Staying together forever? Life-cycle effects of overoptimistic couples*

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Abstract

In the United States, about 35 – 40% of all marriages end with a divorce. Yet, average probabilistic expectations of divorce are found to be considerably lower. In this paper, we incorporate overoptimistic expectations about divorce into a household life-cycle model with endogenous accumulation of human capital and assets. We account for ex-ante heterogeneity in both spouses' wages. Couples jointly choose their market hours, home production hours, and joint savings. We quantify the model using data from the US and show that overoptimism about marital stability leads to (1) higher within-couple specialization and (2) lower savings because overoptimistic couples do not anticipate the insurance value of human capital and assets in case of divorce. The higher specialization of overoptimistic couples is driven by reduced market hours of the lower-wage spouse, leading to lower human capital. Overoptimism during marriage propagates beyond divorce through assets and human capital, which is particularly harmful to the less-insured, lower-wage spouse, explaining the high poverty rates of divorced single mothers. Based on paternalistic welfare, the initially higher-wage spouse potentially benefits from overoptimism. Yet, the losses of the lower-wage spouse always outweigh the partner's gains. If all couples acted under rational expectations, the aggregate levels of hours worked, human capital, and assets in the economy would increase substantially. We evaluate two policies to mitigate the effects of overoptimism, an increase in child support and the introduction of a *divorce fund* that insures divorcees.

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1 Introduction

High divorce rates are a widespread phenomenon across many high-income countries. For example, about 43% of the 55 to 64-year-old US population in 2014 got divorced at least once in their lives (Mayol-García, Gurrentz, and Kreider 2021). Yet, there is ample evidence that married individuals are overoptimistic about their marital stability, especially during the early years of marriage, thereby underestimating the risks associated with divorce (e.g., Baker and Emery 1993). For example, Campbell, Wright, and Flores (2012) find an average expectation to experience a divorce of 13%, considerably below the population-wide realized divorce rates. This finding aligns with a long-standing psychology literature that established an unrealistic optimism regarding future life events (e.g., Weinstein 1980).

Married couples decide together who takes care of the children, who works in the market and how many hours, thereby trying to achieve a career, and how much to save together. They base their decisions on expectations about the future, in particular their divorce expectations, because within-couple insurance after divorce is limited. Therefore, assets and individual human capital provide self-insurance against significant income losses after divorce. But overoptimism about marital stability affects intra-household decisions during marriage because couples neglect (or under-predict) the need to prepare for life after divorce. However, decisions taken within the couple have long-lasting effects through savings and human capital and propagate well beyond the time of divorce. So, how do overoptimistic divorce expectations shape intra-household decisions during marriage? What are the implications for life after divorce? How does it affect gender inequality, poverty of single mothers, and aggregate macroeconomic outcomes? And which policies could mitigate the effects of overoptimistic divorce expectations?

This paper is – to the best of our knowledge – the first paper that introduces subjective, overoptimistic expectations about divorce into a dynamic structural household model with endogenous assets and human capital accumulation via learning-by-doing. It allows us to shed light on the immediate and long-run implications of couples' overoptimism. We thereby combine the rapidly developing areas of research on subjective expectations (Bachmann, Topa, and van der Klaauw 2023) and on (macro-)family economics, which focuses on couples or families as the unit of observation (e.g., Doepke and Tertilt 2016; Chiappori and Mazzocco 2017; Greenwood, Guner, and Vandenbroucke 2017). We build on the empirical evidence on divorce expectations – reviewed in Section 2 – which shows that (at least some) individuals are overoptimistic about their marital stability.

To tackle the postulated questions, we set up a structural household life-cycle model in which spouses jointly choose their individual consumption, joint savings, and each spouse's time allocation between market work, home production, and leisure hours. We focus on initially married couples with two children born in two predetermined consecutive periods. Their home production hours yield a home-produced good, which they consume and value more with (young) children. We assume that divorce occurs with an exogenous probability depending on marriage duration. Couples have either rational or overoptimistic expectations about the exogenous divorce likelihood. In addition to the heterogeneity in couples' divorce expectations, our model incorporates heterogeneity in joint savings and spouses' human capital, which maps into their wages. We capture ex-ante heterogeneity in human capital within and across couples. Human capital is accumulated through learning-by-doing: higher market hours increase the expected future level of human capital, thereby capturing career effects. We allow for a more pronounced impact of market hours on human capital at a younger age, which helps to match the wage profile over the life cycle. But the years of rapid wage growth coincide with when couples have children. Therefore, couples have to trade off how many hours both spouses work in the market and how many hours they work at home. After divorce, assets are split equally, children stay with their mother, and ex-spouses produce their home-produced goods separately. Maintenance payments, reflecting child support, are paid by the male divorcee to his female ex-spouse.

We quantify the model using two survey data sets from the United States, the Panel Study of Income Dynamics (PSID) covering 1999 to 2019 and the American Time Use Survey combined with the Current Population Survey (ATUS-CPS) for 2003 to 2019. We target life-cycle profiles of market and home production hours by marital status and gender, and wage profiles of men and women. We use evidence on divorce expectations from Campbell, Wright, and Flores (2012) to quantify the share of overoptimistic couples. The model fits the targeted data moments reasonably well. We further show that our model replicates non-targeted reduced-form evidence of Campbell, Wright, and Flores (2012), who find that women who participate in the labor market have, on average, a 7.7 percentage point higher divorce expectation. In comparison, our model predicts a difference of 5.2 percentage points. From the perspective of our model, married rational women are more likely to participate in the labor market than overoptimistic ones.

Using the quantitative model, we evaluate the behavioral differences of couples with overoptimistic divorce expectations compared to those with rational expectations. Overoptimism leads to (i) higher within-couple specialization and (ii) lower savings because

by neglecting their divorce risk, overoptimistic couples do not anticipate the insurance value of human capital and assets after divorce. A couple with rational divorce expectations trades off the common desire for specialization within marriage according to both spouses' market and home production productivities with the need of the lower-wage spouse to prepare for life after divorce by accumulating human capital.[1] In addition, it balances current consumption – especially of the home-produced good – and leisure with the insurance value of assets. Overoptimistic couples neglect the need for self-insurance, which frees up market hours at the couple level (due to the lower perceived marginal utility of savings) and leads couples to allocate their time more strongly according to their current productivity differences within marriage (due to the lower perceived marginal return of human capital for the lower-wage spouse).[2]

The average within-couple difference in weekly market hours between the primary and the secondary earner is 2.8 hours or 8.2% higher in overoptimistic couples than rational ones. Comparably, the gap in home production hours is 2.3 hours higher (7.4%). The difference is more prominent during earlier years of life when wage growth is highest and children are young. For example, when the first child is born in the second period, the average within-couple difference in market hours is more than six hours higher in overoptimistic couples. But these numbers mask considerable heterogeneity: we find that the effect of overoptimism increases with within-couple initial wage differences.

Higher within-couple specialization of overoptimistic couples is driven by higher home production and lower market hours of the lower-wage spouse, leading to lower on-the-job human capital accumulation and higher within-couple wage inequality. The higher-wage spouse invests less time into producing the home-produced good, while market hours are slightly higher but broadly comparable.[3] As a result, on average, overoptimistic couples have a lower household income, implying lower savings and consumption, but higher specialization leads to higher consumption of the home-produced good.

Upon divorce, lower-wage, overoptimistic spouses enter life with lower assets and human capital compared to lower-wage, rational spouses. The magnitudes are sizeable: asset levels are about 30% lower at the time of divorce, whereas wages are about 5%

[1] The need to accumulate human capital as a lower-wage spouse to insure against income losses after divorce is necessary because the human capital of the higher-wage spouse is non-contractable: we find in the PSID that alimony payments are negligible. In addition, prenuptial contracts are rarely used (Mahar 2003). However, we find evidence in the PSID for child support and include it in our model.

[2] Home productivity differs by gender to match the large gender differences in home production hours within marriage in the data (see Section 4).

[3] Generally, there is no trade-off between within-couple specialization during marriage and human capital accumulation to insure against income losses after divorce for the higher-wage spouse.

lower.[4] These differences propagate beyond divorce, leading to more considerable current and future consumption losses for overoptimistic, lower-wage spouses.

We use the quantitative model to assess the implications of overoptimism for welfare, measures of inequality, and aggregate macroeconomic outcomes and conduct policy counterfactuals. First, to calculate welfare results, we take the paternalistic perspective of a social planner and apply the actual divorce probabilities that couples face. We compute the ex-ante expected welfare of an information treatment for overoptimistic couples (cf. e.g., Balleer et al. 2021; Exler et al. 2022): what is the %-change in every period's consumption of overoptimistic spouses to make them as well off as after the information treatment, when they decide based on rational divorce expectations? By construction, overoptimistic couples gain from the information treatment.[5] However, one spouse in an overoptimistic couple possibly benefits from the information treatment while the other loses. We find that women and men benefit from the information treatment if we average out initial wages. Once we condition on initial wage differences, the initially lower-wage spouse significantly benefits, with their spouse less so; a man with an initially higher wage even loses, on average. We further calculate the ex-post realized welfare conditional on either staying married throughout life or ever getting divorced. Overoptimistic couples lose from an information treatment if they never experience a divorce - an intuitive finding as overoptimistic couples do not invest in insurance against the divorce shock, which, ex-post, did not occur. But if divorce happens, over-optimists substantially benefit from the information treatment. Lower-wage spouses, who gain during marriage and lose during divorce, drive both effects.

Second, the higher within-couple wage inequality of overoptimistic couples implies a more dispersed distribution of human capital of divorcees upon divorce. It leads to a higher share of divorced, single mothers who face hardship and live under the poverty level. Hence, overoptimism during marriage is an explanation for why we observe a large share of divorced mothers with a household income below the poverty level.[6]

Third, the impact of overoptimism on gender inequality is, on average, muted because the behavioral adjustments of overoptimistic couples depend on within-couple wage differences. In 27.5% (55%) of all couples, women have the initially higher (lower)

[4] Wages of higher-wage spouses are of similar magnitude independent of their divorce expectations.

[5] If we had used overoptimistic expectations to determine ex-ante welfare, we would have found higher welfare for overoptimistic couples because "ignorance is bliss".

[6] The U.S. Census Bureau reports that in 2016, 20% of women who divorced within the last 12 months had a household income below the poverty level in comparison to 11% for recently divorced men and 8% for married women (Mayol-García, Gurrentz, and Kreider 2021).

wage. Taken together, the average gender earnings gap of overoptimistic couples is 0.4% larger compared to rational couples. Once we focus on couples with initially lower-wage women, it adjusts to 3.1%.

Fourth, to evaluate the impact on macroeconomic outcomes, we consider an information treatment inducing the entire population to base their decisions on rational expectations. We compare this economy to our baseline economy, which accounts for the quantified share of overoptimistic couples. The information treatment would increase aggregate savings by more than 7.5%, total market hours by 1.7%, human capital by 1.4%, and discounted government revenues by almost 4% and the gender earnings gap would shrink by 0.4%.[7] The results presumably represent upper bounds as we abstract from general equilibrium effects and focus on a sub-population more significantly affected by overoptimistic divorce expectations than the general population.

Finally, we investigate two policies to mitigate the implications of overoptimistic expectations. First, motivated by the higher poverty among divorced mothers due to overoptimism, we model an increase in child support payments paid by the male spouse to the female ex-spouse.[8] By construction, women benefit from this reform in both overoptimistic and rational couples, while men lose. The policy provides additional insurance for the large group of female lower-wage spouses after divorce, which helps particularly those with overoptimistic expectations during marriage. The policy increases aggregate welfare, driven mainly by lower-wage female spouses. Second, we suggest and evaluate a novel intra-generational divorce insurance mechanism labeled *divorce fund*. It is motivated by the ex-post welfare results: overoptimistic couples who remain married throughout life benefit from higher specialization, while those who get divorced suffer losses after divorce. Therefore, the policy collects contributions from married couples and redistributes them to divorcees. Both contributions and payments are lump-sum and determined such that the fund is inter-temporally budget-neutral within the generation. Rational women and both overoptimistic men and women are better off through this policy and aggregate welfare increases by 0.1%. It particularly helps lower-wage spouses with more pronounced effects for over-optimists. We abstract from endogenous divorce responses to the policy changes, which would presumably lower the welfare gains, especially in the case of the divorce fund.

[7] Therefore, overcoming overoptimism could also alleviate the surging problem of shortages of skilled workers in advanced economies due to demographic change (e.g., Germany).

[8] Mothers have custody of their child in 83% of the cases (see Census report, Grall 2016). We focus on child support because we found that the overwhelming share (98%) of maintenance payments paid by divorced men are child support payments in the US based on the PSID (1999 – 2019).

Literature Our paper connects and thereby contributes to two different areas of economic research: first, to the rapidly growing area of research that incorporates subjective expectations when studying decisions under uncertainty, and second, to the literature that develops economic models of the family with a focus on divorce.

The former literature focuses on individual expectations about either aggregate or individual outcomes. Manski (2004) is an early survey of this literature, complemented by a recently edited handbook chapter by Bachmann, Topa, and van der Klaauw (2023).[9] But neither of the two discusses individual expectations about divorce. Our paper is related to research on expectations about individual outcomes. A focus of this quickly evolving literature is labor market outcomes, for example, expectations about transitions between labor market status, job loss, job finding, and wage offers (Spinnewijn 2015; Mueller, Spinnewijn, and Topa 2021; Conlon et al. 2018; Balleer et al. 2021; Adams-Prassl et al. 2023).[10] In addition, previous work has focused on areas such as expectations related to returns on educational investments (Attanasio and Kaufmann 2014; Delavande and Zafar 2019; Wiswall and Zafar 2021), health and survival probabilities (Grevenbrock et al. 2021; Foltyn and Olsson 2023), and income (Exler et al. 2022; Rozsypal and Schlafmann 2023). Related to our paper is recent work by Gong, Stinebrickner, and Stinebrickner (2022), which focuses on early expectations of college students about marriage, children, and labor supply outcomes. They compare later outcomes with initial expectations. Our study complements theirs as they do not consider expectations about divorce.

To the best of our knowledge, our paper is the first to study the impact of overoptimistic divorce expectations on intra-household decisions and how effects propagate beyond divorce. An additional angle provided by our study is that once we evaluate the welfare consequences of overoptimism, we find that even though the unit of decision-making, the overoptimistic couple, benefits from an information treatment, one spouse could be worse off, thereby benefitting from overoptimism. Many decisions are taken at the household level, emphasizing the potential implications of this finding.

The second literature to which we contribute focuses on household decision-making. The common assumption in this literature is that households have rational expectations about their divorce likelihood in models with exogenous divorce probabilities (e.g., Adda, Dustmann, and Stevens 2017; Jakobsen, Jørgensen, and Low 2022) but also in those that model endogenous divorce through limited commitment (e.g. Mazzocco 2007; Voena 2015; Low et al. 2018; Doepke and Kindermann 2019; Foerster 2022;

[9] Given our structural model, the chapter by Kosar and O'Dea (2023) is closely related.

[10] See Mueller and Spinnewijn (2023) for a recent survey of this literature.

Reynoso 2023; Lafortune and Low 2023). We contribute to this literature by incorporating subjective, overoptimistic divorce expectations and show that it leads to higher specialization and lower savings upon divorce, thereby providing a novel explanation of within-couple wage inequality, which crucially propagates beyond divorce. It also increases gender inequality in labor market outcomes of couples in which men have higher initial wages. As we focus on couples with children, which amplifies specialization, overoptimism is a potential driver of the child penalty (see e.g., Angelov, Johansson, and Lindahl 2016; Kleven, Landais, and Søgaard 2019). We also contribute to the research evaluating marriage-related taxes and transfers – some of them particularly focusing on secondary earner – or maintenance payments, e.g., Blundell et al. (2016), Guner, Kaygusuz, and Ventura (2020), Malkov (2021), Foerster (2022), Guner, Kaygusuz, and Ventura (2023), Borella, De Nardi, and Yang (2023), Bronson and Mazzocco (2023).

Finally, as prominently pointed out by Goldin (2021) in the last sentence of her Book *Career and Family*: "It's all a matter of time" (p. 218, Goldin 2021). In this paper, we provide a novel mechanism that amplifies the desire for within-couple specialization through their time allocation, leading to disparities in both spouses' careers and higher within-couple wage inequality.

The structure of the paper is as follows: Section 2 describes the evidence on divorce expectations. We outline our model in Section 3. Section 4 discusses the quantification of the model. We describe the effects of overoptimistic expectations in Section 5. Section 6 discusses the policy experiments. Section 7 concludes.

2 Evidence about divorce expectations

There exists a well-established literature in psychology that investigates the phenomenon of unrealistic overoptimism regarding future life events (e.g. Weinstein 1980; Weinstein 1984; Rothman, Klein, and Weinstein 1996). This research establishes that individuals frequently underestimate (overestimate) the likelihood of unfavorable (favorable) events. When it refers to expectations concerning negative future life events, such as divorce, participants tend to perceive themselves as less susceptible than the average member of a given group. This tendency is commonly referred to as the "Illusion of Unique Invulnerability" (Perloff and Fetzer 1986).

Building on this general notion, survey evidence suggests a widespread tendency within the population to have strikingly overoptimistic expectations about the probability of divorce. Weinstein (1980) surveyed college students in the U.S., revealing that partici-

pants consistently underestimated their likelihood of experiencing divorce. The mean comparative judgment of their chances of divorce, compared to the group's average, was strikingly lower, with an average underestimation of about 50%. This substantial deviation regarding divorce expectations is particularly noteworthy as it ranked among the top three most underestimated events within a list of 24 surveyed adverse life events.

