The Economics of Egg Freezing

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Abstract

Children and career compete for a woman's time in the same years of her life. Egg freezing loosens the conflict: a woman who freezes eggs while young keeps part of her fecundity for a later birth, although at a high upfront cost per egg-retrieval cycle. I study how access to egg freezing changes fertility and human capital over the life cycle. I add an endogenous choice to freeze eggs to a life-cycle model of women's labor supply and fertility with incomplete markets and a borrowing limit, and discipline it with medical evidence on the biological constraints of human eggs. Access to egg freezing raises fertility by 0.064 children per woman (3.3%) and human capital by 0.85%. The extra births come both from women who become mothers and from mothers having more children. College-educated women drive the fertility gain; less-educated women freeze less, so access widens the welfare gap between the two groups. Between a government-sponsored loan and a subsidy to egg freezing, the loan is the most effective at raising both welfare and fertility.

Keywords: egg freezing, ART, assisted reproduction technology, fertility, human capital, life-cycle.

JEL Codes: D15, E61, I18, J13, J16, J22, J24.

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1 Introduction

Despite recent improvements, children still represent a substantial cost for women's careers and lifetime earnings (Adda, Dustmann and Stevens, 2017; Kleven, Landais and Søgaard, 2019). The cost is high because careers and children compete for the same years: earnings grow fastest in a woman's twenties and early thirties, which is also when she is most fertile. A woman who has children early interrupts her career when her earnings would have grown most; a woman who waits risks having fewer children than she wants. Egg freezing loosens this trade-off. If a woman freezes her eggs while young, she preserves part of her fertility. The technology allows her to store eggs, with the idea of thawing them later and using them through *in vitro fertilization* (IVF). Eggs yield a live birth with a probability that depends positively on how many eggs are thawed and negatively on the age at which they were frozen. A woman can therefore delay a birth, focus on her career, and still conceive later.

Having children later is already what women do: in most developed countries, birth rates have fallen and mothers increasingly have children at older ages.[1] To policymakers worried about low fertility, egg freezing therefore looks like a way to raise births without asking women to have them earlier. Egg freezing is expensive, however: a retrieval cycle costs about $12,800 in the US. Public subsidies to make it affordable are thus spreading worldwide.[2] Yet, little is known about the long-run effects of the widespread adoption of egg freezing, let alone the consequences of subsidizing it.

To fill this gap, I study how access to egg freezing changes women's earnings growth and fertility over the life cycle. I embed the decision to freeze eggs in a partial-equilibrium life-cycle model of women's labor supply and fertility in the spirit of Adda, Dustmann and Stevens (2017) and Jakobsen, Jørgensen and Low (2025). In the model, a woman's earning potential is summarized by her human capital, a reduced-form stock

[1] The total fertility rate fell from 1.9 in 1980 to 1.5 in 2022, and the mean age of mothers at childbirth rose from 26.8 to 30.8 over the same period. Both figures are population-weighted averages across the 21 countries of the Human Fertility Database (2026) with continuous data over 1980–2022.

[2] Especially in low-fertility countries. Examples of subsidized elective egg freezing, that is, not for medical reasons, include France, where national health insurance covers retrieval, but not storage, for women aged 29 to 37 (Assurance Maladie, 2025, 2026); the Italian regions of Apulia (Il Sole 24 Ore, 2025) and Tuscany (Il Post, 2026); the local governments of Seoul, South Korea (Seoul Metropolitan Government, 2024), and Tokyo, Japan (The Japan Times, 2024); and the US Department of Defense, which reimburses up to $10,000 a year to service members facing hazardous duty or long separation from their partners (U.S. Department of Defense, 2026).

of everything an uninterrupted career brings, from skill accumulation to promotions and more flexible work arrangements. It grows with each year she works, fastest early in her life cycle, shrinks while she is out of work, and sets her wage. The medical literature and new price data discipline the egg-freezing choice, so that it reflects the biological and financial constraints a woman faces when she considers freezing her eggs.

I then use the model to measure how fertility, human capital and welfare respond to the price of egg freezing and to different policies. At market prices, about half of college-educated women freeze their eggs and fewer than two in ten less-educated women do, partly because they cannot pay for it upfront. Egg freezing therefore widens the welfare gap between the two groups. Across different budget-neutral policies, a government-sponsored loan for egg-freezing, the likes of a student loan, is the most effective at increasing fertility and welfare of the current generation. A subsidy to egg freezing financed by a proportional tax on labor earnings raises fertility and human capital, but it is less effective at raising welfare than the loan.

I make three contributions. *Empirically*, I assemble two novel datasets on the egg-freezing market. The first harmonizes assisted-reproduction registries of 13 jurisdictions. It documents that egg freezing has spread fast everywhere and is now mostly elective.[3] The second dataset covers 561 US clinics and identifies the mean price at $12,800 per egg-retrieval cycle and $750 per year of storage. A single cycle alone represents about three-quarters of what the median working woman earns at age 20. The women for whom freezing is biologically most effective, the youngest, are the ones least able to pay for it. These prices discipline the cost that the model treats as the barrier to access.

Theoretically, I build on the life-cycle discrete-choice models of female labor supply and fertility and add an endogenous decision to freeze eggs. A woman's chance of conceiving falls with age, and a year of work adds most to her human capital early in her life cycle, as in Guner, Kaygusuz and Ventura (2020). A birth interrupts that accumulation, so an early birth costs her the most valuable years of experience, while a late birth risks not conceiving at all. Egg freezing lets a woman keep part of her

[3] Elective egg freezing is undertaken by a healthy woman to preserve her fertility for later use; medical egg freezing precedes a treatment, such as chemotherapy, that threatens fertility.

younger fertility: for example, eggs frozen at age 30 and used at 40 are as likely to produce a live birth as the eggs of a 30-year-old. She can therefore delay a birth, accumulate more human capital, and still conceive later. This option has a trade-off of its own. She pays for it upfront, at an age when her assets are low and she can borrow little against future earnings. She benefits only if she later wants a child and cannot conceive naturally. Egg freezing is thus an expensive, illiquid and uncertain asset.

I embed this trade-off in the life-cycle model, estimated separately for women with and without a college degree. Each year, a woman chooses how much to consume and save, whether to work full time, part time or not at all, and, if she is still fertile and has a partner, whether to try to conceive. In her fertile years, she can also retrieve and freeze eggs, and between 21 and 50 she can thaw them and try to conceive with her frozen stock.[4] Her wage rises with human capital, which she accumulates on the job, fastest early in her life cycle,[5] and which depreciates while she is out of work. Children bring her utility but cost her childcare and raise her disutility of work, the most while her youngest child is an infant. Partnerships form and dissolve stochastically, and a partner brings extra income and assets. Markets are incomplete and borrowing is limited. Because markets are incomplete, there exists no insurance against risks to her fertility. Egg freezing is a way to decrease the risk of not being able to have a child.[6] Because borrowing against her future earnings is limited, she may be unable to pay for a retrieval cycle early in life, when freezing would be biologically optimal but her spending capacity is lowest.

I discipline the egg-freezing technology with the medical literature and the rest of the model with US survey data. Age at retrieval affects egg freezing in two ways: an older woman retrieves fewer eggs, and each of her eggs is less likely to produce a live birth. I calibrate both margins from the medical literature and I combine them into an effective-egg index, which values each egg at retrieval by its chance of producing a live birth. I estimate the model by the simulated method of moments on the PSID and

[4] Egg freezing not only allows a woman to delay a birth to a better time, but also extends her fertile window beyond biological limits. Clinics accept frozen eggs up to age 50, five years after the typical end of natural fertility, so egg freezing also insures a woman who wants a child late, because she partnered late or chose to wait, against not being able to have one at all.

[5] This framework is a reduced-form way of modeling Ben-Porath's (1967) human-capital accumulation, and it captures the decreasing returns on investment in human capital.

[6] In this sense, egg freezing can be interpreted as a self-protection mechanism *à la* Ehrlich and Becker (1972), given that it decreases the probability of remaining childless.

the CPS. For both college-educated and less-educated women, the model reproduces closely the distribution of children by age, and pins down the steep rise in wages in the first years of the adult life cycle.

Crucially, I estimate the model with the egg-freezing option turned off. The estimated parameters reflect the trade-off between career and fertility without egg freezing, as the data I use still do not contain enough women who use the technology. Every quantification in what follows is therefore a counterfactual: a hypothetical future economy where egg freezing is widely available, well-known and everyone can access it at market prices if it is privately optimal.

Quantitatively, access to egg freezing raises fertility without lowering human capital. In an economy where every woman freezes her eggs whenever it is optimal for her, fertility rises by 0.064 children per woman (3.3%) and human capital by 0.85%, relative to an economy without the technology. The extra births come from both the intensive and the extensive margins: the share of women who reach 50 childless falls from 16.6% to 15.5%, and mothers have more children. The aggregate hides the heterogeneity across education types. College-educated women account for two thirds of the extra births. Less-educated women freeze less, 17% against 51% by age 45, and access is worth 0.12% of lifetime consumption to them, against 2.79% to college women.[7]

I then run two main policy experiments. In the first, a woman pays for egg freezing with a government-sponsored loan: every egg-freezing cost accrues to a balance that compounds at the market rate and is due at retirement, so the government spends nothing in net present value. In the second, the government makes the first retrieval free, financing this egg-freezing subsidy with a proportional tax on labor earnings. Each policy is evaluated against a baseline economy without the technology. The loan is the best of these policies for both welfare and fertility. Against an economy without egg freezing, it raises welfare by 3.48% of lifetime consumption for college women and by 0.72% for less-educated women and it adds 7.5 births per 100 women. Its cost is human capital.[8] At age 50, human capital falls by 0.07%, while a subsidy

[7] The result for college-educated women is consistent with Cruces (2024), who finds that higher returns to experience push college-educated women's births later and that infertility treatments reconcile later births with rising completed fertility.

[8] The fall in human capital comes entirely from less-educated women with a high taste for children. They use the loan to buy what is, in effect, a conventional IVF cycle: nothing in the model requires eggs to stay in storage for a minimum length of time, so a woman can retrieve them in one year and

that makes the first egg retrieval free buys almost as many births, 7.2 per 100 women, and raises human capital by 1.0%. However, once women pay the tax to finance the egg-freezing subsidy, their welfare drops by 0.05% of lifetime consumption relative to egg freezing at the market price.

Roadmap. The rest of the paper proceeds as follows. Section 2 summarizes the related literature. Section 3 documents the decline and postponement of fertility, the diffusion of egg freezing, its prices and its success rates. Section 4 presents the model, Section 5 its calibration and estimation, and Section 6 its fit to the data. Section 7 shows which women freeze their eggs and what access to the technology does to fertility, human capital and welfare. In Section 8 I conduct three policy experiments: varying the price of a cycle, deferring its payment, and comparing a subsidy to egg freezing with a childbirth subsidy of equal fiscal cost; I close with the freezing subsidy a utilitarian government would choose. Section 9 concludes.

2 Related literature

I contribute to three strands of literature. The first strand studies women's labor supply and fertility as joint choices in dynamic models.[9] The studies closest to mine are Adda, Dustmann and Stevens (2017) and Jakobsen, Jørgensen and Low (2025). In both, fecundity falls with age and time out of work erodes a mother's human capital, so a woman trades a later birth against her career. I add the option to freeze eggs, which lets her postpone a birth while keeping part of her fecundity. As in both, she cannot borrow freely against future earnings, so her current resources decide whether she can pay for it. Unlike Jakobsen, Jørgensen and Low (2025), I model women rather than couples, with partnership as a random state, and I abstract from the occupational choice of Adda, Dustmann and Stevens (2017).

The second strand studies the economic effects of assisted-reproduction technologies. In theory, a technology that makes late births possible can encourage

thaw them in the next. These women therefore have their children earlier, accumulate less human capital, and pull down the population average.

[9] A non-exhaustive list of papers in this literature includes Adda, Dustmann and Stevens (2017); Caucutt, Guner and Knowles (2002); Cruces (2024); Eckstein, Keane and Lifshitz (2019); Francesconi (2002); Haan and Wrohlich (2011); Hotz and Miller (1988); Jakobsen, Jørgensen and Low (2025); Keane and Wolpin (2010); Moffitt (1984); Sheran (2007); Wang (2026); Yamaguchi (2019).

postponement and thereby lower fertility (Rainer, Selvaretnam and Ulph, 2011; Rossi, 2026), or act as earnings-risk insurance and raise fertility slightly (Sommer, 2016). In practice, empirical evidence for the US and Israel shows that access to *in vitro* fertilization (IVF) does delay births (Gershoni and Low, 2021a; Machado and Sanz-de-Galdeano, 2015) but barely changes the number of births (Bundorf, Henne and Baker, 2007) or completed fertility (Machado and Sanz-de-Galdeano, 2015). Furthermore, IVF increases investment in human capital (Gershoni and Low, 2021b; Kroeger and La Mattina, 2017). Economists have hardly studied egg freezing itself.[10] To my knowledge, this paper presents the first quantitative model of egg freezing, where choices to freeze and thaw eggs are endogenous and interact with standard economic choices.[11] It lets me evaluate policies for which reduced-form designs have no data to exploit, and derive the effects of egg freezing on fertility and human capital.

The third strand evaluates family policy. Child-related cash transfers raise fertility (Brewer, Ratcliffe and Smith, 2012; Cohen, Dehejia and Romanov, 2013; Laroque and Salanié, 2014; Milligan, 2005), but much of the response is timing rather than completed fertility (Kim, 2014; Parent and Wang, 2007), and short-run responses overstate long-run ones (Adda, Dustmann and Stevens, 2017; Cruces and Rodríguez-Román, 2025). In structural models, childcare subsidies raise married women's labor-force participation (Bick, 2016; Guner, Kaygusuz and Ventura, 2020; Haan and Wrohlich, 2011) while unconditional child credits lower it (Guner, Kaygusuz and Ventura, 2020); subsidized childcare leaves fertility unchanged (Bick, 2016), and longer parental leave barely moves it (Yamaguchi, 2019). Each instrument pays for a birth or for the care of a child already born. A freezing subsidy is different: it pays childless women early, buys an option rather than a birth, and raises births only in the states in which a woman later uses her eggs. At equal fiscal cost, the freezing subsidy raises fertility slightly more than a childbirth subsidy, but it lowers welfare where the childbirth subsidy raises it.

[10] The economic studies of egg freezing I know of are Keller, Ortmann and Chambers (2024), who find in a laboratory experiment that demand for egg freezing is price-inelastic, and Rossi (2026), who shows theoretically that egg freezing can lower completed fertility. His result hinges upon a restricted set of uncalibrated parameters.

[11] Previous clinical decision analyses (Devine et al., 2015; Mesen et al., 2015) compute the cost per live birth of egg freezing for a woman who freezes and tries to conceive at ages fixed by the analyst. In my model she chooses both ages, together with her labor supply, savings and the timing of natural births, so I can measure what the option to freeze is worth to her in consumption-equivalent terms, and how much she delays childbearing because the technology exists.

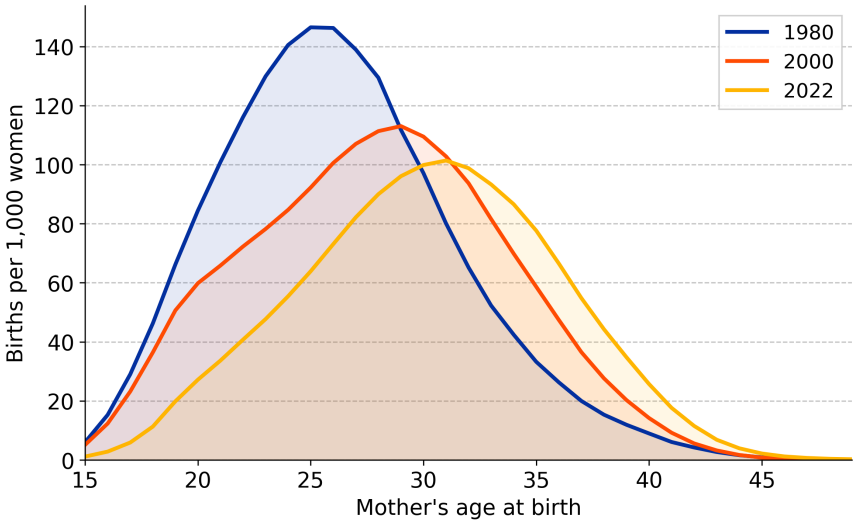


Figure 1: Population-weighted average age-specific fertility rate across 21 HFD countries, 1980–2022

Source: Human Fertility Database (2026). Notes: population-weighted average age-specific fertility rate – births per 1,000 women, ages 15–49 – in 1980, 2000, and 2022 across the 21 countries with data in all three years: Austria, Belgium, Canada, Denmark, Estonia, Finland, France, Iceland, Ireland, Italy, Japan, the Netherlands, Norway, Poland, Portugal, Spain, Sweden, Switzerland, Taiwan, the United Kingdom, and the United States.

3 Institutional and Empirical Background

This section assembles the facts that motivate the model and presents institutional and empirical facts about egg freezing. Four are central: the secular decline and postponement of childbearing; the recent and highly selected diffusion of elective egg freezing; the level and structure of its monetary cost; and the joint dependence of live-birth probability on a woman's age and the number of oocytes she banks.

3.1 Fertility postponement and the child penalty

Across high-income countries the total fertility rate has fallen steadily over the past half-century, in most cases to well below the replacement level (Jones, 2022; Lesthaeghe, 2010). Two distinct margins underlie this decline: women are having fewer children, and they are having them later. The second margin is the one on which this paper turns. Comparing the age-specific fertility schedule across periods, the mass of births has moved out of the early twenties and into the thirties, and the schedule has both fallen and shifted visibly to the right between 1980 and 2022 (Figure 1), so that first births now cluster nearer the upper end of the reproductive span. Looking

at market outcomes, I document that the postponement in childbearing results in a smaller drop in employment and earnings for women who have children later in life (Figure 2).

Several reasons may underlie this postponement.[12] This paper focuses on human capital accumulation (Adda et al., 2017; Gustafsson, 2001; Miller, 2011). Indeed, the first decade of the career, when wages grow fastest, is also a woman's most fertile period, so delaying birth protects the accumulation of human capital and the earnings it generates. But postponement runs against biology. Natural fecundity decreases with age, gradually through the early thirties and then sharply, and the decline is only partially reversible by assisted reproduction (Leridon, 2004). The tension between a rising private return to delay childbearing and a falling biological capacity[13] is the conflict that egg freezing acts upon, and the remainder of the paper is devoted to quantifying it.

3.2 The egg freezing technology and its diffusion

Egg freezing, medically termed "oocyte cryopreservation", is a medical procedure whereby a woman's eggs are extracted, frozen, and stored for potential later use; when the woman chooses to conceive with the frozen gametes, the eggs are thawed, fertilized through IVF, and transferred to the uterus. The whole process can be divided into three stages: retrieval, storage, and thaw-and-IVF. Retrieval is the most taxing stage. It involves a couple of weeks of injections for ovarian stimulation, followed by the surgical retrieval of eggs and the subsequent recovery period. During stimulation, a woman is recommended to avoid strenuous physical activity like sports, and to abstain from alcohol and coffee. This phase thus represents a mentally and physically demanding period. The second phase is storage, during which the eggs remain frozen at the clinic. The third phase is thaw-and-IVF, which involves the thawing of the eggs, fertilization, and embryo transfer to the uterus.

[12] Among the most prominent are the diffusion of modern contraception, which gave women direct control over the timing of births and raised investment in education and careers (Bailey, 2006; Goldin and Katz, 2002); and rising economic uncertainty, which depresses and delays fertility, especially during recessions (Sobotka, Skirbekk and Philipov, 2011). See Doepke, Hannusch, Kindermann and Tertilt (2023) for a recent survey.

[13] See the natural-fecundity schedule, plotted and estimated in Appendix A.5.

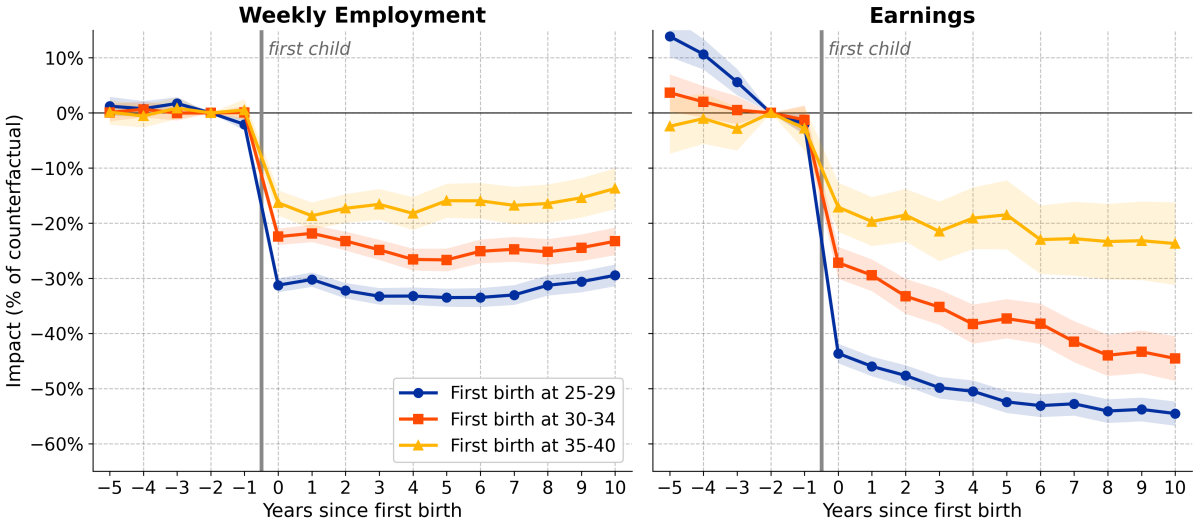


Figure 2: Impact of the first birth on women's weekly employment and earnings, by age at first birth

Source: CPS ASEC 1968–2020 and ACS 2000–2019 (IPUMS), survey-weighted. Notes: pseudo-event studies of the first birth following Kleven (2026), estimated separately for women whose first birth falls at ages 25–29, 30–34 and 35–40. Event time is the age of the eldest own child in the household; mothers are matched to childless women with the same demographics observed up to five survey years earlier, at correspondingly younger ages, who provide the pre-birth periods. Each line is the event-time coefficient as a percentage of the counterfactual outcome, normalized to zero at $\tau = -2$; shaded areas are 95% confidence intervals. For more details on the construction, see Appendix B.2.

Egg freezing has a long-standing *medical* use,[14] but its rapid growth is *elective*, undertaken by healthy women to widen the window in which they can attempt to conceive. The elective market is recent: the technique of vitrification removed the technical barrier of ice-crystal damage in the mid-2000s (Kuwayama et al., 2005), and the American Society for Reproductive Medicine lifted the "experimental" label from oocyte cryopreservation in 2012–13 (ASRM and SART, 2013), after which take-up accelerated across the world.

To document these trends I assemble and harmonize data from assisted-reproduction registries of 13 jurisdictions. To my knowledge no prior work has brought these sources together on a comparable basis. Every country or region with usable registry data shows the same broad pattern: a steep rise in egg-freezing activity over the past decade (Figure 3), even if this shared trend masks considerable heterogeneity in levels. Penetration relative to the female population remains low even at the frontier, so these are young, unsaturated markets. Where the medical/elective breakdown is

[14] Preserving fertility ahead of treatments that damage the gonads and impair fertility, such as chemotherapy and pelvic radiotherapy, which can deplete the ovarian reserve and induce premature ovarian insufficiency.

