Fertility and Family Labor Supply*

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Abstract

We study how fertility decisions interact with labor supply of men and women. First, we use longitudinal Danish register data and tax reforms to show that increases in wages of women decrease fertility while increases in wages of men increase fertility. Second, we estimate a life-cycle model to quantify the importance of fertility adjustments for labor supply and long-run gender inequality. Wage elasticities of women are more than 10% lower if fertility cannot be adjusted in our model. Finally, we show that human capital depreciation around childbirth is an important driver of the long-run gender wage gap.

Keywords: Fertility, Labor supply, Human capital accumulation, Gender inequality, Tax reform, Life-Cycle.

JEL Codes: J22, J13, D15, H24

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1 Introduction

Understanding labor supply is a key part of evaluating policy reforms. However, labor supply choices are not made in isolation of other decisions, and in particular the arrival and rearing of children is deeply interconnected with labor market behavior.[1] Further, decisions about fertility and labor supply have lasting implications over the life-cycle and for gender pay gaps, through the impact on human capital. The aim of this paper is to quantify this feedback mechanism between fertility and labor supply choices. We call this the *fertility multiplier*, and show how this multiplier changes the implications of core labor market policy reforms.

We provide three main contributions. Our first contribution is to document that fertility responds to wage changes empirically in different ways for men and women. We use longitudinal register data on Danish couples and labor income tax reforms, especially in 2009/2010, to pin down how fertility decisions are affected by changes in the marginal net wage rates of men and women, analogous to the elasticity of taxable income literature (see e.g. Gruber and Saez, 2002). We find strong asymmetric effects: Increased marginal net wages of women reduce fertility of couples, while increased marginal net wages of men increase fertility. Our results imply that the substitution effect between children and labor supply is dominating for women while the income effect is dominating for men.

Our second contribution is to quantify the importance of fertility adjustments for labor supply responses and labor market gender inequality. We estimate separately by education groups a dynamic life-cycle model of couples in which they decide on the number and timing of children, along with labor supply of women and men. Parents derive direct utility from children, but the number and age of children also affect the dis-utility from market work, potentially in different ways for women and men. Children and labor market outcomes are interlinked through several channels and, since biological fecundity declines with age, there is a tension between human capital accumulation motives and fertility in the model.

We estimate substantial gender differences in the dis-utility of work when children are present. For less skilled women, the dis-utility from work increases by 61.1% at the time of first childbirth, whereas for their male partners the increase is 3.9%.[2] These

[1] There is a wide literature on the impact of children on labor market outcomes, see for example Rosenzweig and Wolpin (1980); Waldfogel (1998); Simonsen and Skipper (2006, 2012); Bertrand, Goldin and Katz (2010); and Kleven, Landais and Søgaard (2019).

[2] The dis-utility from labor market work when children are present captures a range of different mechanisms. These include intra-household bargaining, time-allocation decisions, preferences, norms and

gender differences are important drivers of the asymmetric response to wage changes, and explain a large part of the so-called “child penalty“ in the share of women working around childbirth in the model. Our model also suggests, however, that the estimated differences in the dis-utility from market work when children are present is not the main driver of long run gender wage inequality: Removing the gender difference reduces the short run gender gap as women work more when young, but this is offset by an increase in fertility from the lower utility cost of having children while working. On the other hand, human capital depreciation and its interaction with fertility decisions are important drivers of the long run gender wage gap. Human capital depreciation while on maternity leave, reduces labor supply and fertility and explains about a quarter of the long run gender pay gap.

To quantify how important fertility adjustments are, we compare behavior in our estimated model with a counterfactual scenario in which couples cannot adjust fertility in response to changes in economic incentives. With exogenous fertility, labor supply does not respond as much to wage changes and the labor supply elasticity is around 10% lower.

Our final contribution is to analyze labor market policy reforms within our framework. We focus on subsidies to the cost of childcare, the earned income tax credit (EITC) and maternity leave. We find that increased subsidies to the cost of children increase fertility and lower labor market work, especially by young women. By age 50, however, the difference in labor supply has reduced and there is little impact on the long run gender wage gap. Removing maternity leave increases the labor supply of mothers after first childbirth relative to the baseline, but the difference is much lower by age 50. Nonetheless, the increase in early labor supply reduces the gender pay gap later in the life. Letting the EITC depend on the number of children increases completed fertility substantially and reduces hours worked, in line with Keane and Wolpin (2010).

We contribute to two main strands of literature. We contribute to a growing literature analyzing women's labor supply through the lens of dynamic economic models.[3] Most existing studies of women's labor supply treat fertility as exogenous, with some notable exceptions including Moffitt (1984); Hotz and Miller (1988); Francesconi (2002); Sheran (2007); Keane and Wolpin (2010); Adda, Dustmann and Stevens (2017); Yamaguchi (2019); and Eckstein, Keane and Lifshitz (2019).[4] We build on the seminal work

labor market discrimination. Our assumption is that the dis-utility function is constant across policies.

[3] There is a large literature related to our paper which analyzes dynamic labor supply of men with endogenous human capital accumulation. See e.g. Eckstein and Wolpin (1989); Keane and Wolpin (1997); Imai and Keane (2004) and the reviews by Keane (2011, 2022).

[4] A non-exhaustive list of key contributions to the literature on women's labor supply: Heckman and Macurdy (1980); Rosenzweig and Wolpin (1980); Moffitt (1984); Hotz and Miller (1988); Eckstein

by Gary Becker (e.g. Becker 1960; Becker, Murphy and Tamura 1990) by quantifying the interaction of dual-earner labor supply dynamics along with fertility planning. Our focus is on the number of children rather than the quality of investments into those children. The studies closest related to ours are Adda, Dustmann and Stevens (2017) and Eckstein, Keane and Lifshitz (2019). Adda, Dustmann and Stevens (2017) model endogenous educational attainment, fertility, female labor supply and occupational choice of women along with endogenous wealth accumulation. Male labor supply is exogenous in their model. In our model, we treat men and women symmetrically to allow for non-separability between labor supply and fertility for both men and women. Eckstein, Keane and Lifshitz (2019) model both male and female labor supply as endogenous choices along with educational attainment, fertility and marriage and divorce. Instead of modelling marriage and education decisions, we condition on education at age 25, and focus on couples with fixed Pareto weights. We abstract from the intra-household allocation of time between e.g. market work, home production and child rearing. We do not have access to time-use data nor data on spending on particular goods that would enable this analysis. Our way forward is to include partners market work in an individuals' dis-utility of working in the presence of children. This is analogous to assuming that the allocation of time not spend on market work to other tasks and chores, such as child rearing, is fixed.[5] This assumption allows us to remain agnostic about the origins of the estimated gender differences in the dis-utility from working when children are present.

In our model, we include the decision on how much to save, which means that households' wealth can matter for decisions. Some of the incentives to smooth (such as to smooth child costs) are achieved through saving. Without saving, all childcare costs (for example) would have to be met by income generated that period. This ties to the notion of children as a consumption commitment (analogous to Chetty and Szeidl, 2007): the amount of resources available for future expenditure on children will be a key determinant of the timing and number of children. More generally, any desire to move income to the future would require more human capital accumulation to increase future wages. We do not want to overstate the importance of the wage incentives on fertility and on labor

and Wolpin (1989); Klaauw (1996); Francesconi (2002); Sheran (2007); Keane and Wolpin (2010); Guner, Kaygusuz and Ventura (2012); Bronson (2015); Bick (2016); Greenwood, Guner, Kocharkov and Santos (2016); Blundell, Dias, Meghir and Shaw (2016); Adda, Dustmann and Stevens (2017); Attanasio, Levell, Low and Sánchez-Marcos (2018); Yamaguchi (2019); Eckstein, Keane and Lifshitz (2019); Guner, Kaygusuz and Ventura (2020); Bronson and Mazzocco (2021) and Borella, De Nardi and Yang (2023).

[5] Siminski and Yetsenga (2022) show that the intra-household allocation of time devoted to household production and childcare are hardly affected by the relative wages of men and women in Australia.

supply, and so we allow for this extra margin.

We also contribute to a literature on how fertility adjusts to financial incentives. Previous research has shown that the likelihood of giving birth responds to financial incentives directly targeted on fertility, such as child subsidies and tax reliefs (see e.g. Rosenzweig, 1999; Milligan, 2005; Brewer, Ratcliffe and Smith, 2012; Cohen, Dehejia and Romanov, 2013; Laroque and Salanié, 2014), and child care costs (Blau and Robins, 1989; Del Boca, 2002; Mörk, Sjögren and Svaleryd, 2013; Wang, 2022). We provide the first empirical evidence that fertility responds to changes in taxes not directly linked to the presence of children.[6]

The paper proceeds as follows: In Section 2, we describe the Danish data used throughout and in Section 3 we present our empirical findings that increased female wages reduce fertility while increased male wages increases fertility. We present a life-cycle model of families that capture the trade-off between labor market supply and fertility in Section 4. In Section 5 we discuss the estimation strategy and present the model fit. In Section 6 we simulate permanent wage increases, compare outcomes to the Danish data and quantify the role of fertility adjustments for labor market responses. Our key findings are in Section 7 where we use our model to simulate counterfactual policy changes and show the importance of fertility adjustments for the short and long-run labor market gender inequality. In Section 8 we explore the sensitivity of our results to the human capital process and the Pareto weights. We conclude in Section 9.

2 Data and Institutional Background

We use longitudinal Danish administrative register data on the universe of Danish individuals from 2004 through 2018. Our use of this high quality data is twofold. First, in Section 3, we utilize Danish tax reforms from 2009 to 2018 to document how fertility responds to changes in the marginal net-of-tax wage rate. Second, we use detailed labor market information from 2010–2018 to estimate our life-cycle model in Section 5.2. We refer to the two samples as the "tax sample" and "estimation sample", respectively.

[6] Heckman and Walker (1990) find that fertility is decreasing in wages of women but slightly decreasing in wages of men. More recently and exploring natural experiments, Black, Kolesnikova, Sanders and Taylor (2013) and Kearney and Wilson (2018) find that fertility is increasing in men's wages and Schaller (2016) and Autor, Dorn and Hanson (2019) find that improved local labor markets of men increase fertility while improved local labor markets of women decrease fertility. Keller and Utar (forthcoming) find that worsened Danish local labor market conditions from Chinese import competition leads to increased fertility and reduced labor market work of women but not of men.

We link individuals to potential partners through Statistics Denmark's definition of a family, including both married and cohabiting couples.[7] We link children through the mother and father ID of newborns and adoptees. The main variables used throughout, besides fertility and the number of children, are income and labor supply indicators, as we will describe below. Detailed variable definitions are given in Section A in the Supplemental Material.

In the estimation sample, used to estimate the model in Section 5.2, we utilize detailed monthly pay-slip information through the Danish eIndkomst register (BFL). This data is only available in the last part of our sample period and the estimation sample thus includes the years 2010–2018. This data is well suited for our purpose because we can define the degree of labor market participation based on hours worked as reported on the pay-slip and we can use the monthly frequency to accurately account for changes around childbirths. Unless otherwise noted, we aggregate monthly pre-tax labor income and working hours to the annual level using the calendar year. When we calculate estimation moments around child arrival, however, we center the year around the childbirth such that income and hours worked in the birth year is the sum of 12 months from the month of birth. Another benefit of this data is that we can remove labor income and hours registered while on parental leave. See Supplemental Material A for a detailed description of how we handle paid parental leave.

Depending on the employment contract, hours worked are either contracted hours or actual hours. Many employees are hired on fixed-pay contracts and do not get overtime pay.[8] We therefore primarily use hours worked to construct indicators of labor market participation and what we will refer to as part time and full time work. Concretely, an individual is said to participate in the labor market if working at least 481 hours annually (e.g. 37 hours in 13 weeks) with an annual income of at least 50,000DKK ($8900).[9] We denote part time work as working between 481 and 1,664 hours annually (e.g. 32 hours in 52 weeks) and full time work as working more than 1,664 hours annually. Although this measure is arguably one of "part year" work, we refer to this as "part time" work

[7] Families are both married and cohabiting couples. Cohabiting couples are defined as either two adults living at the same address who are registered as parents to a child, or two adults of opposite sex with an absolute age-difference less than 15 years, registered as living at the same address.

[8] Around 36 percent of the survey respondents in the Danish labor force survey (1st quarter, 2017), who worked overtime in the week of the survey, received overtime pay. Since there is likely a positive selection into overtime work of people with overtime pay, 36 percent is likely an upper bound for the share of workers with overtime pay.

[9] The normal full-time working week is 37 hours in Denmark and the average exchange rate in 2010 was 5.6DKK/USD or 8.7DKK/GBP.

throughout.

In the tax sample (going back to 2004), the eIndkomst register is not available. We therefore construct labor income and personal income measures using the annual income tax data. The main components of personal income is labor earnings and transfers along with profits from own businesses. These measures are only used in the tax sample in the section below but are also constructed in the estimation sample for comparison.

We use additional characteristics such as educational attainment and labor market experience. Educational attainment is measured as the highest degree earned in the sample period and we define high skilled as those with at least a bachelor's degree (similar to a college degree in the US) and less skilled as those with less education than that. Labor market experience is the definition used by Statistics Denmark using all previous special pension payments (ATP). These are mandatory payments for wage workers and is a function of hours worked. We focus on individuals aged 25 through 60 with an opposite-sex partner and discard observations where the individual is registered as mainly student, self-employed, retired or on disability pension. Finally, we drop observations with missing information on key variables.

In Table 1, we report descriptive statistics for the estimation and tax samples. In the estimation sample, for which descriptive statistics are reported in the columns 1–2 of Table 1, we further restrict attention to 2010–2018 and focus on couples with at most five years age difference. The restriction on age-differences between partners in the estimation sample is to increase homogeneity in age when matching moments from the model. In the tax sample, shown in columns 3–4, we use all years from 2004-2018, but focus on coupled women aged 25–40 where both household members have personal income in the range DKK50,000–600,000 ($8,900-$107,000).

In the estimation sample, the average personal income is around 293,770DKK ($52,400) for women and 401,740DKK ($71,700) for men. Around 88% of women work while around 92% of men do. The average age is around 43 for both men and women and the average number of children is around 1.8 for women and 1.7 for men. 74% of women and 72% of men are married and 47% of women and 40% of men are high skilled. The tax sample focuses on a more narrow group, namely 25-40 year old women and is thus slightly different from the estimation sample. Because the average age is mechanically lower, the share working is lower and so is the income, number of children and share married. The share of high skilled is slightly higher in this group.

Table 1: Descriptive Statistics.

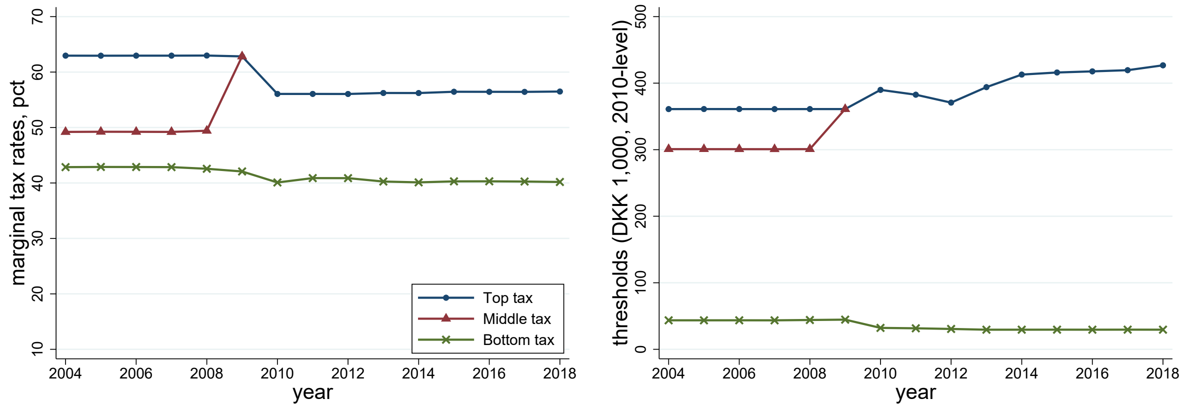
	Estimation sample: all aged 25–60 w. partners 2010–2018		Tax sample: women aged 25–40 w. partners 2004–2018	
	mean	std	mean	std
Personal income, women	293.77	200.95	262.16	81.22
Personal income, men	401.74	406.02	.	.
Working, women	0.88	0.32	0.89	0.31
Working, men	0.93	0.26	.	.
Age, women	43.09	9.73	33.24	4.39
Age, men	43.17	9.71	.	.
Children, women	1.83	1.04	1.52	1.07
Children, men	1.73	1.07	.	.
Married, women	0.74	0.44	0.61	0.49
Married, men	0.72	0.45	.	.
High skilled, women	0.47	0.50	0.49	0.50
High skilled, men	0.40	0.49	.	.
BFL				
Labor income	316.78	161.93		
Labor income, men	433.86	358.24		
Working, women	0.88	0.32		
Working, men	0.93	0.26		
Part time, women	0.31	0.46		
Part time, men	0.17	0.38		
Full time, women	0.58	0.49		
Full time, men	0.75	0.43		
Observations	10851444		2531181	

Notes: This table reports descriptive statistics and number of observations (individual-time) for the "estimation sample" used to estimate the model in Section 5.2 and the "tax sample" used to estimate the causal effect of tax changes on fertility in Section 3. Both are sub-samples of a baseline sample. The baseline sample is based on all individuals aged 25 through 60 with an opposite-sex partner who are not registered as mainly being a student, self-employed, retired or on disability pension. We also exclude individuals with missing information on key variables. The estimation sample is based on the baseline sample but only includes the years 2010–2018 and discard couples with more than five years age difference. The tax sample is also based on the baseline sample but restricts attention to women aged 25–40. All financial variables are in 1,000 of Danish kroner (DKK) and in 2010 real values using the Danish CPI.

Figure 1: Danish Tax Variation, 2004–2018.

(a) Marginal tax rates.

(b) Thresholds.



Notes: This Figure illustrates the main tax variation in the statutory tax thresholds and marginal tax rates from 2004 through 2018 (average across municipalities). Source: Jakobsen and Søgaard (2019).

2.1 Institutional Background

The Danish tax system is progressive in marginal tax rates, and has traditionally been composed of three income tax brackets, and is to a large extend individual. The marginal tax rate is 8% below the bottom income threshold. Very few people have income in this fourth bracket since many transfers are included in taxable income. Therefore we focus on the other three tax brackets and show in Figure 1 the main changes in the Danish statutory labor income tax schedule throughout the sample period. Panel a) shows the evolution of the marginal tax rate in the three main income tax brackets (bottom, middle and top) and panel b) shows the associated income thresholds (deductions) in real 2010 values. From 2004 until 2008, the tax system was quite stable in terms of both marginal tax rates and tax bracket thresholds, with one of the worlds highest marginal income tax rates in the top bracket of around 63%.

A 2009/2010 tax reform significantly reduced the marginal tax rate of a large share of the working population. The middle tax threshold was set equal to the top tax threshold in 2009, before removing the middle tax bracket completely in 2010. The marginal tax rate in the top bracket was also reduced in 2010 to around 58%. Another change in 2010, not depicted in the Figure, was how unused middle tax deductions could be transferred between spouses prior to the 2010 reform. Unused deductions in the bottom tax bracket can be transferred between spouses throughout. From 2012, the top tax bracket threshold increased steadily. The dip in 2010 stems from a fixed nominal threshold in 2009 and 2010. The marginal tax rate is lowered in the bottom tax bracket from 2010 as is the real threshold in that year. See also e.g. Kreiner, Leth-Petersen and Skov (2016) for a description of the 2010 reform. Figure A.2 in the Supplemental Material shows the simulated net of marginal tax rate changes – what we denote $\Delta_4 \tau_{i,t}^m$ below – from the reforms.

3 Empirical Fertility Responses to Tax Changes

Our contribution to this literature is to study fertility adjustments to tax changes on households. We follow the large elasticity of taxable income literature (see e.g. Gruber and Saez, 2002; Kleven and Schultz, 2014; and Jakobsen and Søgaard, 2019 and reference therein). The large degree of individual taxation in the Danish tax system enables us to study responses on the household level from changes in member's marginal tax rates, something that would be virtually impossible in the US, for example, where taxation is joint on the household level.

Let $\tau_{i,t} = \tau_t(z_{i,t}, Z_{i,t})$ denote the marginal tax-rate given the tax schedule at time t, personal income $z_{i,t}$ and other characteristics $Z_{i,t}$ (such as marital status) and let $\tau_{partner(i,t)}$ similarly denote the marginal tax rate of the male partner. Furthermore, denote $y_{i,t}$ and $y_{partner(i,t)}$ as the virtual income of the woman and man, respectively, calculated as in e.g. Gruber and Saez (2002). We then estimate equations of the form

$$\begin{aligned}\Delta_4 N_{i,t} =& \eta_w \Delta_4 \log(1-\tau_{i,t}) + \gamma_w \Delta_4 \log(y_{i,t}) \\ &+ \eta_m \Delta_4 \log(1-\tau_{partner(i,t)}) + \gamma_m \Delta_4 \log(y_{partner(i,t)}) \\ &+ \beta X_{i,t} + g(z_{i,t}, z_{partner(i,t)}) + \vartheta_{i,t} \end{aligned} \tag{1}$$

where $N_{i,t}$ is the number of children of woman i at time t and $\Delta_4 x_{i,t} = x_{i,t+4} - x_{i,t}$ are four-year forward differences. The parameters η_w and η_m are proportional to the compensated elasticity of fertility w.r.t women's and men's marginal net-of-tax wages, respectively, and γ_w and γ_m are proportional to the income elasticities.

The controls in $X_{i,t}$ include age and year dummies, number of children dummies, a high skilled dummy, and a quadratic polynomial in work experience. Besides year and children dummies, we include separate controls for men and women. To control for mean-reversion, we include flexible controls for both household member's income through $g(z_{i,t}, z_{partner(i,t)})$. Specifically, we follow the approach in Jakobsen and Søgaard (2019) and include DKK10,000-interval income dummies for both partners in the regressions.

Marginal tax rates are likely endogenous to the behavior of couples. We again follow the existing elasticity of taxable income literature and use mechanical tax rate changes as instruments. Let $\Delta_4 \tau_{i,t}^m \equiv \log(1-\tau_{t+4}(z_{i,t}, Z_{i,t})) - \log(1-\tau_t(z_{i,t}, Z_{i,t}))$ be the mechanical change in the net-of-tax rate change due to a change in the tax system from t to $t+4$ while keeping individual characteristics fixed at year-t values. We then instrument $\Delta_4 \log(1-\tau_{i,t})$, $\Delta_4 \log(1-\tau_{partner(i,t)})$, $\Delta \log(y_{i,t})$ and $\Delta \log(y_{partner(i,t)})$ using mechanical tax rate changes. We predict the mechanical tax rate changes using a Danish tax-simulator in the spirit of TAXSIM for the US, extended from Kleven and Schultz (2014) and Jakobsen and Søgaard (2019). The tax simulator includes the changes in the statutory tax rates discussed above but also differences across individuals due to e.g. family structure and capital income. We discuss the validity of the instrument in Supplemental Material A.1.

Table 2: 2SLS Estimates: Number of Children.

	(1)	(2)	(3)
$\Delta_4 \log(1-\tau_{i,t})$, women	-0.035***	-0.023**	-0.023**
	(0.010)	(0.010)	(0.010)
$\Delta_4 \log(y_{i,t})$, women	0.003	0.004*	0.005*
	(0.003)	(0.003)	(0.003)
$\Delta_4 \log(1-\tau_{i,t})$, men	0.008	0.005	0.005
	(0.009)	(0.009)	(0.009)
$\Delta_4 \log(y_{i,t})$, men	0.020**	0.026***	0.028***
	(0.008)	(0.008)	(0.008)
Income dummies	Yes	Yes	Yes
Children dummies	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes
Age dummies	Yes	Yes	Yes
Hum. cap. controls, women	No	Yes	Yes
Hum. cap. controls, men	No	No	Yes
Avg. dep. var. (y, level)	1.52	1.52	1.52
Obs.	2,531,181	2,531,181	2,531,181
First stage F-stat.	27,585.8	27,869.9	27,903.8

Notes: This table shows estimated parameters, η_w, γ_w η_m, and γ_m from equation (1) using 2SLS. The dependent variable is the 4-year difference in the number of children born. As instruments for the change in the net of marginal tax rates and virtual income we use the mechanical net of marginal tax rate changes, fixing information as in the base-year. All regressions include DKK10,000 bin income dummies for both women and men, age dummies for both men and women, year dummies and number of children dummies. Column (2) also includes a quadratic polynomial in labor market experience of women and an indicator equal to one if she has at least a bachelor's degree. Column (3) adds similar human capital variables for men. The data used for estimation is the "tax sample" discussed in connection to Table 1. Robust standard errors in brackets are clustered at the individual level. *$p < 0.10$, **$p < 0.05$, ***$p < 0.01$.

Our main 2SLS estimation results of the effect of marginal net-of-tax wages on fertility are reported in Table 2. Each column reports the estimated effect on the change in the number of children gradually adding more controls across columns. The first-stage results are reported in Tables A.1–A.4 in the Supplemental Material.

We estimate a significant negative compensated elasticity w.r.t. wages of women ($\hat{\eta}_w$ has a p-value of 0.021) and a significant positive income effect from wages of men ($\hat{\gamma}_m$ has a p-value of 0.0005). The compensated elasticity w.r.t. wages of men and the income effect from wages of women are insignificant (p-values of 0.589 and 0.096, respectively). In turn, this suggests that the fertility substitution effect dominates w.r.t. wages of women while the fertility income effect dominates w.r.t. wages of men.

Our results suggests that children are normal goods and are very much in line with predictions of Becker (1973): If women are the primary caregiver for children, the income effect w.r.t. wages of men will likely dominate and increased male wages would lead to increased fertility, as we find empirically. Whether the income effect or the substitution effect would dominate w.r.t. wages of women is theoretically more unclear. Our results suggests that the substitution effect dominates.

The results are also in line with existing research showing that increased wages of women decrease fertility (see e.g. Haan and Wrohlich, 2011) and increased wages of men increase fertility (Black, Kolesnikova, Sanders and Taylor, 2013 and Kearney and Wilson, 2018). Schaller (2016) and Autor, Dorn and Hanson (2019) find that fertility increases if the local labor market demand for men improves but decreases if the local labor market demand for women improves.

We have implemented several alternative specifications to investigate the robustness and heterogeneity of our results. Table A.5 in the Supplemental Material shows estimates from our preferred specification with different minimum income thresholds. Our baseline minimum income in base years are DKK50,000, which is reproduced in the second column. Reassuringly, the results are quite robust to changing this threshold.

We investigate whether there is heterogeneity in fertility responses across the income distribution in Table A.6 in the Supplemental Material. The first two columns show estimates from two groups of couples in which personal income of the woman is in the range $50,000$–$350,000$ in column (1) and in $350,000$–$600,000$ in column (2). We find that the effects are slightly stronger for the lower-income couples.

We report separate estimation results split by women's educational attainment in the third and fourth columns of Table A.6. The effects are slightly larger and more significant for less skilled women. For men of less skilled women we estimate a significantly positive compensated elasticity (and no income effect) while for men with high skilled partners, we find a significant positive income effect and insignificant compensated elasticity.

We report in Table A.7 in the Supplemental Material estimated labor income elasticities using a similar specification as above where the left hand side variable is either log-labor income of women or that of their male partners. We estimate a significant positive compensated labor income elasticity of around 0.21 for women and 0.20 for men, in the range of what other studies have found (see e.g. Gruber and Saez, 2002; Kleven and Schultz, 2014 and Jakobsen and Søgaard, 2019). We also estimate negative own income elasticities for both, but only significant for women.

In table 3 we report unconditional results, where we do not include virtual income. We therefore interpret the results as the total (or Marshall) elasticity. We report results for all couples in column one and split by less and high skilled in columns one and two. The results show a borderline significant negative elasticity w.r.t. wages of women and an insignificant positive elasticity w.r.t. wages of men. Interestingly, when splitting by educational attainment of the woman in the couple, we find a significant negative elasticity w.r.t. wages of women and a significant positive elasticity w.r.t. wages of men. Both are insignificant for high skilled.

Table 3: 2SLS Estimates: Number of Children, Unconditional.

	all	less skilled	high skilled
	(1)	(2)	(3)
$\Delta_4 \log(1-\tau_{i,t})$, women	-0.018*	-0.047***	-0.015
	(0.010)	(0.014)	(0.013)
$\Delta_4 \log(1-\tau_{i,t})$, men	0.010	0.038***	-0.020
	(0.009)	(0.012)	(0.013)
Income dummies	Yes	Yes	Yes
Children dummies	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes
Age dummies	Yes	Yes	Yes
Hum. cap. controls	Yes	Yes	Yes
Male partner controls	Yes	Yes	Yes
Avg. dep. var. (y, level)	1.522	1.664	1.372
Obs.	2,531,181	1,299,908	1,231,273
First stage F-stat.	47,359.7	17,621.2	28,805.6

Notes: This table shows estimated parameters η_w and η_m from equation (1) but not conditioning on the income effects, using 2SLS. The dependent variable is the 4-year difference in the number of children born. As instruments for the change in the net of marginal tax rates we use the mechanical net of marginal tax rate changes, fixing information as in the base-year. All regressions include DKK10,000 bin income dummies for both women and men, age dummies for both men and women, year dummies, number of children dummies, a quadratic polynomial in labor market experience of women and an indicator equal to one if she has at least a bachelor's degree. Finally, we include similar variables for men. The data used for estimation is the "tax sample" discussed in connection to Table 1. Robust standard errors in brackets are clustered at the individual level. $^*p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

4 Life-Cycle Model

We now turn to the life cycle model of fertility and family labor supply that we use to quantify the importance of fertility adjustments for labor market responsiveness of men and women. A period in the model is a year and in each period couples maximize the expected discounted sum of utility from the remaining part of their life by choosing how much to consume and save for the future, how much each household member should work, and whether to try to conceive more children. While we estimate the model separately for different educational groups, we abstract from educational heterogeneity throughout for ease of exposition.

We let $e_t = 1$ denote if a couple chose to exert effort to conceive a child, and $e_t = 0$ if not. Whether a child arrives in the following period is then probabilistic. We allow for three discrete levels of labor supply of women and men: Not working, part time work, and full time work, denoted as $l_{j,t} \in \{0, l_{PT}, 1\}$ for $j \in \{w, m\}$. Finally, we let C_t denote consumption and A_t the amount of savings.

Households make their decisions while taking a range of state variables into account. These are collected in $\mathcal{S}_t = (A_{t-1}, K_{w,t}, K_{m,t}, n_t, o_t, job_{w,t}, job_{m,t}, f_t)$ where $A_{t-1} \geq 0$ is beginning-of-period wealth, $K_{w,t}, K_{m,t} \geq 0$, are human capital of women and men, $n_t \in \{0, 1, 2, 3\}$ is the number of children living in the household, and $o_t \in \{NC, 0, 1, 2, 3, 4, 5, 6+\}$ denotes the age of the youngest child, where NC indicates "no children" in case $n_t = 0$. Finally, $job_{j,t} \in \{0, 1, 2\}$ indicates if member j is restricted in the job opportunities in the beginning of the period. If $job_{j,t} = 2$, the labor market supply is unrestricted but if $job_{j,t} = 0$ the labor market supply is restricted to be $l_{j,t} = 0$ and member j is thus unemployed. If $job_{j,t} = 1$, the labor supply is restricted to $\{0, l_{PT}\}$. We denote by p_0 and p_1 the probability of each situation. Finally, $f_t \in \{0, 1\}$ denotes whether the couple is permanently infertile.

We allow for partnership dissolution and denote $s_t \in \{0, 1\}$ as an indicator equal to one if single and zero otherwise. While research document that marriage markets are potentially important for labor market and fertility dynamics (see e.g. Eckstein, Keane and Lifshitz, 2019), we abstract from that margin here and treat partnership transition as a random function of age and family size.[10] We do include endogenous wealth accumulation in the model as it has been shown to be important (see e.g. Adda,

[10]This is purely due to computational tractability and including a more rich description of the marriage market, intra-household bargaining and family dissolution is a very interesting avenue for future research.

Dustmann and Stevens, 2017). Keane (2011), among others, discuss how wealth and non-earned income are very important drivers of labor market income effects and thus important for our analysis of labor market behavior over the life cycle. Furthermore, children can be seen as a consumption commitment (Chetty and Szeidl, 2007) and the amount of resources available for funding future expenditures on children is thus a key determinant of the timing and number of children. Finally, wealth is used as an insurance mechanism against future shocks to the earnings potential of men and women (Deaton, 1991; Carroll, 1992). Below, we describe the decision problem of couples before discussing the environment for singles.

4.1 Preferences

Household utility is a weighted sum of individual utilities

$$U(C_t, n_t, o_t, e_t, l_{w,t}, l_{m,t}) = \lambda u_w(C_t, n_t, o_t, l_{w,t}) + (1-\lambda) u_m(C_t, n_t, o_t, e_t, l_{m,t})$$

where λ is the bargaining power of the woman in the household.[11] The utility of household member j in period t is

$$\begin{aligned} u_j(C_t, n_t, o_t, e_t, l_{j,t}) = & \frac{(C_t/\nu(n_t))^{1-\rho}}{1-\rho} \\ & + \sum_{k=1}^{3} \omega_k \mathbf{1}(n_t \geq i) \\ & + \eta_0 e_t \mathbf{1}(o_t = 0) + \eta_1 e_t \mathbf{1}(o_t = 1) + \eta_2 e_t \mathbf{1}(o_t = 2) \\ & + g_j(l_{j,t}, age_{j,t}) \\ & + q_j(l_{w,t}, l_{m,t}, n_t, o_t) \mathbf{1}(n_t > 0) \end{aligned}$$

consisting of five components. The first component is a standard constant relative risk aversion (CRRA) value of consumption with ρ being the CRRA coefficient and $\nu(n_t) = 1 + 0.5(1 - s_t) + 0.3 n_t$ being OECD equivalence scales. The second component relates to the direct value of having children and ω_1, ω_2 and ω_3 measures the value of having at least 1, 2 or 3 children, respectively. Children also affect the marginal utility of consumption through $\nu(n_t)$ and the dis-utility from market work through the fifth term, $q_j(l_{j,t}, n_t, o_t)$.

[11] Since λ is fixed in our model, we do not allow household bargaining as in the limited commitment as done in e.g. Mazzocco (2007); Voena (2015); and Low, Meghir, Pistaferri and Voena (2018). We focus on the interaction between fertility and family labor supply. While allowing for limited commitment is an interesting avenue for further research, it is out of the scope of the current paper.

The third term is related to the spacing of childbirths. Concretely, η_0, η_1 and η_2 captures potential dis-utility (if negative) of trying to conceive a child if the youngest child is zero, one or two years old, respectively.

The fourth term captures the dis-utility from working,

$$\begin{aligned} g_j(l_{j,t}, age_{j,t}) = \mu_{PT,j}\mathbf{1}(l_{j,t} > 0)&\Big[1 + \mu_{PT,age,j}(age_{j,t} - 25)\Big] \\ + \mu_{FT,j}\mathbf{1}(l_{j,t} = 1)&\Big[1 + \mu_{FT,age,j}(age_{j,t} - 25) + \mu_{FT,age2,j}(age_{j,t} - 25)^2/10\Big] \end{aligned}$$

where $\mu_{PT,j}$ measures the utility from working and $\mu_{FT,j}$ measures the additional utility from full time work. We thus expect these to be negative. $\mu_{PT,age,j}$ and $\mu_{FT,age,j}$ and $\mu_{FT,age2,j}$ allows for the dis-utility to change over the life cycle.

The fifth term is a flexible non-separable function of labor supply and children, aimed at capturing the main trade-offs between working and home production. The (dis)utility from labor market work depends on age, the number of children, the age of the youngest child and the labor supply of their partner through

$$\begin{aligned} q_j(l_{w,t}, l_{m,t}, n_t, o_t) =& \mu_{PT,j}\mathbf{1}(l_{j,t} > 0)\Big[\alpha_{PT,child,j} + \alpha_{PT,more,j}(n_t - 1) + \alpha_{PT,young,j}\mathbf{1}(o_t < 4) \\ &\qquad + \alpha_{PT,birth,j}\mathbf{1}(o_t = 0) + \alpha_{PT,n,working}\mathbf{1}(l_{-j,t} > 0)\Big] \\ &+ \mu_{FT,j}\mathbf{1}(l_{j,t} = 1)\Big[\alpha_{FT,child,j} + \alpha_{FT,more,j}(n_t - 1) + \alpha_{FT,young,j}\mathbf{1}(o_t < 4) \\ &\qquad + \alpha_{FT,birth,j}\mathbf{1}(o_t = 0) + \alpha_{FT,n,working}\mathbf{1}(l_{-j,t} > 0)\Big] \end{aligned} \tag{2}$$

where $l_{j,t} = 0$ is again the reference alternative. Importantly, we allow for different parameters for men and women. All parameters are relative to the level parameters. For example, $\alpha_{PT,child,j} \cdot 100$, measures the percentage increase in the utility of part time work when a child is present. If $\mu_{PT,j} < 0$ and $\alpha_{PT,child,j} > 0$ (as we estimate below), then children tend to increase the dis-utility from part time work compared to not working. We allow for substitution/complementarities in leisure through $\alpha_{PT,n,working}$ and $\alpha_{FT,n,working}$, which measures, respectively, the dis-utility of part time and full time work, when children are present and the partner works.

4.2 Fertility and Children

In each period, couples choose whether to try to conceive an additional child. We denote $e_t = 1$ if a couple exerts effort to conceive a child and $e_t = 0$ else. Whether a subsequent childbirth in the following period occurs depends on the effort and the biological fecundity of the woman. The biological fecundity is falling in age and calibrated to match medical literature. This means that after a certain age, T_f, women are no longer fertile and cannot have more children. Furthermore, couples also have imperfect contraceptive control such that unintended childbirths can occur. The imperfect fertility control is similar to that in Adda, Dustmann and Stevens (2017) but we also allow for unintended pregnancies as in e.g. Ejrnæs and Jørgensen (2020).

