

# ONLINE APPENDIX

## Female Relative Wages, Household Specialization and Fertility

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### A Data Appendix

#### A.1 Total Fertility Rate by Mothers' Birthplace

The US total fertility rate exhibits a U-shape with an incline since the late 1970s. Since immigrant women have more children than the native population (in recent years)<sup>1</sup>, the recovery in the aggregate data is to some degree the result of immigration. To remove this effect, I construct a series of total fertility rate for US-born women only. I take data from

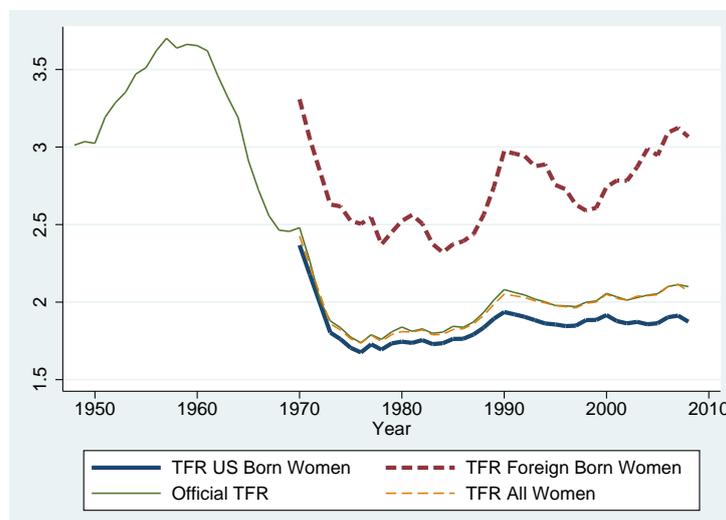


Figure A-1: Total fertility rate: decomposition by mother's birthplace

Source: Author's computation based on Vital Statistics of the United States, combined with population estimates from IPUMS US Census and ACS.

the US Vital Statistics, which since 1970 (but not in 1972) lists live births by the mother's birthplace and in five-year age brackets. To obtain age-specific birthrates by immigration

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<sup>1</sup>Over the last decades there has been a pronounced rise in the fraction of births to immigrant mothers. While in 1970 foreign-born mothers accounted for 7.2 percent of all births, in 2008 they account for 24.4 percent, see Vital Statistics of the United States.

status, I then divide the number of live births by the corresponding number of women in the population, for which I use IPUMS data (Census and American Community Survey), provided by King, Ruggles, Alexander, Flood, Genadek, Schroeder, Trampe, and Vick (2010), with linear interpolation between collection years. Finally I calculate the total fertility rates by adding up the age-specific birthrates and multiplying by 5, as the age brackets are of five years width.<sup>2</sup> Figure A-1 shows the resulting breakdown. Fertility of the native population has shown a very modest incline after the 1970s.

## A.2 Fertility in Europe

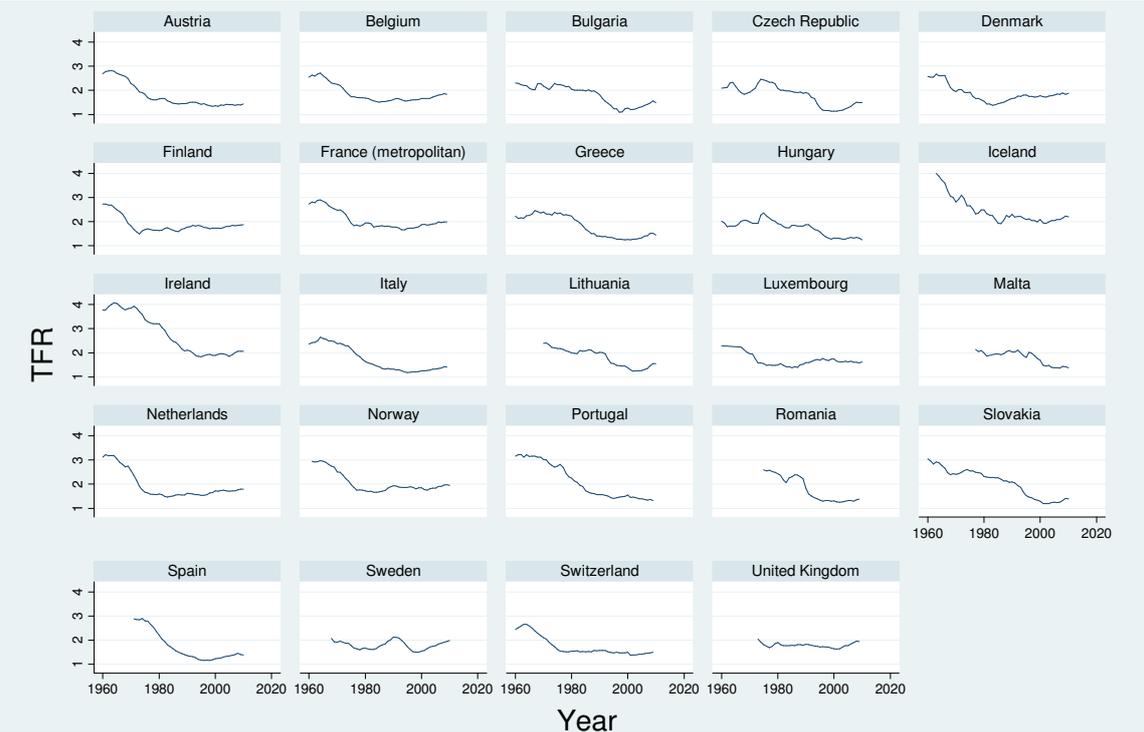


Figure A-2: Total fertility rates in Europe

Source: Eurostat

Fertility trends in most European countries have been very similar to the US; after a decline, fertility rates have stabilized. In figure A-2 I show the total fertility rate for 20 European countries. These are the official numbers as published by Eurostat; however due to lacking data I am unable to measure the fertility of native women only.

