Untying the Knot: How Child Support and Alimony Affect Couples' Decisions and Welfare

Hanno Foerster*

December 4, 2023

Abstract

In many countries, divorce law mandates post-marital maintenance payments (child support and alimony) to insure the lower earner in married couples against financial losses upon divorce. This paper studies how maintenance payments affect couples' intertemporal decisions and welfare. I develop a dynamic model of family labor supply, home production, savings, and divorce and estimate it using Danish register and survey data. The model captures the policy tradeoff between providing insurance to the lower earner and enabling couples to specialize efficiently, on the one hand, and maintaining labor supply incentives for divorcees, on the other hand. I use the estimated model to study various counterfactual policy scenarios. I find that alimony comes with more substantial labor supply disincentives compared to child support payments and is less efficient in providing consumption insurance. The welfare maximizing policy, within the status quo policy space, involves increasing child support and reducing alimony payments. My results show that Pareto improvements beyond this welfare maximizing policy are feasible, highlighting limitations of how child support and alimony policies are commonly implemented.

Keywords: marriage and divorce, child support, alimony, household behavior, labor supply, limited commitment

JEL classification: D10, D91, J18, J12, J22, K36

*Boston College, Department of Economics. hanno.foerster[at]bc[dot]edu. I am extremely grateful to my advisers Gerard van den Berg and Michèle Tertilt for their outstanding guidance and support. I also thank Jérôme Adda, Dan Anderberg, Jesper Bagger, Annette Bergemann, Pierre-André Chiappori, Bernard Salanié, Bart Cockx, Monica Costa Dias, Matthias Doepke, Chris Flinn, Eric French, Hans-Martin von Gaudecker, Ahu Gemici, Katja Kaufmann, Fabian Lange, Valérie Lechene, Arthur Lewbel, Attila Lindner, Tim Obermeier, Claudia Olivetti, Theodore Papageorgiou, Pia Pinger, Anna Raute, Uta Schönberg, Holger Stichnoth, Hélène Turon, Michela Tincani, Robert Ulbricht, Alessandra Voena and seminar participants at Aarhus University, the University of Edinburgh, ZEW Mannheim and last but not least the Mannheim Macro Group for helpful comments. I am very grateful to Alexander Paul and Bastian Schulz for helpful comments and their support with the data. Financial support from ERC grant SH1-313719, funding by the German Research Foundation (DFG) through CRC TR 224 (Project A03), and support by the state of Baden-Württemberg through bwHPC is gratefully acknowledged.

1 Introduction

Marital breakdown often has severe financial consequences for the lower earner in divorcing couples. The U.S. poverty rate among women who divorced in 2009 was 21.5%, compared to 10.5% for divorced men and 9.6% for married people (Elliott and Simmons, 2011). For this reason, most societies have divorce laws that mandate post-marital maintenance payments, alimony and child support, to insure the lower earner in couples against the loss of access to their partner's income upon divorce.

Over the past decade, fierce political debates about reducing post-marital maintenance payments have emerged in several countries, including the U.S., Germany, the U.K. and France. These debates were typically dominated by two economic arguments. Those in favor of reducing maintenance payments emphasized that divorcees who receive high maintenance payments have little incentive to work and become economically self-sufficient. Those in favor of high maintenance payments argued that people who invest less in their careers after getting married, e.g., because they spend time on home production (e.g., child care and housework), should be insured against the drop in financial resources upon divorce. How relevant is each of these arguments quantitatively? And how should maintenance payments be designed to balance both arguments?

In this paper, I provide the first study of how maintenance payments should be designed to balance an important policy tradeoff. In particular, I ask how child support and alimony payments should be designed to provide insurance to the lower earner in couples and enable couples to specialize efficiently, on the one hand, while maintaining labor supply incentives for divorcees, on the other hand. I further take into account that maintenance payments may influence divorce rates as well as women's and men's bargaining power in the household.

A number of empirical studies document that alimony and child support payments influence the labor market behavior of married and divorced couples. Several studies find that increasing child support leads to a reduction in divorced mother's and fathers' labor supply (Graham and Beller (1989); Holzer et al. (2005); Cancian et al. (2013); Barardehi et al. (2020); Ong (2020); Friday (2021)). There is also evidence that introducing alimony for existing couples leads to a decrease in women's and an increase in men's labor supply (Rangel (2006); Chiappori et al. (2016); Goussé and Leturcq (2022)). [1] The empirical evidence strongly suggests that maintenance payments influence couples' behavior. Nonetheless, to draw conclusions about how maintenance payments affect couples' welfare, a joint economic framework of couples' consumption, labor supply and time allocation and (endogenous) divorce is needed.

[1] Looking at a broader set of outcomes, Aizer and McLanahan (2006) find that strengthened child support enforcement leads men to have fewer out of wedlock births, Tannenbaum (2020) finds that stronger child support enforcement leads to fewer marriages after non-marital pregnancies and fewer abortions and Rossin-Slater and Wüst (2018) find that child support increases divorced fathers' post-separation fertility and reduces father-child co-residence. Rossin-Slater and Wüst (2018) do not find a significant impact of child support on divorced parents' labor force participation or wages. Considering divorce law changes more generally, empirical studies find effects of introducing unilateral divorce on divorce rates (e.g., Friedberg (1998) and Wolfers (2006)) and labor supply of married and divorced couples (e.g., Gray (1998); Stevenson (2007) and Stevenson (2008)). The magnitude of the effects often depend on the asset division regime (e.g., Voena (2015)).

To examine the consequences of post-marital maintenance payments for couples' welfare, I develop a dynamic structural model of married and divorced couples' decision-making. In my model, divorced ex-spouses are linked by maintenance payments, which depend on both ex-spouses' labor earnings, their number of children and on who takes child custody. Decision-making of divorced couples is modeled as non-cooperative (dynamic) game. In deciding about their labor supply, each ex-spouse takes into account how own choices influence her/his ex-spouse's choices and how the stream of maintenance payments is affected. Accounting for the strategic interdependence in ex-spouses' dynamic labor supply decisions, which arises because of maintenance payments, is a novel feature relative to the previous literature.

Married spouses are influenced by maintenance payments, as their outside options (their values of divorce) are affected by maintenance payments. In modeling decision-making in marriage, I build on the limited commitment framework (see Kocherlakota (1996); Ligon et al. (2002) and Marcet and Marimon (2011)) that has previously been used to model intertemporal household decision-making, e.g., by Mazzocco (2007), Voena (2015), Fernández and Wong (2016) and Low et al. (2018). [2] Married spouses experience "love shocks", which account for non-economic reasons for staying married. If one spouse prefers divorce to staying married (e.g., because of a bad love shock draw) this may lead to a shift in bargaining power from the spouse who prefers staying married to the spouse who wants to divorce. Changes in maintenance payments impact each spouses' value of divorce and thus may trigger shifts in bargaining power or lead to divorce. The model includes savings in a risk-free asset and "learning by doing" human capital accumulation, i.e., by working during marriage model agents can increase their future expected wages and thus self-insure against losing resources upon divorce. [3] By this mechanism, maintenance payments weaken the individual incentives to supply labor and thus increase the possibilities for intra-household specialization according to comparative advantage. [4] Higher maintenance payments thus facilitate efficient household specialization, while lower maintenance payments promote two-earner households.

The model is estimated using rich longitudinal data from Danish administrative records together with data from the Danish Time Use survey (DTUS). In addition to marital histories, labor supply wages and assets, the administrative data include information on the amount of post-marital maintenance payments between ex-spouses, the number of (biological) children that a couple has together, the children's age and whom the children stay with if a couple divorces. I complement these data with information on home production hours and individual consumption from the DTUS.

I conduct event study regressions to document the evolution of work hours, wages, and assets around divorce. I further use accounting identities together with structural assumptions on household decision-making to impute individual consumption and gauge the evolution of gender consumption inequality around divorce. I then use the data to estimate the parameters of my structural model. The model provides a

[2] See Chiappori and Mazzocco (2017) for a detailed description of limited commitment framework applied to household decision-making.

[3] See Doepke and Tertilt (2016) for an analysis of the impact of divorce risk on savings.

[4] Lafortune and Low (2017) and Lafortune and Low (forthcoming) explore a similar mechanism by which post-divorce asset division fosters household specialization.

good fit for all targeted data moments, including moments that capture married and divorced couples' time allocation conditional on number of children and the event-study coefficients that capture the evolution of work hours and wages around divorce. I further provide a range of external validity checks, confirming that my estimated model is in line with empirical evidence from various previous studies on the impact of maintenance payments on married and divorced couples' labor supply.

To assess how maintenance payments affect couples' decisions and welfare, I use the estimated model as a policy lab to conduct counterfactual experiments. I first compare how different policy changes influence labor supply and consumption. I find that most policy changes that increase child support payments (raising the lump sum component, increasing the dependence on the payer's income, or reducing the concavity in the number of children) lead to smoother consumption paths around divorce and to a moderate reduction in labor supply among divorced women and men. By contrast, increasing alimony payments or strengthening the dependence of child support on divorced parents' income difference leads to stronger reductions in divorcees' labor supply. As a consequence, these policy changes are less efficient in providing consumption insurance and, in some cases, amplify the consumption drop experienced by women upon divorce.

Second, I search for the policy parameters that maximize ex ante utilitarian welfare within the status quo policy space. [5] I find that the welfare maximizing policy involves increasing the lump sum component of child support, increasing the dependence of child support on the payer's income and reducing alimony payments relative to the Danish status quo. Implementing this policy change would increase child support payments by 88%, reduce alimony payments by 10% and increase overall maintenance payments by 40%.

Third, to study how close maintenance policies can bring couples to efficiency, I compare the welfare-maximizing policy to a first best scenario in which frictions (limited commitment and noncooperation in divorce) are removed from the model. The first best allocation is characterized by full consumption insurance and higher home production hours among married women and men relative to the Danish status quo. In terms of ex-ante welfare, the first best allocation is a Pareto improvement relative to the status quo, while the welfare-maximizing maintenance policy (within the status quo policy space), increases women's welfare and reduces men's.

I further analyze policies beyond the status quo policy space that make maintenance payments backward looking. I.e., I consider maintenance schedules only depend on variables determined before a couple gets divorced. My results show that such policy changes are more efficient in providing consumption insurance, and Pareto dominate in terms of welfare, compared to both the Danish status quo policy and the welfare maximizing policy in the status quo policy space.

The contribution of this paper is threefold. First, I develop and estimate a model that incorporates a novel tradeoff that is relevant for studying maintenance policies. In my model, maintenance payments provide insurance to the lower earner in couples and facilitate efficient intra-household specialization but

[5] I consider a policy space that approximates the Danish institutional setting, which resembles the rules and guidelines in many OECD countries (see de Vaus et al. (2017) and Skinner et al. (2007)). A detailed description is provided in section 8.

distort divorcees' labor supply incentives. This paper provides the first study of how maintenance payments should be designed to be welfare maximizing in light of this tradeoff. I thereby add to a small body of literature that studies alimony and child support payments using economic models (see, e.g., Weiss and Willis (1985); Weiss and Willis (1993); Del Boca and Flinn (1995); Flinn (2000); Del Boca and Ribero (2001); Chiappori and Weiss (2007)). [6] Previous studies in this literature have used static models of divorced couples' decision-making to study, e.g., how compliance with maintenance policies (Del Boca and Flinn (1995)) and cooperation between ex-spouses (Flinn (2000)) can be encouraged by policymakers. Considering maintenance payments in a dynamic environment allows me to study how married couples who face a risk of divorcing later in life are affected by child support and alimony policies. It further allows me to analyze how alimony and child support interact with channels by which married spouses can self-insure against income losses from divorce, such as human capital accumulation and savings.

