

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

Elisa de Weerd^{1,3} John Cawley² Hans van Kippersluis¹

¹Erasmus School of Economics, Erasmus University Rotterdam & Tinbergen Institute

²Maxwell School, Syracuse University

³School of Economics, Radboud University

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Motivation

- **Transgender** individuals face stigma and discrimination, as well as disparities in health and economic outcomes (Badgett et al., 2023; Leppel, 2021; Carpenter et al., 2020; Shannon, 2022; Carpenter et al., 2022; Lagos, 2018; Kolk et al., 2025)
 - Roughly 1.6% of the population identify transgender (Carpenter et al., 2022), and is increasing over time, particularly among youth (Herman et al., 2022; Kolk et al., 2025)
- Gender **transition** may be social, medical, and/or legal
- Access to legal and medical transitioning frequent topic of political debate (Human Rights Campaign, 2023; Borah et al., 2023; Betts, 2023)

This Paper

- **Research Question:** How do labor market outcomes (employment, income) vary before and after legal and medical gender transitions?
- **Why?**
 - ① Discrimination based on (perceived) sex
 - ② Discrimination based on transgender status
 - Role of congruent documentation (Mann, 2021; Campbell et al., 2023a)
 - ③ May reinforce identity and confidence in the work environment (Akerlof and Kranton, 2000)
 - ④ Volatile/vulnerable period from a physical and mental point of view
- Conduct event studies using Dutch linked administrative data on legal and medical gender transitions between 2014 and 2022

Related literature

- Dynamics of earnings around a gender transition: Carpenter et al. (2024) (admin, US), Dujeancourt (2023); Burn et al. (2025) (admin, Sweden), Geijtenbeek and Plug (2018) (admin, Netherlands), and Schilt and Wiswall (2008) (survey, US)
 - Those who transition male-to-female (MTF) face additional earnings penalty to those who transition female-to-male (FTM)
 - Differences between FTM and MTF also documented in other studies, see e.g., Carpenter et al. (2022); Granberg et al. (2020).
- Use of gender-affirming care (GAC) associated with improvement in mental health (De Vries et al., 2011; Drydakis, 2017; Bränström and Pachankis, 2020; Mann, 2021; Campbell et al., 2023b; Saxby et al., 2025)

Contributions of this paper

- Explore relatively large dataset of transitioners that includes legal gender changes, hormone therapy, and surgeries
 - Isolate mechanisms: which transition event is most impactful?
- 15 years of administrative data on outcomes of interest: employment and earnings; sector of work, work hours, antidepressant medication
 - Isolate mechanism: how are labour market outcomes affected by transitions?

Policy Context: The Netherlands

- Relatively progressive stance towards sexual and gender diverse populations (Equaldex, 2025)
 - First country to legalize same-sex marriage
 - One of the first to allow legal gender recognition, and GAC through gender teams (Bakker, 2018)
- Healthcare system ensures broad financial accessibility to GAC



Legal Gender Transition

Amendment of birth certificate, ID documents, and legal name.

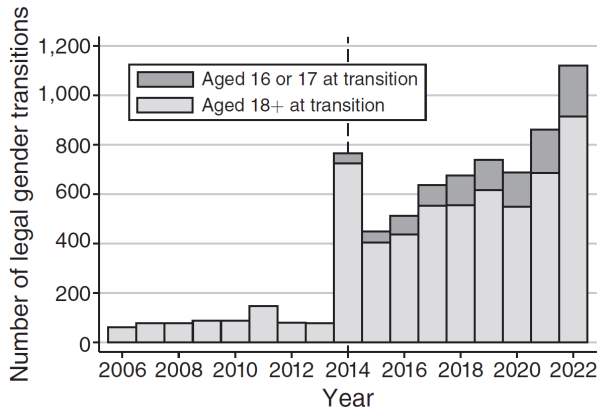
Since July 1, 2014

No surgical requirements

Expert statement [Details](#)

Age 16+

Administrative procedure



Source: De Weerd et al. (2024) [Descr](#)

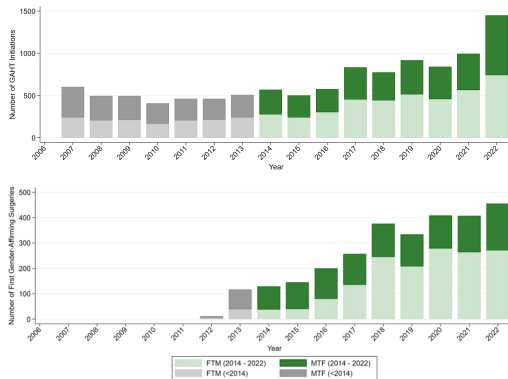
Gender-Affirming Medical Care

Hormone Therapy (GAHT)

- FTM: testosterone; MTF: estrogen
- Via gender clinic or GP referral; requires diagnosis of gender incongruence
- Typically from age 16

Surgery

- FTM: mastectomy, phalloplasty; MTF: augmentation, orchiectomy, vaginoplasty
- Requires gender incongruence diagnosis + ≈ 1 year GAHT
- Age 18+ (mastectomy: 16+)