<sup>2</sup>As a consistency check, I do the same calculations for all women in the population, i.e. independent of their immigration status, and compare the constructed series to the official total fertility data. The two series align almost perfectly.

### A.3 Time Spent on Home Production

To highlight trends in home production, I use data from Aguiar and Hurst (2007), based on the American Time Use Survey. As the survey questionnaire in 1993 did not ask for the family structure of respondents, such as marital status or number of children, I drop this year from the analysis. Next, I need to define what activities classified in the time use surveys to include as home hours. I start with the definitions of activities Aguiar and Hurst (2007) make:

1. ‘Basic Child Care’ (what Aguiar and Hurst call child care basic). This excludes time spent on teaching (in a broad sense) and playing with a child.
2. ‘Full Child Care’ (what Aguiar and Hurst call child care full) which also includes teaching and playing with children.
3. ‘Home Production’, which is sum of time spent on preparing meals, housework, home and car maintenance, gardening and pet care and other domestic duties.
4. ‘Non-Market Work’ defined as ‘Home Production’ plus time spent on obtaining goods.
5. My own and *preferred* indicator ‘Non-Market Work including Basic Child Care’, which I construct as ‘Non-Market Work’ plus ‘Basic Child Care’.

In all statistics and regressions with the dataset I make use of the adjusted weights that Aguiar and Hurst (2007) provide.

All five measures of home hours show the same trend as in figure 4 over time: a secular decline for women and a rise for men. This robustness across the different measures is confirmed in OLS regressions for data on married respondents in 1965, 1975, 1985 and 2003. The results are shown in table A-1. The coefficients of the year dummies indicate the time-trend for female home hours. The trend in male hours is given by the sum of coefficients of the year dummies and their corresponding interaction with the male dummy. Across the five measures, the only coefficients differing in signs are on the year 1985 and the year 2003 dummy for child care. For all other measures of home hours they are significantly negative, indicating a downward trend in female hours. The coefficient on the dummy for male respondents is significantly negative and quite large (in absolute values). Moreover, all coefficients on the interaction of year dummies and the dummy for males are significantly positive and exceed the overall year effect. This indicates that in 1965 married men worked fewer hours at home than married women, and that over time male hours have been rising and female hours falling.

My preferred measure is ‘Non-Market Work including Basic Child Care’. Although most parents might enjoy child care more than other domestic chores, I do include basic care, as it is a necessary task to be done. The change in home hours over time is similar across households with and without children (living at home), as shown in figure A-3. While these two household types have different levels of home hours, both display the decline in women’s and the rise in men’s hours.

One final comment is in order. Since marital status in the Aguiar and Hurst (2007) data is defined in a legal sense, it is not possible to disentangle cohabiting from other singles. But since it is more likely that men and women who are not married, but have children together, are cohabiting, the current number of children can be employed as a proxy. Since changes in cohabitation affect mainly younger people, I plot in figure A-4

Table A-1: Regressions of different measures of home hours for married men and women

VARIABLES	(1) Basic Child Care	(2) Full Child Care	(3) Home Production	(4) Non-Market Work	(5) Non-Market +Basic Child Care
Dummy Year 1975	-1.691*** (0.353)	-1.629*** (0.405)	-5.533*** (0.888)	-6.386*** (0.985)	-8.077*** (1.065)
Dummy Year 1985	-0.252 (0.334)	0.290 (0.394)	-7.293*** (0.727)	-7.215*** (0.828)	-7.467*** (0.914)
Dummy Year 2003	0.797*** (0.304)	2.302*** (0.355)	-10.68*** (0.644)	-11.40*** (0.729)	-10.60*** (0.801)
Dummy 1975× Male	2.887*** (0.429)	2.580*** (0.492)	8.158*** (1.062)	8.700*** (1.227)	11.59*** (1.324)
Dummy 1985× Male	1.934*** (0.378)	1.671*** (0.455)	14.06*** (0.897)	14.22*** (1.050)	16.15*** (1.140)
Dummy 2003× Male	1.916*** (0.350)	1.456*** (0.417)	16.53*** (0.758)	17.11*** (0.889)	19.02*** (0.973)
Dummy Male	-5.111*** (0.296)	-5.436*** (0.348)	-25.52*** (0.658)	-28.11*** (0.782)	-33.22*** (0.857)
Number of Kids in Hh	2.323*** (0.140)	3.111*** (0.168)	2.306*** (0.302)	2.422*** (0.346)	4.745*** (0.378)
(Number of Kids in Hh) <sup>2</sup>	-0.182*** (0.0319)	-0.274*** (0.0378)	-0.168*** (0.0571)	-0.192*** (0.0649)	-0.374*** (0.0742)
Age	-0.919*** (0.134)	-0.864*** (0.157)	-0.396 (0.341)	-0.463 (0.383)	-1.382*** (0.417)
Age <sup>2</sup>	0.0160*** (0.00270)	0.0141*** (0.00317)	0.0108 (0.00732)	0.0129 (0.00819)	0.0289*** (0.00885)
Age <sup>3</sup>	-8.86e-05*** (1.69e-05)	-7.41e-05*** (2.00e-05)	-6.27e-05 (4.90e-05)	-8.06e-05 (5.47e-05)	-0.000169*** (5.88e-05)
Constant	19.36*** (2.095)	19.62*** (2.418)	29.32*** (4.837)	37.03*** (5.420)	56.39*** (5.975)
Observations	17199	17199	17199	17199	17199
R <sup>2</sup>	0.198	0.209	0.270	0.259	0.295

Robust standard errors in parentheses

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ 

non-market hours worked for men and women aged 20-40. Over time, as relative female wages rise, women spend less time working at home, whereas men devote more time to non-market work. These effects are strongest for married men and women, followed by singles with children. This supports the view that unmarried childless men, who are more likely to be without a female partner, are not affected by female relative wages. For unmarried women, however, the trends in home hours of those with and without children are very similar, and virtually flat.