Second, my research contributes to the literature that estimates dynamic economic models to study the impact of divorce law changes on household decisions and welfare. A large part of this literature is focused on studying switches from mutual consent to unilateral divorce and asset division upon divorce (e.g., Chiappori et al. (2002); Voena (2015); Bayot and Voena (2015); Fernández and Wong (2016) and Reynoso (2018)). [7] Less attention has been paid to policies such as child support and alimony payments that make spouses financially interdependent beyond divorce. [8] My paper adds to this literature by examining child support and alimony payments in a framework that fully accounts for the strategic interdependence that such policies induce between ex-spouses' labor supply and savings decisions in a dynamic context. [9] An important motivation for fully modeling this strategic interdependence is that I am trying to speak to various facts that require modeling work hours choices by divorced women and men. [10] Modeling female and male labor supply gives rise to strategic motives and thereby adds computational complexity but enables my model to capture the following empirical findings that are key in my context: 1. that men and women readjust their work hours after divorce (see, e.g., Johnson and Skinner (1986)) 2. that post-divorce transfers affect married couples' household specialization (cf. Rangel (2006) and Lafortune and Low (forthcoming)) and 3. the empirical fact that child support and alimony payments affect male and female divorcees' work hours (see Graham and Beller (1989), Cancian et al. (2013), Rossin-Slater and Wüst (2018), Barardehi et al. (2020), Ong (2020), and Friday (2021)). My model captures each of these facts, as I take into account that both men and women make labor supply decisions and model the strategic

[6] For an overview of this literature, see Del Boca (2003).

[7] See Ábrahám and Laczó (2017) for a theoretical analysis of optimal asset division upon divorce.

[8] A notable exception is the study by Brown et al. (2015) on the impact of child support on child investments and fertility.

[9] Note that modeling the interaction of divorcees *in static settings* as strategic interaction (in a Cournot or Stackelberg type of game) goes back to at least Weiss and Willis (1985) and has been common in static settings since (see, e.g., Weiss and Willis (1993), Weiss (1997), Del Boca and Flinn (1995), Flinn (2000)). My model introduces this notion that has been standard in the static literature to the dynamic structural literature on divorce.

[10] By contrast, the previous dynamic structural literature on divorce has routinely resorted to two simplifying assumptions, imposing: 1. that women only choose labor supply at the extensive margin (i.e., work zero hours or full time) 2. that men always work full time (see, e.g., Voena (2015), Bayot and Voena (2015), Fernández and Wong (2016), Reynoso (2018)). These assumptions shut down any strategic interdependence in ex-couples' labor supply decisions and thereby substantially reduce computational complexity. My paper moves beyond these simplifying assumptions by modeling both female and male labor supply at the extensive and intensive margins and accounting for the resulting strategic interdependence.

interaction that arises as a consequence.

As a third contribution, this paper examines a first-best scenario that serves as a benchmark of what can be attained by maintenance policies (and divorce law changes more generally). I identify two key frictions that maintenance policies can help mitigate. The first friction is limited commitment, i.e., the inability of married couples to make binding promises about future allocations. The second friction is a missing market for binding agreements beyond divorce, reflected by non-cooperative decision-making in divorce. Removing both of these frictions yields the first best scenario. Limited commitment has received much attention in the previous literature (see Mazzocco (2007), Voena (2015), Fernández and Wong (2016), and Lise and Yamada (2018)). Non-cooperation in divorce features in most models of divorcees' decision-making, but few have studied the welfare loss that non-cooperation in divorce entails and to what extent this loss can be overcome by policy. [11] By providing this analysis, I extend the work of previous studies that have examined the welfare consequences of divorce law changes (e.g., Brown et al. (2015); Voena (2015); Fernández and Wong (2016)).

The remainder of this paper is organized as follows. The next section describes the institutional background. Section 3 describes the data. Section 4 presents evidence from event studies. Section 5 develops my model, and Section 6 describes the estimation. In Section 7, I discuss the key frictions in my model and characterize the first best scenario. Section 8 discusses the results from policy simulations and provides external validity checks of my structural framework. In Section 9, I draw welfare comparisons, solve for the welfare-maximizing policy and contrast it with the first best allocation. Section 10 concludes.

2 Institutional Background

In most OECD countries, divorce law determines the amount of maintenance payments to be made between divorced ex-spouses. The related rules typically formulate how maintenance payments are to be computed based on both ex-spouses' labor incomes, the ex-couple's number of children and the children's age. [12] The precise rules differ across countries, and countries also differ in whether the rules are applied rigidly or serve as broad guidelines. [13] I use Denmark as an example to study the impact of maintenance payments for three interrelated reasons. First, in Denmark, rigid rules are applied to determine the amount of maintenance payments from ex-spouse labor incomes and the number of children. [14] Second, maintenance payments are relatively strictly enforced by the Danish government. Third, Danish administrative records that contain information on maintenance payments allow me to gauge the extent to which the institutional rules are reflected in actual payments. In the following, I describe the rules that determine the size and

[11] A notable exception is Flinn (2000), who analyzes a framework in which divorced couples endogenously choose between cooperation and noncooperation and studies to what extent policymakers can encourage cooperation between ex-spouses.

[12] See de Vaus et al. (2017) and Skinner et al. (2007) for comparisons of maintenance payments in the OECD.

[13] For some countries, e.g., the U.S., it is known that compliance with maintenance rules is low (see Weiss and Willis (1985), Del Boca and Flinn (1995) and Case et al. (2003)).

[14] See Skinner et al. (2007) for an overview of which countries apply rigid rules versus broad guidelines.

Figure 1: Child support rules

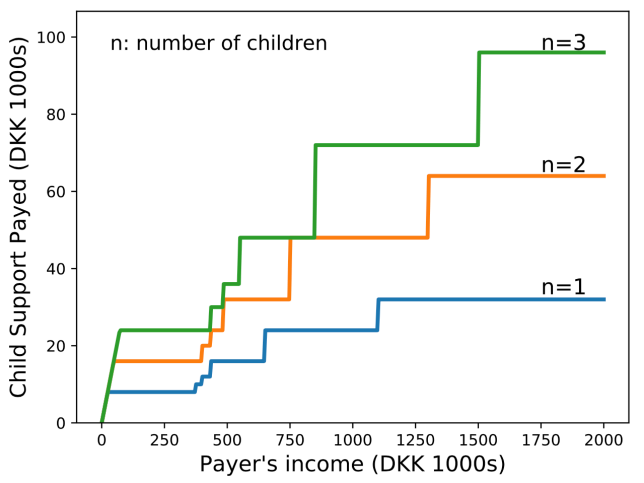
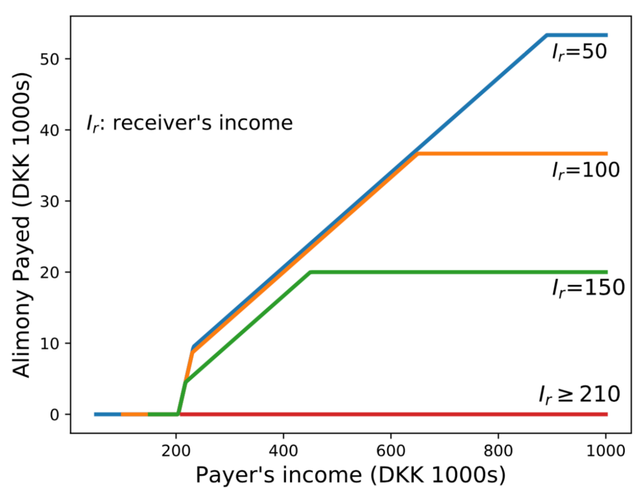


Figure 2: Alimony rules



Notes: These figures show the 2004 rules for child support and alimony, respectively.

duration of maintenance payments in Denmark. [15]

Child Support Child support is to be paid from the non-custodial to the custodial parent for each child under the age of 18 that a divorced couple has together. The payments are computed based on the child support payer's gross labor income and the number of children. Consider divorced ex-spouses f and m. Suppose that $s \in \{f, m\}$ holds custody of n_s children and that the other ex-spouse $\tilde{s} \in \{f, m\} \setminus s$ has monthly gross labor earnings $I_{\tilde{s}}$. Then, the noncustodial parent $\tilde{s}$ is mandated to make monthly child support payments $\mathrm{cs}(\mathrm{n_s}, \mathrm{I_{\tilde{s}}})$, where cs is increasing in each argument. [16] Figure 1 provides an illustration of the dependence of child support payments on n_s and $I_{\tilde{s}}$. Child support payments for a given child need to be made as long as the child is under the age of 18.

Alimony Alimony payments are to be paid from the higher-earning to the lower-earning ex-spouse. These payments are mandated independently of whether the divorced couple has children. Suppose $s \in \{f, m\}$ is the higher-earning and $\tilde{s} \in \{f, m\} \setminus s$ the lower-earning ex-spouse in terms of monthly labor earnings before taxes, i.e., $I_s > I_{\tilde{s}}$. As a simple rule of thumb, alimony payments equal a fraction τ of the monthly labor income difference, i.e., $\tau \cdot (I_s - I_{\tilde{s}})$. For a wide range of incomes, this rule of thumb exactly determines maintenance payments, but there are exceptions taking the form of caps that ensure that the maintenance receiver does not end up receiving too much and that the payer is not left with too little. [17] Figure 2 provides an illustration of the functional dependence of alimony on I_s and $I_{\tilde{s}}$. Alimony payments may last for up to ten years but end if the receiving ex-spouse remarries or begins to cohabit with a new partner.

[15] Qualitatively, the following descriptions apply to a wide range of countries. All functional forms and quantities inserted for policy parameters are specific to Denmark. Note that child support and alimony are computed differently and depend on different economic variables but are not earmarked for specific purposes; i.e., child support payments do not need to be used for expenses related to children.

[16] The functional form of cs is provided in Appendix A.

[17] For the formal functional form of alimony payments including caps, $\mathrm{alim}(\mathrm{I_s}, \mathrm{I_{\tilde{s}}}, \tau)$, see Appendix A.

Maintenance Payments Maintenance payments equal the sum of child support and alimony, subject to a cap on the total amount of payments that ensures that the maintenance payer does not have to pay more than a third of her/his income before taxes. Denote by $M_f(n_f, n_m, I_f, I_m)$ the overall maintenance payments that are made from ex-husband to ex-wife (if $M_f > 0$) or from ex-wife to ex-husband (if $M_f < 0$) by the ex-wife ($M_m = -M_f$ denotes the same payments from the ex-husband's perspective). In estimating my dynamic model and conducting the counterfactual policy experiments, I approximate the Danish institutional setting in a lower-dimensional policy space in which each policy parameter has a clear connection to one aspect of child support or alimony payments, as described in Section 8.

3 Data

I use Danish register data covering 1980 to 2013. The data include all Danish individuals who have been married at some point during the covered period. For each year, I observe each individual's annual labor income, labor force status, hours worked, and household assets. [18] Additionally, I observe each individual's marital history (starting from 1980) and number of children as recorded in the Danish birth register. [19] For divorced individuals, I additionally observe the amount of maintenance payments that they make or receive and with which parent divorced couples' children continue to live after divorce. [20]

I restrict the sample to couples where both spouses are in their first marriage and are aged between 25 and 58 and where at least one spouse is working in at least one sampled year. Furthermore, I exclude couples where one spouse has a child from a previous relationship. [21] The final sample includes 322,732 couples (645,464 individuals) and 4,312,826 couple–year observations. Table G.1 presents summary statistics for the final sample. Note that while the gender earnings gap is substantial, Denmark is a relatively gender-equal country in terms of work hours (see, e.g., OECD (2018)). [22]

I further use information on home production hours and relative consumption in couples. These data are obtained from the *Danish Time Use Survey* (DTUS), which was conducted in 2001 among a 2,105-household representative sample of the Danish population. [23] A limitation of the DTUS is that married couples cannot be distinguished from cohabiting couples and that divorced individuals cannot be distinguished from singles. I therefore pool these groups when making use of the time use data.

[18] Hours worked are employer-recorded in five bins of weekly hours (<10, 10–19, 20–29, 30–37 and ≥ 38). I set work hours equal to 0 in the case of nonparticipation, 38 in the case of full time and, if work hours fall into one of the bins, equal to the midpoint of the respective bin. See Lund and Vejlin (2015) for a description of the measurement of work hours in Danish register data. Household assets record net wealth, i.e., are positive for households whose savings exceed their debt and negative otherwise. Specifically, assets include bank deposits as well as other financial assets and real assets net of loans and mortgage debt.

[19] By using the Danish birth register, I can distinguish the biological children that a couple have *together* from other children living in the couple's household (e.g., children that one of the spouses has with someone else).

[20] Maintenance payments are recorded by tax authorities. The data source is the maintenance payer's tax declaration.