Baker and Emery (1993) elicited the estimated average divorce rates in the U.S. and the personal expectations of divorce likelihood within a cohort of young individuals seeking their first marriage licenses in Virginia. Their findings reveal a striking disparity in participants' outlook toward their own prospects compared to their perceptions of others' chances of divorce. Notably, the median estimate for the average American couple's likelihood of divorce was 50%, in stark contrast to the participants' median self-assessment, indicating zero chance of experiencing divorce themselves.

Mahar (2003) describes a notable scarcity of prenuptial agreements in the U.S. and shows that this finding can be attributed to people's persistent overoptimism regarding the stability of their marriages. In a survey conducted among law students, the author observed that participants were well aware of the national divorce rates – around 50% at that time – yet they still placed their own likelihood of divorce at 11.7%. Hence, prenuptial contracts are not (widely) used as a tool to make differential human capital accumulation resulting from specialization decisions within the couple contractible.

Finally, Campbell, Wright, and Flores (2012) surveyed recently married, childless women in the U.S. in 2011. Their findings confirm previous research results: participants, on average, estimated a mere 13.2% probability of divorce over their lives. Further, they find that currently employed women have significantly higher divorce expectations compared to non-employed women, resulting in a difference of 7.7 percentage points. Their regression, which yields the previous result, controls for additional factors that might impact divorce expectations. Hence, even though it is not causally identified, this observation hints at the influence of divorce expectations on women's labor market decisions.

The presence of overoptimistic divorce expectations is also echoed in studies by Fowers et al. (2001), Boyer-Pennington, Pennington, and Spink (2001), Lin and Raghubir (2005) and Helweg-Larsen, Harding, and Klein (2011).[11]

[11] Boyer-Pennington, Pennington, and Spink (2001) find that even though experiencing parental divorce decreases overoptimism about personal marital stability, it still remains substantial. Lin and Raghubir (2005) show that couples in Taiwan are also overoptimistic about their divorce likelihood with Taiwanese men being more overoptimistic than women, a finding confirmed by Helweg-Larsen, Harding, and Klein (2011) for unmarried college students in the U.S. In contrast, Fowers et al. (2001) do not find gender differences. We currently abstract from gender differences or within-couple differences in expectations.

3 Model

To identify the implications of overoptimistic divorce expectations on household behavior, we develop a dynamic structural life-cycle model of household choice in which spouses jointly decide about their time allocation, savings, and individual consumption. We build on previous work by Voena (2015) and Foerster (2022) and incorporate the following features into the model: First, married couples take their decisions cooperatively with a fixed, equal bargaining weight. Second, couples face an exogenous divorce probability p_t^{div} but differ in their divorce expectations: either both spouses have rational expectations, or both are overoptimistic about their marital stability, thereby underestimating their divorce likelihood. Therefore, in the optimization problem of the married couple, overoptimism affects the weights that both spouses assign to their respective continuation values of staying married or getting divorced.[12] Third, spouses can self-insure against financial losses upon divorce by either saving in the joint asset or by engaging in market work to accumulate individual human capital. Fourth, we assume that children always live with their mother. After divorce the male spouse pays a fraction of his labor income as maintenance payments, i.e., child support, to his ex-spouse.

The model focuses on initially married spouses consisting of a female individual f and a male individual m, taking household formation as given. The model is in discrete time. In period $t \in \{1, ..., T\}$ the couple chooses market work hours h_{ft}, h_{mt}, home production hours q_{ft}, q_{mt}, individual consumption c_{ft}, c_{mt} and joint savings in a risk-free asset A_t. We assume discrete labor supply. In each period, both spouses are endowed with a time endowment H. Upon divorce, joint assets are split equally and thereafter, the ex-spouses save in distinct assets A_{mt}, A_{ft} and optimize individually taking child support payments as given. We assume that divorcees do not remarry. After period T, both spouses retire and die at the end of period $T + T_R$. We assume a fixed fertility type: all couples have two kids born in periods $t = 2$ and $t = 3$.

Couples are heterogeneous in four dimensions: They differ in their divorce expectations, having either rational or overoptimistic expectations; their type is given ex-ante and fixed over time. In addition, each couple is heterogeneous in three endogenous states: both spouses' human capital and their joint assets. We described the initial conditions, which capture ex-ante heterogeneity in wages, in Section 4.

[12] By assuming an exogenous divorce probability and a fixed bargaining weight, we do not allow for household bargaining as in limited commitment models. We restrict our focus on the interaction between subjective divorce expectations and within-couple time allocation. The main channel would still be present if we extended our model by limited commitment. It is an interesting avenue for future research.

3.1 Preferences, home-produced good and time allocation

Individuals denoted by $i \in \{f, m\}$ derive utility from individual consumption c_{it}, leisure l_{it}, and a home-produced good Q_t. Both spouses allocate their time between market work, leisure, and home production given their time endowment

$$H = l_{it} + h_{it} + q_{it}, \quad i \in \{f, m\}. \tag{1}$$

The home-produced good Q_t is a public good in marriage and jointly produced by both spouses' time inputs, q_{ft} and q_{mt}, given the production technology (cf. Foerster 2022):

$$Q_t = F_Q(q_{ft}, q_{mt}) = (aq_{ft}^{\sigma} + (1-a)q_{mt}^{\sigma})^{\frac{1}{\sigma}}. \tag{2}$$

The parameter $a \in [0, 1]$ controls differences in male and female productivity and σ determines the degree of complementarity or substitutability of the spouses' home production. After divorce, the home-produced good becomes a private good and the production technology adjust to

$$Q_{it} = a_i^{div} q_{it}, \quad i \in \{f, m\}. \tag{3}$$

The home-produced good Q_t captures consumption of goods and services produced within the household and the well-being of children. Hence, q_{it} reflects, for example, time spent on childcare, providing homemade meals, shopping, and cleaning.[13]

We assume that preferences are separable across time and states of the world. The flow utility of a **married individual** i is given by

$$u_i^{mar}(c_{it}, l_{it}, Q_t) = \frac{c_{it}^{1-\eta}}{1-\eta} + \psi_i \frac{l_{it}^{1-\gamma_i}}{1-\gamma_i} + b(k_t)\frac{Q_t^{1-\kappa}}{1-\kappa}, \quad i \in \{f, m\},$$

where $b(k_t)$ allows the derived utility from the home-produced good to depend on the current household structure, which is denoted by $k_t = (ac_t, nc_t)$ and captures the age of the youngest child ac_t and the number of children in the household nc_t. We describe the functional form assumption for $b(k_t)$ in Section 4.

[13] We follow Aguiar, Hurst, and Karabarbounis (2013) in their definition of time use categories in the ATUS. We then define home production to be the sum of their nonmarket work and childcare time which is in line with the definition of home production in Doepke and Tertilt (2016).

The flow utility of a **divorced individual** i is given by

$$u_i^{div}(c_{it}, l_{it}, Q_{it}) = \frac{c_{it}^{1-\eta}}{1-\eta} + \psi_i \frac{l_{it}^{1-\gamma_i}}{1-\gamma_i} + b(k_{it}) \frac{Q_{it}^{1-\kappa}}{1-\kappa} \ , \quad i \in \{f, m\},$$

where Q_{it} denotes the **private** home-produced good and k_{it} the household structure of divorcee i. We assume that children live with their mother after a divorce, implying $k_{ft} \neq k_{mt}$ as long as children are below 18.

3.2 Economies of scale and children

We follow Voena (2015) and assume that fertility is exogenous and childbirth takes place at a predetermined age of the parents: the first of two children is born in period $t = 2$, while the second is born in period $t = 3$. Both children stay in the household until they reach the age of eighteen.[14]

We account for economies of scale in consumption (cf. Voena 2015), which yields the household expenditure function

$$x(c_{ft}, c_{mt}, k_t) = e(k_t) \left[c_{ft}^{\rho} + c_{mt}^{\rho} \right]^{1/\rho} , \tag{4}$$

where $e(k_t) \geq 1$ is an equivalence scale, which reflects the consumption of children and is increasing in the number of children (for details, see Appendix 4.3). Only divorcees with whom children live after divorce incur expenditures for them. For $\rho > 1$, the expenditure function captures economies of scale from consumption within marriage, while there are no economies of scale after divorce.

3.3 Wages and human capital process

Wages are a function of human capital K_{it} characterized by

$$\ln(w_{it}) = \phi_0 + \phi_1 K_{it} \ , \quad i \in \{f, m\}. \tag{5}$$

where w_{it} denotes the wage of individual i.[15] We follow Foerster (2022) and assume that human capital K_{it} is discrete and distributed on the support $\{0, 1, 2, ..., K_{max}\}$. We assume a Markovian human capital process over the discrete human capital grid with

[14] Assuming exogenous fertility is a common simplification in the literature (e.g., Voena 2015; Reynoso 2023; Low et al. 2018; Foerster 2022; Lafortune and Low 2023).

[15] In the current version of the paper, we do not incorporate temporary wage shocks but rather focus on permanent wage shocks taking place through a stochastic human capital accumulation process.

probabilities to move over the grid between period t and $t+1$ which depend on age t and contemporaneous market hours h_{it}: $\pi_{up}(h_{it}, t)$, $\pi_{stay}(h_{it}, t)$, and $\pi_{down}(h_{it}, t)$. This setup captures dynamic returns to working longer hours (e.g., Imai and Keane 2004; Michelacci and Pijoan-Mas 2012; Blundell et al. 2016) and allows for larger dynamic returns during younger ages, i.e., earlier years of the career (e.g., Attanasio, Low, and Sánchez-Marcos 2008; Gicheva 2013).[16] We assume the same human capital process for both gender, i.e., for $i \in \{f, m\}$.

We make functional form assumptions to characterize the probabilities π_{up}, π_{stay}, and π_{down}. First, we model human capital depreciation in each period as a constant probability p_δ to move down in the human capital grid, which is independent of age and market hours. Second, human capital can be accumulated, i.e., K_{it} increases by one unit, with a probability $p_K(h_{it}, t) = 1 - exp\big(-(\zeta_1 + \zeta_2 \cdot t)\, h_{it}\big)$, which depends on market hours and age. $\zeta_1 > 0$ controls the impact of market hours on p_K, while $\zeta_2 \leq 0$ mitigates the impact as individuals age. Thus, the human capital evolution is characterized for $i \in \{f, m\}$ as:

$$K_{it+1} = \begin{cases} \min\{K_{it}+1, K_{max}\} & \text{with } \pi_{up}(h_{it}, t) = p_K(h_{it}, t) \cdot (1 - p_\delta) \\ K_{it} & \text{with } \pi_{stay}(h_{it}, t) = p_K(h_{it}, t) \cdot p_\delta + (1 - p_K(h_{it}, t)) \cdot (1 - p_\delta) \\ \max\{K_{it}, 0\} & \text{with } \pi_{down}(h_{it}, t) = (1 - p_K(h_{it}, t)) \cdot p_\delta \,. \end{cases} \tag{6}$$

3.4 Post divorce: child custody, maintenance payments and asset division

We assume that after divorce children live with their mother.[17] Further, child support payments make up the vast majority of post-marital maintenance payments compared to alimony payments. Thus, we model maintenance payments $\mathcal{M}_t$ paid by the divorced father to the divorced mother as a share θ of the contemporaneous pre-tax labor income of the divorced father: $\mathcal{M}_t = \theta\, w_{mt} h_{mt}$.[18] Finally, we assume an equal division of assets upon divorce. Institutional details are discussed further in Appendix A.

3.5 Budget constraint and government policies

We follow Guner, Kaygusuz, and Ventura (2023) and allow government policies to depend on marital status, number of kids as well as gender of the divorcee. Using their

[16] For two recent contributions on underlying drivers of wage growth over the life cycle, see Adda and Dustmann (2022) and Bayer and Kuhn (2023).

[17] This is a simplification, but we observe that 82.5% of custodial parents were mothers and only 17.5% fathers in the US (see Census report on child custody, Grall (2016)).

[18] We find that 98% of maintenance payments paid by divorced men are child support payments (PSID, 1999 – 2019).

recent implementation of the tax and transfer system in the United States, we first model the joint tax system through HSV-tax functions that depend on the marital status (Bénabou 2002; Heathcote, Storesletten, and Violante 2017), second, the Earned Income Tax Credit (EITC), and third, welfare payments.[19] WE denote the tax and transfer system by $\mathcal{T}^{mar}\big(I, k_t\big)$ and $\mathcal{T}_i^{div}\big(I, k_t\big)$, where I is the labor income of the household and k_t summarizes the family structure in the household. Then, the budget constraint of the married couple is given by

$$x(c_{ft}, c_{mt}, k_t) = w_{mt}h_{mt} + w_{ft}h_{ft} - \mathcal{T}^{mar}\big(w_{mt}h_{mt} + w_{ft}h_{ft}, k_t\big) + (1+r)A_t - A_{t+1}\ , \quad (7)$$

where r is an exogenous interest rate on savings.

Taking maintenance payments and child custody into account, the budget constraint of divorced women is given by

$$x(c_{ft}, 0, k_t) = w_{ft}h_{ft} + \mathcal{M}_t - \mathcal{T}_f^{div}\big(w_{ft}h_{ft}, k_t\big) + (1+r)A_{ft} - A_{ft+1}\ , \quad (8)$$

and of divorced men by

$$c_{mt} = w_{mt}h_{mt} - \mathcal{M}_t - \mathcal{T}_m^{div}\big(w_{mt}h_{mt}, k_t\big) + (1+r)A_{mt} - A_{mt+1}\ . \quad (9)$$

Note that we assume that maintenance payments are not tax deductible for the payer and do not count as taxable income for the recipient.[20]

3.6 Problem of the married couple: over-optimists and rationals

The married couple takes decisions cooperatively subject to the perceived exogenous divorce risk. They choose in each period t their market work h_{mt}, h_{ft}, leisure l_{mt}, l_{ft}, home production q_{mt}, q_{ft}, private consumption c_{mt}, c_{ft}, and savings in a joint asset A_t. Thus, the choice vector is given by $\iota_t = (c_{mt}, c_{ft}, q_{mt}, q_{ft}, l_{mt}, l_{ft}, h_{mt}, h_{ft}, A_{t+1})$. What matters for the decision making of the couple are – besides the age t, which also determines the household structure k_t – both spouses' endogenous human capital and their joint assets. Hence, the state space of the couple is given by $\Omega_t = \big(A_t, K_{ft}, K_{mt}\big)$.

[19] Appendix C.2 describes the implementation based on Guner, Kaygusuz, and Ventura (2023).

[20] In general, child support is not deductible and also not considered income. But alimony payments are typically deductible by the payer and need to be included in the recipient spouse's income if it falls under a divorce agreement before 2019. We abstract from this difference as we find in the PSID that the overwhelming part of maintenance payments are child support payments. Hence, we assume $\mathcal{M}_t$ to be neither deductible nor considered income. For more information, consult the IRS website (Link).

Married couples have either rational or overoptimistic divorce expectations. We denote the expectation type by $E \in \{O, R\}$ and use superscripts to emphasize which objects depend on E. We define the optimization problem of a **married couple with divorce expectations of type** E in period t after the divorce shock in t occurred as

$$V_t^{mar,E}(\Omega_t) = \tag{10}$$
$$\max_{\iota_t} \mu\Big[u_f^{mar}(c_{ft}, l_{ft}, Q_t) + \beta \mathbb{E}_t^E[V_{ft+1}^E(\Omega_{t+1})]\Big] + u_m^{mar}(c_{mt}, l_{mt}, Q_t) + \beta \mathbb{E}_t^E[V_{mt+1}^E(\Omega_{t+1})]$$
$$\text{s.t. time constraint (1), budget constraint (7), household expenditure (4),}$$
$$\text{home production (2), wage equation (5), human capital evolution (6),}$$

where μ is the relative bargaining weight within the couple which is constant over time. We denote the expected continuation utility of individual i prior to the realization of the human capital and divorce shocks in period $t+1$ by $\mathbb{E}_t^E[V_{it+1}^E(\Omega_{t+1})]$. Couples make decisions based on rational expectations about their human capital evolution (6) at time t given by $\mathbb{E}_{K,t}$. We define the expectation about the divorce likelihood as $\mathbb{E}_{div,t}^E$ for $E \in \{O, R\}$. We combine the above ingredients and obtain

$$\mathbb{E}_t^E[V_{it+1}^E(\Omega_{t+1})] = \mathbb{E}_{div,t}^E\Big[\mathbb{E}_{K,t}\big[V_{it+1}^E(\Omega_{t+1})\big]\Big], \quad E \in \{O, R\}.$$

For **couples with rational divorce expectations**, i.e., $E = R$, the formula simplifies to

$$\mathbb{E}_t^R[V_{it+1}^R(\Omega_{t+1})] = p_{t+1}^{div}\, \mathbb{E}_{K,t}\big[V_{it+1}^{div}(\Omega_{it+1})\big] + (1 - p_{t+1}^{div})\, \mathbb{E}_{K,t}\big[V_{it+1}^{mar,R}(\Omega_{t+1})\big], \;\; i \in \{f, m\},$$

where the *true, age-dependent divorce probability* in period $t+1$ is given by p_{t+1}^{div}. We denote the value of being a divorced individual i in period $t+1$ with states Ω_{it+1} as $V_{it+1}^{div}(\Omega_{it+1})$ and define it in the next subsection.[21] The value of being a married individual i with expectations E in period $t < T$ (after the divorce shock in t realized) is given by

$$V_{it}^{mar,E}(\Omega_t) = u_i^{mar}(c_{it}^{E,*}, l_{it}^{E,*}, Q_t^{E,*}) + \beta \mathbb{E}_t^E[V_{it+1}^E(\Omega_{t+1})], \;\; i \in \{f, m\}, \; E \in \{O, R\},$$

where $c_{it}^{E,*}, l_{it}^{E,*}, Q_t^{E,*}$ with $i \in \{f, m\}$ denote the optimal levels of consumption, leisure and the home-produced good of a couple with expectation type E.

