Supplementary Appendix for Moberg et al. (2025), "The End of an Impossible Choice"

Ylva Moberg, Rinni Norlinder, J. Lucas Tilley, and Emma von Essen

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1 Supplementary information

In this section, we briefly describe our data. We refer the reader to our Replication Package for additional information about the source files and how to obtain them from Statistics Sweden and the National Board of Health and Welfare.

1.1 Data sources and sample construction

To generate Figure 1, we use a customized dataset that includes information on legal gender marker changes for everyone observed with a gender incongruence diagnosis in the National Patient Register between 1973 and 2020. Statistics Sweden compiled the data using records from the Swedish Tax Agency, the authority responsible for formally registering such changes. Because a gender incongruence diagnosis was a requirement for changing one's legal gender marker during our study period (2007–2016), this customized dataset provides a reliable count of the number of transgender individuals obtaining legal gender recognition.[1]

We also use our customized dataset to derive people's assigned sex at birth, which we define as the earliest legal gender marker on record for an individual. Trans women are assigned a male gender marker at birth and subsequently change this marker from male to female (MtF), whereas trans men are assigned a female

[1] By restricting to legal gender marker changes among individuals with a gender incongruence diagnosis, we reduce the risk of capturing administrative errors, particularly among people who immigrate to Sweden. For example, caseworkers may mistakenly record an incorrect gender marker upon someone's arrival in Sweden and later update it to the correct gender marker. Such errors are not reflected in our data.

gender marker at birth and subsequently change this marker from female to male (FtM). Only 10 of 964 people in our sample changed their legal gender marker twice. For simplicity, we exclude second gender marker changes from Figure 1 and maintain our original classifications of people as trans women and trans men based on whether their first legal marker change was MtF or FtM.

To generate Figures 2 and 3, we merge our customized dataset with Sweden's Total Population Register and National Patient Register, constructing a balanced panel of people who changed their legal gender marker between 2007 and 2016. We study people's health care utilization from four years before to four years after their legal gender marker change, and thus, we restrict the sample to people who resided in Sweden each year during this nine-year period. Given inadequate coverage and quality of Sweden's medical data between 1973 and 2003, we further restrict the sample to those who received their first gender incongruence diagnosis in 2004 or later. Finally, we drop a small number of people who received their first diagnosis after the year of their legal gender marker change because our health care data is arguably of uncertain quality for them. Our resulting sample includes 839 people (412 trans women and 427 trans men).[2]

A limitation of the medical data used in Figures 2 and 3 is that we only observe procedures performed within the Swedish health care system. Anecdotal evidence suggests that some transgender people seek gender-affirming surgeries, including sterilization and genital reconstruction, abroad. Consistent with this, 4.4% of trans women and 1.4% of trans men from the 2007–2012 cohorts in our balanced panel lacked a valid sterilization date in our data. However, according to government reports and our conversations with the transgender community, there was no feasible way to obtain legal gender recognition before 2013 without being sterilized. Thus, these missing dates are likely the result of surgeries performed abroad (or misreporting in Swedish medical records) rather than non-compliance with the sterilization requirement.

To accurately reflect the legal framework in place at the time, we impute sterilization dates for the small share of individuals in the 2007–2012 cohorts who lack

[2]All of our results are similar in both sign and magnitude if we include individuals who received their first diagnosis before 2004 or use an unbalanced panel without sample restrictions.

this information. We first calculate the average number of days between sterilization surgery and legal gender marker change, separately by assigned sex and year of change, for individuals with complete records. Then, we subtract this average from the observed date of legal gender marker change for those missing a sterilization date. These imputations imply that our data in Figure 2 reflect perfect compliance with the sterilization requirement, which aligns with our reading of how the National Board of Health and Welfare interpreted and enforced the law.

We note that individuals who transitioned after 2013, when sterilization was no longer a legal requirement, may also have sought sterilizing surgeries abroad. The extent to which this occurs is unknown. Nevertheless, if the number or share of individuals undergoing surgery abroad has remained relatively stable over time, any underestimation of the true sterilization rate in our post-2013 data would be minimal.

1.2 Classification of procedures in the medical records

This section describes the procedural and pharmaceutical codes that we use to define gamete storage, sterilization surgery, gender-affirming chest surgery, and gender-affirming hormone therapy in Swedish medical records. The procedural codes are found in the National Patient Register and classified according to the Swedish Classification of Care Measures (KVÅ). When defining our main outcomes, we use data on procedures performed in either inpatient hospital settings or specialized outpatient care. The pharmaceutical codes are found in the National Prescribed Drug Register and classified according to the Anatomical Therapeutic Chemical (ATC) classification system.

Gamete storage We define gamete storage based on all relevant KVÅ codes for sperm, egg, or embryo preservation. For trans women, the codes AK102, AK103, and DK106 correspond to sperm banking procedures. For trans men, the codes LAA10 and LAA11 indicate egg retrieval, while DL004 corresponds to embryo freezing.