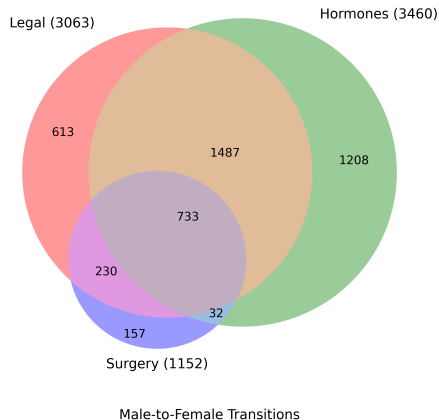
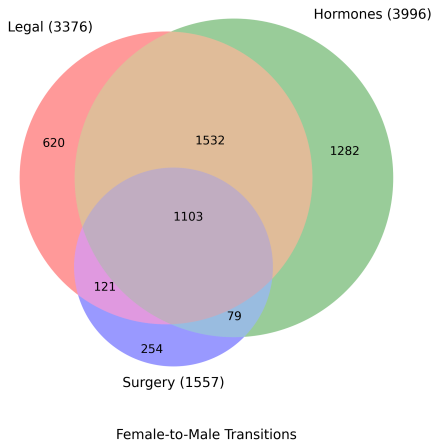


Data

- Dutch annual administrative data 2010-2024 on:
 - Labor market outcomes: being employed and earnings
 - Other: Receipt of sickness/disability benefits; antidepressant use
 - Later: sector of work, hours of work
- Identify 9,399 individuals with any transitioning event between 2014 and 2022
 - Legal transitions: amendments on birth certificates (available 2006 - 2022)
 - Initiation of gender-affirming hormones: ATC4-codes of prescriptions (G03B testosterone, G03C estrogens, available 2007 - 2023)
 - Gender-affirming surgeries: DTC codes from insurance declarations (available 2013 - 2023) Included surgeries
- Include random sample of 500,000 never-treated controls

Large Overlap Between Transitioners

Sequence



Note: This figure only includes transitioning events between 2014 and 2022, unrestricted by age.

Descriptive Statistics

	Legal		GAHT		Surgery	
	<i>FTM</i>	<i>MTF</i>	<i>FTM</i>	<i>MTF</i>	<i>FTM</i>	<i>MTF</i>
Age	26.90	35.16	31.18	36.30	29.07	37.87
Has college degree	0.29	0.27	0.35	0.28	0.26	0.30
Employed	0.59	0.52	0.63	0.54	0.56	0.57
Receives unemployment benefits	0.02	0.03	0.03	0.03	0.02	0.04
Receives welfare benefits	0.11	0.15	0.10	0.17	0.13	0.13
Receives sickness/disability benefits	0.07	0.10	0.08	0.08	0.09	0.12
Average FTE-level	0.68	0.75	0.67	0.76	0.68	0.77
Has permanent contract	0.45	0.55	0.49	0.51	0.45	0.57
Earnings (log)	10.08	10.35	10.20	10.32	10.08	10.46
Has a partner	0.19	0.19	0.26	0.21	0.18	0.21
Has children	0.09	0.15	0.25	0.21	0.10	0.20
<i>Observations</i>	3,387	3,070	4,009	3,493	1,559	1,153

Note: The table displays means, measured in 2022. Employment statistics are only measured for those aged 22 – 67.

Partner and children statistics are only measured for those aged 22 and above.

Never-treated

Age distribution

Method 1: Event Studies using Never-Treated as Controls

$$Y_{it} = \sum_{s \in S} \beta_s D_{it}^s + \gamma_a + \delta_t + \mu_i + \varepsilon_{it}, \quad f \in \{0, 1\}$$

Where:

- Y_{it} : outcome for individual i at time t
- D_{it}^s are event-time indicators for legal gender transitions
 $s \in \{-6, -5, -4, -3, -2, 0, 1, 2, 3, 4\}$, with $s = -1$ as the omitted reference period
- γ_a and δ_t are bi-annual age and year fixed effects, and μ_i individual fixed effects
- Standard errors are clustered at the individual level
- Poisson regression for earnings; logit for employment and antidepressant use

Issues and Solutions

Issues

- Staggered adoption + heterogeneous treatment effects leads to forbidden comparisons (Baker et al., 2025)
- Never-treated may not represent a reasonable counterfactual

Solutions

- Define cohorts by age-at-transition and treat these as 'subexperiments'
- Use only pre-transition outcomes of **future treated** as counterfactuals
- Given possible anticipation, use only future-treated outside of event window (i.e., those transitioning ≥ 4 years later)