Letting $b_t = 1$ denote the birth of a child in period t and $x_t = 1$ denote a child moving out, the number of children evolves as

$$n_{t+1} = n_t + b_{t+1}(e_t, f_t) - x_{t+1} \tag{3}$$

where $b_{t+1} = 0$ if $n_t = 3$ and otherwise

$$b_{t+1}(e_t, f_t) = \begin{cases} 1 & \text{with probability } \wp_t(e_t, f_t) \\ 0 & \text{with probability } 1 - \wp_t(e_t, f_t) \end{cases} \tag{4}$$

with the probability of a childbirth given as

$$\wp_t(e_t, f_t) = \begin{cases} 0 & \text{if } f_t = 1 \\ \overline{\wp}_t & \text{if } f_t = 0 \text{ and } e_t = 1 \\ \overline{\wp}_t \underline{\wp} & \text{if } f_t = 0 \text{ and } e_t = 0 \end{cases}$$

in which $\overline{\wp}_t$ measures the biological fecundity and $\underline{\wp} > 0$ allows for unintended childbirths. The probability of becoming permanently infertile is $P(f_{t+1} = 1) = p_f(t)$. We calibrate these objects based on medical literature.

Children can also move out of the household and this process is governed by

$$x_{t+1} = \begin{cases} 1 & \text{with probability } q_t(n_t, o_t) \\ 0 & \text{with probability } 1 - q_t(n_t, o_t) \end{cases} \tag{5}$$

where we assume that children can move out once the fertile period ends, i.e. $q_t = 0$ when $\overline{\wp}_t > 0$ in the fertile period and $q_t \geq 0$ when $\overline{\wp}_t = 0$ in the infertile period. Concretely, we assume that x_{t+1} is a realization of a Binomial distribution with

$$q_t(n_t, o_t) = \begin{cases} P_{bin}(n_t) & \text{if } n_t > 0,\ t > T_f \text{ and } o_t \in \{6+\} \\ 0 & \text{else} \end{cases}$$

where

$$P_{bin}(n) = \frac{n!}{(n-1)!} p_x (1 - p_x)^{n-1}$$

is the binomial distribution yielding the likelihood of a child out of n_t children moving. p_x is the leave probability parameter. The restriction that the youngest child must be at least six years old ensures that not until all children in the household are above 6 years old does any children move out. This is a parsimonious way of delaying children moving out even in the infertile period.

Finally, the age of the youngest child, o_t, evolves deterministically as

$$o_{t+1} = \begin{cases} 0 & \text{if } b_{t+1} = 1 \\ o_t + 1 & \text{if } b_{t+1} = 0 \text{ and } o_t \in \{0,1,2,3,4,5\} \\ o_t & \text{if } b_{t+1} = 0 \text{ and } o_t \in \{6+\} \\ NC & \text{if } b_{t+1} = 0 \text{ and } o_t \in \{NC\}. \end{cases} \tag{6}$$

4.3 Human Capital, Wages and Income

Labor income is given as

$$Y_{j,t} = w_{j,t} l_{j,t} \tag{7}$$

where the wage rate depends on the level of accumulated human capital,

$$\log w_{j,t} = \gamma_{j,0} + \gamma_{j,1} K_{j,t}. \tag{8}$$

Human capital evolves according to

$$K_{j,t+1} = [(1-\delta)K_{j,t} + l_{j,t}]\epsilon_{j,t+1} \tag{9}$$

where δ is the depreciation rate and $\epsilon_{j,t+1}$ is a log-normal mean one permanent shock to human capital, $\log \epsilon_j \sim \mathcal{N}(-0.5\sigma^2_{j,\epsilon}, \sigma^2_{j,\epsilon})$, similarly to the process in e.g. Keane and Wasi (2016). The declining biological fecundity and endogenous wages create a trade-off between investing in human capital while young and postponing fertility too long.

Combining the two household member's labor market income, we denote $Y_t = Y_{m,t} + Y_{w,t}$ as the household income. We let $\mathcal{B}_{j,t}$ denote the unemployment benefits received by household member j and denote $\tilde{Y}_{j,t} = Y_{j,t} + \mathcal{B}_{j,t}$ as the total income received by member j. In turn, total household income is $\tilde{Y}_t = \tilde{Y}_{m,t} + \tilde{Y}_{w,t}$.

4.4 Budget Constraint and Institutions

In each period, choices must satisfy the inter-temporal budget constraint

$$C_t + A_t = RA_{t-1} + \tilde{Y}_t - \mathcal{T}(n_t, \tilde{Y}_{w,t}, \tilde{Y}_{m,t}, l_{w,t}, l_{m,t}, s_t) - \mathcal{C}(n_t, o_t, Y_t, s_t) \tag{10}$$

where $A_t \geq \underline{A}\ \forall t$ is end-of-period wealth, $\mathcal{C}(\bullet)$ is child care costs net of child subsidies, and $\mathcal{T}(\bullet)$ is total taxes paid.

The child care costs and subsidies along with the transfer and tax system are parsimonious versions of the Danish rules as they were in 2010. Below, we briefly describe the main features of the implemented institutions and defer the exact implementation and illustrations hereof to the Supplemental Material B.

Child care costs and subsidies. Child care costs are highly subsidized in Denmark such that at most around 25% of the cost of child care provision are held by the parents. In the model, child care costs, $\mathcal{C}_c(n_t, o_t, \tilde{Y}_t, s_t)$, depends on the partnership status of parents, the number of children, the age of the youngest child, and household income. Low to middle income households pay a reduced fee and child care is completely free if household pre-tax income is less than around 150,000 DKK (depending on the household composition).

Child-related *subsidies*, $\mathcal{C}_s(n_t, o_t, s_t)$, are subtracted from the child care costs. In the model, couples receive child subsidies of 16,988DKK for one child if the youngest child is below age 6 and 10,580DKK for each of the remaining children. Singles receive additional benefits, as described in the Supplemental Material. Combining the child care costs and subsidies, the net child care cost is

$$\mathcal{C}(n_t, o_t, Y_t, s_t) = \mathbf{1}(n_t > 0)(\mathcal{C}_c(n_t, o_t, Y_t, s_t) - \mathcal{C}_s(n_t, o_t, s_t)) \tag{11}$$

which can be negative if the child subsidies exceed the costs.

Labor market transfers. We assume that all individuals not working receive $118,284$ DKK annually, equal to the basic income assistance level in Denmark in 2010 ("Kontanthjælp" in Danish). In turn, we let $\mathcal{B}_{j,t} = \mathbf{1}(l_{j,t} = 0) \cdot 118,284$.

Taxes. The Danish labor income tax system is individual with a relatively small link between couples where the unused labor participation tax deduction of around 43,000 DKK in 2010 can be transferred across spouses. We have implemented a version of the labor income tax system capturing the main statutory rates in 2010. We discuss the features and calculation in more detail in the Supplemental Material.

Parental Leave. The Danish parental leave system is quite generous. All Danish parents have the right to a year of leave around childbirths. Women take the bulk of the parental leave (Hald, 2018) and we will describe the rules for mothers under the assumption that men take no leave. Most mothers are eligible for parental leave benefits equal to at most 3,760 kroner per week (180,480 annually) for 50 weeks. Out of these, 32 weeks can be distributed freely between the parents. Furthermore, most mothers have the right to full wage compensation in up to 34 of the 50 weeks, depending on her employment arrangements.

We implement maternity leave in the model in the following way. We assume that she has the right to half a year of maternity leave with full wage compensation. We furthermore assume that part time work of mothers of newborns reflects a period of parental leave with full pay and the remaining weeks of the year with full-time pay, motivated by the discussion above. In turn, she earns a full year of full-time labor income if she chooses to work any hours in the year of childbirth. We assume that she has the right to half a year of maternity leave with full wage compensation. See B.4 in the Supplemental Material for a precise formulation of the maternity leave system.

4.5 Partnership Dissolution

Couples transition into single-hood randomly, and the probability of partnership dissolution, $p_s(t, n_t)$, is a function of age and the number of children. We assume that single-hood is an absorbing state and abstract from re-partnering for simplicity.

The allocation of wealth, children, and custody after a divorce is as follows. We assume that a fraction κ_A of the household wealth goes to women and the reciprocal share $1-\kappa_A$ goes to men after partnership dissolution. We further assume that children is with their mother a fraction κ_n of the time but that the mother bears all the child care costs and receives all the child subsidies. The father pays ζn_t in child support each year. The share of time spent with a parent affects the consumption equivalence scale through $\nu(\kappa_n n_t)$ for women and $\nu((1-\kappa_n)n_t)$ for men.

4.6 Retirement

Retirement is exogenous at age T_r. We assume that individuals receive constant retirement benefits such that a single person receives the maximum amount of old-age pension ("Folkepension" in Danish), which is DKK 122,712 annually in 2010. Couples receive a slight reduction (per person) and receive DKK 179,808 in total annually. While unlikely, children could still be living at home in retirement until they move out. For simplicity, we do not allow for divorce in retirement and ignore potential spousal death and bequests. The problem, in turn, becomes a simple consumption-savings model in this part of the life cycle with associated value function $\tilde{V}_{T_r}(K_{w,T_r}, K_{m,T_r}, n_t, o_t, A_{T_r})$. We let $T_r = 60$.

To adjust for the parsimonious description of life in retirement, we follow the approach in e.g. Keane and Wolpin (1997) and Gourinchas and Parker (2002) and discussed in Jørgensen and Tô (2020). Concretely, we introduce an adjustment factor, κ_V, multiplied to the retirement value function, such that the value in the first retirement period is $V_{T_r}(K_{w,T_r}, K_{m,T_r}, n_t, o_t, A_{T_r}) = \kappa_V \tilde{V}_{T_r}(K_{w,T_r}, K_{m,T_r}, n_t, o_t, A_{T_r})$. We will estimate κ_V as a way of allowing for empirical deviations from this stylized formulation in retirement.

4.7 Recursive Formulation

The state variables for a single individual $j \in \{w, m\}$ is $\mathcal{S}_{j,t} = (A_{t-1}, K_{j,t}, n_t, o_t, job_{j,t})$ and the recursive problem prior to retirement can be formulated as, with $s_t = 1$,

$$
\begin{aligned}
V_{w,t}(\mathcal{S}_{w,t}) = \max_{C_t, l_{w,t}} \; & u_w(C_t, \kappa_n n_t, o_t, 0, l_{w,t}) + \beta \mathbb{E}_t[V_{w,t+1}(\mathcal{S}_{w,t+1})] \\
\text{s.t.} \quad & \\
& A_t = RA_{t-1} - C_t + \tilde{Y}_{w,t} - \mathcal{T}(n_t, \tilde{Y}_{w,t}, 0, l_{w,t}, 0, 1) - \mathcal{C}(n_t, o_t, Y_{w,t}, 1) + \zeta n_t \\
& \text{and eqs. (5)–(9)}
\end{aligned}
$$

for women and similarly for single men

$$
\begin{aligned}
V_{m,t}(\mathcal{S}_{m,t}) = \max_{C_t, l_{m,t}} \; & u_m(C_t, (1-\kappa_n) n_t, o_t, 0, l_{m,t}) + \beta \mathbb{E}_t[V_{m,t+1}(\mathcal{S}_{m,t+1})] \\
\text{s.t.} \quad & \\
& A_t = RA_{t-1} - C_t + \tilde{Y}_{m,t} - \mathcal{T}(n_t, 0, \tilde{Y}_{m,t}, 0, l_{m,t}, 1) - \zeta n_t \\
& \text{and eqs. (5)–(9)}
\end{aligned}
$$

where mothers bear all child care costs and receive all subsidies, and fathers pay child support.

The recursive problem for a couple is

$$\begin{aligned}\overline{V}_t(\mathcal{S}_t, \xi_t^0, \xi_t^1) = \max_{C_t, l_{w,t}, l_{m,t}, e_t} & U(C_t, n_t, o_t, e_t, l_{w,t}, l_{m,t}) + \sigma_e \xi_t^{e_t} \\ & + \beta \mathbb{E}_t[p_s(t, n_t) V_{t+1}^s(\mathcal{S}_{t+1}) + (1 - p_s(t, n_t)) \overline{V}_{t+1}(\mathcal{S}_{t+1}, \xi_{t+1}^0, \xi_{t+1}^1)] \\ \text{s.t. eqs. } & (3)\text{–}(11)\end{aligned}$$

where $V_{t+1}^s(\mathcal{S}_{t+1}) = \lambda V_{w,t+1}(\mathcal{S}_{w,t+1}) + (1-\lambda) V_{m,t+1}(\mathcal{S}_{m,t+1})$ is the weighted value of becoming single in the following period and η^{e_t} *iid* extreme value type 1 taste shocks related to not trying to conceive a child, ξ_t^0, and trying to conceive a child, ξ_t^1. σ_e is proportional to the variance of these taste shocks. The expectation is with respect to these taste shocks, the arrival and moving of children and human capital shocks of both women and men. The model is solved numerically using the extension of the endogenous grid method (proposed by Carroll, 2006) in Iskhakov, Jørgensen, Rust and Schjerning (2017) and Druedahl and Jørgensen (2017), as described in detail in the Supplemental Material D.

5 Estimation Strategy

We estimate the model parameters in two-steps. Some parameters, listed in Table D.1 in the Supplemental Material, are calibrated outside the model in a first step. We denote these calibrated parameters as $\boldsymbol{\phi}$. We estimate the remaining parameters, collected in $\boldsymbol{\theta}$, within the model in a second step. We investigate the sensitivity of our results to the calibrated parameters in Section 8, following the approach suggested in Jørgensen (2023).

5.1 Parameters Set Outside the Model

We fix the relative loading on the utility of women, λ, to 0.5, as done in e.g. Eckstein, Keane and Lifshitz (2019) and fix the gross real interest rate R at 1.03, as in Jørgensen (2017). The human capital process is calibrated based on values in Keane and Wasi (2016). We set the human capital depreciation rate to 10 percent, $\delta = 0.1$. Part time work, l_{PT}, is 75% of full time work, in line with the Danish labor market where the normal working week is 37 hours and part time work often is 28–32 hours a week. We allow for borrowing up to a hundred thousand Danish kroner.

The biological fecundity, $\overline{\wp}_t$, is calibrated based on medical literature (Leridon, 2004) and falling in age (see Figure C.1 in the Supplemental Material). We calibrate $\underline{\wp}$ in the unplanned pregnancy probability, $\overline{\wp}_t \underline{\wp}$, to 6.1% for less skilled and 3.8% for high skilled, based on the estimated values in Ejrnæs and Jørgensen (2020). We calibrate the probability of permanent infertility, $p_f(t)$, based on Sommer (2016). We fix the probability parameter in the binomial distribution related to child moving out to $p_x = 0.08$. We show how this fits the overall pattern in the Danish data in Figure C.3.

We estimate the probability of partnership dissolution as a function of age and number of children from the Danish data. The resulting probabilities are presented in Figure C.2 in the Supplemental Material. We assume that children spend 80 percent of the time with their mother in case of a dissolution, $\kappa_n = 0.8$, and that wealth is shared fifty-fifty, $\kappa_A = 0.5$, which is the default in Denmark.

The initial distribution of human capital is calibrated based on the joint distribution of previous work experience, registered by Statistics Denmark. We include a scale factor, κ_{K_w}, for women and κ_{K_m} for men multiplied onto the initial human capital. These parameters are then estimated below. The initial distribution of wealth is based on wealth of 25-year olds in the Danish data and likewise is the number of children at age 25.

5.2 Parameters Estimated within the Model

We estimate the remaining 48 parameters per educational group by Simulated Method of Moments (Smith, 1993; Gouriéroux, Monfort and Renault, 1993). Collecting these parameters in $\boldsymbol{\theta}$, we estimate these as

$$\hat{\boldsymbol{\theta}} = \arg\min_{\boldsymbol{\theta}} g(\boldsymbol{\theta})' W g(\boldsymbol{\theta})$$

where $g(\boldsymbol{\theta}) = m^{data} - m^{sim}(\boldsymbol{\theta})$ is a $J \times 1$ vector of differences between the J empirical moments calculated from the "estimation sample" discussed in Section 2 and the same moments calculated from simulated data for a given $\boldsymbol{\theta}$. W is a $J \times J$ symmetric positive definite weighting matrix. We use a diagonal matrix with the inverse of the variance of the empirical moments on the diagonal with slightly higher weight on moments related to labor market participation. To construct the moments in $m^{sim}(\boldsymbol{\theta})$ we solve the model for a given $\boldsymbol{\theta}$ and simulate synthetic data for N_{sim} households and use these simulated observations to calculate the same moments as in the Danish data.[12]

[12]See the Supplemental Material for details on how we numerically solve and simulate the model for a given value of $\boldsymbol{\theta}$. We use a modified version of the so-called "TikTak" global search algorithm in Arnoud, Guvenen and Kleineberg (2019).

5.2.1 Moments Matched

We include nine sets of moments for identification of particular parameters in $\boldsymbol{\theta}$ and here discuss which parameters each set of moments should be informative about.[13] The nine groups of moments included in the estimation are (all moments are education-specific):

1. **Labor.** The share working and the share working full time conditional on working, split by age and gender. This gives in total $2 \times 36 \times 2 = 144$ moments. These should be especially informative about the baseline value of leisure over the life cycle, $\mu_{PT,j}, \mu_{PT,age,j}$ and $\mu_{FT,j}, \mu_{FT,age,j}, \mu_{FT,age^2,j}$ for $j \in \{w, m\}$.

2. **Wages.** Average wages when working, split by age and gender. This gives $36 \times 2 = 72$ moments that should be particularly informative about the wage process parameters $\gamma_{0,j}, \gamma_{1,j}$ for $j \in \{w, m\}$.

3. **Variance of Wages.** The variance of log wages when working, split by age and gender. This gives $36 \times 2 = 72$ moments that should be informative about the human capital shock variances, $\sigma_{j,\epsilon}$ for $j \in \{w, m\}$, and the scale on the initial distribution of human capital, κ_{K_w} and κ_{K_m}.

4. **Children.** The share with at least 1 through 3 children, split by age. This gives in total $3 \times 36 = 108$ moments that should be informative about the value of having (more) children, ω_1, $\omega_{1,age}$, ω_2, and ω_3 and the taste-shock variance, σ_e.

5. **Spacing.** The distribution of years between first and second childbirths. This gives in total 15 moments that should be informative about the dis-utility of fertility effort when an infant is present, η_0, η_1 and η_2 along with the taste-shock variance, σ_e.

6. **Work/fertility interaction.** The share working and share working full time after first and second childbirth, split by gender. We use from 0 to 7 years after birth and measure all moments in percent relative to the year prior to birth. This gives in total $2 \times 2 \times 2 \times 8 = 64$ moments that should be informative about the trade-off between work and leisure when children are present, $q_j(\bullet)$, i.e. $\alpha_{l,child,j}$, $\alpha_{l,birth,j}$ $\alpha_{l,young,j}$, and $\alpha_{j,more,j}$ for $l \in \{FT, PT\}$, $j \in \{w, m\}$.[14]

[13] In Section E in the Supplemental Material we complement this discussion with a more formal analysis of the informativeness of included moments based on the measure proposed by Honoré, Jørgensen and de Paula (2020).

[14] The maternity leave system in the model implies that no mother will work full time in the year of birth. In turn, we cannot identify $\alpha_{FT,birth,w}$ so we fix that at zero.

7. **Work/fertility interaction when partner is working.** The share of women working and share working full time after first childbirth, conditional on partner working. We use from 0 years to 7 years after birth and measure all moments in percent relative to the year prior to birth. This gives in total $2 \times 8 = 16$ moments that should be informative about the substitutability of the time of parents when a child is present, $q_j(\bullet)$, i.e. $\alpha_{PT,n,working}$, and $\alpha_{FT,n,working}$.

8. **Wealth.**The median wealth split by age. This gives 36 moments that should be informative about the discount factor, β, the constant relative risk aversion coefficient, ρ, and the retirement adjustment factor, χ_V.

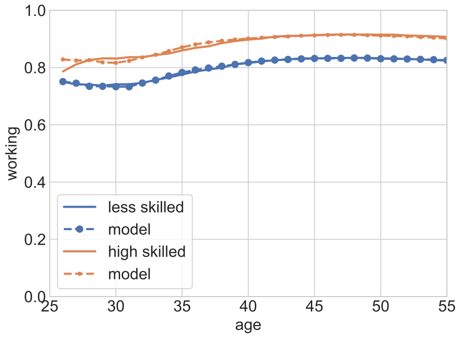
9. **Correlations and transitions.** We include regression coefficients from regressions of the number of children, the share working, and the share working full time on lagged labor market income, split by gender for 30-35 year olds. This gives $3 \times 2 = 6$ moments that should be informative about the job arrival probabilities, p_0, p_1 , and the taste shock variance related to fertility, σ_e.

Empirical age profile moments are based on age-dummies estimated from a regression including age and cohort dummies. All empirical work/fertility interaction moments are time-since birth coefficients from a regression also including cohort dummies, and empirical measures are based on 12 months of observations centered around the first or second childbirth.

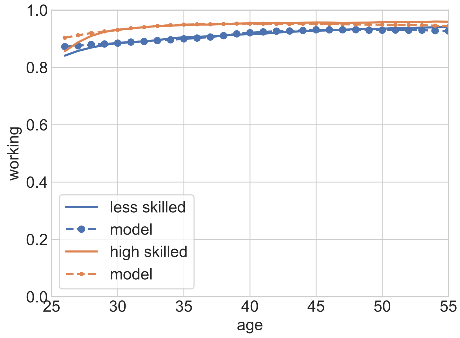
Figures 2–4 show the model fit of the key moments, while Figures D.3–D.6 in the Supplemental Material contain the remaining moments. We plot the empirical moments along with moments calculated from simulated data based on the estimated model, separately by education group, and where relevant, separately for men and women. Across these different moments, and for both education groups, the fit is very good, especially considering the relatively few number of parameters estimated and the many different aspects of behavior matched.

Figure 2: Model Fit. Age Profiles.

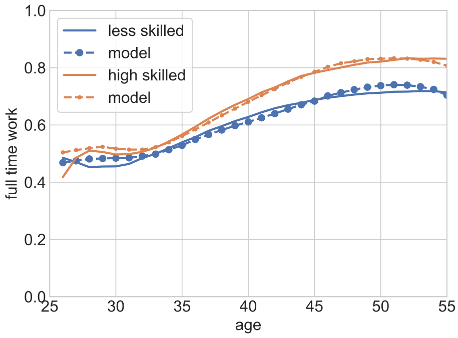
(a) Share Working, Women.



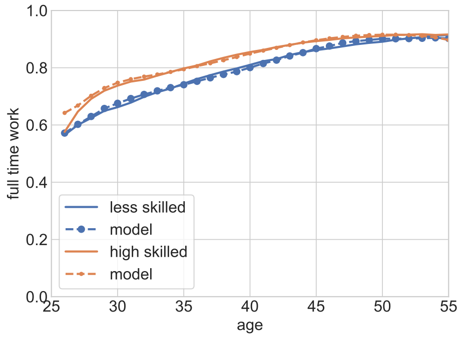
(b) Share Working, Men.



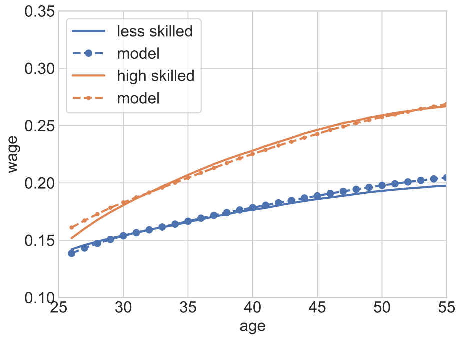
(c) Full time when working, Women.



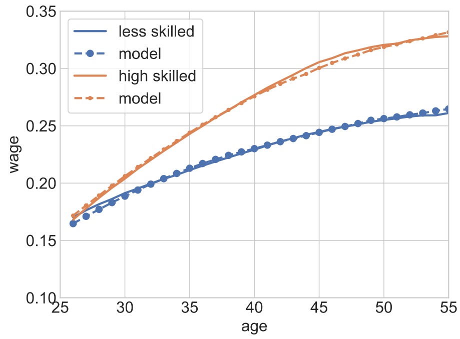
(d) Full time when working, Men.



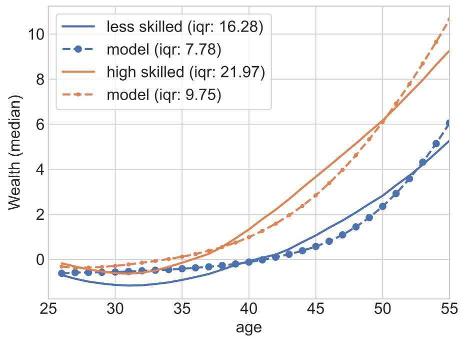
(e) Wage when Working, Women.



(f) Wage when Working, Men.

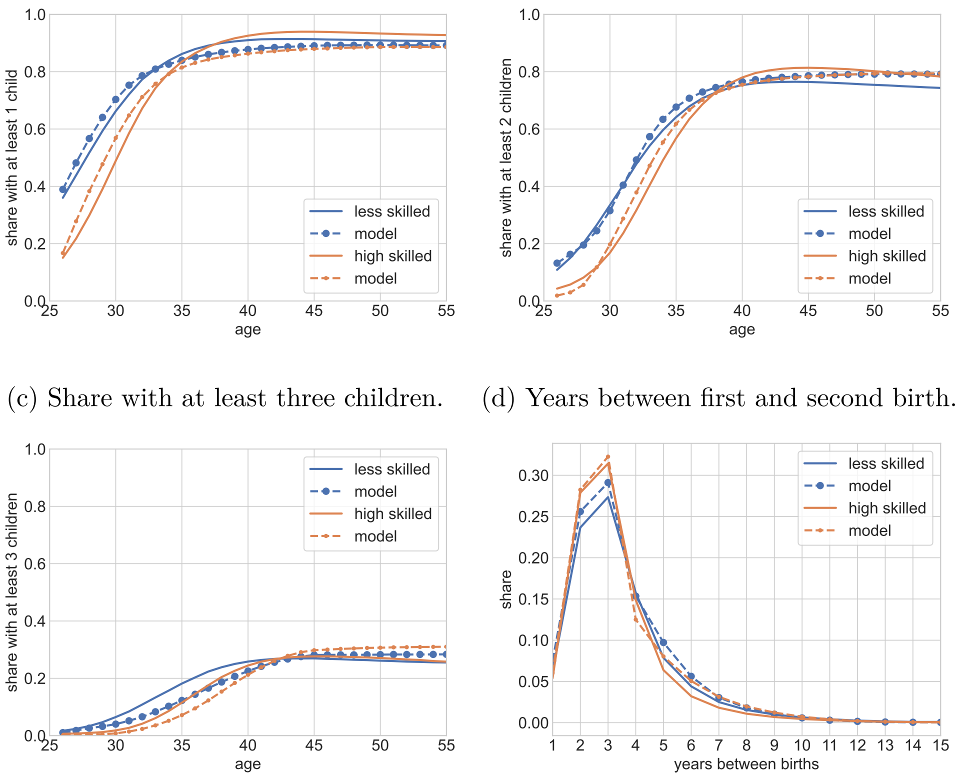


(g) Wealth (household).



Notes: The figure illustrates the model fit. Empirical moments, except median wealth, are regression coefficients from a regression including also cohort dummies. Wages are measured in 1,000s DKK and wealth is measured in 100,000s DKK. In 2024, 1000DKK=$145.

Figure 3: Model Fit: Children.

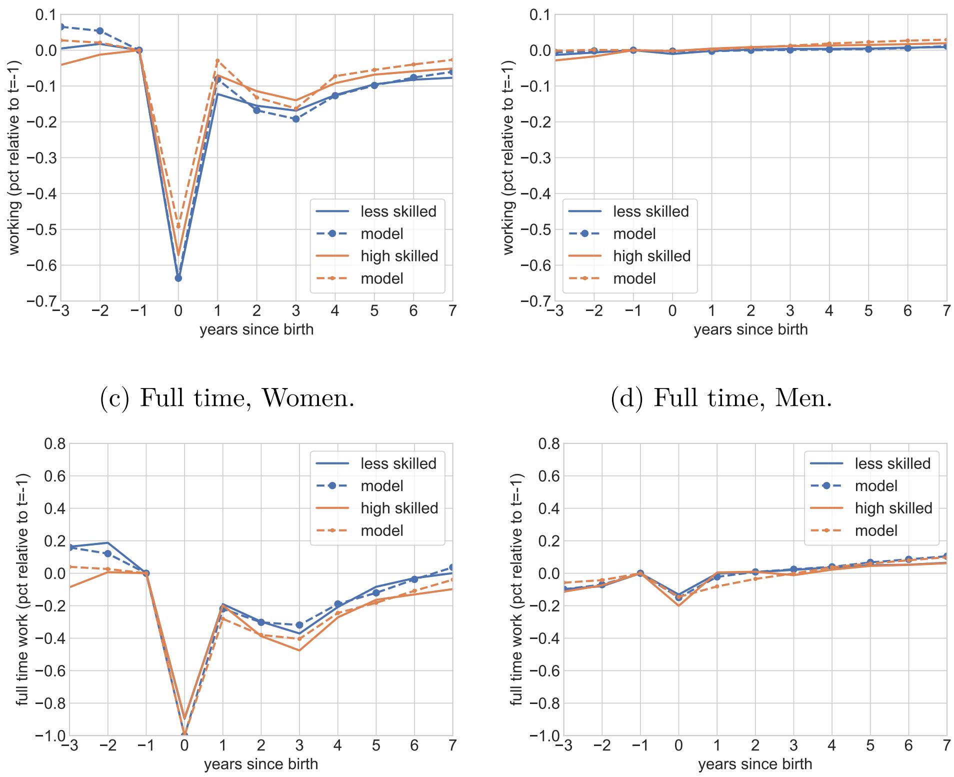


(a) Share with at least one child. (b) Share with at least two children.

(c) Share with at least three children. (d) Years between first and second birth.

Notes: The figure illustrates the model fit. All empirical moments, except the years between first and second birth, are regression coefficients from a regression including also cohort dummies.

Figure 4: Model Fit. First Childbirth Events.



(a) Share Working, Women. (b) Share Working, Men.

(c) Full time, Women. (d) Full time, Men.

Notes: The Figure shows empirical and simulated labor market outcomes after first childbirth. All empirical outcomes are 12-month aggregated values centered around the first childbirth. All empirical moments are regression coefficients from a regression including cohort dummies. We only use couples with the first birth in the age interval 26 through 59. We do not match on any pre-birth event parameters when estimating $\hat{\boldsymbol{\theta}}$.

Figure 2 shows average age profiles of the share working, the share working full time, wages along with median wealth over the life-cycle. Figure 3 shows the model fit with respect to the share with at least one, two, and three children along with the distribution of years between first and second birth. Figure 4 shows the share working and the share working full time in percent relative to the period before first childbirth. The scale is the same across men and women to highlight the difference. The dip in the share working for women three years after the first birth reflects the arrival of second births, as captured in Figure 3 panel d).

Figure D.3 shows the variance of log-wages over the life cycle. The estimated model matches the level and slope well and reproduces a lower variance for women and a lower variance for less skilled. Figure D.4 shows the share working and the share working full time in percent relative to the period before first childbirth conditional on the partner working. Figure D.5 shows the share working and the share working full time in percent relative to the period before second childbirth. The estimated model reproduces these event studies well but generates a smaller increase in the share of mothers working full time the years following the second childbirth. Figure D.6 shows regression coefficients from regressions of the number of children, an indicator for working, and an indicator for working full time on lagged labor income. The model reproduces the overall patterns in the data, that there is a positive correlation between lagged labor income of men and fertility while there is a negative correlation between lagged labor income of women and fertility. Likewise, the model reproduces a larger correlation between lagged labor income and labor market participation for women compared to men, albeit the levels being slightly different.

5.3 Parameter Estimates and Implications

Table E.3 in the Supplemental Material reports the estimated parameters in $\boldsymbol{\theta}$. We estimate a significant dis-utility from labor market hours since $\mu_{FT,j}$ and $\mu_{PT,j}$ for $j \in \{w, m\}$ are all estimated to be negative. The dis-utility of working is falling in age since $\mu_{PT,age,j}$, $\mu_{FT,age,j}$ and $\mu_{FT,age^2,j}$ for $j \in \{w, m\}$ are all estimated to be negative.

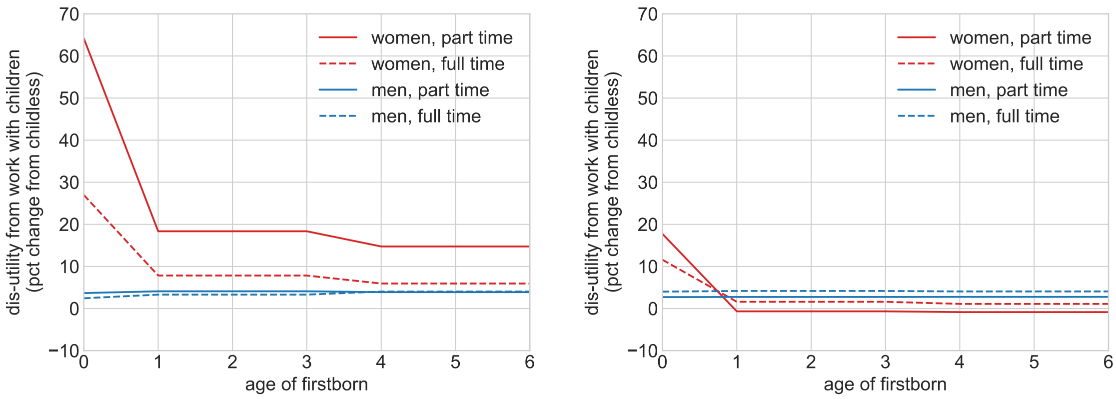
We estimate a significant increase in the dis-utility of work when children are present, especially for less skilled women, as also illustrated in Figure 5. For less skilled women, the dis-utility from working part time increases with 14.7% if a child is present and further increases by 3.6pp if the child is under age 4. The dis-utility of working part time for less skilled women in the year of their first childbirth increases by $14.7 + 3.6 + 45.8 = 61.1\%$. For high skilled women, we estimate the increased dis-utility from part time work at the time of first childbirth to be only around 17.7%.[15] The presence of children interacts less with the intensive labor market margin and having several children present only really matters for the dis-utility from working of high skilled women.

The dis-utility from working when children are present is less pronounced for men. Concretely, we estimate a slight increase in the dis-utility of men from working when a child is present of 3.9% for less skilled and 2.8% for high skilled. The extensive margin effect is, however, more active for men relative to women as we estimate a similarly sized increase in the dis-utility of working full time (compared to part-time) when a child is present (3.8% for less skilled and 2.6% for high skilled).

[15]Because the dis-utility of work vary by age, these numbers can be thought of as those of a 25 year old woman.

Figure 5: Dis-Utility from Work when Children are Present.

(a) Less skilled. (b) High skilled.



Notes: The figure illustrates the change in the dis-utility from working (compared to not working) as a function of the age of the firstborn child. The calculations are based on changes in the estimated q-functions (see eq. 2) across age of the only child.

We estimate a significant utility-cost to conception effort if the firstborn child is less than two years old ($\hat{\eta}_0, \hat{\eta}_1 < 0$) and a slight preference for conception effort if the firstborn child is two years old ($\hat{\eta}_2 > 0$). This is driven by the striking spacing patterns in the data suggesting a clear preference for around 3 years age-spacing between the first and second child.

We estimate wage profiles that are similar across men and women, but men have a slightly higher baseline wage, γ_0, and return to human capital, γ_1. For less skilled, we estimate a return to human capital of 9% for women and 10% for men. For high skilled, we estimate a higher baseline wage level for women but a slightly lower return to human capital of 8.2%. For men partnered with high skilled women, the return to human capital is around 11%. The estimated return to human capital, $\hat{\gamma}_1$ also measures the expected percentage increase in wages from working an additional full year. To see this, recall the wage process and human capital accumulation process is such that log-wages are $\log w_{j,t+1} = \gamma_0 + \gamma_1[(1-\delta)K_{j,t} + l_{j,t}]\varepsilon_{j,t+1}$. The percentage change in wages from working full time compared to not working can be approximated by the change in the log-wage, $\Delta_l \log w_{j,t+1} = \log w_{j,t+1}|_{l_{j,t}=1} - \log w_{j,t+1}|_{l_{j,t}=0} = \gamma_1\varepsilon_{j,t+1}$ with expected value $\mathbb{E}_t[\Delta_l \log w_{j,t+1}] = \gamma_1$ since $\mathbb{E}_t[\varepsilon_{j,t+1}] = 1$.

We estimate the human capital shock standard deviations, σ_j to be 0.140 for less skilled women and 0.171 for their male partners. The estimates are a bit higher for high skilled (0.192 for women and 0.180 for men).

5.4 Discussion

Our model highlights that policies that increase fertility can reduce labor supply, and worsen gender equality. However, there are caveats to our framework.

We abstract from early life and human capital investments, such as through education, and how these are impacted by policy changes. Eckstein, Keane and Lifshitz (2019) find that going from joint to individual taxation in the US could increase the college completion rate with 4.2%. Instead, in our framework, we take education to be exogenously determined.

We model home production and intra-household time allocation between market work, housework and childcare in a parsimonious way through the estimated q-function. This function depends on the number of market hours worked by the individual's partner. However, the underlying assumption is that the intra-household allocation of time is roughly constant across marginal wage changes and our policy experiments, conditional on hours of market work. Siminski and Yetsenga (2022) provides empirical support for this assumption: using unique Australian panel data on time use of couples, they show that the intra-household allocation of time devoted to household production and childcare are hardly affected by the relative wages of men and women. Further, while the arrival of children is important for household specialization, it is not related to the absolute advantage in market work (relative wages) because children increase home production of women but not of men, almost irrespective of the intra-household wage distribution. Treating q as a constant function across policies emulates the observed insensitivity of home production allocations within couples.