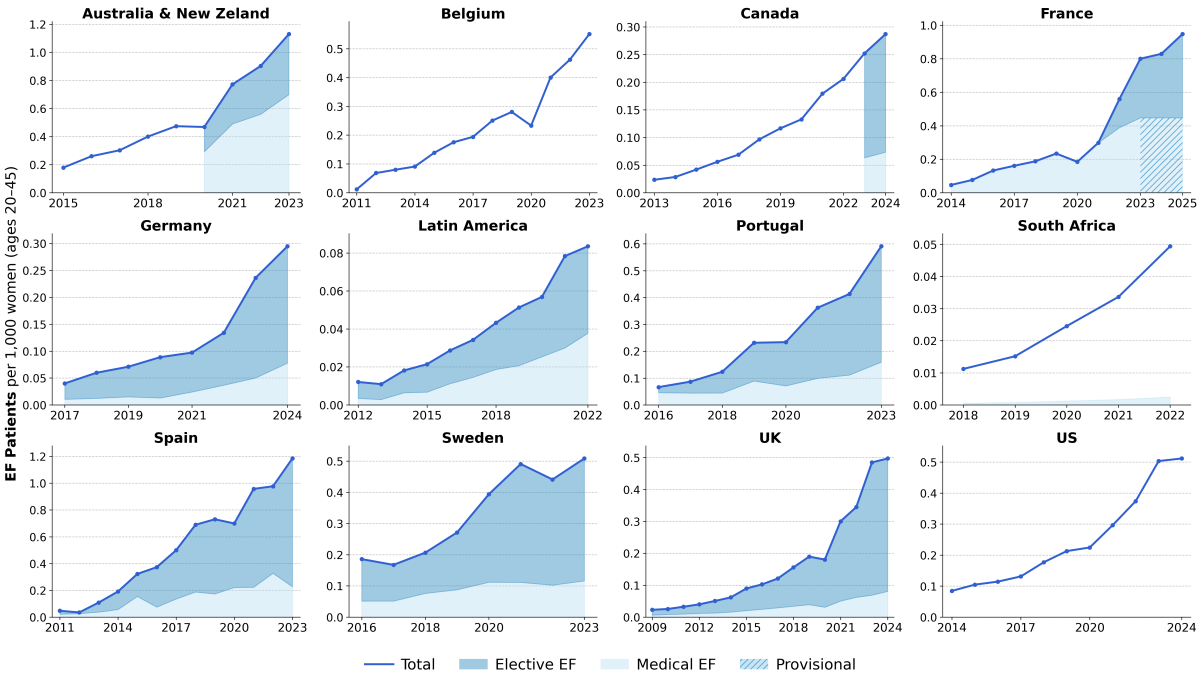


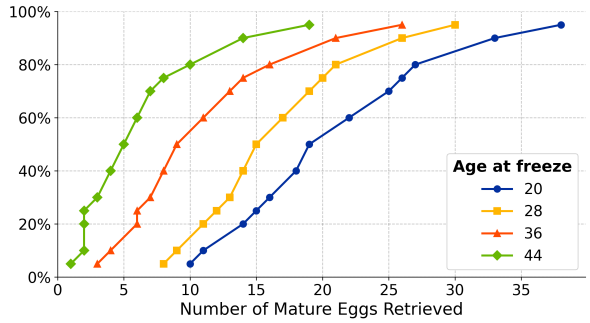
Figure 3: Egg-freezing diffusion across countries

Notes: Egg-freezing patients per 1,000 women aged 20–45, one panel per country. Counts are drawn from national assisted-reproduction registries. Medical and elective indications are shown as shaded areas under each country's total where the breakdown is reported. The registries, their coverage and country-specific coverage caveats are listed in Appendix B.3.

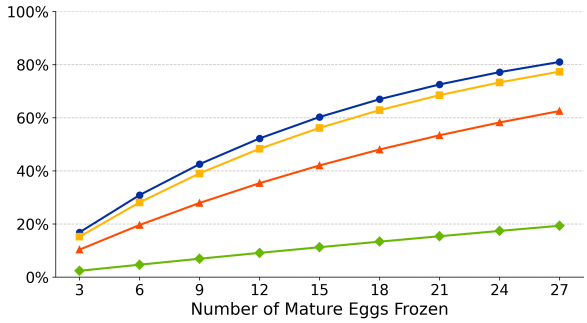
reported, the composition is shifting strongly toward elective use, whose share has risen over time. Take-up is also highly selected on socioeconomic status: women who freeze electively are disproportionately high-education, high-earning women (see Appendix B for the supporting evidence).

3.3 Costs and prices

Egg freezing is expensive, and unless covered by health insurance, its cost falls almost entirely on the woman at the moment of retrieval. For the US, drawing on a novel clinic-level price dataset for 561 US clinics (Appendix B.5), a single retrieval cycle – medication, monitoring, the procedure, and laboratory work – costs on average $12,800. Two further cash flows follow: annual storage of roughly $750 per year for as long as the eggs are held, and a later thaw-and-IVF procedure costing on the order of $10,000 if and when the woman uses the eggs. The cost structure matters for the economics. The large upfront retrieval cost is incurred years, often a decade or more, before any benefit is realized, and the benefit itself is contingent on a future in which the woman both wants a child and has difficulty conceiving naturally. Freezing is



(a) Cumulative probability of retrieving mature eggs, by age



(b) Cumulative live-birth rate, by age and number of eggs frozen

Figure 4: The two biological gradients of egg freezing

Source: Machtinger et al. (2025) and La Marca et al. (2011) (panel a); Cascante et al. (2024) and Doyle et al. (2016) (panel b); Author's elaboration. Notes: Panel (a) plots the cumulative distribution of mature oocytes retrieved in a single cycle by age at retrieval. Panel (b) plots the cumulative live-birth rate as a function of the number of mature eggs frozen. More details on the estimation of these curves are given in Appendix A.

therefore the purchase of an expensive, illiquid, and uncertain option, which makes affordability and the timing of the outlay first-order determinants of who takes it up.

Health insurance rarely offsets this cost. US state mandates cover fertility *preservation* ahead of treatments that impair it, such as chemotherapy, but not elective freezing. The alternative is employer benefits, but coverage reaches only a minority of large firms, 16% of those with 500+ employees in 2022, and is usually capped at a lifetime maximum of about one to one and a half retrieval cycles (Mercer, 2021, 2023). More details are available in Appendix B.6.

Elsewhere elective freezing is likewise paid out of pocket, with the exception of France: since the 2021 bioethics law it reimburses retrieval in full for women aged 29 to 37. A handful of jurisdictions have also introduced partial vouchers that cut the price without removing it; Appendix B.7 documents these and the rest of the international picture.

3.4 The biology of human eggs

The probability of a live birth from thawed eggs depends on two components: how old a woman is when she freezes and how many mature oocytes she banks. The clinical literature lets me summarize both (Cascante et al., 2024). Figure 4 displays the two gradients. The number of mature oocytes a woman can expect to retrieve in a cycle declines sharply with age (Figure 4a): the distribution shifts left as age rises,

with a median near nineteen in the early twenties falling to about five by the mid forties. On the other hand, the cumulative live-birth rate falls with age at freezing and rises with the number of mature eggs banked (Figure 4b): holding the count fixed at twenty-one *frozen* oocytes, the probability of at least one live birth falls from about 69% at age 28 to 53% at age 36 and 15% at age 44, while at any age moving from a handful of eggs to twenty or more raises it sharply—at age 28, from 28% at six frozen oocytes to that same 69% at twenty-one. The two margins compound. The practical implication is that freezing early dominates freezing late on both counts at once, yet early freezing is exactly when the future need is most uncertain and the opportunity cost of the cash outlay highest. The model in Section 4.5 collapses these two clinical gradients into a single "effective-egg" index. An effective egg is a *count*: it is a standard-quality egg carrying a fixed per-egg live-birth probability $\bar{\pi}$, and a woman who retrieves n oocytes at a given age is credited with however many such eggs would reproduce the live-birth probability her own draw implies. Age enters twice (through how many eggs she draws and through what each one is worth in terms of quality) and the index folds both into one number (Appendix A.4).

4 Model

The institutional and empirical background motivates a model in which a woman trades off fertility and earnings growth, and where time out of the labor market costs less at later ages. On the egg-freezing technology, both the financial and the biological constraints need to be modeled faithfully, as they are first-order determinants of whether a woman freezes her eggs and when she does so. This section therefore develops a finite-horizon, partial-equilibrium, life-cycle model of a woman who chooses consumption, savings, labor supply, fertility, and – the novel margin – whether to freeze or use eggs, under stochastic transitions in fertility, partnership, and egg retrieval/survival and an age-declining fecundity schedule.

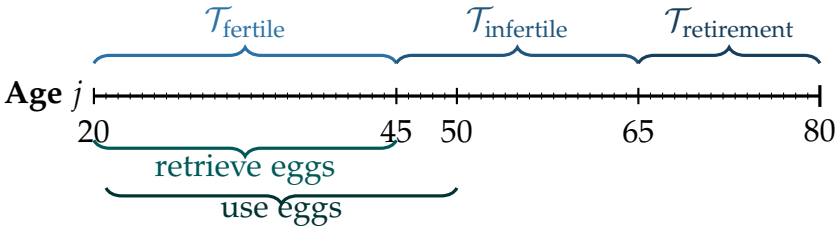


Figure 5: Life-cycle phases and the egg-freezing windows

4.1 Environment and Timing

Time is discrete and a period is one year; j indexes the woman's age. As depicted in Figure 5, women live deterministically from age 20 to the terminal age $J = 80$, i.e. $j \in \{20, \ldots, J\}$, and the life cycle is partitioned into three phases: a *fertile* phase ($j \in \mathcal{T}_{\text{fertile}}$, ages 20–45) in which the woman works and is fertile; an *infertile* phase ($j \in \mathcal{T}_{\text{infertile}}$, ages 46–64) in which she works but is no longer fertile; and *retirement* ($j \in \mathcal{T}_{\text{retirement}}$, age 65 onward), in which the household lives off its savings and leaves a bequest. Overlapping the first two phases there are an *egg retrieval* window (ages 20–45) and an *egg use* window (ages 21–50)[15] during which the egg-freezing technology is available. The gross interest rate R is exogenous and the woman's wage rises with human capital accumulated on the job.

4.2 Heterogeneity and the State Space

Agents are households that represent a single or a partnered woman. They differ along two kinds of dimensions: *permanent types*, fixed at entry and constant over the whole life cycle, and *age-varying states*, which evolve from one age to the next.

Permanent types. Each woman has two permanent types: her education $i \in \{\text{College}, \text{No college}\}$ and her fertility-taste type $\psi \in \{L, H\}$ (Section 4.3).[16] The parametrization of the model is education-specific: parameters and functions that depend on education

[15] Clinical practice typically bars the use of frozen eggs for women above 50.

[16] A third permanent characteristic is present but never enters the woman's problem: an indicator $\iota \sim \text{Bernoulli}(\pi^{\text{inf}})$ for permanent infertility, set at $\pi^{\text{inf}} = 0.05$ following Adda, Dustmann and Stevens (2017). A woman neither knows her own ι nor learns it from unsuccessful attempts, so it appears in neither the state vector nor the value function: she solves exactly the problem of a fertile woman with the same observables, and only the realization of the birth draw differs. See Appendix A.9.

carry the superscript i, which is dropped where no confusion arises. The taste type shifts the value of children and of the disutility of work.

Age-varying states. At the start of age j a woman of types (i, ψ) is described by

$$s_j = \left(a_j,\, h_j,\, n_j,\, o_j,\, \tilde{e}_j,\, \tilde{f}_j\right), \tag{1}$$

with two continuous and four discrete components:

- $a_j \geq \underline{a}_j$ – liquid household assets (continuous), which may be negative down to the age-specific borrowing floor $\underline{a}_j$ (Section 4.6);
- $h_j \geq 0$ – human capital (continuous), which determines the wage (Section 4.4);
- $n_j \in \{0, 1, 2, 3\}$ – number of children *ever born* (discrete, capped at three);
- $o_j \in \{N, B, Y, G\}$ – age bracket of the youngest child: newborn N (age 0), baby B (ages 1–3), young Y (ages 4–13), grown G (age ≥ 14);
- $\tilde{e}_j \in \{0, 1\}$ – partnership status (0: single, 1: in a couple); while partnered the household receives a type- and age-specific partner income flow $\tilde{e}_j\, y^i_j$, assortatively matched by education (Appendix A.7);
- $\tilde{f}_j \in \{0, 5, 10, 15, 20, 25, 30\}$ – discretized stock of *effective* frozen eggs (Appendix A.4).

Their laws of motion are set out below. Human capital and the frozen-egg stock start at 0 for every woman at age 20. The other states are initialized at the model's entry age from their empirical distributions (Section 5); in particular, initial assets a_{20}, which measure household wealth, follow an education-specific distribution $F^i_{a_{20}}$ estimated on the NLSY97.

Choices. At age j the woman chooses consumption c_j, discrete labor supply $\ell_j \in \{0, \mathrm{PT}, \mathrm{FT}\}$, savings a_{j+1}, a binary natural conception effort $e_j \in \{0, 1\}$, and a mutually exclusive egg-freezing action $f_j \in \{0, 1, 2\}$ (no action, retrieve, use), each available only within its admissible age window.

4.3 Preferences

Labor supply is discrete. A woman works full time, part time, or not at all, and hours are measured as a fraction of a full-time year, $\ell_j \in \left\{0,\ \frac{1}{2},\ 1\right\}$. College women cannot work full time at ages 20–22, the years they are typically still enrolled, and they know the restriction in advance.

A woman values consumption, leisure, and children. Let $\tau_j \equiv j - 20$ be her age net of the entry age. Per-period utility follows the form of Jakobsen et al. (2025),

$$u_j^i(c_j, \ell_j, n_j, o_j, \tilde{e}_j, \psi) = \frac{\left(c_j / \nu_j\right)^{1-\sigma}}{1-\sigma} + g^i(\ell_j, j) + q^i(\ell_j, n_j, o_j) + \Omega^i(n_j, j, \psi)\,, \tag{2}$$

and is additively separable in consumption, labor, and children. Consumption enters through a CRRA term deflated by the OECD equivalence scale $\nu_j \equiv \nu(n_j, \tilde{e}_j, o_j)$,

$$\nu(n_j, \tilde{e}_j, o_j) = 1 + 0.5\,\tilde{e}_j + 0.3\,\rho(n_j, o_j), \qquad \rho(n_j, o_j) = \max\Big\{\, n_j\, s(j, o_j),\ \mathbb{I}\big(n_j \geq 1,\ o_j \neq G\big)\,\Big\}, \tag{3}$$

which adds half an adult for a partner and 0.3 for each *dependent* child, $\rho(n_j, o_j)$. The residency share $s(j, o) \in [0, 1]$ is the fraction of children ever born who are still dependants, by the mother's age and the bracket of her youngest child. Section 4.5 explains the role of the residency share, while Appendix A.6 provides the construction details.

The child term Ω^i gives one level per child. The mother's age tilts every level by a common slope, and her taste type shifts it,

$$\Omega^i(n_j, j, \psi) = \sum_{k=1}^{3} \Big[\omega_k^i + \delta_k^i\, \mathbb{I}(\psi = H) + \omega_{\text{age}}^i\big(\tau_j - \bar{\tau}^{\,i}\big)\Big]\mathbb{I}\big(n_j \geq k\big)\,. \tag{4}$$

The levels ω_k are indexed by children ever born, so the value of having had a child does not lapse when the child leaves home.

The term $\omega_{\text{age}}(\tau_j - \bar{\tau})$, the age tilt, lets the value of a child change as the mother grows older. Its slope ω_{age} is the change in the yearly value of each child for each extra year of the mother's age, common to the first, second and third child. The tilt depends on her current age τ_j. Two mothers of the same age and type therefore draw

the same yearly value from their k-th child, whether they had it at 25 or at 35. They differ in the years in between: the woman who waited spent them without the child, and with $\omega_{\text{age}} < 0$ a child is worth more to a mother of 25 than to one of 35.

A negative slope, as I estimate, raises the cost of postponing a birth and moves births earlier. The levels ω_k determine how many children a woman has; the slope sets when she has them. I center the tilt at $\bar{\tau}$, where $20 + \bar{\tau}$ is the PSID mean age at birth in her education group, averaged over first, second and third births (Table 1). The tilt is zero at that age, so ω_k is the yearly value of a k-th child at the age women typically give birth. The taste type shifts each level. Half of women are of the high type, and a high-type woman values her k-th child at $\omega_k + \delta_k$.

Work enters through two terms, a baseline disutility that varies with age and a penalty for working while children are at home,

$$g^i(\ell_j, j) = \mu^i_{\text{PT}}\, \mathbb{I}(\ell_j \neq 0) \left(1 + \mu^i_{\text{PT,age}}\,(\tau_j - \tau_c)\right) + \mu^i_{\text{FT}}\, \mathbb{I}(\ell_j = 1)\,, \tag{5}$$

$$\begin{aligned} q^i(\ell_j, n_j, o_j) = \Big\{ & \mathbb{I}(\ell_j \neq 0)\, \left[\alpha^i_{\text{PT},o_j} + \alpha^i_{\text{PT},more}(n_j - 1)\right] + \\ & \mathbb{I}(\ell_j = 1)\, \left[\alpha^i_{\text{FT},o_j} + \alpha^i_{\text{FT},more}(n_j - 1)\right] \Big\} \mathbb{I}(n_j \geq 1)\,. \end{aligned} \tag{6}$$

The baseline disutilities are estimated negative, $\mu_{\text{PT}}, \mu_{\text{FT}} < 0$. The part-time term, which every worker pays, changes linearly with age about $\tau_c = 12$, so μ_{PT} is its value at age 32; the full-time increment μ_{FT} is a constant premium over part-time work.

The penalty q is additive and measured in utils. Each α is the yearly utility cost a child imposes on work at a given intensity, over and above the baseline g that a childless woman of the same age pays. Two terms stack: a step $\alpha_{\cdot,o_j}$ over three brackets of the youngest child's age (infant, ages 0–3, that is $o \in \{N, B\}$; young; grown), and a slope $\alpha_{\cdot,more}$ in the number of additional children, $n_j - 1$. The penalty vanishes only for childless women. The α's are the model's representation of the time conflict between work and children. They are estimated with the restriction of being non-positive and ordered,

$$\alpha_{\cdot,\text{infant}} \;\leq\; \alpha_{\cdot,\text{young}} \;\leq\; \alpha_{\cdot,\text{grown}} \;\leq\; 0, \qquad \alpha_{\cdot,more} \leq 0, \tag{7}$$

so the burden a child places on work falls as the child grows.

4.4 Human Capital and Wages

Human capital grows only with work and takes a form similar to Guner et al. (2020):

$$h_{j+1} = \max\Big\{ h_j + \underbrace{\exp(-\phi^i \tau_j)}_{\text{age}} \underbrace{d^i(\ell_j)}_{\text{hours}} - \delta_{\text{out}} \mathbb{I}\{\ell_j = 0\} + \xi_{j+1},\ 0 \Big\}, \qquad h_{20} = 0, \quad (8)$$

where

$$\xi_{j+1} \ \sim \ \mathcal{N}\left(0,\ \sigma_\xi^2\right), \qquad \sigma_\xi = \sigma_\eta^i / \gamma_1^i, \quad (9)$$

and σ_η is the standard deviation of the permanent innovation to the log wage, $\gamma_1 \xi_{j+1}$. A year of work accumulates human capital according to the age and the labor supply. At entry a full-time year adds one unit of h, so h counts full-time-equivalent years of experience valued at entry. The accumulation then decays with age at rate ϕ: the same full-time year adds $\exp(-\phi\tau_j)$ units at age j. Women enter with $h_{20} = 0$. This function of human capital accumulation captures in reduced form the seminal insight of Ben-Porath (1967) that in a finite-horizon, life-cycle model, the return to experience falls with age. Furthermore, as I show in Section 6.1, the data support this observation.

The hours term $d^i(\ell_j)$ gives the experience a year of work buys at each intensity,

$$d^i(1) = 1, \qquad d^i\left(\tfrac{1}{2}\right) = \psi_{\text{PT}}^i, \qquad d^i(0) = 0. \quad (10)$$

A full-time year is one unit by construction and ψ_{PT} is the fraction that a part-time year buys. Experience proportional to hours would set $\psi_{\text{PT}} = \frac{1}{2}$; however, following the evidence of Blundell et al. (2016), I set these values so that part-time work costs half the hours and buys about a tenth of the experience. In other words, part-time work is a weak substitute for full-time work in building human capital. The age decay makes the life-cycle wage profile concave. It also determines the age gradient of the cost of an interruption: a year out at age $20 + \tau$ forgoes $\exp(-\phi\tau)$ units, so a late interruption costs less than an early one. Deferring a birth protects a career through that gradient (Section 4.8). Human capital depreciates in years out of work, at a rate δ_{out}. A year out of work therefore costs twice: the forgone deposit $\exp(-\phi\tau_j)$ and the

depreciation δ_{out} (Table 1).

The log wage is linear in human capital,

$$\log w^i(h_j) = \gamma_0^i + \gamma_1^i h_j, \tag{11}$$

I estimate γ_1 and calibrate γ_0 externally. Because $h_{20} = 0$, γ_0 is the mean log wage at labor-market entry, and γ_1 is the return to a full-time year of work at the entry age. Every woman draws the shock ξ_{j+1} every year. Under (11) the log wage is a random walk with innovation $\gamma_1 \xi_{j+1}$ around the experience profile. Two women of the same education type enter with the same human capital and differ in wages only through their histories of work and of ξ.

4.5 Children, Partnership, and Frozen Eggs

Natural fertility. A partnered woman who tries to conceive, $e_j = 1$, succeeds with the age-specific natural fecundity q_j, taken from the medical literature (Appendix A.5). Without a deliberate attempt, because she is single or because she does not try, she still conceives with the smaller unintended probability $q_j \underline{q}^i$, where $\underline{q}^i \in (0,1)$ differs by education. Unintended conception does not require a partner. A postpartum term $s_{pp}(o_j)$ shuts both routes while the youngest child is a newborn,

$$p_j(e_j, \tilde{e}_j, o_j) = s_{pp}(o_j) \times \begin{cases} q_j & e_j = 1,\ \tilde{e}_j = 1 \\ q_j\, \underline{q}^i & \text{otherwise,} \end{cases} \qquad s_{pp}(o_j) = \begin{cases} 0 & o_j = N \\ 1 & o_j \in \{B, Y, G\}. \end{cases} \tag{12}$$

Setting $s_{pp}(N) = 0$ imposes an interpregnancy interval: a woman cannot conceive in the year after a birth.[17] The interval applies to frozen eggs too: a thaw ($f_j = 2$) is unavailable while $o_j = N$. Since retrieval harvests eggs but does not involve starting a pregnancy, it is not restricted.

Births during college. College women at ages 20–22 are the exception. Their births in those years are drawn from the PSID cohort birth schedule of college women. The

[17] This is meant to capture lactational amenorrhea, that is the natural infertility during breastfeeding (Bongaarts, 1978; Kennedy et al., 1989), and the fact that we typically observe interpregnancy intervals longer than a year.

schedule stands in for the fertility cost of being enrolled, a margin the model does not represent. From age 23 the law (12) is in force. As a simplification, the woman does not anticipate the schedule: she solves her problem at 20–22 as if (12) applied, so the schedule moves realized births without entering her expectations.

Children. Let $b_j \sim \text{Bernoulli}\big(p_j(e_j, \tilde{e}_j, o_j)\big)$ indicate the realization of a birth. The number of children is capped at three and evolves as

$$n_{j+1} = \min\{\, n_j + b_j,\ 3 \,\}. \tag{13}$$

The bracket of the youngest child resets to N at a birth and otherwise moves up stochastically through baby, young, and grown,

$$o_{j+1} = \begin{cases} N & \text{if } b_j = 1 \text{ (new birth resets clock)} \\ o_j & \text{w.p. } 1 - \pi_{o_j},\ \text{if } b_j = 0 \\ o_j' & \text{w.p. } \pi_{o_j},\ \text{if } b_j = 0, \end{cases} \qquad \Pi_o = \begin{pmatrix} 0 & 1 & 0 & 0 \\ 0 & 2/3 & 1/3 & 0 \\ 0 & 0 & 9/10 & 1/10 \\ 0 & 0 & 0 & 1 \end{pmatrix}, \tag{14}$$

where the brackets are ordered (N, B, Y, G), o_j' is the next bracket up, and π_{o_j} are the transition probabilities reported in Π_o. The transition probabilities give expected durations of one year as a newborn, three as a baby, and ten as young, so the youngest child enters the grown bracket at age 14 in expectation.