In contrast to couples with rational divorce expectations, **married couples with overop-**

[21] With slight abuse of notation, the states of divorcee i, Ω_{it+1}, are a subset of the states during marriage, Ω_{t+1}, when we apply the equal asset split upon divorce.

timistic divorce expectations, i.e., $E = O$, expect a lower age-dependent divorce probability, $p_{t+1}^{div,O} < p_{t+1}^{div}$. We assume that $p_{t+1}^{div,O} = \alpha \cdot p_{t+1}^{div}$ and obtain

$$\mathbb{E}_t^O[V_{it+1}^O(\Omega_{t+1})] = \alpha \cdot p_{t+1}^{div} \, \mathbb{E}_{K,t}\big[V_{it+1}^{div}(\Omega_{it+1})\big] + (1 - \alpha \cdot p_{t+1}^{div}) \, \mathbb{E}_{K,t}\big[V_{it+1}^{mar,O}(\Omega_{t+1})\big], \;\; i \in \{f, m\},$$

Hence, overoptimistic couples put a lower weight on $\mathbb{E}_{K,t}\big[V_{it+1}^{div}(\Omega_{it+1})\big]$ compared to rational couples.

Finally, $\mathbb{E}_T^E[V_{iT+1}^E] = V_{iT+1}$ with $E \in \{O, R\}$ is the expected continuation utility upon retirement, which is deterministic given our assumptions that couples stay married throughout retirement and no further human capital shocks take place; in fact, the human capital of the last working period T affects the pension income. Details are provided in Appendix B.1. Hence, there are no differences in behavior between rational and overoptimistic couples during retirement conditional on entering retirement with the same states (K_{ft}, K_{mt}, A_t).

3.7 Problem of the divorcee

We now characterize the value of a divorcee for given state variables Ω_{it}.[22] In the problem of the male divorcee, the states are given by $\Omega_{mt} = \big(A_{mt}, K_{mt}\big)$. In each period t, a male divorcee decides about his time allocation and chooses consumption and savings. We summarize the choices in period t by $\iota_{mt} = (c_{mt}, A_{mt+1}, q_{mt}, l_{mt}, h_{mt})$. We abstract from strategic interactions between both divorcees as in Foerster (2022). Thus, the **value of being a divorced man** at time t is given by

$$\begin{aligned} V_{mt}^{div}(\Omega_{mt}) = \max_{\iota_{mt}} \quad & u_m^{div}(c_{mt}, l_{mt}, Q_{mt}) + \beta \mathbb{E}_{K,t}[V_{mt+1}^{div}(\Omega_{mt+1})] \\ \text{s.t.} \quad & \text{time constraint (1)}, \;\; \text{budget constraint (9)}, \;\; \text{home production (3)}, \\ & \text{wage equation (5)}, \;\; \text{human capital evolution (6)}. \end{aligned} \tag{11}$$

The value $V_{mT+1}^{div}(\Omega_{mT+1})$ is defined by the value of retirement of divorced men. We describe the optimization problem in retirement in Appendix B.1. Given the value of retirement, the above problem can be solved recursively. We assume no remarriage.

The state space of a female divorcee contains not only her assets and human capital but also those of her ex-spouse because her optimal decisions based on the maintenance payment, which depends on Ω_{mt}. Hence, the state space of the female divorcee is given

[22] Again, there is a one-to-one mapping from period t to the household structure denoted by k_{it}, $i \in \{f, m\}$, after divorce because we assume one exogenous fertility type.

by $\Omega_{ft} = \left(A_{ft}, K_{ft}, A_{mt}, K_{mt}\right)$ and her choices by $\iota_{ft} = (c_{ft}, A_{ft+1}, q_{ft}, l_{ft}, h_{ft})$. Thus, the **value of being a divorced woman** at time t is

$$V_{ft}^{div}(\Omega_{ft}) = \max_{\iota_{ft}} \quad u_f^{div}(c_{ft}, l_{ft}, Q_{ft}) + \beta \mathbb{E}_{K,t}[V_{ft+1}^{div}(\Omega_{ft+1})] \tag{12}$$

$$\text{s.t. time constraint (1), budget constraint (8), household expenditure (4),}$$
$$\text{home production (3), wage equation (5), human capital evolution (6).}$$

Similar to divorced men, the value $V_{fT+1}^{div}(\Omega_{fT+1})$ is defined by the value of retirement of divorced women (see Appendix B.1). Given the value of retirement and the maintenance payments $\mathcal{M}_t$, we solve the problem for divorced, working-age women recursively.

The propagating impact of overoptimism on the well-being after divorce solely unfolds through differences in the levels of human capital and assets at the time of divorce.

4 Quantification of the model

We calibrate our model to the United States using data covering 1999 to 2019. We take three steps to obtain the underlying structural parameters of the model. First, we determine the initial distribution of assets and both spouses' human capital. Second, we fix some model parameters externally, relying on the existing literature and values based on external data sources. In addition, we estimate a few parameters outside of the structure of our model using US micro data. In this step, we also use evidence provided by Campbell, Wright, and Flores (2012) to determine the share of overoptimistic couples in the population. Finally, relying on the above ingredients, we calibrate the remaining parameters internally, matching a broad set of empirical moments.

4.1 Data

We use two data sources: First, the Panel Survey of Income Dynamics using data between 1999 – 2019. We observe the marital history, age, number of children and their age, each individual's annual labor income and hours worked. We restrict the sample to those in their first marriage and between 23 and 61. We calculate hourly wages to determine the wage profiles by gender. For divorced spouses, we also observe child support and alimony payments. The final sample includes 47 595 individual-year observations. Second, we use the American Time Use Survey combined with the Current Population Survey (ATUS-CPS) covering 2003 – 2019, which is a cross-sectional data set. We use the data to construct life cycle profiles of market and home production hours by gender and

marital status. We select the sample based on the respective age of the youngest child and the marital status of the parents, which yields 46 462 individual-year observations.

4.2 Initial conditions and wage process

We incorporate initial heterogeneity in human capital between and within couples. Our structural model exhibits a one-to-one relationship between human capital and wages (cf. eq. (5)). To utilize this, we first assume that our human capital grid covers ten distinct human capital states, $K_{it} \in \{0, 1, ..., 9\}$. Second, we determine the lowest wage covered by the human capital grid to be \$6 and the highest wage attainable in the model to reflect the 95th percentile of the wage distribution, \$65.9, in the PSID sample (in 2016 Dollars). This pins down the parameters of equation (5) to be $\phi_0 = 1.7918$ and $\phi_1 = 0.2663$. Third, similar to Borella, De Nardi, and Yang (2023), we estimate a joint log-normal distribution of the observed wages.[23] We then discretize the distribution and apply equation (5), which yields the initial joint distribution of human capital, which we plot in Figure C1d. In addition, we calculate the average level of net savings of the same sample and use this uniform initial asset level for all married couples (details in Appendix C.1).

4.3 Externally fixed parameters

We fix some model parameters to values previously used in the literature which are summarized in Table 1. We follow the convention in the literature (e.g., Voena 2015; Foerster 2022; Reynoso 2023) and assume that a model period corresponds to three years. The life cycle starts with married couples at the age of 23 – 25 and lasts for thirteen working periods $T = 13$, i.e., 39 years. At age 62, individuals retire and live for five more periods, i.e., $T_R = 5$ or 15 years. The retirement income is given by $I_r(K_{iT}) = \nu_r w(K_{iT})\bar{h}$ where ν_r represents the median replacement rate in the US, which is 41% (cf. OECD 2013, p. 366), $\bar{h} = 32.42$ are the average working hours over the life-cycle calculated from the ATUS-CPS sample between 2003 – 2019 and $w(K_{iT})$ is the wage of individual i in the last working period T. We fix the time budget per week to be 84 hours ($H = 84$). Since we observe in the data that many individuals pool at certain market work hours, we incorporate a discrete hours choice and allow for four different levels of market hours in addition to non-participation (0 hours): two levels of part-time work (20 hours and 30 hours), regular full-time work (40 hours), and long hours (50 hours). As in Attanasio,

[23] We describe the sub-sample of the PSID sample in Appendix C.1. Figure C1 depicts the underlying raw data, the resulting normal distribution of log-wages, and the distribution of within-couple wage differences in the data and in the estimated distribution.

Low, and Sánchez-Marcos (2008), we set the annual discount factor to 0.98. The annual interest rate is set to 0.02. We assume that both spouses have an equal and time-invariant bargaining weight within the household, i.e., $\mu = 1$. We follow Voena (2015) in the calibration of the economies of scale parameter, $\rho = 1.4023$, which reflects the McClements scale according, to which a single individual needs to spend higher resources to ensure the same amount of individual consumption as a married couple. Further, Voena (2015) also uses the McClements scale to determine the equivalence scale $e(k_t)$, which reflects children's consumption as a share of the parental consumption.

We take the exogenous divorce probability by marital age from a report by the U.S. Census Bureau (see Mayol-García, Gurrentz, and Kreider 2021).[24] The cumulative percent of divorced first marriages in 2014 is shown in Figure 1. Finally, we calculate maintenance payments using the PSID, restricting the sample to divorced fathers between 1999 and 2019. We compute the average share of their labor income paid as maintenance payments, which is the sum of child support and alimony payments, to be 10%. We find that 98% of the amount of maintenance payments are child support payments.

Overoptimism. We use the empirical evidence on probabilistic divorce expectations provided by Campbell, Wright, and Flores (2012). They interviewed first-married, female survey participants within their first two years of marriage and find an average expected likelihood to get divorced from their current spouse of 13.2%. Relying on their results, we assume that men have identical divorce expectations. Furthermore, we assume that both spouses within a couple have the same expectations, as described in Section 3.6.[25] For the ease of the underlying analysis, we assume that overoptimistic couples do not expect divorce to take place at all, i.e., $\alpha = 0$ given its definition in Section 3.6. Combining the assumptions with the cumulative divorce probability over the life cycle, which is 33.7%, allows us to determine the share of overoptimistic couples within the population: $\mathcal{S}_o = 1 - \frac{13.2\%}{33.7\%} = 0.6083$.[26] We further assume that the expectation type of the couple is uncorrelated with the initial conditions.

Government policies. We model the tax and transfer system as a composition of the labor income tax liability modeled through the widely used parametric form following

[24] The calculation of the divorce probability by marriage duration in Mayol-García, Gurrentz, and Kreider (2021) is based on the Social Security Administration Supplement to the Survey of Income and Program Participation (2014 Panel, Wave 1).

[25] In future research, we intend to investigate heterogeneity in expectations within couples because it would affect the magnitude of within-couple specialization, as shown in an earlier version of this project.

[26] $\mathcal{S}_o$ matters for the calibration of the internal parameters in Section 4.4, for aggregate outcomes in Section 5.5, and the aggregate welfare effects in Section 6.

Table 1: Preset and directly estimated parameters of the model

Parameter	Value	Reference
Initial age	23	Voena (2015)
Years in each period	3	
Number of working periods (T)	13	
Number of retirement periods (T_R)	5	
Age at child bearing	26 & 29	PSID
Annual discount factor	0.98	Attanasio, Low, and Sánchez-Marcos (2008)
Annual interest rate	0.02	
Bargaining weight (μ)	1	
Equivalence scale ($e(\cdot)$)		McClements scale (see Foerster 2022)
- 1 child	1.23	
- 2 children	1.46	
Economies of scale (ρ)	1.4023	McClements scale (see Voena 2015)
Weekly work hours	0, 20, 30, 40, 50	
Log-wage level (ϕ_0)	1.7918	lowest wage \$6
Log-wage slope (ϕ_1)	0.2663	highest wage \$65.9 (95th-percentile, PSID)
Replacement rate ν_r	0.41	OECD (2013)
Working hours (for retirement) $\bar{h}$	32.42	ATUS-CPS
Maintenance payments (share θ)	0.1	PSID
Exogenous divorce probability (p_t^{div})	see Fig. 1	Mayol-García, Gurrentz, and Kreider (2021)
Degree of overoptimism (α)	0.0	
Share of overoptimistic couples ($\mathcal{S}_o$)	60.83%	Campbell, Wright, and Flores (2012)

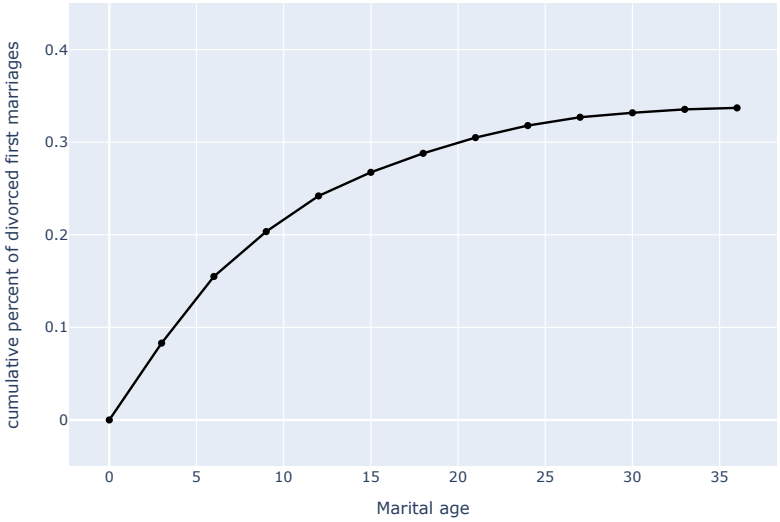
Bénabou (2002) and Heathcote, Storesletten, and Violante (2017), the Earned Income Tax Credit (EITC), and welfare receipt. We implement the estimated functional forms of Guner, Kaygusuz, and Ventura (2023). Details are provided in the Appendix C.2.

4.4 Internally calibrated parameters

The remaining parameters of the model are internally calibrated using a grid-search optimization routine. They consist of five parameters that govern the preferences for consumption, leisure, and the home-produced good (η, γ, ψ_m, ψ_f, κ), three parameters for the functional form of $b(k_t)$, namely (b_1, b_2, b_3), four parameters of the production function of the home-produced good during marriage and after divorce $(a_f^{div}, a_m^{div}, a, \sigma)$, and, finally, three parameters $(p_\delta, \zeta_1, \zeta_2)$ that determine the evolution of human capital and thereby affecting life cycle wage profiles (cf. equation (6)).

Our targeted moments are the life cycle profiles of market work and home production hours conditional on gender and marital status. In addition, we target wage profiles

Figure 1: Cumulative percent of divorced first marriages by marital age in 2014



Notes: Based on Figure 7 in Mayol-García, Gurrentz, and Kreider (2021), U.S. Census Bureau who use the Social Security Administration Supplement to the Survey of Income and Program Participation, 2014 Panel – Wave 1. The resulting cumulative divorce probablity over the entire life cycle is given by 33.7% after 39 years of marriage.

conditional on gender. By using the entire life cycle structure, we rely on 182 data moments in our internal calibration. The resulting parameters are presented in Table 2.[27]

Before turning to the model fit, we briefly discuss the *functional form assumptions of* $b(k_t)$, the multiplier on the utility derived from the consumption of the home-produced good (cf. Section 3.1). We allow this utility to depend on the age of the youngest child ac_t and the number of children in the household nc_t, summarized by $k_t = (ac_t, nc_t)$. We make the following assumptions about its underlying form: First, if no child below the age of 18 currently lives in the household, we denote $k_t = (0, 0)$ and we assume $b\big((0,0)\big) = b_1$. Second, in period $t = 2$, the first child is born which is denoted by $k_2 = (1, 1)$ and we assume that $b\big(k_2\big) = b_2$. Third, in period $t = 3$, the second child is born into the family denoted by $k_3 = (1, 2)$ and as no more children are born $k_4 = (2, 2)$, $k_5 = (3, 2)$, ...We assume the following functional form for the time period with two children: $b\big((ac_t, 2)\big) = b_1 + b_3(7 - ac_t)$. For example, if k_3, we get $b\big((1, 2)\big) = b_1 + 6 \cdot b_3$. Note that if $ac_t > 6$, the youngest child is above 18 years old and hence, $b\big((0, 0)\big) = b_1$. This functional form is motivated by its simplicity as it requires only three parameters and, in addition, replicates the data well, as shown in the following subsection.

[27] We visualize the Markovian human capital transition probabilities $\pi_{up}(h_{it}, t)$, $\pi_{stay}(h_{it}, t)$, and $\pi_{down}(h_{it}, t)$, implied by the parameters p_δ, ζ_1, and ζ_2, for all market hours over the life cycle in Figure C3.