Finally, we do not model dynamic bargaining between couples or allow for endogenous divorce. Bronson and Mazzocco (2021) analyze the consequences of transitioning from a joint to individual taxation in the US in a limited commitment model. Their results suggest that intra-household bargaining might be important when studying joint vs individual taxation. Eckstein, Keane and Lifshitz (2019) also find sizable marriage market effects from such a policy. Our model is a unitary framework with fixed pareto weights. We can interpret our results as being conditional on marriage decisions. In Section 8, we analyze how sensitive our results are to the fixed bargaining position of men and women in couples.

In the Supplemental Material Tables E.14 and E.15 we report how sensitive the parameter estimates are to the calibrated parameters in $\boldsymbol{\phi}$, following the approximation of $\frac{\partial \boldsymbol{\theta}}{\partial \boldsymbol{\phi}}$ proposed in Jørgensen (2023).

6 Permanent Wage Changes

We use our estimated model to simulate the impact of permanent changes in wages.[16] We use these simulations in three ways. First, we provide additional validation of the model by comparing model simulations to our reduced from empirical results. Second, we show the long run impacts of wage changes on fertility, labor supply and human capital. We contrast these long run impacts with a model without the fertility choice to quantify the importance of fertility adjustments. Finally, we show how elasticities differ by the age at the time of the shock.

6.1 Validation

We compare simulated behaviour in the model with the empirical reduced-form findings in Section 3, which were not used explicitly in estimation of the model. In Table 4 we show the simulated and empirical fertility elasticities with respect to wages. The empirical estimates are based on the reduced-form results in Table 3.[17] We interpret these coefficients as Marshallian elasticities, assuming that the Danish tax reforms were believed to be permanent at the time. In the model, to emulate the empirical strategy, we simulate a permanent unanticipated wage increase of women and men separately at age 35 and report the change in the number of children four years later (relative to the number of children four years later in the baseline model).

Table 4: Validation: Fertility Responses to Wage Changes.

	Less skilled		High skilled	
	data	model	data	model
Women's wages	-0.028 [-0.045,-0.012]	-0.031	-0.011 [-0.030, 0.008]	-0.047
Men's wages	0.023 [0.009, 0.037]	0.008	-0.015 [-0.033, 0.004]	0.006

Notes: Empirical elasticities are based on Table 3 with simulated elasticities from the estimated model. The simulated effects are based on an unanticipated permanent increase in wages at age 35 and shows the elasticity four years later. Numbers in square brackets represent 95% confidence intervals.

The estimated model replicates well the empirical fertility responses to exogenous

[16]We increase wages of member j with x percent through the modification of the wage process: $w_{j,t} = \exp(\gamma_{j,0} + \gamma_{j,1}K_{j,t}) + x \cdot \exp(\gamma_{j,0})$. This is to keep the return to human capital unchanged across x. As a consequence, the percentage change in the wage is decreasing in the amount of human capital.

[17]We convert the estimated coefficient on wages into a fertility elasticity by dividing by the average number of children.

wage changes. As in the data, the model predicts a sizable negative effect on fertility from increasing wages of less skilled women. The magnitude is very similar, -0.028 vs. -0.031. The model correctly predicts a positive effect on fertility of increasing men's wages in less skilled couples. The effect is, however, in the lower end of the 95% confidence interval. For high skilled, the elasticities are insignificant in the data while our model predicts somewhat similar responses as for low skilled. Below, in Figure 6, we show that the *completed fertility* response for high skilled are much lower than that of less skilled in the model.

Table E.5 in the Supplemental Material shows similar results using log hours worked as outcome rather than number of children. Here, the model predicts much larger responses than the data seems to suggest. This is, however, a common finding: The "structural" literature tend to find labor market elasticities with similar magnitudes as our model suggests (see our discussion below and e.g. Attanasio, Low and Sanchez-Marcos, 2008 and Borella, De Nardi and Yang, 2023). Reduced-form estimates are often much smaller (see e.g. Keane, 2011, 2022). One potential reason for this discrepancy here and in the literature is that labor supply elasticities estimated by IV are downward biased if wages are endogenous due to human capital accumulation (Keane, 2016). While further understanding this difference is very interesting, it is outside the scope of this paper.

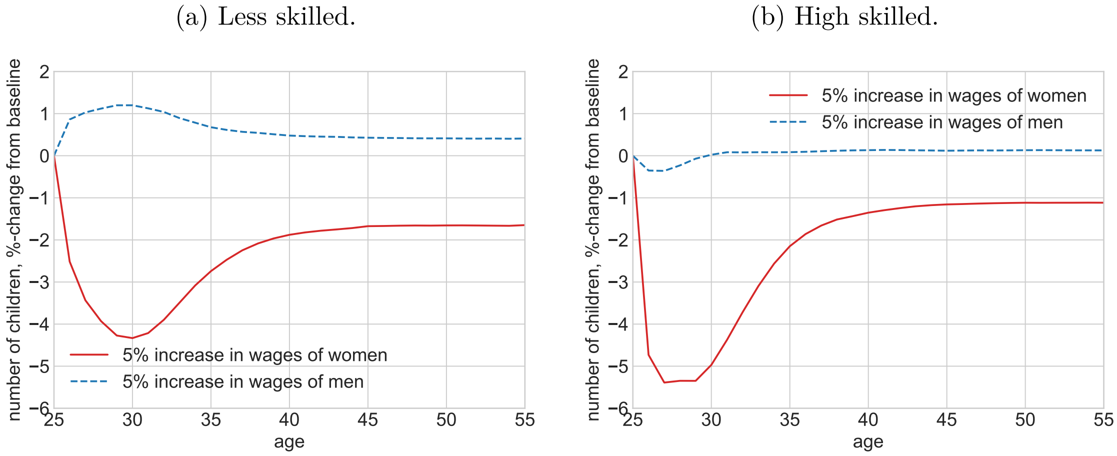
6.2 Increased Wages from Age 25

Fertility. In Figure 6 we show the impact of permanent wage increases of less skilled women and men from age 25 on the number of children born over the life-cycle. Figure E.1 in the Supplemental Material shows similar output for high skilled couples. In the model, increases in wages change the incentives to work and the incentives to have children. These decisions interact not only through income and substitution effects but also through dis-utility from market work when children are present, estimated in the q-function. We show again that couples adjust fertility asymmetrically to wage changes of men and women. The 5% permanent increase in the wage of less skilled women at age 25 leads to a 4.3% decline in the number of children by age 30. This fertility decline is composed of a timing effect and a quantity effect, as completed fertility is reduced by around 1.75%. This corresponds to a completed fertility elasticity of -0.33. For men, we estimate a much weaker interaction effect between children and the dis-utility of work in the q-function. This means that the income effect dominates and completed fertility increases by around 0.3% from the 5% increase in the wages of men.

The simulated fertility response to wages of women is in line with existing studies.

Keane and Wolpin (2010) find that a 5% increase in wages of women leads to a reduction in the number of children born by age 28 by 6.3% for Black women, 6.5% for Hispanic women, and 8.6% for White women. Francesconi (2002) computes completed fertility elasticities with respect to wages of women mostly in the range −0.65 to −1.25 and Wang (2022) simulates a completed fertility elasticity of −1.18 for married women. None of these studies estimate fertility responses to the wages of men.

Figure 6: Fertility Effect of Permanent Wage Increase from Age 25.



Notes: The figure shows the percentage change in the number of children from a 5% permanent wage increase from age 25 of women and men separately.

Hours worked and human capital. The solid lines in Figure 7 show how the increase in permanent wages in the baseline model leads to changes in the life-cycle profile of hours worked and of the offered wage, separately for less skilled women and men. Figure E.6 in the Supplemental Material shows similar output for high skilled.[18]

Less skilled women increase hours worked by 10% at age 30, similar in magnitude to existing research (see e.g. Keane and Wolpin, 2010; Attanasio, Levell, Low and Sánchez-Marcos, 2018 and Borella, De Nardi and Yang, 2023). This increase in hours worked over the life-cycle contributes to an increase in offer wages by age 50 (panel (b)), over and above the direct effect of the wage increase, partly due to human capital accumulation. The labor market responses of women are amplified by the fall in fertility, and so human capital and the offer wage increases even further. We label this as the *Fertility Multiplier*.

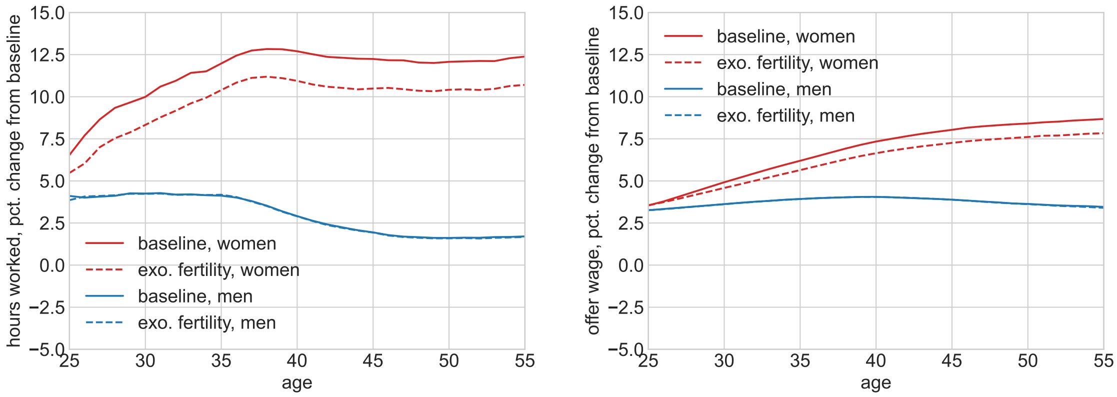
Men are less responsive than women and increase their hours worked by around 4% at age 30 from a 5% increase in their wages from age 25 (as in surveys by Keane, 2011,

[18]See also Tables E.12 and E.13 in the Supplemental Material.

2022).

Figure 7: Permanent Wage Increase from Age 25. Less Skilled.

(a) Hours worked. (b) Offer wage.



Notes: The figure shows simulated behavior from a 5% permanent wage increase of women and of men from age 25 in the baseline model (solid) and an alternative model in which fertility is exogenous (dashed).

The Role of Fertility Adjustments. To quantify the importance of endogenous fertility adjustments, we compare labor supply responses in our baseline model with an alternative scenario in which fertility cannot respond to wage changes. In the alternative model, fertility is exogenous and stochastic, as is assumed in much existing literature.[19] Childbirth expectations in this alternative model are consistent with the realized arrival rate in the baseline model, conditional on age and the number of children. That is, couples in the alternative model expect children to arrive exogenously following a process estimated from the endogenously chosen fertility in the baseline model. Consequently, the simulated age profiles of fertility are identical across the baseline and the alternative model.

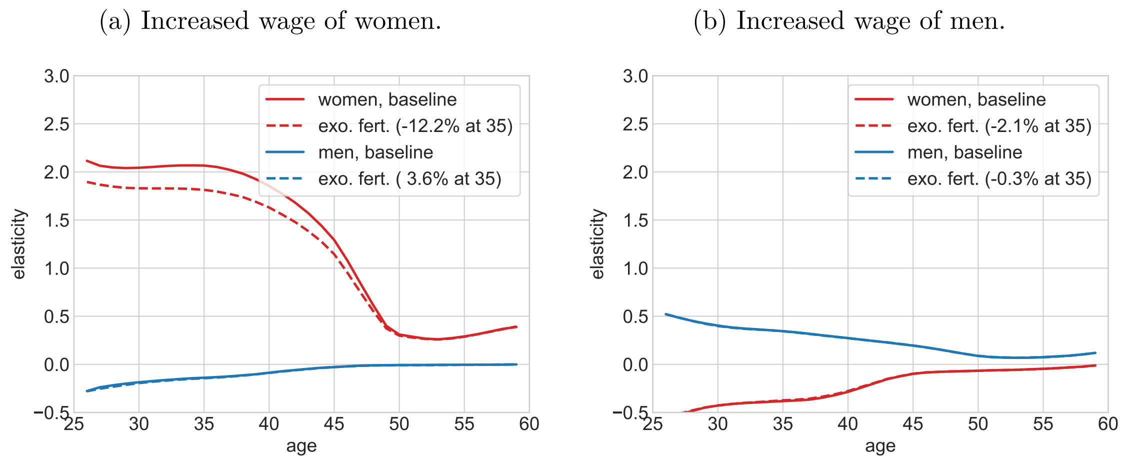
The dashed lines in Figure 7 show the lower labor supply response to the permanent wage change when there is no choice over fertility. The response in hours worked by women depends markedly on the ability to adjust fertility, while the response by men does not. The change in hours worked by women is consistently around 2 percentage points higher throughout the working life when fertility can adjust. The larger labor market response in the baseline translates into a larger change in the offer wage later in life. Figure E.6 in the Supplemental Material shows that the difference is smaller for high skilled women.

[19]For some recent examples see e.g. Blundell, Dias, Meghir and Shaw (2016); Low, Meghir, Pistaferri and Voena (2018); Guner, Kaygusuz and Ventura (2020); Bronson and Mazzocco (2021); and Borella, De Nardi and Yang (2023).

6.3 Marshallian Life-Cycle Elasticities

In Figure 8 we consider how the age at which the shock occurs impacts the response.[20] We report hours elasticities from an unanticipated permanent wage increase for both the baseline model (solid lines) and the alternative exogenous fertility model (dashed lines) for less skilled. Figure E.7 in the Supplemental Material shows similar output for high skilled. The horizontal axis denotes the age at which the unanticipated permanent wage increase occurred and the vertical axis shows the average life-cycle elasticity of hours worked. The hours elasticity of less skilled women at age 35 is 12.2% lower in the exogenous fertility model relative to the baseline model. For men, the difference is only 0.3%. For high skilled, this fertility multiplier is 6.2% at age 35 for women and 0.2% for men. Accounting for the choice over when and whether to have children plays an important role in understanding labor market responses, particularly of less skilled women. This is in addition to the direct effect of children

Figure 8: Quantifying the Role of Fertility Responses. Less Skilled.



Notes: The figure shows the labor supply elasticities from an unanticipated permanent wage increase for both the baseline model (solid lines) and the alternative exogenous fertility model (dashed lines). On the x-axis is the age at which the unanticipated permanent wage increase occurred and on the y-axis we show the elasticity of hours worked, calculated as the average number of hours in the remainder of the working life from the age at which the permanent shock occurred.

Fertility adjustments happen on both the extensive and intensive margin. In Figures E.8 and E.9 in the Supplemental Material we show the elasticity of the age at first birth and the elasticity of completed fertility. The increased wages of women early in life lead

[20] In Tables E.6 and E.7 in the Supplemental Material, we report life-cycle Marshallian elasticities of participation, hours worked, and offered wage at age 55 together with the immediate percentage point change in the likelihood of a birth and the elasticity of the number of children at completed fertility from 5% unanticipated wage increases from different points over the life cycle.

to marked delays in childbirth. This impact on timing is greater than the decline in completed fertility.

7 Child-Related and Labor Market Policy Reforms

We simulate the impact of child-related labor market reforms on the timing and number of children, labor supply, and gender wage inequality. We show both simulated event studies around first childbirth, and long run life-cycle behavior.[21] We analyze the impact of labor market reforms, in particular changes in the earned income tax credit (EITC), child care costs, and maternity leave. To understand what drives the responses to labor market reforms, we then investigate the importance of human capital depreciation and of the dis-utility of working alongside having children in generating differences in behavior between men and women in the short and long run. For expositional reasons we only show results for less skilled in the main text. The Supplemental Material contains analogous results for high skilled.

7.1 Labor Market Reforms

First, we consider the impact of removing the earned income tax credit (EITC) completely. Second, we show the effect of making the maximum EITC dependent on the number of children, as is the case in the US but not in Denmark.[22] Third, we simulate a government subsidy that makes childcare free. Finally, we simulate the removal of parental leave.

Earned Income Tax Credit. In panel (a) of Figure 9, we show the impact on working around the time of childbirth from removing the EITC and from making the EITC dependent on the presence of children. Figure 10 shows the life-cycle implications of these reforms for completed fertility, the long-run gender wage gap, and hours worked at age 30 and 50. When making the EITC dependent on the presence of children, we multiply the maximum EITC by the number of children present, and remove EITC for childless couples.

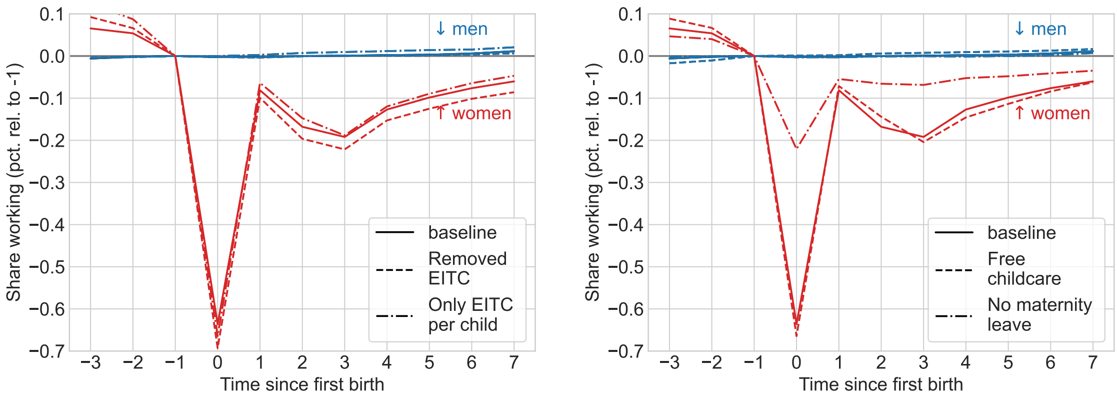
Removing the EITC reduces the return to working and disincentivizes participation, both around childbirth and over the life-cycle. Hours of work decline persistently over the working life by more than 6%. Mirroring this, there is a small increase in the number

[21] Tables E.8 to E.11 in the Supplemental Material shows outcomes from these counterfactual simulations.

[22] In 2014, an additional EITC for singles with dependants was introduced in Denmark but the EITC for couples remain independent of dependents. We use 2010 rules throughout.

Figure 9: Event Studies: EITC and Child-Related Policies. Less Skilled.

(a) EITC. (b) Child-related.



Notes: The figure shows the share working around first childbirth. Solid lines are the baseline model, red lines are behavior of women and blue lines are behavior of men. Panel (a) shows in dashed lines behavior when the Danish EITC is completely removed. Dot-dashed lines shows behavior when we remove the EITC for childless but let the maximum EITC depend on the number of children. Dashed lines in panel (b) show behavior when childcare is completely free; dot-dashed lines show behavior when maternity leave with benefits is not available.

of children (at the intensive margin). The overall effect is a reduction in wage offers to women at age 50 and thus an increase in the gender wage gap.

Making the EITC dependent on the presence of children increases completed fertility substantially. This increase in the number of children reduces hours worked despite the increased financial return to work, in line with results found in Keane and Wolpin (2010).

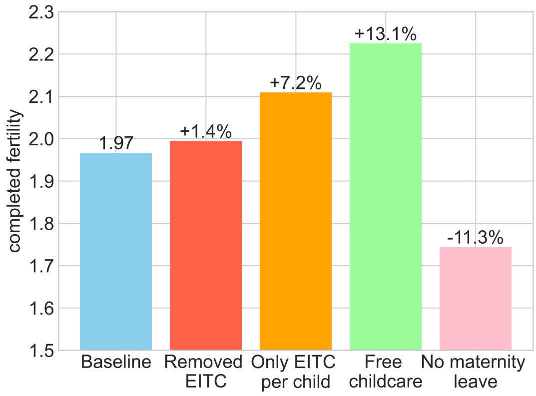
Free Childcare. In many countries, the costs of having children can be substantial. In Denmark, such costs are already heavily subsidised with a co-payment of around 25% of the cost of child care.[23] Consequently, formal childcare take-up rates are high. Around 90% of 2-year olds and 96% of 3-year olds were in some formal child care in 2006 (Statistics Denmark, PAS1 and FOLK2 series). We therefore model childcare as the cost of having a child rather than the cost of having a child while working. The only work-specific child cost is through the q-term in the utility function. This policy reform is similar to the unconditional child allowance which is being discussed in the US (e.g. Parolin, Giupponi, Lee and Collyer, 2022).

Panel (b) of Figure 9 shows behavior around childbirth, and Figure 10 shows the life-cycle implications from free childcare. The cut in the cost of children leads to an increase in the number of children per couple. This is accompanied by a short-term reduction in

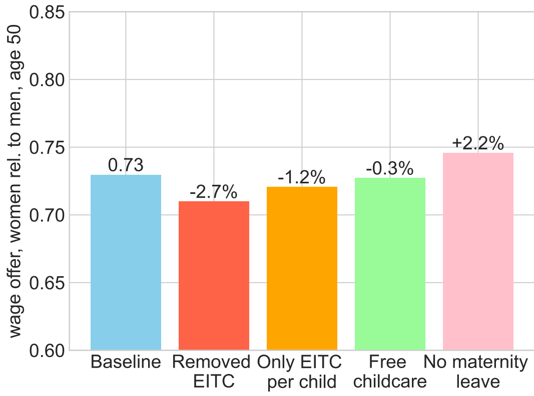
[23]See Figure B.1 in the Supplemental Material.

Figure 10: Life-Cycle Behavior of Women: Policy Reforms. Less Skilled.

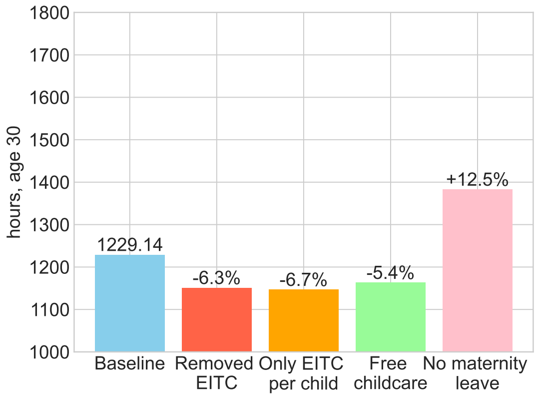
(a) Completed fertility.



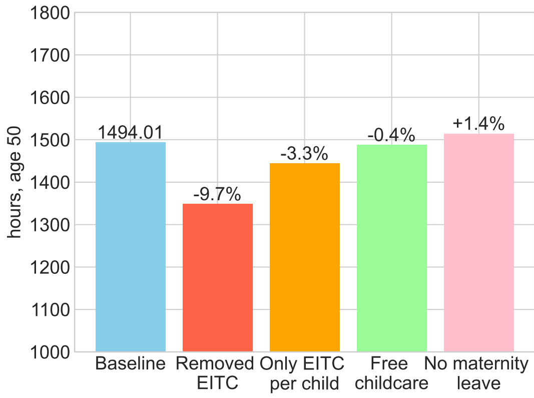
(b) Gender wage gap, age 50.



(c) Hours worked, age 30.



(d) Hours worked, age 50.



Notes: The Figure shows simulated outcomes for women from the estimated baseline model in column 1 and outcome from an alternative model in which the Danish EITC is completely removed in column 2. Column 3 also removes the EITC for childless but lets the maximum EITC be the baseline value times the number of children. In column 4 childcare is completely free and column 5 removes the possibility of newborn mothers taking maternity leave with benefits. See Figure E.4 for results for high skilled.

hours worked relative to the baseline, although this disappears later in life. The recovery in hours worked means there is very little effect on life-cycle gender inequality by age 50. While the labor market adjustments are primarily on the extensive margin, the fertility adjustments are on the intensive margin (see Table E.9 in the Supplemental Material).

Maternity Leave. We also investigate behavior if maternity leave was not available. In this exercise, no maternity payments are made when the mother is not working in the year after childbirth, and periods with newborn babies are just like any other period in the model. Figure 9 shows that this would substantially increase participation by women at the time of childbirth. Further, there is no dip in participation 3 years after the first birth, partly driven by the decline in second births. Figure 10 shows a significant decrease in completed fertility and a shift towards increased hours worked when young. Later in the working life, at age 50, however, the increased hours worked is very much muted and the long-run gender wage gap only reduces by around 2.2%.[24]

7.2 Human Capital and the Dis-Utility from Work

The policy simulations above highlight the importance of capturing both labor supply and fertility behavior, and their interaction around childbirth. The importance of this interaction depends on the extent of human capital depreciation when on maternity leave and the extent to which the dis-utility of work changes in the presence of children for men and women. Each of these elements may contribute to the reduction in work after first childbirth, and have long-run implications for gender inequality. Here we investigate the role of these mechanisms in the model.

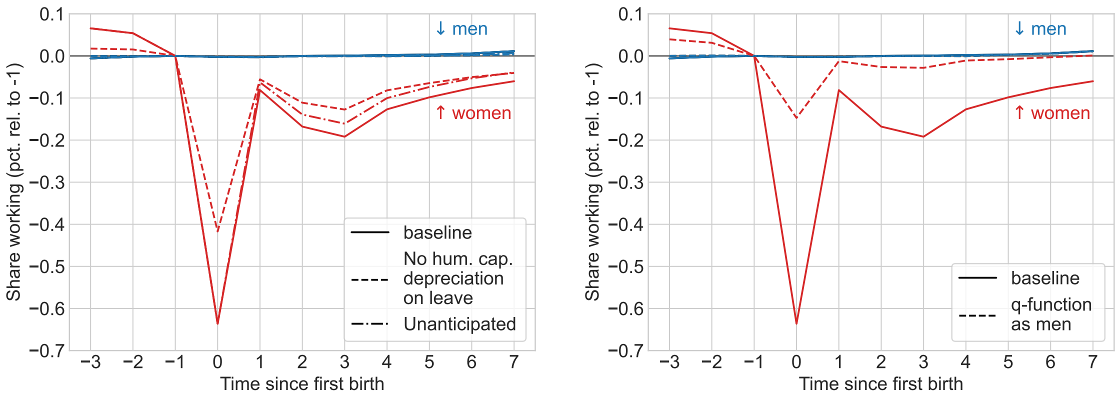
Human Capital Depreciation. If human capital does not depreciate while on maternity leave, labor supply is affected in several ways. First, it is less costly to take parental leave. Second, there is less of a wage cost in having additional children and taking time out. Finally, the return to accumulating human capital is higher: Any human capital accumulated before taking parental leave is not lost during leave. Panel (a) of Figure 11 shows how these mechanisms play out in the short-run through the share working around

[24] Parental leave in the model is only available to mothers and not fathers as a parsimonious way of emulating the division of leave in Denmark in the sample period (see e.g. Jørgensen and Søgaard, 2024). This means that the model is not well suited to study the intra-household allocation of parental leave.

first childbirth, and Figure 12 shows the life-cycle implications.[25]

Figure 11: Event Studies: Human Capital and Dis-Utility from Work. Less Skilled.

(a) Human capital. (b) Dis-utility from work.



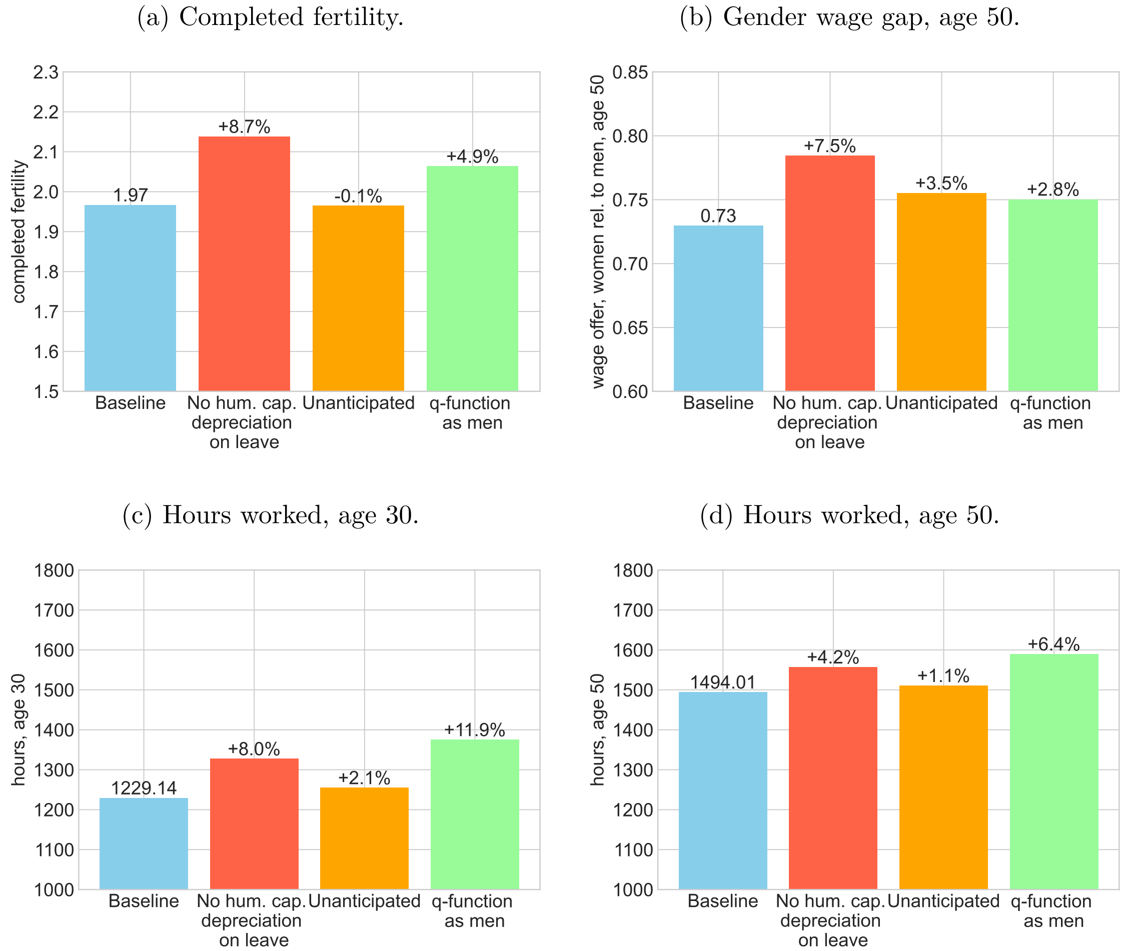
Notes: The figure shows the share working around first childbirth. Solid lines are the baseline model. Dashed lines in Panel (a) are when human capital depreciation does not happen in the year of childbirth, i.e. $\delta = 0$ for women if $o_t = 0$. The dot-dashed lines also show behavior when there is no depreciation, but in this case, the lack of depreciation is unanticipated. Dashed lines in Panel (b) are when the parameters in the q-function of women are set to the estimated parameters of men (see e.q. (2)).

The net effect of removing depreciation during maternity leave is for the share of women working after first childbirth to fall by a smaller percentage than in the baseline. This is because of the anticipation effect: Women work more in advance of having children (this is normalised to 0 at time $t = -1$ in Figure 11 panel (a)), and then exit less (in percentage terms) after the arrival of their first child. When the lack of skill depreciation is unanticipated, there is only an impact on participation after maternity leave ends: Wages are unexpectedly higher and the share working is correspondingly higher through a mechanical wage effect.

The lack of wage depreciation while on maternity leave induces families to have more children (panel (a) of Figure 12). This increase in children, and corresponding increase in the cost of working, offsets the direct increase in the incentive to work.

[25]Tables E.8 and E.10 in the Supplemental Material show several additional outcomes.

Figure 12: Life-Cycle Behavior of Women: Human Capital and Dis-Utility from Work. Less Skilled.



Notes: The Figure shows simulated outcomes for women from the estimated baseline model in column 1 and outcome from an alternative models. See notes to Figure 11.

In the long-run, by age 50, hours worked remain higher than in the baseline model, driven by the increased incentive to work due to increased wages. In turn, the gender wage gap is reduced by 7.5%, shown in panel (b) of Figure 12. This reduction is substantial since fertility also increases substantially. Human capital depreciation while on maternity leave thus increases the gender wage gap by around 25% for less skilled and 36% for high skilled.

The Dis-Utility of Work in the Presence of Children. In estimation, we allow for gender symmetry in the dis-utility from work when children are present (the q-function) but we estimate substantial differences between men and women. The dis-utility of work increases much more sharply in the presence of young children for women compared to men. We investigate how behaviour around child-birth and over the life-cycle is driven by these differences while remaining agnostic about the origin of them. The estimated gender differences can e.g. stem from differences in preferences, norms, bargaining and other factors. It would be interesting in future research to unpack this more to study pontential mechanisms better.

The dashed lines in panel (b) in Figure 11 show the behavior in a model where women have the same parameters in their q-function in eq. (2) as those estimated for men. Women leave the labor market much less in response to first childbirth, if women have the same q-function as men. Figure 12 shows the longer run life-cycle effects. Panel (a) shows that fertility increases when there is less of an interaction between the presence of children and the cost of work, and similarly hours worked at age 30 and age 50 increase. The net effect is a reduction in the gender wage gap by 2.8% at age 50, although a sizable gender gap remains. The reduction in the gender wage gap is much less than might be expected from the increased share working seen in the event study in panel (b) of Figure 11. The difference arise because the increase in fertility means that while more women who have children remain in the labor force, a larger share works part time (see Table E.8 in the Supplemental Material).

8 Sensitivity Analysis

Two potentially important sets of assumptions concern the human capital accumulation process and the bargaining position of couples. We show the sensitivity of our results on the life-cycle gender wage gap, on hours worked and on completed fertility. We further show how elasticities of labor supply are affected.

When we change the human capital process, we modify the accumulation rate so that:

$$K_{j,t+1} = [(1 - \delta - \delta_0(1 - l_{j,t}))K_{j,t} + l_{j,t}]\varepsilon_{j,t+1} \tag{12}$$

where $\delta_0 \geq 0$ measures the degree of convexity in the human capital depreciation rate. The estimated baseline model is nested and correspond to $\delta_0 = 0$. If $\delta_0 > 0$, human capital depreciates more when current labor market supply is lower. The idea is that "long term" non-employment leads to more severe human capital depreciation.[26]

When we change the bargaining power of women, we increase λ by 10% to $\lambda = 0.55$.

[26] Ideally, we could allow for several years of employment history to affect the depreciation but that would require keeping track of multiple years of the employment history of each partner when solving the model.

This is not a substitute for a full limited commitment model, but rather sheds light on the role of power in our framework.

Table E.16 in the Supplemental Material shows changes compared to the baseline levels (reproduced in column (1)). Column 2 shows changes if human capital depreciation is convex ($\delta_0 = 0.01$), columns 3 shows changes if the depreciation rate, $\delta = 0.101$, column 4 shows changes when power increases and $\lambda = 0.55$. We focus our discussion on less skilled couples and report in Table E.17 similar output for high skilled couples.

Convexity in the human capital accumulation process induces women to work more hours early in their careers, but to cut back later in life, relative to the baseline. Further, there is a reduction in the number of children. This is in contrast to the effects of increasing the (linear) depreciation rate where hours of work fall across the life-cycle and the number of children increases. The difference arises because in the case with convexity, wage depreciation can be avoided by working more, whereas with linearity there is an increase in depreciation regardless of the amount worked. In addition to the impacts on labor supply and fertility, the alternative human capital accumulation processes change the way fertility choices interact with labor supply choices. The hours of work elasticity is lower when fertility is exogenous, but this effect is somewhat smaller with greater depreciation: -10.6% when depreciation is convex, and -11.6% when depreciation is increased, but linear. This is compared to -12.2% in the baseline.

If women have more power in our model, they work significantly less and have more children. Further, their elasticity of hours worked is greater. On the other hand, the additional impact on the labour supply elasticity of being able to choose fertility is less: this fertility multiplier falls to -4.9%.

We found that human capital depreciation explains around 25% of the gender wage gap for less skilled at age 50, based on Figure 12. In Figure 13, we show that this result is robust to a more convex human capital accumulation process. The figure shows the offer wage gap at age 50 in the model with convex human capital ($\delta_0 = 0.01$) in the first column. In the following columns we show results from models with convex human capital accumulation and i) no human capital depreciation while on leave, ii) no human capital depreciation while on leave but unanticipated, and iii) the dis-utility from work when children are present identical between men and women.[27]

The convexity of human capital accumulation does not change the importance of

[27]Figures E.10 and E.11 in the Supplemental Material shows similar output for a higher depreciation rate and increased power of women, respectively. Figures E.15–E.17 shows sensitivity results for high skilled.

human capital accumulation while on leave significantly (7.5% in panel (b) of figure Figure 12 compared to 7.7% in panel (b) of Figure 13). Our simulated policy counterfactuals do also not change markedly across the alternative specifications. The results are shown in Figures E.12–E.14 and E.18–E.20 in the Supplemental Material.

Figure 13: Sensitivity to Convex Human Capital: Human Capital Depreciation and Dis-Utility from Work. Less Skilled.

Notes: The Figure shows simulated outcomes for women from the alternative model with convex human capital accumulation process ($\delta_0 = 0.01$) model in column 1 and outcomes from an alternative models. The outcomes are comparable to those in Figure 12.

In the Supplemental Material Tables E.14 and E.15 we report how sensitive the parameter estimates are to the calibrated parameters in $\boldsymbol{\phi}$, following the approximation of $\frac{\partial \boldsymbol{\theta}}{\partial \boldsymbol{\phi}}$ proposed in Jørgensen (2023).

9 Conclusion

The labor supply responsiveness of men and women are key to understanding welfare reforms and optimal tax policy. In this paper, we show that fertility adjustments are an important driver of especially women's labor supply elasticities. This has implications for how we design optimal policy and shows that we should think carefully about fertility adjustments as potentially playing an important role in counterfactual policy evaluations.

We provide new evidence that fertility responds to general tax changes not specifically targeted families with children. Using detailed Danish register data and a series of tax reforms from 2009, we show that increases in women's marginal net-of-tax wages tend to decrease fertility while increases in men's marginal net-of-tax wages tend to increase fertility. Our results suggest that this asymmetric response stems from the fertility substitution effect dominating for women while the fertility income effect dominates for wages of men.