Children leaving home. The equivalence scale (3) charges 0.3 of an adult for each *dependent* child. Since n_j counts children ever born and never falls, the scale would imply that a woman still supports dependent children up to age 80. The residency share $s(j, o_j)$ addresses this issue: it is the fraction of her children who are still dependants, so $n_j\, s(j, o_j)$ is the expected number of dependants she is charged for. It depends both on age and on the age of the youngest child. Conditioning on age alone would penalize exactly the births that egg freezing produces. The population share of children still at home in the forties reflects mostly women who gave birth in their twenties and whose children have left, so a woman who conceives late through

frozen eggs would be charged as though her newborn had grown up. The age of the youngest child separates the two cases: for instance, at 48 the calibrated share is 0.92 when the youngest child is not yet grown and 0.54 when it is. The max in (3) adds a floor: a youngest child under 14 ($o_j \neq G$) is certainly dependent, so the scale charges her for at least one child however low the share has fallen. I calibrate $s(j, o)$ from PSID birth histories (Appendix A.6).

Partnership. Partnership evolves exogenously. A single woman forms a couple with probability $\pi_{j,\text{form}}$, and a partnered woman separates with probability $\pi_{j,\text{dissolve}}(n_j)$,

$$\begin{aligned} \Pr\big(\tilde{e}_{j+1} = 1 \mid \tilde{e}_j = 0\big) &= \pi_{j,\text{form}}, \\ \Pr\big(\tilde{e}_{j+1} = 0 \mid \tilde{e}_j = 1,\, n_j\big) = \pi_{j,\text{dissolve}}(n_j) &= \begin{cases} \pi^{0}_{j,\text{dissolve}} & n_j = 0, \\ \pi^{+}_{j,\text{dissolve}} & n_j \geq 1. \end{cases} \end{aligned} \tag{15}$$

Dissolution depends on whether she has any children, and $\pi^{+}_{j,\text{dissolve}} < \pi^{0}_{j,\text{dissolve}}$: children stabilize a partnership but do not lock it in. Both probabilities vary with age, and I calibrate them on the NLSY97 separately for each education group. Past the last age the NLSY97 covers, each hazard declines linearly to zero at 80 (Appendix A.8).

Assets are re-pooled at every partnership transition. They double when a couple forms ($\tilde{e}_j = 0 \to \tilde{e}_{j+1} = 1$) and, following Voena (2015), halve when it dissolves ($\tilde{e}_j = 1 \to \tilde{e}_{j+1} = 0$), as if the partner brought, and later took away, an equal share of household wealth. The rescaling applies to the whole balance, debt included: a woman who partners while in debt doubles it, and one who separates leaves with half of the couple's. The rescaled balance is then clipped below at the floor $\underline{a}_j$.

Egg freezing. The egg action $f_j \in \{0, 1, 2\}$ is the margin the model adds, and its three values are mutually exclusive. With no action ($f_j = 0$) the stock of frozen eggs stays constant, and the woman pays for storage whenever $\tilde{f}_j > 0$, up to age 50. Retrieval ($f_j = 1$), available up to age 45, draws a random number of effective eggs $\tilde{f}_{\text{new}} \in \{0, 5, 10, 15, 20, 25, 30\}$, with a distribution that worsens with her age at retrieval (Section 3.4). Use ($f_j = 2$) is available from 21 to 50[18] and requires $\tilde{f}_j > 0$. It thaws stored eggs, measured in effective units, and yields a live birth the following year with

[18] Fertility clinics typically refuse to transfer frozen eggs to women over 50.

probability $\pi_{egg} = 10\%$ per effective egg.[19] Both actions close once the woman reaches the parity cap $n_j = 3$, and retrieval closes once the stock reaches the top of the grid.

As in clinical practice, eggs are thawed in batches of 10, or fewer in the last batch. The thaw stops at the first batch that produces a live birth:[20] every batch thawed up to that one is consumed, and the rest stays in storage. If all batches fail the stock is exhausted, so a thaw ends either in a birth or with no eggs left. The thaw-and-IVF fee in $\mathcal{C}^{EF}$ is charged once per thaw, not once per batch, so a birth costs less for a woman who holds a large stock.

A partnered woman may try both routes in the same year, choosing $e_j = 1$ and $f_j = 2$. The natural attempt comes first. If it succeeds, with probability $p_j(1, 1, o_j) = s_{pp}(o_j)\, q_j$, she skips the thaw: her eggs stay in storage, $\tilde{f}_{j+1} = \tilde{f}_j$, and she does not pay the thaw-and-IVF fee. If it fails, the thaw goes ahead batch by batch. In any year in which she thaws a positive stock, the thaw takes the place of the birth draw in (12) and the unintended rate $q_j \underline{q}^i$ does not apply.

A thaw does not need a partner, so a single woman can conceive with her own frozen eggs and donor sperm, at the price of a standard thaw plus the vial c_D in (18). Success depends only on the effective-egg stock, so a partnered and a single woman who hold the same $\tilde{f}_j$ face identical odds. A single woman cannot exert natural effort, so for her the thaw always runs, and it is her only deliberate route to a birth. The frozen-egg stock evolves as

$$\tilde{f}_{j+1} = \min\Big\{ \tilde{f}_j + \tilde{f}_{\text{new}}\, \mathbb{I}(f_j = 1) - \tilde{f}_{\text{use}}\, \mathbb{I}(f_j = 2,\ \tilde{f}_j > 0)\,,\ \bar{f} \Big\}, \tag{16}$$

where $\bar{f} = 30$ is the top of the effective-egg grid, $\tilde{f}_{\text{new}}$ is the number of effective eggs a retrieval adds, and $\tilde{f}_{\text{use}}$ is the number a thaw consumes; the clinical literature disciplines both. Freezing buys a stock at the egg quality of the woman's *current* age, and the stock later converts into a birth probability through the effective-egg index. Freezing breaks the link between the age at conception and the age of the eggs.

The effective-egg index makes eggs banked at 25 and at 38 the same commodity once expressed in effective units, and the stock is their sum. The woman carries one

[19] The implied live-birth probabilities are 0% for 0 effective eggs, 41% for 5, 65% for 10, 79% for 15, 88% for 20, 93% for 25, and 96% for 30: the probability of at least one success among n_{eggs} banked eggs, $1 - (1 - \pi_{egg})^{n_{eggs}}$.

[20] The model assumes away miscarriages.

number, $\tilde{f}_j$, instead of a vector of vintages, and her age at freezing never enters the state. Without the conversion, a model with repeated retrieval would have to track how many eggs she banked at each age, and the state space would grow exponentially.

4.6 Budget, Childcare, and Transfers

Assets evolve through the budget constraint,

$$\begin{aligned} c_j + a_{j+1} + \mathcal{C}^{EF}(f_j, \tilde{f}_j) + \kappa(n_j, o_j, \ell_j) = R\, a_j + \big(1 - \delta_R\, \mathbb{I}(f_j = 1)\big)\, w^i(h_j)\, \ell_j + \tilde{e}_j\, y_j^i \\ + \mathcal{T}_j^i\big(h_j, \ell_j, n_j, o_j, \tilde{e}_j\big)\,, \qquad a_{j+1} \geq \underline{a}_{j+1}^i, \end{aligned} \tag{17}$$

where the woman's wage $w^i(h_j)$ follows (11); δ_R is the time cost of a retrieval cycle, in forgone earnings; $\kappa(n_j, o_j, \ell_j)$ is the childcare bill; $\tilde{e}_j\, y_j^i$ is partner income; $\mathcal{T}_j^i$ is a means-tested government transfer (Appendix A.11); and $a_{j+1} \geq \underline{a}_{j+1}^i$ is the borrowing floor. The egg-freezing outlays are

$$\mathcal{C}^{EF}(f_j, \tilde{f}_j) = c_R\, \mathbb{I}(f_j = 1) + c_S\, \mathbb{I}(f_j = 0,\ \tilde{f}_j > 0) + \big[c_{IVF} + (1 - \tilde{e}_j)\, c_D\big]\, \mathbb{I}(f_j = 2)\,. \tag{18}$$

A retrieval cycle costs $c_R = \$12{,}800$, storage $c_S = \$750$ a year whatever the number of eggs held, and a thaw with transfer $c_{IVF} = \$10{,}000$ (Section 3.3). A single woman who thaws also buys donor sperm, $c_D = \$2{,}000$, about the list price of a bank vial with shipping. Storage is billed only while the eggs can still be used: past age 50 the stock is worthless and she discards it.

The borrowing floor. Savings cannot fall below a floor $\underline{a}_{j+1}^i$ that depends on age and education. Indexed by the age at which the assets are held, the floor tracks the NLSY97 tenth percentile of net financial wealth. Entry assets are net financial wealth at age 20. About 40% of college women and 45% of no-college women enter with negative net financial wealth.

Retrieval must be financed out of her own resources. A woman pays for a retrieval cycle out of her *own* resources,

$$\mathcal{C}^{EF}(1, \tilde{f}_j) \;\leq\; \vartheta(\tilde{e}_j)\, \Big[a_j - \kappa(n_j, o_j, \ell_j) + \max\{0,\, -\underline{a}_{j+1}^i\}\Big] + (1 - \delta_R) w^i(h_j)\, \ell_j. \tag{19}$$

Her own earnings, net of the time cost, count in full. What the household holds or owes jointly counts at her share ϑ: the assets, the childcare bill, and the room to borrow down to next year's floor, which is a household floor. A single woman's share is $\vartheta(0) = 1$ and a partnered woman's is $\vartheta(1) = \frac{1}{2}$, the share she leaves with if the couple splits. Partner income does not count. Retrieval is thus the one purchase the couple does not make jointly. The bill is net of any subsidy.

The time cost of a cycle. As described in Section 3.2, the stimulation phase and the retrieval of eggs are a taxing phase: fourteen days of injections, several early-morning monitoring visits, the surgical retrieval itself under sedation, and a few days of recovery. Setting $\delta_R = 4/52 \approx 0.077$ prices the disruption as forgone earnings, so a woman who retrieves collects a fraction $1 - \delta_R$ of her yearly wage bill. Unlike the cash outlays in $\mathcal{C}^{EF}$, the time cost scales with the wage, so it bites hardest on the full-time, high-h women for whom the retrieval price matters least, and it is zero for a woman who does not work. Appendix A.10 gives the details.

Childcare. Following Jakobsen et al. (2025) and Adda et al. (2017), the youngest child is the one who drives the childcare bill, which is proportional to hours and has sibling economies of scale,

$$\kappa\big(n_j, o_j, \ell_j\big) = \kappa(o_j)\,\sqrt{n_j}\,\ell_j, \qquad \kappa(o_j) = \begin{cases} \kappa_B & o_j \in \{N, B\} \\ \kappa_Y & o_j = Y \\ 0 & o_j = G. \end{cases} \tag{20}$$

A woman who does not work pays nothing. A full-time worker ($\ell_j = 1$) with n_j children pays $\kappa(o_j)\sqrt{n_j}$, so $\kappa(o_j)$ is the annual full-time bill of a one-child household.

4.7 Recursive Formulation

For a woman of education i and fertility taste type ψ, the value of entering age j in state s_j (1) is

$$V_j(s_j) = \max_{\{c_j, \ell_j, a_{j+1}, e_j, f_j\}} \Big\{ u_j^i(c_j, \ell_j, n_j, o_j, \tilde{e}_j, \psi) + \beta\, \mathbb{E}\big[V_{j+1}(s_{j+1}) \mid s_j\big] \Big\}, \tag{21}$$

with $\ell_j \in \{0, \text{PT}, \text{FT}\}$, $e_j \in \{0, 1\}$, and $f_j \in \{0, 1, 2\}$. The maximization is subject to the budget (17) and its borrowing floor, the human-capital law (8), and the transitions of children, partnership, and frozen eggs (12)–(16). The expectation is over the year's shocks.[21] Life ends with a warm-glow bequest in the spirit of De Nardi and Yang (2014),[22]

$$V_{J+1}(a_{J+1}) = \kappa_0 \left(1 + a_{J+1}/\kappa_1\right)^{1-\sigma}. \tag{22}$$

4.8 Three Mechanisms

Three mechanisms drive the results. The first runs through the *labor market*. Human capital grows only with work (8), and the deposit a year of work earns decays with age at rate ϕ. A year out forgoes $\exp(-\phi\tau)$ units on top of the depreciation δ_{out}, so an interruption costs most when taken early. The child-labor disutility q (6) is largest when children are young, so a birth pulls a woman out of work or pushes her into part time. Freezing lets her move births to a flatter part of the wage profile and protect her human capital.

The second is *option value*. A woman does not know whether she will have a partner (15), and her fecundity declines with age (12). Freezing (16) buys an option: it fixes egg quality at today's age and pays off only if she later wants a child and cannot conceive naturally.

The third runs through *partnership risk*. A deliberate natural conception requires a partner (12), and a single woman faces only the small unintended probability; a thaw requires no partner. Freezing therefore loosens the tie between the timing of births and the arrival of a partner.

[21] Each discrete margin, labor ℓ_j, the egg action f_j, and fertility effort e_j, carries additively separable, choice-specific Type-I extreme-value taste shocks $\varepsilon_j(\ell_j, f_j, e_j)$, with scales $\sigma_{\varepsilon,\text{labor}}$, $\sigma_{\varepsilon,\text{freeze}}$, and $\sigma_{\varepsilon,\text{birth}}$. The woman observes the shocks before she chooses, but because they are additively separable, consumption and savings can be optimized for each discrete alternative first; the max in (21) is then an expected maximum over the discrete alternatives. I compute it by nested logit aggregation (labor innermost, then the egg action, then fertility effort) with the discrete–continuous endogenous grid method of Iskhakov, Jørgensen, Rust and Schjerning (2017). I estimate the labor and birth scales and pin $\sigma_{\varepsilon,\text{freeze}}$ externally at 10^{-2}, so the freezing nest is close to a hard max.

[22] The first dollar bequeathed has a bounded marginal value, $\kappa_0(1-\sigma)/\kappa_1$, while the marginal utility of consumption is unbounded as consumption falls. Poor women therefore leave nothing, and richer women leave a share of their wealth that rises with wealth: bequests are a luxury good. $|\kappa_0|$ scales the strength of the motive; κ_1 governs how much of a luxury bequests are.

5 Data, Calibration, and Estimation

5.1 Data Sources and Sample

The model is estimated separately for two labor-productivity types, *college* and *no college*, so that most moments below are computed within education group. Each data source plays a circumscribed role: the micro-panels behind the labor, earnings, and fertility targets are described here, while the egg-freezing technology—costs, retrieval yields, and live-birth rates—is taken from the clinical literature and the price data documented in Section 3.

Labor supply and earnings. The life-cycle profiles of labor supply and wages are built from the Panel Study of Income Dynamics (PSID), pooling the biennial waves 1999–2023. The sample is women observed between ages 20 and 65; the college type is defined by ever completing at least a four-year degree, and all cells are weighted by the PSID longitudinal individual weight. Women are assigned to the discrete labor grid—non-work, part-time, full-time—on *usual weekly* hours, with cut-points at 8 and 35 hours: below 8 h/week counts as non-work, 8 to 34 as part-time, and 35 or above as full-time.[23] Part-time women work on average half the annual hours of full-time women, so $\ell_{\mathrm{PT}} = 0.5$. The wage is the reported hourly wage times full-time annual hours, in \$10,000 units to match the model's numéraire, so $w\,\ell$ is annual real earnings. The PSID supplies eight labor moments, the part- and full-time shares at ages 25–40 of mothers of one, two or more, and three or more children and of mothers of one child at 28–32, and six wage moments: the mean log wage of working women at 30 and 45, its slopes over 22–28 and 28–35, the within-age slope of the log wage on experience at 28–32, and the standard deviation of the log wage of working women at 30.

Labor supply around childbirth. The child-labor disutilities α are identified by how mothers' hours respond to a young child, relative to women without children. The targets are the part- and full-time shares of women aged 25–40 in four groups: childless women, and mothers whose youngest child is an infant (ages 0–3), young (4–13), or grown (14–17 and still at home; the model's grown bracket has no upper

[23] The 35-hour cut is the BLS full-time recode, which keeps the PSID classification comparable to the CPS-June shares used below.

age). These shares come from the June Fertility Supplement of the Current Population Survey, pooled over the 2020, 2022, and 2024 waves, and are the only labor moments not taken from the PSID. The CPS records status in a *reference week*, so a mother on parental leave after a birth is coded as non-work ($\ell = 0$). The PSID asks instead for average weekly hours worked *last year*, which mixes leave weeks with worked weeks and cannot isolate the state the infant bracket is meant to measure.

Fertility quantities and timing. Fertility moments are taken from the cumulative children distribution $P(n_a \geq k)$, $k = 1, 2, 3$, by single year of age, built on the PSID birth histories for the 1960–1978 birth cohorts observed to age 45. From it come the twelve cumulative shares $P(n \geq k)$ at ages 25, 30, 35 and 45; the mean and the variance of the age at first birth; and three first-birth hazards, over ages 21–23, 24–26 and 27–29. The mean age at birth, averaged over first, second and third births, anchors the age tilt of (4) (Table 1). I also report two untargeted moments of birth spacing, the mean gaps between the first and second and between the second and third births.

Duration-progression gaps. Two more moments identify the taste type of (4). Among women with k children at age 30, they compare the chance of going on to have $k+1$ children by 45 between those who reached k by 25 and those who were at $k-1$ children at 25, so that women with two births between 25 and 30 are in neither group,

$$\begin{aligned} D_k = {} & P(n_{45} \geq k+1 \mid n_{30} = k,\ n_{25} = k) \\ & - P(n_{45} \geq k+1 \mid n_{30} = k,\ n_{25} = k-1)\,, \qquad k = 1, 2. \end{aligned} \tag{23}$$

Partnership, assets, and childcare. Partner income is matched assortatively by education type. It is a time-varying flow that mimics the median earnings, zeros included, of a woman's partner, by the woman's age. It is described in Appendix A.7. Partnership formation and dissolution hazards, the partnered share at the model's entry age, the distribution of assets at that age, and the childcare-cost parameters are calibrated from the NLSY97.[24]

[24] The NLSY97 is used because it observes cohabitation, which the PSID largely cannot. On marriage, which both surveys measure the same way, they agree: restricted to the NLSY97 1980–84 birth cohorts, the married-at-20 share is 0.107 in the PSID marriage history against 0.104 in the NLSY97.

5.2 Externally Calibrated Parameters

A first group of parameters is fixed from outside sources, either because it is standard in the life-cycle literature or because it is pinned down by data or biology. Table 1 collects them.

Wages and human capital. Four wage and human-capital parameters are set outside the model. The intercept γ_0 of (11) is the mean log wage at age 20 in the cohort-adjusted PSID profile; since every woman enters with $h_{20} = 0$, it fixes the wage at entry. The observed log wage carries a transitory component with standard deviation σ_ν, set to the PSID standard deviation of log wages at 25. It enters only the simulated dispersion of log wages; the permanent shock σ_η is estimated (Section 5.3). The out-of-work depreciation $\delta_{\text{out}} = 0.10$ sets the human-capital cost of a year out of work. The part-time experience share ψ_{PT} of (10) comes from Table VIII of Blundell et al. (2016): 0.116 for college women (their university group) and 0.096 for no-college women (their high-school group).

Children leaving the household. The residency share $s(j, o)$ of (3) turns children ever born into children still supported, so that $n_j\, s(j, o_j)$ is the expected number of dependants a woman is charged for. It is calibrated outside the model on the PSID childbirth histories.[25]

Biology of fertility and egg freezing. The three biological objects are taken directly from the medical literature and enter the model as fixed schedules. The natural-fecundity schedule q_j is the age-specific probability that a partnered woman who tries has a conception ending in a live birth within a year. It is a cubic fit to anchors from the demographic and medical literature, estimated in Appendix A.5. The distribution of mature oocytes retrieved in a cycle and the per-egg contribution to the cumulative live-birth probability come from the clinical data of Section 3.4: retrieval yields from Machtinger et al. (2025) and La Marca et al. (2011) (Appendix A.1). The per-egg live-birth mapping is obtained from Cascante et al. (2024) and Doyle et al. (2016) (Appendix A.2). These together define the "effective-egg" index used in the egg

[25] Details in Appendix A.6.

Table 1: Externally calibrated parameters

Symbol	Description	Value: No college	Value: College	Source
Preferences and the budget (2), (17)				
β	Discount factor	0.96		De Nardi and Yang (2014)
R	Gross interest rate	1.03		Jakobsen et al. (2025)
σ	Risk aversion (1/IES)	2.0		Adda et al. (2017)
κ_0	Bequest scale	−10.6		De Nardi and Yang (2014)
κ_1	Bequest shifter	16.5		De Nardi and Yang (2014)
$\underline{a}_j$	Borrowing floor	Section 4.6		NLSY97 p10 net financial wealth[a]
Labor, wages, and childcare (11), (20)				
γ_0	Log-wage intercept	0.886	0.768	PSID entry wage[b]
ψ_{PT}	Part-time experience share	0.096	0.116	Blundell et al. (2016)
δ_{out}	HC depreciation, out of work	0.100	0.100	No-college wage slope, 45–60
σ_ν	Transitory log-wage component, s.d.	0.555	0.563	PSID s.d. of log wage, age 25
ℓ_{PT}	Part-time hours level	0.500		PSID annual hours/2,024.5
$\bar{H}$	Full-time hours ($\ell = 1$)	2,024.5		PSID, weighted mean, FT class
κ_B	Childcare cost, infant (0–3)	\$10,743		NLSY97, annual FT 2025 USD
κ_Y	Childcare cost, young	\$8,845		NLSY97, annual FT 2025 USD
Fertility and partnership (12), (15)				
q_j	Natural fecundity	Figure 17		Leridon (2004), Adda et al. (2017)
q^i	Unintended-conception multiplier	0.0610	0.0380	Ejrnæs and Jørgensen (2020)
π^{inf}	Permanently infertile share	0.05		Adda et al. (2017) (Appendix A.9)
$\pi_{j,\text{form}}$	Partnership formation hazard	Figure 16		NLSY97 transitions
$\pi_{j,\text{dissolve}}(n)$	Dissolution hazard, by # of children	Figure 16		NLSY97 transitions
y^i_j	Partner income	Figure 15		PSID couples, cubic in age
$s(j,o)$	Child residency share	Figure 14		PSID childbirth histories
$20 + \bar{\tau}$	Mean age at birth	25.8	29.5	PSID cohort parity CDF[c]
Egg-freezing technology (16)				
$\tilde{f}_{\text{new}}$	Egg retrieval yield	Figure 4a		Machtinger et al. (2025), La Marca et al. (2011)
π_{egg}	Live birth per thawed egg	Figure 4b		Cascante et al. (2024), Doyle et al. (2016)
$\tilde{f}_{\text{use}}$	Thaw batch size	10 eggs		Clinical practice
$\mathcal{C}^{EF}(f, \tilde{f})$	Freezing cost schedule	2025 USD		Clinic prices (Section 3.3)
c_D	Donor sperm, single woman's thaw	\$2,000		US sperm-bank list prices
δ_R	Time cost of a retrieval cycle	4/52		Section 4.6

[a] Linear in age between knots: −\$60,000 at 20, the education-specific NLSY97 tenth percentile of net financial wealth at 30, 35 and 40, and \$0 at 65. See Section 4.6.
[b] Since $h_{20} = 0$, (11) makes γ_0 the mean log wage at labor-market entry by identity, so it is read directly off the age-20 cell of the cohort-adjusted PSID wage profile. In the budget, w is annual earnings at full time ($\ell = 1$) in units of \$10,000, so γ_0 is the PSID mean log hourly wage (real 2025 dollars) plus $\log(2{,}024.5/10{,}000) = -1.597$, which converts an hourly wage into full-time annual earnings. The shift moves only γ_0.
[c] Mean of the ages at the first, second and third births, each weighted by the share of women who reach it by 45, on the PSID 1960–1978 birth cohorts. It anchors the age tilt in (4).
Notes. Parameters with a single centered value are common to both education types.

state. Finally, the egg-freezing cost schedule $\mathcal{C}^{EF}(f_j, \tilde{f}_j)$ (retrieval, annual storage, and thaw-and-IVF), is fixed at the 2025-dollar values documented in Section 3.3.