Table 2: Internally calibrated parameters of the model

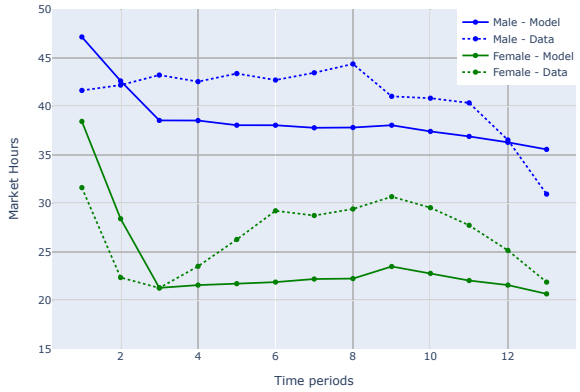
Parameter	Value
Utility function	
Consumption curvature (η)	1.35
Leisure curvature (γ)	1.9
Leisure level - men (ψ_m)	1.2
Leisure level - women (ψ_f)	1.0
Home produced good curvature (κ)	1.5
Home produced good level (b_1)	0.12
Home produced good level - child 1 (b_2)	0.18
Home produced good level - child 2 multiplier (b_3)	0.07
Home production	
Female productivity within marriage (a)	0.54
Complementarity of home production hours w/in marriage (σ)	0.8
Male productivity after divorce (a_m^{div})	0.25
Female productivity after divorce (a_f^{div})	0.25
Human capital evolution	
Human capital depreciation (p_δ)	0.25
Human capital accumulation - baseline (ζ_1)	0.027
Human capital accumulation - age-dependency (ζ_2)	-0.0017

4.5 Model fit

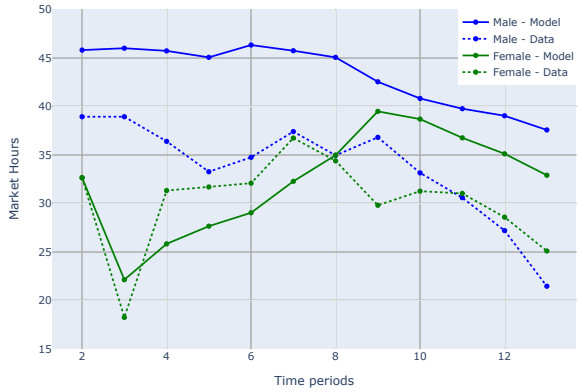
Fit of targeted moments. Figure 2 presents the model fit by comparing the simulated model moments with the targeted, empirical counterparts from the ATUS-CPS and PSID. We calculate the model moments by simulating rational and overoptimistic couples 50,000 times, drawing both spouses' initial wages from the initial joint wage distribution, the exogenous divorce shocks, and the permanent wage shocks defined through the human capital transition probabilities. We then calculate the respective moments for overoptimistic and rational couples to finally weigh them with their respective population size, i.e., with $\mathcal{S}_o$ and $1 - \mathcal{S}_o$.

As visible in Figure 2, the model matches the data fairly well, although it faces tension to match both male labor supply in divorce and during marriage – average market hours of married men tend to be too low over the life cycle while they are too high for male divorced spouses. In addition, the model predicts lower female work hours during marriage after the arrival of the second child compared to the data. However, the model matches the hours of home production well across gender and marital status (see Figures 2c and 2d). Time allocation decisions within couples are driven by wage differences, the degree of complementarity of home production (σ), and the difference in

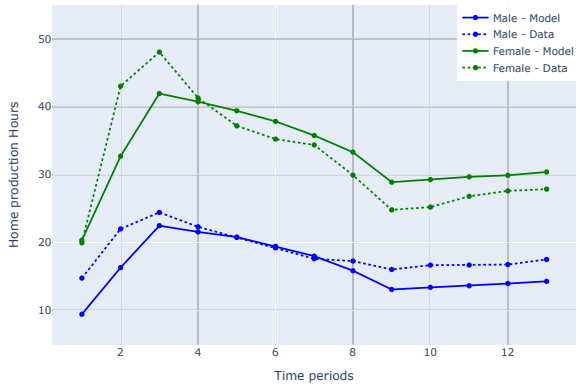
Figure 2: Model fit of targeted life-cycle profiles



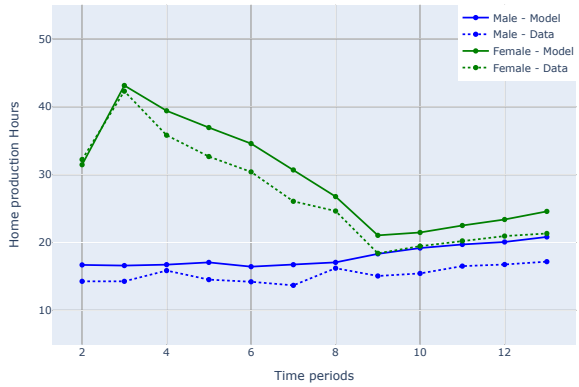
(a) Market hours of married individuals



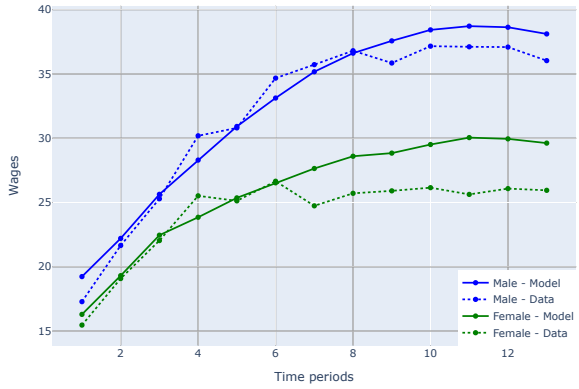
(b) Market hours of divorced individuals



(c) Home production hours of married ind.



(d) Home production hours of divorced ind.



(e) Wage profiles

*Notes: For the **model outcomes**, we simulate life-cycle profiles of 50,000 overoptimistic and rational couples which are then weighted with their respective population share to calculate the population moments (for overoptimistic couples with $\mathcal{S}_o$, and for rational couples with $1 - \mathcal{S}_o$). For the wage profiles, we pool married and divorced men, respectively women. The **data outcomes** of market hours and home production hours are produced from ATUS-CPS 2003 – 2019. Wage profiles are based on the PSID 1999 – 2019. More information on the data can be found in Section 4.1.*

the home productivity of both spouses within marriage (a). The calibration determines women to be slightly more productive in home production ($a = 0.54$) to match the average within-couple difference in home production hours between men and women. We do not incorporate gender differences in the parameters of the wage process ϕ_0 and ϕ_1 (see Table 1) nor in the parameters that govern the evolution of human capital p_δ, ζ_1, and ζ_2. The implied gender differences in the wage profiles in Figure 2 originate entirely from selection into work and into different levels of market hours.

External validity: non-targeted moment. Campbell, Wright, and Flores (2012) provide us with an additional data moment that we did not target in our internal calibration: the correlation between participating in the labor market and the probabilistic divorce expectations for women. In fact, Campbell, Wright, and Flores (2012) run a regression (see their Table 3, p. 118) with probabilistic divorce expectations as the dependent variable and labor force participation as an independent variable adding other controls such as parental divorce, religiosity, commitment measures, length of cohabitation before marriage, etc. They find that women who are employed have probabilistic divorce expectations that are 7.7 percentage points higher compared to women who are not employed. We replicate the same measure using our model. As their female survey participants were on average 27.3 years old, we use female employment in period $t = 2$, which reflects age 26 to 28. We include the formal definition of the measure in the Appendix C.4. Our model replicates their finding: our simulation implies that employed women in period $t = 2$ have, on average, a 5.2 percentage point higher divorce expectation compared to those women who do not work. The reason is that rational women are more likely to participate in the labor market as they correctly anticipate the value of human capital and assets given their accurate divorce expectations. As our model predicts a smaller difference (5.2pp) compared to the data (7.7pp), our model slightly under-predicts the difference in participation of rational and overoptimistic married women.

5 Effects of overoptimism

To grasp the behavioral differences between overoptimistic and rational couples, let us first summarize the gains from marriage these couples experience in the model. Overoptimistic couples do not expect to lose these gains due to divorce, which shapes their behavior. So, first, both spouses derive utility from the home-produced good within marriage. Hence, being married allows the couple to reap efficiency gains from specialization. Second, spouses can insure each other against a permanent wage shock by

increasing their market hours. Third, couples benefit from economies of scale in consumption. An additional difference compared to divorced men – but not compared to divorced women – is the presence of children, which scales down consumption by $e(k_t)$ but increases the utility derived from the home-produced good through the multiplicative effect $b(k_t)$. Thereby, returns to specialization within the couple are amplified when children are young, i.e., $b(k_t)$ is highest.

5.1 How do overoptimistic couples behave differently?

Table 3 summarizes the differences in time allocation, private consumption, and consumption of the home-produced good between overoptimistic and rational couples. For both types of couples, we aggregate the respective outcome, e.g., market work hours, over the simulated population and the entire life cycle or the time of marriage and then compute the differences with rational couples as the baseline. Over the entire life-cycle, market hours decrease for women by 3.4% (0.92 h/week) and for men by 2.4% (0.97 h/week). Hours are reallocated towards home production and leisure. This leads to lower private consumption and higher consumption of the home-produced good. Figure D4 in the Appendix shows the life-cycle profiles of all five outcomes for women and men with rational and overoptimistic expectations. The effects are driven by pronounced differences in behavior during marriage.

Table 3: Difference in behavior and consumption between over-optimists and rationals

	Market work		Home production		Leisure		Consumption	Home-prod. good
	%	h/week	%	h/week	%	h/week	%	%
Entire working life								
Women	-3.4	-0.92	1.7	0.54	1.5	0.38	-2.2	2.4
Men	-2.4	-0.97	3.6	0.59	1.4	0.38	-2.1	2.5
During marriage								
Women	-4.8	-1.19	2.2	0.70	1.8	0.49	-2.3	2.6
Men	-3.3	-1.33	5.1	0.81	1.8	0.52	-2.3	2.6
Initially lower-wage spouse	-17.8	-2.98	5.8	2.22	2.6	0.76	-2.4	2.7
Initially higher-wage spouse	0.7	0.32	-5.7	-0.63	1.2	0.31	-2.4	2.7

Notes: Results are based on a simulation sample of 50,000 rational and overoptimistic households. The results are derived by summing up the respective outcome measure over the entire life-cycle and over the entire sample, e.g., women or men, assuming either rational or overoptimistic expectations. Then, we calculate the %-difference or the difference in hours/week in the aggregate sums using rational expectations as the base. There exist couples, in which both spouses initially have the same wage due to the discreteness of the human capital grid (17.7%). In the data these couples rarely exist (see Table C1). Table D6 contains results for this group.

Within-couple specialization. Focusing on average outcomes by gender masks the importance of initial human capital differences within the couple. Therefore, to pin down differences of rational and overoptimistic couples in their degree of specialization, we compute the differences in the time allocation during marriage for spouses with the initially lower and those with the initially higher wage within their couple, presented in the last two rows of Table 3.[28] Initially lower-wage spouses in overoptimistic couples have substantially lower market hours within marriage than those in rational couples with a difference of -17.8% or -2.98 h/week. In contrast, overoptimism leads 0.7% higher market hours for the initially higher-wage spouses. Therefore, with overoptimistic expectations, the lower-wage spouse invests more time into home production (+2.22 h/week) overcompensating the lower involvement in home production by the higher-wage spouse (-0.63 h/week). Finally, both spouses consume higher leisure.

We observe that conditional on initial wage differences overoptimistic couples specialize more than rational couples. We confirm this result by computing two measures of within-couple specialization, independently of their initial wages: the average absolute within-couple difference in market hours as well as in home production hours. Table 4 shows that the within-couple difference in market hours is 8.2% or 2.8 h/week higher in overoptimistic couples than in rational ones. This difference is mirrored by higher specialization in home production in overoptimistic couples (7.4% or 2.3 h/week).

Table 4: Specialization of overoptimistic and rational couples within marriage

	Average absolute within-couple difference in ...	
	... market hours/week	... home production hours/week
Rational couples	34.24	31.23
Overoptimistic couples	37.04	33.54
Difference in hours/week	2.80	2.31
% Difference	8.18	7.38

Notes: Results are based on a simulation sample of 50,000 rational and overoptimistic households. We calculate the measure as follows: We calculate the average (over couples and time) absolute within-couple difference of market hours (home production hours) for overoptimistic couples as well as rational couples.

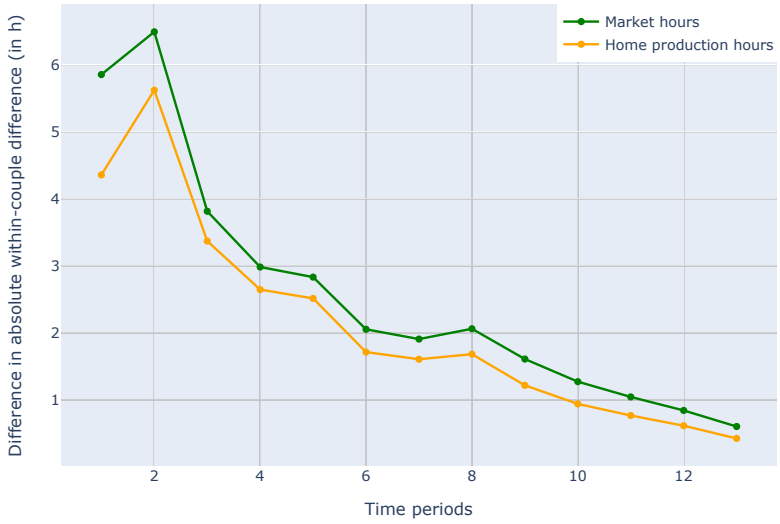
Figure 3 depicts the within-couple differences in market and home production hours over the life cycle.[29] The larger specialization of overoptimistic couples is particularly

[28] Due to the discreteness of the human capital grid, in some couples spouses have the same initial wage. We include results for them in Table D6. Their degree of specialization depends only on gender differences in home production productivity and the realizations of the human capital shock.

[29] Figure D5 shows the averages for market and home production hours over the life cycle.

pronounced at the beginning of the life cycle, with its peak at the first child's birth in $t = 2$. The early years of life are also the time with the highest wage growth, thereby, implying large returns to specialization – to ensure that one partner builds a career – but also to building up human capital as insurance in anticipation of a potential divorce.

Figure 3: Difference of the average absolute within-couple difference of market and home production hours per week between overoptimistic and rational couples



Notes: Results are based on a simulation sample of 50,000 rational and overoptimistic households. We calculate the measure as follows: For each time period t, we calculate the average absolute within-couple difference of market hours (home production hours) for overoptimistic couples as well as rational couples. Then, we take the measure of the overoptimistic couples and subtract the one of the rational couples. We plot the average absolute within-couple differences for both hours measures and expectation type in Figure D5.

The measure of absolute within-couple differences is gender neutral. In the Appendix in Figure D7, we plot the distribution of the difference in male and female market and home production hours in $t = 2$ and $t = 5$. Overoptimistic couples outweigh rational couples at both ends of the distribution implying that the increased specialization depends on the relative productivity in the market and at home.

The reason for the higher specialization of overoptimistic couples is that both spouses in an overoptimistic couple neglect their divorce risk. For both spouses, the accumulation of human capital would be a way to self-insure against the case of divorce and thereby overoptimistic spouses perceive the return to market hours to be lower compared to the (correct) perception of both spouses in a rational couple. The insurance value of acquiring human capital is higher for the lower-wage spouse. To prepare for the case of divorce through higher market hours, a rational couple forgoes the consumption of

the home-produced good as there is less time left to provide such a good within their marriage. They also give up on leisure to rather accumulate human capital through market hours. If the true divorce likelihood was zero, rational couples would behave like overoptimistic ones and specialize more compared to their behavior with a positive divorce likelihood. Therefore, by neglecting the possibility of divorce, overoptimistic couples reap benefits from specialization within marriage.

Heterogeneous responses by initial human capital and gender. Next, we focus on differences in behavior when conditioning on two time-independent characteristics: gender and the initial wage combination of the couple, i.e., if the female spouse had the initially (i) lower wage, (ii) higher wage, or (iii) same wage compared to her husband. Table 5 summarizes the differences in behavior and consumption of men and women in rational and overoptimistic couples if we focus on groups (i) and (ii).[30] We observe strong specialization patterns along the gender dimension once we condition on these groups of couples. In group (i), female, lower-wage spouses in overoptimistic couples have substantially lower market hours during marriage compared to those in rational couples (-17.3% or -2.33 h/week). In turn, their home production hours are 1.71 h/week higher, which counterbalanced lower home production of their spouses. This leads to higher consumption of the home-produced good and lower private consumption due to a lower household income. After divorce, women, who lived in an overoptimistic couple, still work slightly less as they have lower human capital, therefore, allocating their time to home production.

In group (ii), which consists of couples with an initially higher-wage female spouse, we observe the reversed pattern: men in overoptimistic couples have drastically lower market hours than those in rational couples, and to a lesser extent, the opposite for women. The differences in home production hours are large: overoptimistic women invest almost 7% (-1.16 h/week) less than rational women. However, their male spouses outweigh this by investing 10.6% more (3.24 h/week). The stronger responses compared to those in group (i) are due to the complementarity of home production hours within marriage (cf. eq. (2) and $\sigma = 0.8$) combined with higher home production hours of women in group (ii) compared to hours of men in group (i), due to the higher female productivity at home.

After divorce, overoptimistic men in group (ii) suffer a large consumption drop, but invest more time in market work and less in home production compared to rational

[30] Table D6 shows the results for the group (iii).

Table 5: Difference in behavior and consumption between over-optimists and rationals – **Couples with different initial human capital** (in %)

	Market work		Home production		Leisure		Consumption	Home-prod. good
	%	h/week	%	h/week	%	h/week	%	%
(i) Initially lower female wage								
Entire working life								
Women	-10.0	-1.81	3.4	1.32	1.8	0.49	-2.2	2.3
Men	0.1	0.05	-2.5	-0.27	0.9	0.23	-1.5	2.4
During marriage								
Women	-17.3	-2.33	4.1	1.71	2.2	0.62	-2.0	2.5
Men	0.1	0.06	-4.4	-0.36	1.1	0.31	-2.0	2.5
After divorce								
Women	-0.7	-0.21	0.4	0.12	0.4	0.09	-3.0	0.4
Men	0.0	0.02	0.0	-0.01	0.0	-0.01	-0.1	0.0
(ii) Initially higher female wage								
Entire working life								
Women	1.6	0.67	-4.7	-0.90	1.0	0.22	-2.4	3.0
Men	-11.0	-3.13	8.7	2.39	2.6	0.74	-3.4	3.0
During marriage								
Women	1.9	0.85	-6.9	-1.16	1.3	0.31	-3.1	3.3
Men	-18.5	-4.28	10.6	3.24	3.5	1.04	-3.1	3.3
After divorce								
Women	0.4	0.13	-0.3	-0.08	-0.2	-0.05	0.0	-0.3
Men	0.9	0.41	-1.2	-0.20	-0.9	-0.20	-4.5	-1.2

Notes: Results are based on a simulation sample of 50,000 rational and overoptimistic households. The results are derived by summing up the respective outcome measure over the entire life-cycle and over the entire sample, e.g., women or men, assuming either rational or overoptimistic expectations. Then, we calculate the %-difference or the difference in hours/week in the aggregate sums using rational expectations as the base. There exist couples in which both spouses initially have the same wage due to the discreteness of the human capital grid (17.7%). In the data these couples rarely exist (see Table C1). Table D6 contains results for this group.

divorced men with the aim to built up human capital. This behavior differs from the response of initially lower-wage, overoptimistic women, i.e., women in group (i). The reason is an important difference between men and women: children keep living with their mother after divorce. Hence, the mother experiences a sharp drop in consumption because it is scaled down by $e(k_t)$, although she receives child support from her ex-spouse. In addition, her utility derived from the home-produced good is scaled up by the presence of children through $b(k_t)$.