Method 2: Stacked Event Study Design using Later-Treated as Controls

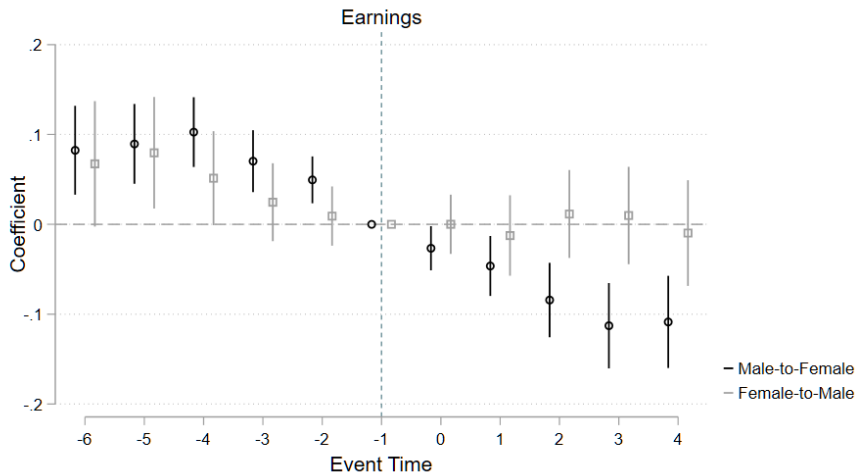
$$Y_{ict} = \sum_{s=-4}^4 \beta_s \cdot \text{Treat}_i \cdot 1\{\text{EventTime}_{it} = s\} + \alpha \cdot \text{Treat}_i + \sum_{s=-4}^4 \delta \cdot 1\{\text{EventTime}_{it} = s\} + \gamma_c + \varepsilon_{ict},$$

- Y_{ict} is the outcome of individual i in cohort c at time t
- Treat_i indicates whether individual i belongs to the treated group in cohort c
- $1\{\text{EventTime}_{it} = s\}$ denotes event time s relative to cohort-specific transition year
- γ_c denote cohort fixed effects.

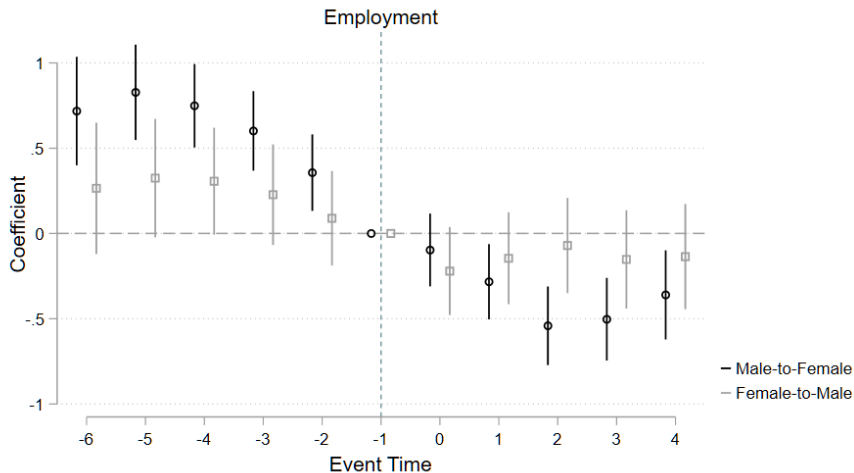
Methodological choices

- Limit sample to:
 - those with transitioning events between ages 26 and 63, such that we only include those in working-age population (leaves $\approx 40\%$ of total transitioning sample, [Descriptives](#))
 - transitioning events between 2014 and 2022, such that we can observe overlap
- Estimate separately for FTM and MTF
- Aggregation: Weighted regressions such that each cohort-specific event time coefficient is weighted by its share of the treated sample.

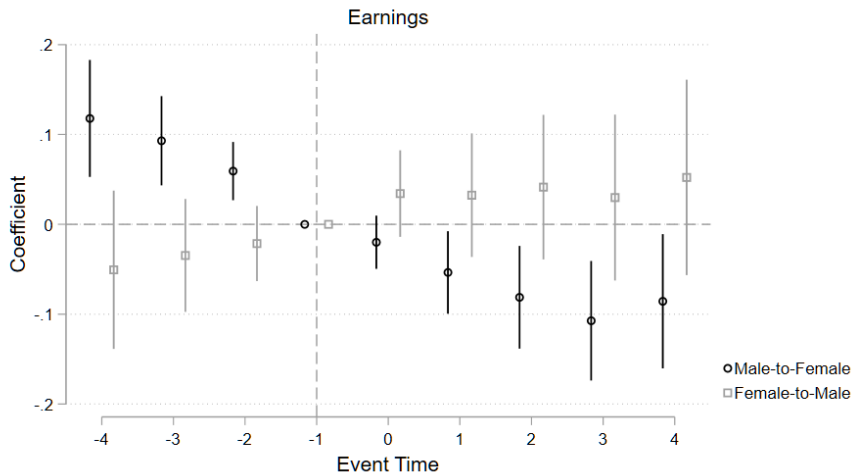
Poisson Event Studies of Earnings, Never-Treated as Controls t-4