5.3 Internally Estimated Parameters

The remaining 23 parameters govern how women value children, how costly work is, and what experience is worth. I estimate them by the simulated method of moments (SMM), separately for each education type and with the egg-freezing technology switched off. Let θ collect them, let $m(\theta)$ be the vector of the $K = 41$ moments of Section 5.1 simulated at θ, and let $\hat{m}$ be their data counterparts. The estimator solves

$$\hat{\theta} = \arg\min_{\theta} \; \tfrac{1}{2} \sum_{k=1}^{K} \left(\frac{m_k(\theta) - \hat{m}_k}{\hat{s}_k} \right)^2 . \tag{24}$$

Each moment is divided by its standard error, $\hat{s}_k$. The standard errors come from bootstraps that resample women in the PSID and households in the CPS. I minimize (24) with CMA-ES (Hansen and Ostermeier, 2001), a derivative-free global search that copes with the kinks the discrete labor and fertility choices put into the objective, and polish the result with the Nelder–Mead simplex (Nelder and Mead, 1965).

What is estimated. The 23 parameters fall into five blocks. *(i) Preferences over children*: the per-child levels ω_k and the taste-type shifts δ_k, $k = 1, 2, 3$, and the common age tilt ω_{age} of (4). *(ii) Labor disutility*: the part- and full-time levels $\mu_{\text{PT}}, \mu_{\text{FT}}$ and the part-time age slope $\mu_{\text{PT,age}}$ of (5). *(iii) Child-presence penalties*: for each work intensity, the penalty $\alpha_{\cdot,\text{grown}}$ when the youngest child is grown, two non-positive increments for a young and an infant youngest child, and the per-additional-child term $\alpha_{\cdot,\text{more}}$ of (6); the increments impose (7). *(iv) The wage*: the return to experience γ_1 of (11), the decay rate ϕ of (8), and the standard deviation σ_η of the permanent wage innovation of (9). *(v) Taste-shock scales*: $\sigma_{\varepsilon,\text{birth}}$ and $\sigma_{\varepsilon,\text{labor}}$, which set how much of the variation in timing and hours is idiosyncratic. I fix the third scale, $\sigma_{\varepsilon,\text{freeze}}$, at 10^{-2}.

Estimation without egg freezing. Inside the SMM loop, both the solution and the simulation restrict f_j to 0 at every age and start every woman with $\tilde{f}_{20} = 0$. The estimate $\hat{\theta}$ is therefore the parameter vector of a model without the technology, and I hold it fixed when I switch freezing back on. The PSID fertility cohorts behind the moments, born 1960–1978, were mostly past their early thirties when elective freezing

Table 2: Internally estimated parameters

Symbol	Description	Estimate	
		No college	College
Child utility (4)			
ω_1	First child	−0.03	−0.27
ω_2	Second child	0.26	0.24
ω_3	Third child	0.05	−0.31
ω_{age}	Age tilt, every child	−0.0099	−0.0144
δ_1	High-taste shift, first child	0.00	0.55
δ_2	High-taste shift, second child	0.20	0.51
δ_3	High-taste shift, third child	0.17	0.46
Baseline labor disutility (5)			
μ_{PT}	Part-time level	−0.250	−0.095
μ_{FT}	Full-time level	−0.010	−0.011
$\mu_{\text{PT,age}}$	PT age slope	−0.0145	−0.0175
Child-presence penalties (6)			
$\alpha_{\text{PT,infant}}$	PT, youngest 0–3	−0.0701	−0.0155
$\alpha_{\text{FT,infant}}$	FT, youngest 0–3	−0.0517	−0.0393
$\alpha_{\text{PT,young}}$	PT, young	−0.0024	−0.0108
$\alpha_{\text{FT,young}}$	FT, young	−0.0231	−0.0039
$\alpha_{\text{PT,grown}}$	PT, youngest grown	−0.0008	−0.0107
$\alpha_{\text{FT,grown}}$	FT, youngest grown	−0.0104	−0.0039
$\alpha_{\text{PT,more}}$	PT, per extra child	−0.0035	−0.0038
$\alpha_{\text{FT,more}}$	FT, per extra child	−0.0155	−0.0129
Wage (11), (8)			
γ_1	Return to experience	0.092	0.258
ϕ	HC deposit decay rate	0.087	0.143
σ_η	Permanent log-wage innovation, s.d.	0.020	0.093
Taste-shock scales			
$\sigma_{\varepsilon,\text{birth}}$	Fertility shock scale	0.98	2.70
$\sigma_{\varepsilon,\text{labor}}$	Labor shock scale	0.144	0.057

Notes. Estimates from the joint SMM run of (24), one column per education type, minimizing the distance (24) between the 41 simulated and empirical moments of Section 5.1. The no-college σ_η sits at the lower bound of its search box, 0.02.

began to spread (Section 3.2). The CPS labor shares are measured in 2020–2024 on women born 1980–1999, who could freeze, but elective take-up among them is still small, so their behavior is largely that of women who did not use the option. The model with freezing is then a counterfactual: the technology is available and known, while preferences and constraints stay as they are in the economy without it.

5.4 Identification

I estimate the twenty-three parameters of Table 2 jointly on the 41 moments of Section 5.1. Each block of moments shifts a distinct feature of the life-cycle profiles. The list below names the moments most informative about each block.

1. *Wages* $\rightarrow (\gamma_1, \phi, \sigma_\eta)$. The return to experience γ_1 is read off the within-age slope of the log wage on measured experience at ages 28–32: a regression with age fixed effects among working women, where experience counts full-time-equivalent years worked. The decay rate ϕ then shapes the mean wage profile, measured by the log-wage levels at 30 and 45 and the slopes over 22–28 and 28–35. The standard deviation of the log wage at 30 identifies σ_η: net of the transitory component σ_ν, it measures the dispersion the permanent shock has accumulated by 30.

2. *Labor supply of childless women* $\rightarrow (\mu_{\text{PT}}, \mu_{\text{FT}}, \mu_{\text{PT,age}})$. The part- and full-time shares of childless women at 25–40 identify the two baseline disutilities, since no child-presence penalty applies to them. The age slope $\mu_{\text{PT,age}}$ tilts the whole path of hours; the childless part-time share and the wage slope over 28–35, which prices cumulative work, identify it jointly.

3. *Child-presence penalties* $\rightarrow (\alpha_{\cdot,o}, \alpha_{\cdot,\text{more}})$. With q additive, the gap between the labor supply of mothers and childless women in a cell is the penalty of that cell in utils. The shares of mothers whose youngest child is grown pin the level $\alpha_{\cdot,\text{grown}}$. Each increment is read off the step between adjacent brackets: the infant step off the infant versus young shares, and the young step off the young shares against those of mothers of one child. The shares of mothers of two and of three or more children pin the per-child term $\alpha_{\cdot,\text{more}}$.

4. *Completed fertility* $\rightarrow (\omega_1, \omega_2, \omega_3)$. The cumulative shares $P(n \geq k)$ at 25, 30, 35 and 45 pin each level.

5. *Fertility timing* $\rightarrow \omega_{\text{age}}$. The tilt rotates the yearly value of every child about $\bar{\tau}$, raising it on one side of that age and lowering it on the other, so it moves births across ages while the levels ω_k shift whole curves. The three first-birth hazards (21–23, 24–26, 27–29), the mean age at first birth, and the cumulative shares $P(n \geq k)$ at 25 against those at 45 identify it.

6. *Taste heterogeneity* $\rightarrow (\delta_1, \delta_2, \delta_3)$. A mixture of types changes the shape of the first-birth hazard: high-type women have their first child early, and the hazard then falls as the remaining childless women are increasingly of the low type. The early hazards (21–23, 24–26) and $P(n \geq 1)$ at 25 and 30 identify δ_1. The duration-progression gaps D_1 and D_2 of (23) identify δ_2 and δ_3.

7. *Taste-shock scales* $\rightarrow (\sigma_{\varepsilon,\text{birth}}, \sigma_{\varepsilon,\text{labor}})$. The variance of the age at first birth identifies $\sigma_{\varepsilon,\text{birth}}$. The part- and full-time shares of mothers of one child at 28–32 identify $\sigma_{\varepsilon,\text{labor}}$.

The estimation targets no egg-freezing moment: the cost schedule, retrieval yields and live-birth rates are external (Section 5.2).

6 Validation and Model Fit

6.1 Model Fit

Table 3 reports the 41 moments targeted in estimation, data against model, separately by education type. Two figures show the fit. Figure 6 plots the log-wage profile against its PSID counterpart by single year of age. Four numbers on each curve are targeted, the levels at ages 30 and 45 and the slopes over 22–28 and 28–35, so the agreement in between is untargeted. The model reproduces the level gap between the two education types and the shape of the rise. Figure 7 shows the fertility fit: the model-implied parity distribution by age tracks the PSID age profile of $P(n \leq k)$ across most of the life cycle for both education types. The largest gaps are in the college group, where the model has too many first births by 25, too few second and third births at 30–35 and too many third births by 45, and in the variance of the age at first birth, which the model overstates in both groups (Table 3). The duration-progression gaps have the sign of the data and between a third and two thirds of its size. Births are spaced too widely: the untargeted gap between the first and second births is 5.1 years for college women against 3.3 in the data, and 4.8 against 3.7 for no-college women.

As an external validation I compare the model with the child penalty, the fall in a mother's employment and earnings after her first birth. It measures the conflict between career and children that egg freezing acts on, and no moment in Table 3 targets it.[26] Figure 20 in Appendix C.1 sets the model's paths around the first birth beside the event studies of Kleven (2026). Earnings fit: five to ten years after the birth the model's penalty is 23 percent for college women and 20 percent for no-college

[26] The closest targeted moments are the part- and full-time shares of mothers by the age of the youngest child. They pin the level of mothers' labor supply, not its fall against the same woman's childless path.

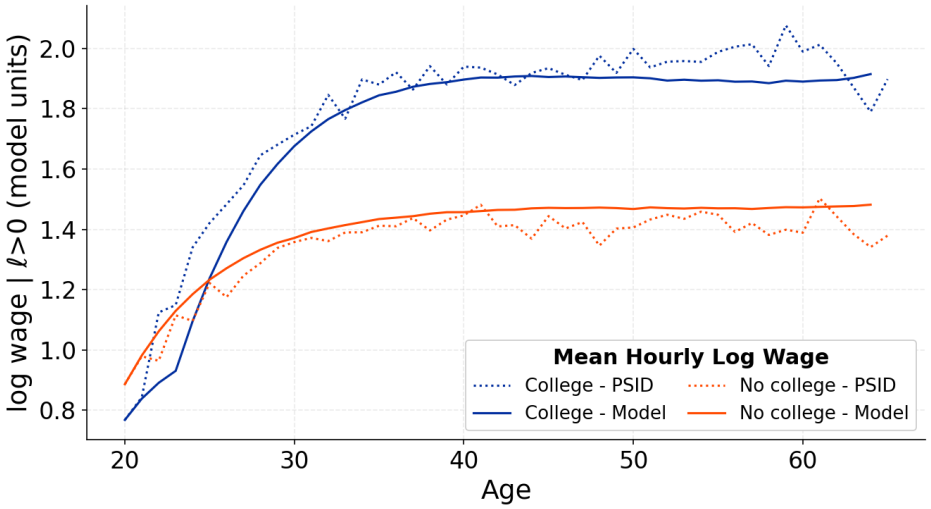


Figure 6: Log-wage profile by age and education: PSID vs. model

Notes. Dotted lines are the PSID mean log wage by single year of age within education type, pooling the 1999–2023 waves and weighted by the longitudinal individual weight; solid lines are the simulated profile at the estimated $\hat{\theta}$, evaluated at the mean human capital of *working* women, $\mathbb{E}[h_j \mid \ell_j > 0]$, which is the conditioning the PSID cells carry. Wages are in model units (annual earnings per \$10,000). The vertical dashed line marks age 65, the end of the working phase. Four moments per curve are targeted, the log-wage levels at ages 30 and 45 and the slopes over 22–28 and 28–35, so the fit at every other age is untargeted. Source: PSID; author's calculations.

women, the values in the data. Employment falls by about the right amount at the birth, 15 and 25 percent against 18 and 26, but recovers too fast, and the long-run employment penalty is 16 and 13 percent against 21 and 20. The model therefore understates the cost of a child on the extensive margin, most for women without a college degree, while it gets the loss of earnings right.

Table 3: Targeted moments, data vs. model

	No college		College	
Moment	Data	Model	Data	Model
Wages $\rightarrow$ $(\gamma_1, \phi, \sigma_\eta)$				
Log wage, age 30	1.358	1.324	1.714	1.642
Log wage, age 45	1.444	1.459	1.934	1.875
Log-wage slope, 22–28	0.271	0.251	0.585	0.654
Log-wage slope, 28–35	0.113	0.121	0.275	0.310
Experience slope, 28–32	0.077	0.070	0.088	0.119
S.d. of log wage, age 30	0.617	0.572	0.636	0.627
Childless labor supply (CPS) $\rightarrow$ $(\mu_{\text{PT}}, \mu_{\text{FT}}, \mu_{\text{PT,age}})$				
PT share, n=0	0.114	0.125	0.072	0.073
FT share, n=0	0.592	0.629	0.775	0.861
Mothers by youngest child (CPS) $\rightarrow$ $\alpha_{\cdot,o}$				
PT share, infant	0.138	0.121	0.135	0.174
PT share, young	0.129	0.144	0.114	0.139
PT share, grown	0.106	0.150	0.078	0.145
FT share, infant	0.365	0.387	0.556	0.557
FT share, young	0.522	0.545	0.682	0.668
FT share, grown	0.618	0.602	0.728	0.692
Mothers by parity (PSID) $\rightarrow$ $(\alpha_{\cdot,\text{grown}}, \alpha_{\cdot,\text{more}}, \sigma_{\varepsilon,\text{labor}})$				
PT share, n=1	0.165	0.120	0.144	0.118
FT share, n=1	0.593	0.608	0.706	0.726
PT share, $n\geq$2	0.187	0.145	0.212	0.179
FT share, $n\geq$2	0.517	0.479	0.554	0.559
PT share, $n\geq$3	0.190	0.151	0.251	0.197
FT share, $n\geq$3	0.483	0.452	0.468	0.504
PT share, n=1, age 28–32	0.106	0.114	0.126	0.103
FT share, n=1, age 28–32	0.654	0.608	0.746	0.754
Completed fertility $\rightarrow$ $(\omega_k, \omega_{\text{age}})$				
$P(n \geq 1)$, age 25	0.610	0.654	0.264	0.319
$P(n \geq 1)$, age 30	0.775	0.767	0.542	0.567
$P(n \geq 1)$, age 35	0.828	0.814	0.721	0.698
$P(n \geq 1)$, age 45	0.854	0.849	0.805	0.801
$P(n \geq 2)$, age 25	0.363	0.343	0.120	0.100
$P(n \geq 2)$, age 30	0.568	0.546	0.309	0.287
$P(n \geq 2)$, age 35	0.678	0.651	0.520	0.464
$P(n \geq 2)$, age 45	0.716	0.734	0.632	0.656
$P(n \geq 3)$, age 25	0.118	0.097	0.040	0.025
$P(n \geq 3)$, age 30	0.237	0.232	0.098	0.070
$P(n \geq 3)$, age 35	0.348	0.322	0.175	0.149
$P(n \geq 3)$, age 45	0.393	0.424	0.256	0.324
Timing of the first birth $\rightarrow$ $(\omega_{\text{age}}, \delta_1, \sigma_{\varepsilon,\text{birth}})$				
Mean age at first birth	23.77	23.47	28.00	27.92
Var. of age at first birth	22.32	24.31	29.63	36.92
First-birth hazard, 21–23	0.277	0.345	0.092	0.086
First-birth hazard, 24–26	0.272	0.274	0.159	0.236
First-birth hazard, 27–29	0.259	0.211	0.256	0.242
Duration-progression gaps $\rightarrow$ (δ_2, δ_3)				
D_1	-0.232	-0.153	-0.378	-0.127
D_2	-0.145	-0.063	-0.228	-0.122
Birth spacing (untargeted)				
Gap, first to second birth	3.69	4.84	3.33	5.11
Gap, second to third birth	4.24	5.57	3.98	6.13

Notes. The 41 moments targeted in (24), by education type, and two untargeted moments of birth spacing. *Data* are the empirical moments of Section 5.1; *Model* are their simulated counterparts at $\hat{\theta}$ (100,000 simulated women). Each panel heading names the parameters the panel chiefly identifies (Section 5.4). Labor shares are for ages 25–40 unless stated; "infant" is a youngest child aged 0–3, "young" 4–13 and "grown" 14 or older in the model and 14–17 in the CPS cells. Wages are log annual earnings in \$10,000; ages, the gaps and the variance are in years and years squared.

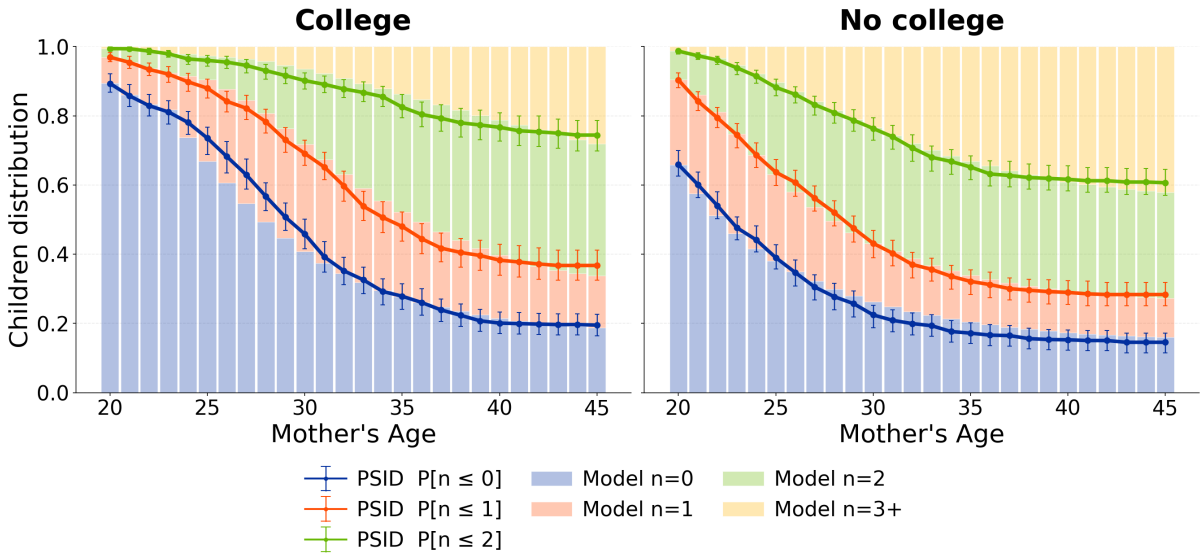


Figure 7: Children distribution by mother's age: PSID vs. model

Notes. Stacked shares by parity $n \in \{0, 1, 2, 3+\}$ at the estimated $\hat{\theta}$ (bars), against the PSID cumulative parity profile $P[n \leq k]$ with 95% confidence bands (markers), by age and education type. The age-30 and age-45 cross-sections of this profile are the fertility moments targeted in Table 3.

6.2 Take-up of egg freezing

The take-up the model predicts is not meant to be the take-up we observe in the data. The model describes an economy in which egg freezing is a mature technology: every woman knows about it, every woman can buy it at the market price, and a woman freezes her eggs exactly when doing so is privately optimal given her preferences over children, her career and her resources. The simplifying assumption is that supply of egg freezing is perfectly elastic at current market prices. Today's take-up is lower for reasons the model leaves out: elective freezing is recent, information about it is uneven, clinics are few outside large cities, and the women who would gain from it have had only a few years in which to use it. None of these frictions is a property of the technology, and each should fade as it spreads. For this reason I do not target take-up in estimation. The model is estimated on the economy without egg freezing (Section 5), and the take-up it delivers is a prediction.

Furthermore, the model assumes away never takers. A woman who would never freeze her eggs, at any price and whatever its value to her, for religious reasons or out of personal conviction, has no counterpart in the model: every simulated woman treats egg freezing as one option among others and takes it when it pays. The model's take-up therefore refers to the women for whom the technology is an admissible

choice. If a share of women would never use it, aggregate take-up and the aggregate effects of Section 7 scale down by roughly that share.

The example of France is illustrative. Since the 2021 bioethics law, retrieval without a medical indication has been free for women aged 29 to 37 (Appendix B.7). Demand rose faster than clinics could expand, and in 2024 the average wait for treatment was about ten months nationally and fourteen in the Paris region (Agence de la biomédecine, 2024). In the short run the number of centres and specialists is fixed, so a jump in demand generates waiting queues. The model describes the long run, in which supply has fully adjusted and every woman who wants to freeze her eggs can do so.

7 Results

In this section I present the results of the counterfactual exercise. As explained in Section 5, the model is estimated on the economy without egg freezing, so the counterfactuals are the model's own predictions of what would happen if the egg-freezing technology were available, widely diffused and known. Each exercise simulates 100,000 women per education type from the model's own entry distribution—so that $\tilde{e}_{20}$ is drawn from its type-specific NLSY97 age-20 partnership rate, $a_{20} \sim F^i_{a_{20}}$, n_{20} and o_{20} come from their PSID entry distributions, the fertility taste type ψ is H with probability one half, and the permanent sterility indicator is $\iota \sim \text{Bernoulli}(0.05)$. Where the results are presented in aggregate, I weight the two education types by the NLSY97 college share, 0.319. The technology enlarges each woman's choice set. A woman who does not want to freeze can always choose not to, so access to the technology cannot lower her expected lifetime utility at entry. The welfare gains are positive, as this requires: measured as the consumption-equivalent gain, access is worth 2.79% of lifetime consumption to college women and 0.12% to no-college women (Section 7.2). The egg-freezing technology widens inequalities across education types. Next, I turn to the analysis of who freezes.

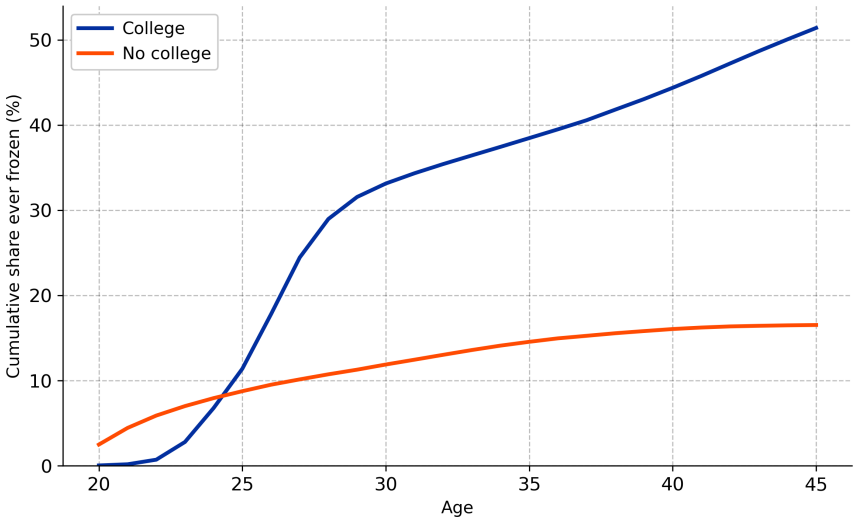


Figure 8: Cumulative share who have ever frozen, by age and education type

Notes. Share of each simulated cohort that has taken the retrieval action $f_j = 1$ at or before the age on the horizontal axis. 100,000 simulated women per education type, entry states $(a_{20}, \tilde{e}_{20}, n_{20}, o_{20}, \psi, \iota)$ drawn from the distributions of Section 4.2. The window ends at age 45, the last age at which retrieval is admissible; the curves are flat by construction thereafter.

7.1 Who Freezes

Timing. Figure 8 plots the cumulative share by education cohort that has ever retrieved, by age, over the admissible freezing window (ages 20–45). The two education types follow different patterns. College women retrieve in their mid- to late twenties: the curve is below 1% at 22, reaches 11% at 25 and 29% at 28, and then rises more slowly, by about 1.3 points a year from 28 to 45, reaching 51% at 45. About half of the college women who ever retrieve have done so by 28. The no-college curve starts at entry and stays low: 2.5% retrieve at 20 and 5.9% by 22, the share reaches 12% at 30, and it ends at 16.5% at 45. Half of the no-college women who ever retrieve have done so by 25.