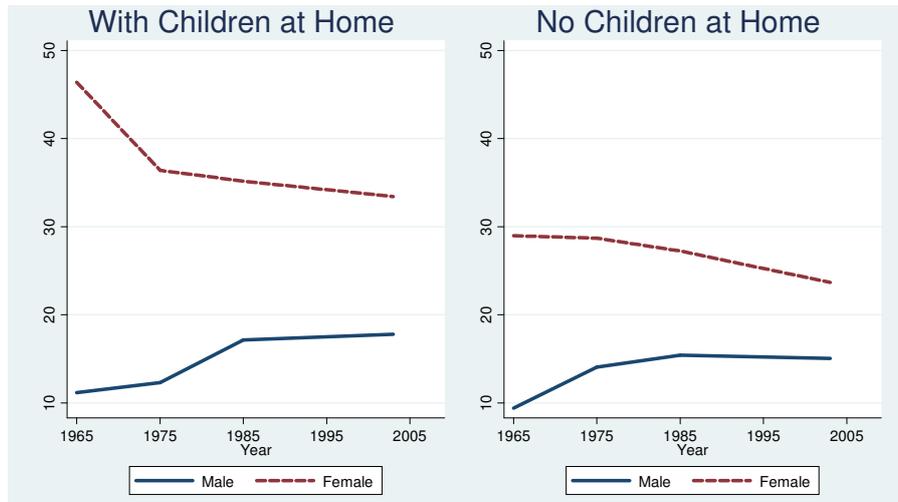


Figure A-3: Home hours for men and women, with and without children  
 Weekly hours spent on nonmarket work and basic child care for men and women aged 20 to 80.  
 Source: Aguiar and Hurst (2007), based on the American Time Use Survey.

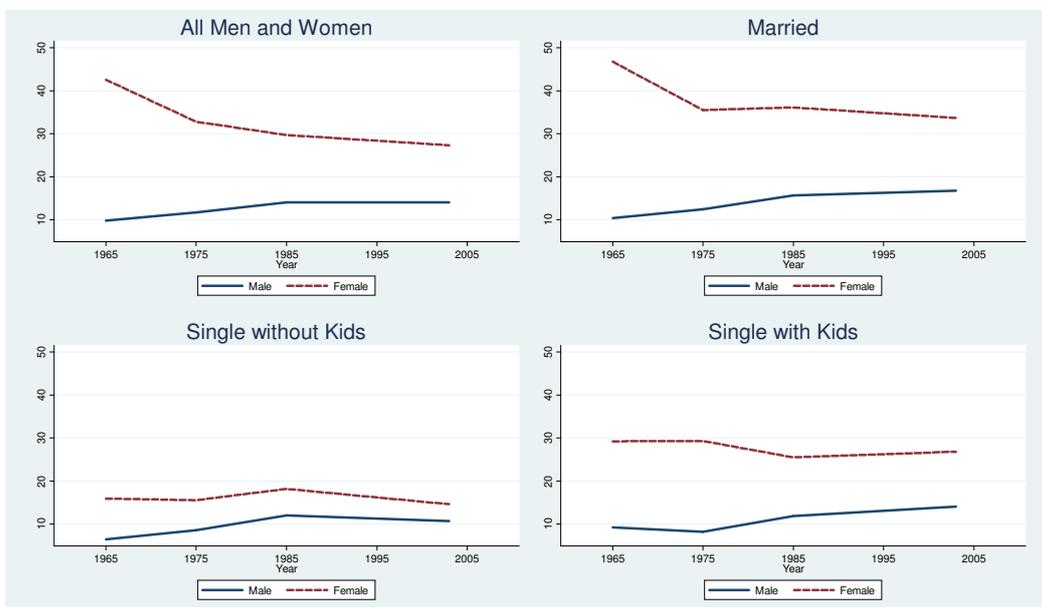


Figure A-4: Home hours of 20 to 40 year old, married, and singles with and without children  
 Weekly hours spent on nonmarket work and basic child care for men and women aged 20 to 40.  
 Source: Aguiar and Hurst (2007), based on the American Time Use Survey.

## A.4 Cross-sectional Time Use

In section 2 of the main text I document in a cross section the pattern that individuals spend less time on home production if they work longer in the labor market or earn more, but spend more hours on home production if their partner works longer or earns more. In tables A-2 and A-3 I show that these patterns also hold when restricting the cross-sectional regression to the subsample of only female or only male (married or cohabiting) ATUS respondents.

Table A-2: Cross-sectional regressions of women's home production

	(1)	(2)	(3)	(4)	(5)	(6)
Nbr. of Kids in Hh	74.35*** (11.01)	78.01*** (12.20)	86.49*** (10.72)	81.43*** (12.44)	78.37*** (11.32)	81.81*** (12.75)
(Nbr. of Kids in Hh) <sup>2</sup>	-10.55*** (3.32)	-11.63*** (3.66)	-13.78*** (3.06)	-11.29*** (3.74)	-11.28*** (3.34)	-11.43*** (3.77)
Own market hours	-3.16*** (0.43)	-3.43*** (0.52)			-3.19*** (0.43)	
Spouse's market hours	1.21** (0.48)	1.16* (0.62)			1.15** (0.48)	
Own wage		-0.12 (0.45)		-0.19 (0.45)		-0.14 (0.45)
Spouse's wage		0.99** (0.39)		0.99** (0.40)		0.87** (0.41)
Own earnings			-0.03*** (0.01)			
Spouse's earnings			0.03*** (0.01)			
Own age					0.12 (1.12)	-0.87 (1.26)
Spouse's age					0.73 (1.09)	0.97 (1.23)
Constant	250.08*** (25.11)	232.60*** (33.90)	160.02*** (11.95)	148.79*** (13.52)	216.71*** (32.87)	147.38*** (27.15)
Race Dummies	No	No	No	No	Yes	Yes
Observations	1349	1064	1219	1064	1349	1064
$R^2$	0.12	0.13	0.10	0.09	0.12	0.10