[21] This case would be complicated to study, as there would be child support payments to be made or received for the children from previous relationships as well.

[22] Lind and Rasmussen (2008) document that in Denmark, the share of women working full time and the share of men working part time are high and have increased steadily since the 1980s. See also OECD (2020).

[23] For a detailed description of the data, see Browning and Gørtz (2012).

4 Evidence from Event Studies

This section presents evidence from event studies on the evolution of work hours, wages, assets, labor income and consumption around divorce. A subset of the empirical patterns documented in this section are used as estimation targets in the structural estimation.

Specifically, I use data on work hours, wages, and assets from Danish administrative records to estimate event-study regressions that exploit variation in the timing of divorce to separate changes that are associated with divorce from age and time trends. [24] The event studies are estimated on a balanced panel of divorcing spouses who are observed continuously for at least two years before and six years after divorce. My sample includes 42,290 divorcing couples who satisfy these criteria. The empirical results of this section show that women and men tend to reduce work hours around divorce while there is little change in wages. Women dissave more than men in the first 6 years after divorce, presumably smoothing consumption around divorce. The ratio of female-to-male income net of maintenance payments six years after divorce is 73%, pointing to considerable gender inequality between divorcees.

In a next step, I impute consumption from data on labor income (wages times work hours), maintenance payments and changes in asset holdings. To obtain an approximation of individual consumption, I additionally invoke structural assumptions and information from external data sources on equivalence scales, taxes and the female-to-male consumption ratio in married couples. The imputations illustrate that (under the described set of structural assumptions) women's imputed consumption level drops substantially while male consumption rises upon divorce.

Work Hours, Wages, Labor Income, and Assets I estimate event study regressions controlling for age as well as calendar year fixed effects, following the specification used in Kleven et al. (2019). Denote by y_{it} the outcome variable of interest for individual i at age t. I run the following regression separately for women and men for work hours and wages as outcomes:

$$y_{it} = v_{a(i,t)} + \omega_{c(i,t)} + \sum_{k=-2}^{6} \beta_k \cdot d_{it-k} + \nu_{it}, \tag{1}$$

where d_{it} is a dummy variable that indicates whether individual i divorces at age t. a_t are age fixed effects, and $b_{c(i,t)}$ are calendar time fixed effects, where $c(i,t) \in \{1980, 1981, ..., 2013\}$ denotes the calendar year in which i is of age t. I normalize the coefficient estimates $\hat{\beta}_k$ by adding the average of the considered outcome at divorce $\widehat{E}[y_{it}|d_{it} = 1]$.

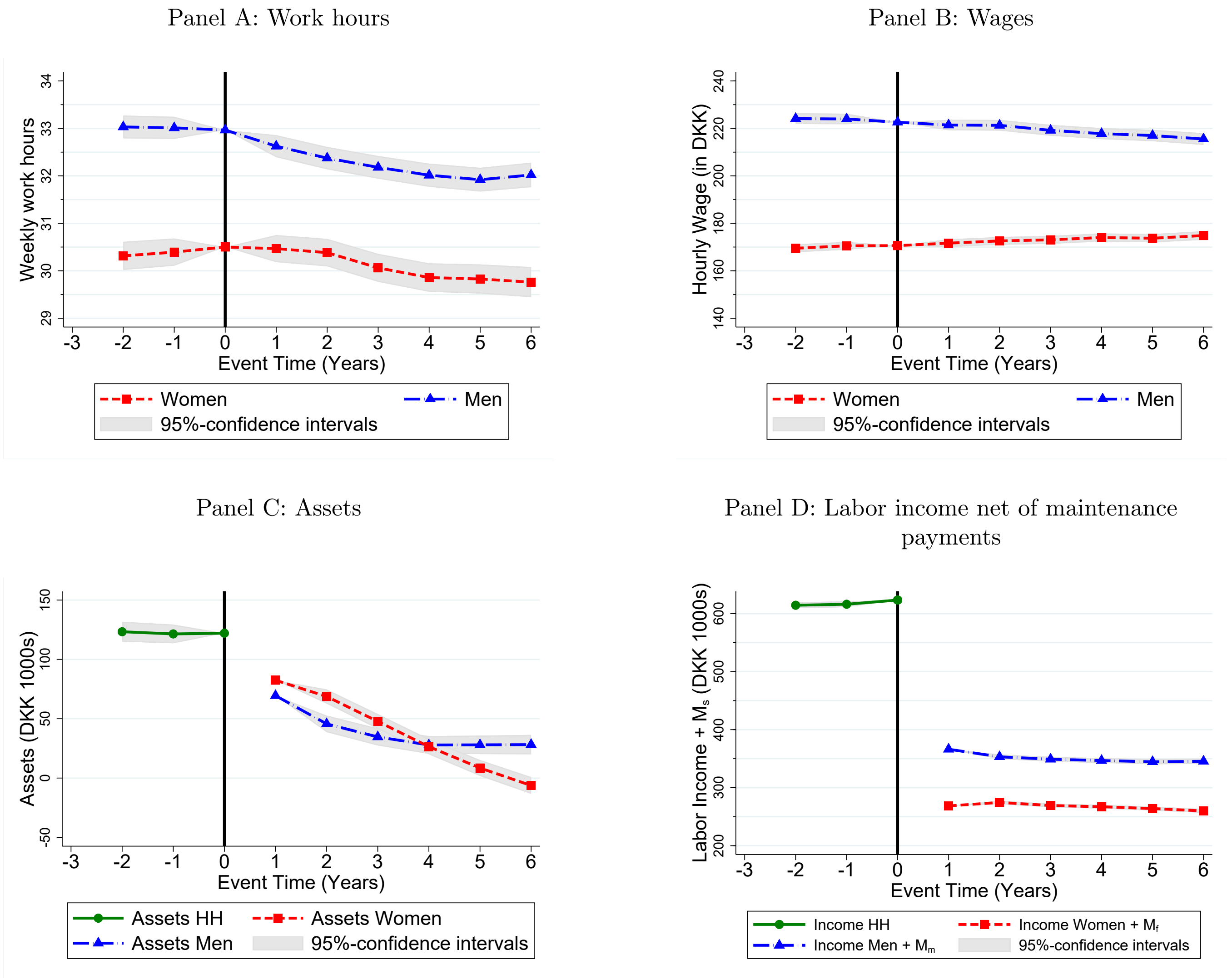
Panels A and B in Figure 3 plot the normalized coefficient estimates $\hat{\beta}_k + \widehat{E}[y_{it}|d_{it} = 1]$ for work hours and wages separately for women and men. The estimates show that women and men tend to reduce their work hours over the first 6 years after divorce by 0.76 and 0.98 weekly work hours, respectively. Wages, by

[24] In similar analyses, Fisher and Low (2015) and Fisher and Low (2016) consider the evolution of divorcing spouses' labor income (and income from other sources) after divorce.

contrast, remain relatively flat but are slightly increasing for women and slightly declining for men.

For assets and labor income net of maintenance payments, I run three separate regressions, one for married couples over the last two years prior to divorce and one regression each for divorced women and men over the first six years post divorce. In all regressions with assets as outcome, I exclude couples with assets above the 98th or below the 2nd percentile. [25] The normalized coefficient estimates are presented in Panels C and D of Figure 3. The estimation results on assets show that women own slightly more assets than men in the first three years after divorce but dissave faster than men and, 6 years after divorce, on average, own close to zero assets. The estimates for labor income net of maintenance payments show that - even after maintenance payments - female divorcees have considerably less income than their ex-husbands. The female-to-male income ratio six years after divorce is 73%.

FIGURE 3: Event studies around divorce

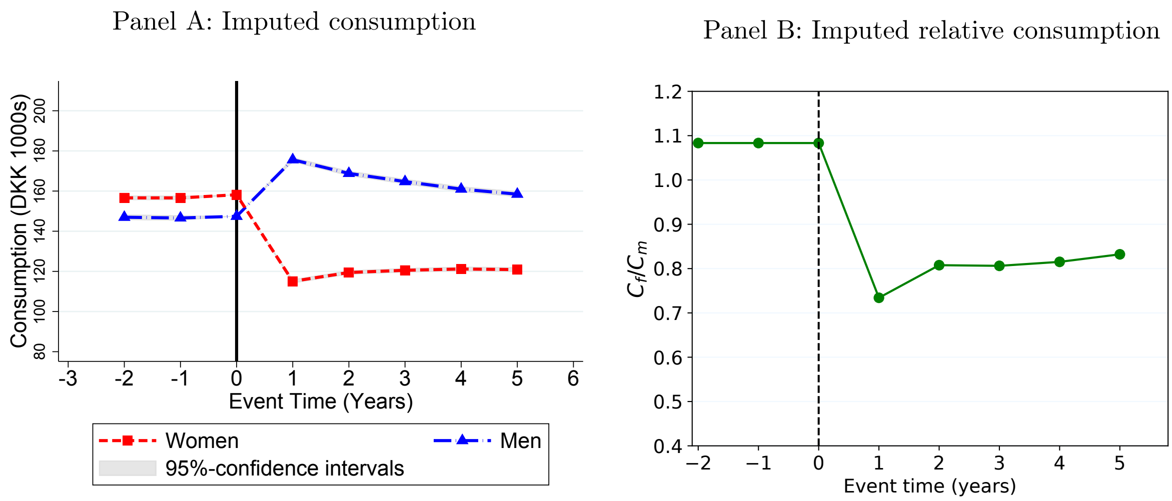


Notes: The figures display the evolution of work hours (Panel A), wages (Panel B), assets (Panel C) and household income net of maintenance (Panel D) around divorce. Displayed are normalized coefficient estimates from event study specification (1). The event-study regressions are run separately for women and men, include age and calendar year fixed effects and are based on a balanced panel of 42,290 divorcing couples who are observed for at least two years prior to and six years after divorce.

[25] Assets are low or negative for the majority of my sample (recall that assets record net wealth). Median assets among divorcing couples are 22,475 DKK ($\approx 3,500$ USD). The 2nd percentile is -855,690 DKK ($\approx -133,200$ USD).

Consumption Combining data on labor income, changes in asset positions, and maintenance payments allows me to impute household consumption expenditures using simple accounting identities (see, e.g., Browning and Leth-Petersen (2003), Autor et al. (2019), and Eika et al. (2020)). From household consumption expenditures, I further back out individual consumption levels by invoking additional assumptions on equivalence scales, a cross-sectional measurement of the male-to-female consumption ratio from the DTUS, and a linear approximation of the Danish tax system. I assume that divorcees who remarry or cohabit with a new partner share finances with their new partner. I thus take the new partner's labor income and assets into account when imputing household consumption expenditures. These assumptions and the procedure by which consumption is imputed are laid out in detail in Appendix B. [26] As noted above (and outlined in Appendix B), the obtained results rely on several additional assumptions. My attempt at gauging the evolution of consumption around divorce should therefore be interpreted more cautiously than the results on work hours, wages, labor income, and assets.

FIGURE 4: Imputed consumption around divorce



Notes: The figure displays mean consumption (Panel A) and mean relative consumption (Panel B) around divorce computed from imputations of consumption based on the Danish administrative data and the DTUS. The imputations for consumption are obtained by combining data on income, maintenance payments, and assets with structural assumptions on equivalence scales, a cross-sectional measurement of the male-to-female consumption ratio from the DTUS, and a linear approximation of the Danish tax system, as described in detail in Appendix B.

To provide an estimate of the evolution of consumption around divorce, I run specification (1) separately for women and men, using imputed consumption as the outcome variable. Panel A of Figure 4 presents the normalized coefficient estimates. According to the estimates, women's consumption drops upon divorce by 26% and recovers somewhat to 23% below the pre-divorce level over the subsequent 5 years. [27] , [28]

[26] The fractions of divorcees who are remarried or living with a new partner after divorce are displayed in Figure H.1.

[27] The magnitude of the implied consumption drop for women is broadly consistent but slightly larger than the drop in food consumption that Page and Stevens (2004) document for divorcing women in the U.S., which is 18%. Note that food expenditures are not ideal as a proxy for overall consumption, and as Page and Stevens (2004) note, "One might expect to see less variation in food expenditures than in almost any other consumption item: Families may spend down their savings in order to maintain some threshold level of food consumption." Following this reasoning, the impact of divorce on overall consumption for women in the U.S. may be larger than the 18% drop that Page and Stevens (2004) document.