Characteristics of women who freeze. Figure 8 says *when* egg freezing happens but not *who* freezes. Let $\mathcal{E}_j$ denote that a woman is eligible to freeze for the first time at age j: she has not retrieved yet and is inside the admissible window. I estimate a discrete-time hazard for the first retrieval, separately by education group, with every

covariate evaluated in that period:

$$\Pr\big(f_j = 1 \mid \mathcal{E}_j,\, S_j \geq 0\big) = \Lambda\big(x_j'\beta + \delta_j\big), \quad \begin{aligned} x_j'\beta \;&= \beta_1 \operatorname{asinh}\big(S_j\big) + \beta_2\, \tilde{e}_j + \beta_3 \mathbb{I}\big(n_j > 0\big) \\ &\quad + \beta_4 \log w^i(h_j) + \beta_5 \mathbb{I}\big(\ell_{j-1} > 0\big) \\ &\quad + \beta_6 \mathbb{I}(\psi = H) + \beta_7\, \iota, \end{aligned} \tag{25}$$

where $\Lambda(\cdot)$ is the logistic c.d.f. and δ_j is a full set of age dummies. Each observation is one woman at one age, where individual indices are suppressed. The slack S_j is the money she would have left after paying for a cycle out of her own resources, as in (19), if she worked as much as she can that year:

$$S_j = \vartheta(\tilde{e}_j)\big[a_j - \kappa(n_j, o_j, \bar{\ell}_j) + \max\{0, -\underline{a}^i_{j+1}\}\big] + (1 - \delta_R)\, w^i(h_j)\, \bar{\ell}_j - \mathcal{C}^{EF}(1, \tilde{f}_j),$$

where $\bar{\ell}_j$ is full time, or part time for college women at 20–22, when full-time work is closed to them. The slack carries her share of the household's assets, childcare bill, borrowing room, and her own earnings. The partnership coefficient, β_2, measures what a partner does to the value of the option once her own resources are held fixed. The wage prices the time a cycle takes, which she pays as the share δ_R of her earnings. Work enters with a lag, because hours and retrieval are chosen in the same period. Every woman enters at 20, so time at risk is age minus 20, and the age dummies absorb every age effect at once: fecundity, egg quality and the remaining horizon. Figure 9 reports each coefficient as an effect on the probability of freezing in percentage points, a discrete change for the indicators and a one-standard-deviation move for the slack and the wage.

For college women three effects stand out. A woman of the high taste type is more likely to freeze by 9.2 percentage points a year, about three times the group's base hazard of 2.9 points, and a first child lowers the hazard by 5.1 points. The women who freeze are those who want children and do not have them yet, which is in line with the option value of Section 4.8. Among college women who can afford a cycle, resources still matter: a one-standard-deviation increase in $\operatorname{asinh}(S_j)$ raises the hazard by 5.0 points, and the same move in the log wage by 0.4 points. A partner, work in the previous year and sterility each move the hazard by less than half a point. For no-college women the base hazard is 0.64 points a year, so the effects are best read

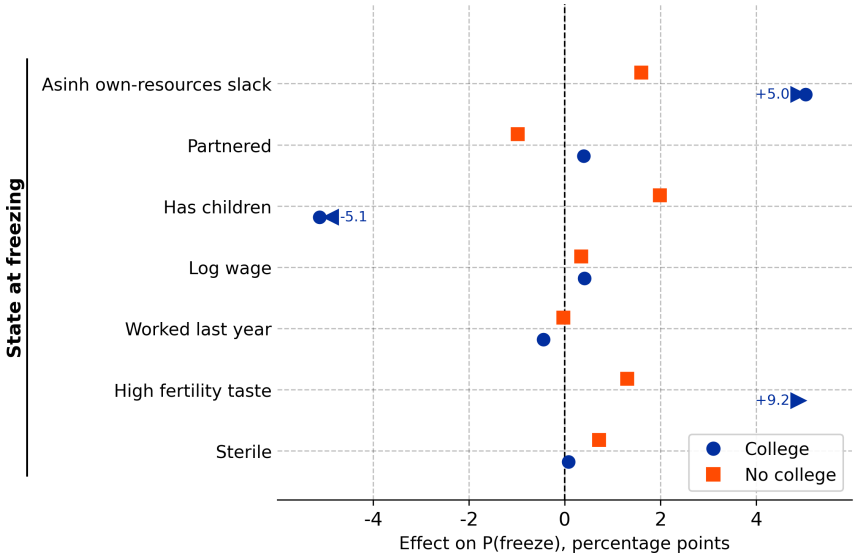


Figure 9: Effects on the probability of freezing among women who can afford it

Notes. Discrete-time hazard logit (25) for the first retrieval: one row per woman and age at which she is eligible to freeze for the first time and passes the own-resources test, $S_j \geq 0$. Regressors: asinh of the slack S_j, current partnership, an indicator for having any children, the log wage, an indicator for having worked the year before, the high taste type, permanent sterility, and a full set of age dummies (omitted from the figure). Estimated separately by education group. Age 20 is excluded, because the lagged work indicator is not defined there. Indicator effects are the discrete change $\mathbb{E}[P(\cdot = 1)] - \mathbb{E}[P(\cdot = 0)]$; the slack and the wage are rescaled to a one-standard-deviation move; both are in percentage points of $P(\text{freeze})$. Bars are 95% confidence intervals from standard errors clustered by woman.

against that base. Resources lead: a one-standard-deviation increase in $\text{asinh}(S_j)$ raises the hazard by 1.6 points, two and a half times the base. Having a child raises it by 2.0 points and a partner lowers it by 1.0, pointing at a pattern of single mothers who retrieve in order to thaw. The high taste type adds 1.3 points, sterility 0.7 and the wage 0.3, while work in the previous year leaves the hazard unchanged.

7.2 The Aggregate Effect of the Egg Freezing Technology

The two economies. As laid out in Section 5.3, the *estimated* economy is the one without egg freezing: the choice set is restricted to $f_j = 0$ at every age, so the egg stock is $\tilde{f}_j \equiv 0$ throughout. The *counterfactual* is the economy in which the technology is switched *on*: the retrieval and thaw actions enter the choice set at the prices of Section 3.3, and nothing else changes. Everything reported below is therefore the model's own out-of-sample prediction of what the presence of the egg-freezing technology would do over the life cycle of a cohort, measured against a world

estimated as if it had never existed.

The paired design. The two economies share everything except the choice set: the entry distributions of Section 4.2, the fecundity schedule, the partnership hazards and $\hat{\theta}$. I simulate both at the same seed. Entry states come from a single stream drawn in a fixed order before anyone makes a choice, so each woman enters both economies with the same assets, partnership status, children and sterility draw. Her later shocks come from a stream of her own, and they coincide in the two economies until the first year in which something happens to her in one economy and not in the other. Every woman enters with no eggs in store, so that event is either a retrieval or a birth that occurs in only one of the two economies. Either changes how many random numbers the year uses, and from then on she draws fresh shocks in each economy from the same distributions. Before that year her choices can already differ, because the option to freeze changes her hours, her savings and whether she tries to conceive, but she faces the same draws in both economies.

Because the same woman appears in both economies, I can compute her individual effect $\Delta Y \equiv Y^{EF} - Y^{NEF}$ woman by woman, where EF marks the counterfactual economy and NEF the estimated one. The mean of ΔY across women is the effect of the technology.

Headline. Table 4 reports the two aggregates. Relative to the estimated economy, the arrival of the technology raises lifetime human capital by 0.85% and completed fertility at 50 by 0.064 children, and it raises the share of women with any child at 50 by 1.1 percentage points. Egg freezing is, in this model, both career-protecting and fertility-raising in the aggregate, and it raises fertility on both margins: more women become mothers, and mothers have more children.

The fertility gains are concentrated in the college type, as suggested by the pattern of take-up. College women gain 0.128 children and no-college women 0.033, against lifetime take-up rates of 51.4% and 16.5%. Human capital rises in both groups, by 0.60% for college women and 0.92% for no-college women. Welfare follows the split in take-up: measured as the consumption-equivalent gain ξ at entry, the permanent proportional rise in consumption, at every age and state, that makes the economy without egg freezing as good as the one with it, access to the technology is worth

2.79% of lifetime consumption to college women and 0.12% to no-college women.

Table 4: The aggregate effect of the egg-freezing technology

	No college	College	Aggregate
Population weight	0.681	0.319	1.000
Lifetime human capital $H = \sum_{j=20}^{64} h_j$			
Counterfactual (EF on)	235.57	153.06	—
Estimated (no EF)	233.41	152.15	—
Change	+0.92%	+0.60%	+0.85%
Completed fertility at age 50			
Counterfactual (EF on)	2.041	1.918	2.002
Estimated (no EF)	2.008	1.790	1.938
Change	+0.033	+0.128	+0.064
Share with any child at age 50			
Counterfactual (EF on)	0.849	0.836	0.845
Estimated (no EF)	0.849	0.804	0.834
Change	+0.001	+0.033	+0.011
Lifetime freezing take-up	0.165	0.514	0.277

Notes. Paired economies. The estimated arm is the one *without* egg freezing—the choice set is restricted to $f_j = 0$, so $\tilde{f}_j \equiv 0$—and is the economy $\hat{\theta}$ is fitted to; the counterfactual arm adds the retrieval and thaw actions and is otherwise identical, including $\hat{\theta}$, the entry distributions and the seed, so each woman is observed in both arms with the same entry state and shock path. 100,000 simulated women per education type per arm.

Fertility: extensive against intensive. Write $P_1 \equiv \Pr(n_{50} \geq 1)$ and decompose the change in completed fertility exactly as

$$\Delta \mathbb{E}[n_{50}] = \underbrace{\left(P_1^{EF} - P_1^{NEF}\right) \mathbb{E}_{NEF}[n_{50} \mid n_{50} \geq 1]}_{\text{extensive}} + \underbrace{P_1^{EF} \left(\mathbb{E}_{EF}[n_{50} \mid n_{50} \geq 1] - \mathbb{E}_{NEF}[n_{50} \mid n_{50} \geq 1]\right)}_{\text{intensive}}. \tag{26}$$

The goal of the decomposition is to understand the contribution of each component to the overall change in fertility. The split adjudicates whether the technology raises fertility by turning childless women into mothers (*extensive margin*) or by letting women who would have become mothers anyway have more of them (*intensive margin*). For the college type the answer is both: the extensive margin carries 0.072 of the 0.128 additional children and the intensive margin 0.056, and the share reaching 50 childless falls from 19.6% to 16.4%. For the no-college type almost all of the 0.033 additional

Table 5: Completed fertility at age 50: extensive and intensive margins

	No college	College	Aggregate
Total $\Delta\mathbb{E}[n_{50}]$	0.0332	0.1285	0.0636
Decomposition of the total, eq. (26)			
Extensive margin	0.0011	0.0724	0.0238
Intensive margin	0.0321	0.0561	0.0398

Notes. Paired economies, counterfactual against estimated (same design as Table 4), 100,000 simulated women per education type per arm, completed fertility measured at age 50. The aggregate column weights the two types by the NLSY97 college share (0.319).

children come through the intensive margin (0.032), which indicates that mothers retrieve in order to have further children.

8 Policy: Should Egg Freezing Be Subsidized?

I run three policy exercises on the estimated model. The first scales the price of a cycle from free to twice its current level. It measures how strongly demand responds to the price, and whether the women a lower price brings in turn their frozen eggs into births or simply hold insurance they never use. The second leaves the price alone and changes only when the bill is paid: the cost of freezing accrues to a balance that falls due at retirement, at no cost to the government. It separates liquidity from price. If young women stay away because they cannot raise $12,800 today, deferral brings them in; if they stay away because the option is not worth its present value to them, deferral does nothing. The third makes the first retrieval free and spends the same public budget on a transfer paid per birth instead, each financed by a flat tax on the labor earnings of all women. It asks whether public money aimed at increasing fertility should pay for the option on a future birth or for the birth itself, and it ends with the subsidy a utilitarian government would choose.

An overview of the results follows. The price moves take-up far more than births: halving it raises the share of college women who ever freeze from 51% to 79%, and completed fertility changes by less than 0.01 children. Deferral raises take-up in both education types, from 51% to 65% for college women and from 17% to 29% for no-college women, and moves retrievals to the first years of adult life: liquidity keeps young women away. At no cost to the government, it gives the largest welfare

gain of any policy I study, 3.5% of lifetime consumption for college women and 0.7% for no-college women, and the most births, 7.5 per 100 women against the economy without egg freezing. Its cost is human capital, which at 50 ends 0.07% below the economy without egg freezing. The fall comes entirely from less-educated women with a high taste for children, who use the loan to retrieve eggs in one year and thaw them in the next, in effect a conventional IVF cycle, and so have their children earlier and accumulate less human capital. A free first retrieval raises births by more than twice as much as a birth transfer of equal cost and raises human capital by 0.04%; once women pay the tax that funds it, it lowers welfare by 0.05% of lifetime consumption, while the birth transfer raises it by 0.09%. The utilitarian optimum is a subsidy of about 5% of the price, with a welfare gain of 0.0003% of lifetime consumption, close to no subsidy at all.

Frictions. The model has two frictions. First, a woman cannot borrow below the floor $\underline{a}_j$. Second, markets are incomplete: a woman cannot insure the shocks that decide her fertility (whether she finds a partner, whether she conceives) or her wage, and her only asset is a risk-free bond. With egg freezing a woman pays today for fertility she may use years later, reducing the realization probability of the bad state in which children are not born.

An egg-retrieval subsidy acts indirectly on both frictions. Paid for by a tax that every woman incurs, it lowers the cash she must have at the moment of retrieval, which matters when the floor $\underline{a}_j$ binds. Moreover, it lowers the probability of the childless state, acting as a self-protection or loss prevention mechanism (see Ehrlich and Becker, 1972; Mehr and Cammack, 1966). But it also lowers the price at the margin, and so draws in women whose value of the stored eggs falls short of the cost of a cycle. On the other hand, the tax distorts labor supply (Section 8.3). Whether a subsidy raises welfare depends on which force dominates. Finally, a loan at the market rate (Section 8.2) acts on the borrowing limit alone, but can also help completing the fertility market. In particular, it can help those women that are not constrained in consumption but still fall short of the resources to freeze their eggs.

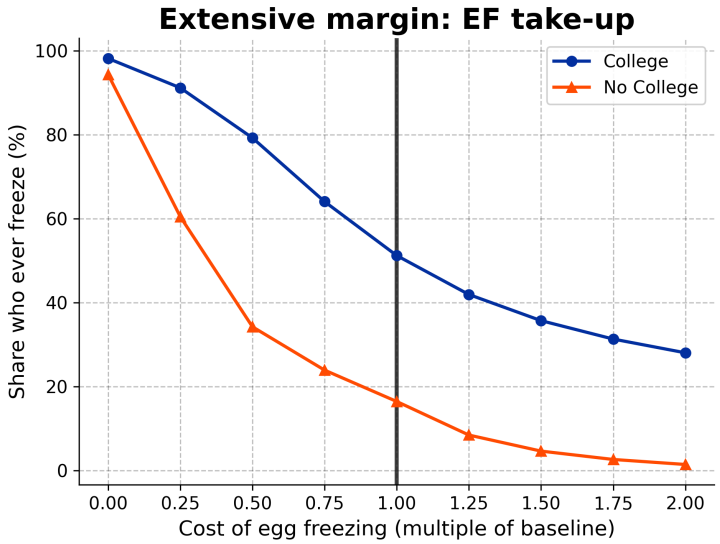


Figure 10: Take-up and the price of a cycle

Notes. Share of each education type that retrieves at least once by 45, against the price factor λ_F that scales retrieval, storage and thaw costs. The vertical line marks the baseline price, $\lambda_F = 1$. 100,000 simulated women per education type.

8.1 Exercise 1: The Price of a Cycle

The first exercise scales the three cash components of $\mathcal{C}^{EF}(f_j, \tilde{f}_j)$ (retrieval, annual storage and the thaw-and-transfer cycle, calibrated in Section 3.3) by a common factor λ_F and holds everything else at $\hat{\theta}$, including the time cost δ_R. A factor below one stands in for any subsidy that lowers the price: an employer benefit, a voucher or a public program. The changes can also be read as supply shocks to the price. Figures 10 and 11 plot the results and Table 6 reports them.

Take-up responds strongly to the price. At the baseline price 51% of college women and 16.5% of no-college women ever retrieve. Halving the price raises the two shares to 79% and 34%, and a free cycle sends almost every woman to the clinic, 98% and 94%. Around the baseline, a 25% change in the price gives an elasticity of take-up of about -0.9 for college women and about -1.9 for no-college women, whose take-up starts from a lower base.[27]

Completed fertility responds far less than take-up. At today's price the technology adds 0.126 children by age 50 for college women (1.921 against 1.795 without it) and 0.034 for no-college women (2.047 against 2.013). Making it free adds a further

[27] The elasticity is $\varepsilon = (\Delta P/P)/(\Delta\lambda_F/\lambda_F)$, where P is the share of women who retrieve at least once by 45. P and λ_F are taken at the baseline, $\lambda_F = 1$, and Δ is the change between $\lambda_F = 0.75$ and $\lambda_F = 1.25$ (Table 6).

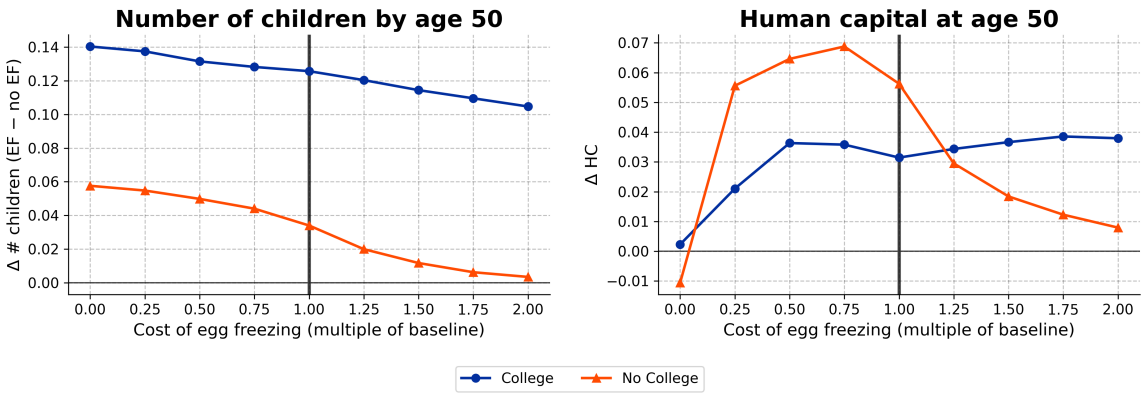


Figure 11: Children and human capital at 50 and the price of a cycle

Notes. Difference between the economy with egg freezing at price factor λ_F and the economy without it, by education type. Left: children born by 50. Right: human capital at 50, in full-time-equivalent years. The vertical line marks the baseline price, $\lambda_F = 1$. 100,000 simulated women per education type.

0.014 and 0.024. Most of the women a lower price brings in buy insurance they never use: among college women who freeze, 34% ever thaw at the baseline price and 23% when the cycle is free; among no-college women the share falls from 75% to 28%.[28] Human capital at 50 changes by hundredths of a full-time year at any price. At the baseline price it rises by 0.03 for college women and 0.06 for no-college women; when the cycle is free it ends at its level without the technology for college women and 0.01 below it for no-college women.

8.2 Exercise 2: Deferred Payment

The second exercise changes when the bill is paid. No egg-freezing outlay is taken from current resources. Each bill is added instead to a balance that compounds at the market rate and is settled in a single payment at retirement,

$$D_{j+1} \;=\; R\,D_j \;+\; \mathcal{C}^{EF}(f_j, \tilde{f}_j), \qquad D_{20} = 0, \qquad a_{T_r} \;\longmapsto\; a_{T_r} - D_{T_r}, \tag{27}$$

where the egg-freezing bill $\mathcal{C}^{EF}$ no longer enters the budget (17) while the policy is on: it is charged to D_j instead and repaid at the retirement age T_r. The balance compounds at the rate at which the government discounts, so the expected present value at entry of the public outlays, G, is zero. Written in net worth $b_j \equiv a_j - D_j$, the two laws of

[28] Appendix C.2 reports the share who thaw and the number of retrieval cycles at every price.

motion collapse into the budget,

$$b_{j+1} \;=\; R\, b_j + \big(1 - \delta_R\, \mathbb{I}(f_j = 1)\big)\, w^i(h_j)\, \ell_j + \tilde{e}_j\, y^i_j + \mathcal{T}_j - c_j - \kappa_j. \tag{28}$$

The only thing the policy changes is the borrowing constraint, which in net worth reads

$$b_{j+1} \;\geq\; \underline{a}^i_{j+1} \;-\; D_{j+1}. \tag{29}$$

Deferral is the borrowing floor lowered by exactly the bills a woman has incurred, which is why the exercise isolates liquidity: it removes the financing problem of the price and leaves its present value untouched. Because the loan only lowers a borrowing floor, it too enlarges the choice set, and it cannot lower any woman's expected lifetime utility.

Table 8 and Figure 12 report the results. Deferral raises take-up in both education types: from 51.4% to 65.1% for college women and from 16.5% to 29.1% for no-college women. It also moves retrievals to the start of adult life. With the loan 18.7% of college women retrieve at 20 and 41.0% by 22, against 0.7% by 22 when each bill is paid on the spot. No-college women follow the same pattern from a lower level: 15.7% retrieve at 20, against 2.5%. Since the loan leaves the present value of the bills unchanged,

Table 6: The price of a cycle: take-up, fertility and human capital

	Ever retrieves		Children at 50		h at 50	
Price factor λ_F	College	No college	College	No college	College	No college
No egg freezing	—	—	1.795	2.013	4.021	6.202
0.00	0.982	0.943	1.935	2.071	4.024	6.191
0.25	0.912	0.605	1.933	2.068	4.043	6.257
0.50	0.792	0.343	1.927	2.063	4.058	6.266
0.75	0.641	0.239	1.923	2.057	4.057	6.271
1.00	0.512	0.165	1.921	2.047	4.053	6.258
1.25	0.419	0.085	1.915	2.033	4.056	6.231
1.50	0.357	0.046	1.910	2.025	4.058	6.220
1.75	0.313	0.027	1.905	2.020	4.060	6.214
2.00	0.281	0.015	1.900	2.017	4.059	6.210

Notes. λ_F scales the three cash components of $\mathcal{C}^{EF}(f_j, \tilde{f}_j)$ (retrieval, storage and thaw) by a common factor; $\lambda_F = 1$ is the baseline and the time cost δ_R is held at $4/52$. "Ever retrieves" is the share of women who retrieve at least once by 45; children and human capital h (in full-time-equivalent years) are means at age 50. 100,000 simulated women per education type.

Table 7: Welfare gain of egg freezing, deferred payment and subsidies

	College	No college
Egg freezing, each bill paid when due	2.79	0.12
Egg freezing with deferred payment	3.48	0.72
Financed by a tax on gross earnings		
Free first retrieval	2.79	0.05
Birth transfer, same outlay	2.82	0.22
Optimal freezing subsidy	2.80	0.11
Birth transfer, same outlay	2.79	0.12

Notes. Consumption-equivalent gain at entry age, in percent of lifetime consumption, relative to the economy without egg freezing. The first row is the gain reported in Section 7.2; the second adds the loan of (27). The last four rows are the free first retrieval of Section 8.3 and the optimal subsidy of Section 8.4, each followed by the birth transfer that spends the same amount, all with the tax that pays for them and against the same economy without egg freezing.

liquidity is what keeps women from retrieving in their early twenties, for college and no-college women alike.

Table 7 compares the welfare gain of the technology with and without the loan. Against the economy without egg freezing, the technology with deferred payment is worth 3.48% of lifetime consumption to college women and 0.72% to no-college women, against 2.79% and 0.12% when each bill is paid when it falls due. Deferral adds 0.69 percentage points for college women and 0.60 for no-college women. Because the balance compounds at the government's discount rate, these gains come at no fiscal cost.

