Dynamics in Employment and Income Before and After Transgender Transitioning: Evidence from Dutch Administrative Data

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Abstract

This paper estimates the changes in labor market and health outcomes before and after legal gender transitioning. Using individual-level administrative panel data from the Netherlands over the period 2014-2022, we identify nearly 6,500 legal gender transitions, defined as the change of gender marker on one's birth certificate. Data on employment and health care utilization are drawn from administrative records.

Using an event study approach with a sample of the general population serving as controls, we find changes in economic outcomes after transitioning, and important differences between those transitioning female-to-male (FTM) versus male-to-female (MTF). For both groups, employment and earned income decrease in the years preceding their legal gender transition. They differ, however, in dynamics after transitioning. For those transitioning FTM, there are increases in employment and income 5 or more years after transitioning; in contrast, for those transitioning MTF, employment and income remain significantly lower 3-4 years after transitioning, and are not significantly higher 5 or more years post-transition.

The results provide information about dynamics in economic outcomes around legal gender transitions, and demonstrate that there can be meaningful differences for those transitioning FTM versus MTF.

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1 Introduction

People who are transgender[1] are more likely to face stigma, discrimination and violence (Carpenter et al., 2020; Aksoy and Sanone, 2022; Granberg et al., 2020). Relative to cisgender individuals, transgender individuals are less likely to have a college education (Badgett et al., 2023), are less likely to be employed (Leppel, 2021; Carpenter et al., 2020, 2022; Shannon, 2022) and generally have lower earnings or household incomes (Carpenter et al., 2020, 2022; Badgett et al., 2023; Shannon, 2022). Transgender individuals report worse health outcomes, raising concern about health equity (Carpenter et al., 2022; Lagos, 2018).

Individuals may seek to align their gender presentation or characteristics with their gender identity. This process - referred to as gender transitioning – can take many forms. It may involve any or all of: social transitioning (e.g., coming out to others, manner of dress), medical transitioning (which includes receiving Gender Affirming Care (GAC) such as puberty blockers for adolescents, hormone treatments, and/or surgery), and legal transitioning (changing one's sex on official government records and documents, such as birth certificate and passport). Those transitioning are sometimes classified as MTF (male to female) or FTM (female to male); yet another category is gender-nonconforming (GNC); see Carpenter et al. (2020).

Access to legal and medical transitioning varies, and transgender rights have become a topic of political discussion around the world. Over the last decade, many European countries including Sweden, Denmark, the Netherlands, and Switzerland removed bureaucratic barriers and invasive medical prerequisites such as permanent sterilization for a legal transition. In contrast, within the U.S., there has been a surge in legislation aimed at limiting access to gender-affirming healthcare and legal gender recognition. In the U.S., more than 20 states have banned GAC for those under age 18 (Human Rights Campaign, 2023; Borah

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[1]The American Psychological Association defines transgender people as those whose gender identity is not fully aligned with their sex assigned at birth (APA, 2015). In contrast, cisgender people do identify with their sex assigned at birth. It is estimated that roughly 1.6% of the population is transgender (Brown, 2022; Carpenter et al., 2022; Herman et al., 2022), although the prevalence tends to be higher in recent cohorts.

et al., 2023), and some states are refusing to allow people of any age to change their sex on government documents (Betts, 2023).

In this paper we take advantage of Dutch administrative data, which include information both on the universe of legal gender transitions and on a rich set of outcomes such as employment, earned income, benefit receipt, and having a prescription for antidepressants. We estimate event studies using these data to explore dynamics in economic and health outcomes before and after legal gender transition.

Transitioning could affect these outcomes in two ways. First, it may decrease the risk of discrimination. Having incongruent documents – ones with a gender marker that does not match one's gender identity – may draw attention to the fact they are transgender and be interpreted as a negative signal by employers or others (Mann, 2021; Campbell et al., 2023a). Second, transitioning, by reinforcing the individual's identity, might increase their confidence to seek employment or interact with others in the work environment (Akerlof and Kranton, 2000). Consistent with this, the use of gender-affrming care (GAC) has been found to be associated with an improvement in mental health (Mann et al., 2023; Campbell et al., 2023b; De Vries et al., 2011; Bränström and Pachankis, 2020; Drydakis, 2017).

The first economics article devoted to the economics of sexual orientation and gender identity (Badgett, 1995) is less than 30 years old. Much of the early research focused on sexual minorities rather than gender minorities such as transgender individuals (Geijtenbeek and Plug, 2018). Moreover, much of the research on sexual orientation and gender identity has used U.S. data (Badgett et al., 2023).

Three studies have examined dynamics of earnings around a gender transition. Dujeancourt (2023) compares transgender individuals with their cisgender siblings using Swedish administrative data (N=957), and finds that those who transition MTF face an additional earnings penalty compared to those who transition FTM. Geijtenbeek and Plug (2018) examine legal transitions in the Netherlands between 2006 and 2012 (N = 291), when gender confirmation surgery was a requirement for a legal transition. Their administrative data

allow them to examine dynamics of earnings before and after transitioning. They find that FTM workers earn as much if not more after transition than they did before, but MTF workers earn significantly less after transition. Schilt and Wiswall (2008) collected a small (N=43) convenience sample of transgender individuals, whom they surveyed regarding their earnings before and after transition. They find that earnings of FTM workers rise slightly after transition, whereas those of MTF workers fall by nearly one-third.

This paper makes the following contributions to the literature. First, our longitudinal data allow us to estimate event studies that explore the dynamics in these outcomes before and after individuals legally transition. This advantage is shared by Dujeancourt (2023) and Geijtenbeek and Plug (2018). Second, we utilize a large database on legal gender transitions; specifically, the universe of legal transitions (FTM and MTF) in the Netherlands between 2014 and 2022. The large sample (nearly 6,500) provides statistical power and is considerably larger than the samples used by Dujeancourt (2023, N=957), Geijtenbeek and Plug (2018, N=291), and Schilt and Wiswall (2008, N=43). Third, using administrative records avoids problems related to sample selection; self-reports from surveys could lead to false negatives - certain transgender individuals declining to self-report.[2] Fourth, the use of the rich administrative data allows us to link numerous outcomes of interest over time, including on employment, earned income, and certain types of health care utilization. Fifth, these outcomes are measured automatically and nationwide, which avoids problems such as a refusal to report income or benefit receipt, or misreporting any of the outcomes.

To preview the results, we find that there are consistent differences between those transitioning FTM versus MTF in terms of the dynamics of employment, income, and benefit receipt. Specifically, those transitioning FTM tend to experience greater improvements in economic outcomes than those transitioning MTF. For both groups, we find that the probability of employment and amount of earned income falls from 5 years before to the time

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[2]Harris (2015) uses the 2010 U.S. Census and identifies likely transgender individuals by exploring changes to individuals' first names and sex-coding. Linking those individuals to their 2010 Census responses, he finds that this approach identifies more transgender members of ethnic and racial minority groups than other studies using survey data.

of transition. After transitioning, those outcomes bounce back for FTM transitioners but remain lower for MTF transitioners. Similarly, the probability of welfare receipt rises in the years prior to transitioning for both groups, but afterwards that probability falls for FTM transitioners but remains elevated for MTF transitioners. FTM transitioners experience an increase in the probability of having a cohabiting partner in the years after transitioning, but that probability falls significantly for MTF transitioners. For both groups, the probability of having a prescription for antidepressants is lower after transitioning than the year before transitioning.

2 Policy Context in the Netherlands

The Netherlands is recognized for its progressive stance towards sexual minorities and gender diverse populations. According to the 2023 Equaldex index, which assesses factors such as legal rights, equality, and public opinion, the Netherlands ranks as the fifth-most LGBTQ-friendly country in the world (Equaldex, 2023). It was the first country to legalize same-sex marriage, and it was one of the first to allow individuals to legally change their gender (Bakker, 2018). It was also one of the first countries to offer GAC through a multidisciplinary gender team (Bakker, 2018). The Dutch national healthcare system ensures broad financial accessibility to GAC for the entire population, irrespective of income or wealth.