We then estimate a dynamic model of fertility and family labor supply that replicates our empirical finding, without explicitly being targeted in estimation. Our main contribution is to quantify the importance of fertility adjustments through counterfactual simulations within our framework. Concretely, we compare the labor hours elasticities in the baseline estimated model with that from an alternative version of the model, in which couples *cannot* adjust their fertility. The life-cycle Marshallian hours elasticity of women in our baseline model is around 28% higher than that of women in the alternative exogenous fertility model. This suggests that fertility adjustments are a key component of labor supply responses of women and an important driver of long term gender wage inequality.

Our results guide several avenues for future research. The estimated model is rich in the sense that couples in each period chose how much to save, whether each member should work and how much to work and whether to try to conceive a child. Our analysis is not without caveats, however. In particular, we abstract from intra-household bargaining and time-allocation decisions over leisure and home production (child care). This is partly motivated by data limitations and computational considerations. Including time-allocation of non-market work in the spirit of e.g. Blundell, Pistaferri and Saporta-Eksten (2018) would be an interesting extension. Related to this allocation of home production time, we abstract from the important quantity-quality trade-off in child rearing (Becker, 1960). Interesting alternative frameworks to capture within household allocations include collective models (Chiappori, 1992; Bourguignon and Chiappori, 1994), non-coorperative models (Konrad and Lommerud, 2003), and limited commitment bargaining models (Mazzocco, 2007; Doepke and Kindermann, 2019). Low, Meghir, Pistaferri and Voena (2018) show how Pareto weights can change with labor market policy, but without endogenous fertility. Their conclusion is that Pareto weights change very little, conditional on being married. A similar conclusion is in Fernández and Wong (2014).

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Supplemental Material

A Data Appendix

In Denmark, many parents have the right to full wage compensation while on parental leave. The way it works is that employers pay out full wages for the weeks on leave with full wage compensation and apply for reimbursement from the authorities. This means that periods on parental leave with full wage compensation will show up as regular employment in the BFL register with monthly payslips. The BFL register does, unfortunately, not indicate whether the person was actually on parental leave while receiving the wages/parental leave benefits. To determine whether the parent was on parental leave, we use another register, the "OF"-register with parental leave spell-data. We then scale the monthly hours and income by the share of the month registered on parental leave.

We construct other variables as follows:

- Couples are constructed using *EFALLE* (from the register BEF).
- Birth year (cohort) and gender is based on FOED_DAG and KOEN (from BEF). The age of a couple is the age of the woman.
- Household wealth includes deposits in bank accounts, bonds, stocks and properties net of loans and mortgages and are measured at the end of the calendar year for tax purposes FORM and FORMREST_NY05 (after 1996) from IND). Property values are based on the public valuation and is in many cases underestimated. We thus follow the approach in, e.g. Leth-Petersen (2010) and increase registered property values with 10%. Wealth is deflated using the Danish CPI and in 1000DKK.
- We use two measures of income. The measure of personal income (PERINDKP from IND) includes labor income through wage work and profit from own firms and labor market transfers during a given year. Labor income is constructed as 12-month sum of monthly labor income in the BFL registry. In age profiles, the 12 months are the calandar year, running from January through December. For event-study moments, we center the 12-months around childbirth. For example, if a firstborn child arrives in March 2010, all income from January and February will be included in annual income one year prior to childbirth (-1). This has the effect that in event-study-moments, all births happen in the beginning of the year, which is what we assume in the model. All income measures are deflated using the Danish CPI and in 1000DKK.

- Self-employed, retired, students and individuals on disability pension is identified through SOCSTIL and SOCSTIL_KODE measuring the main activity in end of November.

- An individual is classified as high-skilled if the individual has at least 180 months of education (using HFPRIA from UDDA).

- The age of children is linked through the parents identifiers in the register BEF. Almost all children can be linked to a mother.

- Labor market experience is based on the accumulated payments to ATP (ERHVER and ERHVER79 from the IDAP register). Part time employment here is equivalent to 2/3 of that of full time.

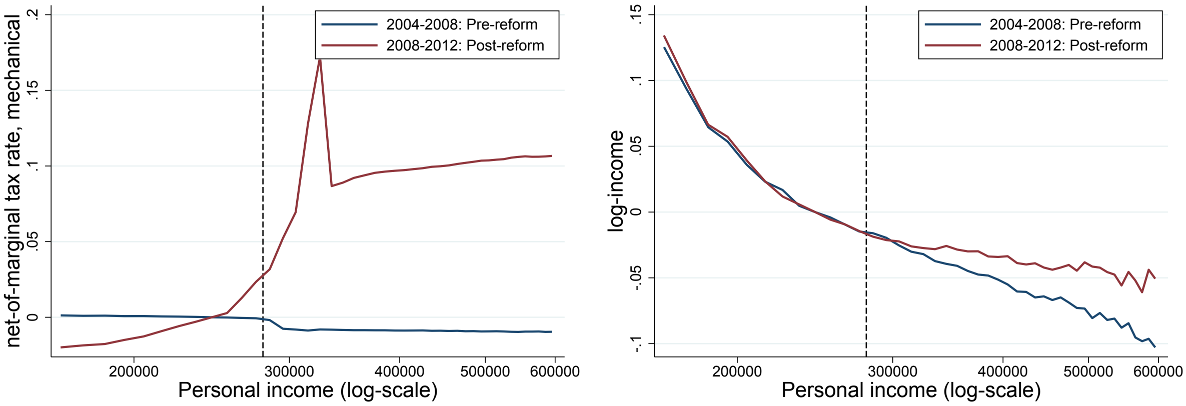
A.1 Additional info and Results Related to Section 2

Similar in spirit to Gruber and Saez (2002) and Jakobsen and Søgaard (2019), we restrict attention to couples in which both members have personal income in the range 50,000–600,000 in the baseline years of the forward differences.[28] This leaves a significant part of the income distribution in the "validation region" without significant mechanical marginal tax changes even after the 2009/2010 reform. In Figure A.1, we illustrate this point by plotting the mechanical tax change in panel a) for base years 2004 and 2008 and the change in personal income in panel b), both across the income distribution in the base year. We clearly see that in the validation region (to the left of the dashed vertical line in panel a)), the mechanical tax change is zero both before and after the reform. Likewise, in panel b) we see that the change in personal income was very similar in this region while quite different higher up in the income distribution where the mechanical net-of-tax change was much larger after the reform. Combined, this indicates that the tax variation used here constitutes a valid instrument, once we flexibly control for base year income (Jakobsen and Søgaard, 2019).

[28] In turn, while $z_{i,t}$ and thus $\tau_t(z_{i,t}, Z_{i,t})$ are in a restricted range, $z_{i,t+4}$ and $\tau_{t+4}(z_{i,t+4}, Z_{i,t+4})$, are unrestricted and can be outside the specified range.

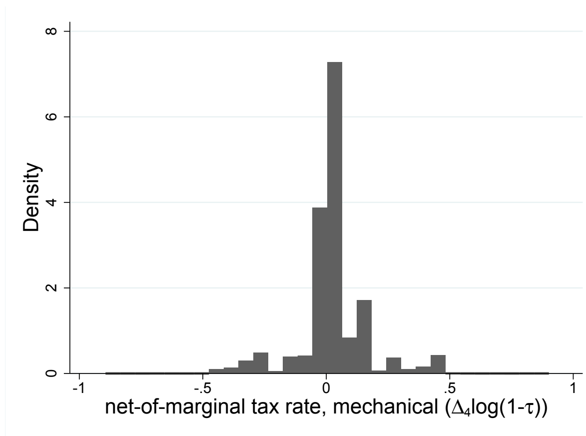
Figure A.1: Verification: 4-year differences across the income distribution.

(a) Mechanical tax change. (b) Log income.



Notes: This figure illustrates the tax variation and the plausibility of the variation in generating exogeneous variation.

Figure A.2: Simulated Net of Marginal Tax Rate Changes.



Notes: This figure illustrates the tax variation and the plausibility of the variation in generating exogeneous variation.

Table A.1: First-stage estimates, $\Delta_4 \log(1-\tau_{i,t})$, Women.

	(1)	(2)	(3)
$\Delta_4 \tau^m_{i,t}$, women	0.428***	0.426***	0.426***
	(0.002)	(0.002)	(0.002)
$\Delta_4 \log(y^m_{i,t})$, women	0.010***	0.010***	0.010***
	(0.000)	(0.000)	(0.000)
$\Delta_4 \tau^m_{i,t}$, men	0.019***	0.019***	0.019***
	(0.001)	(0.001)	(0.001)
$\Delta_4 \log(y^m_{i,t})$, men	0.028***	0.027***	0.027***
	(0.001)	(0.001)	(0.001)
Income dummies	Yes	Yes	Yes
Children dummies	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes
Age dummies	Yes	Yes	Yes
Hum. cap. controls	No	Yes	Yes
Male partner controls	No	No	Yes
Avg. dep. var. (y, level)			
Obs.	2531181	2531181	2531181
First stage F-stat.			

Notes: This Table reports first-stage estimation results of $\Delta_4 \log(1-\tau_{i,t})$ using mechanical tax rate changes, $\Delta_4 \log(\tau^m_{i,t})$, $\Delta_4 \log(\tau^m_{partner(i,t)})$, $\Delta_4 \log(y^m_{i,t})$, and $\Delta_4 \log(y^m_{partner(i,t)})$ as instruments. Robust standard errors in brackets are clustered at the individual level. *$p < 0.10$, **$p < 0.05$, ***$p < 0.01$. See notes to Table 2.

Table A.2: First-stage estimates, $\Delta_4 \log(1-\tau_{i,t})$, Men.

	(1)	(2)	(3)
$\Delta_4 \tau^m_{i,t}$, women	0.015***	0.013***	0.014***
	(0.001)	(0.001)	(0.001)
$\Delta_4 \log(y^m_{i,t})$, women	0.008***	0.009***	0.008***
	(0.000)	(0.000)	(0.000)
$\Delta_4 \tau^m_{i,t}$, men	0.407***	0.407***	0.406***
	(0.001)	(0.001)	(0.001)
$\Delta_4 \log(y^m_{i,t})$, men	0.006***	0.005***	0.006***
	(0.001)	(0.001)	(0.001)
Income dummies	Yes	Yes	Yes
Children dummies	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes
Age dummies	Yes	Yes	Yes
Hum. cap. controls	No	Yes	Yes
Male partner controls	No	No	Yes
Obs.	2531181	2531181	2531181

Notes: This Table reports first-stage estimation results of $\Delta_4 \log(1-\tau_{partner(i,t)})$ using mechanical tax rate changes, $\Delta_4 \log(\tau^m_{i,t})$, $\Delta_4 \log(\tau^m_{partner(i,t)})$, $\Delta_4 \log(y^m_{i,t})$, and $\Delta_4 \log(y^m_{partner(i,t)})$ as instruments. Robust standard errors in brackets are clustered at the individual level. *$p < 0.10$, **$p < 0.05$, ***$p < 0.01$. See notes to Table 2.

Table A.3: First-stage estimates, $\Delta_4 \log(y_{i,t})$, Women.

	(1)	(2)	(3)
$\Delta_4\tau^m_{i,t}$, women	0.428***	0.426***	0.426***
	(0.002)	(0.002)	(0.002)
$\Delta_4 \log(y^m_{i,t})$, women	0.010***	0.010***	0.010***
	(0.000)	(0.000)	(0.000)
$\Delta_4\tau^m_{i,t}$, men	0.019***	0.019***	0.019***
	(0.001)	(0.001)	(0.001)
$\Delta_4 \log(y^m_{i,t})$, men	0.028***	0.027***	0.027***
	(0.001)	(0.001)	(0.001)
Income dummies	Yes	Yes	Yes
Children dummies	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes
Age dummies	Yes	Yes	Yes
Hum. cap. controls	No	Yes	Yes
Male partner controls	No	No	Yes
Avg. dep. var. (y, level)			
Obs.	2531181	2531181	2531181
First stage F-stat.			

Notes: This Table reports first-stage estimation results of $\Delta_4 \log(y_{i,t})$ using mechanical tax rate changes, $\Delta_4 \log(\tau^m_{i,t})$, $\Delta_4 \log(\tau^m_{partner(i,t)})$, $\Delta_4 \log(y^m_{i,t})$, and $\Delta_4 \log(y^m_{partner(i,t)})$ as instruments. Robust standard errors in brackets are clustered at the individual level. *$p < 0.10$, **$p < 0.05$, ***$p < 0.01$. See notes to Table 2.

Table A.4: First-stage estimates, $\Delta_4 \log(y_{i,t})$, Men.

	(1)	(2)	(3)
$\Delta_4\tau^m_{i,t}$, women	0.015***	0.013***	0.014***
	(0.001)	(0.001)	(0.001)
$\Delta_4 \log(y^m_{i,t})$, women	0.008***	0.009***	0.008***
	(0.000)	(0.000)	(0.000)
$\Delta_4\tau^m_{i,t}$, men	0.407***	0.407***	0.406***
	(0.001)	(0.001)	(0.001)
$\Delta_4 \log(y^m_{i,t})$, men	0.006***	0.005***	0.006***
	(0.001)	(0.001)	(0.001)
Income dummies	Yes	Yes	Yes
Children dummies	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes
Age dummies	Yes	Yes	Yes
Hum. cap. controls	No	Yes	Yes
Male partner controls	No	No	Yes
Obs.	2531181	2531181	2531181

Notes: This Table reports first-stage estimation results of $\Delta_4 \log(y_{partner(i,t)})$ using mechanical tax rate changes, $\Delta_4 \log(\tau^m_{i,t})$, $\Delta_4 \log(\tau^m_{partner(i,t)})$, $\Delta_4 \log(y^m_{i,t})$, and $\Delta_4 \log(y^m_{partner(i,t)})$ as instruments. Robust standard errors in brackets are clustered at the individual level. *$p < 0.10$, **$p < 0.05$, ***$p < 0.01$. See notes to Table 2.

Table A.5: 2SLS Estimates: Number of Children. Varying Minimum Income.

	≥ 0 (1)	≥ 50 (2)	≥ 100 (3)
$\Delta_4 \log(1-\tau_{i,t})$, women	-0.022**	-0.023**	-0.019*
	(0.010)	(0.010)	(0.010)
$\Delta_4 \log(y_{i,t})$, women	0.005*	0.005*	0.004
	(0.003)	(0.003)	(0.003)
$\Delta_4 \log(1-\tau_{i,t})$, men	0.006	0.005	0.008
	(0.009)	(0.009)	(0.009)
$\Delta_4 \log(y_{i,t})$, men	0.027***	0.028***	0.028***
	(0.008)	(0.008)	(0.010)
Income dummies	Yes	Yes	Yes
Children dummies	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes
Age dummies	Yes	Yes	Yes
Hum. cap. controls	Yes	Yes	Yes
Male partner controls	Yes	Yes	Yes
Avg. dep. var. (y, level)	1.52	1.522	1.533
Obs.	2541455	2531181	2475451
First stage F-stat.	27662.7	27903.8	27885.3

Notes: This Table reports 2SLS estimates when varying the minimum level of base year income allowed in the estimation sample. Robust standard errors in brackets are clustered at the individual level. *$p < 0.10$, **$p < 0.05$, ***$p < 0.01$. The first column reproduces the preferred specification from Table 2. See notes from that table.

Table A.6: 2SLS Estimates: Number of Children. Heterogeneity across Income and Educational Attainment.

	income $\in$ $[50, 350]$ (1)	income $\in$ $(350, 600]$ (2)	less skilled (3)	high skilled (4)
$\Delta_4 \log(1 - \tau_{i,t})$, women	-0.030***	-0.048	-0.048***	-0.019
	(0.010)	(0.038)	(0.015)	(0.013)
$\Delta_4 \log(y_{i,t})$, women	0.005*	0.009	0.002	0.003
	(0.003)	(0.016)	(0.003)	(0.004)
$\Delta_4 \log(1 - \tau_{i,t})$, men	0.007	0.004	0.038***	-0.026*
	(0.010)	(0.027)	(0.012)	(0.014)
$\Delta_4 \log(y_{i,t})$, men	0.048***	0.040***	0.000	0.025**
	(0.016)	(0.010)	(0.013)	(0.011)
Income dummies	Yes	Yes	Yes	Yes
Children dummies	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes
Age dummies	Yes	Yes	Yes	Yes
Hum. cap. controls	Yes	Yes	Yes	Yes
Male partner controls	Yes	Yes	Yes	Yes
Avg. dep. var. (y, level)	1.526	1.496	1.664	1.372
Obs.	2205258	325923	1299908	1231273
First stage F-stat.	19869.3	1996.9	11197.1	15910.2

Notes: This Table reports 2SLS estimates when varying the female income or educational level. Robust standard errors in brackets are clustered at the individual level. *$p < 0.10$, **$p < 0.05$, ***$p < 0.01$. See notes to Table 2.

Table A.7: 2SLS Estimates: Log-Labor Income.

	Women (1)	Men (2)
$\Delta_4 \log(1-\tau_{i,t})$, women	0.213***	0.111***
	(0.015)	(0.013)
$\Delta_4 \log(y_{i,t})$, women	-0.016***	0.003
	(0.005)	(0.003)
$\Delta_4 \log(1-\tau_{i,t})$, men	-0.004	0.200***
	(0.015)	(0.014)
$\Delta_4 \log(y_{i,t})$, men	0.006	-0.019
	(0.011)	(0.016)
Income dummies	Yes	Yes
Children dummies	Yes	Yes
Year dummies	Yes	Yes
Age dummies	Yes	Yes
Hum. cap. controls	Yes	Yes
Male partner controls	Yes	Yes
Avg. dep. var. (y, level)	5.454	5.728
Obs.	2316021	2396584
First stage F-stat.	28173.6	27295.1

Notes: This Table reports 2SLS estimates with four-year log-labor income changes as dependent variable. Robust standard errors in brackets are clustered at the individual level. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$. See notes to Table 2.

B Danish Institutions in the Model

All institutions described here are based on simplified versions of the Danish institutions as they were in 2010.

B.1 Child care costs and transfers, $\mathcal{C}(\bullet)$.

In each period, households with children pay child-care costs of

$$\mathcal{C}(n_t, o_t, Y_t, s_t) = \mathbf{1}(n_t > 0)(\mathcal{C}_c(n_t, o_t, Y_t, s_t) - \mathcal{C}_b(n_t, o_t, s_t)) \tag{B.1}$$

where $\mathcal{C}_b(n_t, o_t, s_t)$ denotes child-related benefits (discussed below), $\mathcal{C}_c(n_t, o_t, Y_t, s_t) = \pi_t(n_t, Y_t, s_t) \cdot \tilde{\mathcal{C}}_c(n_t, o_t)$ denotes child care costs where the term π_t accounts for an income rebate such that a reduced percentage is paid if the before tax household income is in a certain range,

$$\pi_t(n_t, Y_t) = \begin{cases} 0 & \text{if } Y_t < Y_{min}(n_t, s_t) \\ \min\{1, \zeta_0 + \zeta_1 \cdot (Y_t - Y_{min}(n_t, s_t))\} & \text{if } Y_t \geq Y_{min}(n_t, s_t) \end{cases}$$

where $\zeta_0 = 0.05$ and $\zeta_1 = 0.26 \times 10^{-5}$. The income floor, $Y_{min}(n_t)$ was in 2010 around DKK150,000 and increased with DKK60,000 for singles and with DKK7,000 for every child in excess of the first, $Y_{min}(n_t, s_t) = 150 + 7 \cdot (n_t - 1) + 60s_t$. Household income Y_t includes all labor market income and transfers before taxes. The cost can be negative if the household is a net-receiver of child care benefits.

The child care costs in Denmark are highly subsidized such that at most 25% (per child) of the underlying cost of child care provision can be held by the parents.[29] The cost per child in practice vary slightly with the type of care each child receives and across municipalities in Denmark. For example, in the largest municipality of Copenhagen (capitol) in 2018 the cost of sending one child to home nursery (in Danish "dagpleje") was around DKK3,254 per month including lunch while regular nursery (in Danish "vuggestue") was DKK3,732 per month if lunch was included and DKK3,107 per month without lunch. Whether the services includes lunch or not is often decided through a democratic process at the institutional level. For kindergarten, the monthly costs was DKK2,402 per month including lunch and DKK1,754 without lunch. Children usually enters school around the age of 6 and public schools are universal and free. After school, around 1PM, the chil-

[29] Ministry for Children and Social Affairs (in Danish): https://socialministeriet.dk/arbejdsomraader/dagtilbud/tilskud-og-egenbetaling/

dren can enter after-school care ("SFO" or "Fritidshjem" in Danish) at a cost of around DKK1,000 per month until around age 10 where the cost reduces to around DKK500 per month ("Fritidsklub" in Danish) until age 14 where the cost goes to zero ("Ungdomsklub" in Danish).

We model a simplified version of the age-dependence of child care costs. We do this for several reasons. The primary reason is for computational simplicity because we otherwise would have to keep track of the age of all children. In particular, we calculate the child care costs as

$$\tilde{\mathcal{C}}_c(n_t, o_t) = a_0 + a_1 \cdot \mathbf{1}(o_t \notin \{NC\}) + \frac{a_0}{2}(n_t - 1)$$

where we account for the fact that there is a rebate if households have several children such that the full amount is paid for the most expensive child and the remaining costs are reduced by 50%. We calculate a_0 and a_1 as the average across all municipalities in Denmark in 2010 by age-groups. We then let a_0 be the average costs for child care of children aged 0–6 and let a_1 be the average for children aged 7–18. In turn, we let $a_0 = 6,109$ and $a_1 = 27,236 - a_0 = 21,127$. The series RES88 at Statistics Denmark, http://www.statistikbanken.dk/10557, contains an overview of the different costs in different municipalities across different child-care services.

Child-related *subsidies*, $\mathcal{C}_s(n_t, o_t, s_t)$, are subtracted from the child care costs in eq. (11). We include approximate rules to capture the main part of the biggest subsidy in Denmark, called "BÃžrne- og Ungeydelse" or "bÃžrnecheck" in Danish. Child care transfers are typically paid into the mothers account automatically (by a fourth of the annual amount each quarter) and depend on the age of each child. In particularly, the household receives DKK16,988 per 0–2 year old child, DKK13,448 per 3–6 year old child and DKK10,580 per 7–17 year old child (2010 rules and prices). Since we only keep track of the presence of at least one child in the age of 0–6, we will use 16,988 as the child benefit level for one child and 10,580 for the remaining children, $n_t - \mathbf{1}(o_t \in \{1, 2, 3, 4, 5\})$. In turn, the tax-exempt child care transfer is

$$\mathcal{C}_{1,s}(n_t, o_t) = c_0 \cdot \mathbf{1}(o_t \in \{0, 1, 2, 3, 4, 5\}) + c_1(n_t - \mathbf{1}(o_t \in \{0, 1, 2, 3, 4, 5\}))$$

where $c_0 = 16,988$ and $c_1 = 10,580$.[30]

[30] The levels are adjusted with the consumer price index and can be found for different years here (in Danish): https://www.skm.dk/skattetal/statistik/tidsserieoversigter/boerne-og-ungeydelse-en-historisk-oversigt.

We also include another child-subsidy applicable to singles in our model. This “BÃžr-netilskud” as it is called in Danish is independent of the household income and tax-exempt. The amount is

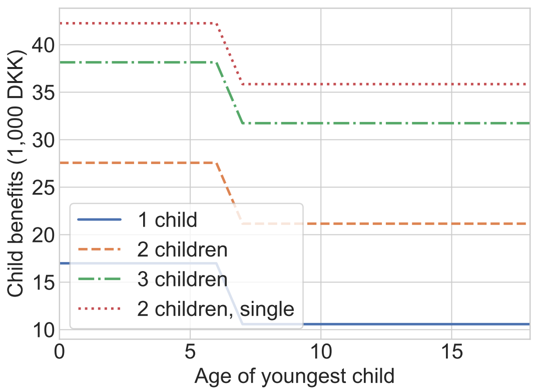
$$\mathcal{C}_{2,s}(n_t, s_t) = [c_2\mathbf{1}(n_t > 0) + c_3 n_t]\mathbf{1}(s_t = 1)$$

where $c_2 = 4,956$ and $c_3 = 4,868$

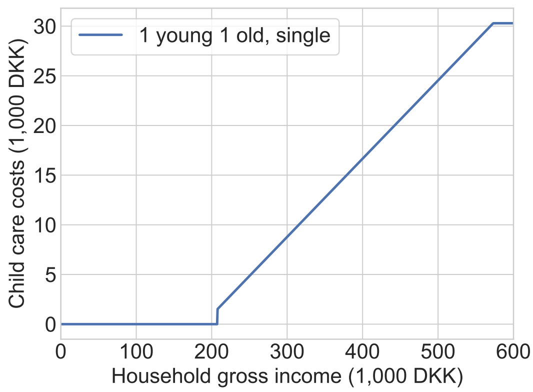
In total, the combined child-related transfers are

$$\mathcal{C}_s(n_t, o_t, s_t) = \mathcal{C}_{1,s}(n_t, o_t) + \mathcal{C}_{2,s}(n_t, s_t)$$

(a) Child Benefits.



(b) Child Care Costs.



(c) Costs net of Benefits, $\mathcal{C}(n_t, o_t, Y_t, s_t)$.

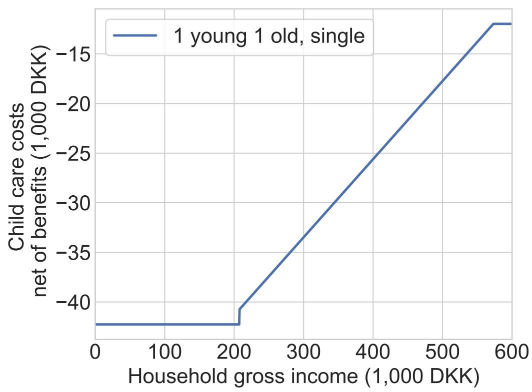


Figure B.1: Child Related Costs and Benefits.

Notes: Figure B.1 shows in panel (a) the child-related benefits in the model as a function of the age of the youngest child and the total number of children. Panel (b) shows the child-related costs in the model as a function of the household gross income (labor market income and transfers before taxes of all household members) and the number and age of children for both couples and singles. Panel (c) shows the child-related costs net of transfers as a function of the household gross income and the number and age of children for both couples and singles. A negative cost refers to situations in which the household is net receivers of child-benefits.

B.2 Taxes, $\mathcal{T}(\bullet)$.

The Danish tax system is individual with a relatively small link between couples. Concretely, the only link between couples is that capital income is measured at the household level in the government tax and unused labor participation tax deduction (around 43,000 DKK in 2010) can be transferred across spouses. The tax schedule is progressive with one of the highest marginal top tax rate in the world. We have implemented a parsimonious version of the system aimed at capturing the main features of the system in 2010.

The after-tax income of an individual j with income $Y_{j,t}$ and potential spousal income of $Y_{-j,t}$ can be calculated based on the following equations:

$$\begin{aligned}
\tau_{\max} &= \tau_l + \tau_u + \tau_c + \tau_h - \bar{\tau}, \\
\text{personal income} &= (1 - \mathbf{1}(l_{j,t} > 0)\tau_{LMC}) \cdot Y_{j,t}, \\
\text{taxable income} &= \text{personal income} - \min\{WD \cdot Y_{j,t}, \overline{WD}\}, \\
\underline{\mathrm{y}}_l &= \underline{\mathrm{y}} + \max\{0, \underline{\mathrm{y}} - Y_{-j,t}\}, \\
\mathrm{T}_c &= \max\{0, \tau_c \cdot (\text{taxable income} - \underline{\mathrm{y}})\}, \\
\mathrm{T}_h &= \max\{0, \tau_h \cdot (\text{taxable income} - \underline{\mathrm{y}})\}, \\
\mathrm{T}_l &= \max\{0, \tau_l \cdot (\text{personal income} - \underline{\mathrm{y}})\}, \\
\mathrm{T}_u &= \max\{0, \min\{\tau_u, \tau_{\max}\} \cdot (\text{personal income} - \underline{\mathrm{y}}_u)\}, \\
\text{tax} &= \mathbf{1}(l_{j,t} > 0)\tau_{LMC} \cdot Y_{j,t} + \mathrm{T}_c + \mathrm{T}_h + \mathrm{T}_l + \mathrm{T}_u,
\end{aligned}$$

where the values from 2010 along with descriptions are given in Table B.1. Historical rates and relevant thresholds can be found at the web page of the Danish tax authorities.[31] Note that capital income in the municipal tax is individual while in the bottom–top tax is on the household level.

[31] https://www.skm.dk/skattetal/statistik/tidsserieoversigter/centrale-skattesatser-i-skattelovgivning

Table B.1: Tax System Parameters in 2010.

Symbol	Value in 2010, DKK	Description
$\bar{\tau}$	.515	Maximum tax rate, »Skatteloft«
τ_{LMC}	.08	Labor Market Contribution, »Arbejdsmarkedsbidrag«
WD	.0425	EITC rate
$\overline{WD}$	$13,600$	Maximum EITC
τ_c	.2564	Average municipal tax rate (including .074 in church tax)
$\underline{y}$	$42,900$	Amount deductible from bottom and muni. tax
$\underline{y}_u$	$389,900$	Amount deductible from top tax bracket
τ_h	.08	Health contribution tax (in Danish »Sundhedsbidrag«)
τ_l	0.0367	Tax rate in lowest tax bracket
τ_u	0.15	Tax rate in upper tax bracket

B.3 Child Support, $\mathcal{D}(\bullet)$

In case of divorce, we assume that the man pays child support to his former wife (which is by far the predominant situation in Denmark). In Denmark, child support is payed until the child is 18. In our model, we will assume that all children living at home are under 18 and all children moved from home are above. The child support payments are tax-deductible (excess of the supplemental amount).

The child support consists of three parts; a base level ($\underline{s}$), a supplement (s) and an elevated amount ($\overline{s}$) where the latter is income-dependent while the two former are not. Since the elevated amount is relatively minor and requires relatively high incomes, we ignore that element here. We do this because it would otherwise require us to keep track of the former husband's income when determining the child support received by the woman. The total annual amount of child support the man has to transfer is thus ζn_t where $\zeta = 14,040$ Danish kroner in 2010. Out of this, the supplement is 1,608 DKK.[32]

B.4 Parental Leave

We implement maternity leave in the model in the following way. We assume that part time work of mothers of newborns reflects a period of parental leave with full pay and the remaining weeks of the year with full-time pay, motivated by the discussion above. In turn, she earns a full year of full-time labor income if she chooses to work any hours in the year of childbirth. In turn, the total amount of parental leave benefits and labor

[32] http://www.statsforvaltningen.dk/site.aspx?p=8331

income a mother receives in the year of childbirth (i.e. when $b_t = 1$) is thus given as

$$\tilde{Y}_{w,t}|_{b_t=1} = \begin{cases} \overline{w}_t \cdot \pi + \underline{w}_t \cdot (1-\pi) & \text{if } l_{w,t} = 0 \\ \overline{w}_t \cdot \pi + \tilde{w}_t \cdot (1-\pi) & \text{if } l_{w,t} = l_{PT} \\ \tilde{w}_t & \text{if } l_{w,t} = 1 \end{cases} \tag{B.2}$$

where $\tilde{w}_t$ is the wage-level associated with full-time work and

$$\overline{w}_t = \tilde{w}_t$$
$$\underline{w}_t = \min\{\tilde{w}_t, 180, 480\}$$

is the level of parental leave benefits in a period with high replacement rate, $\overline{\tau}$, and low replacement rate $\underline{\tau}$, respectively. We set $\pi = 0.5$ such that a mother of a newborn receives full wage compensation for half a year on leave and parental leave benefits in the remaining.

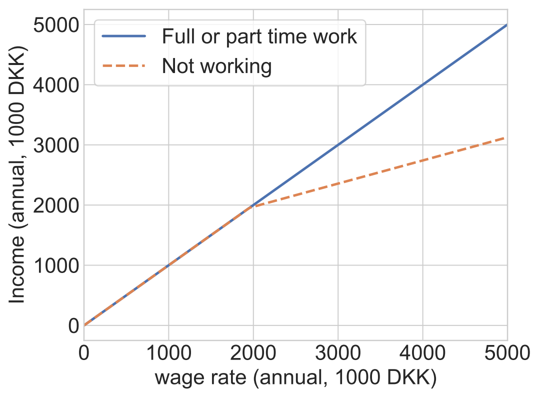


Figure B.2: Parental Leave Benefits.

Notes: Figure B.2 shows how the parental leave benefits depend on the leave take-up and the wage rate in the model.

C Calibration of Exogenous processes

We calibrate the probability of permanent infertility, $p_f(t)$, based on Sommer (2016), shown in panel a) of Figure C.1. We estimate the biological fecundity, i.e. the probability of a child arriving given a couple tries to become pregnant using the medical evidence in Leridon (2004). He finds that 75 percent of women starting to try to conceive at age 30 will have given birth within 1 year, 66 percent at age 35 and 44 percent at age 40. We add to these numbers the assumptions that the "success-rate" is 90 percent at age 20 and 0 percent at age 45 and estimate the complete age-profile from these five data-points. Figure C.1 panel b) shows the used biological fecundity, $\overline{\wp}_t$.

In Figure C.2 we show estimated partnership dissolution probabilities based on Danish data for less and high skilled couples as a function of the number of children present in the household.

(a) Infertility Probability. (b) Biological Fecundity, $\overline{\wp}_t$.

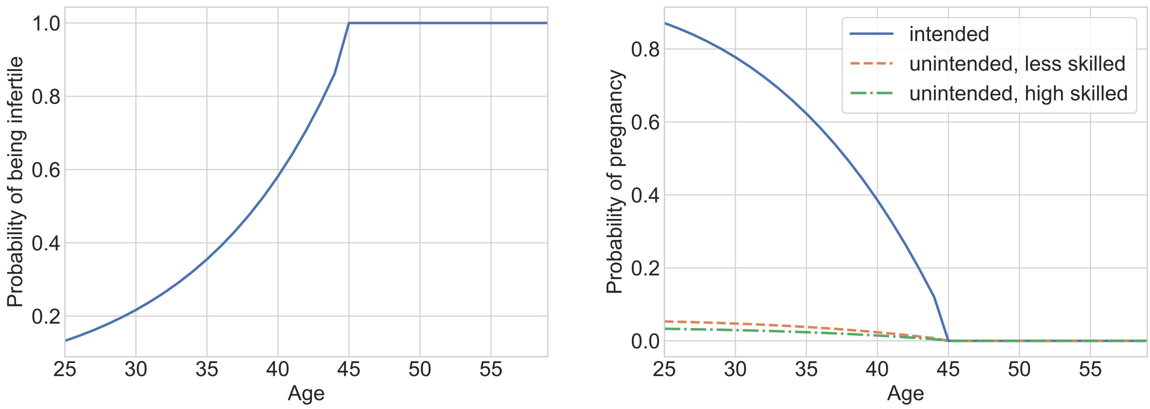


Figure C.1: Biological Fecundity.

Notes: Figure C.1 shows in panel (a) the probability of permanent infertility, $p_f(t)$, based on Sommer (2016). Panel (b) shows the probability of a pregnancy conditional on being fertile. The intended pregnancies are calibrated following the biological fecundity in Leridon (2004) and the likelihood of unintended pregnancies are based on Ejrnæs and Jørgensen (2020).

We calibrate the probability parameter in the Binomial distribution related to a child moving out to be $p_x = 0.08$. Figure C.3 shows the share of Danish households with at least one child and at most three in which a child moves out in panel (a). Panel (b) contains a similar plot for simulated couples from the estimated model. The model captures the overall level of the moving probability but cannot match the slope over age. This is an artifact of the fact that, in the model, children can at the earliest move when their mother is 45 and the youngest child is at least 6 years old.

D Numerical Implementation Details

D.1 Post Retirement Solution

After retirement, the state variables are the retirement benefits of each spouse and the only choices are how much to consume or save. In turn, we have a standard consumption savings problem without any uncertainty. Note, then that the state variables here are

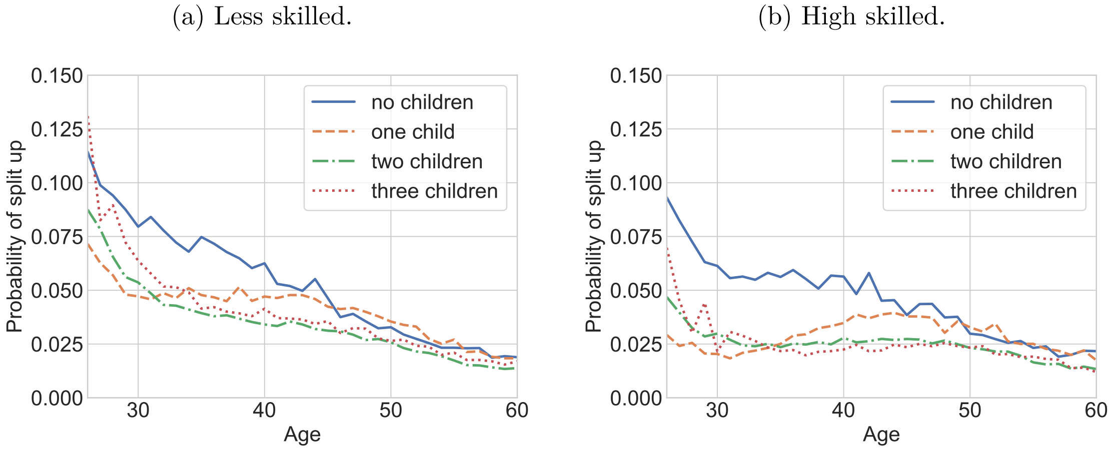


Figure C.2: Dissolution Probabilities.

Notes: Figure C.2 shows the likelihood of a couple splitting up in the following period based on the current number of children present in the household, based on Danish register data for less and high skilled couples.