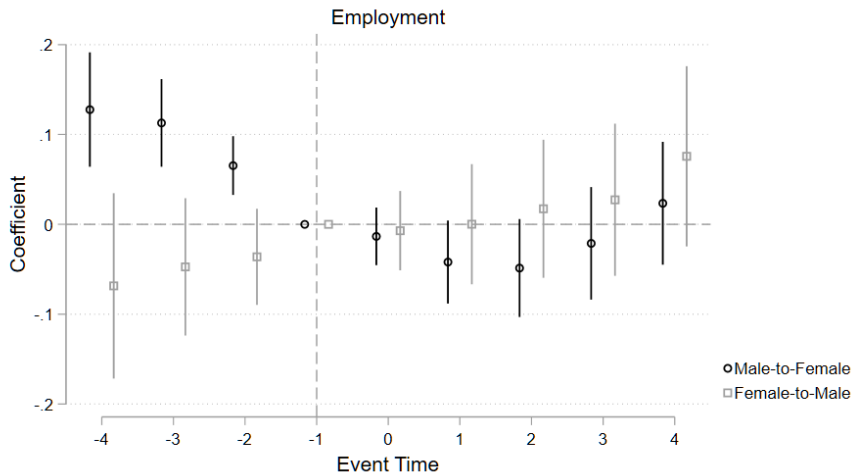
Logit Event Studies of Employment, Never-Treated as Controls



Stacked Event Studies of Earnings, Later-Treated as Controls

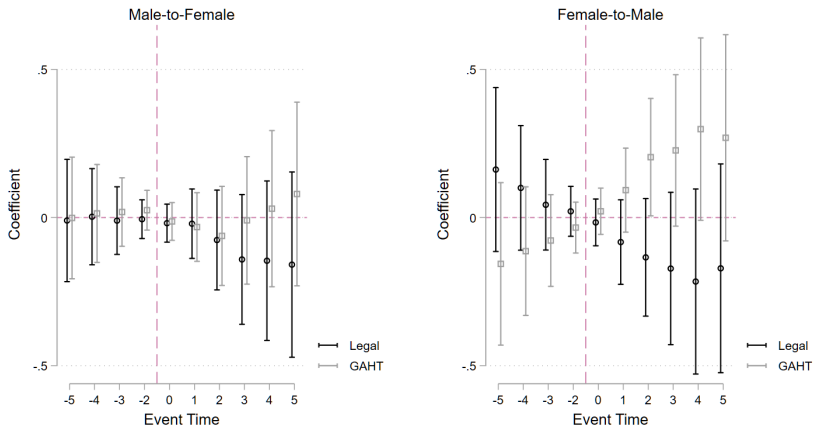


Stacked Event Studies of Employment, Later-Treated as Controls



Among those with legal and GAHT... (Poisson, Never-Treated) All

Earnings



Robustness Checks

- Two alternative specifications using later-treated as controls
 - ① Semi-parametric estimation by cohort using exclusively later-treated as controls (Callaway and Sant'Anna, 2021) Callaway & Sant'Anna
 - ② Using a rolling window of control groups of closely matched later-treated individuals (within 5 years) (Melentyeva and Riedel, 2023) Melentyeva & Riedel
- Explore legal transitions by controlling for other events Never-Treated, Controlled
Later-Treated, Controlled

Conclusions

- MTF earnings decline notably around legal transition; FTM effects are smaller and less precise
 - Consistent with earlier findings (Carpenter et al., 2024; Burn et al., 2025; Dujeancourt, 2023; Schilt and Wiswall, 2008)
 - Patterns consistent with gendered discrimination dynamics
 - Partly driven by extensive margin labor supply
- Substantial pre-trends: many changes begin years before the legal transition date
 - Suggestive evidence that GAHT offsets earnings declines for FTM, but not for MTF

Limitations

- Transitioning and timing of transitioning not random
- Only observe transgender individuals who legally and/or medically transition (subset)
- Do not observe gender non-conforming individuals
- Caution in generalizing - Netherlands relatively inclusive and tolerant

Next Steps

- Further examine the role of GAHT initiation in labor market trajectories
- Investigate mechanisms in employment outcomes, such as job changes and sector shifts
- Consider alternative comparison groups (e.g., siblings), following Dujeancourt (2023) and Carpenter et al. (2024)
- Explore heterogeneity by age at transition

- For later: study teenage transitions and schooling outcomes

Thank you!

Contact:

deweerd@ese.eur.nl

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Appendix

Expert statement

An **expert statement** is a legal document provided if it is clear to the expert that:

- one wants to legally transition
- one oversees and understands the consequences of a legal transition

The expert statement can be provided by doctors and psychologists working at any of the transgender care centres or by any of the 27 other psychologists appointed by the Minister of Security and Justice. The provision is formally not part of a clinical process.

Before July 1 2014, the expert statement was provided after a medical transition, and required a diagnosis of gender incongruence. After July 1 2014 it also became possible to obtain an expert statement **outside of the medical transitioning process** and **without a diagnosis** of gender incongruence through the list of appointed psychologists.

Procedure

Once all requirements to legally transition are fulfilled, individuals can request a birth certificate amendment from their municipality of birth¹. This change is recorded in the Personal Records Database (BRP).

Before July 1 2014, this request was done through a **legal court procedure**. After July 1 2014, this has been replaced by an **administrative procedure**: one can directly submit this request to the civil registrar in their birth municipality. This change has made the process less expensive and time-consuming.

[Back to Policy](#)

¹Parental approval is not required for 16- and 17-year olds.