In our analysis, we do not use any data from before 2014 because there was a major change in Dutch transgender policy that took place that year, which could have altered the relationship between transgender transitioning and our outcomes of interest. The policy, an amendment to the Transgender Act, lowered the total cost of a legal transition in several ways.[3] In other work, we find that the policy change was followed by a substantial increase in

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[3]The policy change lowered the total cost of a legal transition in four ways. First, the earlier requirement of permanent infertility through a gonadectomy was dropped. Second, the earlier requirement of a physician's diagnosis of gender incongruence was dropped, and instead individuals now need to only provide an expert statement from a psychologist or psychiatrist on an approved list which confirms that: a) the individual wants to legally transition; and b) the individual understands the consequences doing so. It does not require a diagnosis of gender incongruence. Third, the minimum age to legally transition was reduced from 18 to

the number of individuals transitioning, as well as a change in the composition of individuals transitioning; see De Weerd et al. (2024).[4]

In this paper, we do not exploit this policy change. Instead, because it seems to have altered the composition of those transitioning and may have changed the relationship between transitioning and our outcomes of interest, we focus on the post-policy-change era and thus exclude legal gender transitions from before 2014. Our data indicate only the year, not the month and day, during which individuals transitioned, so we are unfortunately not able, for those who transitioned during 2014, to separate out those who transitioned under the old policy (before July 1) versus under the new policy (after July 1). We must make a decision about whether to include or exclude all of the transitions from 2014. Figure 1 shows that the number of legal transitions rose dramatically after the policy change in 2014. This suggests that the vast majority of those transitioning in 2014 did so after the policy change, and that there is a substantial benefit to including all of 2014 in terms of the resulting increase in statistical power. For this reason, we do include 2014 transitions in our analysis, but as a robustness check we re-estimate the models excluding 2014.

3 Data

We use Dutch administrative individual-level data collected by Statistics Netherlands, which includes records on all individuals who are registered citizens. We identify legal gender transitions by observing all amendments to the sex listed on birth certificates between 2014 and 2022. To serve as a comparison group for those transitioning, we extract a random sample of 100,000 individuals who have not legally transitioned and are at least 16 years of age in 2022. These control individuals are randomly assigned a year 2014 to 2022, matching

16, and parental approval is not needed. Fourth, rather than involving a legal procedure in court, it became an administrative procedure done through a civil registrar.

[4]Mann (2021) examines changes in U.S. state policies regarding surgical requirements in order to legally transition. Using data from the BRFSS 2014-19, (Mann, 2021) finds that removing the surgical requirement to legally transition increases employment of transgender individuals, but only for those who are FTM (20 ppt increase), not those who are MTF or GNC. The number of people legally transitioning, and their characteristics or use of GAC, are not observed.
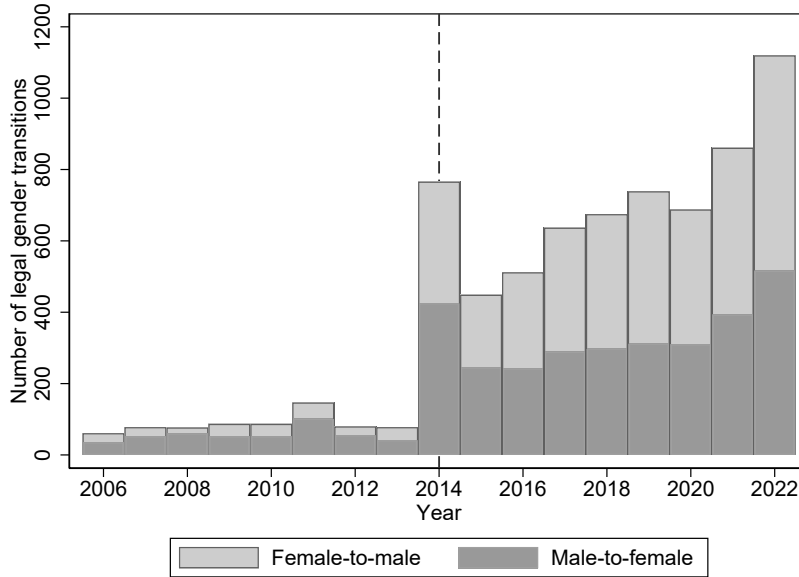
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Figure 1: Number of Legal Gender Transitions in the Netherlands by Year and Type

Data: Statistics Netherlands.

the distribution of years among transitioners. We merge administrative data between 2005 and 2021 regarding demographics (age, having a partner, having children), education, employment, income, benefit receipt, having a cohabiting partner, use of gender-affirming care (puberty blockers by age 18, use of testosterone, testosterone blockers or estrogen), and use of prescription antidepressants (ATC-code N06A). When we study employment and income from employment as outcomes we limit the sample to those aged 25 to 65, and when we examine having a college degree and having a cohabiting partner we limit the sample to those aged 25 or above. In addition, income from employment is only reported for those who are employed (we do not include zeros for those not working).

4 Methods

We use an event study approach (see e.g., Miller, 2023) to estimate the dynamics around a legal gender transition. The main specification takes the following form:

$$Y_{ity} = \beta_0 + \sum_{s=-5, s \neq -1}^{5} \beta_{1s} \cdot I\left[s = t\right] + \beta_2 \cdot \text{Trans}_i + \beta_3 \cdot \text{Age}_{iy} + \beta_4 \cdot \text{Age}_{iy}^2 + \sum_{x=2006}^{2021} \beta_{5x} \cdot I\left[x = y\right] + \varepsilon_{ity}$$

(1)

In this specification, Y_{ity} denotes the outcome for individual i at event time t in calendar year y. Our primary coefficients of interest are β_{1t}, the coefficients on the indicator variables for event time t. For those transitioning, the year of the legal gender transition is designated as event time $t = 0$, and all other years are converted to event time accordingly, for each individual. For those in the control group, each event time indicator is set to zero, because they never experience the event of a legal gender transition. We follow convention and omit event time $t = -1$ (the year before legal transition) as the reference period. We follow Miller (2023) and Schmidheiny and Siegloch (2023) and bin the endpoints of event time to ensure that all event time indicators are identified from a balanced set of cohorts. Specifically, all periods 5 years or more before the event are placed in one category and all periods 5 years or more after the event are placed in another category. This binning assumes that the event time coefficients within those bins are stable.

In equation (1), we also control for Trans_i, a time-invariant indicator variable for whether individual i at some point transitioned; it is set equal to zero for the general population controls. The model controls for age and age squared, and indicator variables for calendar year (omitting calendar year $y = 2005$). Standard errors are clustered at the individual level.

In presenting the results, we follow Kleven et al. (2019) and present our estimates as percentages instead of levels. We do so by dividing the event time dummies β_{1t} by the

counterfactual outcome $\tilde{Y}_{ity}$, where

$$\tilde{Y}_{ity} = \beta_0 + \beta_2 \cdot \text{Trans}_i + \beta_3 \cdot \text{Age}_{iy} + \beta_4 \cdot \text{Age}_{iy}^2 + \sum_{x=2006}^{2021} \beta_{5x} \cdot I\left[x = y\right] \qquad (2)$$

That is, the counterfactual outcome is the predicted outcome when omitting the event dummies, and we scale the coefficients of the event dummies by this counterfactual to obtain percentage effects.

In order to explore heterogeneity between those transitioning FTM versus MTF, we estimate all event studies separately for the two groups. We also conduct a variety of robustness checks. To understand the sensitivity of our results (Miller, 2023), we estimate three alternative specifications: 1) including only transitioners in the sample (no comparison group); 2) adding interactions between transitioning and age and time; and 3) controlling for individual fixed effects.

We note that the event - gender transitioning - and its timing are not randomly determined but are chosen by the individual. As a result, dynamics observed prior to transitioning may include unobserved actions taken by the individual to prepare for the legal transition. In addition, those legally transitioning may undertake social transitioning or medical transitioning around the same time as the legal transitioning. To investigate this, we will we examine the extent to which legal transitioning coincides with use of GAC hormone therapy. In general, one should not interpret the dynamics around the legal transition as being due solely to the legal transition; it may also reflect other actions that we do not observe.

5 Results

5.1 Descriptive Statistics

Table 1 presents the mean and standard deviation of various demographic, socioeconomic and health characteristics of those who transitioned between 2014 and 2022. For each variable,

we include in this table one year of data per person – for those transitioning it is from the year prior to transition (t-1) and for those in the comparison group it is the year prior to their randomly assigned year between 2014 and 2022. We have data for 6,447 individuals who transitioned at some point 2014-2022, as well as data for 82,214 individuals who did not transition 2014-22 (or earlier) and who serve as the comparison group.[5]

Appendix Table A1 provides tests for the statistical significance of differences between various groups shown in Table 1. One important comparison is the transitioners to the controls. We find that those transitioning are significantly less likely than the controls to have a partner (by 23 percentage points), less likely to have children (by 39 percentage points), and more likely to be born in the Netherlands (by 24 percentage points).[6] Compared to the controls, those who transition are also 7 percentage points less likely to have a college degree and are 24 percentage points less likely to be working. They are 5 percentage points more likely to receive sickness/disability benefits, and 12 percentage points more likely to receive unemployment benefits. They have significantly lower earned income, as well.