Standard errors in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Table A-3: Cross-sectional regressions of men's home production

	(1)	(2)	(3)	(4)	(5)	(6)
Nbr. of Kids in Hh	42.38*** (8.96)	41.95*** (10.44)	34.59*** (9.84)	41.06*** (10.46)	45.76*** (9.29)	43.05*** (10.81)
(Nbr. of Kids in Hh) <sup>2</sup>	-6.75*** (2.47)	-5.81* (3.00)	-4.92* (2.84)	-6.13** (3.00)	-6.99*** (2.51)	-6.10** (3.05)
Own market hours	-1.25*** (0.41)	-0.49 (0.54)			-1.32*** (0.41)	
Spouse's market hours	1.07*** (0.42)	1.44*** (0.55)			1.09*** (0.42)	
Own wage		-0.11 (0.37)		-0.12 (0.37)		-0.19 (0.37)
Spouse's wage		0.15 (0.27)		0.04 (0.27)		0.05 (0.27)
Own earnings			-0.01 (0.01)			
Spouse's earnings			0.02** (0.01)			
Own age					0.24 (1.07)	0.77 (1.22)
Spouse's age					0.49 (1.09)	-0.18 (1.23)
Constant	148.30*** (24.17)	101.53*** (34.05)	132.47*** (11.57)	138.58*** (11.88)	119.02*** (32.17)	114.60*** (25.87)
Race Dummies	No	No	No	No	Yes	Yes
Observations	1342	1044	1198	1044	1342	1044
$R^2$	0.03	0.03	0.02	0.03	0.04	0.03

Standard errors in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

## A.5 Market Hours: PSID versus CPS Data

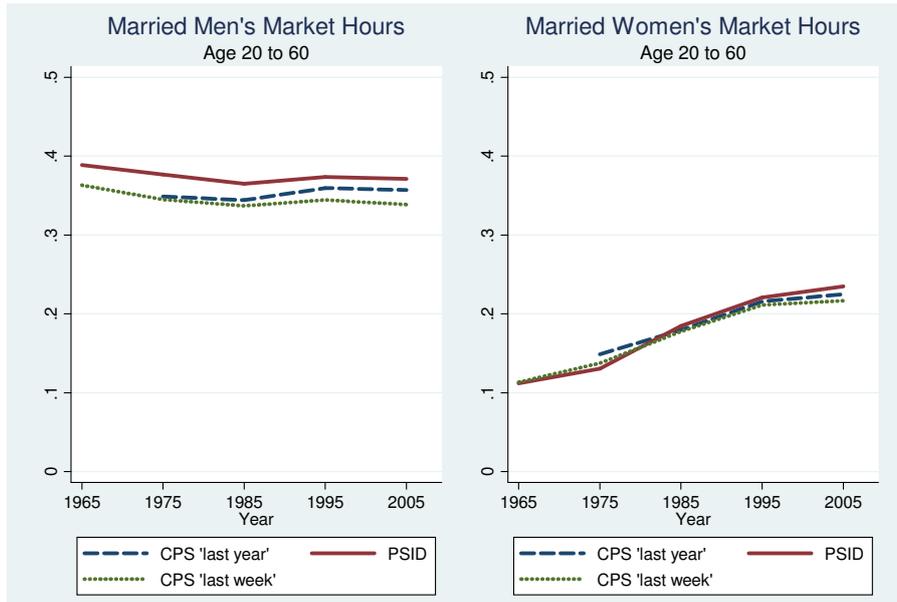


Figure A-5: Hours worked: PSID versus CPS

Market hours of married men and women aged 20 to 60 in the PSID and in the CPS, mapped into a time endowment of one.

The sample size of the PSID is small compared to the Current Population Survey (CPS). However, there are advantages of using the PSID data. Prior to 1975, the CPS did not ask respondents for the exact number of weeks worked last year (but only for a bracketing), and did not ask at all for the usual hours worked per week. Therefore one cannot construct a reliable measure of yearly hours worked before 1975. However in all years since its launch in 1962, the CPS asked for hours worked in the previous week. I can map this too into my model. In particular, under my assumption that  $2/3$  of time is disposable, I divide ‘hours worked last week’ by  $(2/3 \times 24 \times 7)$  to obtain a yearly analogue of male and female labor supply out of a time endowment of one. Then I take averages over nonoverlapping windows of 10 years, which is the length of one period in my calibrated model. In figure A-5 I compare male and female market labor as indicated by the PSID and by the CPS data, which I retrieve from IPUMS, provided by King, Ruggles, Alexander, Flood, Genadek, Schroeder, Trampe, and Vick (2010). The data is very similar. Albeit the CPS suggests a slightly higher level for married men’s labor supply, the two surveys show the same trends over time.

Also hourly wages, calculated as last year’s wage and salary income divided by last year’s hours worked, are not available in the CPS before 1975. Therefore I rely on the PSID to construct hourly wages and the ratio of median female to male wages.

## B Quantitative Results Appendix

### B.1 Alternative Calibration of No Male Home Production

As an alternative calibration for the  $z_m = 0$ -model, presented in section 5.3 of the main text, here I also adjust the parameter capturing the curvature of the demand for children, such that this model variant targets the lowest observed fertility rate in the same way

as imposed on the baseline model. Specifically, I required the baseline model to generate on the transition path the lowest value observed in the data (2.044), which it matches when  $\frac{w_f}{w_m} = 0.7614$ . To make the two models comparable, I now impose that the  $z_m = 0$ -version yields at this point the same fertility. Maintaining that the spouses' home productivities sum to one, I set  $z_m = 0$  and  $z_f = 1$ , and choose  $\phi_b$  and  $\sigma_b$  jointly to replicate fertility in 1965 and  $b = 2.044$  at  $\frac{w_f}{w_m} = 0.7614$ . This implies for the fertility preference parameters  $\phi_b = 0.0221$  and  $\sigma_b = 0.8961$ . Figure A-6 shows the model's transition under this alternative calibration.