	FTM		MTF	
	'06-'13	'15-'22	'06-'13	'15-'22
Age	34.24	23.29	40.99	30.53
Born in Netherlands	0.90	0.95	0.78	0.88
Has a partner	0.17	0.20	0.20	0.22
Has children	0.15	0.04	0.25	0.11
Distance to gender clinic	55.68	53.02	56.57	53.43
College degree	0.27	0.30	0.19	0.30
Working	0.61	0.54	0.57	0.54
Disability benefits	0.15	0.11	0.18	0.10
Annual income (log)	7.05	5.96	6.26	6.24
Female sector	0.35	0.35	0.21	0.29
Male sector	0.45	0.45	0.60	0.56
Antidepressants	0.04	0.05	0.01	0.04
<i>Observations</i>	247	3076	448	2605

Included Surgery Codes

Code	Description
36880	Gender surgery male-to-female, penis amputation, castration and simultaneous construction of female genitals.
36881	Gender surgery female-to-male, preparation phalloplasty, vaginectomy and urethral extension.
36882	Gender surgery female-to-male, (re)construction of male genitals using pedicled or microvascular flaps (urethral extension), including scrotoplasty.
36883	Gender surgery female-to-male, formation of penis and lengthening of urethra, metaidioplasty (phalloplasty with local tissue).
36888	Extensive secondary corrections in gender surgery.
36890	Gender surgery female-to-male, resection of male genitals (scrotum and/or penis).
33920	(Subcutaneous) mastectomy with or without skin reduction, without axillary toilet.

Note: The Care Activity Codes are taken from Statistics Netherlands-file *MSZgeleverdzorgprofieltab* and the national healthcare authority (NZa). The descriptions are translated from Dutch.

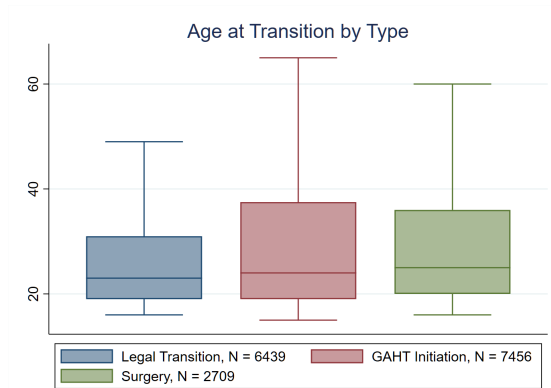
Descriptive Statistics – Age-matched never treated

[Back to Descriptive Statistics](#)

	Total	Female	Male
Age	33.41	33.37	33.45
Has college degree	0.39	0.43	0.36
Employed	0.78	0.76	0.81
Receives unemployment benefits	0.03	0.03	0.02
Receives welfare benefits	0.03	0.04	0.03
Receives sickness/disability benefits	0.04	0.05	0.03
Average FTE-level	0.79	0.72	0.85
Has permanent contract	0.64	0.64	0.64
Earnings (log)	10.60	10.49	10.70
Has a partner	0.32	0.36	0.29
Has children	0.34	0.39	0.29
<i>Observations</i>	500,000	237,891	262,109

Note: The general population controls are 500,000 individuals that do not have any transitioning event, age-matched to the total transitioning-population. The table displays means, and are measured in 2022. Employment statistics are only measured for those aged 22 – 67. Partner and children statistics are only measured for those aged above 22.

Transitioners Are Relatively Young at Time of Event



Note: Only transitioning events 2014 – 2022 are included, unrestricted by age. The center line in each box presents the median. The bottom (top) of each box presents the 25th (75th) percentile. The whiskers extend to the smallest and largest values within 1.5 times the interquartile range (= 75th perc. – 25th perc.).

[Back to Descriptive Statistics](#)

Sequence of Transitions [Back to overlap](#)

Out of those with two transitioning events 2014 – 2022 ($n = 3,481$):

- The most common combination (87%) is a legal gender transition with GAHT
- Most initiate GAHT in the same year as their legal gender transition occurs
- If the years differ, GAHT is most often initiated prior to the legal gender transition

Out of those with all three transitioning events 2014 – 2022 ($n = 1,817$):

- The most common sequence is initiating GAHT and having a legal gender transition in the same year, followed by surgery in a later year

[Table](#)[Event-study graphs of overlap](#)

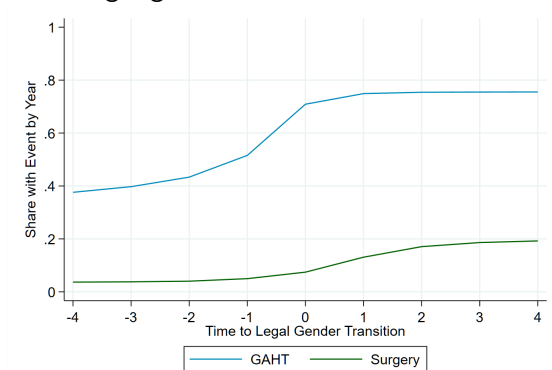
Sequence of Transitions

Number of Events	Sequence	Count
<i>One Event</i>	Hormones	2490
	Legal	1233
	Surgery	411
<i>Two Events</i>	Hormones = Legal	1686
	Hormones → Legal	897
	Legal → Hormones	436
	Legal → Surgery	195
	Surgery = Legal	103
	Hormones → Surgery	81
	Surgery → Legal	53
	Surgery = Hormones	18
	Surgery → Hormones	12
<i>Three Events</i>	Legal = Hormones → Surgery	1006
	Hormones → Legal → Surgery	287
	Legal → Hormones → Surgery	161
	Hormones → Legal = Surgery	152
	Legal = Hormones = Surgery	78
	Hormones → Surgery → Legal	61
	Legal → Hormones = Surgery	45
	Legal = Surgery → Hormones	16
	Surgery = Hormones → Legal	11