Another relevant comparison is how those transitioning FTM compare to those transitioning MTF. We find that those transitioning FTM are, on average, 8 years older, and are 9 percentage points more likely to have children than people transitioning MTF. There are no statistically significant differences between those transitioning MTF and FTM in terms of probability of having a partner, having a college degree, working, receiving sickness/disability benefits, or welfare benefits (all of which are measured in the year prior to transition).

5.2   Event Studies

We next present and describe event study results for employment, income from employment, receipt of welfare benefits, receipt of sickness/disability benefits, having a prescription for an-

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[5]The reduction in size of the control group from 100,000 to 82,214 stems from the exclusion of those younger than 16 at their randomly assigned year, those without information on gender, and those aged 80 or above.

[6]This large difference is due to the control group being sampled from all persons listed in the Personal Records Database (Basisregistratie Personen; BRP) since October 1, 1994. This includes people with a migration background who (have) live(d) in the Netherlands temporarily.

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	Transitioners			General Pop. Controls		
	Total	FTM	MTF	Total	Male	Female
Demographic characteristics						
Age	27.37	23.59	31.62	46.38	46.21	46.57
	(12.10)	(9.26)	(13.45)	(18.14)	(18.00)	(18.29)
Born in the Netherlands	0.92	0.96	0.89	0.68	0.66	0.70
	(0.27)	(0.20)	(0.32)	(0.47)	(0.47)	(0.46)
Has a partner	0.21	0.19	0.22	0.44	0.42	0.47
	(0.41)	(0.40)	(0.41)	(0.50)	(0.49)	(0.50)
Has children	0.08	0.04	0.13	0.47	0.43	0.52
	(0.27)	(0.19)	(0.33)	(0.50)	(0.49)	(0.50)
Socioeconomic and health characteristics						
College degree	0.30	0.31	0.29	0.37	0.36	0.38
	(0.46)	(0.46)	(0.46)	(0.48)	(0.48)	(0.49)
Working	0.54	0.54	0.53	0.78	0.82	0.73
	(0.50)	(0.50)	(0.50)	(0.42)	(0.38)	(0.45)
Working part-time	0.29	0.40	0.25	0.35	0.13	0.59
	(0.46)	(0.49)	(0.43)	(0.48)	(0.34)	(0.49)
Sickness/disability benefits	0.11	0.11	0.11	0.06	0.06	0.07
	(0.32)	(0.31)	(0.32)	(0.24)	(0.23)	(0.25)
Welfare benefits	0.16	0.15	0.17	0.04	0.04	0.05
	(0.37)	(0.36)	(0.37)	(0.20)	(0.19)	(0.22)
Unemployment benefits	0.07	0.06	0.08	0.05	0.05	0.05
	(0.26)	(0.24)	(0.27)	(0.22)	(0.22)	(0.21)
Annual income (log)	10.17	10.04	10.24	10.54	10.79	10.26
	(1.41)	(1.20)	(1.51)	(1.18)	(1.12)	(1.19)
Female dominated sector	0.28	0.36	0.24	0.37	0.18	0.56
	(0.45)	(0.48)	(0.43)	(0.48)	(0.39)	(0.50)
Male dominated sector	0.52	0.41	0.57	0.42	0.60	0.21
	(0.50)	(0.49)	(0.50)	(0.49)	(0.49)	(0.41)
Antidepressants	0.04	0.05	0.04	0.01	0.01	0.02
	(0.21)	(0.21)	(0.20)	(0.12)	(0.10)	(0.13)
Observations	6447	3417	3030	82214	43067	39147

Table 1: Descriptive Statistics

Note: Standard deviations are presented in parentheses. Descriptive statistics are displayed for year t–1, where t is the (assigned) year of transition. Employment and income from employment are reported only for those aged $\geq$ 25 and $\leq$ 65, and having a partner or a college degree is reported only for those aged $\geq$ 25. See online Appendix Table A1 for statistical t-tests on all group-wise comparisons, and Table A3 for variable descriptions. *Data:* Statistics Netherlands.

tidepressants, having a prescription for gender-affirming hormones, and having a cohabiting partner.

The dynamics of employment around the time of legal gender transition differs for those transitioning FTM versus MTF. Figure 2, panel (a), indicates that, for those transitioning FTM, the probability of employment is U-shaped relative to the time of transition; it is higher 5 years before and 5 years after transitioning relative to the years just before and after the FTM transition. 5 years after transitioning FTM, the probability of employment is not significantly different from what it had been 5 years before the transition. When compared to the period just before transition, employment is around 15% higher for FTM 5 or more years after transition. In contrast, MTF transitioners are between 5 and 10% less likely to be in employment compared with the period just before their transition.

In contrast, for those transitioning MTF (Figure 2, panel (b)), the probability of employment falls consistently from 5 years before to 2 years after transitioning, and remains significantly lower even 5 years post-transition, although is not significantly different from the period just before transition.

(a) Female-to-Male (N = 715,256)   (b) Male-to-Female (N = 725,776)
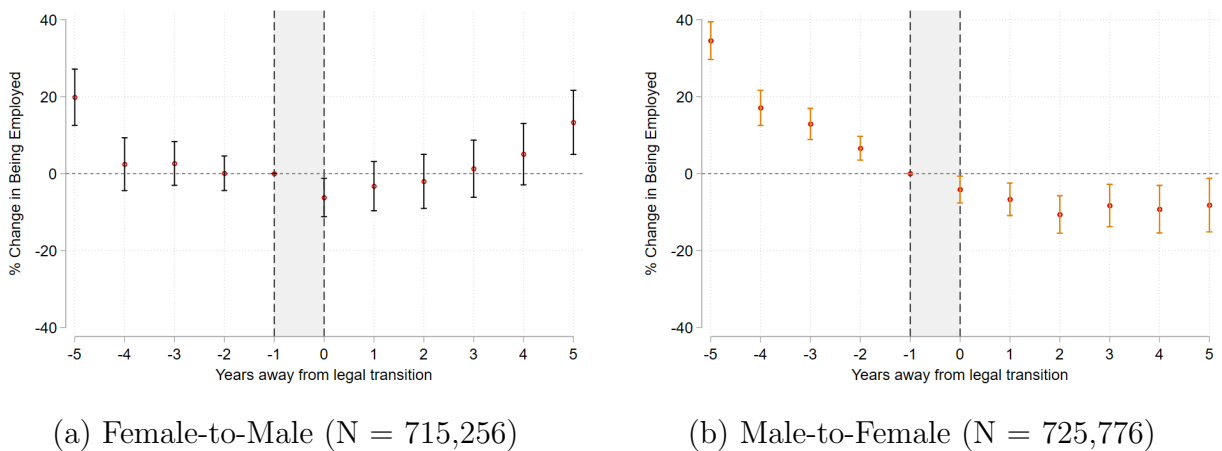
Figure 2: Event Studies of Being Employed

Note: Average level at $t = -1$ is 54% for FTM, and 53% for MTF. An individual is employed if they received any positive income from employment (including self-employment). The sample is limited to those aged 25 to 65. *Data:* Statistics Netherlands.

The next outcome we examine is income from employment, which is shown in Figure 3.