$\mathcal{S}_t = (M_t, K_w, K_m)$. The problem can be written in recursive form as (for $t > T_r$)

$$\begin{aligned}
\tilde{V}_t(\mathcal{S}_t) &= \max_{C_t \in (0, M_t)} U(C_t, n_t, o_t, l_{w,t}, l_{m,t}) + \beta \tilde{V}_{t+1}(\mathcal{S}_{t+1}) \\
&\text{s.t.} \\
M_{t+1} &= RA_t + 2 \cdot B_{ret}
\end{aligned}$$

where B_{ret} are retirement benefits. The Euler equation must hold for $A_t > 0$:

$$\nu(n_t)^{-(1-\rho)} C_t^{-\rho} = \beta R \nu(n_{t+1})^{-(1-\rho)} C_{t+1}^{-\rho}$$

where we use that

$$\begin{aligned}
\frac{\partial U(C_t, n_t, o_t, l_{w,t}, l_{m,t})}{\partial C_t} &= \lambda \frac{\partial u_w(C_t, n_t, o_t, l_{w,t})}{\partial C_t} + (1-\lambda) \frac{\partial u_m(C_t, n_t, o_t, l_{m,t})}{\partial C_t} \\
&= \frac{\partial}{\partial C_t} \frac{(C_t/\nu(n_t))^{1-\rho}}{1-\rho} \\
&= \nu(n_t)^{-(1-\rho)} C_t^{-\rho}
\end{aligned}$$

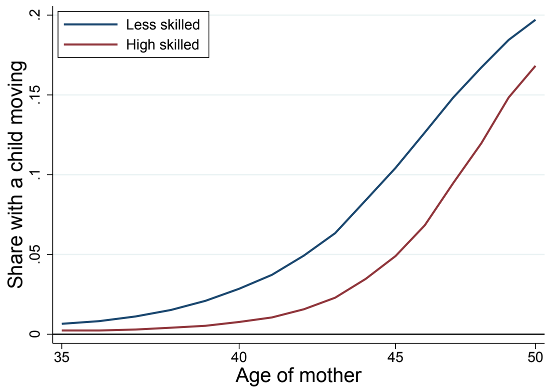
We can invert the Euler equation to get

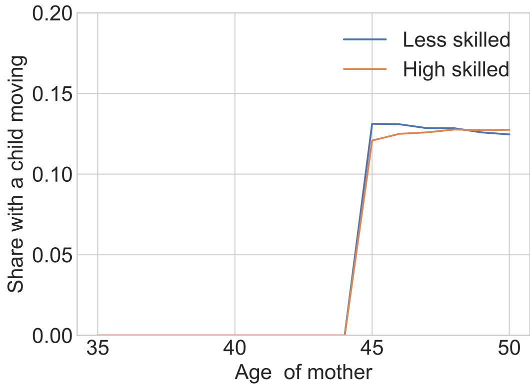
$$C_t = (\beta R)^{-\frac{1}{\rho}} [\nu(n_{t+1})/\nu(n_t)]^{\frac{1-\rho}{\rho}} C_{t+1}.$$

We use the Endogenous Grid Method (EGM) proposed by Carroll (2006) to solve for optimal consumption, $C_t^\star(\mathcal{S}_t)$ by using a post-decision grid over savings, $\overrightarrow{A}$ with the

Figure C.3: Moving Probability, Data and Model.

(a) Data. (b) Model.





Notes: Figure C.3 shows in panel (a) the share of Danish households with at least one child and at most three in which a child moves out. Panel (b) shows a similar plot based on simulations from the estimated model.

lowest point being (close to) zero. We then use this to construct the value function $\tilde{V}_t(\mathcal{S}_t)$. When we interpolate next period consumption and value function we use that the constrained region, $A = 0$, correspond to the solution found for the lowest point in our $\overrightarrow{A}$ grid. Denoting the value function in this point as $\tilde{V}_t^0$, we can construct the value function in the constrained region for some $M_t < M_t^*$ where M_t^* is the point at which the credit constraint just binds (i.e. the endogenous level of resources found for the lowest point in the grid). In particular, we can construct the value at $M_t < M_t^*$ as $\tilde{V}_t(\mathcal{S}_t) = U(M_t, n_t, o_t, l_{w,t}, l_{m,t}) + \tilde{V}_t^0 - U(M_t^*, n_t, o_t, l_{w,t}, l_{m,t})$. For consumption, we simply put $C^\star = M_t$ in the constrained region.

We employ a similar strategy when solving the model for singles. For computational efficiency, we solve the model on a grid $\overrightarrow{A}_w = \kappa_A \overrightarrow{A}$ and $\overrightarrow{A}_m = (1 - \kappa_A)\overrightarrow{A}$ such that interpolation is not needed in the wealth direction for that model when constructing the post-decision continuation value, as we describe below.

To adjust for the parsimonious description of reality in retirement, we follow the approach in e.g. Gourinchas and Parker (2002) and Jørgensen (2017) and add an adjustment factor, $\varkappa_V$, multiplied to the retirement value function such that the value in the first non-working period is $V_{T_r}(\mathcal{S}_{T_r}) = \varkappa_V \tilde{V}_{T_r}(\mathcal{S}_{T_r})$.

D.2 Pre-Computation of Continuation Values: Singles

We solve the model for singles using value function iteration but rather than computing expectations for all guesses of discrete and continuous choice variables we pre-compute the discounted expected continuation value. The problem can be re-formulated as

$$V_{j,t}(\mathcal{S}_{j,t}) = \max_{l_{j,t}\in\ell(job_{j,t})} v_{j,t}(\mathcal{S}_{j,t}|l_{j,t})$$
$$v_{j,t}(\mathcal{S}_{j,t}|l_{j,t}) = \max_{C_t} u_j(C_t, n_t, o_t, l_{j,t}) + \beta\mathbb{E}_t[V_{j,t+1}(\mathcal{S}_{j,t+1})]$$

where

$$\ell(job_{j,t}) = \begin{cases} \{0\} & \text{if } job_{j,t} = 0 \\ \{0, 0.75, 1\} & \text{if } job_{j,t} = 1. \end{cases}$$

Defining $\overline{K}_{j,t} = [(1-\delta)K_{j,t} + l_{j,t}]$ as the post-decision (before shock) human capital, we compute the expectation as

$$\begin{aligned} w_{j,t}(job_{j,t}, n_t, o_t, A_t, \overline{K}_{j,t}) &= \mathbb{E}_t[V_{j,t+1}(job_{j,t+1}, n_{t+1}, o_{t+1}, K_{j,t+1}, A_t)] \\ &= \beta\int_0^\infty \Big[q_t(n_t, o_t)V_{j,t+1}(job_{j,t+1}, n_t - 1, o_{t+1}, \overline{K}_{j,t}\cdot\varepsilon, A_t) \\ &+ (1 - q_t(n_t, o_t))EV_{j,t+1}(job_{j,t+1}, n_t, o_{t+1}, \overline{K}_{j,t}\cdot\varepsilon, A_t)\Big]g(\varepsilon)d\varepsilon \\ &\approx \beta\sum_{k=1}^{K}\omega_{j,k}\Big[q_t(n_t, o_t)EV_{j,t+1}(job_{j,t+1}, n_t - 1, o_{t+1}, \overline{K}_{j,t}\cdot\varepsilon, A_t) \\ &+ (1 - q_t(n_t, o_t))EV_{j,t+1}(job_{j,t+1}, n_t, o_{t+1}, \overline{K}_{j,t}\cdot\varepsilon, A_t)\Big] \end{aligned}$$

over a grid of end-of-period wealth and human capital. We use $K = 5$ Gauss-Hermite quadrature nodes to approximate the numerical integral. Note that we assume that singles do not have more children but the number of children can decline due to existing children moving out. When finding optimal $l_{j,t}, C_t$ we interpolate $w_{j,t}(n_t, o_t K_{c,t}, A_t, \overline{K}_{j,t})$ rather than re-calculating the expectations. We assume that singles enjoy an "effective number of children" $\kappa_N n_t$ for single women and $(1-\kappa_n)n_t$ for single men. Thus, in the flow utility function of singles, these enter rather than the number of children.

D.3 Pre-Computation of Continuation Values: Couples

Like for singles, we pre-compute the discounted expected continuation value on post-decision grids for couples. Recalling that children only move after the fertile period, the expected continuation value is in the infertile periods, $t > T_f$

$$
\begin{aligned}
& w_t(job_{w,t}, job_{m,t}, n_t, o_t, A_t, \overline{K}_{w,t}, \overline{K}_{m,t}) \\
& = \sum_{j_w=0}^{1} \sum_{j_m=0}^{1} p_{job,w} p_{job,m} \Bigg(p_{t+1}^{s} \int \int \Bigg[q_t(n_t, o_t) V_{t+1}(j_w, j_m, A_t, \overline{K}_{w,t} \cdot \varepsilon_w, \overline{K}_{m,t} \cdot \varepsilon_m, n_t - 1, o_{t+1}) \\
& + (1 - q_t(n_t, o_t)) V_{t+1}(j_w, j_m, A_t, \overline{K}_{w,t} \cdot \varepsilon_w, \overline{K}_{m,t} \cdot \varepsilon_m, n_t, o_{t+1}) \Bigg] g(\varepsilon_w) g(\varepsilon_m) d\varepsilon_w d\varepsilon_m \\
& + (1 - p_{t+1}^{s}) \lambda \int \Bigg\{ q_t(n_t, o_t) V_{w,t+1}(j_w, \kappa_A A_t, \overline{K}_{w,t} \cdot \varepsilon_w, n_t - 1, o_{t+1}) \\
& + (1 - q_t(n_t, o_t)) V_{w,t+1}(j_w, \kappa_A A_t, \overline{K}_{w,t} \cdot \varepsilon_w, n_t, o_{t+1}) \Bigg\} g(\varepsilon_w) d\varepsilon_w \\
& + (1 - p_{t+1}^{s})(1 - \lambda) \int \Bigg\{ q_t(n_t, o_t) V_{m,t+1}(j_m, (1 - \kappa_A) A_t, \overline{K}_{m,t} \cdot \varepsilon_m, n_t - 1, o_{t+1}) \\
& + (1 - q_t(n_t, o_t)) V_{m,t+1}(j_m, (1 - \kappa_A) A_t, \overline{K}_{m,t} \cdot \varepsilon_m, n_t, o_{t+1}) \Bigg\} g(\varepsilon_m) d\varepsilon_m \Bigg)
\end{aligned}
$$

with $\overline{K}_{j,t} = [(1-\delta)K_{j,t} + l_{j,t}]$ being post-decision human capital. In the fertile periods, $t \leq T_f$, the expectation can be formulated as

$$
\begin{aligned}
&w_t(f_t, job_{w,t}, job_{m,t}, n_t, o_t, A_t, \overline{K}_{w,t}, \overline{K}_{m,t}|e_t) \\
&= p_f(t) \\
&\times \sum_{j_w=0}^{1}\sum_{j_m=0}^{1} p_{job,w}p_{job,m}\Bigg(p^s_{t+1}\int\int\Big[\wp_t(e_t)\cdot V_{t+1}(j_w, j_m, A_t, \overline{K}_{w,t}\cdot\varepsilon_w, \overline{K}_{m,t}\cdot\varepsilon_m, n_t+1, o_{t+1}) \\
&+ (1-\wp_t(e_t))\cdot V_{t+1}(j_w, j_m, A_t, \overline{K}_{w,t}\cdot\varepsilon_w, \overline{K}_{m,t}\cdot\varepsilon_m, n_t, o_{t+1})\Big] g(\varepsilon_w)g(\varepsilon_m)d\varepsilon_w d\varepsilon_m \\
&+ (1-p^s_{t+1})\wp_t(e_t)\lambda\int V_{w,t+1}(j_w, \kappa_A A_t, \overline{K}_{w,t}\cdot\varepsilon_w, n_t+1, o_{t+1})g(\varepsilon_w)d\varepsilon_w \\
&+ (1-p^s_{t+1})(1-\wp_t(e_t))\lambda\int V_{w,t+1}(j_w, \kappa_A A_t, \overline{K}_{w,t}\cdot\varepsilon_w, n_t, o_{t+1})g(\varepsilon_w)d\varepsilon_w \\
&+ (1-p^s_{t+1})\wp_t(e_t)(1-\lambda)\int V_{m,t+1}(j_m, \kappa_A A_t, \overline{K}_{m,t}\cdot\varepsilon_m, n_t+1, o_{t+1})g(\varepsilon_m)d\varepsilon_m \\
&+ (1-p^s_{t+1})(1-\wp_t(e_t))(1-\lambda)\int V_{m,t+1}(j_m, \kappa_A A_t, \overline{K}_{m,t}\cdot\varepsilon_m, n_t, o_{t+1})g(\varepsilon_m)d\varepsilon_m\Bigg) \\
&+ (1-p_f(t)) \\
&\times \sum_{j_w=0}^{1}\sum_{j_m=0}^{1} p_{job,w}p_{job,m}\Bigg(p^s_{t+1}\int\int\Big[V_{t+1}(j_w, j_m, A_t, \overline{K}_{w,t}\cdot\varepsilon_w, \overline{K}_{m,t}\cdot\varepsilon_m, n_t, o_{t+1})\Big] g(\varepsilon_w)g(\varepsilon_m)d\varepsilon_w d\varepsilon_m \\
&+ (1-p^s_{t+1})\lambda\int V_{w,t+1}(j_w, \kappa_A A_t, \overline{K}_{w,t}\cdot\varepsilon_w, n_t, o_{t+1})g(\varepsilon_w)d\varepsilon_w \\
&+ (1-p^s_{t+1})(1-\lambda)\int V_{m,t+1}(j_m, \kappa_A A_t, \overline{K}_{m,t}\cdot\varepsilon_m, n_t, o_{t+1})g(\varepsilon_m)d\varepsilon_m\Bigg)
\end{aligned}
$$

with the expected value wrt. the extreme value shocks, ξ^0 and ξ^1, are given by

$$V_t(\mathcal{S}_t) = \sigma_e \log\Big[\exp(v^0_t(\mathcal{S}_t)/\sigma_e) + \exp(v^1_t(\mathcal{S}_t)/\sigma_e)\Big]$$

where $v^e_t(\mathcal{S}_t)$ is the value associated with choosing e.

The expectations can then be pre-computed for each combination of discrete choice over fertility, e_t, and discrete states, $job_{w,t}, job_{m,t}, n_t, o_t$, on grids of $A_t, \overline{K}_{w,t}, \overline{K}_{m,t}$ and then re-used in the optimization over consumption and discrete choices. We again use $K = 5$ Gauss-Hermite quadrature nodes for each of the household member's shock to human capital. Recall, the single's solution is on gender-specific grids, $\overrightarrow{A}_w = \kappa_A\overrightarrow{A}$ and $\overrightarrow{A}_m = (1-\kappa_A)\overrightarrow{A}$, such that interpolation is not needed in that direction when looking up in the next-period value in case of divorce. We use linear interpolation to interpolate between known points in the grids.

D.4 EGM

We use the Endogenous Grid Method (EGM) propsoed by Carroll (2006) extended to allow for discrete choices as in Iskhakov, Jørgensen, Rust and Schjerning (2017) and Druedahl and Jørgensen (2017). We here describe how the approach is implemented for singles. The approach is similar for couples but the notation becomes cluttered and is left out. Let

$$w_t'(job_{w,t}, job_{m,t}, n_t, o_t, A_t, \overline{K}_{w,t}, \overline{K}_{m,t}|e_t) \equiv \frac{\partial w_t(job_{w,t}, job_{m,t}, n_t, o_t, A_t, \overline{K}_{w,t}, \overline{K}_{m,t}|e_t)}{\partial A_t}$$

be the marginal value of saving. We have that optimal consumption (away from the credit constraint) must satisfy the first order condition

$$u_j'(C_t, n_t, o_t, l_{j,t}) = w_t'(job_{w,t}, job_{m,t}, n_t, o_t, A_t, \overline{K}_{w,t}, \overline{K}_{m,t}|e_t)$$

such that given a grid of end-of-period wealth, $\overrightarrow{A}_t$, consumption can be found in closed form as

$$C_t(l_{j,t}, e_t) = u_j'^{-1}[w_t'(n_t, o_t, \overrightarrow{A}_t, \overline{K}_{w,t}, \overline{K}_{m,t}|e_t)]$$

and endogeneous resources can be found as

$$\overrightarrow{M}_t^{endo}(l_{j,t}, e_t) = C_t(l_{j,t}, e_t) + \overrightarrow{A}_t$$

such that the optimal consumption can be represented as a function of total resources in the beginning of the period, $\overrightarrow{M}_t^{endo}(l_{j,t}, e_t)$, conditional on the discrete choices. To get the solution on a grid of beginning-of-period wealth, A_{t-1}, which is the state variable, we construct an exogenous grid of resources as $\overrightarrow{M}_t^{exo}(\overrightarrow{A}_{t-1}, l_{j,t}, e_t)$ using a beginning-of-period grid, $\overrightarrow{A}_{t-1}$, (which can be the same as $\overrightarrow{A}_t$) using the budget constraint (10). By interpolating onto this grid, we get $C_t^\star(\overrightarrow{A}_{t-1}; l_{j,t}, e_t) = \text{interp}(\overrightarrow{M}_t^{endo}(l_{j,t}, e_t), C_t(l_{j,t}, e_t), \overrightarrow{M}_t^{exo}(\overrightarrow{A}_{t-1}, l_{j,t}, e_t))$. This process is complicated by the presence of discrete choices and we thus use the DC-EGM proposed in Iskhakov, Jørgensen, Rust and Schjerning (2017) with the upper envelope algorithm proposed in Druedahl and Jørgensen (2017) to back out which solutions to the FOC that maximizes the value function in the last interpolation step.

D.5 Simulating from the Model

To simulate synthetic data for N_{sim} households for T_{sim} periods from the model, we draw several stochastic draws. First, we draw initial conditions for all state variables, $\{\mathcal{S}_{i,0}\}_1^{N_{sim}}$

from an empirical distribution based on the Danish data. We assume that child-capital is zero for all households at beginning of adulthood. Secondly, we simulate $N_{sim} \times T_{sim}$ human capital shocks for each household member, uniform pregnancy draws, uniform child moving draws, and uniform divorce draws

$$\{\varepsilon_{w,i,t}, \varepsilon_{m,i,t}, \nu_{\wp,i,t}, \nu_{q,i,t}, \nu_{s,i,t}\}_{i,t}^{N_{sim},T_{sim}}.$$

Finally, we also simulate $N_{sim} \times T_{sim}$ uniform draws to determine the optimal discrete choices

$$\{\nu_{l_w,i,t}, \nu_{l_m,i,t}, \nu_{f_w,i,t}, \nu_{f_m,i,t}, \nu_{e,i,t}\}_{i,t}^{N_{sim},T_{sim}}.$$

Optimal discrete choices are found by calculating choice-probabilities and comparing them with these uniform draws.

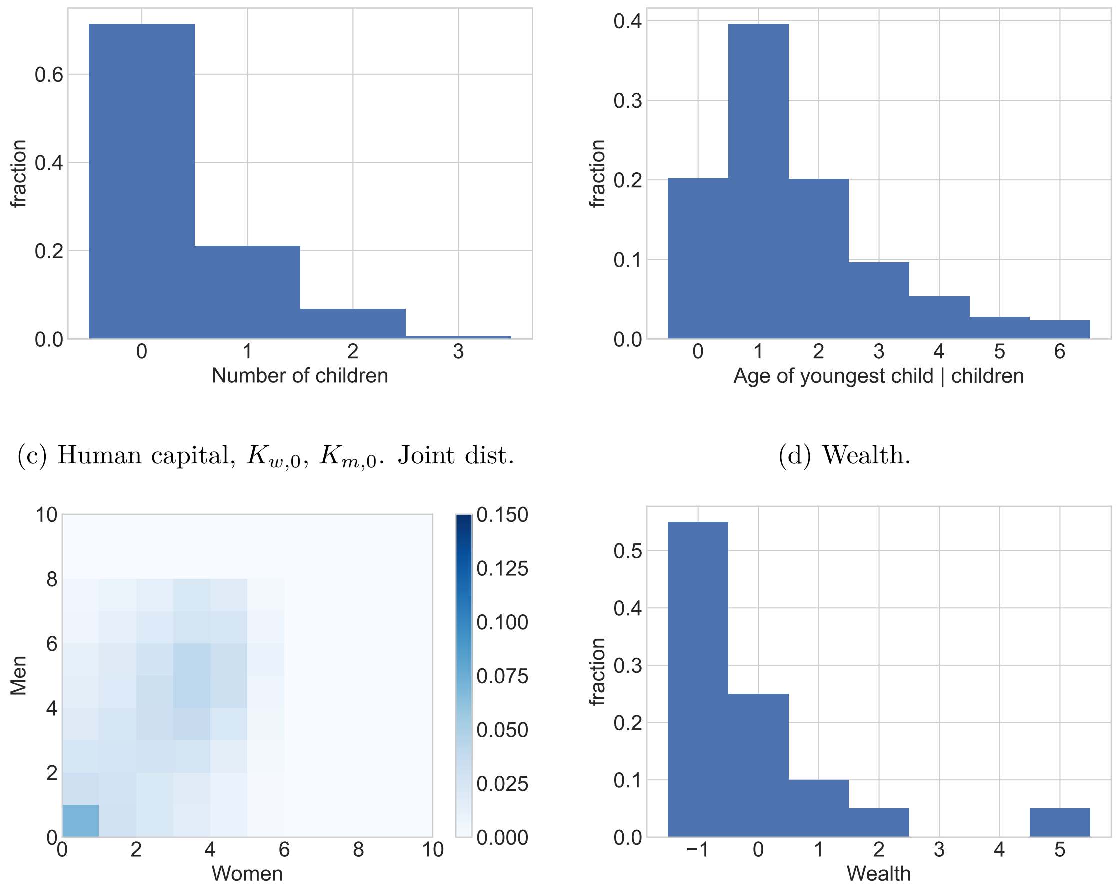
Initial Conditions.

When simulating when initialize all households at age 25 as couples with zero net wealth and the empirical joint distribution of number of children, age of youngest and human capital based on Danish couples in our sample at age 25. The latter is based on recorded labor market experience through payments to the labor market pension account (ATP). One year of full time employment gives a value of one and part time employment is equivalent to 2/3 of that of full time. Because this is a crude measure that does not take depreciation into account, we scale the register-based measure with 0.5. We truncate the empirical net-wealth distribution at the minimum amount allowed in the model. Figure D.1 shows the empirical distributions used as initial conditions when simulating data from the model.

Counterfactual simulations. We calculate the effect on an outcome y of a wage increase in the following way. The effect at age t is

$$\Delta y_t = y_t - \tilde{y}_t$$

where $y_t = n_t^{-1} \sum_i y_{i,t}$ is the average simulated optimal outcome under the baseline estimated model and $\tilde{y}_t^{(s_1:s_2)} = n_t^{-1} \sum_i \tilde{y}_{i,t}^{(s_1:s_2)}$ is the average simulated optimal outcome under the counterfactual setting in which wages are scaled by μ percent in periods s_1 through



(a) Number of children, n_0. (b) Age of youngest child, o_0. (c) Human capital, $K_{w,0}$, $K_{m,0}$. Joint dist. (d) Wealth.

Figure D.1: Initial Distributions, Less Skilled.

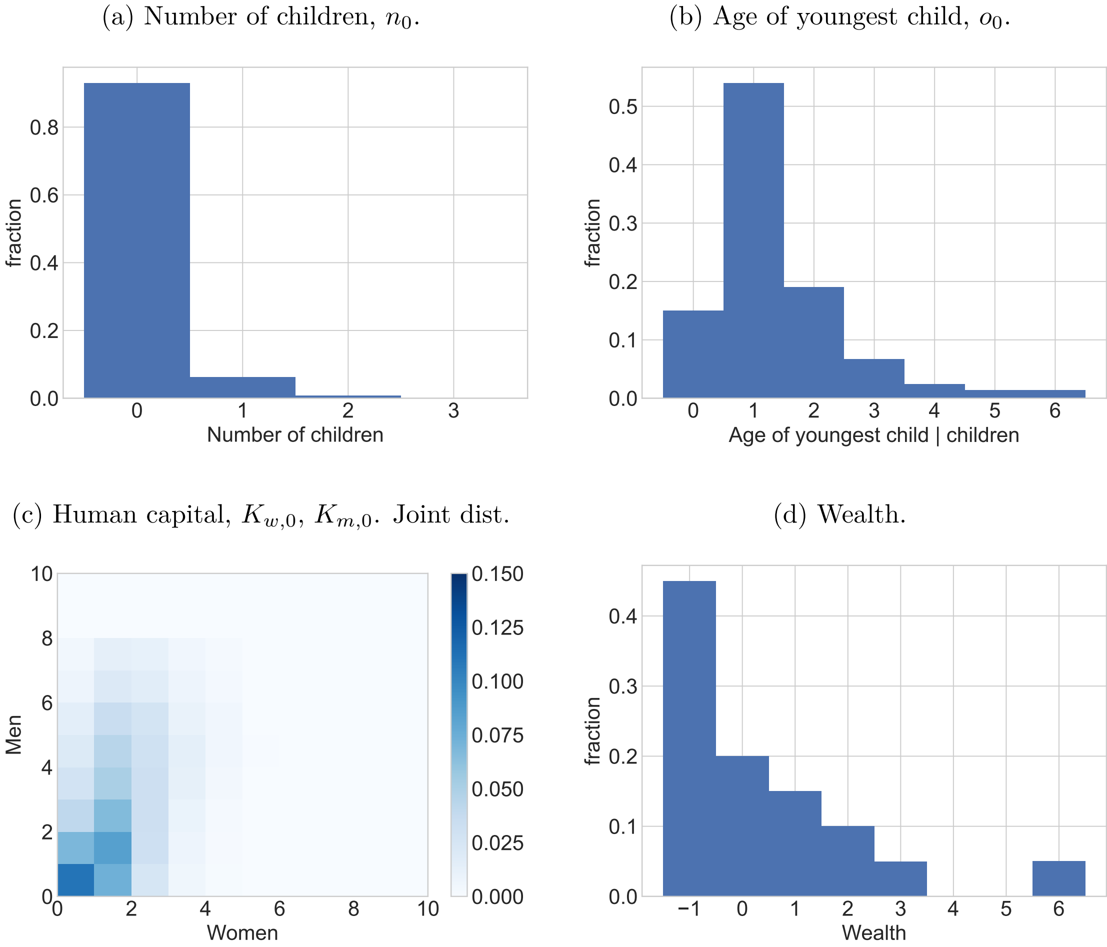
Notes: Figure D.1 shows the initial distribution of the number of children in panel (a), the age of the youngest child (given at least one child is present) in panel (b), and the simultaneous distribution of human capital level of both men and women in panel (c) and the distribution of initial wealth in panel (d). All distributions are based on the Danish data for 25 year old women in couples.

s_2. Formally, wages in the alternative model are given as

$$\tilde{w}_{i,t}^{(s_1:s_2)} = \begin{cases} w_{i,t} + \mu e^{\alpha_{0,j(i)}} & \text{if } s_1 \leq t \leq s_2 \\ w_{i,t} & \text{else.} \end{cases}$$

Unless otherwise explicitly stated, we use a five percent increase, $\mu = 0.05$. This specification is used both in the solution and simulation of the model.

For unanticipated chocks the model economy is identical before the shock and $y_t = \tilde{y}_t$ for $t < s_1$. The model economy is also identical for $t > s_2$ but the simulated paths might differ due to previous shocks. To generate transitory shocks we set $s_1 = s_2$ and to generate permanent shocks we set $s_2 = T_r$. Varying s_1 lets us investigate how responses differ as a function of the age at which the shock occurred. We refer to regime shifts as permanent



(a) Number of children, n_0.

(b) Age of youngest child, o_0.

(c) Human capital, $K_{w,0}$, $K_{m,0}$. Joint dist.

(d) Wealth.

Figure D.2: Initial Distributions, High Skilled.

Notes: Figure D.2 shows the initial distribution of the number of children in panel (a), the age of the youngest child (given at least one child is present) in panel (b), and the simultaneous distribution of human capital level of both men and women in panel (c) and the distribution of initial wealth in panel (d). All distributions are based on the Danish data for 25 year old women in couples.

changes from the first period of the model by letting $s_1 = 25$ and $s_2 = T_r$.

D.6 Estimation of θ

We estimate the remaining parameters primarily governing the wage process and utility parameters related to work and children, collected in θ by Simulated Method of Moments (Smith, 1993; Gouriéroux, Monfort and Renault, 1993). Concretely, we estimate θ as

$$\hat{\theta} = \arg\min_{\theta} g(\theta)' W g(\theta)$$

where $g(\theta) = m^{data} - m^{sim}(\theta)$ is a $J \times 1$ vector of differences between the J empirical moments in the data and the same moments calculated from simulated data for a given θ.

W is a $J \times J$ symmetric positive definite weighting matrix and we use a diagonal matrix with the inverse of the variance of the empirical moments on the diagonal.

The minimization problem might have several local minima and be ill-behaved due to simulated discrete choices. Our estimation approach this use non-gradient based numerical solvers and involves several steps to increase the likelihood of finding the global minimum. Concretely, we use an extended version of the "TikTak" approach suggested in Arnoud, Guvenen and Kleineberg (2019). The parameters are estimated through the following steps, where $N_{threads}$ are the number of parallel threads used for estimation,

0. **Choose settings:** Define a set of initial guesses, θ_0 and set lower and upper bounds, $\underline{\theta}$ and $\overline{\theta}$.

   Set the number of initial (potential random) evaluation points per thread, N_{init}, the desired number of K-means groups per thread, N_{kmeans}, and the desired number of refinement estimation steps, N_{step}.

   Set also the maximum number of objective function evaluations, $N_{maxevals}$.

1. **Initialization:** Evaluate the objective function $Q(\theta) = g(\theta)'Wg(\theta)$ for $N_{init} \times N_{threads}$ initial (pseudo) random points within the bounds. We use Sobel points to span the high-dimensional space of initial points weighted towards the initial guess with a weight w_0. This is easily done in parallel.

   (a) Sort the resulting parameters based in the value of the objective function in ascending order. This gives a set of parameter vectors $\{\theta^{(k)}\}_{k=1}^{N_{threads} \times N_{init}}$ where $Q(\theta^{(k+1)}) > Q(\theta^{(k)}) > Q(\theta^{(k-1)})$.

2. **K-means grouping:** (optional) Use K-means to group the best $N_{threads} \times N_{kmeans}$ initial parameters, $\{\theta^{(k)}\}_{k=1}^{N_{threads} \times N_{kmean}}$, into $N_{threads} \times N_{steps}$ groups based on the similarity of the parameters. Since the objective function is not evaluated in this step, this is almost cost-less.

   (a) Sort the resulting parameters based in the value of the objective function in ascending order and (optionally) include the specified initial guess θ_0 as the first element of the sorted list of parameters. If the initial guess is included, the parameters with the highest objective function is discarded.

   (b) This gives a set of parameter vectors $\{\theta^{(k)}\}_{k=1}^{N_{threads} \times N_{steps}}$ where $Q(\theta^{(k+1)}) > Q(\theta^{(k)}) > Q(\theta^{(k-1)})$ that we will initialize estimation from.

3. **Local estimations:** Successively apply local optimization from weighted vectors of starting values in parallel. For each step $s = 1, \ldots, N_{steps}$, do the following:

(a) Construct initial values for each thread $h = 1, \ldots, N_{threads}$ as $z_{s,h} = \omega_s Z^\star + (1 - \omega_s)\theta^{((s-1)\cdot N_{threads}+h)}$ where

$Z^\star = \arg\min_{j<s,k} Q(\hat{z}_{j,k})$ is the vector of parameters associated with the lowest objective function before the current step s and

ω_s is a step-specific weight on the currently best parameter vector. We use a weight that increases linearly over the N_{steps} steps from 0.0 to 0.95.

(b) Call local optimizer for each thread $h = 1, \ldots, N_{threads}$ using $z_{s,h}$ as starting values to get associated estimates $\hat{z}_{s,h}$.

4. **Final estimation:** (optional) Using the local estimated parameters with the lowest objective function across all $N_{threads} \times N_{steps}$, $Z^\star = \arg\min_{s,h} Q(\hat{z}_{s,h})$, as starting values, we call the local optimizer a final time and denote the resulting estimates as $\hat{\theta}$.

The step 3 is included as a modification to the approach in Arnoud, Guvenen and Kleineberg (2019) to try to circumvent that almost all of the $N_{threads} \times N_{steps}$ best initial values stem from the same local minima. We use the gradient-free Nelder-Mead as local solver and set $N_{threads} = 6$, $N_{ini} = 5,000$, $N_{kmeans} = 8$,$N_{steps} = 4$, $N_{maxevals} = 5,000$ and $w_0 = 0.1$. The (worst-case) computation time associated with this estimation setup is $N_{init} \times N_{threads} + N_{maxevals} \times N_{steps} \times N_{threads}$ evaluations of the objective function, $Q(\theta)$.

Figure D.3: Model Fit: Variances.

(a) Wage, Women. (b) Wage, Men.

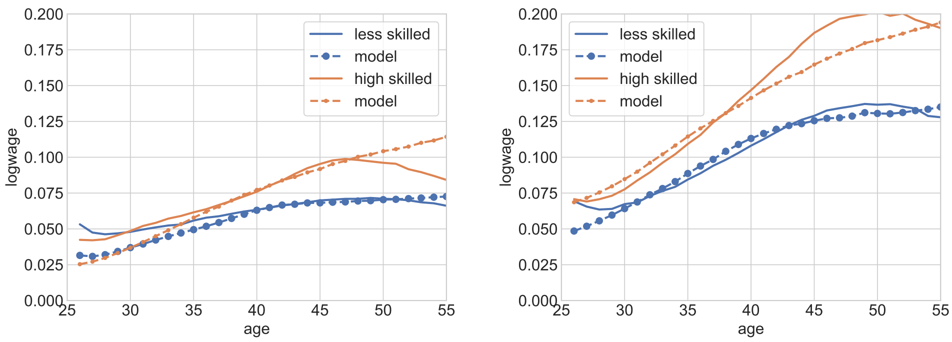


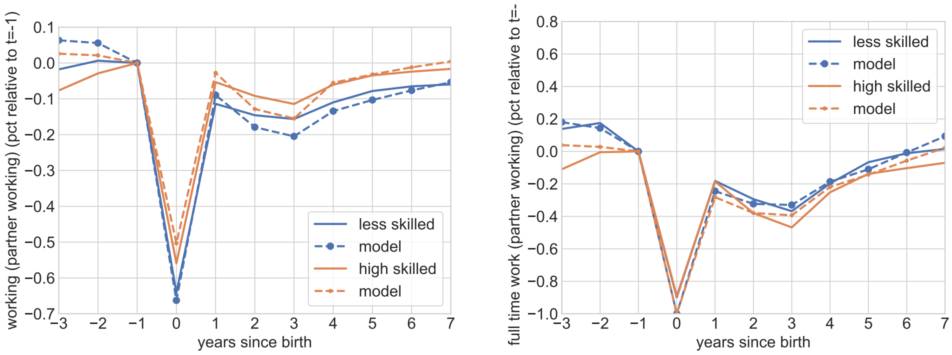
Table D.1: First Step Calibrations and Estimations.

Parameter		Value	Source
Human capital accumulation			
δ	Human capital depreciation	0.1	Keane and Wasi (2016)
l_{PT}	Part time hours, relative to full time	0.75	Own calculations, see text.
Children process			
$p_f(t)$	Probability of permanent infertility	Fig C.1	Sommer (2016)
$\overline{\wp}_t$	Biological fecundity	Fig C.1	Leridon (2004)
$\underline{\wp}$	Unintended pregnancy probability	0.061 / 0.038	Ejrnæs and Jørgensen (2020)
p_x	Probability in child moving process	0.08	Own calculations, see text
Partnership dissolution			
$p_s(\bullet)$	Probability of dissolution	Fig C.2	Own calculations, see text
κ_n	Share of time children are with mother	0.8	Own calculations, see text
κ_A	Share of wealth going to women	0.5	Own calculations, see text
Miscellaneous			
λ	Relative loading on women's utility	0.5	Eckstein, Keane and Lifshitz (2019)
$\underline{A}$	Borrowing limit	-1.0	Own calculations
R	Gross after tax interest rate	1.03	Jørgensen (2017)

Figure D.4: Model Fit. First Childbirth Events. Conditional on Working Spouse.

(a) Share Working, Women.

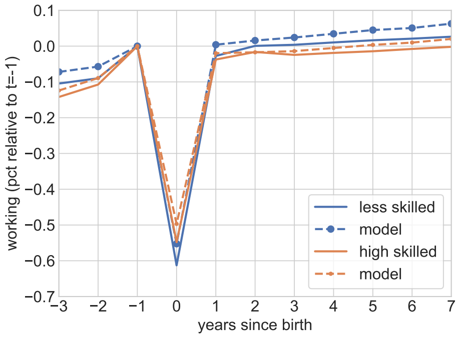
(b) Full time, Women.



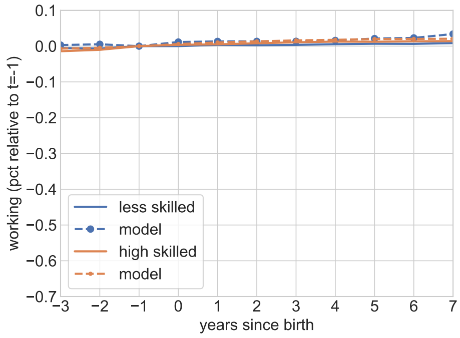
Notes: The Figure shows empirical and simulated labor market outcomes after first childbirth for women, conditional on their partner working. All empirical outcomes are 12-month aggregated values centered around the first childbirth. All empirical moments are regression coefficients from a regression including cohort dummies. We only use couples with the first birth in the age interval 26 through 59.

Figure D.5: Model Fit. Second Childbirth Events.