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Overlap in Transition Event Timing

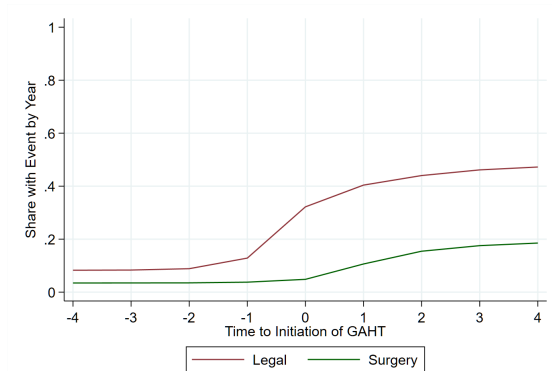
Conditional on having had a legal gender transition...



Note: Figure includes all observed transitioning events, unrestricted to event year or age. The share of those with gender-affirming surgery is therefore mechanically lower, as we observe surgeries between 2013 and 2022, rather than between 2006 and 2022.

Overlap in Transition Event Timing

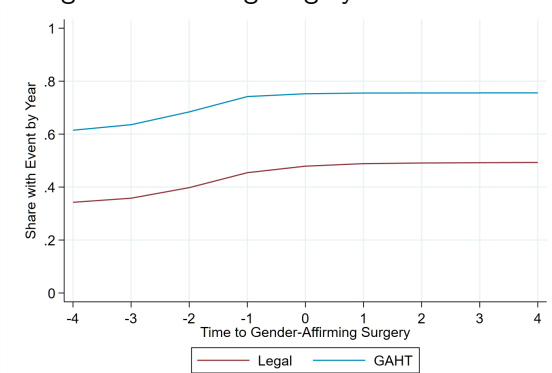
Conditional on having had initiated GAHT...



Note: Figure includes all observed transitioning events, unrestricted to event year or age. The share of those with gender-affirming surgery is therefore mechanically lower, as we observe surgeries between 2013 and 2022, rather than between 2006 and 2022. [Back to legal](#) [See for surgery](#)

Overlap in Transition Event Timing

Conditional on having had gender-affirming surgery...



Note: Figure includes all observed transitioning events, unrestricted to event year or age.

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Descriptive Statistics – Event Studies [Back to method](#)

	Legal		GAHT		Surgery	
	<i>FTM</i>	<i>MTF</i>	<i>FTM</i>	<i>MTF</i>	<i>FTM</i>	<i>MTF</i>
Age	39.83	43.49	44.78	41.81	40.72	44.05
Has college degree	0.36	0.31	0.48	0.35	0.33	0.34
Employed	0.59	0.54	0.67	0.59	0.58	0.58
Receives unemployment benefits	0.03	0.03	0.03	0.04	0.03	0.04
Receives welfare benefits	0.11	0.15	0.08	0.16	0.14	0.12
Receives sickness/disability benefits	0.13	0.14	0.12	0.11	0.13	0.17
Average FTE-level	0.79	0.82	0.74	0.83	0.77	0.83
Has permanent contract	0.62	0.68	0.68	0.64	0.59	0.67
Earnings (log)	10.54	10.73	10.69	10.72	10.51	10.76
Has a partner	0.19	0.22	0.45	0.25	0.20	0.23
Has children	0.09	0.15	0.25	0.21	0.18	0.28
<i>Observations</i>	803	1,611	1,433	1,604	500	702

Note: The table displays means, measured in 2022. Employment statistics are only measured for those aged 22 – 67. Partner and children statistics are only measured for those aged 22 and above.

Logit

[Back to Methods](#)

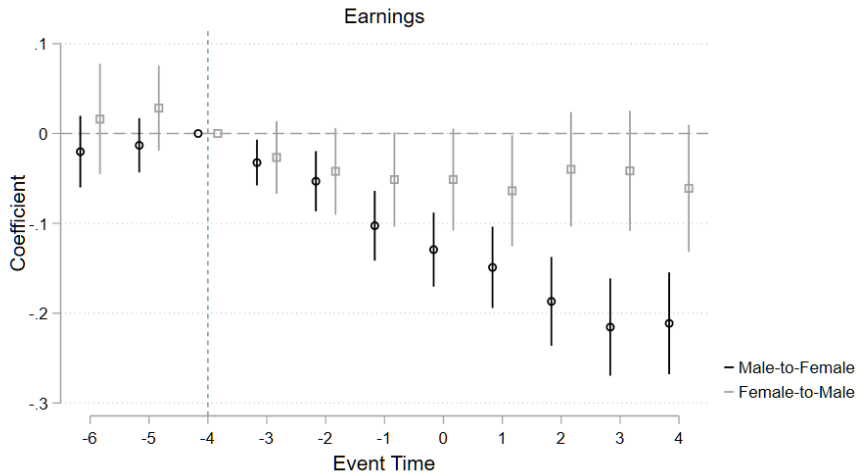
Logit estimation for employment and antidepressant use:

$$\Pr(Y_{it} = 1) = \Lambda \left(\sum_{s \in S} \theta_s^{(f)} D_{it}^s + \gamma_a + \delta_t + \mu_i \right), \quad f \in \{0, 1\},$$