Therefore, lower-wage female spouses can rely on home production as an additional insurance device after divorce. Lower-wage male spouses are, thus, more dependent on

the accumulation of human capital to ensure their well-being after divorce. This differential incentive also explains the stronger specialization patterns induced by overoptimistic expectations for couples with an initially lower-wage male spouses (group (ii)) compared to couples with an ex-ante lower-wage female spouses (group (i)).

Within-couple wage inequality. An endogenous consequence of higher specialization of couples is the higher within-couple wage inequality. Table 6 presents the average of the absolute difference of female and male spousal wages during marriage. It amounts to \$21.5 for rational couples and increases by 3.58% to \$22.27 for overoptimistic couples. We further observe that within-couple wage inequality is largest for couples in which the female spouse had the initially lower wage, while the difference between rational and overoptimistic couples is largest for couples with an initially lower male wage (5.60%).

Table 6: Within-couple wage inequality during marriage

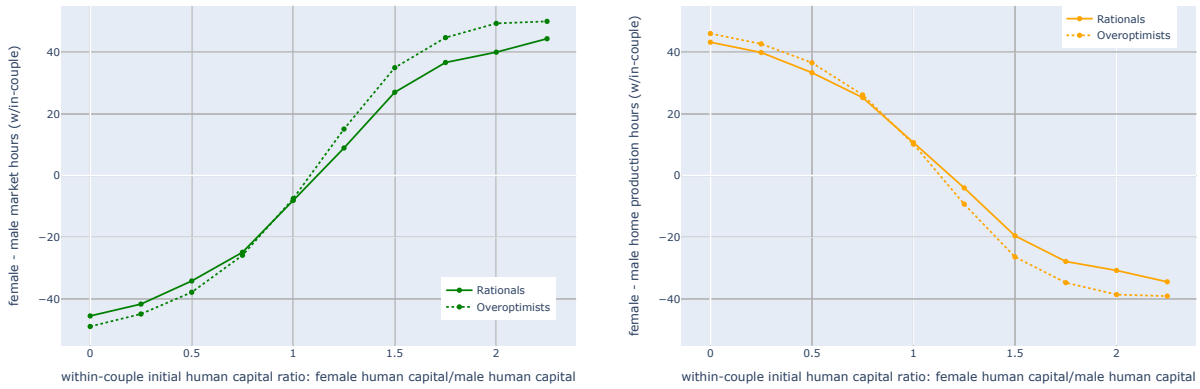
	Rational couples	Over-optimistic couples	Difference in %
Entire population	21.50	22.27	3.58
Couples with ...			
... initially lower female wage	23.99	24.63	2.70
... initially higher female wage	21.18	22.36	5.60
... initially same wage	14.34	14.84	3.53

Notes: We calculate the within-couple wage inequality by taking the absolute difference of female and male spousal wages for each couple in each period and then average over all rational, respectively overoptimistic, couples and their life cycles as long as they stay marred.

Heterogeneous responses by magnitudes of the initial wage difference. The magnitude of the initial wage difference proxies the potential gains from specialization within marriage. Therefore, we visualize the specialization of couples conditional on their respective initial human capital. First, Figure 4 plots the average within-couple difference of female market (home production) hours minus male market (home production) hours for overoptimistic and rational couples by human capital ratios, where we fix the initial male human capital to the median value ($K_m = 4$), while the female initial human capital varies.[31] Figure 4a shows that the spouse with the initially lower human capital works less in the market: for values of the human capital ratio on the horizontal axis that are smaller (larger) than one, the difference is negative (positive) implying that female spouse works less (more) in the market. For the exact same initial human capital,

[31] Figure D6 depicts the same plots for fixed initial female human capital.

Figure 4: Difference in within-couple market and home production hours by initial human capital ratio (per week)



(a) Market hours

(b) Home production hours

*Notes: We **fix the initial male human capital to** $K_m = 4$, representing the median initial male wage. Female human capital varies along the horizontal axis. The within-couple hours difference is given by female - male hours.*

women work slightly less due to their higher productivity at home. Figure 4b shows that the differences in home production hours mirrors those in market hours. Importantly, we observe that specialization is larger in overoptimistic couples than in rational couples as the differences in market hours are more negative for human capital ratios below one and more positive for rations above one. The difference between overoptimistic and rational couples is amplifies by larger wage differences. Figure D8 presents the difference of the measures in Figure 4 for overoptimistic and rational couples over the entire human capital space of both spouses.

How do assets and human capital adjust? The substantial differences in market hours of the lower-wage spouses in overoptimistic and rational couples are driven not only by different perceived returns to human capital but also by a lower perceived marginal value of assets. Savings are an additional way to insure against consumption drops after divorce.[32] Neglecting divorce implies lower incentives to save, which, ceteris paribus, implies higher incentives for contemporaneous private consumption, consumption of the home-produced good and leisure. Hence, the couple allocates more time towards home production.

Table 7 summarizes the %-differences in the average asset and human capital levels between rational and overoptimistic couples at the time of divorce and of divorcees when

[32]There are no different incentives for both spouses about who consumes their savings after divorce versus during marriage as we assume an equal asset split after divorce and a uniform bargaining weight.

Table 7: Difference in assets and wages upon divorce and at retirement (in %)

	Upon divorce		At retirement	
	Assets	Wages	Assets	Wages
Entire population				
Women	-27.85	-2.22	-1.80	-2.08
Men	-27.85	-1.36	-1.36	-1.17
Initially lower female wage				
Women	-30.20	-5.39	-3.34	-4.93
Men	-30.20	0.02	-0.11	0.00
Initially higher female wage				
Women	-37.26	0.25	-0.14	0.32
Men	-37.26	-6.94	-5.63	-5.15
Initially same wage				
Women	-2.78	-1.32	-0.70	-1.12
Men	-2.78	-0.93	-0.85	-0.77

Notes: We calculate the average asset as well as individual human capital levels upon divorce and at retirement for rational and overoptimistic couples. Then we calculate the %-change between the average of overoptimistic couples and the average of rational ones (with rational as baseline).

entering retirement. An overoptimistic couple has about 28% lower assets upon divorce. Overoptimistic couples with initial wage differences have a higher incentive to specialize compared to couples with similar initial wages. This leads to a stronger decline in their household income, lowering their assets substantially more (-30.2% and -37.3% compared to -2.8%). For initially lower-wage divorced spouses, the difference in assets persists even until retirement with differences of -3.3% for women and -5.6% for men. It is especially difficult for them to catch up to their rational counterparts as they also suffer from lower wages upon divorce: -5.4% for women and -6.9% for men. The higher-wage spouses can almost entirely catch up in their asset accumulation after divorced due to their sustained and high human capital levels upon divorce. In sum, Table 7 shows the worse conditions that overoptimistic spouses face upon divorce, which is especially true for the more vulnerable, lower-wage spouses within each couple.

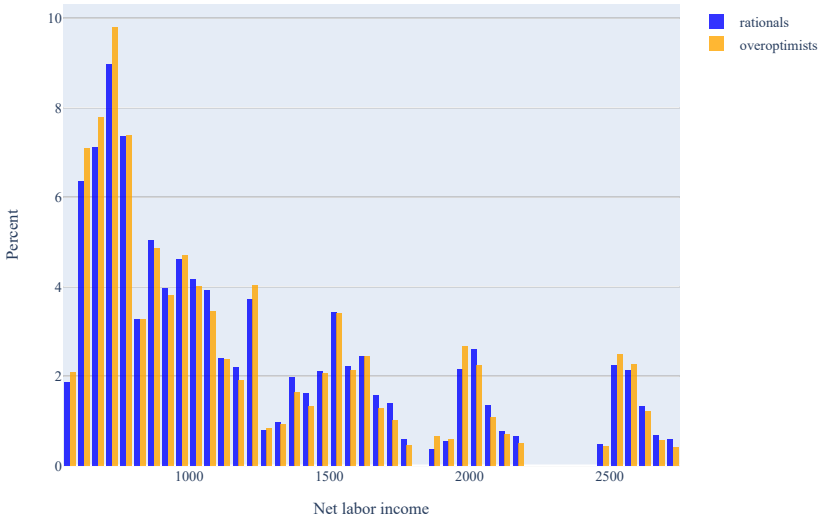
When divorce occurs matters. A divorce of an overoptimistic couple, that occurs later in life, has two implications compared to an earlier divorce: on the one hand, the couple had more time during marriage to specialize and reap the benefits of specialization. But, on the other hand, this also implies worse conditions in terms of assets and human capital upon divorce, which affects primarily the initially lower-wage spouse.

Summary of the effects of overoptimism on household behavior. In short, an overoptimistic couple agrees that the lower-wage spouse works less in the labor market and instead invest more time into the production of the home-produced good compared to a rational couple. This allows the higher-wage spouse to invest less time into home production, and marginally more into market hours. Both spouses also enjoy higher leisure. All of this happens because the couple underestimates the value of self-insurance through assets and human capital and, therefore, willingly accumulates fewer assets and less human capital. If divorce risk was taken into consideration, the incentive to insure would be higher for the spouse with the currently lower human capital level. Neglecting the need for self insurance, allows the couples to reduce the sum of their market hours and allocate market hours more strongly according to their productivity differences within marriage, leading to higher specialization in home production and market hours. In sum, this leads to lower levels of consumption, higher levels of leisure, and higher levels of the home-produced good within marriage but also to lower savings. Upon divorce, lower-wage overoptimistic spouses unexpectedly enter the new period of life with lower assets and human capital compared to a spouse who lived in a rational couple.

5.2 Net income distribution of divorced mothers

The impact of overoptimistic expectations during marriage propagate even after divorce. Divorced mothers are particularly affected by poverty in the data: the U.S. Census Bureau reports that in 2016, 20% of women who divorced within the last 12 month have a household income below the poverty level in comparison to 11% for recently divorced men and 8% for married women (Mayol-García, Gurrentz, and Kreider 2021). We focus on mothers, who get divorced after having been with their spouse for at least 12 years, i.e., who faces a divorce between age 35 and 43, which covers 8.6% of the female population in our economy. Figure 5 shows their weekly net income distribution at the age 47 to 49. The net income distribution comprises after-tax labor income plus received maintenance payments. The net income distribution of divorced, previously overoptimistic women (in orange) exhibits a larger mass at smaller incomes than the distribution of divorced, rational women (in blue). Hence, even years after divorce, the missing insurance implied by overoptimistic divorce expectations during marriage still has a negative impact on the net income of the most vulnerable. Therefore, our results imply that overoptimistic divorce expectations are a possible key explanation for the persistent poverty of divorced mothers.

Figure 5: Net weekly household income of divorced women at the age 47 – 49 who got divorced between 35 and 43



Notes: Results are based on a simulation sample of 50,000 rational and overoptimistic households. The net weekly household income is the sum of after-tax labor income (incl. welfare and EITC) and maintenance payments received from the ex-spouse. Women either lived in an overoptimistic or rational couple.

5.3 Gender inequality

Overoptimistic divorce expectations increase within-couple wage inequality. But what are the implications for gender inequality, measured by the gender wage or earnings gap? We calculate both measures focusing on either overoptimistic couples or rational couples. We compute the average wages and gross earnings as the mean over all individuals and all time periods separately for both gender. Overoptimism explains only a small part of the observed gender gaps. The primary reason is that overoptimism leads

Table 8: Differences in gender gaps

	Gender wage gap (%)	Gender wage gap cond. on pos. hours (%)	Gender earnings gap (%)
Entire population			
rational couples	28.38	20.01	43.65
overoptimistic couples	28.75	20.04	43.72
Increase of gender gap in %	1.32	0.14	0.41

Notes: Values for rationals and over-optimists are given by the difference of male life-cycle averages and female life-cycle averages. Both averages are normalized such that the male life-cycle averages are 100. Increase in % captures the increase in the gender gap moving from rational expectations to overoptimistic expectations.

to higher within-couple wage inequality in labor market outcomes at the expense of the initially lower-wage spouse. Hence, in some couples it favors the higher-wage female spouse and in others the higher-wage male spouse. The two forces counterbalance when calculating the gender gaps. Yet, the gender wage gap and the gender earnings gap are substantially larger due to overoptimistic expectations in couples with an initially lower-wage female spouse (by 3.59% and 3.12% respectively, see Table D7).

5.4 Welfare effects of an information treatment

To evaluate welfare effects of overoptimistic divorce expectations, we consider an information treatment that induces the previously overoptimistic couples to use rational, correct expectations throughout their marriage. Would spouses in an overoptimistic couple benefit from this and if so, by how much? We take the paternalistic perspective of a social planner and apply the actual divorce probabilities that couples face over the life cycle (p_t^{div}) to compute, first, the ex-ante expected welfare of an information treatment for overoptimistic couples and, second, the respective ex-post realized welfare conditional on staying married throughout life or ever getting divorced.

Ex-ante expected (paternalistic) welfare. We adopt the approach of, for example, Balleer et al. (2021) and Exler et al. (2022), and calculate the consumption equivalence variation of a spouse in an overoptimistic couple due to the information treatment. By construction, the overoptimistic couple benefits from the information treatment because without learning the truth, their decisions would be based on biased expectations. But this does not necessarily need to hold at the individual level, which is a novel feature compared to single-agent models used in the previous literature on overoptimistic expectations. We define the consumption equivalence variation δ as the increase in per-period consumption of an overoptimistic individual $i \in \{f, m\}$ to make the individual as well off as after the information treatment:

$$\underbrace{\mathbb{E}_0^r\left[\sum_{t=1}^{T+T_R}\beta^{t-1}u_i^{\cdot}\Big((1+\delta)\cdot c_{it}^o, l_{it}^o, Q_{it}^o\Big)\right]}_{=\mathcal{W}_i^o(\delta)} = \underbrace{\mathbb{E}_0^r\left[\sum_{t=1}^{T+T_R}\beta^{t-1}u_i^{\cdot}\Big(c_{it}^r, l_{it}^r, Q_{it}^r\Big)\right]}_{=\mathcal{W}_i^r}, \tag{13}$$

where $\mathbb{E}_0^r$ indicates rational expectations, indicated by r and taken from the perspective of period 0, $u_i^{\cdot}$ represents either u_i^{mar} or u_i^{div} depending on the marital status of the individual, c_{it}^o, c_{it}^r, l_{it}^o, and l_{it}^r represent the consumption and leisure choices given overoptimistic and rational expectations, and Q_{it}^o and Q_{it}^r represent the consumption of

the home-produced good, which do not depend on i during marriage. The calculation is conditional on the same initial conditions in assets and both spouses' human capital. Hence, we calculate it for each simulated couple and average it by gender. In addition, we condition on groups of couples with different initial human capital combinations.

Table 9: Paternalistic ex-ante welfare of an *information treatment* for over-optimists in % by gender ($\delta \cdot 100$)

	All	initially lower female wage	initially higher female wage	same initial wage
Women	0.26	0.41	0.07	0.06
Men	0.29	-0.04	1.06	0.09
Population shares	100%	54.8%	27.5%	17.7%

Notes: Paternalistic welfare of an information treatment expressed as consumption equivalence variation (CEV) relative to benchmark of overoptimistic divorce expectations.

The first column in Table 9 shows that, on average, both spouses gain from learning about the true divorce probabilities.[33] Once we condition on groups of couples with different combinations of initial human capital, we find stark differences: first, in couples with initially lower-wage female spouses, men actually lose from the information treatment (-0.04%), i.e., they benefit from overoptimistic beliefs at the couple level. However, the lower-wage women in these couples gain substantially more from the information treatment (+0.41%). Second, if men have initially the lower wage within the couple, the results turn around: women only slightly gain, while men's welfare increases significantly by 1.06% in response to the information treatment.

Overall, initial human capital levels within the couple matter a lot: lower-wage spouses gain substantially more from an information treatment, i.e., overoptimistic expectations hurt specially the more vulnerable spouses. They work less in the market and provide more home production hours during marriage, implying lower human capital upon divorce. As overoptimistic couples also save less, lower-wage spouses are especially hurt by a divorce and face a persistently lower consumption than a lower-wage divorcee, who lived in a rational couple.

Lower-wage men are affected more strongly compared to lower-wage women because of two reasons: First, their reduction in market hours are larger during marriage because their marginal return to an increase in home production hours is more pronounced. The reason is that, in couples, in which men have an initially lower wage, home production

[33] We use a "behind the veil of ignorance" perspective, i.e., spouses do not know their wages yet.

hours are more equally distributed across gender and home production hours are complementary (see equation (2) with $\sigma = 0.8$). Second, after divorce women take care of the children which implies that their home-produced good receives a larger weight in the utility function compared to divorced men. Hence, children work as an insurance device as divorced women can substitute private consumption with consumption of the home-produced good, outweighing the effect that children consume a substantial part of mother's household income.