The patterns for income are similar to those for employment, but are generally flatter or less extreme. For those transitioning FTM (panel a) there is a U-shaped pattern in earned income, such that 5 years after transitioning FTM income is not significantly different than it was 5 years before transitioning. For those transitioning MTF (panel b), earned income 5 years post-transition remains significantly lower than it was 5 years prior to the transition.
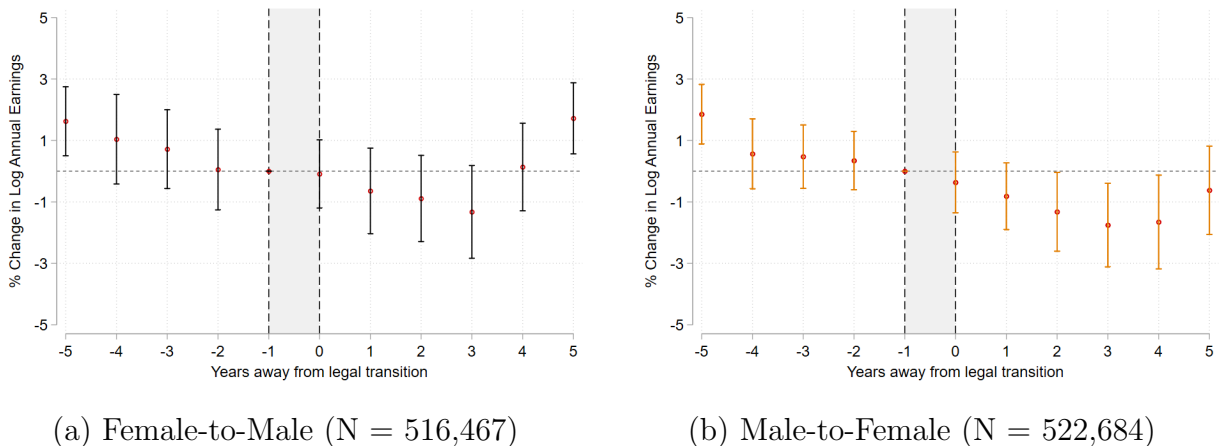

(a) Female-to-Male (N = 516,467)   (b) Male-to-Female (N = 522,684)

Figure 3: Event Studies of Income from Employment

Note: Income from employment is only reported for those who are employed (excluding zeros for those not working). Average level at $t = -1$ is 10.04 ($\approx$€23,000) for FTM, and 10.24 ($\approx$€28,000) for MTF. An individual is employed if they received any positive income from employment (including self-employment). The sample is limited to those aged 25 to 65. *Data:* Statistics Netherlands.

The probability of receiving welfare benefits is shown in Figure 4. For both groups, there is an increase in the probability of receiving welfare benefits in the years prior to transition, but after transitioning FTM the probability declines, to the point that it is significantly lower 4 and 5+ years after the transition. In contrast, for those transitioning MTF, the probability of receiving welfare benefits peaks in the year of transition and then decreases marginally but seems to reach a plateau in the years after transitioning.

The probability of receiving sickness/disability benefits is shown in Figure 5. Once again, there are differences between those transitioning FTM and MTF. Among those transitioning FTM, the probability of receiving sickness/disability benefits does not vary significantly prior to or shortly after transitioning, but is significantly lower 5+ years post-transition.
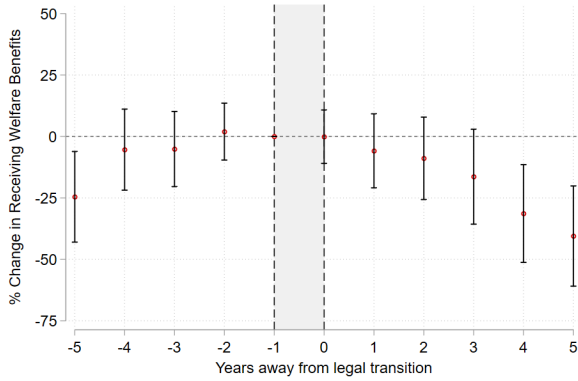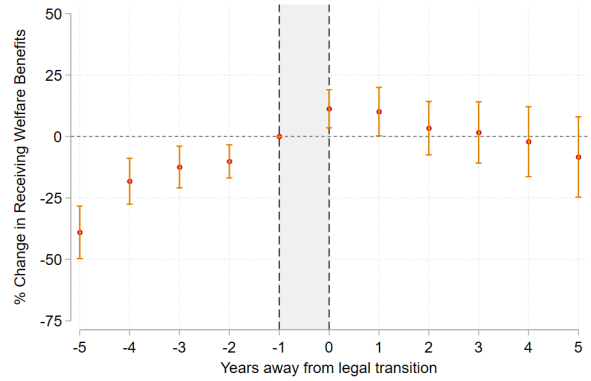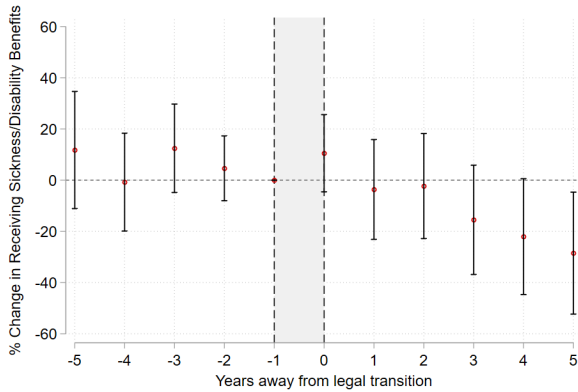
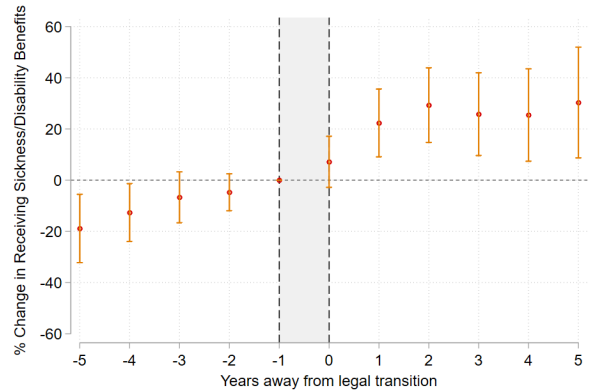(a) Female-to-Male (N = 715,256) (b) Male-to-Female (N = 725,776)

Figure 4: Event Studies of Receiving Welfare Benefits

Note: Average level at $t = -1$ is 15% for FTM, and 17% for MTF. The sample is limited to those aged 25 to 65. *Data:* Statistics Netherlands.

In contrast, the probability of receiving sickness/disability benefits for those transitioning MTF rises in the years prior to transition, continues rising after transition, and remains significantly higher 5+ years post-transition. In percentage terms, MTF transitioners are around 30% more likely to be on disability benefits 5+ years after transition, although it should be noted that the base levels of disability benefits are relatively low at 11% (see Table 1).

(a) Female-to-Male (N = 715,256) (b) Male-to-Female (N = 725,776)

Figure 5: Event Studies of Receiving Sickness/Disability Benefits

Note: Average level at $t = -1$ is 11% for both FTM and MTF. The sample is limited to those aged 25 to 65. *Data:* Statistics Netherlands.

We also examine the dynamics in an important type of healthcare utilization: whether the individual has a prescription for antidepressants; this is shown in Figure 6. In this case the results for those transitioning FTM and MTF are similar; both groups show an increasing probability of a prescription for antidepressants in the years prior to transition, and then a significantly lower probability of antidepressants in the year of transition and in three of the five years after transitioning.
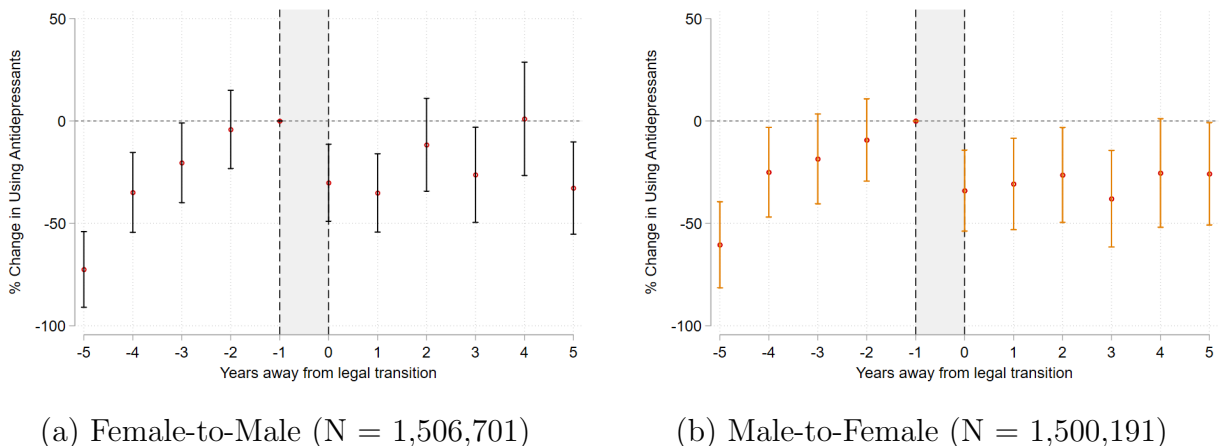

(a) Female-to-Male (N = 1,506,701)   (b) Male-to-Female (N = 1,500,191)

Figure 6: Event Studies of Rx for Antidepressants

Note: Average level at $t = -1$ is 5% for FTM, and 4% for MTF. The outcome is defined as having at least one prescription of antidepressants classified with ATC-code N06A. *Data:* Statistics Netherlands.