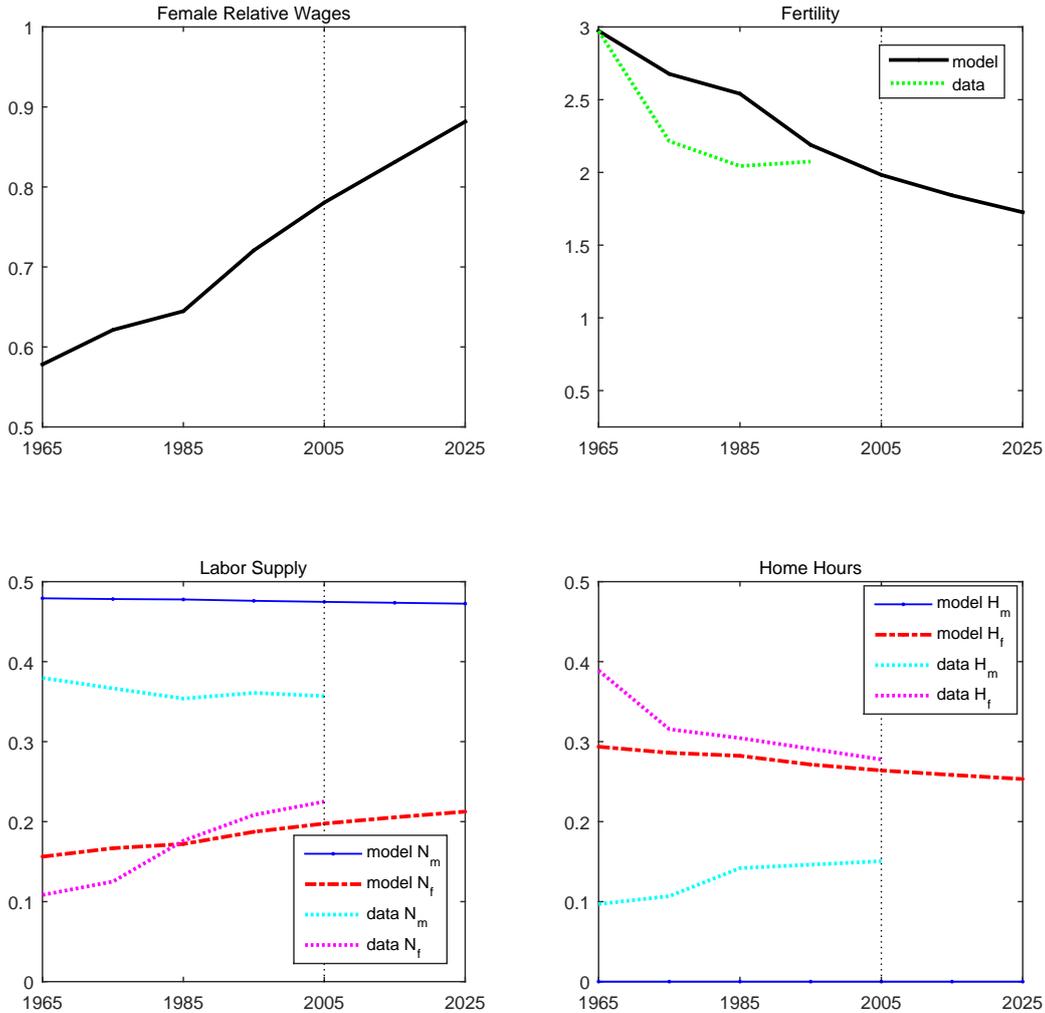


Figure A-6: Transition with  $z_m = 0$ , alternative calibration

For the model without male home production under the alternative calibration this graph plots the transition implied by the narrowing of the gender wage gap (upper-left panel) over time. The dotted vertical line corresponds to the last value of the gender wage gap from the data; to the right of it, the graph shows predictions if the gap continued to close. Home hours and labor supply are shown as fractions of the time endowment of one. The dotted lines show the data.

Confirming the findings of the main text, also under these alternative parameters the model without male home production predicts that fertility falls as long as the gender wage gap shrinks. That parents use more market inputs into home production is not sufficient to generate a flattening out of fertility before the gender wage gap has closed.

## C Life-cycle model

In this section I develop a life-cycle version of the model presented in the main text. Agents enter the economy as young adults at age 20 and can have children in the first period of their lives, before they turn 30. At age 60 agents retire, and they die deterministically at age 80. For tractability I assume, as in the model presented in the main text, that each cohort can be represented by one representative household, formed by a male and a female, which can have a continuous number of children. A model period corresponds to 10 years.

### C.1 Assumptions

Agents discount the future with factor  $\beta$ . Children live with their parents until they turn adults. Then they move out of their mother's and father's household, they find a spouse right away and form a new couple household. I assume that both spouses are of the same age and have the same deterministic life-span, which I denote by  $T_l$ . For computational tractability, I assume that couples can have children only in the first period of their (adult) life. I denote a couple's total number of children by  $b$  and the number of children living in their household by  $b_h$ . I assume that children leave the parental household after  $T_a$  periods. While parents derive utility from having a child as long as they are alive themselves, households do not leave bequests, abstracting from any further intergenerational altruism. Therefore agents, who can freely borrow or lend at interest rate  $r$ , start their economic-active life (at age  $j = 1$ ) with zero assets and leave no assets when they die (at age  $j = T_l$ ). Couples retire at age  $T_r$  and stop working in the market. Market productivity varies over individual's life-cycle; a worker of gender  $g \in \{m, f\}$  and age  $j$  has productivity  $p_g(j)$ . I assume that these profiles are time-invariant for men, whereas for women they evolve because of a time-varying gender pay gap  $\chi_t$  as

$$(A-1) \quad p_{f,t}(j) = \chi_t p_m(j)$$

The home good is nonstorable and is a public good within the household.<sup>3</sup> I assume that couples have perfect foresight over the evolution of the gender wage gap.