[28] This average effect masks substantial heterogeneity: Individuals who remarry or cohabit with a new partner in the first 5 years post divorce show a more attenuated consumption response than individuals who are continuously single over the first 5 years post divorce, as shown in Figure H.2.

Male consumption, by contrast, rises by 21% and attenuates to 7.5% above the pre-divorce level over the subsequent 5 years. Figure 4 plots the within couple female-to-male consumption ratio across event time, showing an initial drop upon divorce from 1.09 to 0.73 followed by a swift recovery and stabilization at 0.82 over the subsequent 5 years. Note that the presented effect occurs despite similar labor supply adjustments for women and men (see Figure 3, Panel A) and a relatively small work hours gap between divorcees (approximately 2.5. hours). The main drivers behind the implied rise in consumption inequality are the substantial gender wage gap among divorcees (see Figure 3, Panel B) and the fact that 79% of women take custody of all children after divorce and need to finance not only their own but also their children's consumption. [29]

5 Model

This section describes a dynamic structural model of labor supply, home production, savings and divorce that incorporates the following main features of married and divorced couples' decision-making: 1. divorced ex-spouses are linked by maintenance payments and interact non-cooperatively, 2. married couples make decisions cooperatively subject to limited commitment, i.e., bargaining power and divorce rates respond to changes in married spouses' outside options, 3. agents are forward looking and working improves their future wages, i.e., working during marriage mitigates financial losses upon divorce.

In the model, a female individual f and a male individual m interact in each time period either as a married couple or as divorced ex-spouses. The model is set in discrete time, the discount factor is β. m and f are married in period 1 and in each time period $t \in \{1, 2, ..., T\}$ choose work hours h_{ft}, h_{mt}, home production hours q_{ft}, q_{mt}, (private) consumption c_{ft}, c_{mt}, and savings. Married couples save in a joint asset A_t, while divorcees save in separate assets A_{ft}, A_{mt}. Moreover, married couples decide whether to stay married, $D_{t+1} = 0$, or to divorce, $D_{t+1} = 1$. Labor supply is discrete, i.e., each spouse's work hours are chosen from finite sets $\mathcal{H}_f$ and $\mathcal{H}_m$. In period T, both individuals retire, meaning that they continue to make decisions about all variables except work hours, which are fixed at zero in every subsequent time period, until the model ends in period $T + T_R$.

At the outset of the model, in period $t = 1$, couples are heterogeneous in their initial number of children n_1 and initial assets A_1. During marriage, a new child is born in each time period $t < T$ with exogenous probability $p(t, n_t)$, which is a function of t and n_t, the number of children already present in the household. [30]

Preferences Model agents $s \in \{f, m\}$ derive utility from private consumption c_{st}, from a household good Q_t and from leisure time ℓ_{st}. The household good represents the well-being of a couple's children and goods

[29] The share of women taking custody of some children after divorce is even higher at 92%. See Appendix D for details.

[30] Keeping fertility exogenous is in line with the previous literature that evaluates divorce law changes using dynamic economic models (e.g., Fernández and Wong (2016), Voena (2015), Bayot and Voena (2015), Reynoso (2018)). See Adda et al. (2017) for a dynamic structural model of career choices and fertility. Doepke and Kindermann (2019) develop a household bargaining model with endogenous fertility.

and services produced within the household, such as homemade meals and cleaning. Q_t is produced from time inputs q_{ft}, q_{mt} (home production hours) and is a public good within married couples but becomes private when a couple divorces (i.e., in divorce there are separate household goods, Q_{ft} and Q_{mt}). [31]

Intra-period utility is additively separable in consumption, leisure, the household good and a taste shock that affects an individual's utility from being married relative to being divorced. The intraperiod utility function of married spouses $s \in \{f, m\}$ is given by

$$u_s^{mar}(c_{st}, \ell_{st}, Q_t, \xi_{st}) = \frac{c_{st}^{1+\eta_s}}{1+\eta_s} + \psi_s \frac{\ell_{st}^{1+\gamma_s}}{1+\gamma_s} + \lambda(n_t)\frac{Q_t^{1+\kappa}}{1+\kappa} + \xi_{st} \ ,$$

where n_t denotes the number of children in the household and $\lambda(n_t) = B \cdot (1 + b \cdot n_t)$, i.e., the relevance of the household good for utility depends on the number of children present in the household. To account for persistence in the taste for marriage, ξ_{st} is assumed to follow a random walk with shocks correlated across s. Specifying ξ_{st} to be individual specific rather than specific to the couple allows for greater flexibility in marital status dynamics. [32]

The intra-period utility function of divorced ex-spouses is given by

$$u_s^{div}(c_{st}, \ell_{st}, Q_{st}) = \frac{c_{st}^{1+\eta_s}}{1+\eta_s} + \psi_s \frac{\ell_{st}^{1+\gamma_s}}{1+\gamma_s} + \lambda(n_{st})\frac{Q_{st}^{1+\kappa}}{1+\kappa} \ ,$$

where the s subscript on Q_{st} accounts for the fact that the household good Q is not public within divorced couples and n_{st} denotes the number of children living with spouse s after divorce.

Home Production Each spouse $s \in \{f, m\}$ has a time budget H, which in each time period is allocated between work, home production and leisure time, i.e., $H = h_{st} + q_{st} + \ell_{st}$. The technology by which the household good Q_t is produced in marriage takes female and male home production time, q_{ft} and q_{mt}, as inputs and has a constant elasticity of substitution form:

$$Q_t = F_Q^{mar}(q_{ft}, q_{mt}) = \left(a q_{ft}^{\sigma} + (1-a) q_{mt}^{\sigma}\right)^{\frac{1}{\sigma}} \ ,$$

where σ controls the degree of substitutability between q_{ft} and q_{mt} and the factor $a \in [0, 1]$ captures productivity differences between the male and the female time input. The parameters σ and a jointly determine to what extent male and female home production time inputs are substitutes or complements in the process of producing the household good. Importantly, married couples produce the household good jointly, while in divorced ex-couples each ex-spouse produces a separate household good. Divorced individuals' home production is captured by the linear technology $Q_{st} = F_{Q_s}^{div}(q_{st}) = a_s^{div} q_{st}$, where a_s^{div} captures male and female divorcees' respective productivity.

[31] This definition of home goods and home production including cleaning, preparing food, and child care follows Doepke and Tertilt (2016).

[32] Imposing marriage-specific quality shocks, i.e., $\xi_f = \xi_m$ within each married couple, would rule out situations where the spouse who benefits most in economic terms from the marriage wants to divorce while the spouse who benefits least in economic terms wants to maintain the marriage.

Economies of Scale and Expenditures for Children I account for economies of scale in married couples' consumption and expenditures for children by specifying the household expenditure function (cf. Voena (2015)):

$$F_x(c_{ft}, c_{mt}, n_t) = e(n_t)(c_{ft}^\rho + c_{mt}^\rho)^{\frac{1}{\rho}}.$$

For $\rho \geq 1$ and given expenditures $x_t = F_x(c_{ft}, c_{mt}, n_t)$, this functional form allows married couples to enjoy economies of scale from joint consumption, while there are no economies of scale if only one spouse consumes. $e(n_t) \geq 1$ is an equivalence scale that accounts for expenditures for children, where $e(0) = 1$ and $e(n_t)$ are strictly increasing in n_t. A married couple with n_t children and private consumption levels c_{ft}, c_{mt} hence has expenditures $x_t^{mar} = F_x(c_{ft}, c_{mt}, n_t)$. The individual expenditures of divorcees f, m with consumption levels c_{ft}, c_{mt} are $x_{ft}^{div} = F_x(c_{ft}, 0, n_{ft})$ and $x_{mt}^{div} = F_x(0, c_{mt}, n_{mt})$, meaning that there are no economies of scale in divorced households and that each divorcee has expenditures only for children who continue to live with her/him.

Wages For each spouse $s \in \{f, m\}$, the wage process depends on human capital K_{ft}, K_{mt} and an i.i.d. random component ϵ_{st}:

$$\begin{aligned} ln(w_{st}) &= \phi_{0s} + \phi_{1s} K_{st} + \epsilon_{st}, \\ \epsilon_{st} &\overset{iid}{\sim} \mathcal{N}(0, \sigma_{\epsilon_s}). \end{aligned}$$

Human capital K_{st} is discrete with values $\{0, 1, 2, ..., K_{\max}\}$ and is accumulated through learning by doing. [33] In particular, from period t to $t+1$, the stock of human capital K_{st} increases by one unit with probability $p_K(h_{st})$, which is strictly increasing in period t working hours. As functional form for p_K, I impose $p_K(h_{st}) = 1 - \exp(-\alpha_s h_{st})$, where α_s controls how responsive the human capital process is to changes in work hours. At the same time, K_{st} constantly depreciates with (exogenous) probability p_{δ_s}. This leads to the following law of motion for human capital:

$$K_{st} = \begin{cases} \min\{K_{st-1} + 1, K_{\max}\} & \text{with prob. } p_K(h_{t-1})(1 - p_{\delta_s}) \\ K_{st-1} & \text{with prob. } p_K(h_{t-1})p_\delta + (1 - p_K(h_{t-1}))(1 - p_{\delta_s}) \\ \max\{K_{st-1} - 1, 0\} & \text{with prob. } (1 - p_K(h_{t-1}))p_{\delta_s}. \end{cases}$$

Allowing for learning by doing adds an important dynamic component to the model. By working during marriage, model agents can increase their individual expected future wages and thereby can self-insure against losing access to their spouses' income upon divorce.

Problem of Divorced Couples Divorced couples are linked by maintenance payments and interact non-cooperatively. [34] Each ex-spouse makes choices to maximize her/his own discounted lifetime utility, taking into account how decisions affect the stream of maintenance payments that flows from one ex-spouse to the

[33] By making these assumptions, I can include human capital for both spouses while keeping the dimension of the state space manageable. In my estimations, I impose $K_{\max} = 4$.

[34] Flinn (2000) analyzes a framework in which the interaction mode between divorcees is endogenous.

other. As both ex-spouses' decisions jointly impact the amount of maintenance payments, the interaction of divorced couples becomes strategic.

In each time period, each ex-spouse chooses her/his time allocation between work hours, home production hours and leisure time as well as consumption and savings in a risk-free asset A_{st+1}, subject to the budget constraint

$$x_{st}^{div} = (1-\nu)(w_{st}h_{st} + \Xi_t M_{st}) + (1+r)A_{st} - A_{st+1}, \tag{2}$$

where r denotes the risk-free interest rate, maintenance payments are denoted by $M_{ft} = -M_{mt} = M_f(n_{ft}, n_{mt}, w_{ft}h_{ft}, w_{mt}h_{mt})$, and ν is the marginal tax rate. [35] Note that f's work hours decision impacts m's decision problem through the maintenance payments M_m in m's budget constraint (and vice versa: m's work hours decision affects f's budget constraint). Period t maintenance payments depend on each ex-spouse's period t labor income and the number of children living with each ex-spouse. To account for the duration for which maintenance payments are made, I introduce an indicator variable Ξ_t that equals 1 as long as maintenance payments are ongoing. In each period, maintenance payments are discontinued ($\Xi_t = 0$) with probability $1 - p_M$, implying an average duration of maintenance payments of $\frac{1}{1-p_M}$ time periods. Once discontinued, maintenance payments remain at zero (i.e., if $\Xi_t = 0$, then $\Xi_{t+1} = 0$).