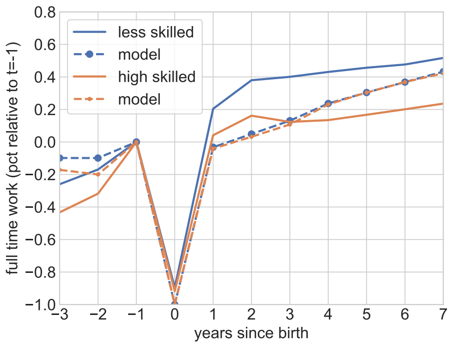
(a) Share Working, Women.



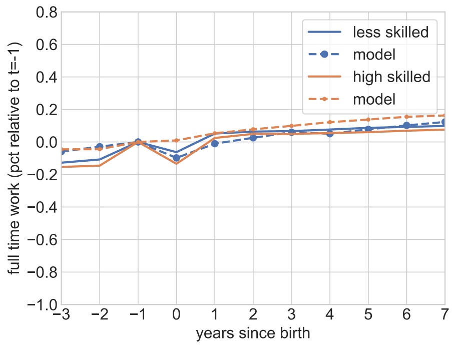
(b) Share Working, Men.



(c) Full time, Women.



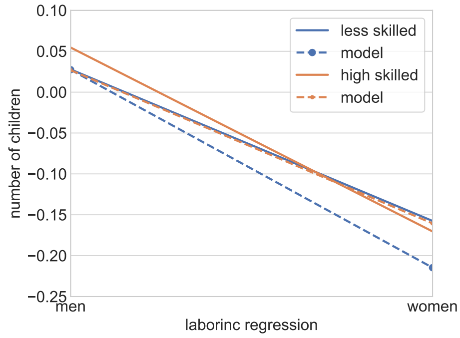
(d) Full time, Men.



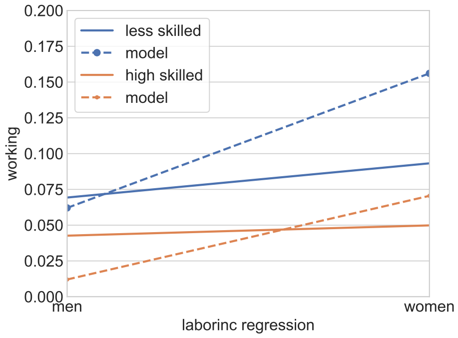
Notes: The Figure shows empirical and simulated labor market outcomes after second childbirth. All empirical outcomes are 12-month aggregated values centered around the second childbirth. All empirical moments are regression coefficients from a regression including cohort dummies. We only use couples with the first birth in the age interval 26 through 59.

Figure D.6: Model Fit. Correlations with Labor Income.

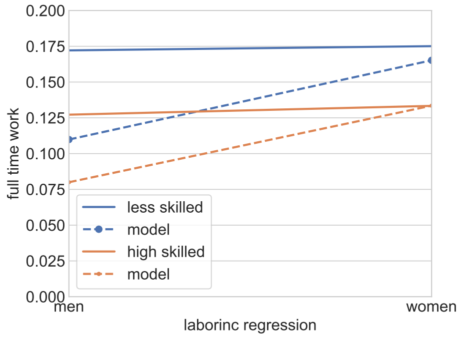
(a) Fertility.



(b) Working.



(c) Full Time.



E Informativeness of Estimation Moments

The moment informativeness measures reported in Tables E.1 and E.2 is motivated by Honoré, Jørgensen and de Paula (2020) and measures the percentage change in the asymptotic variance of elements of $\hat{\boldsymbol{\theta}}$ from removing groups of moments in $g(\boldsymbol{\theta})$, enumerated below. Concretely, the informativeness measure measures the percentage change in the asymptotic variance of $\hat{\boldsymbol{\theta}}$, Σ, from excluding a set of estimation moments. The measure thus is an extension of what Honoré, Jørgensen and de Paula (2020) refers to as M_4. Concretely, we calculate the informativeness as

$$I_k = \text{diag}(\tilde{\Sigma}_k - \Sigma)/\text{diag}(\Sigma) \cdot 100, \tag{E.1}$$

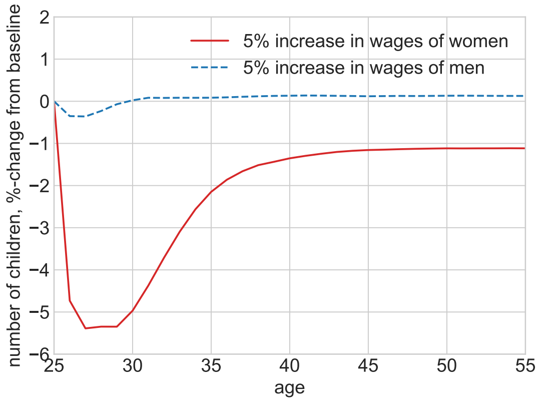
where

$$\begin{aligned}
\tilde{\Sigma}_k &= (G'\tilde{W}_k G)^{-1} G'\tilde{W}_k S \tilde{W}_k G (G'\tilde{W}_k G)^{-1} \\
\tilde{W}_k &= W \odot (\iota_k \iota_k')
\end{aligned}$$

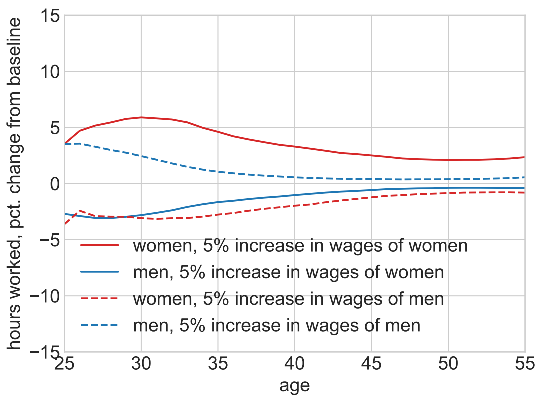
with $\odot$ denoting element-wise multiplication and ι_k is a $J \times 1$ vector with ones in all elements except the kth *group* of moments which are zeros.

Figure E.1: Permanent Wage Increase from Age 25. High Skilled.

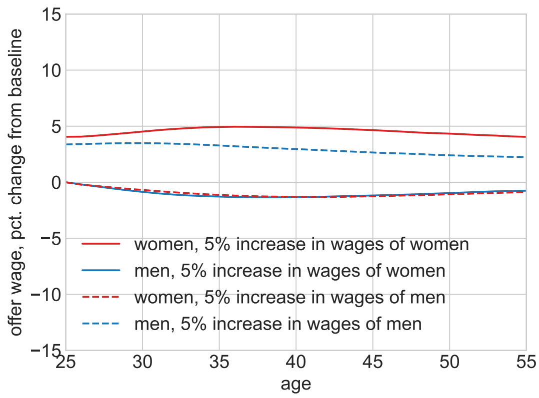
(a) Number of children.



(b) Hours worked.



(c) Offer wage.



Notes: See notes to Figure 6.

Table E.8: Counterfactuals: Human Capital and Dis-Utility from Work. Less Skilled.

	Baseline (1)	No hum. cap. depreciation on leave (2)	Unanticipated (3)	q-function as men (4)
Share working, women				
age 30	0.73	0.79	0.74	0.85
age 40	0.82	0.86	0.83	0.91
age 50	0.83	0.86	0.84	0.92
age 59	0.81	0.84	0.81	0.90
Share working, men				
age 30	0.88	0.87	0.88	0.87
age 40	0.92	0.91	0.92	0.92
age 50	0.93	0.92	0.92	0.93
age 59	0.91	0.89	0.90	0.91
Share working full time, women				
age 30	0.36	0.39	0.37	0.32
age 40	0.50	0.57	0.53	0.39
age 50	0.61	0.65	0.62	0.54
age 59	0.36	0.38	0.36	0.32
Share working full time, men				
age 30	0.60	0.54	0.58	0.58
age 40	0.74	0.67	0.71	0.73
age 50	0.84	0.82	0.83	0.84
age 59	0.82	0.81	0.82	0.82
Offer wage, women				
age 30	2.78	2.91	2.84	2.84
age 40	3.22	3.51	3.39	3.33
age 50	3.56	3.75	3.66	3.64
age 59	3.68	3.82	3.74	3.79
Offer wage, men				
age 30	3.51	3.50	3.51	3.50
age 40	4.35	4.27	4.33	4.32
age 50	4.87	4.78	4.84	4.85
age 59	5.10	5.03	5.07	5.09
Share with at least one child				
age 30	0.70	0.81	0.70	0.82
age 40	0.88	0.92	0.88	0.92
age 50	0.89	0.92	0.89	0.93
age 59	0.89	0.92	0.89	0.92
Number of children				
age 30	1.06	1.25	1.06	1.22
age 40	1.87	2.05	1.87	1.98
age 50	1.97	2.14	1.96	2.06
age 59	1.97	2.14	1.97	2.06

Notes: The Table shows simulated outcomes for less skilled from the estimated baseline model in column (1) and outcome from an alternative model in which human capital depreciation does not happen in the year of childbirth, i.e. $\delta = 0$ if $o_t = 0$ in column (2). Column (3) shows output from a similar model as that in column (2), but the change is unanticipated by the agents. Column (4) shows output from an alternative model in which the parameters in the q-function of women is set to the estimated parameters of men (see e.q. (2)). Column (5) shows behavior from an alternative model in which offer wages are 5% higher for women throughout life.

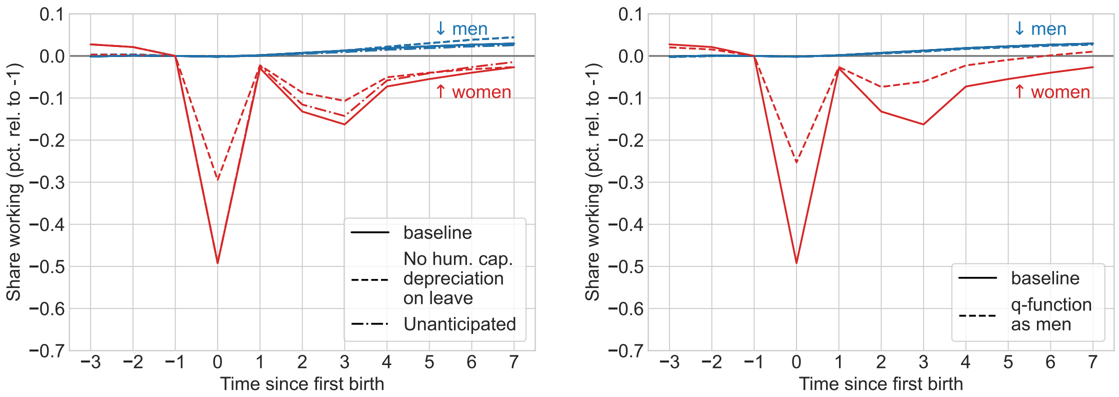
Table E.9: Counterfactuals: EITC and Child-Related Policies. Less Skilled.

	Baseline (1)	Removed EITC (2)	Only EITC per child (3)	Free childcare (4)	No maternity leave (5)
Share working, women					
age 30	0.73	0.68	0.69	0.71	0.81
age 40	0.82	0.75	0.79	0.81	0.83
age 50	0.83	0.75	0.80	0.83	0.84
age 59	0.81	0.72	0.77	0.80	0.82
Share working, men					
age 30	0.88	0.87	0.87	0.89	0.89
age 40	0.92	0.89	0.92	0.92	0.92
age 50	0.93	0.90	0.93	0.93	0.93
age 59	0.91	0.88	0.90	0.91	0.91
Share working full time, women					
age 30	0.36	0.34	0.32	0.30	0.45
age 40	0.50	0.48	0.49	0.46	0.55
age 50	0.61	0.56	0.60	0.60	0.62
age 59	0.36	0.34	0.35	0.35	0.36
Share working full time, men					
age 30	0.60	0.60	0.60	0.57	0.60
age 40	0.74	0.73	0.73	0.70	0.74
age 50	0.84	0.82	0.84	0.84	0.84
age 59	0.82	0.80	0.82	0.82	0.82
Offer wage, women					
age 30	2.78	2.75	2.72	2.73	2.85
age 40	3.22	3.14	3.17	3.18	3.35
age 50	3.56	3.41	3.50	3.53	3.63
age 59	3.68	3.51	3.62	3.66	3.73
Offer wage, men					
age 30	3.51	3.50	3.51	3.52	3.52
age 40	4.35	4.32	4.34	4.33	4.35
age 50	4.87	4.81	4.86	4.85	4.87
age 59	5.10	5.02	5.09	5.09	5.10
Share with at least one child					
age 30	0.70	0.73	0.87	0.89	0.59
age 40	0.88	0.89	0.92	0.93	0.81
age 50	0.89	0.90	0.93	0.94	0.83
age 59	0.89	0.90	0.93	0.94	0.83
Number of children					
age 30	1.06	1.10	1.36	1.43	0.85
age 40	1.87	1.90	2.03	2.13	1.63
age 50	1.97	1.99	2.11	2.22	1.74
age 59	1.97	2.00	2.11	2.23	1.74

Notes: The Table shows simulated outcomes for less skilled from the estimated baseline model in column (1) and outcome from an alternative model in which the Danish EITC is completely removed in column (2). Column (3) also removes the EITC for childless but lets the maximum EITC be the baseline value times the number of children. In column (4) childcare is completely free and column (5) removes the possibility of newborn mothers taking maternity leave with benefits.

Figure E.2: Event Studies: Human Capital and Dis-Utility from Work. High Skilled.

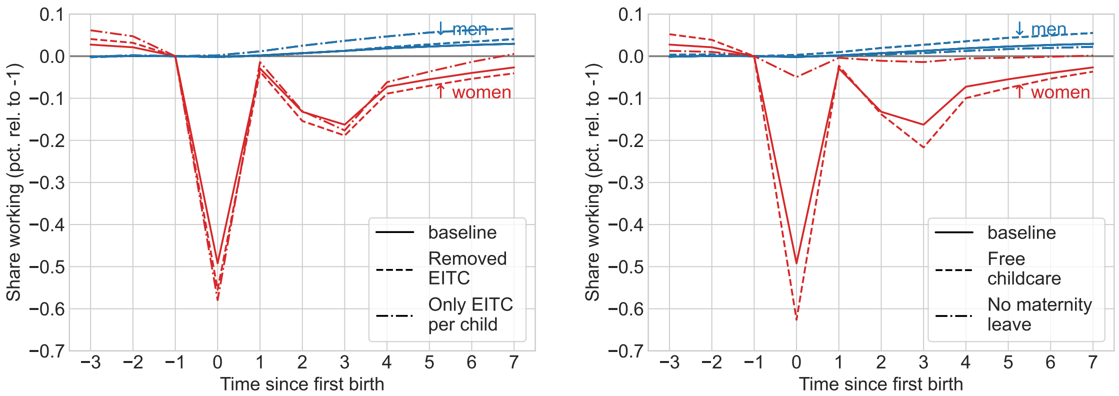
(a) Human capital. (b) Dis-utility from work.



Notes: See notes to Figure 11.

Figure E.3: Event Studies: EITC and Child-Related Policies. High Skilled.

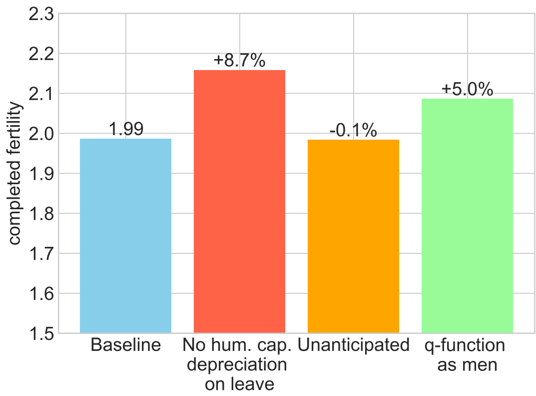
(a) EITC. (b) Child-related.



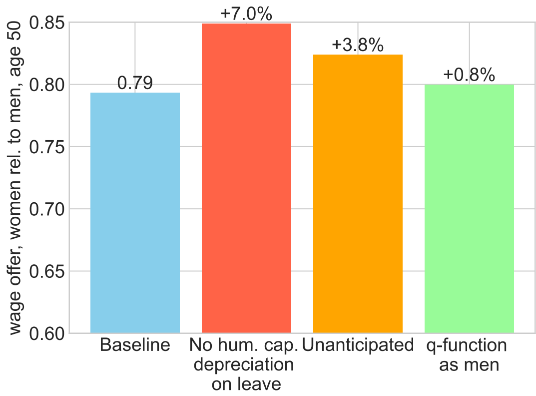
Notes: See notes to Figure 9.

Figure E.4: Short and Long Run Counterfactual Behavior of Women. Human Capital and Dis-Utility from Work. High Skilled.

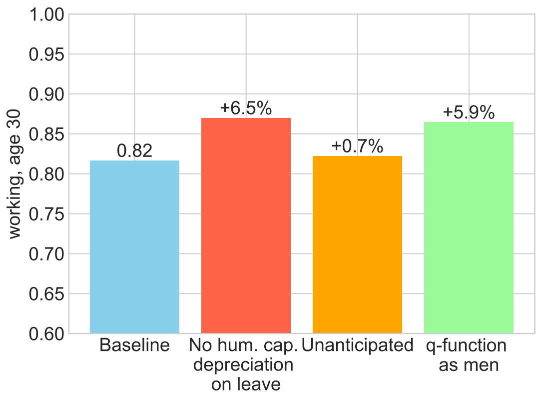
(a) Completed fertility.



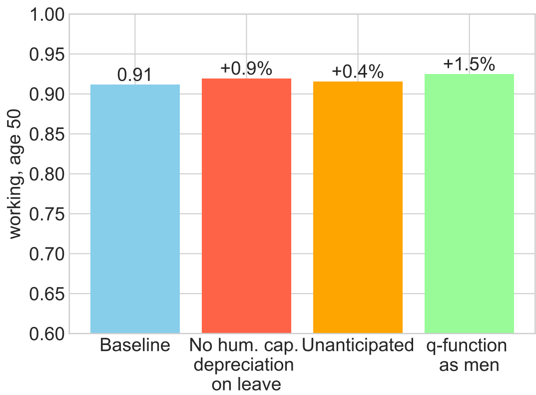
(b) Offer wage gap, age 50.



(c) Share working, age 30.



(d) Share working, age 50.

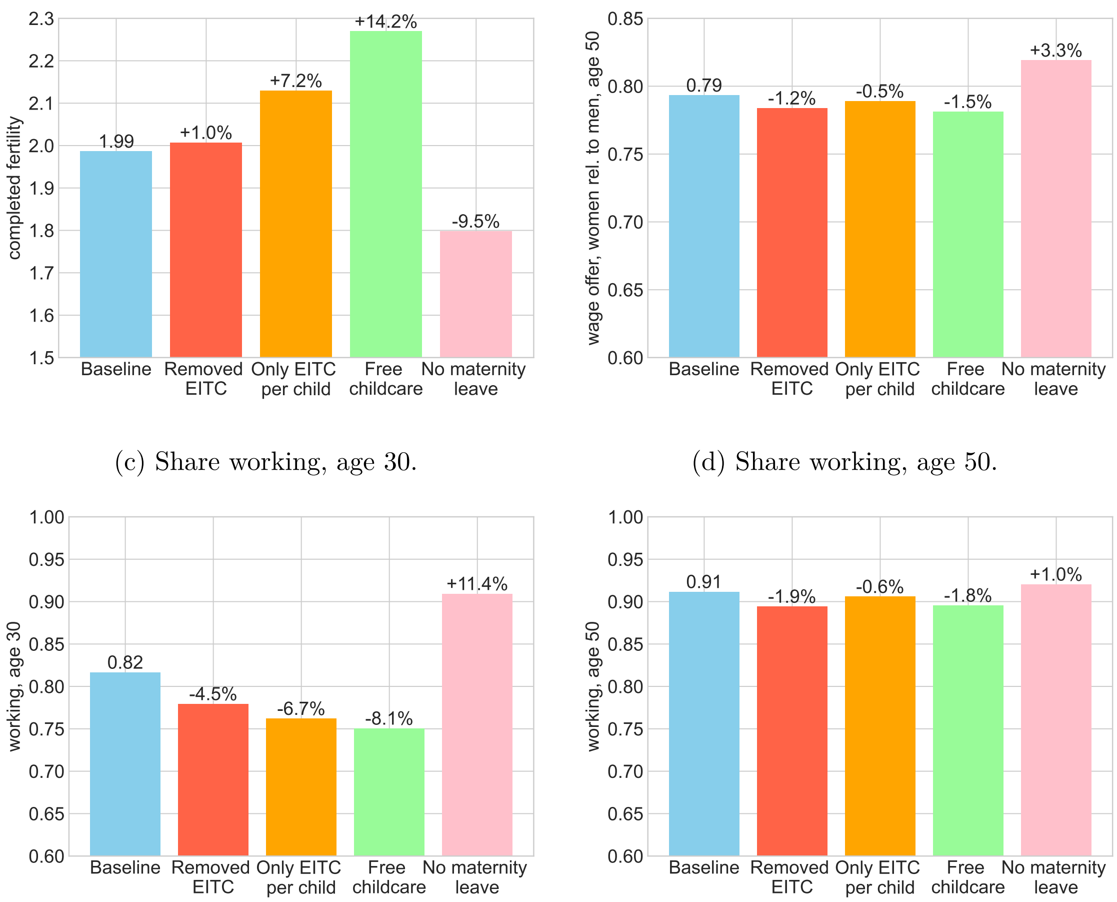


Notes: The Figure shows simulated outcomes for women from the estimated baseline model in column 1 and outcome from an alternative models. See notes to Figure E.2.

Figure E.5: Short and Long Run Counterfactual Behavior of Women. High Skilled.

(a) Completed fertility. (b) Offer wage gap, age 50.

(c) Share working, age 30. (d) Share working, age 50.



Notes: See notes to Figure 10.

Table E.10: Counterfactuals: Human Capital and Dis-Utility from Work. High Skilled.

	Baseline	No hum. cap. depreciation on leave	Unanticipated	q-function as men
	(1)	(2)	(3)	(4)
Share working, women				
age 30	0.82	0.87	0.82	0.86
age 40	0.90	0.92	0.91	0.93
age 50	0.91	0.92	0.92	0.92
age 59	0.88	0.89	0.89	0.89
Share working, men				
age 30	0.93	0.91	0.93	0.93
age 40	0.95	0.95	0.95	0.95
age 50	0.95	0.94	0.95	0.95
age 59	0.93	0.91	0.92	0.92
Share working full time, women				
age 30	0.42	0.47	0.44	0.42
age 40	0.61	0.67	0.64	0.57
age 50	0.76	0.77	0.76	0.73
age 59	0.56	0.55	0.55	0.51
Share working full time, men				
age 30	0.70	0.62	0.68	0.69
age 40	0.81	0.75	0.78	0.81
age 50	0.87	0.84	0.85	0.87
age 59	0.70	0.66	0.68	0.70
Offer wage, women				
age 30	3.47	3.60	3.52	3.49
age 40	4.26	4.65	4.50	4.33
age 50	4.85	5.09	5.00	4.89
age 59	5.10	5.21	5.17	5.11
Offer wage, men				
age 30	3.92	3.89	3.92	3.92
age 40	5.29	5.19	5.27	5.29
age 50	6.11	5.99	6.06	6.11
age 59	6.44	6.34	6.38	6.43
Share with at least one child				
age 30	0.57	0.68	0.57	0.54
age 40	0.86	0.89	0.86	0.85
age 50	0.89	0.91	0.89	0.88
age 59	0.89	0.91	0.89	0.88
Number of children				
age 30	0.77	0.95	0.77	0.79
age 40	1.83	2.01	1.83	1.92
age 50	1.99	2.16	1.98	2.09
age 59	1.99	2.17	1.99	2.09

Notes: See notes to Table E.8.

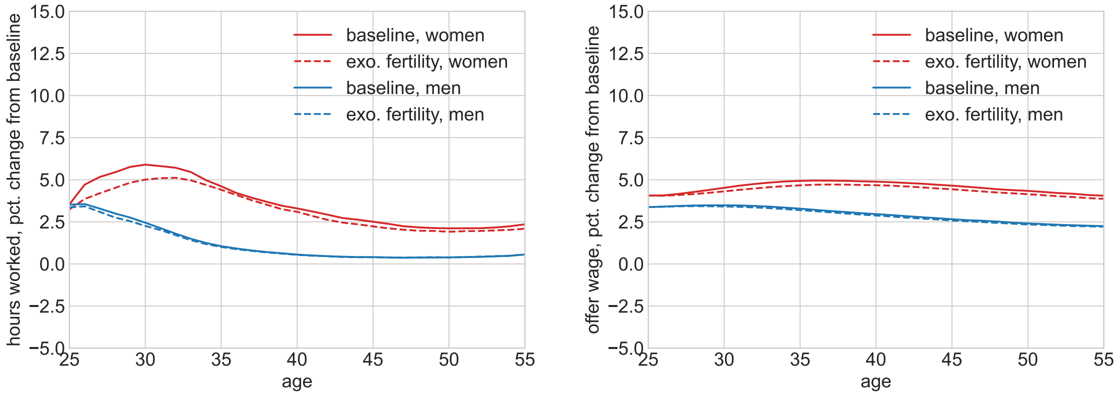
Table E.11: Counterfactuals: EITC and Child-Related Policies. High Skilled.

	Baseline (1)	Removed EITC (2)	Only EITC per child (3)	Free childcare (4)	No maternity leave (5)
Share working, women					
age 30	0.82	0.78	0.76	0.75	0.91
age 40	0.90	0.88	0.89	0.87	0.93
age 50	0.91	0.89	0.91	0.90	0.92
age 59	0.88	0.86	0.87	0.87	0.89
Share working, men					
age 30	0.93	0.91	0.92	0.92	0.93
age 40	0.95	0.95	0.95	0.95	0.95
age 50	0.95	0.95	0.95	0.95	0.95
age 59	0.93	0.92	0.92	0.92	0.92
Share working full time, women					
age 30	0.42	0.42	0.35	0.31	0.56
age 40	0.61	0.60	0.62	0.55	0.68
age 50	0.76	0.75	0.76	0.73	0.77
age 59	0.56	0.56	0.55	0.54	0.56
Share working full time, men					
age 30	0.70	0.70	0.68	0.64	0.69
age 40	0.81	0.81	0.82	0.77	0.79
age 50	0.87	0.87	0.87	0.86	0.86
age 59	0.70	0.71	0.69	0.68	0.69
Offer wage, women					
age 30	3.47	3.44	3.39	3.37	3.55
age 40	4.26	4.20	4.21	4.13	4.47
age 50	4.85	4.78	4.81	4.72	4.99
age 59	5.10	5.04	5.07	5.00	5.18
Offer wage, men					
age 30	3.92	3.91	3.89	3.89	3.92
age 40	5.29	5.28	5.27	5.21	5.29
age 50	6.11	6.10	6.10	6.05	6.09
age 59	6.44	6.43	6.43	6.39	6.41
Share with at least one child					
age 30	0.57	0.59	0.79	0.85	0.43
age 40	0.86	0.87	0.90	0.91	0.81
age 50	0.89	0.89	0.92	0.93	0.85
age 59	0.89	0.89	0.92	0.93	0.85
Number of children					
age 30	0.77	0.81	1.17	1.30	0.55
age 40	1.83	1.85	1.99	2.14	1.62
age 50	1.99	2.01	2.13	2.27	1.80
age 59	1.99	2.01	2.14	2.28	1.80

Notes: See notes to Table E.9.

Figure E.6: Permanent Wage Increase from Age 25, Exogenous Fertility. High Skilled.

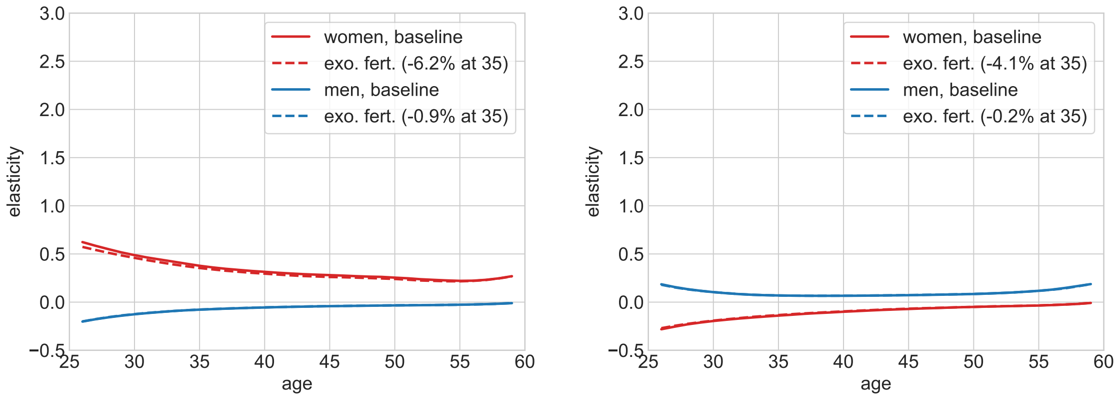
(a) Hours worked.   (b) Offer wage.



Notes: See notes to Figure 7

Figure E.7: Quantifying the Role of Fertility Responses. High Skilled.

(a) Increased wage of women.   (b) Increased wage of men.

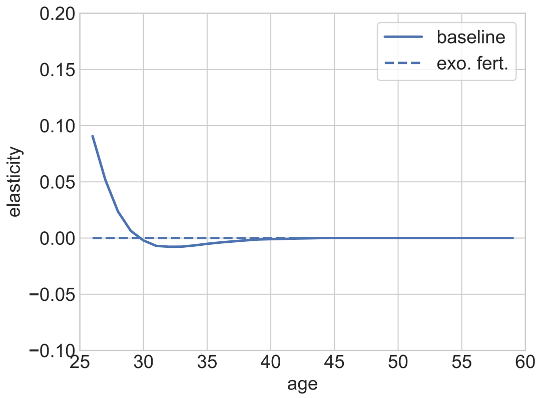


Notes: See notes to Figure 8.

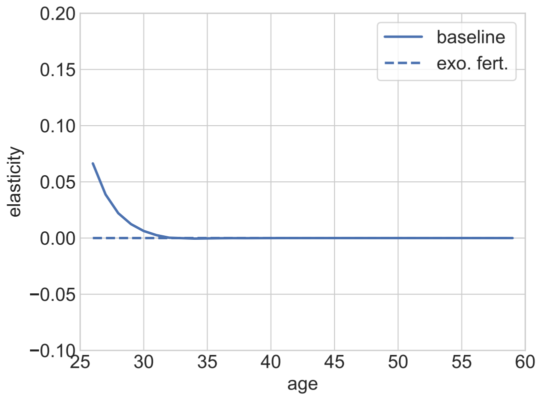
Figure E.8: Quantifying the Role of Fertility: Age at First Birth.

Increased wage of women

(a) Less Skilled.

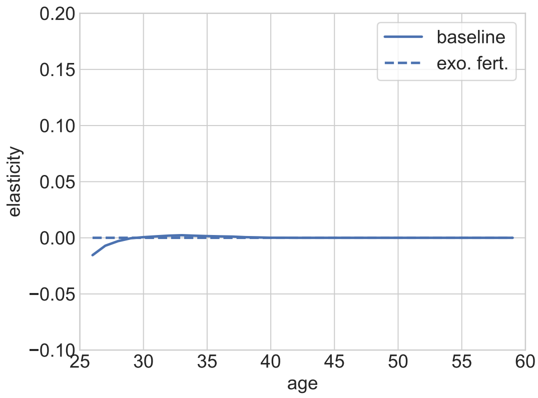


(b) High Skilled.

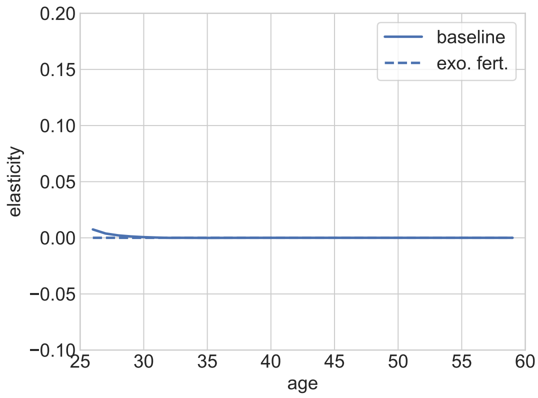


Increased wage of men

(c) Less Skilled.



(d) High Skilled.

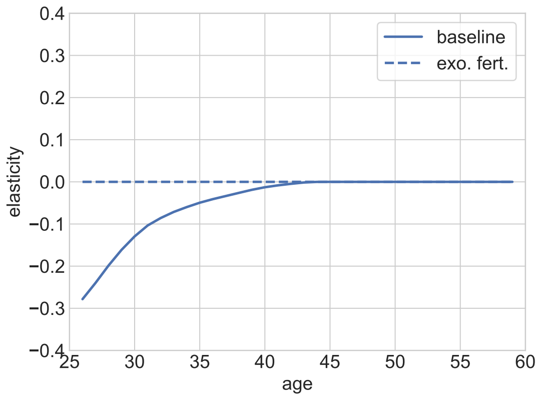


Notes: The figure shows the elasticities of the age of women at the first birth from an unanticipated permanent wage increase for both the baseline model (solid lines) and the alternative exogenous fertility model (dashed lines). On the x-axis is the age at which the unanticipated permanent wage increase occurred, s_1, and on the y-axis we show the elasticity of age of first childbirth.

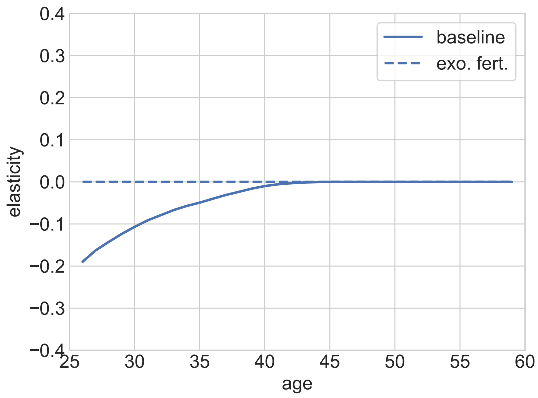
Figure E.9: Quantifying the Role of Fertility: Completed Fertility.

Increased wage of women

(a) Less Skilled.

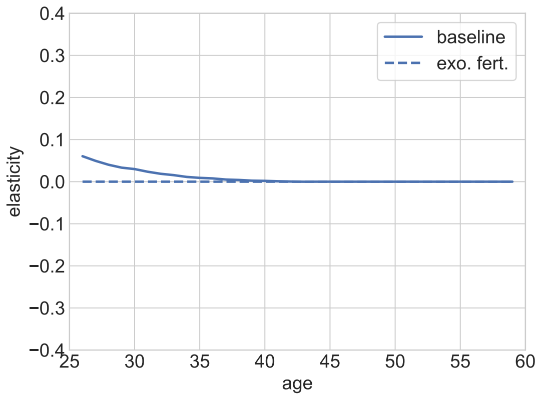


(b) High Skilled.

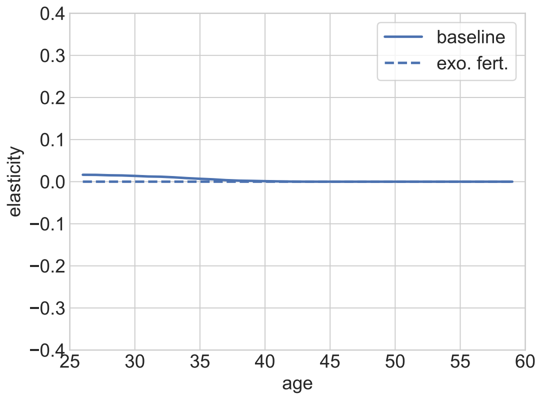


Increased wage of men

(c) Less Skilled.



(d) High Skilled.



Notes: The figure shows the elasticities of completed fertility (number of children at age 45) from an unanticipated permanent wage increase for both the baseline model (solid lines) and the alternative exogenous fertility model (dashed lines).

Table E.16: Sensitivity, Less Skilled.

	baseline	convex hum. cap.	increased depreciation	increased power
		total	total	total
	(1)	(2)	(3)	(4)
Share working, women				
30	0.733	-0.002	-0.007	-0.157
35	0.783	-0.009	-0.007	-0.156
55	0.826	-0.016	-0.010	-0.192
Hours, women				
30	1229.139	6.066	-12.857	-345.257
35	1329.098	-3.185	-13.442	-356.575
55	1471.151	-23.245	-18.109	-407.385
Offer wage, women				
30	2.781	-0.003	-0.010	-0.157
35	3.005	-0.009	-0.020	-0.287
55	3.660	-0.042	-0.049	-0.550
Number of children				
30	1.059	-0.009	0.008	0.178
35	1.639	-0.011	0.007	0.148
55	1.967	-0.008	0.005	0.101
Elasticity of hours, women				
30	2.043	0.160	0.156	0.633
35	2.066	0.197	0.173	0.458
55	0.290	0.003	0.005	0.169
Elasticity of hours, women (exo. fertility)				
30	1.830	0.178	0.148	0.847
35	1.814	0.209	0.165	0.586
55	0.287	0.005	0.005	0.155

Notes: The Table shows the impact of an alternative human capital accumulation process in eq. (12) on several outcomes for less skilled couples. Column (1) shows statistics simulated from the estimated baseline model. Column (2) shows changes in these statistics if human capital depreciation was convex ($\delta_0 = 0.01$) and column (3) show simulated change in outcomes if the depreciation rate was increased one percent to $\delta = 0.101$. Finally, in column (4) we show the effect of increasing the bargaining power of women with 10% to $\lambda = 0.55$.