We consistently observe differences in dynamics for those transitioning MTF and FTM, which begs the question of why. One potential mechanism is differences in household dynamics. Couples may make decisions about labor supply jointly, and may help monitor each other's health. At the same time, one's health and employment status may also influence the likelihood of finding and/or remaining with a partner. We examine dynamics in having a cohabiting partner in Figure 7, not restricting to the same partner over time. Once again there are differences by type of transition; for those transitioning FTM, the probability of having a cohabiting partner remains flat before through shortly after transition, but is significantly higher 4 and 5+ years post-transition. For those transitioning MTF it falls significantly prior to transition and continuing to fall thereafter, remaining significantly lower

even 4 years post-transition. The point estimates suggest a reduction in the likelihood of having a cohabiting partner of up to 20%.

(a) Female-to-Male (N = 1,128,803)   (b) Male-to-Female (N = 1,140,408)
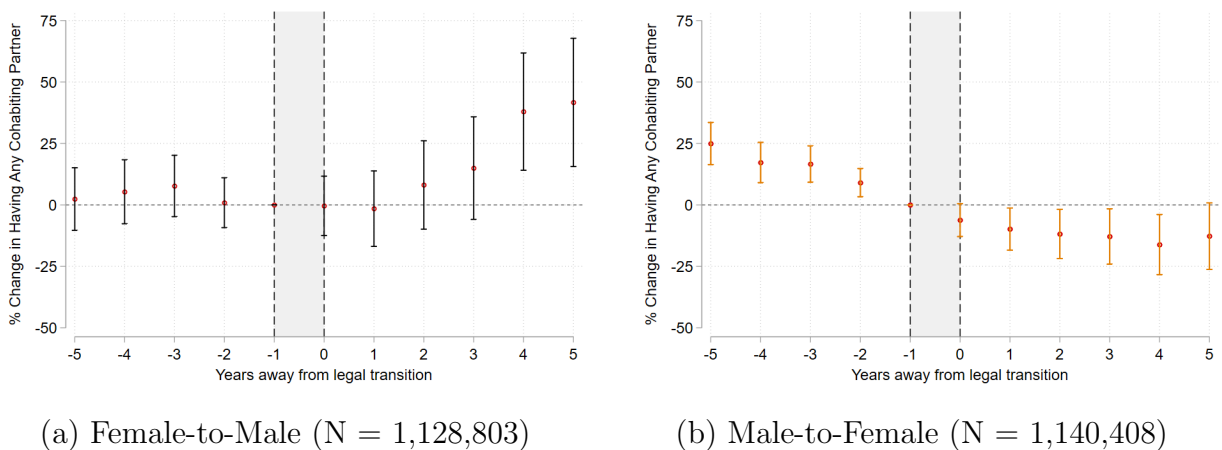
Figure 7: Event Studies of Having A Cohabiting Partner

Note: Average level at $t = -1$ is 19% for FTM, and 22% for MTF. Individuals are classified as having any cohabiting partner using tax records. This figure does not take into account whether this partner is the same in each event-time. The sample is limited to those aged 25 or above. *Data:* Statistics Netherlands.

As noted earlier, we cannot interpret these dynamics as due solely to the legal gender transition; individuals may take other actions around the same time that affect these outcomes. To explore this, we estimated event studies for the probability of having GAC in the form of hormone therapy. Figure 8 shows that the probability of hormone therapy roughly doubles in the year of legal transitioning; this occurs even though, starting in 2014, GAC is no longer required for a legal transition. This suggests that individuals undertaking legal transitioning may be transitioning in other ways as well, and that the estimated dynamics reflect all of these actions and changes.

5.3 Robustness Checks

To understand the sensitivity of our results (Miller, 2023), we present results for three alternative specifications: 1) including only transitioners in the sample (no comparison group); 2) adding interactions between transitioning and age and time; and 3) controlling for individual

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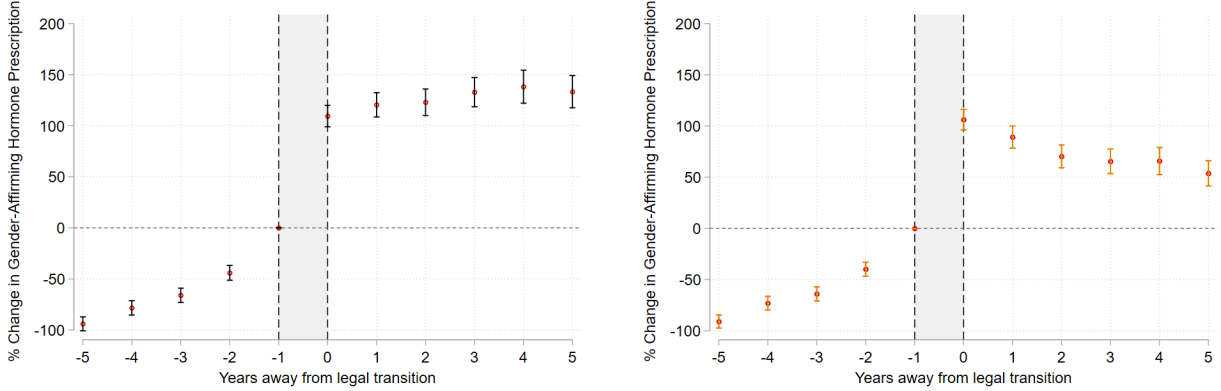
(a) Female-to-Male (N = 1,413,339)   (b) Male-to-Female (N = 1,407,149)

Figure 8: Event Studies of Having a Prescription for Gender-Affirming Hormones

Note: The outcome is defined as having at least one prescription of androgens (such as testosterone; ATC-code G03B), estrogens (ATC-code G03C), antiandrogens (such as testoserone blockers, ATC-code L02B) or puberty blockers (by age 18; ATC-code L02A). *Data:* Statistics Netherlands.

fixed effects. Results for employment are shown in Appendix Figure A1, results for income are shown in Appendix Figure A2, and results for having a prescription for antidepressants are shown in Appendix Figure A3. The results remain very similar.

6   Discussion

This paper contributes to the literature by examining how important socioeconomic and health outcomes change before and after transgender individuals legally transition. Strengths include the use of administrative data, which includes the universe of legal transitions from 2014-22 in the Netherlands, which provides a much larger sample of transitioners (nearly 6,500) than has previously been used to study related questions. Use of administrative data also allows us to merge in data on demographics, education, income, and use of gender-affirming hormone prescriptions.

We find that for both FTM and MTF groups, the probability of employment is lower at the time of legal transition than it had been 5+ years before. For those transitioning FTM, employment has rebounded 5+ years after transitioning, but for those transitioning MTF,

the probability of employment remains significantly lower.

Similar patterns are found for income from employment: for both groups, such income is lower at the time of transition than it had been 5+ years before. Those transitioning FTM see their earned income rebound, whereas it remains significantly lower for those transitioning MTF. This finding is consistent with the earlier findings of Geijtenbeek and Plug (2018), who also studied Dutch data but for the pre-reform period (2006-12) and with a smaller sample (N=291). Our results are also consistent with the findings of Dujeancourt (2023) which estimated sibling comparisons using a Swedish sample (N=957), and those of Schilt and Wiswall (2008) from a convenience sample (N=43).

The richness of the administrative data allow us to examine other outcomes. The probability of receiving welfare benefits rises prior to transition for both FTM and MTF, but it falls afterwards for those transitioning FTM while remaining high for those transitioning MTF. The probability of receiving sickness/disability benefits also varies by group; for FTM transitioners, it does not change significantly prior to transition, and then is significantly lower 5+ years afterwards. For those transitioning MTF, the probability of sickness/disability benefits rises prior to transition, and then remains significantly higher throughout the 5+ year follow-up period.

For both groups, the probability of having a prescription for antidepressants increases in the years preceding a legal gender transition, but falls significantly in the year of transition and remains significantly lower for most years afterwards. This is consistent with earlier findings that medical transitioning, such as use of gender-affrming care (GAC), is associated with improvements in mental health (Mann et al., 2023; Campbell et al., 2023b; De Vries et al., 2011; Bränström and Pachankis, 2020; Drydakis, 2017).

