0002)
Stroke	0.0001 (0.0001)	0.0001 (0.0001)	0.0001 (0.0001)	0.0001 (0.0001)
Year FEs	No	Yes	Yes	No
Quarter FEs	No	No	Yes	No
Year × quarter FEs	No	No	No	Yes

Notes: See Table A8. Cardiac events include heart attacks and strokes.

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

TABLE A11 — Compatibility of Job and Household Responsibilities

	Too tired for chores after work	Too tired at work due to HH responsibilities	Difficulty concentrating due to family responsibilities
Female	0.094*** (0.018)	−0.005 (0.010)	0.033** (0.014)
Age	0.031*** (0.012)	−0.002 (0.007)	0.042*** (0.009)
Age <sup>2</sup>	0.000*** (0.000)	0.000 (0.000)	−0.001*** (0.000)
Living with partner	0.004 (0.019)	−0.028** (0.011)	−0.037** (0.015)
Intercept	−0.010 (0.211)	0.176 (0.124)	−0.506*** (0.162)
Sample mean	0.56	0.09	0.18
Number of observations	3,192	3,191	3,190

Notes: Data are from Austrian households in both waves of the *Generations & Gender Survey*. Listed outcomes are binary variables equal to 1 if the respondent answers anything else than “never” to the question. Responses include survey weights. Coefficients are from a simple OLS model where each column is a separate regression.

TABLE A12 — Effects Based on Marriage Status

	(1)	(2)	(3)	(4)
<i>(a) Prescriptions</i>				
	Opioids	Non-opioid Painkillers	Antide- pressants	Benzodia- zepines
Females	−0.009*** (0.003)	0.006** (0.002)	0.008 (0.01)	0.005* (0.003)
Males	0.003 (0.002)	0.001 (0.002)	0.005 (0.004)	0.002 (0.002)
<i>(b) Health Care Utilization</i>				
	Outpatient Expenditure	Outpatient Visits	Inpatient Days	
Females	1.4 (9.9)	1.3* (0.7)	0.1 (0.1)	
Males	−4.8 (3.8)	0.3 (0.2)	0.09** (0.04)	
<i>(c) Cardiac Events</i>				
	Any Cardiac Event	Heart Attack	Stroke	
Females	0.0008 (0.0005)	−0.0001 (0.0003)	0.0009** (0.0004)	
Males	0.0006 (0.0005)	0.0002 (0.0004)	0.0004** (0.0002)	

Notes: See notes for Tables 4, 9, and 10. We are able to identify approximately half of all married Upper Austrians, based on data limitations. We identify a worker as “married” based on tax status, including whether a worker claims a deduction based on being an earner living in a household with children.

TABLE A13 — Effects Based on Post-UI Wage Change, Female Workers

	(1)	(2)	(3)	(4)
<i>(a) Prescriptions</i>				
	Opioids	Non-opioid Painkillers	Antide- pressants	Benzodia- zepines
Wage decrease	−0.001 (0.002)	0.002 (0.002)	−0.004 (0.005)	−0.002 (0.002)
Wage increase	−0.009** (0.003)	0.002 (0.002)	−0.02* (0.008)	0.007*** (0.002)
<i>(b) Health Care Utilization</i>				
	Outpatient Expenditure	Outpatient Visits	Inpatient Days	
Wage decrease	4.8 (4.7)	0.3 (0.3)	−0.02 (0.07)	
Wage increase	−6.7 (12.4)	0.2 (0.4)	−0.03 (0.09)	
<i>(c) Cardiac Events</i>				
	Any Cardiac Event	Heart Attack	Stroke	
Wage decrease	0.0001 (0.0002)	0.00002 (0.0002)	0.00010 (0.0002)	
Wage increase	0.0001 (0.0003)	−0.0002 (0.0002)	0.0003 (0.0002)	

Notes: See notes for Tables 4, 9, and 10. “Wage decrease (increase)” indicates that an unemployed worker experienced a decrease (increase) in wage levels, conditional on matching to a new occupation.