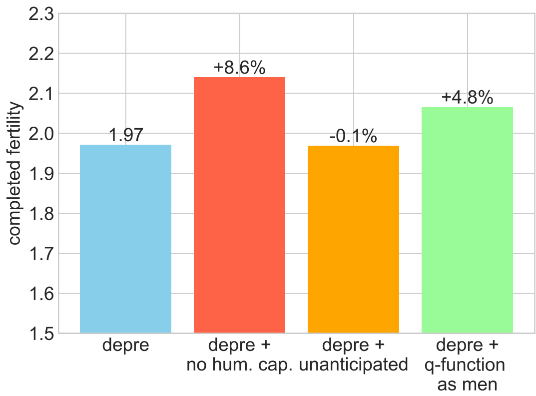
Table E.17: Sensitivity to the Human Capital Process. High Skilled.

	baseline	convex hum. cap.	increased depreciation	increased power
		total	total	total
	(1)	(2)	(3)	(4)
Share working, women				
30	0.817	-0.002	-0.005	-0.252
35	0.871	-0.006	-0.004	-0.257
55	0.902	-0.003	0.000	-0.135
Hours, women				
30	1381.467	7.239	-9.488	-522.122
35	1491.847	2.816	-7.375	-545.986
55	1651.127	-1.791	1.979	-305.922
Offer wage, women				
30	3.467	-0.003	-0.009	-0.262
35	3.883	-0.007	-0.019	-0.501
55	5.033	-0.020	-0.042	-0.754
Number of children				
30	0.774	-0.011	0.006	0.240
35	1.504	-0.012	0.004	0.185
55	1.991	-0.007	0.003	0.128
Elasticity of hours, women				
30	0.488	0.035	0.023	1.852
35	0.377	0.031	0.018	1.728
55	0.221	0.008	0.002	0.264
Elasticity of hours, women (exo. fertility)				
30	0.459	0.031	0.021	1.337
35	0.354	0.027	0.017	1.201
55	0.216	0.005	0.002	0.207

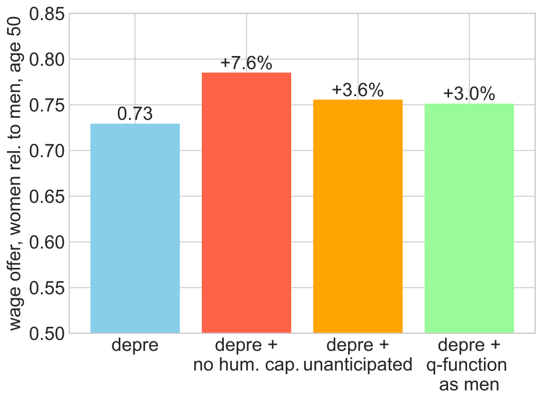
Notes: The Table shows the impact of an alternative human capital accumulation process in eq. (12) on several outcomes for high skilled couples. See notes to Table E.16.

Figure E.10: Sensitivity to Human Capital Depreciation: Human Capital Depreciation and Dis-Utility from Work. Less Skilled.

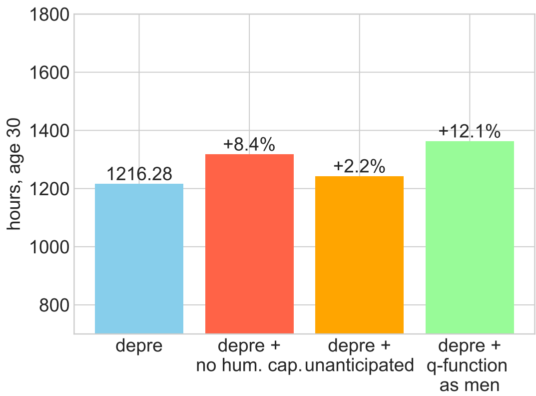
(a) Completed fertility.



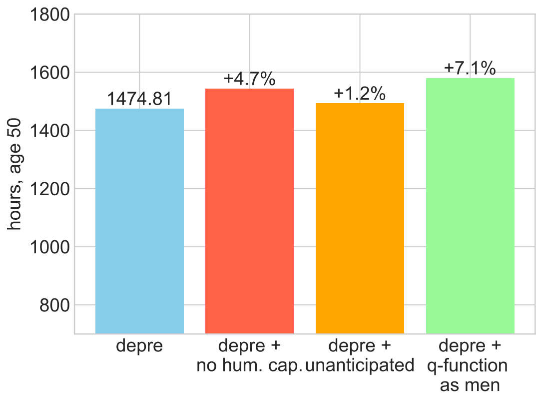
(b) Gender wage gap, age 50.



(c) Hours worked, age 30.



(d) Hours worked, age 50.



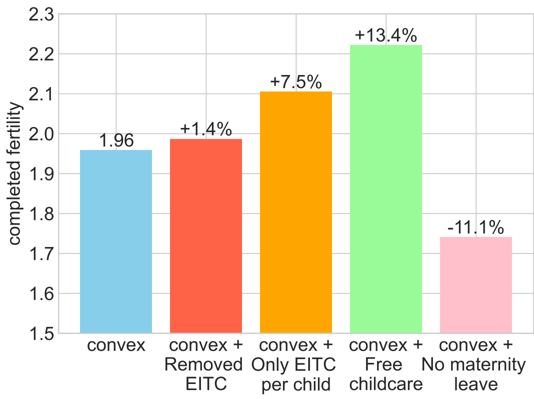
Notes: The Figure shows simulated outcomes for women from the alternative model with increased capital depreciation ($\delta = 0.101$) model in column 1 and outcomes from an alternative models. The outcomes are comparable to those in Figure 12.

Figure E.11: Sensitivity to Bargaining Power: Human Capital Depreciation and Dis-Utility from Work. Less Skilled.

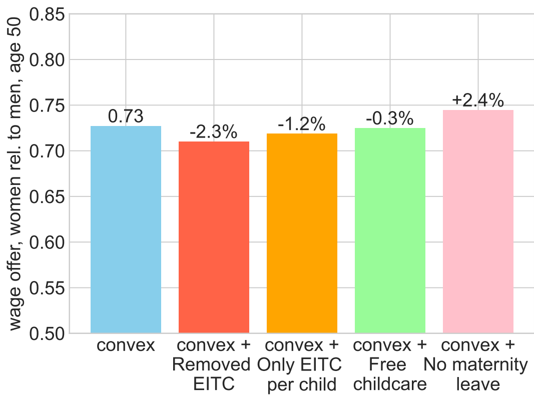
Notes: The Figure shows simulated outcomes for women from the alternative model with increased bargaining power of women ($\lambda = 0.55$) model in column 1 and outcomes from an alternative models. The outcomes are comparable to those in Figure 12.

Figure E.12: Sensitivity to Convex Human Capital: Policy Counterfactuals. Less Skilled.

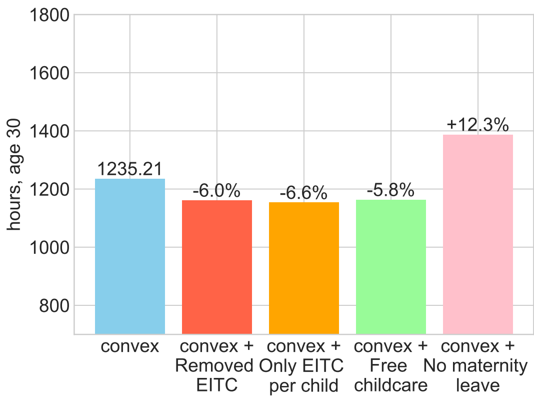
(a) Completed fertility.



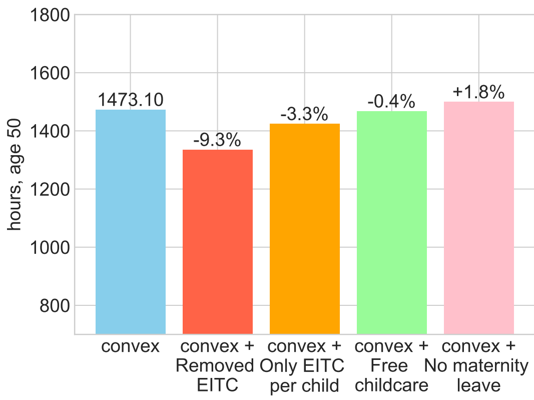
(b) Gender wage gap, age 50.



(c) Hours worked, age 30.

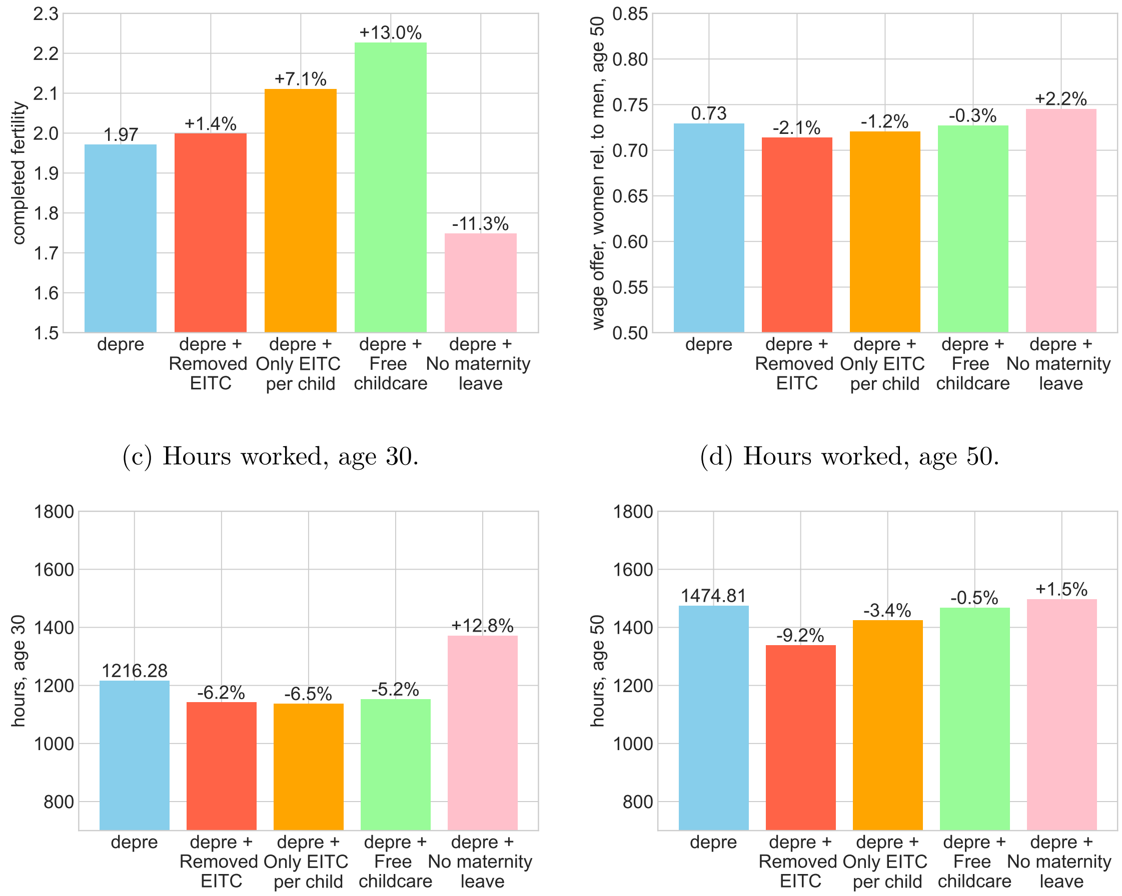


(d) Hours worked, age 50.



Notes: The Figure shows simulated outcomes for women from the alternative model with convex human capital accumulation process ($\delta_0 = 0.01$) model in column 1 and outcomes from an alternative models. The outcomes are comparable to those in Figure 10.

Figure E.13: Sensitivity to Human Capital Depreciation: Counterfactual Policies. Less Skilled.



(a) Completed fertility.

(b) Gender wage gap, age 50.

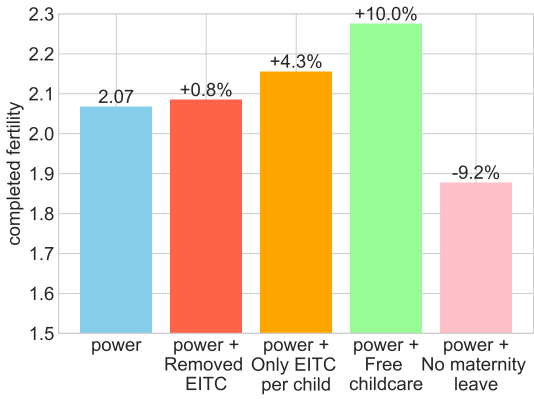
(c) Hours worked, age 30.

(d) Hours worked, age 50.

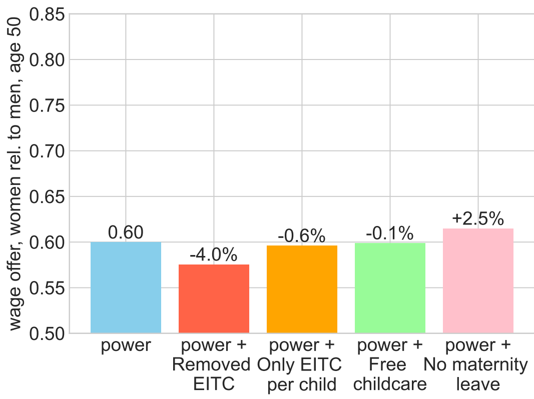
Notes: The Figure shows simulated outcomes for women from the alternative model with increased capital depreciation ($\delta = 0.101$) model in column 1 and outcomes from an alternative models. The outcomes are comparable to those in Figure 10.

Figure E.14: Sensitivity to Bargaining Power: Counterfactual Policies. Less Skilled.

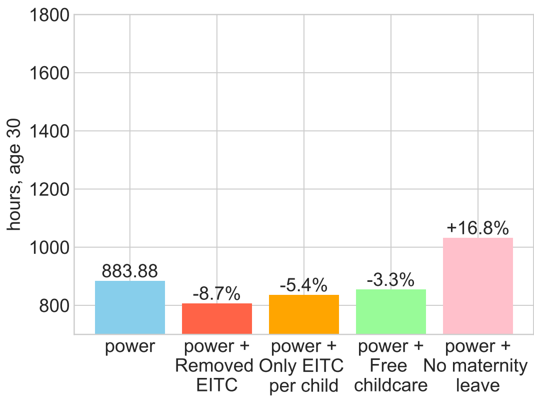
(a) Completed fertility.



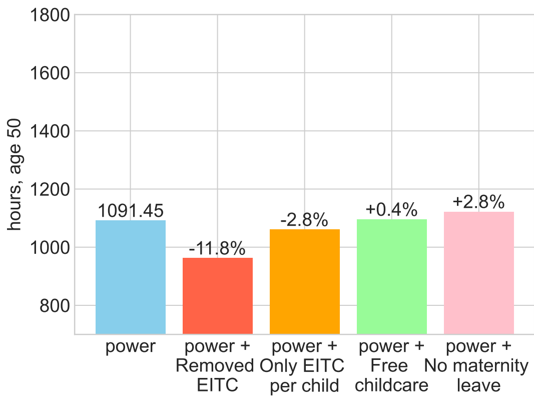
(b) Gender wage gap, age 50.



(c) Hours worked, age 30.

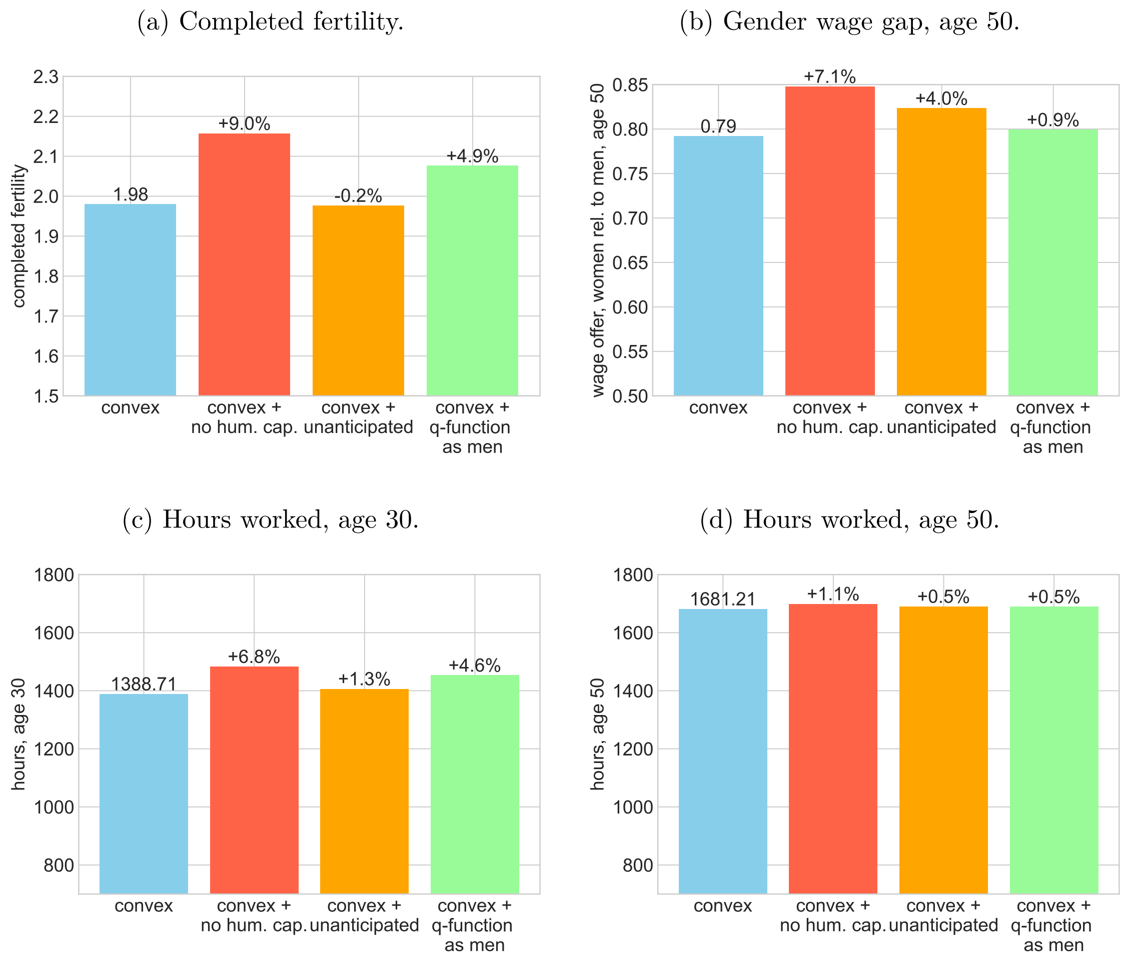


(d) Hours worked, age 50.



Notes: The Figure shows simulated outcomes for women from the alternative model with increased bargaining power of women ($\lambda = 0.55$) model in column 1 and outcomes from an alternative models. The outcomes are comparable to those in Figure 10.

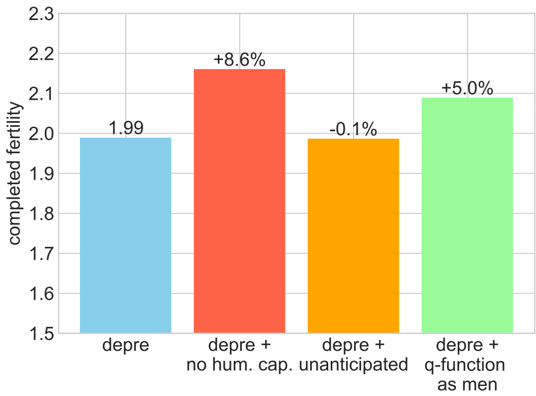
Figure E.15: Sensitivity to Convex Human Capital: Human Capital Depreciation and Dis-Utility from Work. High Skilled.



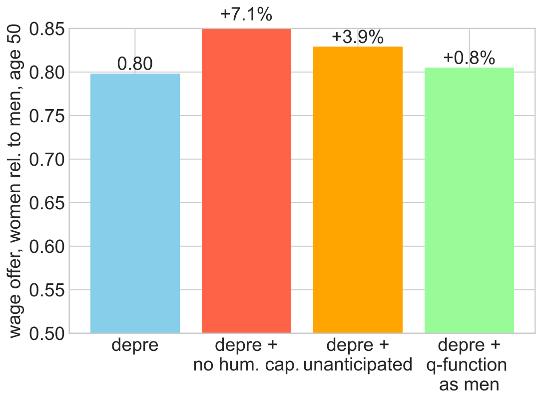
Notes: The Figure shows simulated outcomes for women from the alternative model with convex human capital accumulation process ($\delta_0 = 0.01$) model in column 1 and outcomes from an alternative models. The outcomes are comparable to those in Figure E.4.

Figure E.16: Sensitivity to Human Capital Depreciation: Human Capital Depreciation and Dis-Utility from Work. High Skilled.

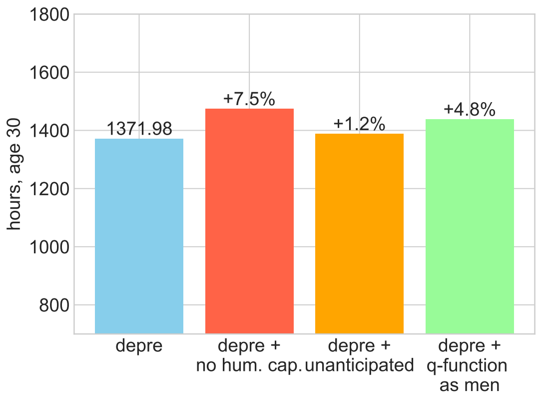
(a) Completed fertility.



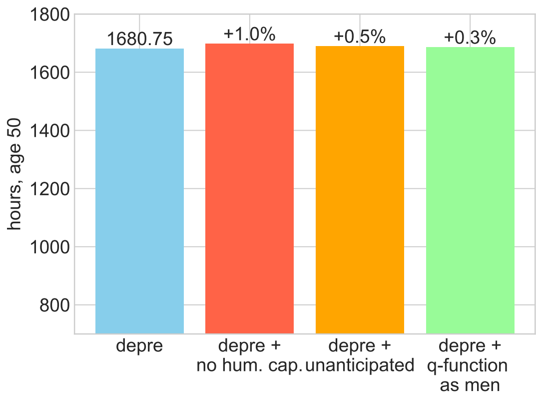
(b) Gender wage gap, age 50.



(c) Hours worked, age 30.



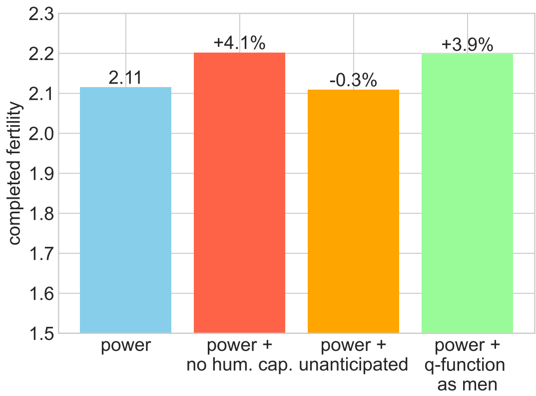
(d) Hours worked, age 50.



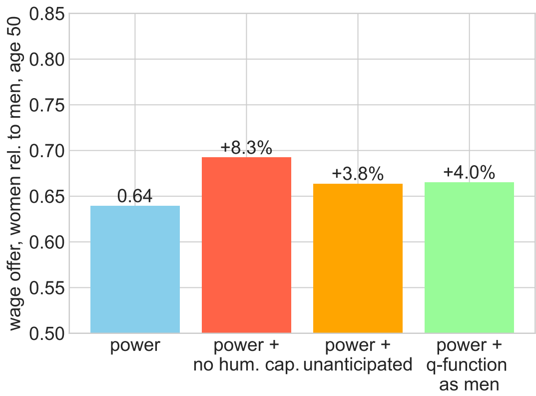
Notes: The Figure shows simulated outcomes for women from the alternative model with increased capital depreciation ($\delta = 0.101$) model in column 1 and outcomes from an alternative models. The outcomes are comparable to those in Figure E.4.

Figure E.17: Sensitivity to Bargaining Power: Human Capital Depreciation and Dis-Utility from Work. High Skilled.

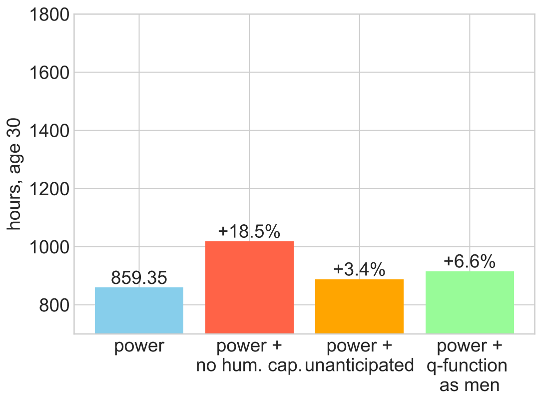
(a) Completed fertility.



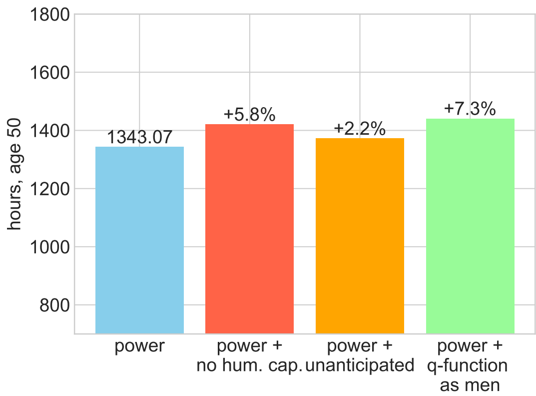
(b) Gender wage gap, age 50.



(c) Hours worked, age 30.



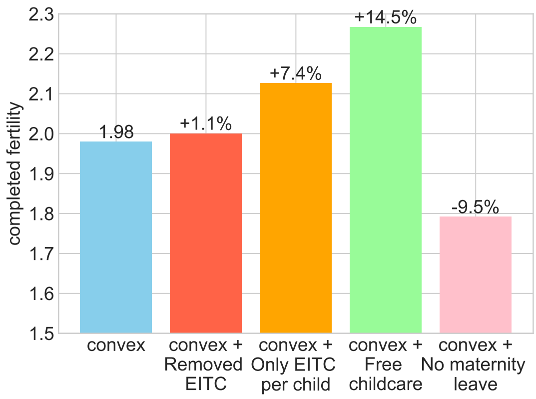
(d) Hours worked, age 50.



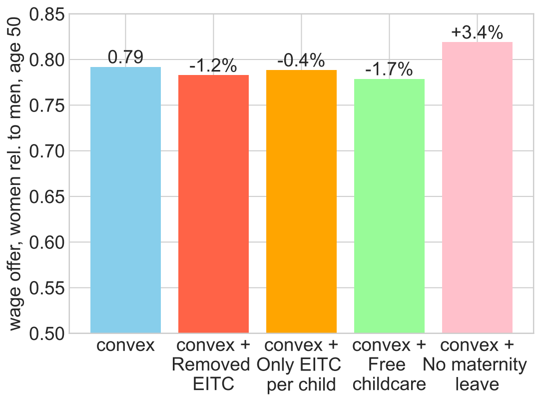
Notes: The Figure shows simulated outcomes for women from the alternative model with increased bargaining power of women ($\lambda = 0.55$) model in column 1 and outcomes from an alternative models. The outcomes are comparable to those in Figure E.4.

Figure E.18: Sensitivity to Convex Human Capital: Policy Counterfactuals. High Skilled.

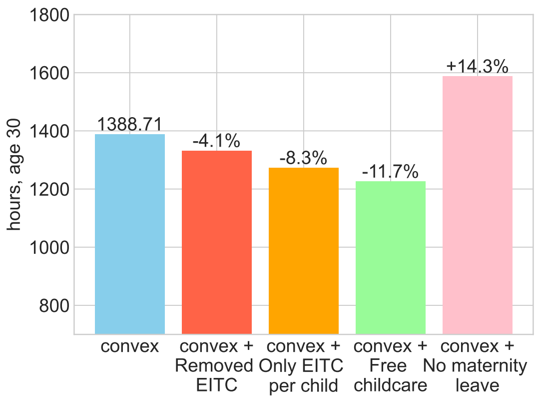
(a) Completed fertility.



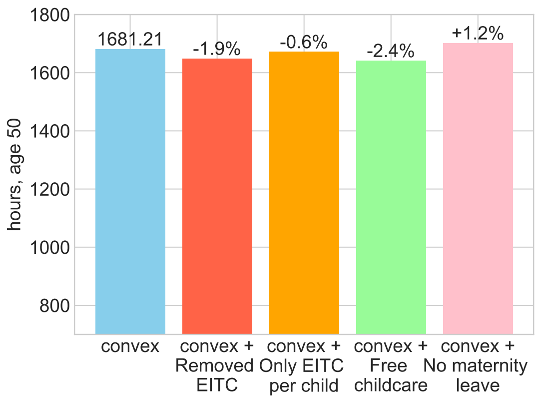
(b) Gender wage gap, age 50.



(c) Hours worked, age 30.



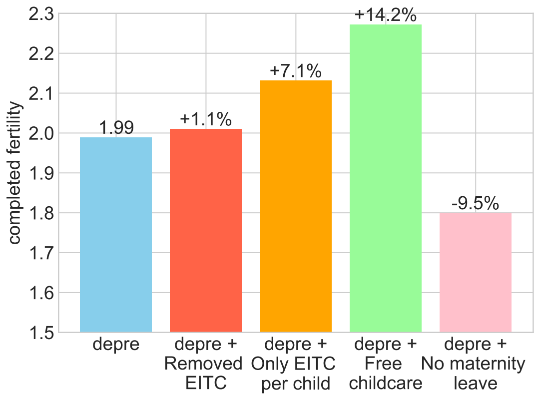
(d) Hours worked, age 50.



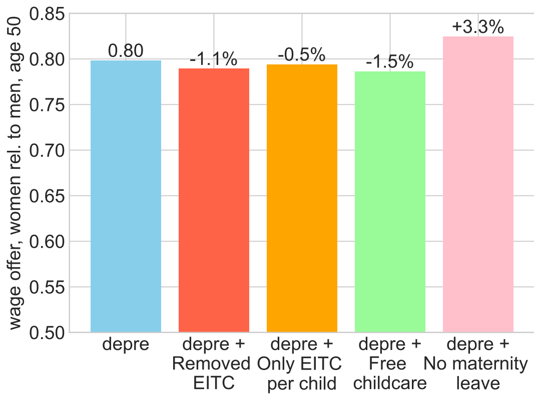
Notes: The Figure shows simulated outcomes for women from the alternative model with convex human capital accumulation process ($\delta_0 = 0.01$) model in column 1 and outcomes from an alternative models. The outcomes are comparable to those in Figure E.5.

Figure E.19: Sensitivity to Human Capital Depreciation: Counterfactual Policies. High Skilled.

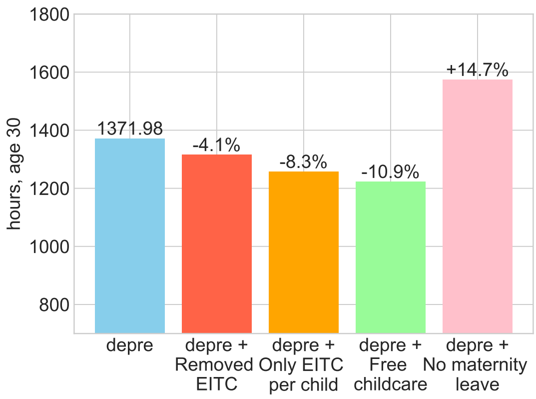
(a) Completed fertility.



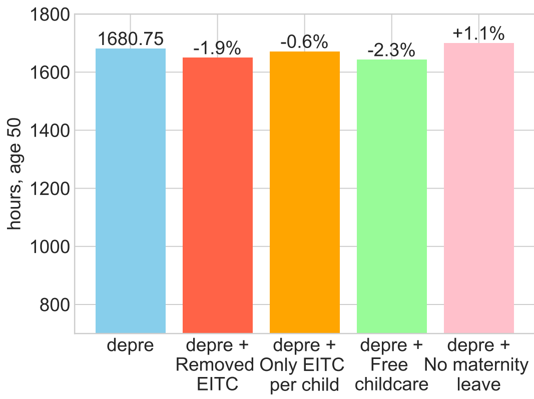
(b) Gender wage gap, age 50.



(c) Hours worked, age 30.



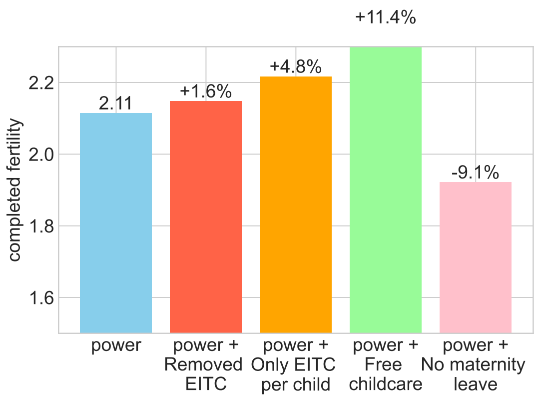
(d) Hours worked, age 50.



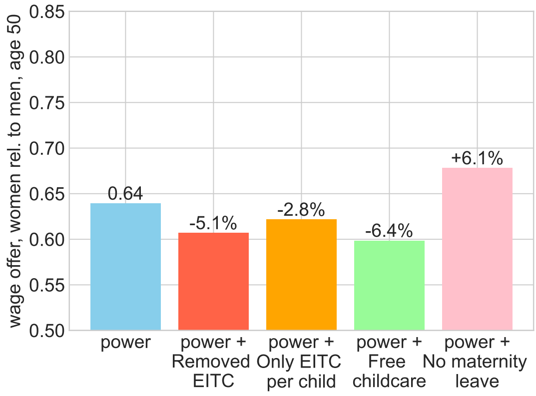
Notes: The Figure shows simulated outcomes for women from the alternative model with increased capital depreciation ($\delta = 0.101$) model in column 1 and outcomes from an alternative models. The outcomes are comparable to those in Figure E.5.

Figure E.20: Sensitivity to Bargaining Power: Counterfactual Policies. High Skilled.

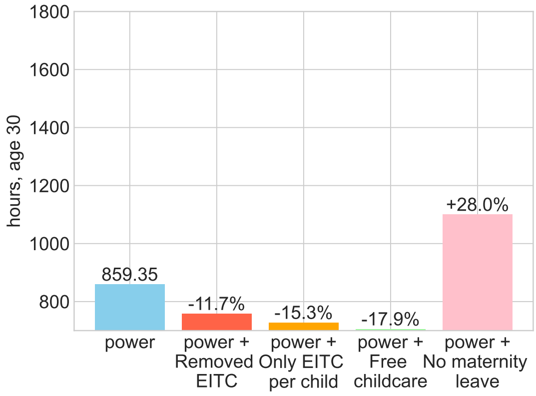
(a) Completed fertility.



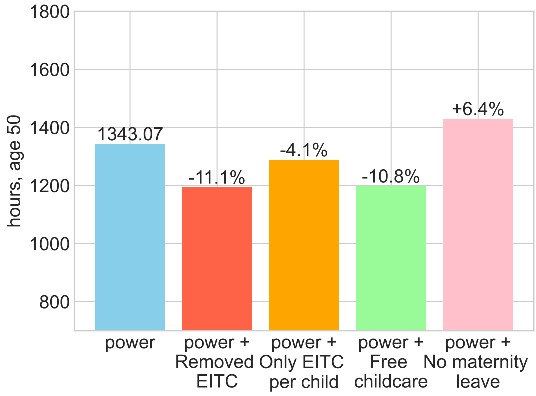
(b) Gender wage gap, age 50.



(c) Hours worked, age 30.



(d) Hours worked, age 50.



Notes: The Figure shows simulated outcomes for women from the alternative model with increased bargaining power of women ($\lambda = 0.55$) model in column 1 and outcomes from an alternative models. The outcomes are comparable to those in Figure E.5.

Table E.1: Informativeness of Estimation Moments, Less Skilled.