8.3 Exercise 3: Two Ways to Spend the Same Budget

The third exercise makes the first retrieval free and asks whether the same public money would do more if it were paid per birth. The *freezing subsidy* pays the whole price of a cycle, \$12,800, on a retrieval taken with no eggs in store, up to age 37; storage and thawing stay at their market price. The *birth transfer* pays b on every birth. Each instrument is funded by its own proportional tax τ on the gross labor earnings of all women, set so that the instrument pays for itself. A free first retrieval costs \$5,180 per woman in present value at 20, and the tax that funds it is 0.69%. I then solve for the birth transfer and its tax together so that the transfer spends the same amount: $b = \$3{,}736$ per birth, again at a tax of 0.69%. Figure 13 compares both, together with the loan of Section 8.2, with the economy that has egg freezing at the market price

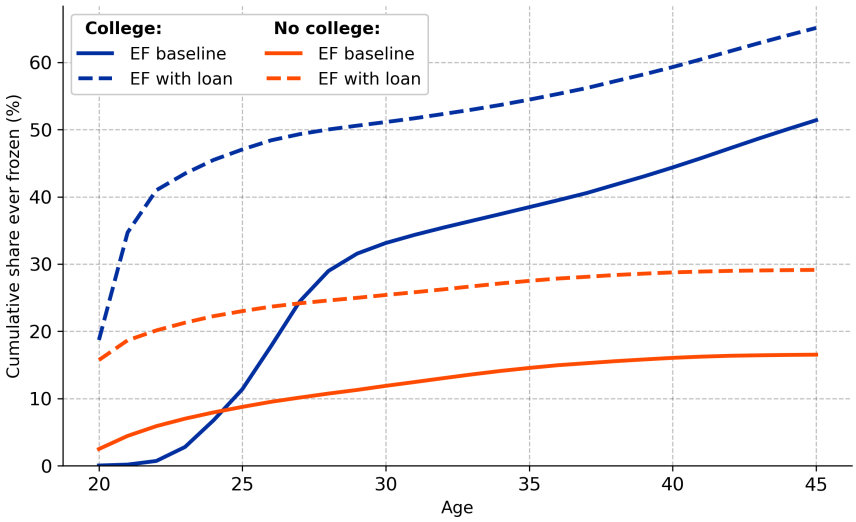


Figure 12: Cumulative share who have ever frozen, with and without deferred payment

Notes. Share of each simulated cohort that has retrieved at least once by the age on the horizontal axis, with each bill paid when it falls due (solid, as in Figure 8) and with deferred payment (dashed). 100,000 simulated women per education type.

and no subsidy; Table 7 measures welfare by education and Table 9 births and human capital for the whole population, both against the economy without egg freezing.

The freezing subsidy buys more than twice as many births. Completed fertility rises by 1.00 birth per 100 women under the subsidy and by 0.45 under the birth transfer. The subsidy raises the share of women who ever retrieve from 27.6% to 41.8% The two instruments part ways on human capital. The birth transfer lowers human capital at 50 by 0.66%, because the extra income lets women work less. The freezing subsidy raises human capital at 50 by 0.04%. In utility terms, women rank the two instruments the other way. Once they pay the tax, the freezing subsidy lowers welfare by 0.05% of lifetime consumption and the birth transfer raises it by 0.09%.

The loss falls on no-college women, who pay the tax and freeze less often. Against the economy without egg freezing (Table 7), the freezing subsidy leaves college women at the 2.79% that egg freezing alone gives them and cuts the gain of no-college women from 0.12% to 0.05%. The birth transfer raises the gain in both groups, to 2.82% and 0.22%.

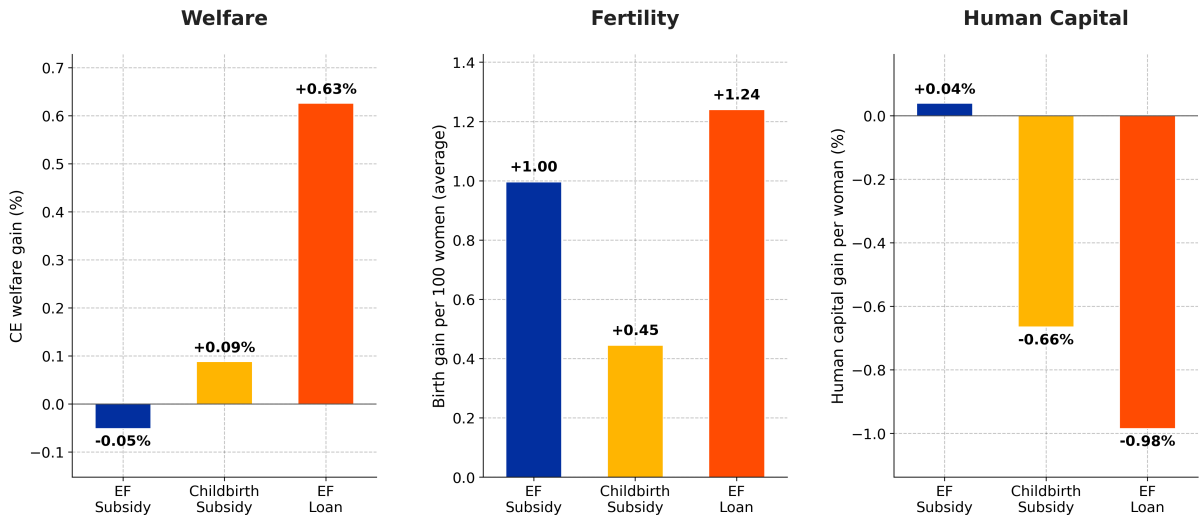


Figure 13: A free first retrieval, a birth transfer of equal cost and deferred payment

Notes. Change against the economy with egg freezing at the market price and no subsidy, for the whole population: education types weighted by their population shares. "EF subsidy" pays the full price of a retrieval taken with no eggs in store up to age 37, $12,800; "Childbirth subsidy" pays $3,736 per birth, which spends the same $5,180 per woman in present value at 20. Each is funded by its own proportional tax on gross labor earnings, 0.69% in both cases. "EF loan" leaves the price unchanged and lets the cost of freezing accrue to a balance at the market interest rate that falls due at retirement (Section 8.2); it costs the government nothing and needs no tax. Left: consumption-equivalent welfare gain, in percent of lifetime consumption, for the policy together with its tax, if any. Center: births per 100 women. Right: human capital at 50, percent change. 100,000 simulated women per education type.

Table 8: Deferred payment

	College	No college
Ever retrieves, baseline	0.514	0.165
Ever retrieves, deferred payment	0.651	0.291
Mean age at first retrieval, baseline	30.6	26.8
Mean age at first retrieval, deferred payment	25.3	23.2

Notes. The deferred arm implements (27) with the balance carried as a state and settled at 65; $G = 0$ because the balance compounds at the government's discount rate. All rows use 100,000 simulated women per education type.

8.4 The Optimal Policy

A free cycle is a large subsidy. A utilitarian government would choose a much smaller one. I vary the subsidy on a retrieval taken with no eggs in store, up to age 37, from 0% (market price) to a free cycle. At each rate a proportional tax on gross labor earnings balances the government budget. Welfare is highest for a small subsidy, around 5% of the price ($640 per cycle), financed by a tax below 0.02% that raises $150 per woman. The gain is 0.0003% of lifetime consumption. A birth transfer of the same

Table 9: Births and human capital under each policy

	Births per 100 women	h at 50 (%)
Egg freezing, each bill paid when due	6.23	0.92
Egg freezing with deferred payment	7.47	−0.07
Financed by a tax on gross earnings		
Free first retrieval	7.23	0.96
Birth transfer, same outlay	6.67	0.25
Optimal freezing subsidy	6.30	0.96
Birth transfer, same outlay	6.25	0.91

Notes. Change against the economy without egg freezing, for the whole population, education types weighted by their population shares. Births per 100 women is the change in completed fertility; h at 50 is the percent change in mean human capital at 50. The rows are those of Table 7: egg freezing at the market price, the loan of (27), and the free first retrieval of Section 8.3 and the optimal subsidy of Section 8.4, each followed by the birth transfer that spends the same amount, all with the tax that pays for them. 100,000 simulated women per education type.

cost, $90 per birth, raises welfare by 0.0023% of lifetime consumption, nine times the 0.0003% of the optimal freezing subsidy. Under a labor tax, then, the best freezing subsidy is close to no subsidy at all.

Across the policies of Tables 7 and 9, lending at the market rate, as a student loan does, ranks first on both welfare and fertility. It gives the largest welfare gain to both education types and adds the most births, 7.5 per 100 women against 7.2 for a free first retrieval, and it costs the government nothing, so it needs no tax. Its price is human capital: it is the only policy under which human capital at 50 ends below the economy without egg freezing, by 0.07%. The fall comes entirely from less-educated women with a high taste for children. Nothing in the model requires eggs to stay in storage for a minimum length of time, so these women use the loan to retrieve in one year and thaw in the next, equivalent to buying a conventional IVF cycle. They have their children earlier and accumulate less human capital, enough to pull the population average below the economy without egg freezing.

9 Conclusion

Careers and children compete for the same years of a woman's life, and egg freezing lets her move part of her fertility out of those years. I asked what that option does to fertility, human capital and welfare when every woman can buy it at market prices, and whether governments should pay for it. To answer, I added the choice to

freeze eggs to a life-cycle model of labor supply and fertility with incomplete markets and a borrowing limit, disciplined the technology with the medical evidence on how eggs age, and estimated the model on US women most of whom made their fertility choices before the technology spread.

The technology raises fertility and human capital together, and college-educated women take most of the gain in births and welfare. Access to egg freezing adds 0.064 children per woman by age 50 (3.3%) and 0.85% to lifetime human capital. College women gain 0.128 children and no-college women 0.033. Among college women the extra births come on both margins: the extensive margin carries 0.072 of the 0.128, and the share who reach 50 childless falls from 19.6% to 16.4%. Among no-college women almost all of them come from mothers who have more children. No-college women freeze far less, 16.5% against 51.4%, so the technology widens the welfare gap between the two groups: access is worth 2.79% of lifetime consumption to college women and 0.12% to no-college women.

The policy exercises show what public money can do about that difference. I compare three policies against the economy without egg freezing: a loan that defers the cost of freezing to retirement at the market rate, a free first retrieval, and a transfer paid per birth with the same budget, the last two financed by a flat tax on women's earnings. The loan costs the government nothing, gives the largest welfare gain, 3.48% of lifetime consumption for college women and 0.72% for no-college women, and adds the most births, 7.5 per 100 women, against 7.2 under the freezing subsidy and 6.7 under the birth transfer. A government that cares about births and welfare alone would lend. The loan also lowers human capital at 50 to 0.07% below the economy without egg freezing, because less-educated women with a high taste for children use it as an IVF cycle and have their children earlier, while the freezing subsidy raises it by 0.96% and the birth transfer by 0.25%. A government that weighs human capital more and welfare less would pay for the first retrieval, which buys almost as many births as the loan at a smaller welfare gain, 2.79% for college women and 0.05% for no-college women.

Several avenues of future research remain open. I estimate the model on data in which the technology is still rare, so every effect is a prediction about a much larger market; as take-up grows, the model can be re-estimated with egg freezing

in the choice set and its predictions tested against the women who freeze. The price of a cycle is exogenous, and a subsidy that raised demand would also move it, for instance, through the scale economies of clinics and the short-run supply of embryologists; letting clinic prices respond to demand would turn the price exercise into an equilibrium one. Partnership arrives and ends at random; making it a choice, with partners who value a woman's fertility as well as her earnings, would ask how egg freezing changes the marriage market as well as the timing of births, a trade-off that Low (2024) shows already shapes who matches with whom. Births carry only private value in the model; adding the taxes the extra children will pay, and any social value of a birth, would show how much each instrument returns to the public purse. The registries I assembled document the same fast diffusion in countries with very different prices and subsidies, which makes it possible to take the model to countries where the state already pays for egg freezing and to compare its predictions with what happened there.

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Table 10: Oocytes retrieved in one cycle, by age: percentiles

	Percentile												
Age	P5	P10	P20	P25	P30	P40	P50	P60	P70	P75	P80	P90	P95
30	8	9	11	12	13	14	15	17	19	20	21	25	28
31	6	7	9	10	10	12	13	14	16	17	19	23	26
32	5	6	8	8	9	10	12	13	15	16	18	22	26
33	5	6	7	8	9	10	11	13	15	16	17	22	26
34	5	6	7	8	8	10	11	13	15	16	18	23	28
35	4	5	7	7	8	9	11	12	14	16	17	22	28
36	4	4	6	6	7	8	10	11	13	15	16	21	27
37	3	4	5	5	6	7	8	10	12	13	15	20	26
38	2	3	4	5	5	6	8	9	11	12	14	19	25
39	2	3	4	4	5	6	7	8	10	12	13	18	23
40	2	2	3	4	4	5	6	8	10	11	12	18	23
41	1	2	3	3	4	5	6	7	9	11	12	18	25

Notes. Number of mature (MII) oocytes frozen in a first elective cycle, at thirteen percentiles of the distribution for each age from 30 to 41; 400 women. Source: Machtinger et al. (2025), Table 2.

A Externally Calibrated Schedules

A.1 Oocyte-retrieval distribution (Panel a)

I build the age profile of mature oocytes retrieved in one cycle from Machtinger et al. (2025), which reports thirteen percentiles of the number of mature (MII) oocytes frozen (P5, P10, . . . , P95) at each age from 30 to 41 (Table 10). To smooth the distribution across ages I fit an LMS (Box–Cox) model (La Marca et al., 2011), which summarizes the distribution at each age by three numbers: the median M, the Box–Cox power L, which governs skewness, and the coefficient of variation S. At each observed age I fix M at the reported P50 and choose (L, S) by differential evolution to match the thirteen percentiles. I then fit a low-order polynomial in age to each parameter and evaluate it over the observed window. The p-th percentile at age a is

$$Q(p \mid a) = \begin{cases} M(a)\left[1 + L(a)\,S(a)\,z_p\right]^{1/L(a)}, & L(a) \neq 0, \\ M(a)\,\exp\!\big(S(a)\,z_p\big), & L(a) = 0, \end{cases}$$

where z_p is the standard-normal quantile of p.

Outside 30–41 I set the polynomial aside. Machtinger's window covers the years in which retrieval yield already falls steeply: the median drops from 15 at 30 to 11 at 35 and 6 at 40. Run backwards, that slope would make yields keep rising steeply through the twenties, a decade in which ovarian reserve declines only gently, and it

delivers a median of 24 mature oocytes at 20. I rescale the boundary quantile vector instead by the antral-follicle-count (AFC) nomogram of La Marca et al. (2011), which reports AFC centiles for every age from 16 to 49 in a general population of 362 women:

$$Q(p \mid a) \;=\; Q(p \mid \underline{a})\,\frac{\mathrm{AFC}_{50}(a)}{\mathrm{AFC}_{50}(\underline{a})}, \qquad a < \underline{a} = 30, \tag{30}$$

and symmetrically above $\bar{a} = 41$. I take only the *shape* of the ovarian-reserve gradient from La Marca and keep Machtinger's level, because AFC counts antral follicles on ultrasound while the model needs mature oocytes retrieved after stimulation. One scalar carries the whole nomogram: across La Marca's five centiles the ratio $\mathrm{AFC}(a)/\mathrm{AFC}(30)$ differs by at most 0.018 over ages 20–45, so the rescaling leaves the fitted (L, S) as they are. It lowers the median at 20 from 24 to 19 and raises it at 45 from 3 to 5. Figure 4a plots the resulting distribution functions.

A.2 Cumulative live-birth rate (Panel b)

The probability of at least one live birth depends on the number of mature oocytes thawed, n, and the age at which they were frozen, a. In the data of Cascante et al. (2024) the number of freezing cycles is insignificant once these two are controlled for, so the surface depends on (n, a) alone. Treating oocytes as independent gives

$$\mathrm{CLB}(n, a) = 1 - \big(1 - \pi(a)\big)^{n}, \tag{31}$$

which is zero at $n = 0$ and increasing and concave in n. I take the level of the per-oocyte success rate $\pi(a)$ from Cascante et al. (2024) and its age profile from Doyle et al. (2016).

Cascante et al. themselves fit a logistic regression, $\mathrm{CLB}(n, a) = 1/\{1 + \exp[-(\beta_0 + \beta_1 a + \beta_2 n)]\}$, with $\beta_1 = -0.14$ per year of age and $\beta_2 = 0.07$ per mature oocyte, both in log-odds. The logistic fails at the ages the model needs. Their Table 2 covers four age bands, with midpoints 32, 36, 39 and 43, while the college women in the model retrieve mostly between 27 and 35, and some as young as 20. A logistic linear in n also stays positive at $n = 0$. With β_0 calibrated to the overall level of Cascante's Table 2, at

age 20 it predicts a live-birth rate of 0.79 with no oocytes at all and 0.82 with three, against the 0.69 that Goldman et al. (2017) predict for women aged 30–34 with *ten* frozen mature oocytes.

The level comes from Cascante. Inverting their Table 2 cell by cell as $\pi = 1 - (1 - \text{CLB})^{1/n}$ and averaging within the youngest band gives $\pi(32) = 0.0593$, a rate measured on the pipeline the model describes: planned oocyte freezing, per oocyte thawed.

The age profile comes from another source, because Cascante's youngest band is centered on 32 and their age coefficient, run back to 20, implies $\pi = 0.144$, about twice the largest cell in their own table (0.077). I take it from Doyle et al. (2016), whose Supplemental Table 2 reports children per retrieved oocyte for all fresh autologous IVF cycles at one center over 2009–2013: 199,892 oocytes in six age bands, from under 30 to 43–44. Writing $D(a)$ for that profile,

$$\pi(a) \;=\; \pi(32)\,\frac{D(a)}{D(32)}. \tag{32}$$

Doyle's cycles are fresh, so his age profile carries no vitrification losses. He also reports frozen and fresh cycles on the same cohort, and the warmed-to-fresh efficiency ratio is 0.854, 0.854 and 0.887 in his three well-measured bands. The freezing penalty is proportional and the same at every age, so it cancels in the ratio $D(a)/D(32)$.

I fit D as a quadratic in age, weighted by oocyte count, pinned to zero at 46 and constrained to be non-increasing. The pin disciplines the extrapolation: an unpinned quadratic turns negative before 45 and falls to $D(20)/D(32) = 0.75$ at the young end. The resulting π falls from 0.0753 at 20 to 0.0593 at 32, 0.0307 at 40 and 0.0057 at 45, and its maximum stays below the largest cell in Cascante's table. Figure 4b plots (31) under this profile.

The profile has two weak points. Doyle pools all ages below 30 into one band, so inside the twenties the monotonicity constraint, and not the data, generates the gradient: it delivers $D(20)/D(32) = 1.27$, while the pooled band sits only 5.7% above 30–34. And the two frozen-pipeline sources disagree on the level: anchoring on Doyle's warmed series instead of Cascante would raise the whole surface by about 18%. I anchor on Cascante because its ages are ages at freezing and its thaw sample is the larger of the two.

A.3 From retrieved to thawed oocytes

The two curves count different eggs. Machtinger et al. (2025) reports mature oocytes *retrieved and frozen*; the predictor in Cascante et al. (2024) is mature oocytes *thawed*. Some vitrified oocytes die in warming, so I discount retrieval counts before they enter the live-birth surface. Treating the two counts as equal would assume that every egg survives and would overstate the live-birth probability of every retrieval. I apply a constant survival rate

$$n^{\text{thawed}} = s \cdot n^{\text{retrieved}}, \qquad s = 0.783,$$

from the systematic review and meta-regression of Hirsch et al. (2024), which pools post-thaw survival across centers and protocols and reports 78.3% (standard deviation 5.4). Cascante's own cohort implies a single-center rate of about 83% (a median of 12 oocytes thawed and 10 surviving), within one standard deviation of the pooled figure; I use the pooled one.

A.4 The effective-egg index

The model carries one egg state, the effective-egg index of Section 4. An effective egg is a standard-quality egg with a fixed live-birth probability $\bar{\pi} = 0.1$. A retrieval of $n^{\text{retrieved}}$ oocytes at age a is credited with the number of standard eggs that has the same chance of producing no birth,

$$(1-\bar{\pi})^{\,n^{\text{eff}}} = 1 - \text{CLB}\big(s\, n^{\text{retrieved}}, a\big) \quad \Longrightarrow \quad n^{\text{eff}} = \frac{\log\big(1 - \text{CLB}(s\, n^{\text{retrieved}}, a)\big)}{\log(1-\bar{\pi})},$$

so one number records both how many eggs a woman banked and how good they were. The model turns the stock back into a birth probability with the same formula, $1-(1-\bar{\pi})^{\tilde{f}}$, so $\bar{\pi}$ cancels on the round trip: any value reproduces the live-birth probability of the underlying draw. $\bar{\pi}$ fixes the units of the egg grid and is not a calibrated success rate. It is not a pure convention, however: the thaw batch of 10 and the grid $\{0, 5, \ldots, 30\}$ are set in effective units, so $\bar{\pi}$ also fixes how much of a stock one thaw uses and how fine the grid is. A draw that falls between two grid points is split between them, with weights that preserve the expected value of $(1-\bar{\pi})^{\tilde{f}}$, and

hence its live-birth probability, exactly.

A.5 Natural fecundity schedule

The natural-fecundity schedule q_j in (12) is the probability that a partnered woman who tries to conceive has a conception that ends in a live birth within a year. I take it from the demographic literature: Leridon (2004) derives these probabilities from a simulation model of fecundability, fetal loss and permanent sterility. No single source covers the whole reproductive span, so I anchor the schedule at five ages. The interior anchors, 0.75 at 30, 0.66 at 35 and 0.44 at 40, come from Leridon (2004); the endpoints, 0.90 at 20 and 0.06 at 45, follow Adda et al. (2017, n. 17). I fit a cubic in age to the five anchors by least squares, clip it to $[0, 1]$, and set fecundity to zero past the age at which the cubic crosses zero, just after 45; that age is the model's natural-infertility age. Figure 17 shows the fitted schedule and its anchors.

A.6 Calibrating the residency share

The share $s(j, o)$ in (3) is set outside the model from the PSID childbirth histories. I count a child as a dependant while she is under 24.[29] I estimate the schedule on two groups: $g = 1$ when the youngest child is grown ($o = G$), and $g = 0$ when it is not ($o \neq G$). For every cell of mother's age j and group g containing at least 50 women,

$$s(j, g) = \frac{\mathbb{E}[\#\{\text{children under 24}\} \mid j,\, g]}{\mathbb{E}[\#\{\text{children ever born}\} \mid j,\, g]},$$

weighted by the longitudinal individual weight, with both counts capped at three so the ratio refers to the same object n_j does. I exclude childless women, since the equivalence scale ν reads s only when $n_j > 0$.

The schedule, depicted in Figure 14, is the mean of these cells. Outside a group's populated range s holds the nearest observed value.

[29] In the US more than half of 18–24 year olds still live in a parental home: 58 percent in 2025, against 16 percent of 25–34 year olds (U.S. Census Bureau, 2025).

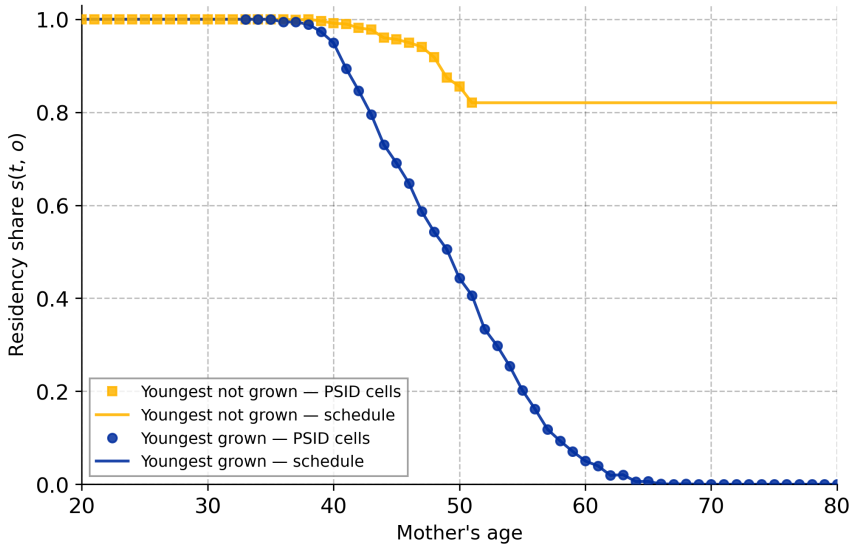


Figure 14: Calibration of the child residency share

Source: PSID childbirth histories; author's calculations. Notes: The residency share $s(j, o)$ of (3) for both groups it is estimated on. Markers are weighted cell means, using the PSID longitudinal individual weight: the share of children ever born who are still under 24, among women of that age in that group. Lines are the schedule the model reads.