To determine allocations in this setting, I restrict my attention to Markov-perfect equilibria. To rule out multiplicity of equilibria, which often occurs in simultaneous-move games, I impose sequential (Stackelberg-type) decision-making within time periods. In particular, I assume that within each time period m chooses first and f responds optimally to m's choices. [36] , [37]

Denote the period t decisions of spouse s by $\iota_s = (c_{st}, h_{st}, q_{st}, \ell_{st}, A_{st+1})$. In the second stage of time period t, f solves the following decision problem. Given m's first-stage choices ι_{mt} and given the vector of period t state variables $\Omega_t^{div} = (A_{ft}, A_{mt}, n_{ft}, n_{mt}, K_{ft}, K_{mt}, \epsilon_{ft}, \epsilon_{mt}, \Xi_t)$, f solves [38]

$$\begin{aligned} \tilde{\iota}_{ft} &= \arg\max_{\iota_{ft}} \; u_f^{div}(c_{ft}, \ell_{ft}, Q_{ft}) + \beta \mathbb{E}_t[V_{ft+1}^{div}(\Omega_{t+1}^{div})] \qquad (3) \\ \text{s.t.} \quad x_{ft}^{div} &= (1-\nu)(w_{ft}h_{ft} + \Xi_t M_f(n_{ft}, n_{mt}, w_{ft}h_{ft}, w_{mt}h_{mt})) + (1+r)A_{ft} - A_{ft+1} \\ Q_{ft} &= F_{Q_f}^{div}(q_{ft}) \\ H_f &= h_{ft} + q_{ft} + \ell_{ft}\,. \end{aligned}$$

In the first stage, m makes his decision taking into account how it influences his female ex-spouse's second-stage response $\tilde{\iota}_{ft}$; i.e., m solves

[35] As received maintenance payments are taxed and paid maintenance is tax deductible, ν is multiplied by the sum of labor income and maintenance payments.

[36] Weiss and Willis (1993) model divorcees' decision-making as a (static) Stackelberg game. Kaplan (2012) imposes sequential decision-making to ensure uniqueness of a Markov-perfect equilibrium in a dynamic two-player setting where youths interact with their parents. His paper provides a discussion of the multiplicity of Markov-perfect equilibria in dynamic two-player settings.

[37] Changing the timing of the game such that f moves first tends to produce unrealistically low levels of male labor supply.

[38] f's optimal choices depend functionally on m's first-stage choices (e.g., for labor supply $\tilde{h}_{ft} = \tilde{h}_{ft}(\iota_{mt})$). For convenience, I suppress the functional dependence in my notation.

$$\begin{aligned}
\iota_{mt}^{*} &= \underset{\iota_{mt}}{\arg\max}\ \ u_m^{div}(c_{mt}, \ell_{mt}, Q_{mt}) + \beta \mathbb{E}_t[V_{mt+1}^{div}(\tilde{\Omega}_{t+1}^{div})] \qquad (4)\\
\text{s.t.}\ \ x_{mt}^{div} &= (1-\nu)(w_{mt}h_{mt} + \Xi_t M_m(n_{ft}, n_{mt}, w_{ft}\tilde{h}_{ft}, w_{mt}h_{mt})) + (1+r)A_{mt} - A_{mt+1}\\
Q_{mt} &= F_{Q_m}^{div}(q_{mt})\\
H_m &= h_{mt} + q_{mt} + \ell_{mt}\,,
\end{aligned}$$

where $\tilde{h}_{ft}$ denotes f's optimal work hours response and $\tilde{\Omega}_{t+1}^{div}$ is the vector of state variables given f's optimal second-stage response. Given m's optimal choices ι_{mt}^{*} and f's optimal responses

$$\iota_{ft}^{*} = \tilde{\iota}_{ft}(\iota_{mt}^{*}),$$

the value of divorce for ex-spouse $s \in \{f, m\}$, for $t < T$, is given by

$$V_{st}^{div}(\Omega_t^{div}) = u_s^{div}(c_{st}^{*}, \ell_{st}^{*}, Q_{st}^{*}) + \beta \mathbb{E}_t[V_{st+1}^{div}(\Omega_{t+1}^{*div})], \qquad (5)$$

where $c_{st}^{*}, h_{st}^{*}, Q_{st}^{*}$ denote the respective components of ι_{st}^{*} and Ω_{t+1}^{*div} is the vector of state variables given optimal period t choices of f and m. Given the period T value of divorce V_{sT}^{div} (the value of retiring as a divorcee) for $s \in \{f, m\}$, the decision problems (3) and (4) and equation (5) recursively define the value of divorce V_{st}^{div} for every period $t \in \{1, ..., T-1\}$ for $s \in \{f, m\}$. V_{sT}^{div} is the value of retiring as part of a divorced couple for spouse $s \in \{f, m\}$. A formal description of decision-making in retirement is provided in Appendix C.2.

Division of Assets upon Divorce and Child Custody If a couple divorces in period t, savings in the joint asset A_t are divided among the divorcing spouses. I assume that property is divided equally, such that each spouse receives $\frac{A_t}{2}$. Equal property division is a close approximation to the property division regime that is in place in Denmark, where assets accumulated during marriage are divided equally but assets held prior to marriage are exempt from property division.

Upon divorce, it is further decided which spouse receives physical custody of the divorcing couple's children. I assume that all children either stay with their mother, $n_{ft} = n_t$, with exogenous probability p_{cust_f}, or with their father, $n_{mt} = n_t$, with probability $1 - p_{cust_f}$. In the case of multiple children, I do not account for cases where some children stay with their mother while others stay with their father, as this would increase the dimensionality of the state space and increase the computational complexity of the model solution drastically. In my sample, I observe that in 93% of all divorcing couples, all children stay with one parent, while in 7% of all cases, some children stay with each parent.

Problem of Married Couples Married couples make decisions cooperatively subject to limited commitment. In limited-commitment models of the family, the outside options of both spouses impact the distribution of bargaining power between husband and wife and the propensity of the couple to divorce. As policy changes to post-marital maintenance payments affect each spouse's outside option, the limited commitment framework allows maintenance payments to impact the intra-household distribution of bargaining power and divorce rates.

In each time period, married couples choose work hours, home production hours, (private) consumption for each spouse and savings in the joint asset A_{t+1}. Define the vector of period t state variables of a married couple by $\Omega_t^{mar} = (\mu_t, A_t, n_t, K_{ft}, K_{mt}, \epsilon_{ft}, \epsilon_{mt}, \xi_{ft}, \xi_{mt})$, and denote a married couple's choice variables by $\iota_t = (c_{ft}, c_{mt}, h_{ft}, h_{mt}, q_{ft}, q_{mt}, \ell_{ft}, \ell_{mt}, A_{t+1}, D_t)$, where $D_t = 1$ indicates the couple's decision to divorce in t. Conditional on the decision to stay married ($D_t = 0$) and for given relative bargaining power μ_t, the couple solves the constrained maximization problem:

$$\begin{aligned} \iota_t^* &= \arg\max_{\iota_t} \;\; \mu_t \big[u_f^{mar}(c_{ft}, \ell_{ft}, Q_t, \xi_{ft}) + \beta \mathbb{E}_t[V_{ft+1}]\big] \\ &\quad + u_m^{mar}(c_{mt}, \ell_{mt}, Q_t, \xi_{mt}) + \beta \mathbb{E}_t[V_{mt+1}] \\ \text{s.t.} \quad x_t^{mar} &= (1-\nu)(w_{ft} h_{ft} + w_{mt} h_{mt}) + (1+r) A_t - A_{t+1} \\ Q_t &= F_Q^{mar}(q_{ft}, q_{mt}) \\ H_f &= h_{ft} + q_{ft} + \ell_{ft} \\ H_m &= h_{mt} + q_{mt} + \ell_{mt} \end{aligned} \tag{6}$$

where ν is the marginal tax rate. [39] The value of marriage for spouse s in $t < T$ is given by

$$V_{st}^{mar}(\Omega_t^{mar}) = u_s(c_{st}^*, \ell_{st}^*, Q_t^*, \xi_{st}) + \beta \mathbb{E}_t[V_{st+1}], \tag{7}$$

where $c_{st}^*, q_{st}^*, \ell_{st}^*$ are the respective components of ι^* and Q_t^* is the quantity of the home good that is produced at q_{ft}^*, q_{mt}^*. V_{sT}^{mar} is the value of retiring as part of a married couple for spouse $s \in \{f, m\}$. [40]

The $t+1$ continuation value V_{st+1} depends on whether the couple stays married $D_{t+1} = 0$ or divorces $D_{t+1} = 1$ in $t+1$ and is given by

$$V_{st+1} = D_{t+1} V_{st+1}^{div}(\Omega_{t+1}^{div}) + (1 - D_{t+1}) V_{st+1}^{mar}(\Omega_{t+1}^{mar}).$$

In the limited-commitment framework, intra-household bargaining power may shift if one spouse's participation constraint is violated. If at given female bargaining power μ_t, both spouses' participation constraints are satisfied, i.e.,

$$V_{st}^{mar}(\Omega_t^{mar}) \geq V_{st}^{div}(\Omega_t^{div}) \;\; \text{for } s \in \{f, m\}, \tag{8}$$

then it is individually rational for both spouses to stay married. In this case, the couple stays married and makes decisions according to (15). [41] If, however, the participation constraint (8) is violated for one spouse but not the other, bargaining power is increased (if f's participation constraint is violated) or decreased (if

[39] Taxation in Denmark is based on individual filing for married couples, but certain deductions can be transferred between spouses (see, e.g., Kleven and Schultz (2014)). For simplicity, I abstract from these deductions and treat taxation as fully individual based.

[40] See Appendix C.2 for a formal description of decision-making in retirement.

[41] Note that the decision of whether to stay married or divorce is made after the period t love shock, ξ_{mt}, has been observed by the model agents. For a graphical illustration of the timing regarding divorce decisions, see Appendix C.1.

m's participation constraint is violated) until the spouse whose participation constraint is binding is just indifferent between staying married and divorcing. Divorce occurs if no value of μ_t exists such that both spouses' participation constraints are satisfied simultaneously.

Policy changes to post-marital maintenance payments typically increase the value of one spouse's outside option while decreasing the value of the other spouse's outside option. Under limited commitment, this may trigger changes in intra-household bargaining power. Furthermore, divorce rates may respond to such policy changes if divorcing becomes too attractive relative to staying married for (at least) one spouse and if reallocating bargaining power cannot restore the incentives to stay married for both spouses.

6 Estimation

To obtain estimated values for the structural parameters of my model, I proceed in three steps. First, a small subset of the model parameters is set externally to match values from the previous literature and external data sources. Next, several model parameters are estimated directly from the Danish register data without making use of the structural model. The remaining parameters are estimated by the method of simulated moments (MSM), (see Pakes and Pollard (1989) and McFadden (1989)); i.e., I use numerical optimization techniques to find model parameters such that a set of simulated model moments match the corresponding moments from the data as closely as possible. The next subsections describe each of the three steps for obtaining estimates of my model parameters in more detail.

6.1 Preset Parameters and Directly Estimated Parameters

I preset several model parameters to match values from the literature. These parameters and the values that I fix them at are summarized in Table 1. In line with previous studies (see Voena (2015) and Reynoso (2018)), I set the model time period to correspond to three years to keep the computational complexity manageable. I solve the model for $T = 10$ and $T_R = 4$, i.e., for individuals whose working life lasts for 30 years after they first marry and who live for 12 years as retirees after their working life ends. I approximate retirement income by $R_s(w_{sT}) = 0.77 \times w_{sT}\overline{h}_s$, where 0.77 is the Danish net pension replacement rate, w_{sT} is the retiree's preretirement wage, and $\overline{h}_s$ denotes female and male average hours worked. [42] For both spouses, f and m, the domain of weekly work hours is restricted to four values: nonparticipation (0 hours), three levels of part-time work (10, 25 and 34 hours), and full-time work (38 hours). To arrive at annual work hours, I impose that one year consists of 49 working weeks. I fix the overall weekly time budget at 50 hours ($H = 50$), such that if a person works full time, there is a residual of 12 hours to be allocated between weekly home production and leisure.

Another subgroup of parameters is directly estimated from Danish register data and the DTUS without resorting to the structural model. These parameters and their estimated values are summarized in Table 2.

[42] Source for the net pension replacement rate: OECD (2013).

For details on the procedures by which these parameters are estimated, see Appendix D.

TABLE 1: Preset parameters

Parameter	Value	Source
Annual discount factor:	0.98	Attanasio et al. (2008)
Risk aversion (η):	-1.5	Attanasio et al. (2008)
Annual interest rate:	0.02	-
Economies of scale (ρ):	1.4023	implied by McClements scale (see Voena (2015))
Number of time periods (T):	10	-
Duration of retirement (T_R):	4 time periods	-
Retirement income ($R_s(w_{sT})$):	$0.77 \times w_{sT}\overline{h}_s$	
Weekly work hours domain:	$\{0, 10, 25, 34, 38\}$	-
Tax rate:	0.46	Trabandt and Uhlig (2011)

Notes: Displayed are all model parameters that are preset. For ease of interpretation, the table presents the implied annual discount factor and interest rate and the implied weekly work hours domain, rather than the corresponding numbers for one model time period, which is three years.