Ex-post realized welfare. We extend the previous analysis and calculate the consumption equivalence variation as described in equation (13) conditional on the realization of the divorce shock: first, for couples that get divorced at some point over their life cycle and second, those couples who stay married throughout. Table 10 shows that, on average, both spouses in always-married couples lose from the information treatment. Intuitively, overoptimistic couples do not insure themselves against the divorce shock and if the shock does not occur over the life, they only reap the benefits from specialization but do not incur the costs. Therefore, an information is costly for them if they stay married throughout life. In contrast, spouses who ever get divorced incur a large welfare gain from the information treatment of 1.06% of consumption equivalence variation for women and 1.39% for men.

Table 10: Ex-post realized welfare of an *information treatment* for over-optimists in % by gender ($\delta \cdot 100$)

	All	initially lower female wage	initially higher female wage	same initial wage
Ever-divorced				
Women	1.06	1.85	-0.25	0.38
Men	1.39	-0.20	4.87	0.65
Always-married				
Women	-0.19	-0.43	0.23	-0.12
Men	-0.29	0.04	-1.01	-0.19

Notes: Ex-post realized welfare of an information treatment expressed as consumption equivalence variation (CEV) relative to benchmark of overoptimistic divorce expectations for couples who either stayed married throughout life or got divorced at some point.

This highlights the tension between specialization during marriage and sufficient insurance in case of divorce. After an information treatment, always-married couples specialize less, which hurts the lower-wage spouse, while the initially higher-wage spouse is (slightly) better off. Their household income increases after the information treatment

leading to higher private consumption, which is counterbalanced by lower levels of the home-produced good and lower leisure. The consumption changes are the same for both spouses due to the equal bargaining weight, but leisure decreases more for the lower-wage spouse, implying higher losses from the information treatment. In overoptimistic couples that get divorced at some point over the life cycle, the initially lower-wage spouses experience sizeable welfare gains of 1.85% for women and 4.87% for men from the information treatment. In contrast, their respective higher-wage spouses are slightly worse off.

5.5 Information treatment: aggregate outcomes

Our quantitative model provides us with a laboratory to evaluate the effects of an information treatment on aggregate outcomes. In other words, what would happen to the economy if overoptimistic couples became rational at the beginning of their lives?[34]

Table 11: Aggregate changes due to the information treatment

	%-change
Savings	7.55
Total market hours worked	1.73
Level of human capital	1.39
Gross labor income	1.35
Gender earnings gap	-0.04
Discounted government revenue	3.89

Notes: First, we calculate the respective aggregate statistic using the estimated model with overoptimistic and rational couples as the sum over the entire life-cycle and the simulated sample. Then, we repeat the exercise for an economy with rational couples. The resulting %-changes of moving from the baseline environment with $\mathcal{S}_o$ overoptimistic and $1 - \mathcal{S}_o$ rational couples to the environment with only rational couples is shown in this Table.

In line with the results in Section 5.1, which found overoptimistic couples to save less compared to rational couples, the aggregate level of savings would increase by 7.55%. In addition, gross labor income, a measure of the Gross Domestic Product (GDP) in this economy, increases by 1.35% driven by an increase in aggregate hours worked and human capital. Discounted government revenue would increase by almost 4% because the secondary earners in married couples would increase their market hours, who face

[34] We consider this as an interesting thought experiment because an information treatment might only be a hypothetical exercise: Baker and Emery (1993) also surveyed law students about their divorce expectations and found that even increasing the knowledge of law students through a course in family law does not diminish their overoptimism about their marital stability.

a higher marginal tax rate given joint taxation, leading to substantial increases in tax revenue. Finally, the gender earnings gap would decrease slightly given the counterbalancing effects of market hours increases of female and male lower-earning spouses.

We believe our results are likely upper-bound effects for two reasons: first, we did not consider general equilibrium effects, which might mitigate responses, especially savings responses. Second, our economy comprises a subgroup of the general population – married couples with two children – which is particularly prone to higher specialization and the related need for insurance. Hence, we expect the remaining population to respond, on average, less strongly, thereby mitigating the aggregate effects.

6 Mitigation through policies

The welfare results in Section 5.4 found that overoptimistic divorce expectations, on average, hurt couples, in particular the less-insured, lower-wage spouses. In this section, we discuss potential policies which might help to mitigate the implications of overoptimistic expectations, but surely interact with them. First, we focus on an increase in maintenance payments which represents an ex-spousal insurance mechanism. Second, we model the introduction of a *Divorce Fund* which rather reflects intra-generational insurance against divorce, i.e., insurance from married couples to those who get divorced.

6.1 Ex-spousal insurance: increase in maintenance payments

As pointed out earlier, the overwhelming share of maintenance payments in the US are child support payments. As we assume that children stay with their mother after divorce, child support payments flow from male ex-spouses to their former female spouses. In this subsection, we investigate the effects of a counterfactual increase in the maintenance payments $\mathcal{M}_t = \theta \; w_{mt} h_{mt}$ through an increase in θ from 10% to $\hat{\theta} = 20\%$ of the gross labor income of the male ex-spouse.[35]

Welfare implications. We evaluate the reform by calculating the implied consumption equivalence variation (CEV) for men and women in rational, respectively, overoptimistic couples induced by the introduction of higher child support (similar to equation 13). Hence, we determine the welfare gain or loss that arises by moving from the

[35] In the PSID, only a negligible share of former spouses pay alimony payments. Therefore, we focus on an expansion of the existing child support payments even though we would expect that an increase in alimony payments that depends on the difference in human capital at the time of divorce – or as human capital is unobservable, on gross labor income – would be a better targeted post-marital insurance policy. We intend to investigate this policy in the future.

baseline scenario to the one with increased child support. Table 12 shows that in both rational and overoptimistic couples, women substantially gain from the increase in child support, while men lose. The men's loss in consumption equivalent units is smaller than the women's gain. The welfare losses of men are relatively similar across different initial couples' wage combinations, whereas women gain the most if they have the initially lower wage (by about 6% of CEV). Hence, the model predicts that there is too little post-marital insurance conditional on spousal wage differences in the US. The gains are comparable for rationals and over-optimists but slightly larger for over-optimists because the policy provides additional insurance for female, lower-wage spouses – one group that is adversely impacted by overoptimistic divorce expectations. Finally, we take a "behind-the-veil-of-ignorance" perspective along all heterogeneity, implying that neither gender, divorce expectations type, nor wages are known yet for a newborn, i.e., we average out wages, gender, and the divorce expectations type. We find that aggregate welfare increases by 0.61% of consumption equivalence variation due to increased child support.

Table 12: Ex-ante expected welfare of an *increase in maintenance payments (child support)* by gender and divorce expectation type: consumption equivalence variation in %

	All	initially lower female wage	initially higher female wage	same initial wage
Aggregate Welfare	0.61			
Rational couples				
Women	4.63	5.93	2.44	3.72
Men	-3.42	-3.35	-3.54	-3.44
Overoptimistic couples				
Women	4.68	6.09	2.34	3.64
Men	-3.46	-3.40	-3.63	-3.41

Notes: Ex-ante expected welfare of an increase in maintenance payments expressed as consumption equivalence variation (CEV) relative to baseline economy by gender and divorce expectation type.

Behavioral adjustments during marriage. In our setting, overoptimistic couples do not expect to get divorced which implies that any changes in divorce laws, in particular increases in post-marital payments, do not affect decisions of married, overoptimistic couples. In contrast, rational couples anticipate divorce and higher child support and, therefore, adjust their decisions during marriage. Due to higher income from child support after divorce, the return to human capital in their lives after divorce decreases for women, leading to lower market hours during marriage. As a woman receives a larger

share of the returns to the couple's investments into the human capital of the male ex-spouse, the relative return of investing in her spouse's human capital relative to hers increases further. In anticipation of higher child support payments after divorce, married men work more in the market because the increased payments after divorce require a higher human capital to sustain income levels.[36] This leads to higher specialization in couples in which women are the lower-wage spouse, while it leads to more equal labor market and home production outcomes in couples with a higher-wage female spouse.

Behavioral adjustments after divorce. Divorcees who previously lived in an overoptimistic or rational couple only differ in their levels of human capital and assets upon divorce. Therefore, their behavioral adjustments in response to increased child support are comparable. In general, due to the higher income through child support, women decrease their market hours and increase their home production, and leisure. Inversely, men increase their working hours driven by the negative income effect of higher child support payments, which outweighs the substitution effect that induces them to work fewer hours in the labor market. They further decrease their home production hours and leisure. The adjustments are largest for divorcees of couples, in which women were initially the lower-wage spouse. Mechanically in these couples men have, on average, higher levels of human capital compared to other couples, implying a larger increase in child support payments due to the proportional increase in child support, amplifying the responses of men and women.

6.2 Within-generational insurance: divorce fund

The welfare results in Section 5.4 highlight the gains from overoptimistic expectations during marriage and losses after divorce, both of which driven by the lower-wage spouses. This motivates the introduction of a *Divorce Fund*, which raises revenue from all married couples and redistributes to divorcees. We assume that the insurance occurs within a generation and that the divorce fund is running an inter-temporally balanced budget.[37] We consider an annual payment of \$5,200 per year, i.e., \$100 per week, to divorcees during their working life. Budget neutrality requires annual contributions of \$3,217.5 by

[36] There exists an opposing substitution effect as the return to human capital decreases in case of divorce as a higher share of gross labor income needs to be paid as child support. But the income effect dominates the substitution effect.

[37] In both policy experiments, we abstract from potential concerns of moral hazard, i.e., couples getting divorced as their outside options after divorce change. We would expect the effect to be more pronounced in the case of a divorce fund as both spouses receive financial support after divorce while the increase in maintenance payments has opposing incentives for both spouses. Higher divorce rates due to the introduction of the divorce fund would increase the contributions during marriage.

married couples. The divorce fund increases the effective total tax liability on married couples and decreases it for divorcees. All remaining features of the tax and transfer system are unchanged. In comparison to the increase in child support, a divorce fund also affects overoptimistic couples during marriage through their contributions.

Welfare implications. We follow the same approach as in the previous policy experiment and evaluate the introduction of the divorce fund by calculating the implied consumption equivalence variation (CEV) for men and women in rational, respectively, overoptimistic couples. Both rational and overoptimistic couples experience a decrease in welfare during marriage, slightly less pronounced for rational couples. But in case of divorce, couples benefit substantially from the additional insurance with a stronger impact on overoptimistic individuals, driven by the improved insurance for overoptimistic lower-wage spouses. In fact, both overoptimistic men and women under the veil of ignorance, i.e., before their individual joint wages are drawn, benefit from the introduction of the divorce fund: their consumption equivalence variation is 0.17% for women and 0.10% for men (see Table 13). Women in rational couples also benefit from the increased insurance after divorce with a consumption equivalence variation of 0.09%. Only men in rational couples are slightly worse off with a decrease in ex-ante expected welfare of -0.01%. Finally, applying the "behind-the-veil-of-ignorance" perspective by averaging out wages, gender, and the divorce expectations type, we find that aggregate welfare increases by 0.10%.

Table 13: Ex-ante expected welfare of *the introduction of a Divorce Fund* by gender and divorce expectation type: consumption equivalence variation in %

	All	initially lower female wage	initially higher female wage	same initial wage
Aggregate Welfare	0.10			
Rational couples				
Women	0.09	0.64	-0.73	-0.43
Men	-0.01	-0.71	1.36	-0.02
Overoptimistic couples				
Women	0.17	0.81	-0.77	-0.45
Men	0.10	-0.74	1.76	0.01

Notes: Ex-ante expected welfare of the introduction of a divorce fund expressed as consumption equivalence variation (CEV) relative to baseline economy by gender and divorce expectation type.

Behavioral adjustments during marriage. Both overoptimistic and rational couples adjust their behavior during marriage in response to the contributions to the divorce

fund. We observe largely similar responses among overoptimistic and rational married couples. Due to the lower household income, both spouses reallocate their time within marriage. First, both decrease leisure hours to sustain consumption and the level of the home-produced good. The higher-wage spouse works slightly more on the market but also increases home production as market hours are limited to 50 hours/week. The lower-wage spouse increases market hours substantially and, therefore, even reduces home production hours. Private consumption and consumption of the home-produced good decrease within marriage. Time reallocations are more pronounced in overoptimistic couples because overoptimistic, lower-wage spouses worked less before the reform than those in rational couples. In addition, the perceived return to human capital increases for overoptimistic couples as they expect to stay married for their remaining life and, therefore, expect to contribute to the divorce fund throughout life.

Behavioral adjustments after divorce. As the policy redistributes resources from currently or previously married couples to divorcees, it works as an insurance policy against income losses after divorce. The higher post-divorce income allows the divorcees to reduce their market hours and to reallocate time towards home production and leisure. Private consumption and the level of the home-produced good increases for all divorcees. The policy implies a stronger insurance effect for overoptimistic couples than rational couples driven by a more considerable increase in the post-divorce private consumption of lower-wage spouses. Overoptimistic male lower-wage spouses also benefit from more substantial increases in their consumption of the home-produced good.

7 Conclusion

Starting from the robust observation that many couples are overoptimistic about their marital stability, we connect two recently growing strands of the economics literature in this paper: first, the literature that uses macro-family household models, which take into account that a couple makes joint decisions and second, the literature that relies on subjective expectations, which individuals might have about future states of the world when modeling their decision-making process. We combine both in a structural household model, allowing couples to have overoptimistic expectations about their marital stability when they make joint decisions about their time allocation, consumption, and savings. We quantify the model using U.S. micro data.

Incorporating overoptimism about marital stability leads to higher specialization within marriage and lower self-insurance of the lower-wage spouse through human capital ac-

cumulation and assets, which propagates beyond divorce. Therefore, overoptimistic divorce expectations are a potential explanation for the high poverty rates of divorced single mothers. Couples with overoptimistic divorce expectations would benefit from an information treatment based on a paternalistic, ex-ante welfare measure. We study two policy experiments: first, an increase in child support, which is to the benefit of women as it provides insurance after divorce for the divorced mother with whom the child lives. The gains are larger for those who lived in an overoptimistic couple during marriage. Second, a within-generational insurance policy, a divorce fund, which reallocates from married couples to divorcees, would mitigate the effects of overoptimistic expectations. In a world without overoptimism, aggregate hours worked, human capital, and savings would increase substantially.

As this is – to the best of our knowledge – the first paper considering overoptimism regarding divorce expectations in a structural household model, various interesting extensions exist. To list only a few: First, the introduction of learning about an underlying match type in a limited commitment framework might lead to interesting further refinements of our baseline result, even though we expect the main result of higher specialization within marriage with its propagating effects on life after divorce to be robust. Endogenizing divorce in the model would allow us to further incorporate possible changes in divorce incentives due to policy reforms. Second, a divorce can potentially be very harmful for children. An exciting avenue would be to investigate the interaction of child development and divorce expectations. Changes in the time allocation within marriage and the custodial mother's lower net household income would impact children. Finally, heterogeneity in expectations within households and the implications for specialization and post-marital poverty is an extension we intend to investigate further.

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Appendix

A Institutional Background

A.1 Asset Division upon Divorce

Currently, three states mandate an *equal* 50/50 split of assets upon divorce, while the remaining forty-seven states and the District of Columbia impose an *equitable* division of assets upon divorce. Among the states with an equitable divorce regime, thirteen states start with a presumption of equal asset division. Legal decision-makers have discretion in allocating assets and consider an extensive list of factors such as housecare contribution, labor force attachment, vocational skills, and the ability of each spouse to accumulate capital assets and earnings (Hersch and Shinall 2020). In practice, equitable divorce regimes assign one-half to two-thirds of the assets to the primary-earner spouse (Woodhouse 2019).

A.2 Child Support Payments

One of the most recent sources for evaluating child support payments after divorce in the United States is the April 2017 report of the Child Support Supplement (CSS) derived from the Current Population Survey (CPS) (Grall 2020). This report encompasses demographic information about custodial parents in 2018 and child support data, as well as other income details for the 2017 calendar year. In 2017, it was found that 49.4% of all custodial parents had either legal or informal child support agreements in place. Among custodial parents eligible for child support, approximately 69.8% of them received partial payments, while about 45.9% received the full child support amount they were owed. The mean annual child support amount received by the 5.4 million custodial parents who were supposed to receive payments in 2017 was $3,431, representing, on average, 8.8% of their personal income.

A.3 Child custody

According to data from the 2019 Current Population Survey (CPS), approximately 83.0% of children residing with a single custodial parent were found to be living with their mothers (Anderson, Hemez, and Kreider 2022). These statistics closely mirror the findings from previous editions of the Child Support Supplements (CSS) within the CPS. In 2013, 82.5% of custodial parents were mothers, while 17.5% were fathers (Grall 2016).

B Additional information on the Model

B.1 Retirement

In this section, we formalize the value functions of retirement for both married and divorced couples. The retirement problems differ from those in the pre-retirement phase in several key dimensions. Notably, retirees do not supply labor hours and, thus, they only allocate their time between leisure and home production. Furthermore, married couples do not face divorce risk any longer during retirement. As a result, expectations regarding divorce become irrelevant, and the optimization problem for both rational and overoptimistic couples collapses into the same deterministic problem. Retirees derive their income from assets and pension income. The latter is defined as the product of the final pre-retirement hourly wage w_{iT}, a fixed population-wide average of work hours denoted as $\overline{h}$, and the retirement replacement rate represented by ν_r. Finally, in retirement, there are no maintenance payments, and pension income is taxed according to the HSV-tax function, and as labor income is zero the EITC becomes irrelevant. The tax and transfer function including taxes and welfare is denoted by $\mathcal{T}_i^{div,ret}$ for divorced retirees and $\mathcal{T}^{mar,ret}$ for married retirees, respectively.