We also found that the probability of having a cohabiting partner rises after transition for FTM, but falls in the years leading up to and after transitioning for MTF. It is unclear how this interacts with the other results. On the one hand, it could be a mechanism for some of the dynamics in labor supply and health. Couples may make decisions about labor

supply jointly, and may help monitor each other's health. On the other hand, decreases in employment and income may make someone less desirable as a cohabiting partner, so the causal arrow may point in the opposite direction, or both may be true.

It is unclear why the differences are so large between those transitioning FTM and MTF. One possible factor is discrimination against women. Such discrimination may decrease against those transitioning FTM but increase against those transitioning MTF. One experiment found that FTM transgender individuals were perceived as more autonomous and assertive, and less likely to go on parental leave, than cisgender men (Van Borm et al., 2020). Schilt and Wiswall (2008) point to qualitiative research which finds that those transitioning MTF experience workplace discrimination and a devaluation of their abilities, whereas those transitioning FTM report gaining respect and authority in the workplace. These differences in gender discrimination may result in different earnings patterns, even if both FTM and MTF transgender individuals experience a transition penalty in earnings. Using a labor market model, Geijtenbeek and Plug (2018) differentiate between hypothesized gender and transition mechanisms, and suggest that a transition penalty may offset the earnings gain of those transitioning FTM, and amplify the earnings loss of those transitioning MTF.

Another possibility involves discrimination against transgender individuals.[7] Shannon (2022) shows that the greater the ability to be gender passing (a congruence between perception and identity), the more their income reflects the income profile of their gender identity. It may be that employers rely more on incongruent documents to identify FTM than MTF transitioners. After legal transitioning, perhaps employers are less likely to be able to tell that someone has transitioned FTM, and such workers experience improvements in employment and earnings, but if employers can identify MTF regardless of document congruence then that may explain why their employment and income do not improve.

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[7]Evidence of employment discrimination against transgender individuals was found by Granberg et al. (2020), who sent fictitious job applications to real job openings in Sweden. All of the cover letters acknowledged a past name change, but were randomized for the name change to be within sex (presumably cisgender) or a change of sex (presumably transgender). They found that the presumably-transgender applicants were 6.3 percentage points (15.6%) less likely to be contacted for an initial job interview.

We also found that the transgender individuals in our sample are less likely than cisgender individuals to have a college degree, less likely to be working, have lower earned income, are more likely to be receiving sickness/disability benefits and welfare benefits, and are less likely to have a cohabiting partner. This is consistent with findings from U.S. data that transgender individuals are less likely to have a college education (Badgett et al., 2023), are less likely to be employed (Leppel, 2021; Carpenter et al., 2020, 2022; Shannon, 2022), have lower earnings or household incomes (Carpenter et al., 2020, 2022; Badgett et al., 2023; Shannon, 2022), and are less likely to be married (Kolk et al., 2023; Badgett et al., 2021).

This paper has several limitations. First, legal transitions are not randomly assigned; both the decision to transition at all and the timing at which to do so are endogenous. We do not interpret the dynamics as causal, but as descriptive information about an important, politically controversial, and little-studied event. Second, we mainly focus on one form of transgender transitioning: legal transitions, which change one's sex on government records and documents. Other important forms of transitioning include social and medical transitioning. We can observe the medical transitioning that takes the form of GAC such as puberty blockers and hormones, but our data do not yet include information about sex reassignment surgery. Third, although we observe the universe of people legally transitioning FTM and MTF, we do not observe gender non-conforming (GNC) individuals who may not identify with either gender and thus may not seek to transition legally. Fourth, while we observe the year of transition we do not observe the month and day, which limits our ability to examine very short-term dynamics around the transition, or to drop those who transitioned in the first half of 2014, under the more restrictive policy. Fifth, when generalizing the results, one should keep in mind that the Netherlands is a particularly inclusive and egalitarian society, and individuals transitioning gender may experience much greater stigma and discrimination elsewhere.

Despite these limitations, this paper provides information about the changes in important economic outcomes such as employment, income, benefit receipt, antidepressant use, and

partnership status, using a much larger sample of transgender transitioners than in the few previous studies. The administrative data avoid problems of self-selection in reporting transitioning, and avoid issues of reporting error that often plague self-reports of income and welfare receipt. This paper also documents consistent differences between those transitioning FTM and MTF, the reasons for which represent an important direction for future research.

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Appendix

	= Trans - Controls	= FTM - Controls	= MTF - Controls	= FTM - Males	= MTF - Females	= MTF - Males	= FTM - Females	= FTM - MTF
Demographic characteristics								
Age at transition	−19.02***	−22.79***	−14.77***	−22.62***	−14.95***	−14.59***	−22.98***	8.03***
Born in the Netherlands	0.24***	0.28***	0.21***	0.29***	0.19***	0.22***	0.26***	−0.07***
Has a partner	−0.23***	−0.25***	−0.22***	−0.22***	−0.25***	−0.20***	−0.27***	0.02
Has children	−0.39***	−0.44***	−0.35***	−0.39***	−0.39***	−0.30***	−0.49***	0.09***
Socioeconomic and health characteristics								
College degree	−0.07***	−0.06***	−0.08***	−0.05**	−0.09***	−0.07***	−0.07***	−0.02
Working	−0.24***	−0.23***	−0.24***	−0.28***	−0.20***	−0.29***	−0.18***	−0.01
Working part-time	−0.05*	0.05	−0.10***	0.27***	−0.34***	0.12***	−0.19***	−0.15**
Sickness/disability benefits	0.05***	0.05***	0.05***	0.05***	0.04***	0.06***	0.04***	0.00
Welfare benefits	0.12***	0.10***	0.12***	0.11***	0.12***	0.13***	0.10***	0.02
Unemployment benefits	0.02***	0.01	0.03***	0.01	0.03***	0.03***	0.01	0.02
Annual income (log)	−0.37***	−0.50***	−0.30***	−0.75***	−0.02	−0.55***	−0.22***	0.20*
Female dominated sector	−0.09***	−0.01	−0.13***	0.18***	−0.32***	0.06*	−0.20***	−0.12**
Male dominated sector	0.10***	−0.01	0.16***	−0.20***	0.36***	−0.03	0.19***	0.17***
Antidepressants	0.03***	0.03***	0.03***	0.04***	0.02***	0.03***	0.03***	−0.01
Observations	88661	85631	85244	46484	42177	46097	42564	6447

Table A1: Comparison of Group Differences

Note: *** p<0.01, ** p<0.05, * p<0.1. Each value denotes the difference between group 1 (above) and group 2 (below). These values correspond to the average descriptive statistics in Table 1. Descriptive statistics are measured in year $t – 1$, where t is the year of transition or assigned year. Employment outcomes are only reported for those aged ≥ 25 and ≤ 65, and college degree for ≥ 25. See Table A3 for variable descriptions. *Data:* Statistics Netherlands.