### C.2 Couple Household's Optimization

Consider the optimization problem of a couple household of age  $j$  with current wealth  $a$ , total number of children  $b$ , of which  $b_h$  are still living at home. The household's resources from financial assets are  $a(1+r)$ . Households before retirement can earn a labor income of  $w_m(j)n_m + w_f(j)n_f$ , where  $w_f(j) = \chi w_m(j)$  is the female wage. Retired household can finance consumption and purchases of time-saving inputs to home production only through assets they built up.

After having decided at the beginning of their lives on the number of children ( $b$ ), for

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<sup>3</sup>Given that I solve my model at a frequency of 10 years, in the context of my model one can think of the purchased labor-savings inputs ( $e$ ) as home capital or durables that depreciate fully over these 10 years.

age  $j \geq 2$  the value functions of the representative couple household solves<sup>4</sup>

$$(A-2) \quad V_C(a; b, j) = \max_{\substack{a', e, c_m, c_f \\ n_m, n_f, h_m, h_f}} \theta u_m(c_m, n_m, h_m, b) + (1 - \theta) u_f(c_f, n_f, h_f, b) + \beta V_C(a'; b, j + 1)$$

subject to the constraint set:

$$(A-3) \quad a' = \begin{cases} (1 + r)a + w_m(j)n_m + w_f(j)n_f - c_m - c_f - e & \text{for } j < T_r \\ (1 + r)a - c_m - c_f - e & \text{for } j \geq T_r \end{cases}$$

$$(A-4) \quad \bar{x}(b_h) = e^\gamma (z_m h_m^{1-\rho} + z_f h_f^{1-\rho})^{\frac{1-\gamma}{1-\rho}}$$

$$(A-5) \quad b_h(j) = \begin{cases} b & \text{for } 1 \leq j < T_a \\ 0 & \text{for } j > T_a \end{cases}$$

$$(A-6) \quad n_m + h_m \leq 1 \text{ and } n_f + h_f \leq 1$$

$$(A-7) \quad V_C(\cdot; T_l + 1) = 0 \text{ and } a_{T_l+1} \geq 0$$

In the first period of a household's life, the value function is different. Then the couple decides on a continuous number of children ( $b$ ), from which the parents will derive utility throughout their lifetime. At model age  $j = 1$ , when the household starts out and is without any assets ( $a = 0$ ), the value function solves

$$(A-8) \quad V_C(0; b; 1) = \max_{\substack{b, a', e, c_m, c_f \\ n_m, n_f, h_m, h_f}} \theta u_m(c_m, n_m, h_m, b) + (1 - \theta) u_f(c_f, n_f, h_f, b) + \beta V_C(a'; b; 2)$$

subject to the constraints (A-3) to (A-7).

I solve a couple's deterministic finite life-time optimization problem (A-2) conditional on a fertility history backwards, making use of the intratemporal first-order conditions, which are the same as (11) to (15) in the main text. Then I choose the number of children that maximizes the couple's life-time value function in the first period of their lives (A-8).

### C.3 Calibration

Since a model period corresponds to 10 years, I set  $T_l = 6$ ,  $T_r = 5$ ,  $T_a = 2$ . For men's productivity profiles over the life-cycle, I draw on the estimates by Hansen (1993), which I interpolated to construct a profile for men at 25, 35, 45, 55 years of age. This leads to the vector  $p_m = (0.915, 1.255, 1.38, 1.36)$ . I impose  $\beta = \frac{1}{1+r}$ , which will imply constant consumption over the life-cycle.

All other parameters I base on the parameterization of the static model, as given in table 2 of the main text, with the following three exceptions. I adjust  $\kappa_0$  to ensure that the life-cycle model matches the home hours observed in 1965 (simple-averaged over working life, ages 20–60), which requires  $\kappa_0 = 0.1916$ . Then I pick  $\phi_b$  and  $\sigma_b$  to match the targets for fertility, the 1965 level and the lowest observed level on the transition path. This is achieved by setting  $\phi_b = 0.0339$  and  $\sigma_b = 0.6123$ . To note is that the fertility choice of a young couple in 2005 depends on the future path of the gender wage gap they foresee. I assume that the gender wage gap keeps closing at the same rate as it did over 1968-2005.

<sup>4</sup>To economize on notation, I do not index variables by time, but it should be understood that age ( $j$ ) takes on this intertemporal role.

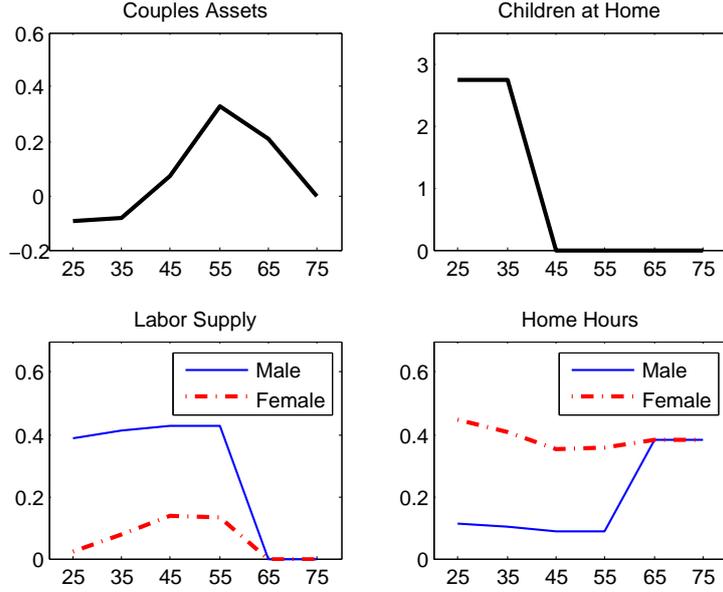


Figure A-7: Life-cycle choices under the 1965 gender wage gap

This graph plots the representative couple household's policy functions when facing the 1965 gender wage gap. The panels show over the life-cycle the optimal choices of assets, male and female market and home hours, and the number of children living at home, against the couple's age. Labor supply and home hours are shown as a fraction of the time endowment of one.