	Moments (group)								
	labor (1)	wage (2)	var (3)	children (4)	spacing (5)	interaction (6)	substitution (7)	wealth (8)	corr (9)
Utility from children									
ω_1	53.90	1.40	9.58	9.36	122.10	26.46	-10.84	6.58	-0.06
$\omega_{1,age}$	92.71	-0.14	0.07	-9.28	675.68	17.94	0.32	-4.61	0.55
ω_2	59.37	-2.51	0.01	-55.81	-1.58	1.68	-2.56	-2.44	0.39
ω_3	62.57	-1.82	-0.82	-28.31	49.58	5.44	-1.21	-1.21	0.04
η_0	50.27	5.61	3.82	-7.03	718.44	22.77	-1.49	3.12	0.07
η_1	63.00	-3.27	5.25	-5.94	905.51	25.52	-0.69	7.95	0.47
η_2	45.21	-1.56	-0.28	-9.21	242.69	43.99	0.49	6.49	0.41
Utility from market work, $g_w(\bullet)$ and $g_m(\bullet)$. Relative to not working.									
$\mu_{PT,w}$	53.90	1.40	9.58	9.36	122.10	26.46	-10.84	6.58	-0.06
$\mu_{PT,age,w}$	92.71	-0.14	0.07	-9.28	675.68	17.94	0.32	-4.61	0.55
$\mu_{FT,w}$	59.37	-2.51	0.01	-55.81	-1.58	1.68	-2.56	-2.44	0.39
$\mu_{FT,age^2,w}$	62.57	-1.82	-0.82	-28.31	49.58	5.44	-1.21	-1.21	0.04
$\mu_{FT,age,w}$	50.27	5.61	3.82	-7.03	718.44	22.77	-1.49	3.12	0.07
$\mu_{PT,m}$	63.00	-3.27	5.25	-5.94	905.51	25.52	-0.69	7.95	0.47
$\mu_{PT,age,m}$	45.21	-1.56	-0.28	-9.21	242.69	43.99	0.49	6.49	0.41
$\mu_{FT,m}$	52.08	5.29	2.40	-18.81	41.54	28.05	-2.34	3.67	-0.12
$\mu_{FT,age,m}$	39.26	-38.18	-4.18	-7.88	27.72	45.43	-0.15	13.86	-0.04
$\mu_{FT,age^2,m}$	81.96	-8.53	-6.93	-2.51	1.83	9.25	-0.68	14.26	0.16
Utility from market work with children, $q_w(\bullet)$ and $q_m(\bullet)$. Relative to not working.									
$\alpha_{PT,child,w}$	53.90	1.40	9.58	9.36	122.10	26.46	-10.84	6.58	-0.06
$\alpha_{PT,young,w}$	92.71	-0.14	0.07	-9.28	675.68	17.94	0.32	-4.61	0.55
$\alpha_{PT,more,w}$	59.37	-2.51	0.01	-55.81	-1.58	1.68	-2.56	-2.44	0.39
$\alpha_{PT,birth,w}$	62.57	-1.82	-0.82	-28.31	49.58	5.44	-1.21	-1.21	0.04
$\alpha_{FT,child,w}$	50.27	5.61	3.82	-7.03	718.44	22.77	-1.49	3.12	0.07
$\alpha_{FT,young,w}$	63.00	-3.27	5.25	-5.94	905.51	25.52	-0.69	7.95	0.47
$\alpha_{FT,more,w}$	45.21	-1.56	-0.28	-9.21	242.69	43.99	0.49	6.49	0.41
$\alpha_{PT,child,m}$	52.08	5.29	2.40	-18.81	41.54	28.05	-2.34	3.67	-0.12
$\alpha_{PT,young,m}$	39.26	-38.18	-4.18	-7.88	27.72	45.43	-0.15	13.86	-0.04
$\alpha_{PT,more,m}$	81.96	-8.53	-6.93	-2.51	1.83	9.25	-0.68	14.26	0.16
$\alpha_{PT,birth,m}$	120.56	-2.14	1.65	-54.36	4.36	66.22	-0.37	3.13	1.62
$\alpha_{FT,child,m}$	144.08	-11.33	1.80	-5.90	84.31	43.97	-2.79	0.45	-0.34
$\alpha_{FT,young,m}$	303.65	-8.06	-1.46	-22.17	55.43	84.92	0.00	19.25	0.38
$\alpha_{FT,more,m}$	212.37	-6.96	1.99	-5.33	0.38	10.35	-2.46	7.45	1.62
$\alpha_{FT,birth,m}$	136.01	-50.60	-6.84	-3.30	0.20	20.78	-0.23	-2.84	0.19
$\alpha_{PT,work}$	301.36	-3.21	-0.63	-4.80	-1.74	24.22	-2.63	6.04	-0.01
$\alpha_{FT,work}$	252.04	0.28	0.12	-4.68	33.14	96.99	-5.72	30.56	0.52
Wage and human capital process									
$\gamma_{0,w}$	53.90	1.40	9.58	9.36	122.10	26.46	-10.84	6.58	-0.06
$\gamma_{1,w}$	92.71	-0.14	0.07	-9.28	675.68	17.94	0.32	-4.61	0.55
$\gamma_{0,m}$	59.37	-2.51	0.01	-55.81	-1.58	1.68	-2.56	-2.44	0.39
$\gamma_{1,m}$	62.57	-1.82	-0.82	-28.31	49.58	5.44	-1.21	-1.21	0.04
σ_w	50.27	5.61	3.82	-7.03	718.44	22.77	-1.49	3.12	0.07
σ_m	63.00	-3.27	5.25	-5.94	905.51	25.52	-0.69	7.95	0.47
κ_{K_w}	45.21	-1.56	-0.28	-9.21	242.69	43.99	0.49	6.49	0.41
κ_{K_m}	52.08	5.29	2.40	-18.81	41.54	28.05	-2.34	3.67	-0.12
Preferences									
ρ	53.90	1.40	9.58	9.36	122.10	26.46	-10.84	6.58	-0.06
β	92.71	-0.14	0.07	-9.28	675.68	17.94	0.32	-4.61	0.55
Miscellaneous									
σ_e	53.90	1.40	9.58	9.36	122.10	26.46	-10.84	6.58	-0.06
p_u	92.71	-0.14	0.07	-9.28	675.68	17.94	0.32	-4.61	0.55
p_p	59.37	-2.51	0.01	-55.81	-1.58	1.68	-2.56	-2.44	0.39
κ_V	62.57	-1.82	-0.82	-28.31	49.58	5.44	-1.21	-1.21	0.04

Notes: The table reports the percent change in the asymptotic variance of $\hat{\theta}$ from removing groups of estimation moments based on the extension of the informativeness measure $M_{\cdot}$ proposed by Honoré

Table E.2: Informativeness of Estimation Moments, High Skilled.

	Moments (group)								
	labor (1)	wage (2)	var (3)	children (4)	spacing (5)	interaction (6)	substitution (7)	wealth (8)	corr (9)
Utility from children									
ω_1	100.38	-3.74	4.90	10.03	83.00	63.17	-8.71	0.99	-0.46
$\omega_{1,age}$	103.26	-0.83	1.03	3.52	417.85	35.86	-1.11	-0.75	0.07
ω_2	85.88	-4.43	-0.31	-48.27	3.34	11.77	-0.78	2.24	-0.14
ω_3	63.10	-2.34	-6.93	-38.95	57.86	17.12	-1.71	-0.67	0.18
η_0	60.04	-1.08	1.33	4.12	388.45	41.65	-2.41	0.66	-0.22
η_1	86.54	-1.42	1.39	2.05	348.36	56.29	-3.17	0.13	0.68
η_2	54.89	-4.41	-1.58	-4.09	168.55	69.63	-1.37	-0.10	0.74
Utility from market work, $g_w(\bullet)$ and $g_m(\bullet)$. Relative to not working.									
$\mu_{PT,w}$	100.38	-3.74	4.90	10.03	83.00	63.17	-8.71	0.99	-0.46
$\mu_{PT,age,w}$	103.26	-0.83	1.03	3.52	417.85	35.86	-1.11	-0.75	0.07
$\mu_{FT,w}$	85.88	-4.43	-0.31	-48.27	3.34	11.77	-0.78	2.24	-0.14
$\mu_{FT,age^2,w}$	63.10	-2.34	-6.93	-38.95	57.86	17.12	-1.71	-0.67	0.18
$\mu_{FT,age,w}$	60.04	-1.08	1.33	4.12	388.45	41.65	-2.41	0.66	-0.22
$\mu_{PT,m}$	86.54	-1.42	1.39	2.05	348.36	56.29	-3.17	0.13	0.68
$\mu_{PT,age,m}$	54.89	-4.41	-1.58	-4.09	168.55	69.63	-1.37	-0.10	0.74
$\mu_{FT,m}$	70.85	3.24	-0.14	-9.05	33.55	57.75	-0.45	-0.07	-0.27
$\mu_{FT,age,m}$	79.21	-29.30	-2.55	-0.66	17.87	77.02	-0.43	6.60	-1.34
$\mu_{FT,age^2,m}$	159.40	-7.47	-3.44	0.94	13.10	59.06	0.35	-1.20	-0.61
Utility from market work with children, $q_w(\bullet)$ and $q_m(\bullet)$. Relative to not working.									
$\alpha_{PT,child,w}$	100.38	-3.74	4.90	10.03	83.00	63.17	-8.71	0.99	-0.46
$\alpha_{PT,young,w}$	103.26	-0.83	1.03	3.52	417.85	35.86	-1.11	-0.75	0.07
$\alpha_{PT,more,w}$	85.88	-4.43	-0.31	-48.27	3.34	11.77	-0.78	2.24	-0.14
$\alpha_{PT,birth,w}$	63.10	-2.34	-6.93	-38.95	57.86	17.12	-1.71	-0.67	0.18
$\alpha_{FT,child,w}$	60.04	-1.08	1.33	4.12	388.45	41.65	-2.41	0.66	-0.22
$\alpha_{FT,young,w}$	86.54	-1.42	1.39	2.05	348.36	56.29	-3.17	0.13	0.68
$\alpha_{FT,more,w}$	54.89	-4.41	-1.58	-4.09	168.55	69.63	-1.37	-0.10	0.74
$\alpha_{PT,child,m}$	70.85	3.24	-0.14	-9.05	33.55	57.75	-0.45	-0.07	-0.27
$\alpha_{PT,young,m}$	79.21	-29.30	-2.55	-0.66	17.87	77.02	-0.43	6.60	-1.34
$\alpha_{PT,more,m}$	159.40	-7.47	-3.44	0.94	13.10	59.06	0.35	-1.20	-0.61
$\alpha_{PT,birth,m}$	248.57	-3.87	0.56	-58.06	4.99	115.53	0.67	-1.27	0.12
$\alpha_{FT,child,m}$	125.79	-6.39	-2.34	4.18	71.53	78.23	-0.94	0.17	-0.18
$\alpha_{FT,young,m}$	480.49	-16.59	-0.41	-9.75	21.99	123.27	-1.49	-2.99	-0.39
$\alpha_{FT,more,m}$	350.49	-2.52	-0.99	-5.34	0.02	60.52	-5.25	-1.35	-0.12
$\alpha_{FT,birth,m}$	166.52	-58.74	-2.26	2.55	6.58	23.96	-0.48	-6.75	-0.26
$\alpha_{PT,work}$	365.82	-11.53	1.02	-2.01	2.66	68.84	1.36	1.24	0.66
$\alpha_{FT,work}$	239.89	-2.41	3.02	-9.58	38.27	90.96	-7.24	0.42	0.70
Wage and human capital process									
$\gamma_{0,w}$	100.38	-3.74	4.90	10.03	83.00	63.17	-8.71	0.99	-0.46
$\gamma_{1,w}$	103.26	-0.83	1.03	3.52	417.85	35.86	-1.11	-0.75	0.07
$\gamma_{0,m}$	85.88	-4.43	-0.31	-48.27	3.34	11.77	-0.78	2.24	-0.14
$\gamma_{1,m}$	63.10	-2.34	-6.93	-38.95	57.86	17.12	-1.71	-0.67	0.18
σ_w	60.04	-1.08	1.33	4.12	388.45	41.65	-2.41	0.66	-0.22
σ_m	86.54	-1.42	1.39	2.05	348.36	56.29	-3.17	0.13	0.68
κ_{K_w}	54.89	-4.41	-1.58	-4.09	168.55	69.63	-1.37	-0.10	0.74
κ_{K_m}	70.85	3.24	-0.14	-9.05	33.55	57.75	-0.45	-0.07	-0.27
Preferences									
ρ	100.38	-3.74	4.90	10.03	83.00	63.17	-8.71	0.99	-0.46
β	103.26	-0.83	1.03	3.52	417.85	35.86	-1.11	-0.75	0.07
Miscellaneous									
σ_e	100.38	-3.74	4.90	10.03	83.00	63.17	-8.71	0.99	-0.46
p_u	103.26	-0.83	1.03	3.52	417.85	35.86	-1.11	-0.75	0.07
p_p	85.88	-4.43	-0.31	-48.27	3.34	11.77	-0.78	2.24	-0.14
κ_V	63.10	-2.34	-6.93	-38.95	57.86	17.12	-1.71	-0.67	0.18

Notes: The table reports the percent change in the asymptotic variance of $\hat{\theta}$ from removing groups of estimation moments based on the extension of the informativeness measure M_1 proposed by Honoré

Table E.3: Parameter Estimates.

Parameter		Less skilled estimate	Less skilled se	High skilled estimate	High skilled se
Utility from children					
ω_1	Value of having at least one child	8.691	(0.012)	-4.794	(0.006)
$\omega_{1,age}$	Value of having at least one child, age.	0.343	(0.001)	1.018	(0.001)
ω_2	Value of having at least two children	12.478	(0.009)	14.684	(0.008)
ω_3	Value of having at least three children	6.054	(0.028)	4.708	(0.032)
η_0	Value of fertility effort when 1st child aged 0	-0.292	(0.006)	-0.363	(0.002)
η_1	Value of fertility effort when 1st child aged 1	-0.034	(0.001)	0.001	(0.001)
η_2	Value of fertility effort when 1st child aged 2	0.025	(0.000)	0.100	(0.001)
Utility from market work, $g_w(\bullet)$ and $g_m(\bullet)$. Relative to not working.					
$\mu_{PT,w}$	Value of working, women	-0.229	(0.001)	-0.447	(0.001)
$\mu_{PT,age,w}$	Value of working wrt. age, women	-1.885	(0.004)	-1.840	(0.004)
$\mu_{FT,w}$	Additional value of full time work, women	-0.320	(0.000)	-0.376	(0.000)
$\mu_{FT,age^2,w}$	Additional value of full time work wrt. age squared, women	-0.680	(0.002)	-0.891	(0.001)
$\mu_{FT,age,w}$	Additional value of full time work wrt. age, women	-0.038	(0.003)	-1.129	(0.004)
$\mu_{PT,m}$	Value of working, men	-0.390	(0.001)	-0.557	(0.001)
$\mu_{PT,age,m}$	Value of working wrt. age, men	-1.399	(0.003)	-2.035	(0.003)
$\mu_{FT,m}$	Additional value of full time work, men	-0.373	(0.000)	-0.429	(0.000)
$\mu_{FT,age,m}$	Additional value of full time work wrt. age squared, men	-0.693	(0.002)	-0.405	(0.001)
$\mu_{FT,age^2,m}$	Additional value of full time work wrt. age, men	-3.339	(0.012)	-3.404	(0.007)
Utility from market work with children, $q_w(\bullet)$ and $q_m(\bullet)$. Relative to not working.					
$\alpha_{PT,child,w}$	Value of working with children, women	14.739	(0.032)	-0.847	(0.014)
$\alpha_{PT,young,w}$	Value of working with young children, women	3.615	(0.038)	0.179	(0.014)
$\alpha_{PT,more,w}$	Value of working with more children, women	-1.352	(0.025)	7.301	(0.012)
$\alpha_{PT,birth,w}$	Value of working at birth, women	45.830	(0.150)	18.396	(0.056)
$\alpha_{FT,child,w}$	Additional value of full time work with children, women	-0.373	(0.011)	3.409	(0.012)
$\alpha_{FT,young,w}$	Additional value of full time work with young children, women	0.667	(0.016)	0.884	(0.009)
$\alpha_{FT,more,w}$	Additional value of full time work with more children, women	-0.065	(0.014)	0.038	(0.005)
$\alpha_{PT,child,m}$	Value of working with children, men	3.892	(0.013)	2.771	(0.011)
$\alpha_{PT,young,m}$	Value of working with young children, men	0.200	(0.065)	-0.020	(0.014)
$\alpha_{PT,more,m}$	Value of working with more children, men	0.068	(0.010)	0.035	(0.009)
$\alpha_{PT,birth,m}$	Value of working at birth, men	-0.418	(0.070)	-0.030	(0.034)
$\alpha_{FT,child,m}$	Additional value of full time work with children, men	4.165	(0.010)	5.724	(0.016)
$\alpha_{FT,young,m}$	Additional value of full time work with young children, men	-1.693	(0.016)	0.294	(0.009)
$\alpha_{FT,more,m}$	Additional value of full time work with more children, men	3.768	(0.016)	0.257	(0.006)
$\alpha_{FT,birth,m}$	Additional value of full time work at birth, men	-1.322	(0.039)	-0.341	(0.013)
$\alpha_{PT,work}$	Value of working with children. Partner working.	0.413	(0.006)	-0.471	(0.004)
$\alpha_{FT,work}$	Value of working full time with children. Partner working.	0.751	(0.007)	-0.069	(0.005)
Wage and human capital process					
$\gamma_{0,w}$	Wage: constant, women	0.562	(0.001)	0.862	(0.001)
$\gamma_{1,w}$	Wage: human capital, women	0.091	(0.000)	0.082	(0.000)
$\gamma_{0,m}$	Wage: constant, men	0.653	(0.001)	0.725	(0.001)
$\gamma_{1,m}$	Wage: human capital, men	0.100	(0.000)	0.110	(0.000)
σ_w	Human capital: shock variance (std), women	0.140	(0.000)	0.192	(0.000)
σ_m	Human capital: shock variance (std), men	0.171	(0.000)	0.180	(0.000)
κ_{K_w}	Human capital: initial factor, women	0.292	(0.003)	0.494	(0.003)
κ_{K_m}	Human capital: initial factor, men	0.073	(0.002)	0.111	(0.002)
Preferences					
ρ	CRRA coefficient	1.149	(0.000)	1.028	(0.000)
β	Discount factor	0.961	(0.000)	0.972	(0.000)
Miscellaneous					
σ_e	Taste shocks: fertility	0.078	(0.001)	0.127	(0.001)
p_u	Probability of unemplyment	0.050	(0.000)	0.045	(0.000)
p_p	Probability of at most part-time	0.090	(0.001)	0.012	(0.001)
κ_V	Retirement: value function adjustement	0.693	(0.001)	0.503	(0.001)

Notes: The table reports the Simulated Minimum Distance estimates of $\boldsymbol{\theta}$ using the "estimation sample". The moments matched are discussed in Section 5.2.1 and Section E in the Supplemental Material. Asymptotic standard errors are reported in brackets.

Table E.4: 2SLS Estimates: Log-Hours, Unconditional.

	Women			Men		
	all	less skilled	high skilled	all	less skilled	high skilled
	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta_4 \log(1 - \tau_{i,t})$, women	0.288***	0.385***	0.191***	0.053***	0.085***	0.016
	(0.020)	(0.040)	(0.023)	(0.013)	(0.026)	(0.016)
$\Delta_4 \log(1 - \tau_{i,t})$, men	0.012	-0.009	0.014	0.138***	0.162***	0.108***
	(0.021)	(0.031)	(0.028)	(0.013)	(0.019)	(0.017)
Income dummies	Yes	Yes	Yes	Yes	Yes	Yes
Children dummies	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Age dummies	Yes	Yes	Yes	Yes	Yes	Yes
Hum. cap. controls	Yes	Yes	Yes	Yes	Yes	Yes
Male partner controls	Yes	Yes	Yes	Yes	Yes	Yes
Avg. dep. var. (y, level)	7.157	7.176	7.142	7.362	7.36	7.363
Obs.	1289151	579260	709891	1253424	569934	683490
First stage F-stat.	19707.6	5093.8	15331	17800.7	4741.3	14056.6

Notes: This table shows estimated parameters η_w and η_m from equation (1) but not conditioning on the income effects, using 2SLS. As instruments for the change in the net of marginal tax rates we use the mechanical net of marginal tax rate changes, fixing information as in the base-year. All regressions include DKK10,000 bin income dummies for both women and men, age dummies for both men and women, year dummies, number of children dummies, a quadratic polynomial in labor market experience of women and an indicator equal to one if she has at least a bachelor's degree. Finally, we include similar variables for men. The data used for estimation is the "tax sample" discussed in connection to Table 1. Robust standard errors in brackets are clustered at the individual level. $*p < 0.10$, $**p < 0.05$, $***p < 0.01$.

Table E.5: Validation: Hours Responses to Wage Changes.

	Less skilled		High skilled	
	data	model	data	model
Women	0.385	1.904	0.191	0.380
	[0.307, 0.463]		[0.146, 0.236]	
Men	0.162	0.407	0.108	0.036
	[0.125, 0.199]		[0.075, 0.141]	

Notes: The Table reports the empirical hours elasticities, reported in Table E.4 together with model-simulated elasticities.

Table E.6: Unanticipated Permanent Wage Changes, Less Skilled.

Age	Participation		Hours		Wage at 55		Child	Comp.
	Women	Men	Women	Men	Women	Men	birth	fertility
A. Change in the wages of women								
25	2.23	-0.34	2.35	-0.45	1.47	-0.20	-1.35	-0.33
30	2.00	-0.14	2.04	-0.19	1.36	-0.09	-0.61	-0.13
35	2.07	-0.11	2.07	-0.14	1.32	-0.07	-0.09	-0.05
40	1.88	-0.08	1.85	-0.09	1.15	-0.04	-0.05	-0.01
45	1.30	-0.02	1.29	-0.03	0.84	-0.01	–	–
50	0.22	-0.01	0.31	-0.01	0.53	-0.00	–	–
avg.	1.28	-0.07	1.33	-0.09	0.96	-0.04	-0.35	-0.05
B. Change in the wages of men								
25	-0.58	0.55	-0.73	0.56	-0.31	0.64	0.46	0.08
30	-0.33	0.41	-0.43	0.40	-0.19	0.57	0.16	0.03
35	-0.30	0.36	-0.38	0.34	-0.16	0.54	0.03	0.01
40	-0.22	0.28	-0.29	0.27	-0.11	0.49	0.01	0.00
45	-0.03	0.20	-0.10	0.20	-0.03	0.44	–	–
50	-0.01	0.09	-0.07	0.09	-0.01	0.39	–	–
avg.	-0.17	0.25	-0.24	0.25	-0.10	0.48	0.09	0.01

Notes: The Table reports elasticities of labor market participation, hours, full-time wage offer at age 55, the percentage point change in the likelihood of childbirth, and the elasticity of completed fertility w.r.t. an unanticipated permanent wage change of either women or men. Participation and hours elasticities are "long run" in that they measure the change in the remaining working life. Responses are calculated based on an unanticipated permanent 5% increase at different points in the life cycle. The average (avg.) is calculated across all ages. Panel A shows effects w.r.t. women's wages and Panel B shows effects w.r.t. men's wages.

Table E.7: Unanticipated Permanent Wage Changes, High Skilled.

	Participation		Hours		Wage at 55		Child	Comp.
Age	Women	Men	Women	Men	Women	Men	birth	fertility
A. Change in the wages of women								
25	0.62	-0.11	0.68	-0.25	0.75	-0.13	-0.88	-0.22
30	0.45	-0.03	0.49	-0.13	0.68	-0.08	-0.52	-0.11
35	0.36	-0.01	0.38	-0.08	0.63	-0.05	-0.14	-0.05
40	0.30	-0.01	0.31	-0.06	0.59	-0.03	-0.05	-0.01
45	0.26	-0.01	0.28	-0.04	0.55	-0.02	–	–
50	0.22	-0.01	0.25	-0.03	0.51	-0.01	–	–
avg.	0.31	-0.02	0.35	-0.07	0.58	-0.04	-0.30	-0.04
B. Change in the wages of men								
25	-0.23	0.17	-0.36	0.22	-0.15	0.43	-0.07	0.03
30	-0.11	0.07	-0.20	0.10	-0.09	0.38	0.03	0.01
35	-0.07	0.05	-0.14	0.07	-0.07	0.36	0.01	0.01
40	-0.04	0.05	-0.10	0.07	-0.05	0.35	0.01	0.00
45	-0.03	0.05	-0.07	0.07	-0.03	0.34	–	–
50	-0.01	0.06	-0.05	0.08	-0.01	0.34	–	–
avg.	-0.05	0.07	-0.11	0.10	-0.05	0.35	-0.00	0.00

Notes: See notes to Table E.6.

Table E.12: Unanticipated Permanent Wage Changes. Exogenous Fertility, Less Skilled.

	Women's response						Men's response					
	Participation		Hours		Wage at 55		Participation		Hours		Wage at 55	
Age	End.	Exo.	End.	Exo.	End.	Exo.	End.	Exo.	End.	Exo.	End.	Exo.
	A. Change in the wages of women											
25	2.23	1.91	2.35	2.01	1.47	1.32	-0.34	-0.28	-0.45	-0.39	-0.20	-0.17
35	2.07	1.80	2.07	1.81	1.32	1.22	-0.11	-0.12	-0.14	-0.14	-0.07	-0.07
45	1.30	1.14	1.29	1.14	0.84	0.79	-0.02	-0.02	-0.03	-0.03	-0.01	-0.01
avg.	1.28	1.13	1.33	1.19	0.96	0.90	-0.07	-0.07	-0.09	-0.09	-0.04	-0.04
	B. Change in the wages of men											
25	-0.58	-0.51	-0.73	-0.66	-0.31	-0.28	0.55	0.54	0.56	0.55	0.64	0.63
35	-0.30	-0.29	-0.38	-0.37	-0.16	-0.16	0.36	0.36	0.34	0.34	0.54	0.54
45	-0.03	-0.03	-0.10	-0.10	-0.03	-0.03	0.20	0.20	0.20	0.20	0.44	0.44
avg.	-0.17	-0.16	-0.24	-0.24	-0.10	-0.10	0.25	0.25	0.25	0.25	0.48	0.48

Notes: The Table illustrates elasticities of labor market participation, hours, wage offer at age 55, likelihood of childbirth, and completed fertility w.r.t. an unanticipated permanent wage change of either women or men. Elasticities are calculated based on an unanticipated permanent 5% increase at different points in life. Participation and hours elasticities are "long run" in the sense that they measure the change in the remaining working life. The average (avg.) is calculated across all ages from 25 through 60. Columns denoted with "End." shows elasticities simulated from the baseline model with endogenous fertility. Columns denoted with "Exo." shows elasticities simulated from an alternative model in which fertility is exogenous and random, with ex-ante fertility expectations consistent with realized fertility simulated from the baseline model.

Table E.13: Unanticipated Permanent Wage Changes. Exogenous Fertility, High Skilled.

	Women's response						Men's response					
	Participation		Hours		Wage at 55		Participation		Hours		Wage at 55	
Age	End.	Exo.	End.	Exo.	End.	Exo.	End.	Exo.	End.	Exo.	End.	Exo.
	A. Change in the wages of women											
25	0.62	0.55	0.68	0.61	0.75	0.72	-0.11	-0.11	-0.25	-0.24	-0.13	-0.13
35	0.36	0.33	0.38	0.35	0.63	0.62	-0.01	-0.01	-0.08	-0.08	-0.05	-0.05
45	0.26	0.24	0.28	0.26	0.55	0.54	-0.01	-0.01	-0.04	-0.04	-0.02	-0.02
avg.	0.31	0.29	0.35	0.33	0.58	0.57	-0.02	-0.02	-0.07	-0.07	-0.04	-0.04
	B. Change in the wages of men											
25	-0.23	-0.19	-0.36	-0.32	-0.15	-0.14	0.17	0.16	0.22	0.21	0.43	0.43
35	-0.07	-0.06	-0.14	-0.13	-0.07	-0.07	0.05	0.05	0.07	0.07	0.36	0.36
45	-0.03	-0.02	-0.07	-0.07	-0.03	-0.02	0.05	0.05	0.07	0.07	0.34	0.35
avg.	-0.05	-0.05	-0.11	-0.11	-0.05	-0.04	0.07	0.07	0.10	0.10	0.35	0.35

Notes: See table notes to Table E.12.

Table E.14: Sensitivity to Calibrated Parameters, Less Skilled.

	Calibrated parameter								
	λ	$\underline{\wp}$	p_x	κ_A	κ_n	R	l_{PT}	δ	δ_0
Utility from children									
ω_1	-6.33	2.11	0.89	0.44	-0.29	-7.00	-2.61	11.00	2.57
$\omega_{1,age}$	2.41	-1.84	-1.24	-0.65	1.49	-12.19	7.39	11.84	-10.46
ω_2	32.30	-31.55	-10.73	1.14	1.19	-33.67	-27.53	78.24	24.00
ω_3	-0.89	-0.26	-0.14	0.00	0.02	0.57	-0.10	1.38	0.25
η_0	2.37	-2.56	0.27	0.15	-0.55	-2.48	-1.67	4.26	1.06
η_1	2.36	0.42	-0.09	0.11	-0.20	-1.25	-1.88	2.44	0.87
η_2	2.30	-0.23	-0.35	0.10	-0.36	-0.61	-0.76	-0.48	0.39
Utility from market work, $g_w(\bullet)$ and $g_m(\bullet)$. Relative to not working.									
$\mu_{PT,w}$	-6.33	2.11	0.89	0.44	-0.29	-7.00	-2.61	11.00	2.57
$\mu_{PT,age,w}$	2.41	-1.84	-1.24	-0.65	1.49	-12.19	7.39	11.84	-10.46
$\mu_{FT,w}$	32.30	-31.55	-10.73	1.14	1.19	-33.67	-27.53	78.24	24.00
$\mu_{FT,age^2,w}$	-0.89	-0.26	-0.14	0.00	0.02	0.57	-0.10	1.38	0.25
$\mu_{FT,age,w}$	2.37	-2.56	0.27	0.15	-0.55	-2.48	-1.67	4.26	1.06
$\mu_{PT,m}$	2.36	0.42	-0.09	0.11	-0.20	-1.25	-1.88	2.44	0.87
$\mu_{PT,age,m}$	2.30	-0.23	-0.35	0.10	-0.36	-0.61	-0.76	-0.48	0.39
$\mu_{FT,m}$	0.59	-0.54	-0.19	0.00	-0.06	-0.54	0.28	0.13	-0.31
$\mu_{FT,age,m}$	0.58	0.08	0.05	0.00	-0.01	1.37	-0.95	-0.81	0.04
$\mu_{FT,age^2,m}$	-39.13	1.09	2.89	-0.53	-0.05	25.38	24.05	-45.12	-7.44
Utility from market work with children, $q_w(\bullet)$ and $q_m(\bullet)$. Relative to not working.									
$\alpha_{PT,child,w}$	-6.33	2.11	0.89	0.44	-0.29	-7.00	-2.61	11.00	2.57
$\alpha_{PT,young,w}$	2.41	-1.84	-1.24	-0.65	1.49	-12.19	7.39	11.84	-10.46
$\alpha_{PT,more,w}$	32.30	-31.55	-10.73	1.14	1.19	-33.67	-27.53	78.24	24.00
$\alpha_{PT,birth,w}$	-0.89	-0.26	-0.14	0.00	0.02	0.57	-0.10	1.38	0.25
$\alpha_{FT,child,w}$	2.37	-2.56	0.27	0.15	-0.55	-2.48	-1.67	4.26	1.06
$\alpha_{FT,young,w}$	2.36	0.42	-0.09	0.11	-0.20	-1.25	-1.88	2.44	0.87
$\alpha_{FT,more,w}$	2.30	-0.23	-0.35	0.10	-0.36	-0.61	-0.76	-0.48	0.39
$\alpha_{PT,child,m}$	0.59	-0.54	-0.19	0.00	-0.06	-0.54	0.28	0.13	-0.31
$\alpha_{PT,young,m}$	0.58	0.08	0.05	0.00	-0.01	1.37	-0.95	-0.81	0.04
$\alpha_{PT,more,m}$	-39.13	1.09	2.89	-0.53	-0.05	25.38	24.05	-45.12	-7.44
$\alpha_{PT,birth,m}$	-28.37	4.60	0.25	0.54	-0.64	32.87	16.17	-7.21	-8.09
$\alpha_{FT,child,m}$	21.82	-4.54	1.94	-3.77	7.44	7.29	47.89	-47.63	-38.87
$\alpha_{FT,young,m}$	-7.28	-6.49	-3.20	-0.25	0.04	-39.07	24.20	45.01	-10.53
$\alpha_{FT,more,m}$	465.94	27.26	-9.06	0.39	-7.81	-59.92	-305.33	127.22	247.63
$\alpha_{FT,birth,m}$	1.80	0.00	-0.01	0.03	-0.00	2.07	-1.24	-2.79	-0.16
$\alpha_{PT,work}$	9.37	0.42	-0.13	0.48	-0.33	3.44	4.01	-19.08	-2.79
$\alpha_{FT,work}$	13.87	0.39	-1.45	0.04	-0.37	2.08	-10.60	-19.19	-4.56
Wage and human capital process									
$\gamma_{0,w}$	-6.33	2.11	0.89	0.44	-0.29	-7.00	-2.61	11.00	2.57
$\gamma_{1,w}$	2.41	-1.84	-1.24	-0.65	1.49	-12.19	7.39	11.84	-10.46
$\gamma_{0,m}$	32.30	-31.55	-10.73	1.14	1.19	-33.67	-27.53	78.24	24.00
$\gamma_{1,m}$	-0.89	-0.26	-0.14	0.00	0.02	0.57	-0.10	1.38	0.25
σ_w	2.37	-2.56	0.27	0.15	-0.55	-2.48	-1.67	4.26	1.06
σ_m	2.36	0.42	-0.09	0.11	-0.20	-1.25	-1.88	2.44	0.87
κ_{K_w}	2.30	-0.23	-0.35	0.10	-0.36	-0.61	-0.76	-0.48	0.39
κ_{K_m}	0.59	-0.54	-0.19	0.00	-0.06	-0.54	0.28	0.13	-0.31

Table E.15: Sensitivity to Calibrated Parameters, High Skilled.

	Calibrated parameter								
	λ	$\underline{\wp}$	p_x	κ_A	κ_n	R	l_{PT}	δ	δ_0
Utility from children									
ω_1	-2.73	3.20	2.18	0.18	-0.53	6.18	-1.90	-2.87	1.52
$\omega_{1,age}$	1.78	6.90	2.89	0.17	0.28	6.47	8.71	-0.05	0.72
ω_2	1.45	-29.71	-18.62	-0.11	-0.70	-28.88	4.82	-22.71	15.86
ω_3	0.30	-0.02	0.60	-0.03	0.02	2.64	0.27	0.09	0.24
η_0	-0.04	-0.23	0.19	-0.05	-0.03	0.34	0.03	-1.40	1.34
η_1	-0.18	-0.19	-0.19	-0.12	-0.04	-0.25	-0.23	-0.51	0.19
η_2	0.28	-1.36	-0.45	-0.01	0.01	0.20	0.06	-0.18	0.03
Utility from market work, $g_w(\bullet)$ and $g_m(\bullet)$. Relative to not working.									
$\mu_{PT,w}$	-2.73	3.20	2.18	0.18	-0.53	6.18	-1.90	-2.87	1.52
$\mu_{PT,age,w}$	1.78	6.90	2.89	0.17	0.28	6.47	8.71	-0.05	0.72
$\mu_{FT,w}$	1.45	-29.71	-18.62	-0.11	-0.70	-28.88	4.82	-22.71	15.86
$\mu_{FT,age^2,w}$	0.30	-0.02	0.60	-0.03	0.02	2.64	0.27	0.09	0.24
$\mu_{FT,age,w}$	-0.04	-0.23	0.19	-0.05	-0.03	0.34	0.03	-1.40	1.34
$\mu_{PT,m}$	-0.18	-0.19	-0.19	-0.12	-0.04	-0.25	-0.23	-0.51	0.19
$\mu_{PT,age,m}$	0.28	-1.36	-0.45	-0.01	0.01	0.20	0.06	-0.18	0.03
$\mu_{FT,m}$	-0.02	-0.92	-0.24	-0.02	0.00	0.36	0.06	0.30	-0.14
$\mu_{FT,age,m}$	0.81	0.05	0.04	-0.00	-0.00	1.62	-0.74	0.74	-0.33
$\mu_{FT,age^2,m}$	1.03	-0.18	1.07	0.02	-0.06	-3.23	3.62	6.02	-3.29
Utility from market work with children, $q_w(\bullet)$ and $q_m(\bullet)$. Relative to not working.									
$\alpha_{PT,child,w}$	-2.73	3.20	2.18	0.18	-0.53	6.18	-1.90	-2.87	1.52
$\alpha_{PT,young,w}$	1.78	6.90	2.89	0.17	0.28	6.47	8.71	-0.05	0.72
$\alpha_{PT,more,w}$	1.45	-29.71	-18.62	-0.11	-0.70	-28.88	4.82	-22.71	15.86
$\alpha_{PT,birth,w}$	0.30	-0.02	0.60	-0.03	0.02	2.64	0.27	0.09	0.24
$\alpha_{FT,child,w}$	-0.04	-0.23	0.19	-0.05	-0.03	0.34	0.03	-1.40	1.34
$\alpha_{FT,young,w}$	-0.18	-0.19	-0.19	-0.12	-0.04	-0.25	-0.23	-0.51	0.19
$\alpha_{FT,more,w}$	0.28	-1.36	-0.45	-0.01	0.01	0.20	0.06	-0.18	0.03
$\alpha_{PT,child,m}$	-0.02	-0.92	-0.24	-0.02	0.00	0.36	0.06	0.30	-0.14
$\alpha_{PT,young,m}$	0.81	0.05	0.04	-0.00	-0.00	1.62	-0.74	0.74	-0.33
$\alpha_{PT,more,m}$	1.03	-0.18	1.07	0.02	-0.06	-3.23	3.62	6.02	-3.29
$\alpha_{PT,birth,m}$	1.24	-1.21	0.24	1.32	-0.38	-12.00	10.10	33.10	-20.79
$\alpha_{FT,child,m}$	0.73	-6.57	-0.41	-2.69	2.12	-13.45	-6.58	-13.10	-12.65
$\alpha_{FT,young,m}$	-3.02	-0.04	-0.50	-1.36	0.71	12.94	8.83	-20.59	7.13
$\alpha_{FT,more,m}$	37.44	11.44	3.11	-2.18	-1.68	163.55	-86.90	-86.48	150.51
$\alpha_{FT,birth,m}$	-0.54	0.15	-0.00	-0.03	-0.00	2.42	-2.01	1.02	0.10
$\alpha_{PT,work}$	0.02	-0.31	-0.34	-0.01	0.01	-4.83	1.81	3.05	0.78
$\alpha_{FT,work}$	5.75	-3.50	-1.18	-0.50	2.73	-16.79	2.26	8.98	-8.11
Wage and human capital process									
$\gamma_{0,w}$	-2.73	3.20	2.18	0.18	-0.53	6.18	-1.90	-2.87	1.52
$\gamma_{1,w}$	1.78	6.90	2.89	0.17	0.28	6.47	8.71	-0.05	0.72
$\gamma_{0,m}$	1.45	-29.71	-18.62	-0.11	-0.70	-28.88	4.82	-22.71	15.86
$\gamma_{1,m}$	0.30	-0.02	0.60	-0.03	0.02	2.64	0.27	0.09	0.24
σ_w	-0.04	-0.23	0.19	-0.05	-0.03	0.34	0.03	-1.40	1.34
σ_m	-0.18	-0.19	-0.19	-0.12	-0.04	-0.25	-0.23	-0.51	0.19
κ_{K_w}	0.28	-1.36	-0.45	-0.01	0.01	0.20	0.06	-0.18	0.03
κ_{K_m}	-0.02	-0.92	-0.24	-0.02	0.00	0.36	0.06	0.30	-0.14