Table A2: Data Description

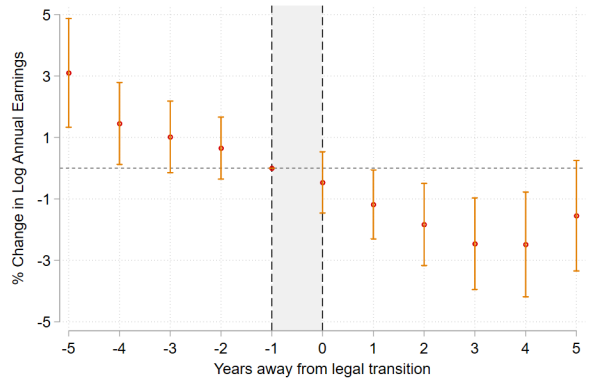| Outcomes	Source	Years	Transitioners observed	Controls observed
Demographic variables	Personal Records Database (BRP)	2005-21	$\approx 100\%$	$\approx 100\%$
Medicine prescriptions	National Health Care Institute	2006-21	$\approx 100\%$	$\approx 100\%$
Income and employment	Tax and Customs Netherlands	2005-21	$\approx 95\%$	$\approx 75\%$
Education	Data from various registers and survey data from the Enquête Beroepsbevolking	2005-21	$\approx 85\%$	$\approx 45\%$
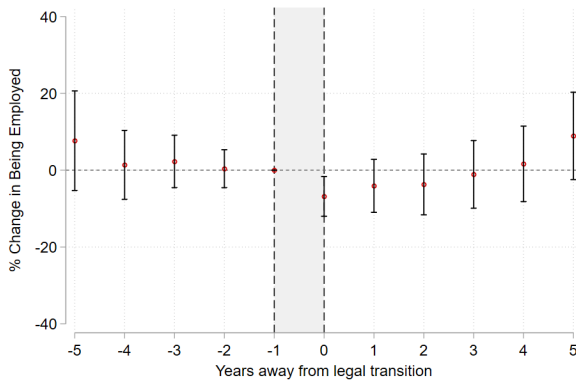
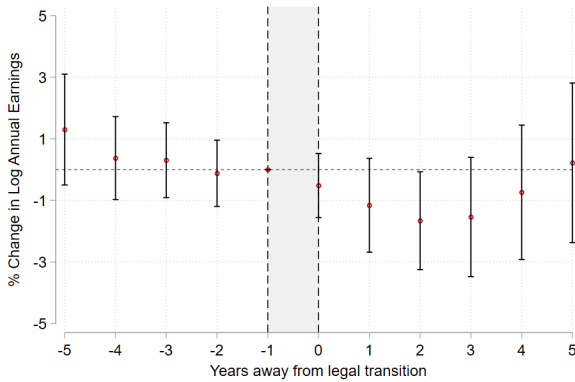(a) Female-to-Male, Spec. A1 (N = 10,874)   (b) Male-to-Female, Spec. A1 (N = 21,394)
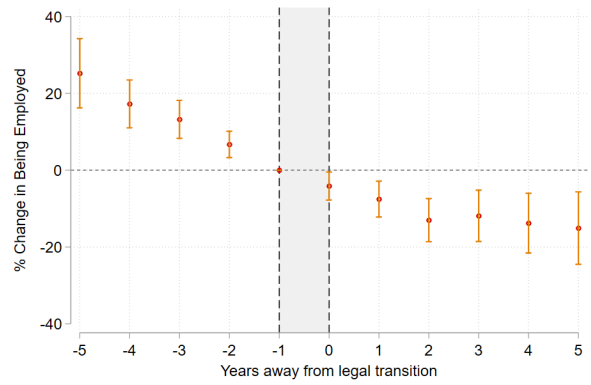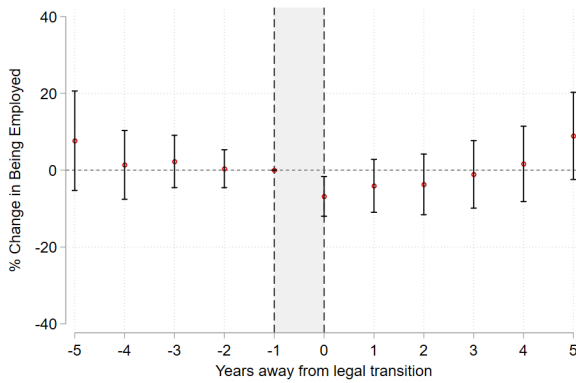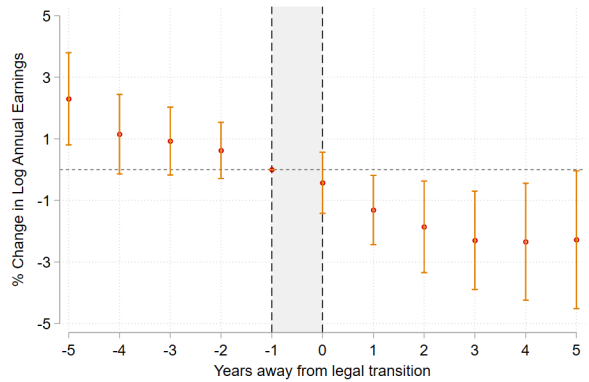
(c) Female-to-Male, Spec. A2 (N = 715,256)   (d) Male-to-Female, Spec. A2 (N = 725,776)
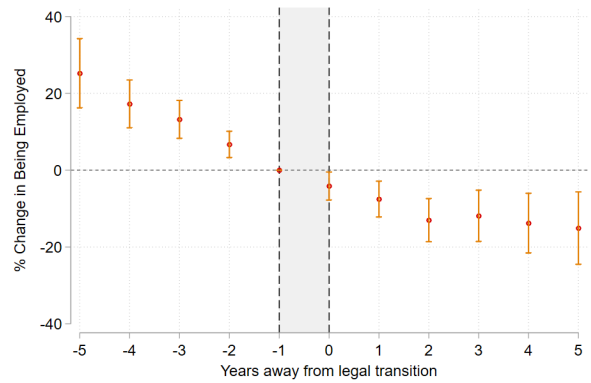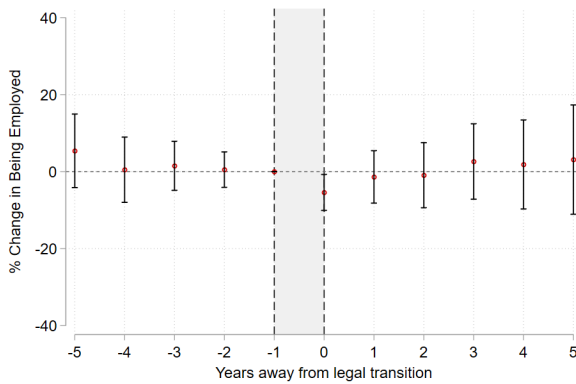
(e) Female-to-Male, Spec. A3 (N = 10,874)   (f) Male-to-Female, Spec. A3 (N = 21,394)
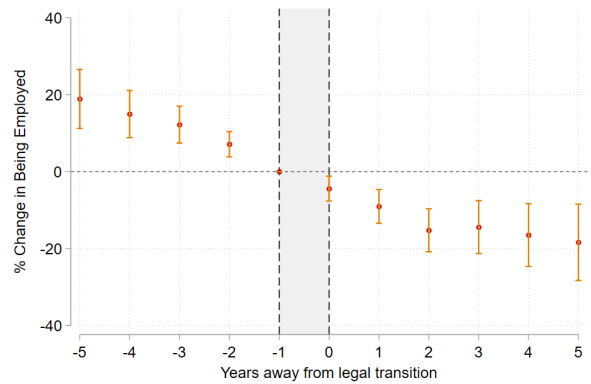
Figure A1: Event Studies with Alternative Specifications of Being Employed

Note: The figure includes findings using three alternative specifications: A1) including only transitioners in the sample (no comparison group); A2) including interactions between transitioning and age and time; and A3) controlling for individual fixed effects. *Data:* Statistics Netherlands.
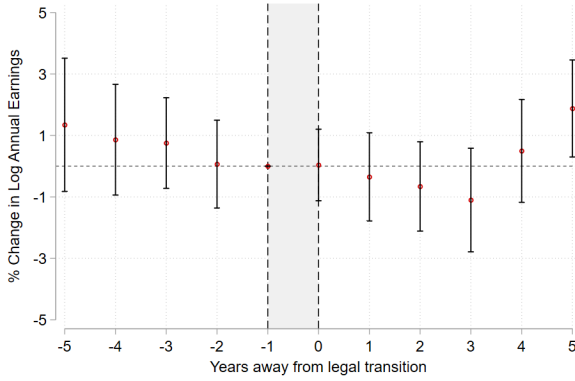
(a) Female-to-Male, Spec. A1 (N = 6,215) (b) Male-to-Female, Spec. A1 (N = 12,432)
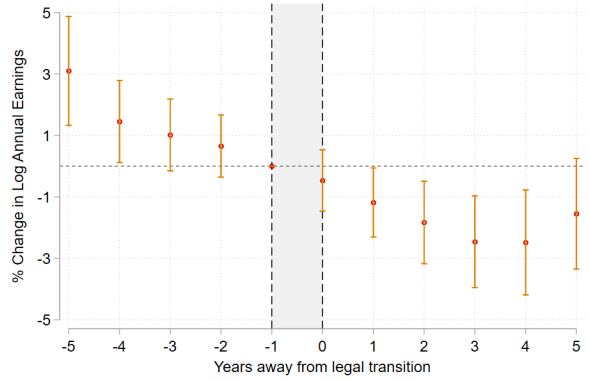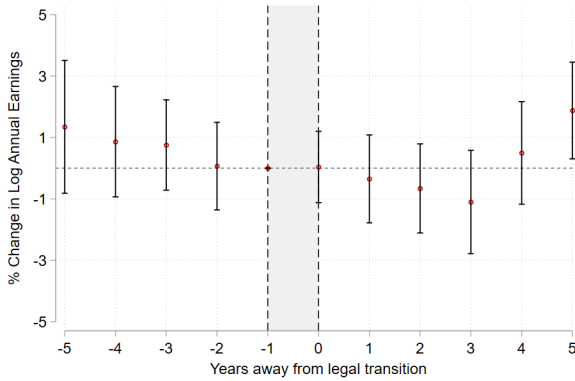
(c) Female-to-Male, Spec. A2 (N = 516,467) (d) Male-to-Female, Spec. A2 (N = 522,684)
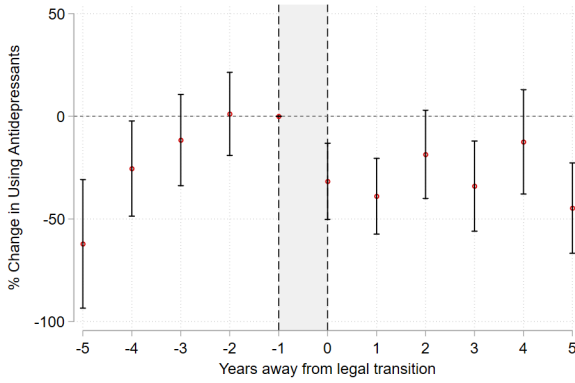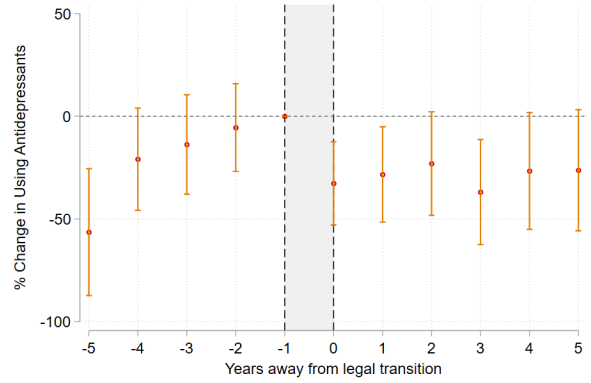
(e) Female-to-Male, Spec. A3 (6,215) (f) Male-to-Female, Spec. A3 (12,432)