TABLE 2: Directly estimated parameters

Parameter	Value	Data source
Initial relative bargaining power, μ_0:	1.13	DTUS
$P(\text{custodial} = f)$:	0.86	Danish register data
Prob. of non-compliance, $P(\Xi_t = 0 \text{ for all } t)$:	0.17	Danish register data
Prob. maintenance discontinued, $P(\Xi_{t+1} = 0 \mid \Xi_t = 1)$:	0.12	Danish register data
Initial distribution of children, $p_{n_1}(n)$:	see Appendix D	Danish birth register
Fertility process, $p_n(n_t, t)$:	see Appendix D	Danish birth register

Notes: Reported are model parameters that are estimated directly without making use of the structural model, along with the estimated values, and the data source used for estimation. See Appendix D for details on the procedure by which each parameter is estimated and the values for the fertility parameters.

6.2 Method of Simulated Moments Estimation

The remaining model parameters that are estimated using the method of simulated moments are the parameters governing preferences for leisure γ_s, ψ_s and preferences for the home good B_f, B_m, b, κ, the parameters governing home production a, σ, the love shock parameters μ_ξ, σ_ξ and the parameters governing the wage processes ϕ_{0s}, ϕ_{1s}, σ_{ϵ_s}, α_s, p_{δ_s} for $s \in \{f, m\}$. I denote the vector of structural model parameters estimated by MSM by θ. For a given θ I solve the structural model by backward recursion, simulate data for 20,000 hypothetical couples and compute the vector of simulated moments $m(\theta)$. MSM-estimates $\widehat{\theta}$ are obtained by minimizing the distance between simulated model moments and their empirical counterparts $\widehat{m}$

$$\min_{\theta} \, (m(\theta) - \widehat{m})' \widehat{W} (m(\theta) - \widehat{m}).$$

The empirical moments that I target are conditional averages of weekly work hours, home production hours and wages, where I condition on marital status (married/divorced) and number of children. [43] I also target the fraction of ever-divorced couples by the time elapsed since the couples married. As a third set of moments, I target event-study coefficient estimates from the event studies discussed in Section 4 that capture the evolution of male and female work hours and wages around divorce. Overall, I target 89 empirical moments. As the weighting matrix $\widehat{W}$, I use the diagonal matrix with the inversed variances of the empirical moments as diagonal entries. [44] The MSM parameter estimates are presented in Table 3 together with asymptotic standard errors (see, e.g., Newey and McFadden (1994)).

6.3 Model Fit

For an assessment of the model fit, Figure 6 contrasts the average outcomes computed from the model simulations with the respective empirical moments computed from my data. In particular, Panel A of Figure 6 shows average work hours and home production hours (conditional on marital status but averaged over number of children), Panel B displays the fraction of ever-divorced couples by the time elapsed since marriage, and Panels C and D display the coefficient estimates from event studies conducted on the observed data and on simulated data from my model, respectively. [45]

Overall, the model matches the considered empirical moments very well, although the model somewhat overpredicts the initial drop in women's work hours after divorce and slightly underpredicts male wages before divorce. The model matches well the observed patterns of household specialization. Note that gender differences in home production hours arise as a consequence of gender differences in labor market returns (husband's and wife's current relative wages and returns to work experience) and in home productivity (captured by a, a_f^{div}, a_m^{div}) and the substitutability between male and female home production hours (governed by σ). An implication of my model parameter estimates is that gender differences in home productivity are small in marriage (a is close to 0.5) and that the male and female home production hours are imperfect substitutes ($\sigma \in [0, 1)$). To explore the extent to which differences in male/female home production hours are driven by differences in home productivity and labor market returns, I run a simple counterfactual simulation in which I equalize home productivity between women and men. The simulation results reveal that eliminating differences in home productivity reduces the gender gap in home production hours by 16%. The remaining 84% is driven by labor market returns. To give the full picture of how well my model fits

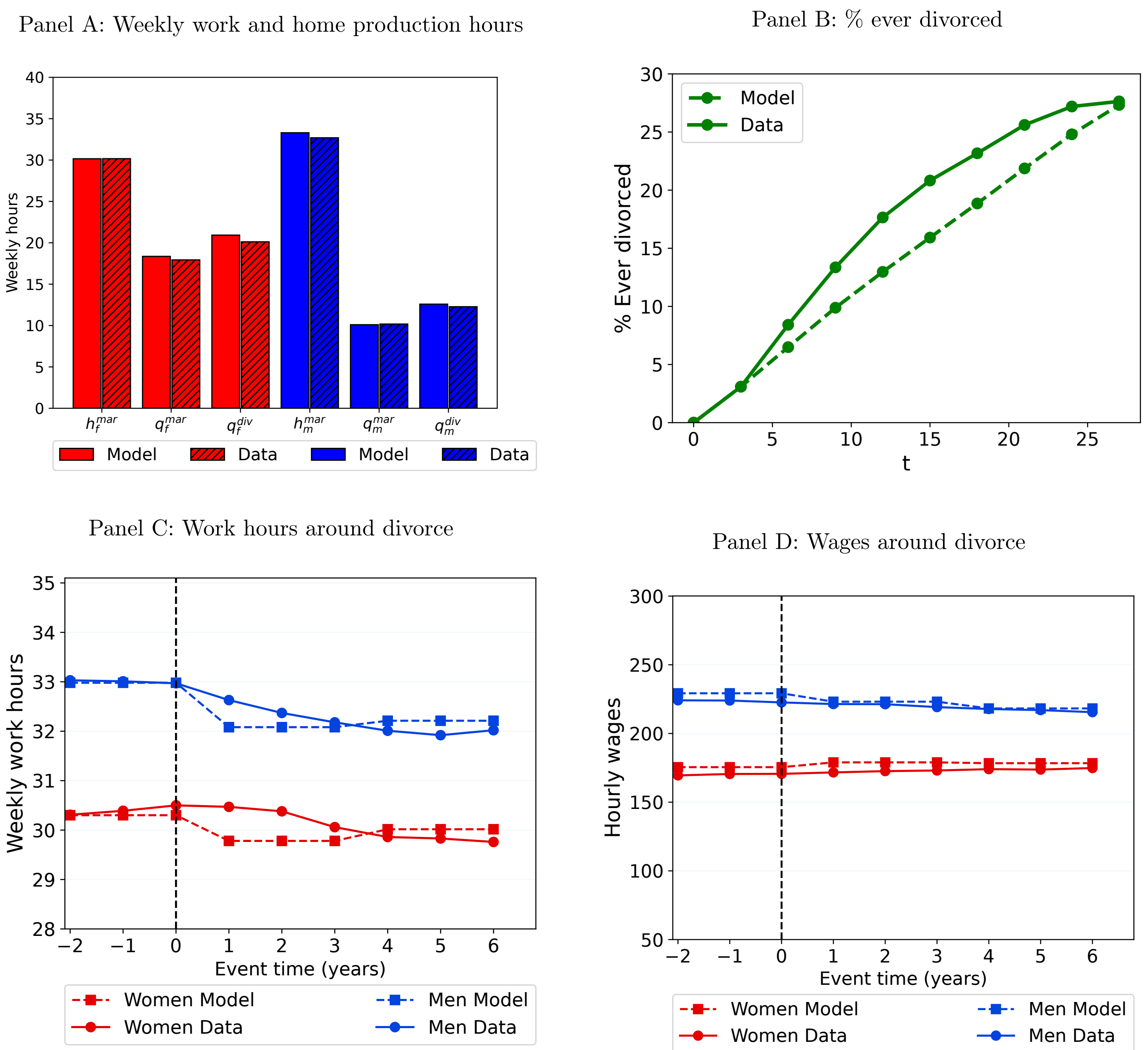
[43] As the data from the DTUS feature few observations on people with two or more children, I compute joint moments for this group; i.e., I target average home production hours separately for three groups: people with no children, people with one child and people with two or more children.

[44] Altonji and Segal (1996) show that using the efficient weighting matrix leads to undesirable finite sample properties.

[45] Note that since one model period equals three years, the model generates variation only at this frequency.

the targeted empirical moments conditional on the number of children, Table G.2 contrasts work hours and home production hours with their counterparts from the model simulations at the estimated parameters. The estimated model fits many of the targeted conditional moments closely, but is a bit sparse on work hours and home production hours of divorced women and men without children (the model underpredicts their leisure). The model has a hard time generating ∩-shaped patterns of work hours in the number of children and thus provides a less convincing fit for some groups, e.g., married women with no children or three children who are observed to work shorter hours than married women with one or two children.

Figure 5: Model fit



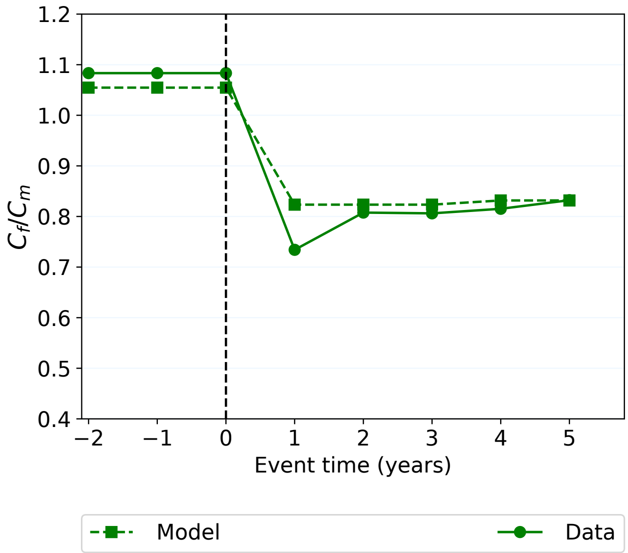
Notes: The figures display mean data moments and simulated model moments separately for women/men. Panel A displays mean work hours of married men and women and home production hours of married and divorced women and men. Data moments on home production are computed based on the DTUS. Panel B displays the evolution of ever divorced couples as a fraction of the total population over time (elapsed since first marriage). Panel C and D present coefficients estimated from event studies around divorce for wages and work hours. Note that one model period equals three years, i.e., the model only generates variation at this frequency.

Table 3: MSM parameter estimates

Parameter	Estimate	Standard error
Leisure preferences		
γ_f	-2.67	0.0103
ψ_f	0.57	0.0021
γ_m	-2.30	0.0052
ψ_m	2.93	0.0133
Home good preferences		
B	0.014	0.0019
b	0.28	0.0007
κ	-1.45	0.0001
Home good production		
a	0.51	0.0047
a_f^{div}	0.76	0.0004
a_m^{div}	0.21	0.0004
σ	0.80	$0.627 \cdot 10^{-4}$
Marriage preferences		
μ_ξ	$0.23 \cdot 10^{-3}$	$0.12 \cdot 10^{-5}$
σ_ξ	0.026	$0.10 \cdot 10^{-5}$
Wage processes		
ϕ_{0f}	3.75	0.0054
ϕ_{1f}	0.52	0.0009
α_f	$0.11 \cdot 10^{-3}$	$0.05 \cdot 10^{-5}$
σ_{ϵ_f}	0.27	0.0007
δ_f	0.05	0.0003
ϕ_{0m}	4.31	0.0067
ϕ_{1m}	0.45	0.0009
α_m	$0.06 \cdot 10^{-3}$	$0.07 \cdot 10^{-5}$
σ_{ϵ_m}	0.47	0.0013
δ_m	0.01	0.0001

Notes: The table presents model parameters estimated by MSM and asymptotic standard errors. The estimates are obtained by fitting average work hours, home production hours and wages conditional on marital status and number of children, as well as the fraction of ever divorced couples conditional over time elapsed since getting married.

Figure 6: Untargeted moments: Relative consumption around divorce



Notes: The figure displays mean relative consumption around divorce computed from imputations of consumption based on the Danish administrative data and the DTUS contrasted with relative consumption from model simulations at the estimated parameters. The imputations for consumption are obtained as described in Section 4.