A.7 Calibrating the partner income profile

The partner income flow y_j^i of Section 4.2 is the age profile of male labor income, measured on PSID couples in which the reference person is male and the spouse or long-term cohabitor is female. For every cell of the woman's age j and education type i holding at least 20 couples, I take the family-weighted median of the male partner's labor income, zeros included, and deflate it to 2025 dollars with the CPI. Within each type I fit a cubic in age over the whole observed range; the cubic, evaluated on ages 20–65, is the deterministic schedule the model reads. Matching is assortative in the sense that the profile is type-specific: a college woman draws the college partner profile whenever she is partnered. The schedule is deterministic conditional on (i, j), so all the risk in household resources comes from the partnership indicator $\tilde{e}_j$ rather than from dispersion in partner earnings. Figure 15 plots the cell medians against the fitted cubic for each type.

A.8 Calibrating the partnership transition hazards

The formation and dissolution hazards entering the partnership-transition law (15) are fitted outside the model to the NLSY97, separately for each education type.

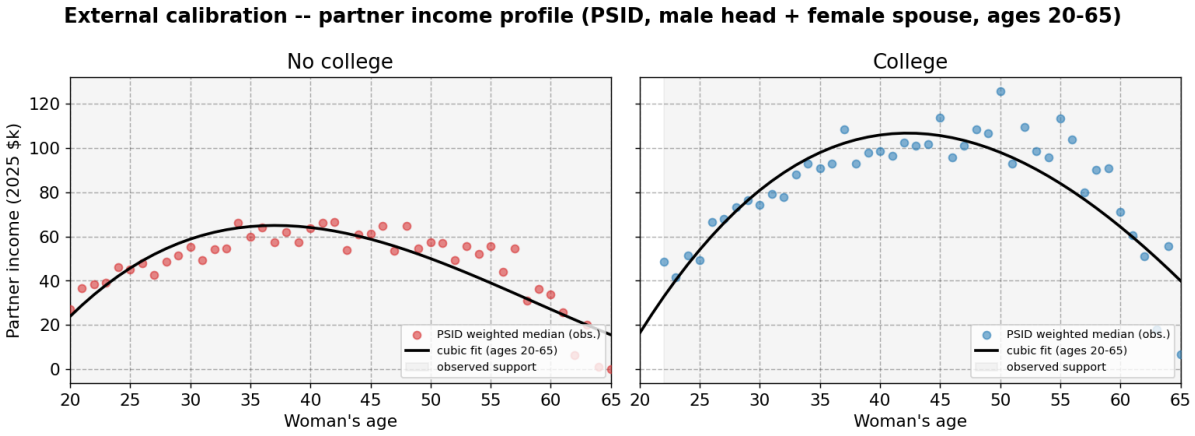


Figure 15: Calibration of the partner income profile y_j^i

Source: PSID, waves 1999–2023; author's calculations. Notes: Markers are weighted median partner income by woman's age within education type, CPI-deflated to 2025 dollars, over cells of at least 20 couples; the solid line is the cubic-in-age fit over ages 20–65 that the model reads as y_j^i. The shaded band marks the range of ages with observed support; outside it the cubic is an extrapolation. The left panel is the no-college type and the right panel the college type. Partners with zero labor income are included, which is why both profiles turn down after the early forties: the share of partners out of work rises.

The formation hazard $\pi_{j,\text{form}}$, read for single women, is fitted as a Gaussian bell in age plus a floor; the dissolution hazard $\pi_{j,\text{dissolve}}(n_j)$, read for partnered women, is fitted as an exponential decay toward a floor, separately for childless women and for women with children. Figure 16 plots the empirical NLSY97 cell hazards against these fits. Past the last age with NLSY97 support each hazard declines linearly to 0 by terminal age 80.

A.9 Permanent infertility

The schedule q_j describes how fecundity declines with age for a woman who is able to conceive at all. Separately from it, a fixed share π^{inf} of women are permanently infertile from the start of the life cycle. Following Adda et al. (2017), I set $\pi^{\text{inf}} = 0.05$ and assume that infertility is orthogonal to every other source of heterogeneity: a woman *neither anticipates it nor learns about it* from unsuccessful conception attempts. She therefore solves and behaves exactly as a fertile woman with the same observable state, including the decision to freeze, and only the realization of the birth draw differs. The figure is disciplined by US medical evidence: Chandra et al. (2005) report that roughly 8% of women aged 15–29 have impaired fecundity, and Adda et al. (2017) discount this to 5% because a fraction of those women conceive following treatment.

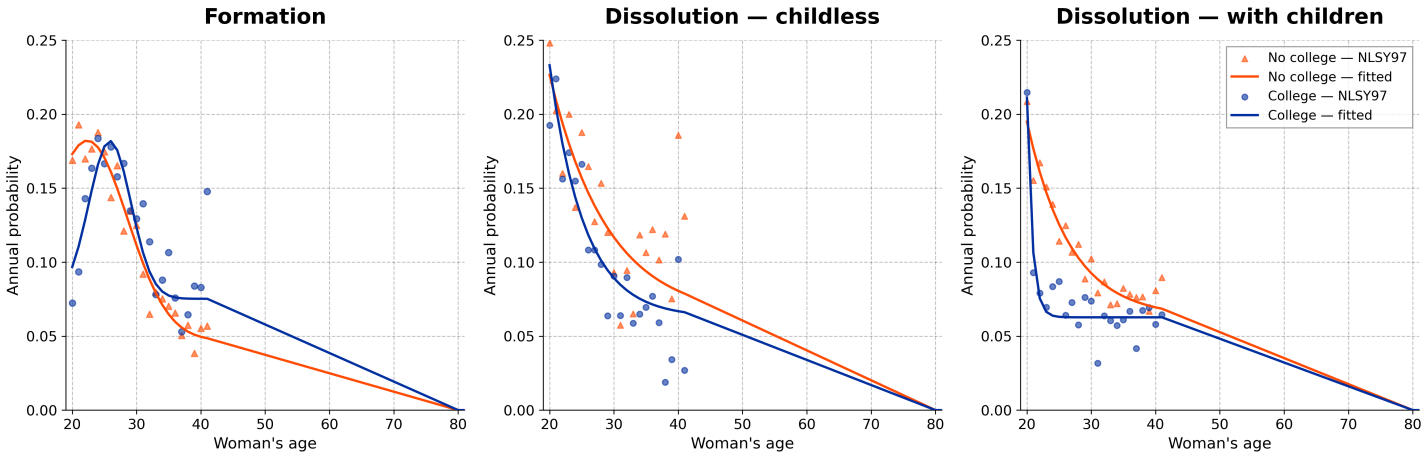


Figure 16: Calibration of the partnership transition hazards

Source: NLSY97; author's calculations. Notes: Annual transition probabilities by the woman's age, for each education type. The left panel is the formation hazard $\pi_{j,\text{form}}$ among single women, fitted as a Gaussian bell in age plus a floor. The middle and right panels are the dissolution hazard $\pi_{j,\text{dissolve}}(n_j)$ among partnered women, fitted as an exponential decay toward a floor, separately for the childless (middle) and for those with children (right). Past the last age with NLSY97 support each fitted hazard declines linearly to zero by 80. Markers are empirical NLSY97 cell hazards; lines are the fitted curves.

This is a reduced-form way to capture the effect of assisted-reproduction technologies absent egg freezing.

Because infertility is unanticipated, an infertile woman freezes at the same rate as a fertile one with the same assets, human capital and partnership status, and learns the outcome only when she tries to conceive. Infertility is a source of *ex post* childlessness. It does not change whether a woman in a given state freezes, but it changes the states infertile women reach: they never conceive, so they stay childless and eligible, and over the life cycle they freeze more often than fertile women with the same entry state (the small positive sterility effect in Figure 9). The estimation targets the parity distribution with the sterile share in place.

A.10 The time cost of a retrieval cycle

The parameter $\delta_R = 4/52$ of Section 4.6 charges one retrieval cycle four weeks of forgone earnings. Four weeks is more than a woman is absent from work. The one direct measurement, Bouwmans et al. (2008), tracked work absence over a four-week IVF window and put productivity losses at about 456 euro per cycle per couple, roughly one week of one person's earnings, and an IVF cycle is more burdensome than a retrieval alone. Clinics report lower figures still, but they sell the procedure.

I therefore read δ_R as a cost of time and disruption: measured absence, travel

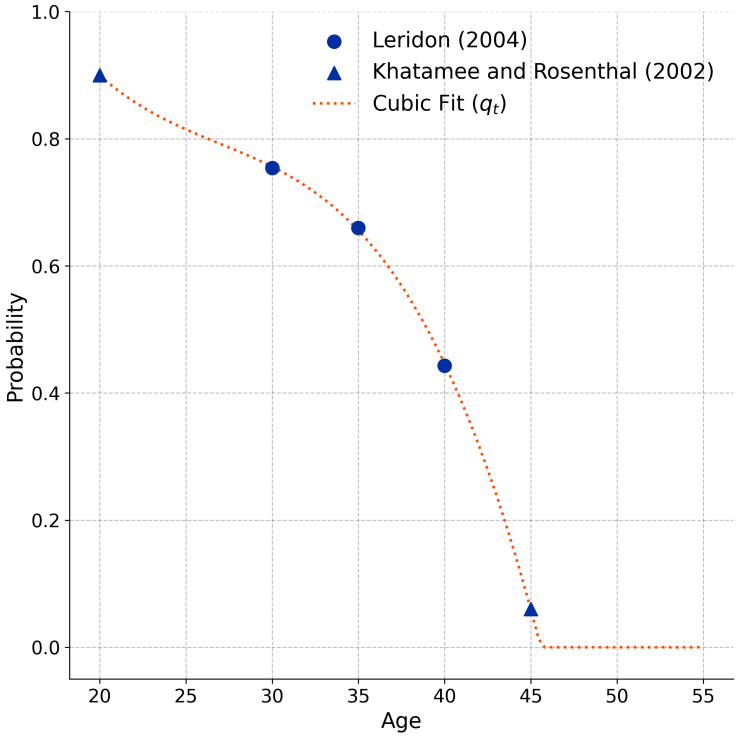


Figure 17: Natural fecundity schedule q_j by age

Source: Leridon (2004) (ages 30–40), Adda et al. (2017) (ages 20 and 45); author's calculations. Notes: markers are the five calibration anchors; the dotted line is the least-squares cubic-in-age fit, clipped to $[0, 1]$ and set to zero past the age at which it crosses zero. This is the schedule q_j entering the conception probability (12).

to monitoring visits, and lower productivity through about two weeks of stimulation side effects.

A.11 The government transfer

The transfer $\mathcal{T}_j^i$ in the budget constraint (17) is a reduced form of the Supplemental Nutrition Assistance Program (SNAP), with the statutory schedule for fiscal year 2026 (48 states and DC, in 2025 dollars),

$$\begin{aligned} \mathcal{T}_j^i(h_j, \ell_j, n_j, o_j, \tilde{e}_j) &= \chi(\ell_j, n_j, o_j) \cdot \max\Big\{0,\ B^{\max}(N_j) - 0.3\, NI_j\Big\}, \\ NI_j &= \max\Big\{0,\ 0.8\big(w^i(h_j)\,\ell_j + \tilde{e}_j\, y_j^i\big) - SD(N_j) - \kappa(n_j, o_j, \ell_j)\Big\}, \end{aligned} \tag{33}$$

where household size $N_j = 1 + \tilde{e}_j + \rho(n_j, o_j)$ counts dependent children as the equivalence scale (3) does. The maximum allotment $B^{\max}(N)$ runs from \$298 a month for one person to \$994 for four, and the standard deduction $SD(N)$ is \$209–223 a month. The factor 0.8 applies the 20% earned-income deduction, childcare is deductible, and bene-

fits phase out at 0.3 per dollar of net income. Eligibility carries the work requirement of H.R. 1 (2025),

$$\chi(\ell_j, n_j, o_j) = \begin{cases} 1 & \ell_j \geq \ell_{\text{PT}}, \\ \min\{\rho(n_j, o_j), 1\} & \ell_j = 0, \end{cases} \tag{34}$$

so a childless woman qualifies only if she works at least part time, while a mother is exempt and loses the exemption gradually as her children leave home. Inside the phase-out she keeps $1 - 0.3 \times 0.8 = 0.76$ of each extra dollar she earns.

B Data Appendix

B.1 Survey samples and variable definitions

PSID. The panel pools the biennial waves 1999–2023. I link the family files to the cross-year individual file and keep every woman who, in some wave, is the reference person or the spouse or long-term cohabiting partner of the reference person. Her age is the survey year minus her modal birth year across waves, which absorbs a single misreported age. Her education group is fixed for life: she is *college* if her highest completed schooling in any wave reaches 16 years. Every statistic is weighted by her longitudinal individual weight, and cells with fewer than 20 observations are dropped. Each wave reports the previous calendar year's labor market outcomes, so the income year is the survey year minus one.

Hours and labor states. Annual hours are winsorized at 4,160, twice a nominal full-time year. The labor state uses usual weekly hours, which the PSID records only from the 2009 wave: under 8 hours is non-work, 8 to 34 part time, and 35 or more full time. A part-time or full-time share is the participation rate (positive annual hours) times the share of workers in that class among those whose weekly hours are observed, so a woman working under 8 hours counts as non-work. Because weekly hours start in 2009, the labor shares describe women aged 25–40 in 2009–2023; they cannot be measured on the 1960–1978 cohorts behind the fertility moments. Parity is the number of births to date, capped at three, so the parity groups are one, two or more, and three or more children. A share over an age window is the average of the age-cell shares,

weighted by cell size.

Wages and units. The wage is the reported hourly wage rate, deflated to 2025 dollars with the CPI-U of the income year. I convert it to the model's units by multiplying by $H = 2{,}024.5$ hours, the weighted mean annual hours of full-time women, and dividing by \$10,000. Labor supply is $\ell =$ annual hours$/H$, so $\ell_{FT} = 1$ by construction and part-time women average 0.50; $w\ell$ is annual real earnings in units of \$10,000 whatever the value of H. The wage profile uses every cohort in the panel, net of cohort effects. Within each education group I regress the log wage on a full set of age dummies and five-year birth-cohort dummies by weighted least squares and read the age profile at the cohort mix of women born 1958–1979. The identifying restriction is the absence of calendar-year effects.

Experience. The experience-slope moment is the slope of the log wage on full-time-equivalent experience among women aged 28–32, with age fixed effects. Experience is one at a woman's first PSID interview and grows each year by her annual hours as a share of full time, capped at one, with hours interpolated across the two-year gap between waves. I keep women first interviewed by age 23, whose careers the panel observes from the start, as the model's are. For a woman first seen at 30 the years before 1999 would be missing from her experience, and that measurement error more than halves the slope.

Fertility. Births come from the Childbirth and Adoption History file, 1985–2023. I count biological births only and date a woman's k-th birth by her age at the earliest record of that birth order. The fertility sample is the women born 1960–1978 who are observed to at least age 45, so that their histories are complete over the window: 736 college and 1,170 no-college women. As in the model, births before 20 are dated at 20 and births after 45 are not counted. From these histories I build the cumulative parity distribution $P(n_a \geq k)$, $k = 1, 2, 3$, at every age from 20 to 45. The parity moments, the first-birth hazards, the mean and variance of the age at first birth, and the distribution of children at entry are all read off it. The first-birth hazard over ages $[a_0, a_1]$ is $[S(a_0 - 1) - S(a_1)]/S(a_0 - 1)$, where $S(a)$ is the share still childless at age a. The duration-progression gaps (23) use the same women as a panel. The partner-income profile, built on PSID couples, is described in Appendix A.7.

CPS June Fertility Supplement. The eight labor shares by youngest child pool the June supplements of 2020, 2022 and 2024. The sample is women aged 25 to 40, weighted by the supplement weight; *college* means a bachelor's degree or more. Parity is the supplement's count of children ever born. A mother's youngest child is her youngest own child under 18 in the household, linked through the parent pointers of the household roster. Childless women form one cell, and mothers fall into three: youngest child aged 0–3 (infant), 4–13 (young) and 14–17 (grown). Mothers with no own child at home belong to none of them. Labor status is the reference-week status, with full and part time split by the BLS recode at 35 usual weekly hours. A woman employed but absent from work counts as non-work if she gave birth in the past year or lives with an own child under one, so that maternity leave is time out of work, as in the model. A share over ages 25–40 is the average of the age-cell shares, weighted by cell size, and cells with fewer than 20 women are dropped.

NLSY97. The NLSY97 follows the 1980–1984 birth cohorts and, unlike the PSID, records cohabitation. The sample is women, weighted by the survey weight of the relevant round; *college* means a bachelor's degree, and a woman is partnered if she is married or cohabiting.

Partnership. A transition counts only when a woman's status is observed at both ends, in rounds one or two years apart, and a two-year transition probability p becomes the annual hazard $1-(1-p)^{1/2}$. Mothers are women with at least one birth in the birth roster. I fit the forms of Appendix A.8 to the age cells from 20 to 45 that hold at least 30 women. The partnered share at entry is the share partnered at 20, by education.

Entry assets. Assets at entry are net financial wealth, financial assets minus debts, from the age-20 asset module; cars, furniture and housing are left out because the model's asset is liquid. The module records a woman's own and jointly held assets, so a partnered woman's figure is the couple's, which is what the model's pooled asset means for a couple. Women without the module are dropped rather than imputed. The weight and the CPI deflator are those of the round in which she answered it, and the distribution is built separately by education.

Childcare. The childcare costs come from the NLSY97 child-care module in 2005,

2008, 2011 and 2015: realized payments, net of subsidies, for family day care and center care, converted to an annual full-time cost at 1,560 hours of care a year and deflated to 2025 dollars. The full-time cost of one child is \$10,743 at ages 0–3 and \$8,845 at ages 4–13.

B.2 The child penalty by age at first birth

Figure 2 reports pseudo-event studies of the first birth in the spirit of Kleven (2026). A cross-section does not follow a woman through her first birth, so the pre-birth periods of each mother are supplied by childless women who look like her and are observed earlier in time.

Data. I pool the Annual Social and Economic Supplement of the Current Population Survey (CPS ASEC), 1968–2020, with the American Community Survey (ACS), 2000–2019, both from IPUMS. The sample is men and women aged 18 to 60; in the ACS I keep households and drop group quarters. Every statistic uses the survey person weight. Each person carries six characteristics, $X = (\text{survey}, \text{sex}, \text{education}, \text{marital status}, \text{race}, \text{state})$: education in four groups (below high school, high school, some college or associate degree, bachelor's degree or more), marital status in five (married with spouse present, married with spouse absent or separated, divorced, widowed, never married) and race in four (white non-Hispanic, black non-Hispanic, Hispanic, other).

Parents, event time and age at first birth. A person is a parent if at least one own child (biological, step or adopted) lives in the household. Event time is the age e of the eldest such child, and the age at first birth is the person's age minus e. A parent enters the study of band B only if this age lies in B; the three bands of the figure, 25–29, 30–34 and 35–40, are separate samples. The eldest child at home is the first child only while that child still lives with the parent, which is why event time stops at ten years.

Outcomes and timing. *Weekly employment* is being employed in the survey reference week, at work or with a job but absent from it; parents with $e = 0, \ldots, 10$ give event times $\tau = e$. *Earnings* are annual wage and salary income, zeros included, deflated to 2020 dollars; it refers to the previous calendar year, so a parent with $e = 1, \ldots, 11$

gives $\tau = e - 1$, and the year in which the eldest child was born is $\tau = 0$.

Matched pre-birth observations. The anchors are parents whose eldest child is under one ($e = 0$). Let $c = (X, t, a)$ be an anchor cell, parents with characteristics X observed in survey year t at age a, and let M_c be its total weight. For weekly employment the cell is matched, for $n = 1, \ldots, 5$, to all childless persons with the same X observed in year $t - n$ at age $a - n$, who provide event time $\tau = -n$. For earnings, which look back one year, $n = 0, \ldots, 4$ and $\tau = -n - 1$. Matching is within survey: CPS parents are matched to CPS non-parents and ACS parents to ACS non-parents. A matched person j with weight w_j in the target cell $c' = (X, t - n, a - n)$ enters with weight

$$\omega_j = w_j \frac{M_c}{K_{c'}}, \qquad K_{c'} = \sum_{i \in c'} w_i,$$

so the matched controls for each n carry exactly the weight of the anchors they stand in for. This is the rule of Kleven (2026), under which each anchor is matched to all k eligible non-parents with weight $1/k$, written with survey weights.

Estimation. The stacked sample of parents and matched non-parents is estimated separately by sex by weighted least squares,

$$Y_{it} = \sum_{\tau \neq -2} \beta_\tau \, \mathbf{1}[\tau_i = \tau] + \sum_a \alpha_a \, \mathbf{1}[\text{age}_{it} = a] + \sum_y \nu_y \, \mathbf{1}[t = y] + \gamma \, \mathbf{1}[\text{ACS}_i] + \varepsilon_{it}, \qquad \tau \in \{-5, \ldots, 10\},$$

with $\tau = -2$, the year before conception, as the omitted period. The impact plotted at event time τ is

$$P_\tau = \frac{\hat{\beta}_\tau}{\mathbb{E}\left[\tilde{Y}_{it} \mid \tau\right]},$$

where $\tilde{Y}_{it}$ is the fitted value net of the event-time term and the expectation is the weighted mean over the observations at τ. The 95 percent intervals are ± 1.96 heteroskedasticity-robust (HC0) standard errors of $\hat{\beta}_\tau$, divided by the same denominator, which is treated as fixed. The average impact is $\frac{1}{11}\sum_{\tau=0}^{10} P_\tau - \frac{1}{5}\sum_{\tau=-5}^{-1} P_\tau$. The figure shows women only.

Limitations. Three features of the construction bear on how the figure is read. First, the comparison group is matched on observed characteristics at the time of the birth, so women who postpone their first birth may differ from earlier mothers in ways the cells do not capture. Second, each band is identified off a narrower range of ages, so age effects and event-time effects are separated less sharply than in the pooled sample; this shows in the earnings of the youngest group, which rise before the birth as the earnings of young women grow steeply with age. Third, before 1977 the CPS identifies only groups of states, so anchors observed in 1977–1981 lose part of their matches in earlier years. The weekly employment measure uses the reference-week questions of the ASEC and the ACS only.

B.3 National assisted-reproduction registries

The diffusion series in Figure 3 come from the national and regional assisted-reproduction registries in Table 11, harmonized to annual counts. Most registries count egg-freezing cycles; the UK, France and Spain count patients. I put every series on a patient basis by dividing cycle and act counts by 1.3 cycles per patient. The ratio comes from the HFEA series, the one that reports both units: since 2019 it has stayed between 1.22 and 1.26 freezing cycles per patient a year, which I approximate by 1.3, slightly above that range.

Coverage caveats. Every panel of Figure 3 counts patients per 1,000 women aged 20–45, with the female population from the UN World Population Prospects 2024 (estimates to 2023, median projections for 2024–2025). Australia and New Zealand are pooled, as ANZARD reports them, and the Latin American denominator is the population of the 17 REDLARA member countries.