## C.4 Comparing the Life-cycle Policy Functions

Figures A-7 and A-8 show the representative couple household's policy functions over the life-cycle when the gender wage gap is given by the 1965 value and by the 2005 value respectively. To note is that I plot the life-cycle policy functions assuming a constant gender wage gap over the household's life-span, as this isolates the effects coming from life-cycle considerations and from changing relative wages over time. However, in the model transition that I study in the next subsection, and to which I have calibrated the model, I assume that a couple has perfect foresight over the future evolution of the gender wage gap; as a consequence the choices on the actual transition path differ. When the female relative wage is low, the couple has more children than when it is high. To note is that in figures A-7 and A-8 the couple chooses a lower fertility than in the transition (and based on which the parameters are chosen). The reason for this is that on the transition path the household has perfect foresight of income gains due to future improvements in female wages, which boost fertility relative to when expecting a constant gender wage gap.

Since the parameters are chosen such that  $\beta(1+r) = 1$ , and the household can freely borrow and lend, consumption, both male and female (and which are equal as  $\theta = 0.5$ ), is constant over the household's life-cycle. As a consequence, variations in market labor are reflecting differences in wages due to the assumed age-earnings profiles and differences in home production duties. There are two life-cycle considerations to this. On the one hand, when the household is retired, the gender wage gap is irrelevant and relative home hours are optimally decided on the basis of relative home productivities. As under the calibrated parameters, the gap between male and female home productivities is small, there are only small gender differences in home hours during retirement. On the other hand, during working life relative home hours, as derived in (12) and (13), are allocated on

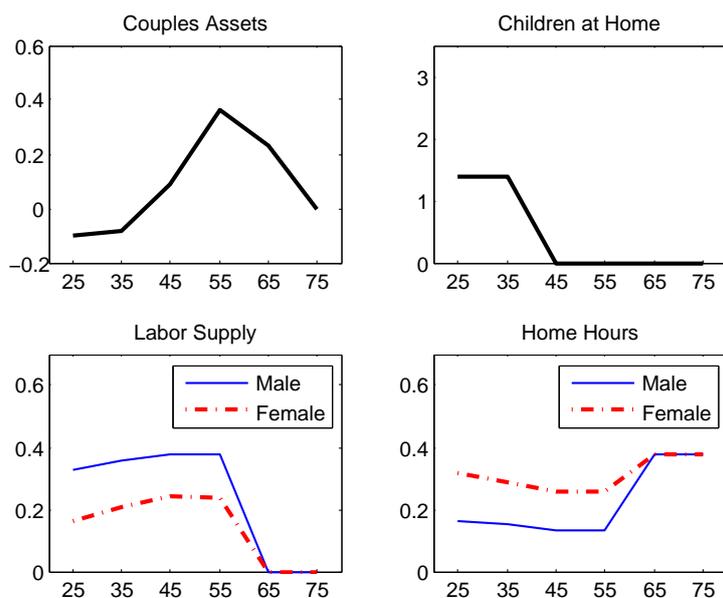


Figure A-8: Life-cycle choices under the 2005 gender wage gap

This graph plots the representative couple household's policy functions when facing the 2005 gender wage gap. The panels show over the life-cycle the optimal choices of assets, male and female market and home hours, and the number of children living at home, against the couple's age. Labor supply and home hours are shown as a fraction of the time endowment of one.

the basis of comparative advantage taking into account market and home productivities of both spouses. The need for home production is the highest when the household has children. A given gender wage gap therefore induces a larger gender difference in time use when the couple is young.

A rather large gender wage gap, such as in figure A-7, implies that optimally a couple specializes, albeit not fully due to the complementarities in home production. Consequently, a wife shoulders most of the housework, and most of a couple's labor income comes from the husband. When the gender wage gap is smaller, the gains from intra-household specialization are smaller. If the gap closed fully, men and women would almost have the same time allocations, but under the calibrated home productivities women would keep a small comparative advantage in home production.<sup>5</sup>

Comparing the life-cycle policy functions across figures A-7 and A-8 shows that most of the increase in female labor supply comes from young women, which is consistent with the empirical findings by Buttet and Schoonbroodt (2013) and Olivetti (2006).

## C.5 The Transition in the Life-Cycle Model

Figure A-9 shows the transition path of the economy since 1965. During the transition, the gender wage gap, shown in the upper-left panel, narrows. The dotted vertical line corresponds to the last value of the gender wage gap from the data; to the right of it, the graph shows predictions if the gap continued to close at the same rate as it did over 1965–2005.

As the gender wage gap closes, women of all working ages supply more hours to the

<sup>5</sup>Advances in technologies over the last century, such as infant formula, have brought male and female productivities closer together. Albanesi and Olivetti (2007) argue that this allowed female labor force participation to rise. In my framework, it also implies a rise in male participation at home.

market and work less at home. As a consequence, average female home and market hours, shown in the figure, display these reallocations. For men, the shift is from market to home. The fertility choice is taken only by the youngest couple. Since the couple has perfect foresight, future improvements in women’s wages are taken into account when deciding on how many children to have. Future income gains (over the entire working life of 40 years) are traded off against the cost of children (which applies only when the children are young). Since children live in the parental household for 20 years, the cost of children depends on the spouses’ wages only in these first 20 years. Due to this asymmetric effect of female wages on lifetime income and on the cost of children, changes in the gender pay gap might have different implications than in the static model of the main text.