Where:

- $\Lambda(\cdot)$ is the logistic cumulative distribution function
- $\theta_s^{(f)}$ capture the change in the probability of the outcome relative to the reference period ($s = -1$)
- γ_a and δ_t denote age and year fixed effects, and μ_i denotes individual fixed effects

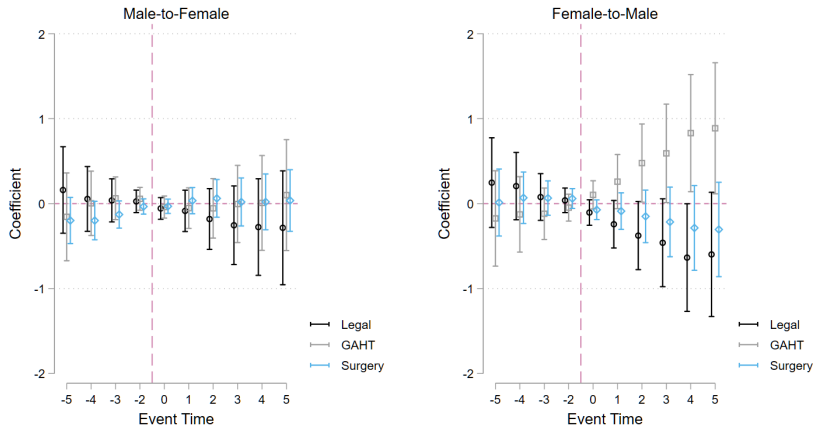
Using t-4 as reference

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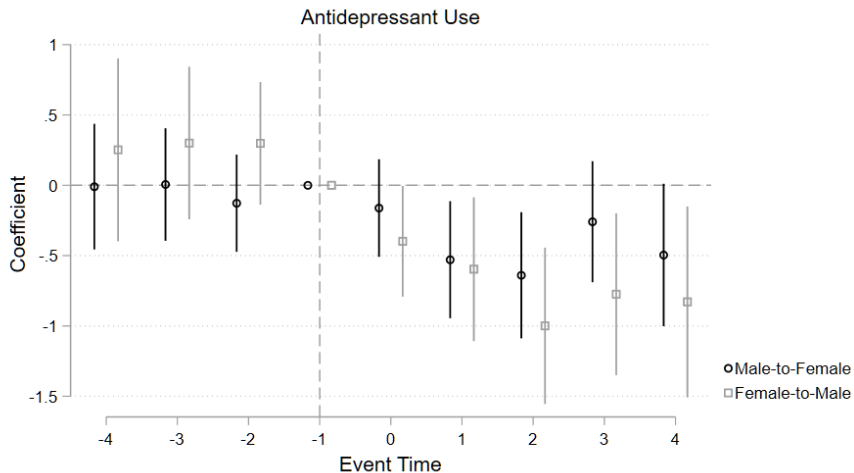
Among those with all three events... (Poisson, Never-Treated)

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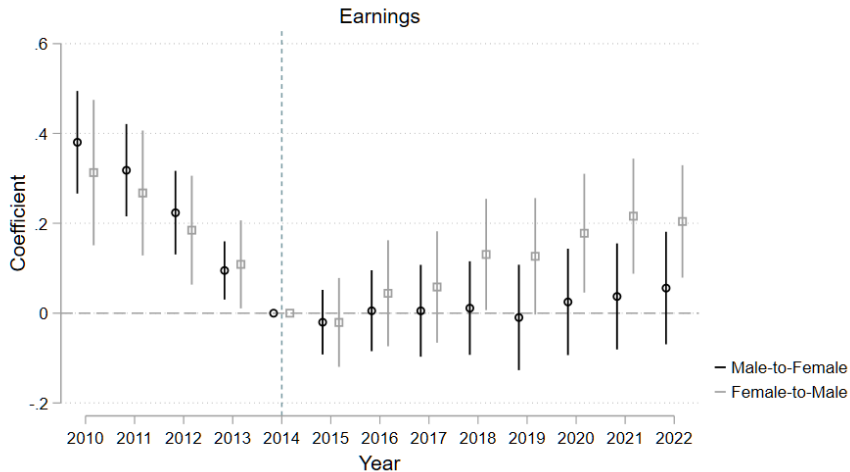
Earnings