Sterilization surgery We define sterilizing surgeries as follows. First, we use all procedure codes that correspond to surgical removal of the reproductive organs:

KFC10 and KFC15 indicate removal of both testes; LAE21, LAF10, LAF11, and LAF30 indicate removal of both ovaries; LBE00, LBE01, and LBE03 indicate removal of the fallopian tubes; and LCD00, LCD01, LCD04, LCD10, and LCD11 indicate removal of the uterus. Additionally, we consider any procedural code starting with the letter K or L—with the exception of fertility procedures—a sterilizing surgery as long as it is accompanied by a gender incongruence diagnosis.[3] Some of these procedures correspond to gender-affirming bottom surgery (e.g., removal of the penis and vaginal construction), and we consider them a sterilization surgery because they render people physically incapable of reproduction.

Gender-affirming chest surgery We classify any procedure code beginning with the letter H as a gender-affirming chest surgery if it appears alongside a gender incongruence diagnosis. This letter is a general prefix for operations on the mammary glands. We also use specific procedural codes, irrespective of whether they occur alongside a gender incongruence diagnosis. For trans women, we include codes related to breast reconstruction (HAC10, HAC15, HAC20, HAC99, HAD20, HAD30, HAD35, HAD99, and HAE99), and for trans men, we include codes related to breast removal or reduction (HAD00, HAD10, HAD99, HAE00, HAE20, and HAE99).

Gender-affirming hormone therapy To accurately capture cross-sex hormone treatment—i.e., masculinizing therapy for trans men and feminizing therapy for trans women—we use pharmaceutical codes in combination with individuals' sex assigned at birth. For trans men, we define HRT as prescriptions for androgens (ATC code G03B). For trans women, we include prescriptions for estrogens (G03C and L02AA) and progestogens (G03D). In addition, we classify certain hormone suppression medications as gender-affirming hormone therapy, including ATC codes C03DA01, G03H, G03GA, G04CB, H01CA, H01CC, and L02AE.

[3]We consider any diagnostic code beginning with "F64" a gender incongruence diagnosis.

2 Supplementary results

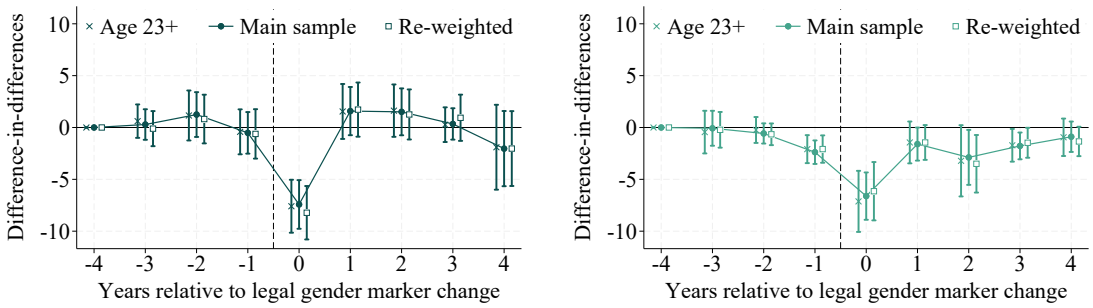
2.1 Tables

Table A1: Descriptive statistics in the year of legal gender recognition for the balanced event study sample

	Trans women (MtF)		Trans men (FtM)	
	2007–2012	2013–2016	2007–2012	2013–2016
Background characteristics:				
Age	36.98	33.01	29.89	26.77
	(13.53)	(12.73)	(8.53)	(7.65)
Age if 23 or older	38.87	35.50	32.65	29.54
	(13.01)	(12.55)	(7.88)	(7.67)
Born in Sweden	86.61%	81.75%	85.71%	87.23%
In a legal union	*	4.91%	*	5.17%
Gender-affirming medical care:				
Years since initial diagnosis	2.57	2.69	2.45	2.85
	(1.56)	(1.94)	(1.18)	(1.83)
Started hormone therapy	∼100%	∼100%	∼100%	∼100%
Had gender-affirming chest surgery	26.77%	16.84%	94.90%	92.40%
Observations	127	285	98	329

Notes: Table A1 provides descriptive statistics for the event study sample used in Figures 2 and 3, i.e., a balanced panel of people who attained legal gender recognition from 2007–2012 or 2013–2016, respectively. We further split the sample into trans women, who changed gender marker from Male to Female (MtF), and trans men, who changed gender marker from Female to Male (FtM). We measure all characteristics in the year of legal gender recognition ($t = 0$ in the figures). A star (*) indicates that the corresponding percentage represents fewer than five individuals. Likewise, the notation ∼100% signifies that fewer than five individuals did not meet the condition. To maintain confidentiality, we suppress the exact numbers.

2.2 Figures



(a) Trans women **(b)** Trans men

Figure A1: Sensitivity analysis for days hospitalized

Note: Figure A1 displays event study estimates from Equation (1) for three samples: (i) restricting to people who were aged 23 or older when changing legal gender marker; (ii) using our main analysis sample; and (iii) using weights to balance the early (2007–2012) and later (2013–2016) transition cohorts in terms of age when changing gender marker. The estimations for all three samples are very similar, which indicates that the reduction in hospital days is not driven by individuals who were below the age requirement for sterilization surgery in the year of their legal change.