Figure A2: Event Studies with Alternative Specifications of Annual Log Earnings
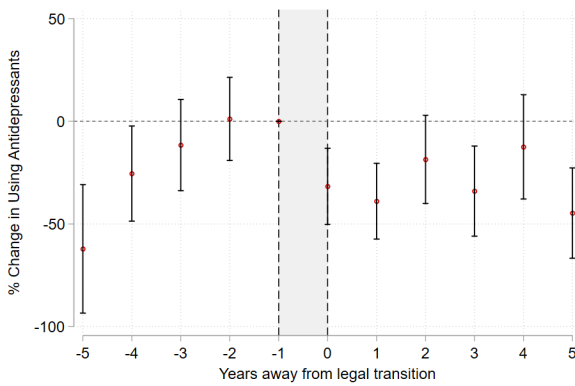
Note: The figure includes findings using three alternative specifications: A1) including only transitioners in the sample (no comparison group); A2) including interactions between transitioning and age and time; and A3) controlling for individual fixed effects. *Data:* Statistics Netherlands.
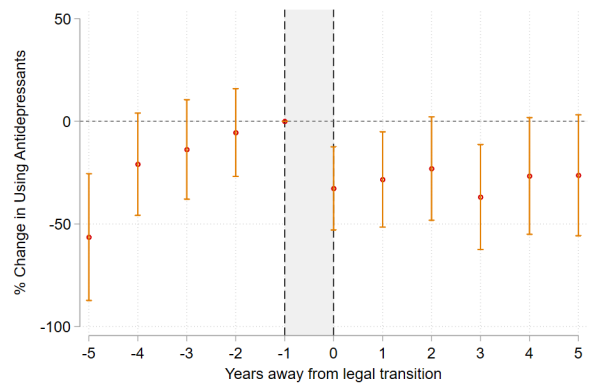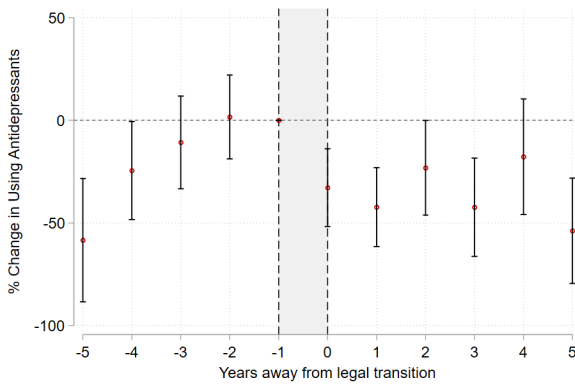
(a) Female-to-Male, Spec. A1 (N = 57,990)

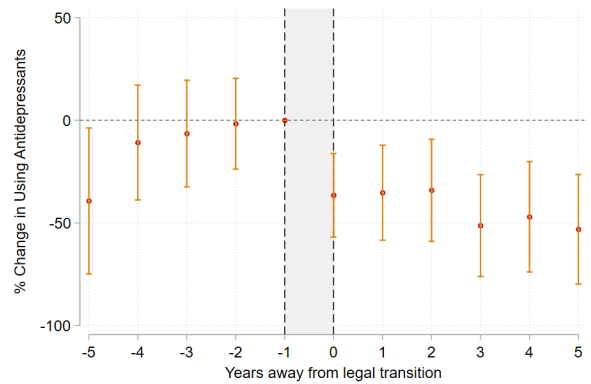(b) Male-to-Female, Spec. A1 (N = 51,480)

(c) Female-to-Male, Spec. A2 (N=1,506,701)

(d) Male-to-Female, Spec. A2 (N=1,500,191)

(e) Female-to-Male, Spec. A3 (N = 57,990)

(f) Male-to-Female, Spec. A3 (N = 51,480)

Figure A3: Event Studies with Alternative Specifications of Having a Prescription for Antidepressants

Note: The figure includes findings using three alternative specifications: A1) including only transitioners in the sample (no comparison group); A2) including interactions between transitioning and age and time; and A3) controlling for individual fixed effects. *Data:* Statistics Netherlands.

Table A3: Variable descriptions

Variable	Description
Age	Continuous variable that is equal to the individuals age in the year of transition in years.
Born in the Netherlands	Dummy variable that takes the value 1 if the individual is born in the Netherlands and 0 otherwise.
Has a partner	Dummy variable that takes the value 1 if the individual cohabited with a registered partner and 0 otherwise.
Has children	Dummy variable that takes the value 1 if the individual has children and 0 otherwise.
College degree	Dummy variable that takes the value 1 if the individual obtained a college degree or higher (in the Netherlands: HBO or WO degree) and 0 otherwise.
Working	Dummy variable that takes the value 1 if the individual received any positive income from employment (including self-employment) and 0 otherwise.
Working part-time	Dummy variable that takes the value 1 if the employed individual is working less than 36 hours and 0 otherwise.
Sickness/disability benefits	Dummy variable that takes the value 1 if the individual received any sickness and/or disability benefits and 0 otherwise.
Welfare benefits	Dummy variable that takes the value 1 if the individual received any welfare benefits and 0 otherwise.
Unemployment benefits	Dummy variable that takes the value 1 if the individual received any unemployment and/or disability benefits and 0 otherwise.
Annual income (log)	Continuous variable that is equal to the individuals income from employment in 2021 Euros, presented in logs. This variable is only presented for individuals with any positive income from employment.
Female dominated sector	Dummy variable that takes the value 1 if the individual works at in a sector with $> 60\%$ females and 0 otherwise, as measured by the sector gender ratio in sector x in 2016.
Male dominated sector	Dummy variable that takes the value 1 if the individual works at in a sector with $> 60\%$ males and 0 otherwise, as measured by the sector gender ratio in sector x in 2016.
Antidepressants	Dummy variable that takes the value 1 if the individual had any antidepressant prescriptions (ATC-code N06A).
Gender-affirming hormone prescriptions	Dummy variable that takes the value 1 if the individual had any androgens prescriptions (ATC-code G03B), estrogens prescriptions (ATC-code G03C), antiandrogens prescriptions (ATC-code L02BB, observed on L02B) or puberty blockers prescriptions (ATC-code L02AE, observed on L02A). Androgens – commonly testosterone – induce masculinization, while estrogens and antiandrogens – commonly testosterone blockers – induce feminization. Puberty blockers, also known as GnRH (Gonadotropin-Releasing Hormone) agonists are medications used to temporarily delay the onset or progression of puberty.