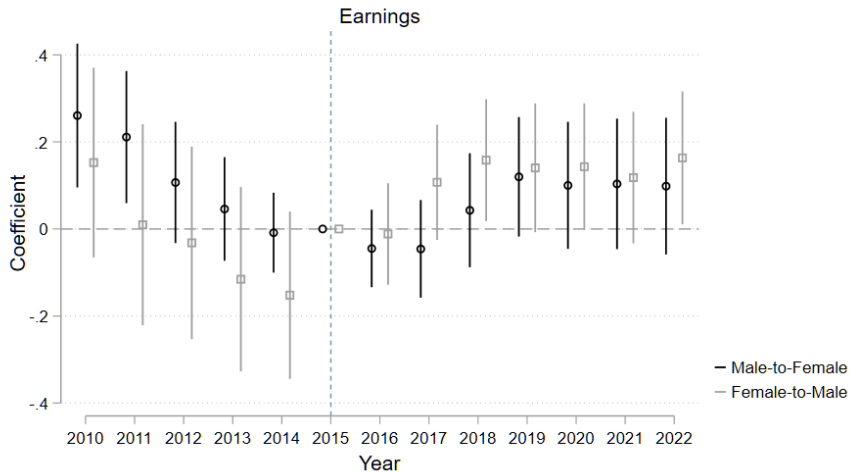
Stacked Event Studies of Antidepressant Use, Later-Treated as Controls



2014 Cohort

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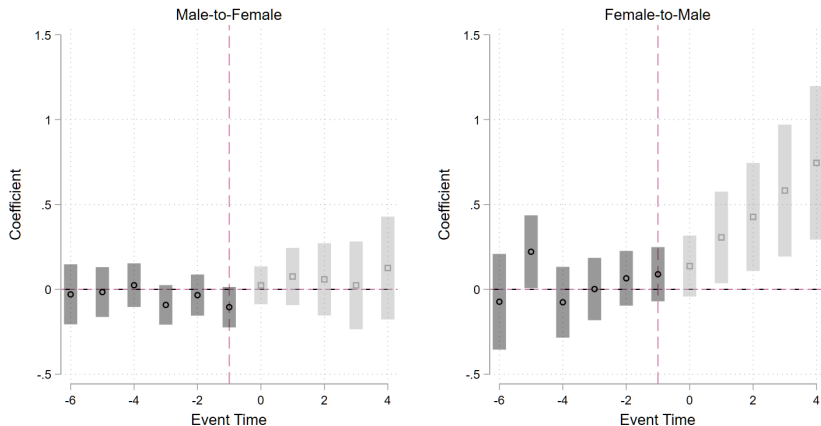
2015 Cohort

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Callaway & Sant'Anna

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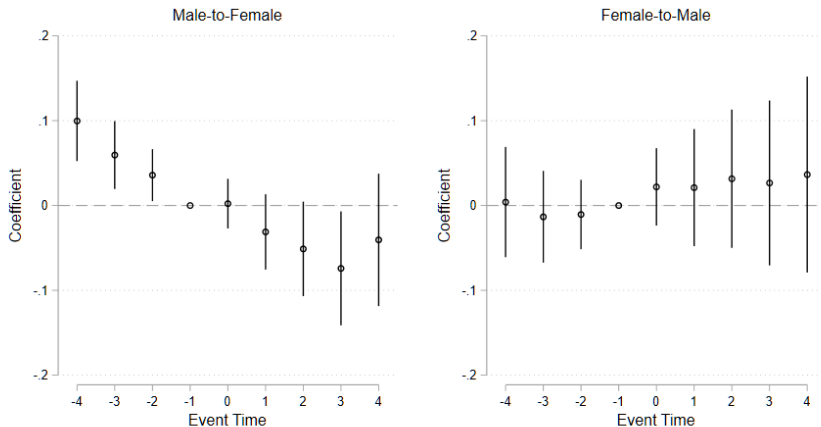
Earnings

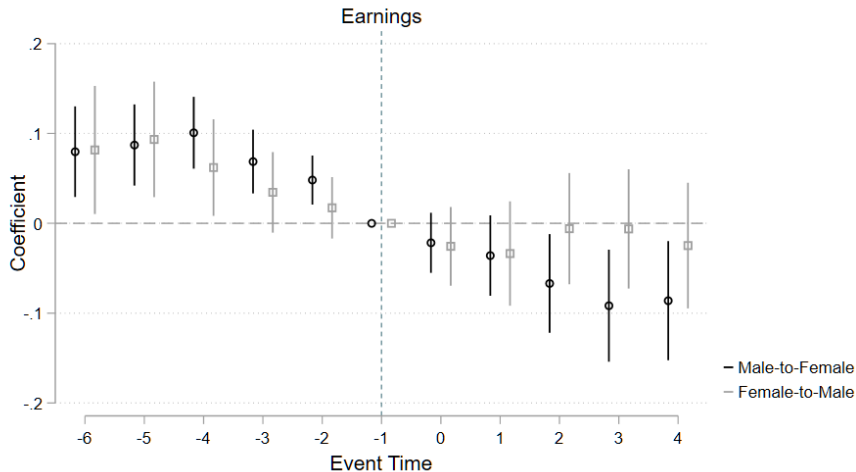


Melentyeva & Riedel

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Earnings



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Controlled for GAHT and Surgery (Poisson, Later-Treated) [Back](#)