B.1.1 Problem of the Divorced Retiree

For an individual $i \in \{f, m\}$ that enters retirement as a divorcee, the state space is characterized by the current assets and the level of human capital which materialized during the final pre-retirement period T. This state space formulates as $\Omega_{it,ret} = \{A_{it}, K_{iT}\}$. In each time period, the retired divorcee makes choices regarding the allocation of time between hours devoted to home production and leisure. Furthermore, he or she makes choices concerning consumption and savings. Since assets are constrained by a non-negative savings requirement in the final period, $A_{iT+T_R} \geq 0$, optimality implies that savings will be zero at the end of life and the terminal value is given by $V^{div}_{iT+T_R+1,ret} = 0$. The choices made by a retired divorcee at time t summarize as $\iota_{it,ret} = \{c_{it}, q_{it}, l_{it}, A_{it+1}\}$. The value associated with a retired divorcee, for $i \in \{f, m\}$, at time t is given by

$$V^{div}_{it,ret}(\Omega_{it,ret}) = \max_{\iota_{it,ret}} \quad u^{div}_i(c_{it}, l_{it}, Q_{it}) + \beta V^{div}_{it+1,ret}(\Omega_{it+1,ret})$$

$$\begin{aligned} \text{s.t.} \quad & H = l_{it} + q_{it} \\ & c_{it} = w_{iT}\,\overline{h}\,\nu_r - \mathcal{T}_i^{div,ret}(w_{iT}\,\overline{h}\,\nu_r, k_t) + (1+r)A_{it} - A_{it+1} \\ & A_{iT+T_R} \geq 0, \quad V^{div}_{iT+T_R+1,ret} = 0. \end{aligned}$$

B.1.2 Problem of the Married Retiree

For a married couple that enters retirement, their state space is characterized by their joint assets and the respective human capital levels of both spouses in the pre-retirement period T. Their state space formalizes as $\Omega_{t,ret} = \{A_t, K_{mT}, K_{fT}\}$. In each period, the couple jointly decides about their respective time allocation of home production and leisure hours. Further, they jointly decide about their consumption and joint savings. The vector of choices summarizes as $\iota_{t,ret} = \{c_{mt}, c_{ft}, q_{mt}, q_{ft}, l_{mt}, l_{ft}, A_{t+1}\}$. The value of being a retired married couple in period t, who does not face divorce risk, is given by

$$V_{t,ret}^{mar}(\Omega_{t,ret}) = \max_{\iota_{t,ret}} \quad \mu \left[u_f^{mar}(c_{ft}, l_{ft}, Q_t)\right] + u_m^{mar}(c_{mt}, l_{mt}, Q_t) + \beta V_{t+1}^{mar}(\Omega_{t+1,ret})$$

$$\begin{aligned} \text{s.t.} \quad & H = l_{it} + q_{it} \quad , i \in \{f, m\} \\ & \left[c_{ft}^{\rho} + c_{mt}^{\rho}\right]^{1/\rho} = w_{mT}\,\overline{h}\,\nu_r + w_{fT}\,\overline{h}\,\nu_r - \mathcal{T}^{mar,ret}(w_{mT}\,\overline{h}\,\nu_r + w_{fT}\,\overline{h}\,\nu_r, k_t) \\ & \qquad\qquad + (1+r)A_t - A_{t+1} \\ & A_{T+T_R} = 0, \quad V_{T+T_R+1,ret}^{mar} = 0. \end{aligned}$$

C Additional information on the Quantification

C.1 Initial conditions

PSID sample for the initial conditions. To determine the initial conditions, we restrict our PSID sample to married couples with women between 23 to 26 years of age while her male spouse was 23 to 28 years old. This sample restriction allows us to stay close to a couple with the same initial age in period $t = 1$ (which is 23 to 25), but still takes into account that men are on average older than their female spouse and therefore, have higher initial wages. As we might observe a couple more than once, we average the observed wages for each spouse which reduces potential measurement error.

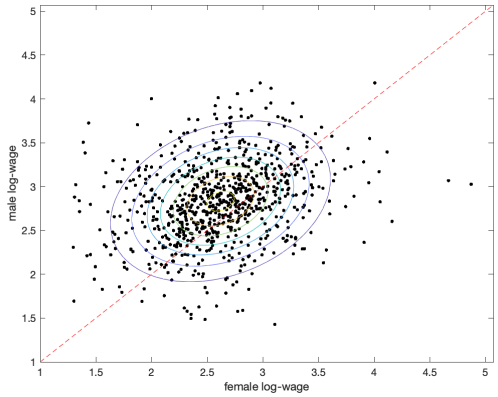
Initial assets. We use the PSID sub-sample and truncate the bottom and top 1% of the reported net wealth levels. Then, we calculate the average level of net savings. The uniform initial asset level for all married couples amounts to \$25 700 (in 2016 prices). Since we re-scale one model period to weekly time use, we also adjust assets by the number of weeks within the three-year model period, resulting in normalized assets of \$165.

Table C1: Population shares of initial human capital combinations within couple

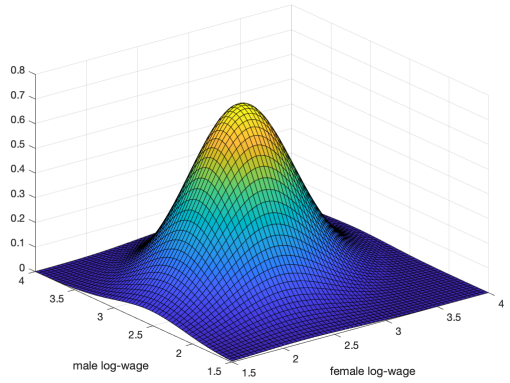
	Share of couples with initially ...		
	... higher female HC	... lower female HC	... same HC
Raw data	33.1%	66.6%	0.3%
Estimated joint log-normal distribution	34.9%	65.1%	0.0%
Discretized joint log-normal distribution	27.5%	54.8%	17.7%

Notes: Based on PSID 1999 – 2019 data. For more information, see the data description above and Section 4.1.

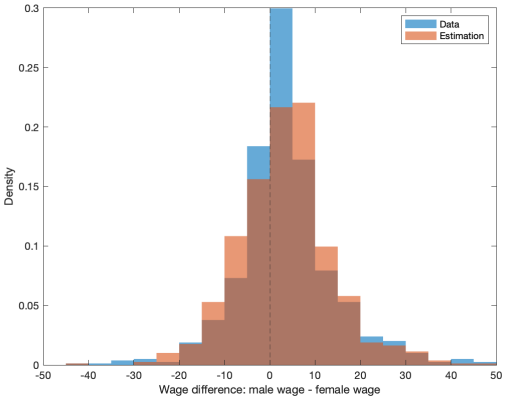
Figure C1: Initial joint wage distribution



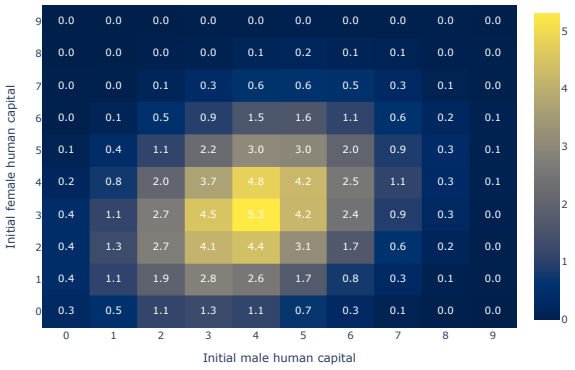
(a) Scatter Plot and fitted bivariate normal distribution of log-wages



(b) Surface plot of fitted bivariate normal distribution of log-wages



(c) Distribution of wage differences



(d) Mass distribution of discretized joint human capital distribution

Notes: Based on PSID 1999 – 2019 data. For more information, see the data description above and Section 4.1.

C.2 Government policies: Tax and transfer system

In the modelling and calibration of our tax and transfer system model, we adopt the methodology outlined by Guner, Kaygusuz, and Ventura (2023). This method provides a comprehensive evaluation of the US welfare state, taking into consideration the heterogeneity in marital status and family composition, which is essential for our model purposes. Specifically, this system is contingent on the total household income I, the number of children represented by nc which is contained in the family composition $k = (ac, nc)$,[38] marital status (categorized as mar for married or div for divorced), and gender i for divorcees. Formally, it is denoted as $\mathcal{T}^{mar}(I, k)$ for married couples and $\mathcal{T}_i^{div}(I, k)$ for single individuals of gender $i \in \{f, m\}$.

Guner, Kaygusuz, and Ventura (2023) normalize household income I by the mean household income in 2004 ($\approx$ \$60,500) such that $\hat{I} = \frac{I}{60{,}500}$. Note that we do not apply the same normalization in our model. Hence, to use their implementation of the tax and transfer system, we need to use the normalized household income $\hat{I}$ in calculating the effective normalized taxes $\widehat{\mathcal{T}}$ based on the HSV-tax function, the EITC and welfare. We define those as $\widehat{\mathcal{T}}^{mar}(\hat{I}, k)$ for married couples and $\widehat{\mathcal{T}}_i^{div}(\hat{I}, k)$ for single individuals of gender $i \in \{f, m\}$ such that

$$\widehat{\mathcal{T}}^{mar}(\hat{I}, k) * I = \mathcal{T}^{mar}(I, k),$$
$$\widehat{\mathcal{T}}_i^{div}(\hat{I}, k) * I = \mathcal{T}_i^{div}(I, k), \quad i \in \{f, m\}.$$

Then, the tax and transfer systems represented by the effective normalized tax functions for both marital types are defined as

$$\widehat{\mathcal{T}}^{mar}(\hat{I}, k) = EITC^{mar}(\hat{I}, k) + W^{mar}(\hat{I}, k) - \tau^{mar}(\hat{I}, k) \times \hat{I},$$
$$\widehat{\mathcal{T}}_i^{div}(\hat{I}, k) = EITC^{div}(\hat{I}, k) + W_i^{div}(\hat{I}, k) - \tau^{div}(\hat{I}, k) \times \hat{I}, \quad i \in \{f, m\},$$

where $\tau(\hat{I}, k)$ denotes the average income tax rate, $EITC(\hat{I}, k)$ the Earned Income Tax Credits (EITC), and $W(\hat{I}, k)$ welfare payments. We describe each of the three components in detail below. For a more in depth description we refer to Guner, Kaygusuz, and Ventura (2023).

Income Tax Liability The normalized income tax liability $\tau(\hat{I}, k) \times \hat{I}$ is governed by the average tax rate $\tau(\hat{I}, k)$ with the following widely-used functional specification based on Bénabou (2002) and Heathcote, Storesletten, and Violante (2017) for married couples and

[38] Recall the ac is the age of the youngest child, not relevant for the tax-transfer schedule

divorcees respectively:

$$\tau^{stat}(\hat{I}, k) = \lambda^{stat}(k)\, \hat{I}^{-\tau^{stat}(k)}, \quad \text{for } stat \in \{mar,\, div\}.$$

The multiplier λ determines the level of the tax schedule, while τ governs its progressivity. Both parameters are functions of marital status and the number of children. We utilize estimates from Guner, Kaygusuz, and Ventura (2023), which are derived from Internal Revenue Service (IRS) microdata on tax returns for the year 2000, specifically focusing on tax liabilities before the application of EITC, CTC, and CDCTC credits.[39] The resulting parameters are presented in Table C2 and the resulting average tax rate re-scaled to household income I is depicted in Figure C2a.[40]

Table C2: Tax Function Parameters

	Married		Single	
	no child	2 children	no child	2 children
λ	0.9024	0.9078	0.8815	0.9227
τ	0.0569	0.0596	0.0356	0.0351

Notes: Tax function parameters from Guner, Kaygusuz, and Ventura (2023)

Earned Income Tax Credits (EITC) The EITC is a fully-refundable tax credit for low-income working households. The EITC is particularly high for working families with children and follows a humped-shaped subsidy scheme in household income. The functional form writes as follows:

$$EITC^{stat}(\hat{I}, k) = \max\Big\{ CAP^{stat}(k) - \max\left\{slope_1^{stat}(k) \times \left(bend_1^{stat}(k) - earnings\right), 0\right\} \\ - \max\left\{slope_2^{stat}(k) \times \left(earnings - bend_2^{stat}(k)\right), 0\right\}, 0 \Big\}, \quad stat \in \{mar, div\},$$

where CAP denotes the maximum credit level, $bend_1$ and $bend_2$ are the threshold levels that determine the zones of increase and decrease, respectively, while the parameters

[39] Currently, we abstract from the Child Tax Credit (CTC) and the Child and Dependent Care Tax Credit (CDCTC).

[40] To map the tax parameters of Guner, Kaygusuz, and Ventura (2023) into our model, we make the following assumptions. Firstly, for married couples during their working age, we assign no kids in period one, two kids from period two onwards, and no kids in retirement. Secondly, for divorced women during their working age, we assume a constant assignment of two kids, as they can only be divorced from period two onwards, with no kids in retirement. Meanwhile, we assume that during their working age and retirement, divorce men have zero kids assigned. This also applies for the EITC and welfare calculations.

$slope_1$ and $slope_2$ represent the rates at which the credit increases and subsequently declines as a function of household income. The corresponding parameter values are summarized in Table C3 and the shape of the EITC by marital status and family composition is depicted in Figure C2b.

Table C3: EITC Parameters

		CAP	$slope_1$	$bend_1$	$slope_2$	$bend_2$
Married	No children	0.006	0.076	0.085	0.076	0.122
	2 or 3 children	0.071	0.399	0.178	0.21	0.248
Single	No children	0.006	0.076	0.085	0.076	0.105
	2 or 3 children	0.071	0.399	0.178	0.21	0.232

Notes: EITC parameters from Guner, Kaygusuz, and Ventura (2023)

Welfare Payments The welfare payments estimated by Guner, Kaygusuz, and Ventura (2023) approximates a range of U.S. cash or in-kind transfers, namely the Temporary Assistance to Needy Families (TANF), the Supplemental Nutrition Assistance Program (SNAP), the Supplemental Nutrition Program for Women, Infants, and Children (WIC), the Supplemental Security Insurance (SSI) and housing subsidies. Specifically, welfare payments take the following form for $stat \in \{mar,\ div\}$ and $i \in \{f, m\}$ if $stat = div$:

$$W_i^{stat}(\hat{I}, k) = \begin{cases} \omega_{0,i}^{stat}(k) & \text{if } \hat{I} = 0 \\ \max\left\{0,\ \omega_{1,i}^{stat}(k) - \omega_{2,i}^{stat}(k) \times \hat{I}\right\} & \text{if } \hat{I} > 0. \end{cases}$$

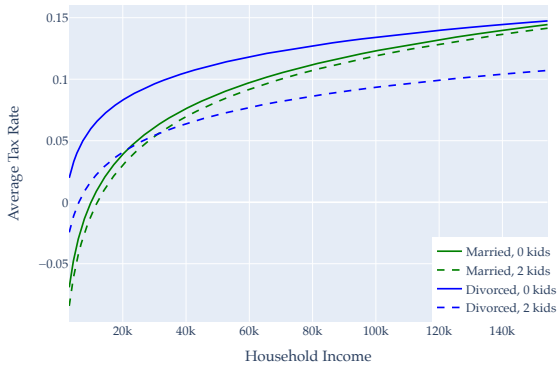
In instances where households have no income, they are entitled to a fundamental transfer of ω_0. Beyond this baseline, households receive a maximum sum of ω_1, which diminishes as a function of normalized labor income I at a rate of ω_2. Notably, for divorced individuals, these parameters are contingent on gender. For a comprehensive overview of the parameterization concerning family structure and marital status, please refer to Table C4, and the resulting pattern of welfare payments is illustrated in Figure C2c.

Table C4: Welfare Parameters

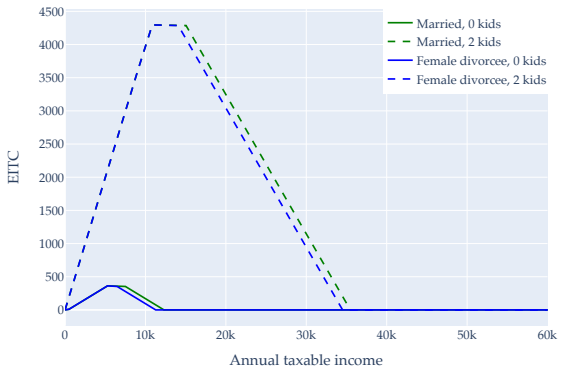
	Married		Single Female		Single Male
	no child	2 children	no child	2 children	no child
ω_0	0.063	0.090	0.090	0.116	0.075
ω_1	0.023	0.043	0.044	0.101	0.032
ω_2	-0.017	-0.033	-0.042	-0.091	-0.028

Notes: Welfare parameters from (Guner, Kaygusuz, and Ventura 2023)

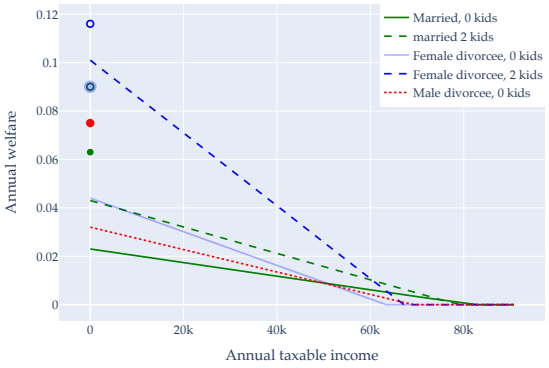
Figure C2: Tax and transfer system



(a) Average Tax (HSV tax function)



(b) EITC

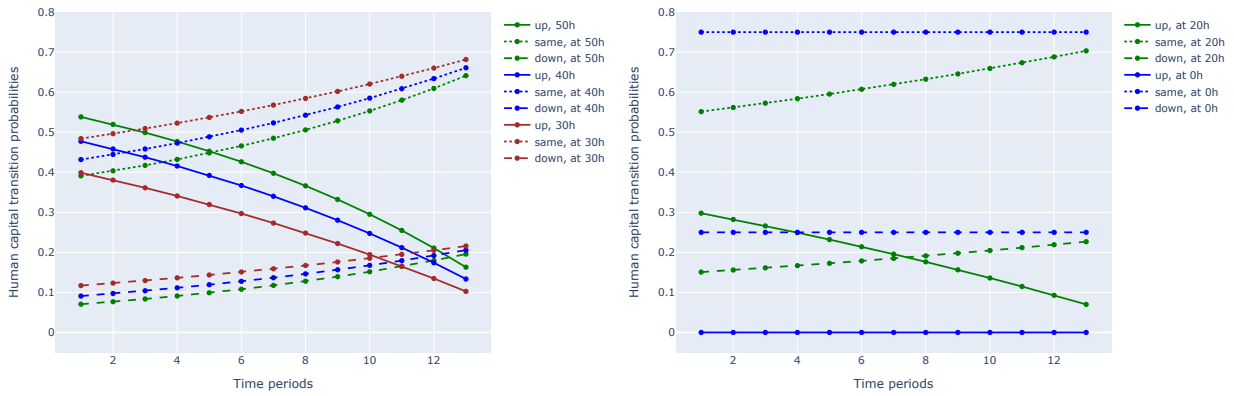


(c) Welfare

Notes: Ingredients of the tax and transfer system which are based on Guner, Kaygusuz, and Ventura (2023).