7 Underlying Frictions and First Best Allocation

This section analyzes the frictions in my model that can potentially be mitigated by maintenance policies. The first friction, which has received much attention in the previous literature, is limited commitment. Limited commitment introduces scope for re-bargaining when participation constraints are violated and thereby keeps spouses from providing full insurance to each other (see Mazzocco (2007), Voena (2015), Fernández and Wong (2016), and Lise and Yamada (2018)). A second friction in my model is non-cooperation in divorce. Many studies of divorced couples assume that divorcees make decisions non-cooperatively (see, e.g., Voena (2015), Fernández and Wong (2016), and Reynoso (2018)), but few have studied the welfare loss that non-cooperation in divorce entails and the extent to which this loss can be overcome by policy. [46] Because of non-cooperation in divorce, there is no mutual insurance between divorcees; i.e., there is an inefficient lack of insurance against income losses upon divorce. Maintenance payments help to rectify this lack of insurance. Another consequence of non-cooperation in divorce is strong incentives for married individuals to work and accumulate human capital to self-insure, reducing the possibilities for intra-household specialization and potentially leading to inefficiently low home production. By reducing the need for self-insurance, maintenance policies may strengthen the overall incentives to supply home production and thus help married households move closer to an efficient time allocation.

Definition of First Best I define a first-best scenario in which both frictions, limited commitment and noncooperation in divorce, are removed from the model. In this scenario, spouses and ex-spouses cooperate under full commitment for the entire time horizon independent of whether they are married or divorced. [47]

[46] Flinn (2000) analyzes a framework in which divorced couples endogenously choose between cooperation and non-cooperation and studies to what extent child support enforcement can implement cooperation.

[47] Note that this definition of "first best" allows for full insurance within, but not for insurance across, couples.

As a consequence, gains from mutual insurance and efficient time allocation are fully realized. The resulting allocation is ex-ante Pareto-efficient and is characterized by the following features: 1. income risk is fully shared between spouses/ex-spouses, 2. married and divorced couples make decisions at fixed bargaining weights subject to the couples joint labor income, 3. couples divorce if and only if divorce is Pareto efficient. Divorcees do not experience love shocks ξ_{st}, do not enjoy economies of scale from joint consumption, do not engage in joint home production, and the produced home goods are consumed privately. A formal definition of the first best allocation is provided in Appendix C.4.

Characterization of the First Best Allocation I solve for the first best allocation at the estimated parameters and draw comparisons to the status quo. To study the magnitude of each underlying friction, I additionally solve and simulate a version of my model in which only non-cooperation in divorce is removed from the model while the limited commitment friction is left in place. For both of these hypothetical scenarios, I fix relative bargaining power at its estimated initial value, $\mu = \mu_0 = 1.13$.

Table 4 presents a range of average outcomes for each scenario. Comparing columns 1-3 from left to right gives an indication of how outcomes change as frictions are removed, first removing the non-cooperation friction and then the limited-commitment friction. A comparison of the first best scenario to the status quo reveals three main differences. First, consumption insurance is much higher under the first best scenario than under the status quo, reflecting full mutual insurance between ex-spouses under the first best scenario. Under the status quo, women consume on average more than men in marriage ($c_f^{mar}/c_m^{mar} = 1.06$), but relative consumption is a lot lower in divorce ($c_f^{div}/c_m^{div} = 0.72$). By contrast, in the first best scenario there is no drop in relative consumption upon divorce ($c_f^{mar}/c_m^{mar} = c_f^{div}/c_m^{div} = 1.08$). As a second notable difference, in the first best scenario married women and men have lower work hours and higher home production hours than under the status quo. This reflects that the frictions considered incentivize women and men to self-insure against financial losses upon divorce by working and accumulating human capital during marriage. Third, the fraction of couples divorcing is lower in the first best scenario than under the status quo. In the first best scenario divorced couples cooperate, and married couples allocate their time efficiently, leading to both an increased value of divorce and an increased value of marriage relative to the status quo. Whether divorce becomes more or less prevalent in the first scenario than in the status quo depends on the relative magnitude of these changes. At the estimated structural parameters, I find that 27.3% of couples divorce by period T while only 18.3% divorce under the first-best scenario.

Finally, the allocation where non-cooperation in divorce is removed from the model, such that limited commitment is the only friction, is generally close to the first best allocation, suggesting that non-cooperation in divorce is the main friction that accounts for differences between the status quo and the first best scenario while limited commitment plays a subordinate role.

Prohibiting Divorce As an alternative benchmark, I consider a scenario in which divorce is eliminated from couples' choice sets. Specifically, this scenario provides a benchmark for the behavior of married couples, revealing couples' time allocations if there were no risk of divorce. The simulation results, displayed in Table 4, show that prohibiting divorce leads to a decrease in both married women's and men's labor supply. This reflects that when divorce is prohibited, the incentives to accumulate human capital to self-insure against financial losses upon divorce vanish. Quantitatively, prohibiting divorce leads, on average, to a reduction of 1.5 weekly work hours among married women, broadly consistent with evidence by Bargain et al. (2012), who document that legalizing divorce in Ireland led to a 1.6–2.5 increase in weekly work hours among married women.

TABLE 4: Mean outcomes: status quo vs. benchmark scenarios

Variable	Status quo	Cooperation in divorce (+ LC)	First best	No divorce
Work hours female (divorced)	27.7	25.3	23.7	-
Home production hours female (divorced)	20.9	23.2	24.8	-
Work hours male (divorced)	30.2	33.3	32.7	-
Home production hours male (divorced)	12.6	10.3	10.8	-
Consumption ratio $\left(\frac{c_f}{c_m}, \text{divorced}\right)$	0.72	1.08	1.08	-
Work hours female (married)	30.1	29.8	29.7	28.6
Home production hours female (married)	18.4	18.7	18.7	19.9
Work hours male (married)	33.3	33.3	33.1	32.3
Home production hours male (married)	10.1	10.1	10.3	10.9
Consumption ratio $\left(\frac{c_f}{c_m}, \text{married}\right)$	1.06	1.07	1.08	1.08
% divorced in T	27.3	27.9	18.3	-

Notes: Mean outcomes by marital status, computed based on model simulations for $N = 20,000$ couples.

8 Policy Simulations

This section explores how changes to child support and alimony policies affect couples' dynamic decisions. To this end, I conduct policy experiments in a parsimoniously parameterized policy space that approximates the Danish institutional setting described in Section 2. I approximate alimony payments by the Danish rule of thumb, i.e., I assume alimony payments equal $\text{alim}_{ft} = -\text{alim}_{mt} = \tau \cdot (w_{mt}h_{mt} - w_{ft}h_{ft})$, where $\text{alim}_{ft} > 0$ if payments flow from ex-husband to ex-wife and $\text{alim}_{ft} < 0$ if payments flow from ex-wife to ex-husband. [48] To approximate child support payments, I project the Danish child support schedule on a lower-dimensional policy space given by

$$\text{cs}_{ft} = -\text{cs}_{mt} = \begin{cases} n_{ft}^{b_n}\left[b_0 + b_1 w_{mt}h_{mt} + b_2(w_{mt}h_{mt} - w_{ft}h_{ft})\right] & \text{if custodial} = f, \\ -n_{mt}^{b_n}\left[b_0 + b_1 w_{ft}h_{ft} + b_2(w_{ft}h_{ft} - w_{mt}h_{mt})\right] & \text{if custodial} = m, \end{cases}$$

[48] By using the rule of thumb formula, I abstract from caps that limit alimony payments in cases where the alimony payer would end up with "too little" or the alimony receiver would end up with "too much" (see Appendix A). These caps are non-binding for 98% of the divorcees in my sample, so abstracting from them yields a close approximation of the exact alimony formula.

where $\text{cs}_{ft} > 0$ if child support flows from ex-husband to ex-wife and $\text{cs}_{ft} < 0$ if child support flows in the opposite direction. Note that each parameter has a meaningful connection to one aspect of child support. b_0 controls the lump-sum component of child support that is independent of the divorcees' labor incomes, b_1 governs the responsiveness of child support payments to the non-custodial parent's income, and b_2 determines the dependence on the income gap between non-custodial and custodial parent. The dependence of child support payments on the number of children is controlled by b_n. The functional form allows concavity ($b_n < 1$) or convexity ($b_n > 1$) of child support payments in the number of children. Values for b_0, b_1 and b_n that approximate the Danish child support schedule are obtained by non-linear least squares. The approximated status quo maintenance policy is given by $\tilde{b}_0 = 24060$, $\tilde{b}_1 = 0.028$, $\tilde{b}_n = 0.79$, and $\tilde{\tau} = 0.2$. Details on the approximation procedure and the goodness of fit are provided in Appendix E. Note that throughout my sample period, child support in Denmark was independent of the custodial parent's income, i.e., $\tilde{b}_2 = 0$.

8.1 The Impact of Maintenance Payments on Time Use, Consumption and Divorce

This subsection describes how counterfactual policy changes to child support and alimony affect couples' time use, consumption, and propensity to divorce. I consider counterfactual policy changes in the child support schedule (b_0, b_1, b_2, b_n) and the alimony policy τ. I simulate the behavior of $N = 20,000$ couples using my estimated structural model.

Maintenance Payments and Divorced Couples' Time Allocation Table 5 shows how divorced couples' time allocation changes if child support payments are varied. For comparability, I consider variations in each of the child support schedule parameters b_k, ($k \in \{0, 1, 2, n\}$) that would ceteris paribus increase child support payments by identical amounts. In the following policy simulations, $b_k^{'}$ denotes parameter values that would ceteris paribus double and by $b_k^{''}$ values that would ceteris paribus triple child support payments, relative to the status quo policy.

Several aspects of the simulation results are noteworthy. First, when child support payments are increased, divorced women on average substitute away from market work toward home production. This holds irrespective of which policy parameter, b_k, is changed. In terms of magnitudes, a policy change that would ceteris paribus triple child support leads to a 4–5% decrease in divorced women's average work hours and a 5–7% increase in their average home production hours, depending on which policy parameter b_k is varied.

Second, increasing the lump-sum component, b_0, or the curvature in number of children, b_n, increases divorced men's average work hours, pointing to dominating income effects that push toward higher male labor supply as child support is increased. Quantitatively, increasing b_0 or b_n such that child support ceteris paribus would be tripled leads to an increase in male work hours by 1%–3%. In contrast, increasing the slope in the child support payer's income, b_1, leads to a decrease in divorced men's labor supply.

Third, in response to an increase in the dependence of child support on the gap between the divorced parents' incomes (i.e. an increase in b_2), divorced men strongly reduce their work hours by 6% and 16%, respectively, in response to policy changes that would ceteris paribus double or triple child support. The explanation for this starker reduction in divorced men's labor supply is that increasing the dependence of payments on both the payer's and receiver's labor income strengthens strategic motives: Divorced men lower their work hours (thereby lowering child support and alimony) to incentivize their ex-wives to work more, which further reduces the amount of child support and alimony that the ex-husband is required to pay.

Table 6 shows how changes in alimony payments affect divorced couples' mean time allocation. I consider counterfactual scenarios in which the alimony parameter τ is increased stepwise from $\tau = 0$ (no alimony) to $\tau = 0.4$. On average, both divorced women and men reduce their work hours in response to higher alimony payments. Qualitatively, the effect of increasing alimony thus resembles the effect of increasing the dependence of child support on the gap between the divorced parents' incomes (increasing b_2). [49] Quantitatively, a switch from the status quo, $\tau = 0.2$, to $\tau = 0.4$, on average, leads to reduction in divorced women's work hours by 5% and divorced men's work hours by 7%.