The medical/elective split is unavailable for the United States and Belgium, which report totals only, for Australia and New Zealand before 2020, and for Canada before 2023; in those years the panel shows the total alone. Spain reports medical patients and Sweden elective cycles, so the other band is the difference from the total. The Latin American medical count is missing for 2020 and interpolated. Medical egg freezing in South Africa is recorded for oncological indications only, so its medical band is a lower bound and the elective share cannot be identified (the elective band is omitted). REDLARA and ANARA are voluntary registries that count only the

Table 11: Registries behind the egg-freezing diffusion series

Country	Registry	Years	Unit	Indication split
Australia, New Zealand	ANZARD	2015–2023	cycles	from 2020
Belgium	BELRAP	2011–2023	cycles	none
Canada	CARTR Plus	2013–2024	cycles	2023–2024
France	ABM	2014–2025	patients	elective from 2022
Germany	D.I.R	2017–2024	cycles	full
Latin America	REDLARA	2012–2022	cycles	full
Portugal	CNPMA	2016–2023	acts	full
South Africa	ANARA	2018–2022	cycles	oncological only
Spain	SEF	2011–2023	patients	medical reported
Sweden	Q-IVF	2016–2023	cycles	elective reported
United Kingdom	HFEA	2009–2024	patients	full
United States	SART	2014–2024	cycles	none

Notes. Years are those with a total series in Figure 3. Where only one of the two indications is reported (Spain, Sweden), the other is the difference from the total. ABM: Agence de la biomédecine. ANARA: African Network and Registry for Assisted Reproductive Technology, a voluntary multinational registry. ANZARD: Australian and New Zealand Assisted Reproduction Database. BELRAP: Belgian Register for Assisted Procreation. CARTR Plus: Canadian Assisted Reproductive Technologies Register Plus. CNPMA: Conselho Nacional de Procriação Medicamente Assistida. D.I.R: Deutsches IVF-Register. HFEA: Human Fertilisation and Embryology Authority. Q-IVF: Swedish National Quality Registry for Assisted Reproduction. REDLARA: Red Latinoamericana de Reproducción Asistida, a voluntary regional registry with 17 member countries. SART: Society for Assisted Reproductive Technology. SEF: Sociedad Española de Fertilidad.

centers that report to them (REDLARA covers about 70 to 80 percent of the region's assisted-reproduction cycles), so both panels understate activity.

In France, elective freezing was banned before 2022; the 2021 bioethics law made retrieval free and publicly funded, so the elective series begins in 2022. The French registry stops in 2023: the 2024–2025 elective counts come from the Agence de la biomédecine's interim survey on the application of the law, and the 2024–2025 medical counts repeat the 2023 value, so the figure hatches that segment as provisional. The dip in 2020 in Belgium, France, Spain and the UK reflects clinic closures during the COVID-19 pandemic.

B.4 Take-up and socioeconomic selection

Women who freeze their eggs electively are far more educated and far richer than other women of their age. Figure 18 sets the share with a bachelor's degree or more in five surveys of such women, covering six countries, against the share among all women aged 35–44 in the same country and year (OECD, 2026). The gap is large everywhere: 97 percent against 51 in the US and 57 in Israel (Inhorn et al., 2018), 92

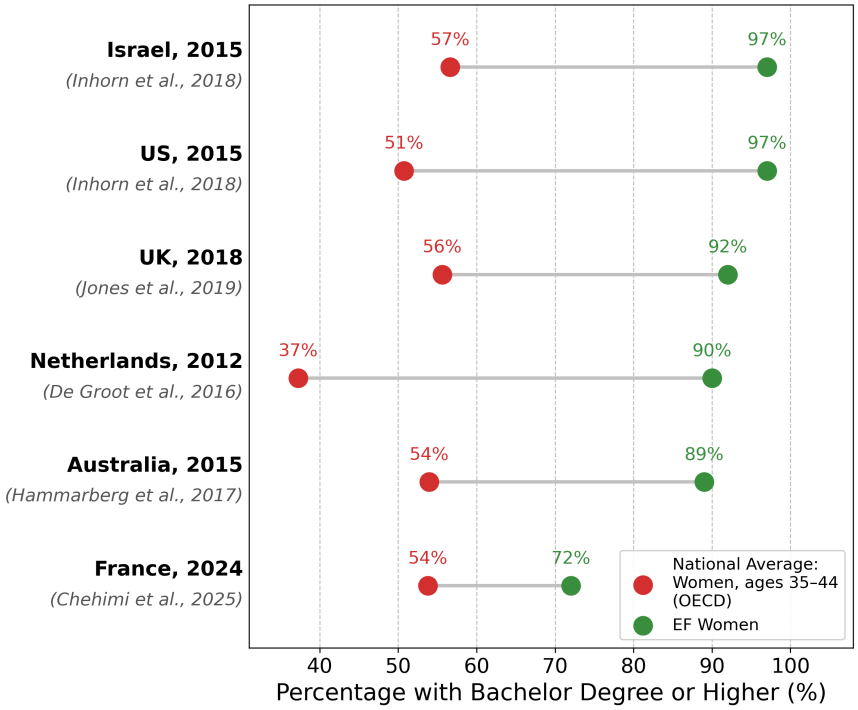


Figure 18: Education of women who freeze their eggs

Sources: Inhorn et al. (2018), Jones et al. (2020), de Groot et al. (2016), Hammarberg et al. (2017), Chehimi et al. (2025) and OECD (2026). Notes: Green markers are the share of survey respondents who froze their eggs electively and hold a bachelor's degree or more. Red markers are the share of women aged 35–44 with tertiary education (ISCED levels 5–8) in the survey's country and reference year. The OECD measure includes short-cycle tertiary degrees, so it overstates the national share with a bachelor's degree and the gaps are, if anything, understated.

against 56 in the UK (Jones et al., 2020), 90 against 37 in the Netherlands (de Groot et al., 2016), and 89 against 54 in Australia (Hammarberg et al., 2017). It is smallest in France, where retrieval has been free since 2022: 72 percent against 54 (Chehimi et al., 2025).

Income tells the same story (Figure 19). The surveys report income in brackets, so I fit a lognormal distribution to the bracket counts by maximum likelihood and read off its deciles. The median French woman who froze her eggs in 2022–2024 earns about 36,000 euros a year, against about 21,000 euros for single women in the 2023 income survey (INSEE-DGFiP-Cnaf-Cnav-CCMSA, 2026). The median woman who froze her eggs at one US academic center in 2012–2016 earns about $133,000, against about $34,000 for single women aged 20–45 in the 2015 CPS (Flood et al., 2024; Greenwood et al., 2018). Each survey is small and comes from a few clinics, so together they show the direction and rough size of the selection rather than a representative profile of the women who freeze.

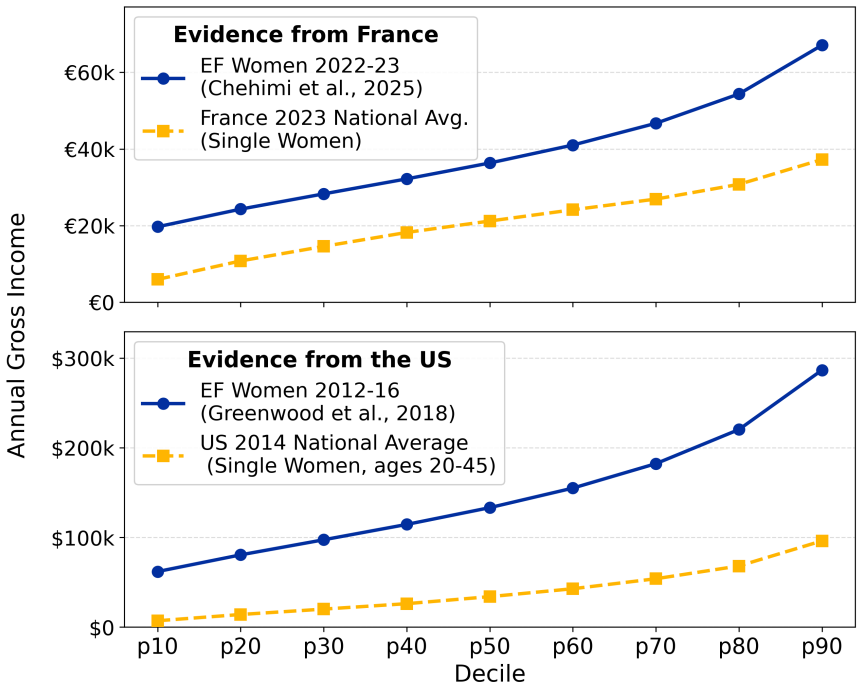


Figure 19: Income of women who freeze their eggs

Sources: Chehimi et al. (2025), 179 women in France, November 2022 to April 2024; Greenwood et al. (2018), 190 women at one US academic center, 2012–2016, excluding non-response; INSEE-DGFiP-Cnaf-Cnav-CCMSA (2026); CPS Annual Social and Economic Supplement 2015 (Flood et al., 2024). Notes: Deciles of annual gross income. For the women who froze their eggs, the deciles come from a lognormal distribution fitted by maximum likelihood to the survey's income brackets. The French comparison is the declared income of single-woman households; the US comparison is single women aged 20–45, income year 2014.

B.5 Clinic prices

The prices in Section 3.3 come from freeze.health, a free online resource on egg freezing that compiles clinics' list prices (Freeze, 2026). Its team collects each price from the clinic's website or by asking the clinic directly, and it has gathered and updated the records continuously over time, so the data are a rolling snapshot rather than a single survey wave. For the United States they cover 561 clinic establishments in 2025. For comparison, the Centers for Disease Control and Prevention counted 457 clinics reporting assisted-reproduction cycles in 2022 (Centers for Disease Control and Prevention, 2026). The CDC counts clinics and the price data count establishments, so a clinic that operates several sites can enter the price data more than once. The US prices in the model are the averages over these establishments: $12,800 for a retrieval cycle and $750 a year for storage.

The same source covers 217 clinics in 36 other countries. Table 12 reports their list prices in US dollars for the countries with at least seven clinics that post both a first-

Table 12: Egg-freezing list prices across countries

Country	Clinics	First cycle and consultation	Storage per year	Total
United Kingdom	40	$6,241	$492	$6,733
Spain	24	$2,817	$408	$3,225
Canada	19	$6,389	$444	$6,832
Australia	10	$4,521	$339	$4,861
Denmark	10	$4,123	$344	$4,467
India	9	$2,761	$451	$3,212
Colombia	8	$3,277	$390	$3,667
Slovakia	8	$2,210	$173	$2,382
Singapore	7	$8,208	$592	$8,800
All countries outside the US	187	$4,531	$424	$4,955
United States (model)		$12,800	$750	$13,550

Notes. List prices in US dollars from Freeze (2026). Averages are over clinics that report both the first-cycle price and the annual storage fee; the initial consultation is added where listed and counted as zero where it is not. Multi-site chains count once per site. Countries are ordered by number of clinics. List prices may exclude stimulation drugs.

cycle price and an annual storage fee. A first cycle costs on average $4,531 outside the US, about a third of the US price, and a year of storage $424. The comparison flatters the other countries somewhat, because their list prices may leave out stimulation drugs.

B.6 US insurance coverage of elective egg freezing

In the United States few women have insurance that pays for elective egg freezing, and no published estimate of their number exists. State mandates almost never cover elective freezing: they target fertility *preservation* ahead of iatrogenic infertility. The channel that matters is employer benefits, and in both employer surveys below egg freezing is the least-covered family-building benefit. In the KFF Employer Health Benefits Survey, cryopreservation ranks last among family-building benefits at firms with 200+ workers, covered by 12%, against 27% for IVF and 37% for fertility medications; the same survey reports that 38% of respondents did not know whether their plan covered cryopreservation at all, the highest "don't know" share of any family-building benefit (Kaiser Family Foundation, 2024). Mercer's repeated employer surveys show both a steep firm-size gradient and a fast trend: elective egg-freezing coverage at firms with 500+ employees rose from 5% in 2015 to 11% in 2020, while

among employers with 20,000+ employees it rose from 6% to 19% over the same period (Mercer, 2021); by 2022 the 500+ figure had reached 16%, against 37% among large high-tech employers and 63% among the Fortune Best Companies (Mercer, 2023). Even where offered, coverage is partial: among employers covering fertility treatment, 60% impose a lifetime dollar maximum, with a median of $20,000 at firms with 500+ employees ($16,250 across all firm sizes), enough for about one and a half retrieval cycles at the prices of Section 3.3, and about a third still require an infertility diagnosis to qualify (Mercer, 2021 for the limits; Mercer, 2023 for the diagnosis requirement). Because this coverage concentrates among large, high-paying firms and their higher-earning workers, insurance in the US segments access even further across the income distribution.

B.7 Coverage and public subsidy outside the United States

Outside the United States national health systems reimburse fertility preservation for medical indications but leave elective freezing out of pocket. That is the rule in the United Kingdom and in most of continental Europe, and it holds even in Israel, which subsidizes IVF among the most generously in the world yet keeps elective oocyte cryopreservation outside the national health basket (Birenbaum-Carmeli, 2023).

France is the exception, and a recent one. Until the bioethics law of August 2021, a woman could freeze her eggs without a medical reason only as part of an egg donation; since then, retrieval without a medical indication is covered by national health insurance for women aged 29 to 37, leaving the patient only an annual storage fee of about 40 euros (Assurance Maladie, 2026, 2025). The age window is itself a policy instrument. It opens at 29, so it misses the retrievals that Section 7.1 places in the late twenties, and it closes at 37, before the ages at which banked eggs are worth least.

Between the French regime and the out-of-pocket norm sits a third and more recent model: a capped voucher that lowers the price of a cycle without removing it. Four such schemes are in operation, and they are the closest existing analogues to the partial cost cuts swept in Table 6.

Tokyo. Since 2023 the Tokyo Metropolitan Government has subsidized elective freezing for resident women aged 18 to 39 up to 300,000 yen, about $2,000: up to

200,000 yen toward the retrieval, about $1,350, and 20,000 yen a year for five years of storage (The Japan Times, 2024). The ceiling is flat, so it works as a flat cut of roughly a tenth of the average US retrieval price documented in Section 3.3.

Seoul. Since September 2023 the Seoul Metropolitan Government has reimbursed 50% of the cost of one cycle (the pre-retrieval tests and the procedure, but not storage) up to 2 million won, about $1,500, once in a lifetime, for women aged 20 to 49 who have lived in Seoul for at least six months. Unlike Tokyo's, the Seoul scheme is a co-insurance rate with a cap rather than a flat voucher, and it screens on ovarian reserve: applicants in their twenties qualify only with an anti-Müllerian hormone level at or below 3.5 ng/mL, or a diagnosis bearing on ovarian function, while women in their thirties and forties qualify regardless. The screen was tighter at launch, at 1.5 ng/mL; in 2024 the city relaxed it and raised the number of places from 300 to 650 (Seoul Metropolitan Government, 2024a,b).

Apulia. In 2024 Apulia became the first Italian region to fund elective freezing, with a one-off contribution of up to 3,000 euros, about $3,300, for women aged 27 to 37 resident in the region for at least twelve months, funded at 900,000 euros over 2025–2027 (Il Sole 24 Ore, 2025). It was the first to means-test: eligibility requires an ISEE household indicator at or below 30,000 euros. Diagnostic work-up preliminary to the cycle is excluded from the contribution.

Tuscany. In September 2026 Tuscany became the second Italian region to fund elective freezing, on terms close to Apulia's: up to 3,000 euros, about $3,300, for women aged 25 to 39 resident in the region for at least a year and with an ISEE at or below 30,000 euros, funded at 550,000 euros over 2026–2028 (Il Post, 2026). Its age window is wider than Apulia's at both ends, and it applies the same income ceiling.

The four target different margins: age alone in Tokyo, age and ovarian reserve in Seoul, and age and household income in Apulia and Tuscany. Each restricts which women receive the subsidy as well as setting its size. Age and household resources are state variables in the model, so it can price the Tokyo, Apulia and Tuscany rules; ovarian reserve is outside the model, and so is Seoul's screen. The counterfactuals of Section 8 sweep the price uniformly; targeting of this kind is left to further work.

C Additional Results

C.1 The child penalty: model and data

Figure 20 compares the effect of a first birth on employment and earnings in the model with the event studies of Kleven (2026, Figure 8) for American women, by education. Section 6.1 discusses the fit; here I describe how the two sets of lines are built.

Data. Kleven (2026) estimates pseudo-event studies of the first birth on CPS and ACS data, separately for women with a college degree and women with at most a high-school diploma, on parents whose first birth falls at ages 25–45. Each dotted line is the effect on women minus the effect on men, in percent of the outcome expected without children, normalized to zero at $\tau = -2$, the year before pregnancy. I read the series off the published vector figure; they reproduce every penalty printed on it to within 0.6 percentage points. In the long run the penalty barely depends on education: five to ten years after the birth, employment is 21 and 20 percent lower and earnings 23 and 20 percent lower. The less educated lose more at the birth itself, 26 percent of employment against 18, and win more of it back over the following decade.

Model. The model needs no male control group, because it observes each woman's childless outcome directly. For each education type I simulate 100,000 women at $\hat{\theta}$, 50,000 of each taste type, with egg freezing unavailable, as it essentially was in Kleven's data. I then simulate every woman a second time as permanently infertile ($\iota = 1$), on the same random draws. She does not know ι (Appendix A.9), so the infertile copy solves the same problem, makes the same choices and follows exactly the same path until the first birth of the original. With F the age at first birth, the effect at event time τ is

$$P_\tau \;=\; \frac{\mathbb{E}\big[\, Y_{F+\tau}(F) - Y_{F+\tau}(\infty) \,\big]}{\mathbb{E}\big[\, Y_{F+\tau}(\infty) \,\big]},$$

where $Y(F)$ is the outcome of the woman as simulated and $Y(\infty)$ that of her infertile copy, and the expectation runs over women whose first birth falls at ages 25–45, Kleven's sample. Because the two paths coincide before the birth, $P_\tau = 0$ for every

$\tau < 0$ by construction, not by a parallel-trends assumption. Later births are part of the effect, as in the data: ten years after the first birth 77 percent of these women have a second child. Employment is $\mathbf{1}\{\ell > 0\}$ over the year. Earnings are gross labor earnings, zeros included and childcare costs not netted out, which matches Kleven's wage and salary income.

Two differences remain. The model's no-college type includes women with some college, whom Kleven's lower group leaves out. And Kleven pools five decades over which the US child penalty fell, while the model describes women born in the early 1980s.

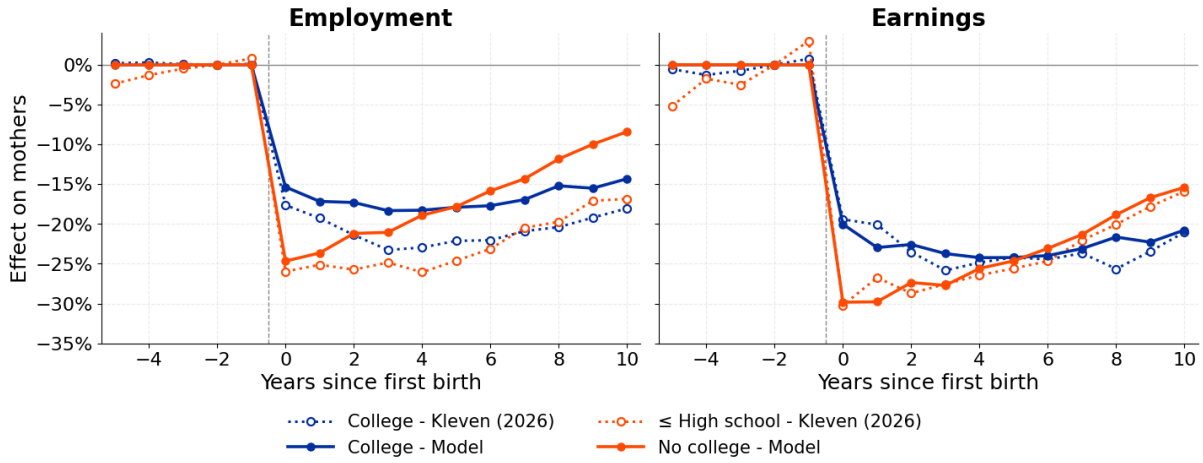


Figure 20: Impact of the first birth on women's employment and earnings, by education: model vs. Kleven (2026)

Notes. Dotted lines with hollow markers: Kleven (2026, Figure 8), women minus men, for women with a college degree (blue) and with at most a high-school diploma (orange). Solid lines: the model at $\hat{\theta}$, each woman against her own permanently infertile copy, first births at ages 25–45. Effects are in percent of the outcome expected without children and are zero at $\tau = -2$. Construction in Appendix C.1.

C.2 The price of a cycle: take-up, cycles and thawing

Section 8.1 scales the cash costs of egg freezing by the factor λ_F and reports take-up, fertility and human capital (Table 6). Table 13 and Figure 21 add the two margins conditional on retrieving at least once by 45: the number of retrieval cycles, and the share of these women who ever thaw their eggs.

The number of cycles moves in opposite directions in the two education groups. Among no-college women who retrieve, it falls steadily with the price, from 3.17 when the cycle is free to 1.41 at the baseline and 1.16 at twice the baseline. Among college

women it falls from 4.13 to 2.92 at the baseline and then rises again, to 3.27 at twice the baseline: as the price goes up, the college women who keep retrieving are those who value the stored eggs most, and they retrieve more often.

The share who thaw rises with the price in both groups, because the women a lower price draws in are the ones least likely to use their eggs. For college women it rises from 23% when the cycle is free to 34% at the baseline and 53% at twice the baseline. For no-college women it rises from 28% to 75% at the baseline and stays between 70% and 75% at higher prices. Above the baseline, fewer than 9% of no-college women retrieve, so these shares rest on between about 1,500 and 8,500 simulated women.

Table 13: The price of a cycle: take-up, cycles and thawing

	Ever retrieves		Retrieval cycles		Ever thaws	
Price factor λ_F	College	No college	College	No college	College	No college
0.00	0.982	0.943	4.13	3.17	0.227	0.278
0.25	0.912	0.605	3.70	2.02	0.221	0.420
0.50	0.792	0.343	3.20	1.68	0.240	0.602
0.75	0.641	0.239	2.95	1.54	0.285	0.717
1.00	0.512	0.165	2.92	1.41	0.340	0.747
1.25	0.419	0.085	3.00	1.38	0.400	0.716
1.50	0.357	0.046	3.10	1.30	0.452	0.703
1.75	0.313	0.027	3.19	1.22	0.496	0.716
2.00	0.281	0.015	3.27	1.16	0.531	0.725

Notes. λ_F scales the three cash components of $\mathcal{C}^{EF}(f_j, \tilde{f}_j)$ (retrieval, storage and thaw) by a common factor; $\lambda_F = 1$ is the baseline and the time cost δ_R is held at $4/52$. "Ever retrieves" is the share of women who retrieve at least once by 45. "Retrieval cycles" is the mean number of retrieval cycles, and "Ever thaws" the share who thaw at least once by 50, both among women who retrieve at least once. 100,000 simulated women per education type; same simulation as Table 6.

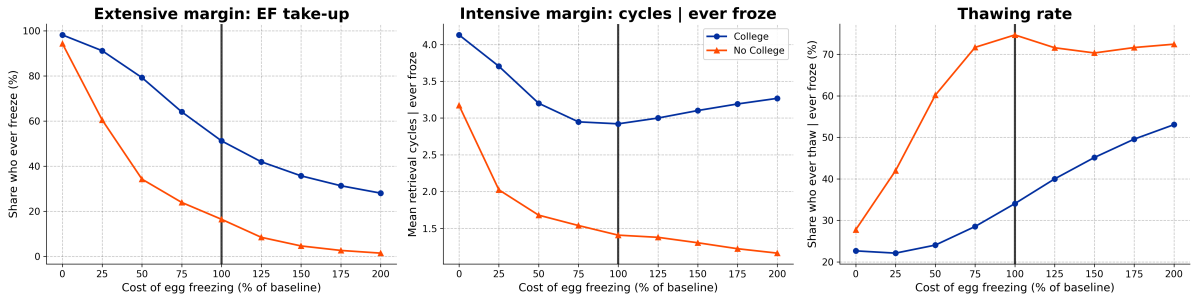


Figure 21: Take-up, retrieval cycles and thawing against the price of a cycle

Notes. Left: share of each education type that retrieves at least once by 45. Middle: mean number of retrieval cycles among women who retrieve at least once. Right: share of those women who thaw at least once by 50. The horizontal axis is the price factor λ_F in percent of the baseline; the vertical line marks the baseline price. Values are those of Table 13.

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