C.3 Human capital transition probabilities

Figure C3: Human capital transition probabilities over the life-cycle



(a) 50, 40 and 30 market hours

(b) 20 and 0 market hours

Notes: The human capital transition probabilities $\pi_{up}(h_{it}, t)$, $\pi_{stay}(h_{it}, t)$, and $\pi_{down}(h_{it}, t)$ by market hours h_{it} and age t are based on the internally calibrated human capital parameters p_δ, ζ_1, and ζ_2 and the human capital evolution and functional form assumptions described in Section 3.3.

C.4 Probabilistic divorce expectations conditional on female labor force participation

Let us first define the cumulative divorce probability over the life cycle as $\mathbb{P}^{div}_{1,T} =$. Given our assumption that $\alpha = 0$, over-optimists expect no divorce over their life cycle, i.e. $\mathbb{E}^o_0[\mathbb{P}^{1,T}_{div}] = 0$. Rational couples expect the true cumulative divorce probability to occur and we can define the expectation from the viewpoint of period $t = 1$:

$$\mathbb{E}^r_0[\mathbb{P}^{1,T}_{div}] = \sum_{t=2}^{T} p^{div}_t \cdot \prod_{\tau=1}^{t-1}(1 - p^{div}_\tau)$$

with $p^{div}_1 = 0$ as we assume that there is no divorce in the first period.

This allows us to define the difference of the average divorce expectation of employed women in $t = 2$ and the average divorce expectation of non-employed women in $t = 2$ where $j \in \{1, ..., N\}$ indicates the woman and $h_{j,2}$ the market hours of woman j in period $t = 2$:

$$\text{mean}\Big(\mathbb{E}^{type(j)}_0 \left[\mathbb{P}^{1,T}_{div} \right] \Big| h_{j,2} > 0 \Big) - \text{mean}\Big(\mathbb{E}^{type(j)}_0 \left[\mathbb{P}^{1,T}_{div} \right] \Big| h_{j,2} = 0 \Big)$$

$$= \frac{\sum_{j=1}^{N} \mathbb{E}_0^{type(j)}\left[\, \mathbb{P}_{div}^{1,T} \,\right] \cdot \mathbb{I}\{h_{j,2} > 0\}}{\sum_{j=1}^{N} \mathbb{I}\{h_{j,2} > 0\}} - \frac{\sum_{j=1}^{N} \mathbb{E}_0^{type(j)}\left[\, \mathbb{P}_{div}^{1,T} \,\right] \cdot \mathbb{I}\{h_{j,2} = 0\}}{\sum_{j=1}^{N} \mathbb{I}\{h_{j,2} = 0\}}$$

$type(j) \in \{o, r\}$ which defines the type of expectations the women j has. We aggregate over the entire population N with $N \cdot (1 - \mathcal{S}_o)$ rational women and $N \cdot \mathcal{S}_o$ women in overoptimistic couples.

D Results

D.1 Effects of overoptimism

Table D5: Difference in behavior and consumption between over-optimists and rationals **after divorce**

	Market work		Home production		Leisure		Consumption	Home-prod. good
	%	h/week	%	h/week	%	h/week	%	%
After divorce								
Women	-0.3	-0.09	0.2	0.05	0.2	0.04	-1.5	0.2
Men	0.3	0.13	-0.3	-0.06	-0.3	-0.06	-1.1	-0.3
Initially lower-wage spouse	0.0	-0.01	0.1	0.02	0.0	-0.01	-3.6	0.1
Initially higher-wage spouse	0.1	0.05	-0.1	-0.03	-0.1	-0.02	-0.1	-0.1

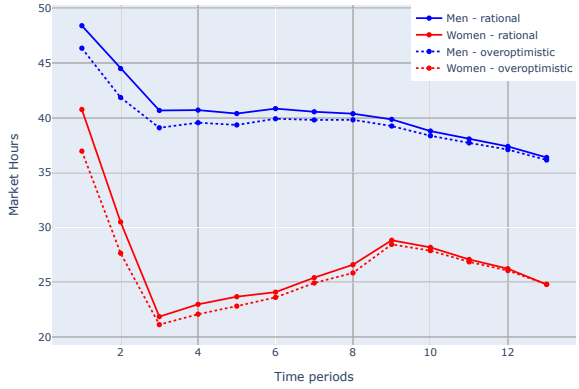
Notes: The table note of Table 3 applies.

Table D6: Difference in behavior and consumption between over-optimists and rationals – **Couples with initially same human capital** (in %)

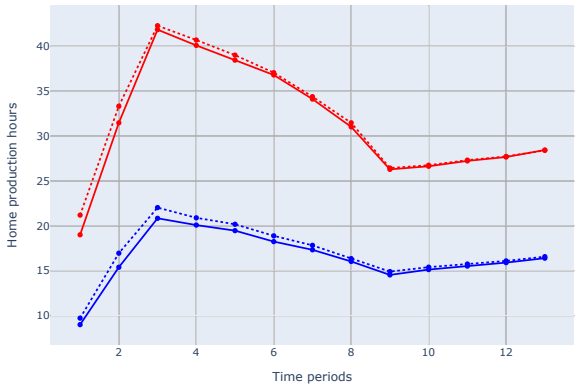
	Market work		Home production		Leisure		Consumption	Home-prod. good
	%	h/week	%	h/week	%	h/week	%	%
Initially same wage								
Entire working life								
Women	-1.9	-0.61	1.3	0.35	1.1	0.26	-1.9	1.9
Men	-1.9	-0.77	2.9	0.49	1.1	0.28	-1.8	2.0
During marriage								
Women	-2.5	-0.80	1.7	0.46	1.4	0.34	-2.2	2.1
Men	-2.6	-1.04	3.9	0.66	1.4	0.38	-2.2	2.1
After divorce								
Women	-0.1	-0.03	0.1	0.02	0.0	0.01	-0.9	0.1
Men	0.1	0.05	-0.1	-0.02	-0.1	-0.02	-0.6	-0.1

Notes: The table shows results for couples, in which both spouses have the same initial wage (17.7%). The table note of Table 3 applies.

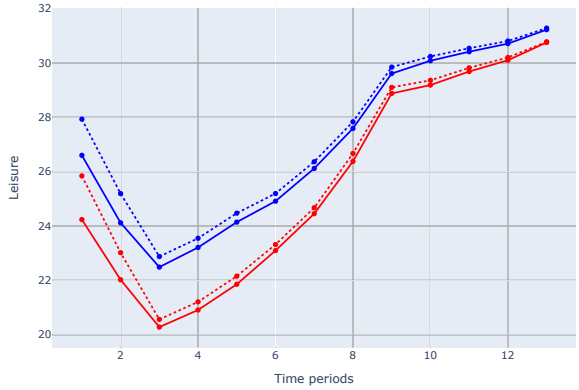
Figure D4: Behavior and consumption over the life-cycle



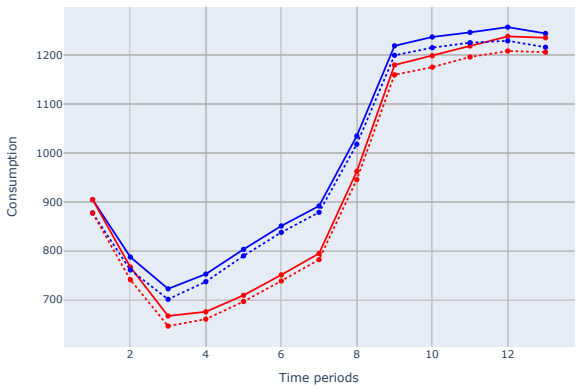
(a) Market hours



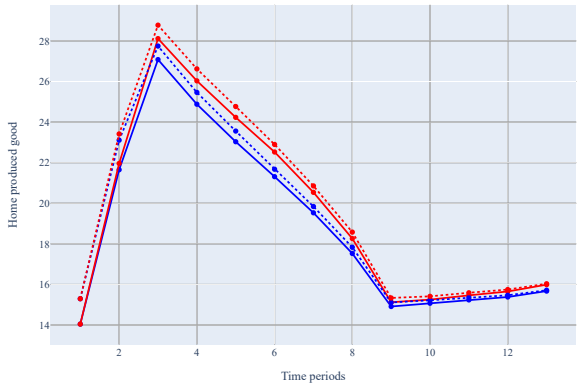
(b) Home production hours



(c) Leisure



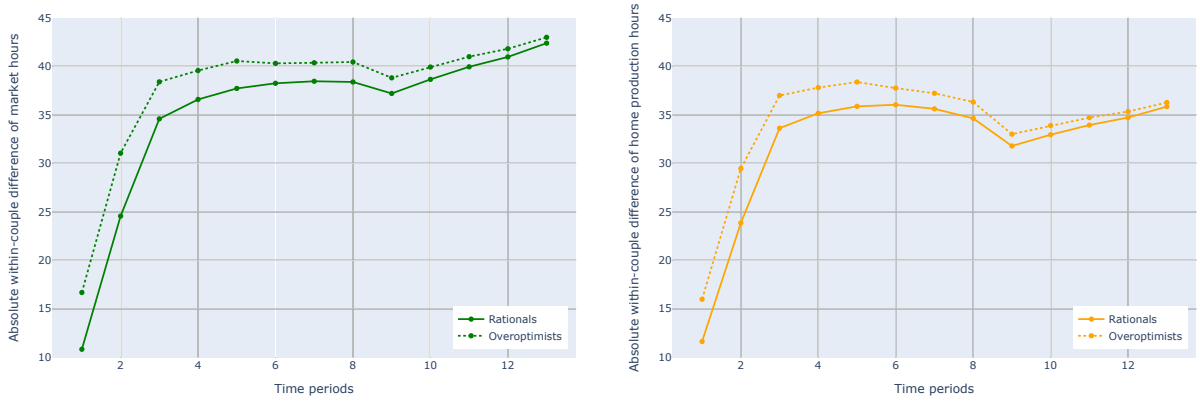
(d) Private consumption



(e) Home produced good

Notes: Life-cycle profiles of 50,000 simulated rational and overoptimistic initially married couples. We pool married and divorced men and women in these plots over the life cycle.

Figure D5: Average absolute within-couple difference of market hours and home production hours for overoptimistic and rational couples



(a) Market hours (b) Home production hours

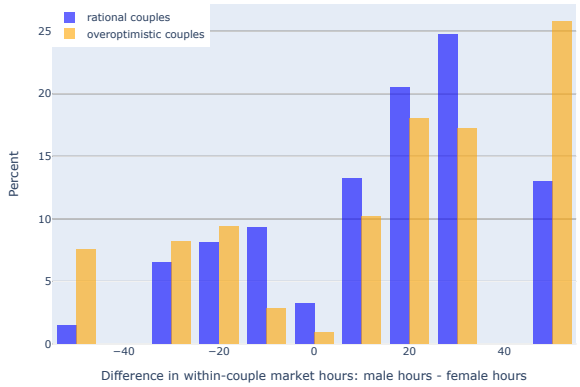
Notes: Results are based on a simulation sample of 50,000 rational and overoptimistic households. We calculate the measure as follows: For each time period t, we calculate the average absolute within-couple difference of market hours (home production hours) for overoptimistic couples as well as rational couples. These measure are the basis for the difference shown in Figure 3.

Figure D6: Difference in market hours and home production hours by initial human capital ratio if female human capital fixed

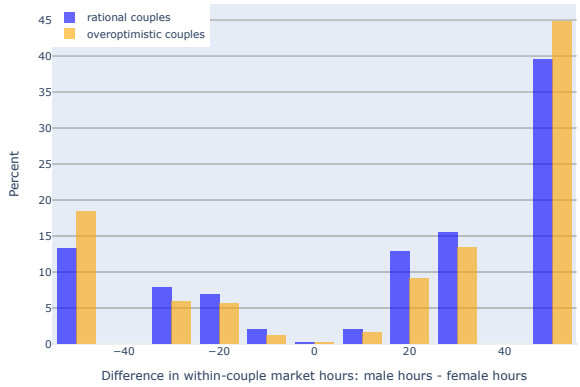
(a) Market hours (b) Home production hours

*Notes: We **fix the initial female human capital to** $K_f = 4$ which represents the median initial male wage. Then, female human capital varies along the horizontal axis. The difference in within-couple hours is represented by male minus female hours.*

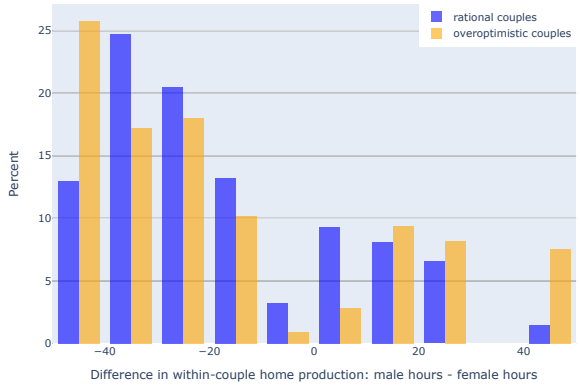
Figure D7: Distributions of within-couple market hours and home production hours



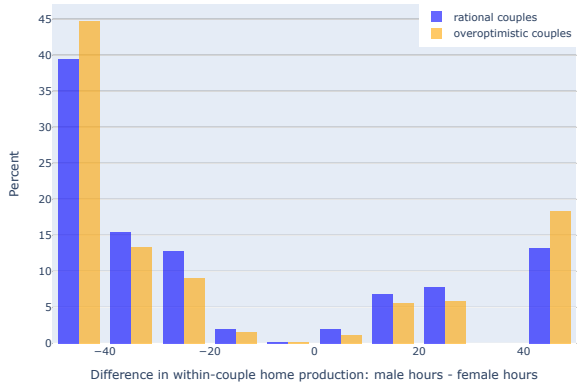
(a) Market hours in t = 2



(b) Market hours in t = 5



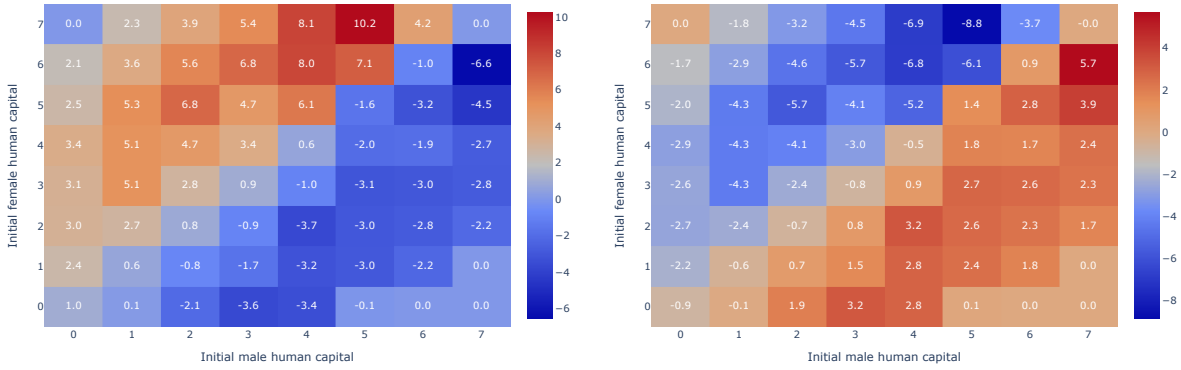
(c) Home production hours in t = 2



(d) Home production hours in t = 5

Notes: Results are based on a simulation sample of 50,000 rational and overoptimistic households.

Figure D8: Difference between rational and overoptimistic couples in the difference in market hours and home production hours by initial human capital



(a) Market hours (b) Home production hours

Notes: We calculate for each initial human capital combination of both spouses the difference in the measures of overoptimistic and rational couples show in Figure 4, i.e. we plot the difference between the within-couple difference in market (home production) hours of overoptimistic couples and the within-couple difference in market (home production) hours of rational couples, all by the initial human capital of both spouses. Intuitively, the difference between the two lines in Figures 4a and 4b (overoptimists - rationals) yields the value in the respective field in this Figure.

D.2 Gender inequality

Table D7: Differences in gender gaps by lower-earning female spouse

	Gender wage gap (%)	Gender wage gap cond. on pos. hours (%)	Gender earnings gap (%)
Initially lower female wage			
Increase of gender gap in %	3.59	4.03	3.12

Notes: Values for rationals and over-optimists are given by the difference of male life-cycle averages and female life-cycle averages conditional on a couple with an initially lower-wage female spouse. Both averages are normalized such that the male life-cycle averages are 100. Increase in % captures the increase in the gender gap moving from rational expectations to overoptimistic expectations averaged over the initial wage distribution.