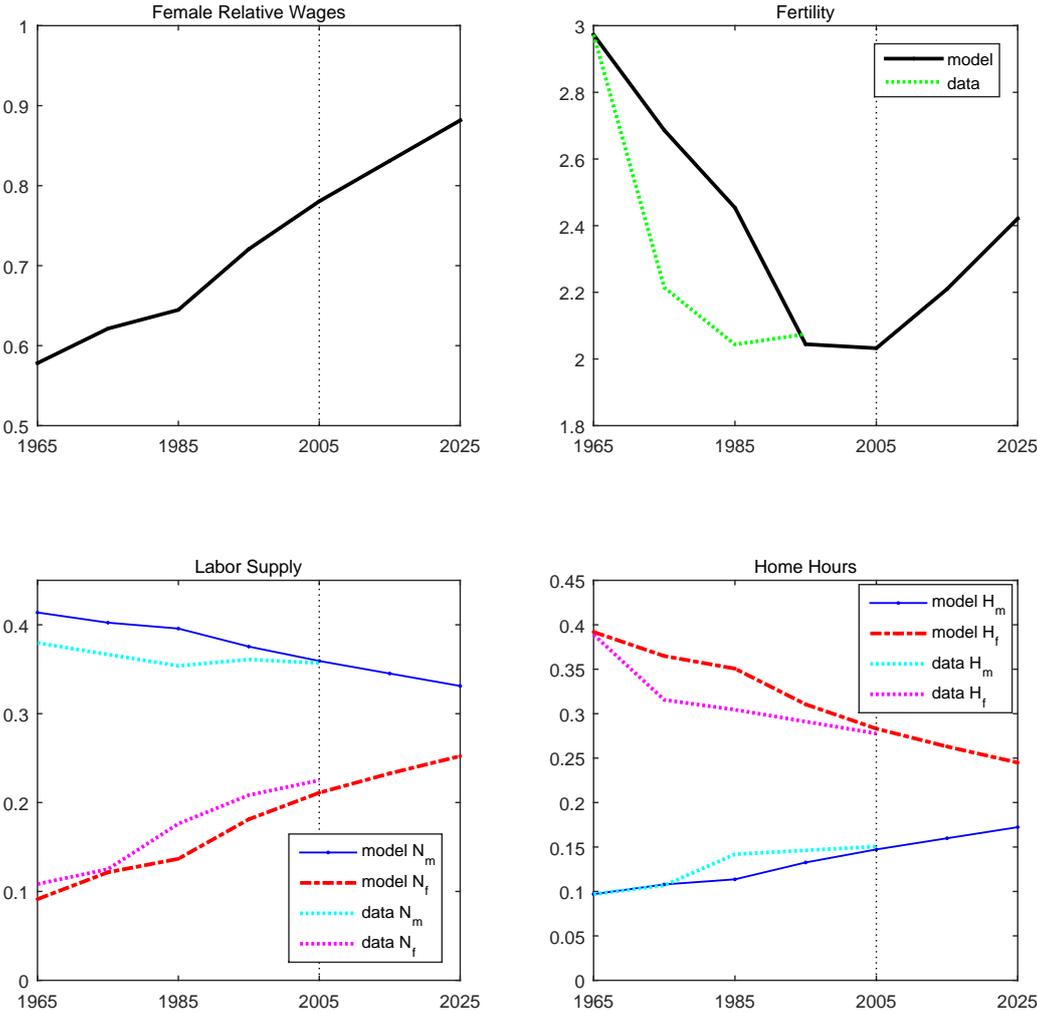


Figure A-9: Transition path of the life-cycle model

This graph shows the benchmark model’s transition over time that is implied by the narrowing of the gender wage gap (upper-left panel). The dotted vertical line corresponds to the last value of the gender wage gap from the data; to the right of it, the graph shows predictions if the gap continued to close. Home hours and labor supply are shown as fractions of the time endowment of one and are the simple average over individuals of different ages. The dotted lines show the data.

However, the predictions of life-cycle model are qualitatively the same as in the static model and also quantitatively close. Both in figure 6 of the main text and in figure A-9, fertility declines fast at first, then slows down and would increase if the pay gap narrowed further. Also the implication for the usage of labor-saving inputs to home production

(which are not plotted) are very similar; between 1965 and 2005 they increase by 12.6 percent in the life-cycle version, compared to 12.8 percent in the static model.

## References

- AGUIAR, M., AND E. HURST (2007): “Measuring Trends in Leisure: The Allocation of Time over Five Decades,” *The Quarterly Journal of Economics*, 122(3), 969–1006.
- ALBANESI, S., AND C. OLIVETTI (2007): “Gender Roles and Technological Progress,” Working Paper 13179, National Bureau of Economic Research.
- BUTTET, S., AND A. SCHOONBROODT (2013): “An Accounting Exercise for the Shift in Life-Cycle Employment Profiles of Married Women Born Between 1940 and 1960,” *Journal for Labour Market Research*, 46(3), 253–271.
- HANSEN, G. D. (1993): “The cyclical and secular behaviour of the labour input: Comparing efficiency units and hours worked,” *Journal of Applied Econometrics*, 8(1), 71–80.
- KING, M., S. RUGGLES, J. T. ALEXANDER, S. FLOOD, K. GENADEK, M. B. SCHROEDER, B. TRAMPE, AND R. VICK (2010): “Integrated Public Use Microdata Series, Current Population Survey,” Discussion paper, University of Minnesota, Minneapolis, Version 3.0.
- OLIVETTI, C. (2006): “Changes in Women’s Hours of Market Work: The Role of Returns to Experience,” *Review of Economic Dynamics*, 9, 557–587.