TABLE 5: The effect of varying child support on divorced couples' time use

Policy parameter, b_k	Variable	$b_k = 0$	Status quo	$b_k^{'}$	$b_k^{''}$
Intercept, b_0	h_f	28.1 (+1.4%)	27.7	26.9 (-2.9%)	26.2 (-3.5%)
	q_f	20.5 (-1.9%)	20.9	21.7 (+3.8%)	22.3 (+6.7%)
	h_m	30.2 (-0.0%)	30.2	30.7 (+1.7%)	31.1 (+3.0%)
	q_m	12.6 (-0.0%)	12.6	12.2 (-3.2%)	11.9 (-5.6%)
Slope in payer's income, b_1	h_f	28.1 (+1.4%)	27.7	26.8 (-3.2%)	26.5 (-4.3%)
	q_f	20.5 (-3.5%)	20.9	21.8 (+4.3%)	22.0 (+5.3%)
	h_m	30.3 (+0.3%)	30.2	30.1 (-0.3%)	30.0 (-0.7%)
	q_m	12.5 (-0.8%)	12.6	12.7 (+0.8%)	12.8 (+1.6%)
Slope in income gap, b_2	h_f	-	27.7	26.6 (-4.0%)	26.3 (-5.1%)
	q_f	-	20.9	22.0 (+5.3%)	22.2 (+6.2%)
	h_m	-	30.2	28.4 (-6.0%)	25.4 (-15.9%)
	q_m	-	12.6	13.9 (+10.3%)	16.3 (+29.4%)
Curvature in no. of children, b_n	h_f	28.1 (+1.4%)	27.7	26.9 (-2.9%)	26.4 (-4.7%)
	q_f	20.6 (-1.4%)	20.9	21.6 (+3.3%)	22.2 (+6.2%)
	h_m	30.3 (+0.3%)	30.2	30.4 (+0.7%)	30.5 (+1.0%)
	q_m	12.5 (-0.8%)	12.6	12.5 (-0.8%)	12.4 (-1.6%)

Notes: Divorcees' mean work hours (h_f and h_m) and home production hours (q_f and q_m) for different child support policy regimes. Reported values are weekly hours. Percentage changes relative to the status quo in brackets. Computed based on model simulations for $N = 20,000$ couples. $b_k^{'}$ and $b_k^{''}$ denote parameter values that would ceteris paribus double and triple child support payments relative to the status quo policy.

[49] Note that the effect of increasing b_2 is strongest for couples with many children while increasing alimony payments affects all divorced couples equally. The two policy parameters counteract each other in couples where the higher earner is the custodial parent. Empirically, this is rarely the case.

Table 6: The effect of varying alimony (τ) on divorced couples' time use

Variable	$\tau = 0$	$\tau = 0.1$	$\tau = 0.2$	$\tau = 0.3$	$\tau = 0.4$
h_f	29.1 (+5.1%)	28.4 (+2.5%)	27.7	27.1 (-2.2%)	26.4 (-4.7%)
q_f	19.5 (-6.7%)	20.2 (-3.3%)	20.9	21.5 (+2.9%)	22.1 (+5.7%)
h_m	31.2 (+3.3%)	30.7 (+1.7%)	30.2	29.4 (-2.6%)	28.2 (-6.6%)
q_m	11.9 (-5.6%)	12.2 (-3.2%)	12.6	13.2 (+4.8%)	14.1 (+11.9%)

Notes: Divorcees' mean work hours (h_f and h_m) and home production hours (q_f and q_m) for different alimony policy regimes. Reported values are weekly hours. Percentage changes relative to the status quo in brackets. Computed based on model simulations for $N = 20,000$ couples.

Maintenance Payments and Married Couples' Time Allocation Tables 7 and 8 show how married couples' time allocations respond to changes in child support or alimony payments. Here, I denote by b_k', b_k'' parameter values that would ceteris paribus lead to a fivefold and a tenfold increase in child support payments relative to the status quo policy. The simulation results show that increasing b_0, b_1 or b_n leads to an increase in household specialization, i.e., a shift from labor market work to home production for women and a shift in the opposite direction for men. The extent to which household specialization increases depends on which specific policy parameter is changed. My results show that the effect is particularly pronounced when the lump-sum component, b_0, or the slope in the child support payer's income, b_1, are changed. In contrast, the effects are more modest for an increase in b_2 (the slope in parents' income gap) or τ (alimony). Quantitatively, an increase in b_0 that would ceteris paribus lead to a tenfold increase in child support reduces female labor supply by 20% and increases female home production by 32%.

Table 7: The effect of varying child support on married couples' time use

Policy parameter, b_k	Variable	$b_k = 0$	Status quo	$b_k^{'}$	$b_k^{''}$
Intercept, b_0	h_f	30.3 (+0.7%)	30.1	29.9 (-0.7%)	24.1 (-19.9%)
	q_f	18.2 (-1.1%)	18.4	18.6 (+1.1%)	24.3 (+32.1%)
	h_m	33.2 (-0.3%)	33.3	33.4 (+0.3%)	35.1 (+5.4%)
	q_m	10.1 (+0.0%)	10.1	10.0 (-1.0%)	8.0 (-20.8%)
Slope in payer's income, b_1	h_f	30.3 (+0.7%)	30.1	30.0 (-0.3%)	29.4 (-2.3%)
	q_f	18.2 (-1.1%)	18.4	18.6 (+1.1%)	19.1 (+3.8%)
	h_m	33.2 (-0.3%)	33.3	33.4 (+0.3%)	33.4 (+0.3%)
	q_m	10.2 (+1.0%)	10.1	10.0 (-1.0%)	10.0 (-1.0%)
Slope in income gap, b_2	h_f	-	30.1	29.8 (-1.0%)	29.4 (-2.3%)
	q_f	-	18.4	18.7 (+1.6%)	19.1 (+3.8%)
	h_m	-	33.3	33.1 (-0.6%)	33.0 (-0.9%)
	q_m	-	10.1	10.2 (+1.0%)	10.3 (+2.0%)
Curvature in no. of children, b_n	h_f	30.3 (+0.7%)	30.1	29.8 (-1.0%)	29.7 (-1.3%)
	q_f	18.2 (-1.1%)	18.4	18.7 (+1.6%)	18.8 (+2.2%)
	h_m	33.2 (-0.3%)	33.3	33.4 (+0.3%)	33.5 (+0.6%)
	q_m	10.2 (+1.0%)	10.1	10.0 (-1.0%)	9.9 (-2.0%)

Notes: Married couples' mean work hours (h_f and h_m) and home production hours (q_f and q_m) for different child support policy regimes. Reported values are weekly hours. Percentage changes relative to the status quo in brackets. Computed based on model simulations for $N = 20,000$ couples. $b_k^{'}$ and $b_k^{''}$ denote parameter values that would ceteris paribus lead to a fivefold and a tenfold increase in child support payments relative to the status quo policy.

TABLE 8: The effect of varying alimony (τ) on married couples' time use

Variable	$\tau=0$	$\tau=0.1$	$\tau=0.2$	$\tau=0.3$	$\tau=0.4$
h_f	30.6 (+1.3%)	30.4 (+0.7%)	30.2	30.1 (-0.3%)	30.0 (-0.7%)
q_f	17.9 (-2.7%)	18.1 (-1.6%)	18.4	18.4 (-0.0%)	18.5 (+0.5%)
h_m	33.1 (-0.6%)	33.2 (-0.3%)	33.3	33.3 (+0.0%)	33.4 (+0.3%)
q_m	10.3 (2.0%)	10.2 (1.0%)	10.1	10.1 (-0.0%)	10.1 (-0.0%)

Notes: Married couples' mean work hours (h_f and h_m) and home production hours (q_f and q_m) for different alimony policy regimes. Reported values are weekly hours. Percentage changes relative to the status quo in brackets. Computed based on model simulations for $N = 20,000$ couples.

Maintenance Payments and Consumption Insurance Next, I consider the extent to which child support and alimony provide consumption insurance. To this end, I conduct simulated event-study regressions that capture the evolution of women's and men's consumption around divorce. To control nonparametrically for time trends, I include time period fixed effects. Denote by $\tilde{c}_{jft}$ and $\tilde{c}_{jmt}$ simulated consumption levels for couple j in model period t. I run the following regression separately for women and men:

$$\tilde{c}_{jst} = a_{st} + \sum_{k=0}^{2} \beta_{sk} \cdot \tilde{d}_{jt-k} + \nu_{jst}, \tag{9}$$

where $\tilde{d}_{jt}$ indicates whether the simulated couple j divorces in t. Recall that a model time period corresponds to three years. I consider a time window of three years before and six years after divorce. To measure the evolution of consumption around divorce, I consider $\Delta c_s = \frac{\beta_{s2}-\beta_{s0}}{\beta_{s0}}$, the relative difference between the event-study coefficients in the last time period before and two time periods (six years) after divorce. This measure captures the consumption drop (or consumption hike) that women and men experience upon divorce, net of time fixed effects, a_{st}. In the following policy simulations, $b_k^{'}$ denotes parameter values that would ceteris paribus double and by $b_k^{''}$ values that would ceteris paribus triple child support payments, relative to the status quo policy.

The results in Table 9 show that under the status quo, divorcing women experience a 27% drop in consumption six years after divorce relative to the last period of marriage while men experience a modest 1% consumption increase. Increasing child support by raising the lump-sum component, b_0, the slope in the noncustodial parent's income, b_1, or the curvature in the number of children, b_n, mitigates the drop in divorcing women's consumption by 3–4 p.p. and leads to a modest drop in male consumption of 6–8 p.p. In contrast, increasing the dependence of child support on the parents' income gap (increasing b_2) amplifies the consumption drop for women (by 4 p.p.) while also leading to a (7 p.p.) consumption drop for men. The driver behind this result are labor supply disincentives associated with b_2 that arise for both women and men, as described in the previous subsection: As women and men reduce their work hours, male and female labor incomes drop. Together, these effects override the insurance effect of maintenance payments and lead to a drop in women's consumption. Similarly, alimony payments fail to provide consumption insurance: As shown in Table 10, increasing alimony amplifies the consumption drop experienced by divorcing women and simultaneously leads to a consumption drop for divorcing men.

Table 9: The effect of varying child support on divorcing couples' consumption

Policy parameter, b_k	Variable	$b_k = 0$	Status quo	$b_k^{'}$	$b_k^{''}$
Intercept, b_0	Δc_f	-0.29	-0.27	-0.26	-0.23
	Δc_m	0.02	0.00	-0.04	-0.08
Slope in payer's income, b_1	Δc_f	-0.29	-0.27	-0.26	-0.24
	Δc_m	0.05	0.00	-0.03	-0.06
Slope in income gap, b_2	Δc_f	-	-0.27	-0.29	-0.31
	Δc_m	-	0.00	-0.06	-0.07
Curvature in no. of children, b_n	Δc_f	-0.29	-0.27	-0.25	-0.23
	Δc_m	0.02	0.00	-0.04	-0.06

Notes: The reported outcome variables are defined by $\Delta c_s = \frac{\beta_{s2} - \beta_{s0}}{\beta_{s0}}$, where β_{sk} are coefficient estimates from specification (9), for different child support policy regimes simulated for $N = 20,000$ couples. $b_k^{'}$ and $b_k^{''}$ denote parameter values that would ceteris paribus double and triple child support payments relative to the status quo policy.

Table 10: The effect of varying alimony (τ) on divorcing couples' consumption

Variable	$\tau = 0$	$\tau = 0.1$	$\tau = 0.2$	$\tau = 0.3$	$\tau = 0.4$
Δc_f	-0.29	-0.28	-0.27	-0.29	-0.30
Δc_m	0.09	0.06	0.00	-0.03	-0.06

Notes: The reported outcome variables are defined by $\Delta c_s = \frac{\beta_{s2} - \beta_{s0}}{\beta_{s0}}$, where β_{sk} are coefficient estimates from specification (9), for different alimony policy regimes simulated for $N = 20,000$ couples.

The Impact of Maintenance Payments on Divorce Rates Divorce law changes generally may influence divorce rates, although ex ante the direction of the effect that maintenance payments have on divorce rates is unclear. [50] For the large majority of divorced couples in my sample, maintenance payments flow from ex-husband to ex-wife, i.e., when maintenance payments are increased, divorce becomes more attractive for women and less attractive for men. [51] Tables G.3 and G.4 show the impact of changing child support and alimony, respectively, on the fraction of couples who divorce (by time period T). The simulation results show that the impact of b_0, b_1, or b_n on divorce rates is ambiguous. Small increases in these policy parameters reduce divorce, while larger increases tend to raise divorce rates. This pattern suggests that for small increases in child support, the effect of divorce becoming less attractive for men dominates, while for larger increases, the effect of divorce becoming more attractive for women seems to dominate. Increasing the dependence of maintenance payments on the divorced couple's income gap (increasing τ or b_2), by contrast, unambiguously lowers divorce rates, suggesting that these policy changes make divorce less attractive for both women and men.

[50] Chiappori et al. (2015) and Clark (2001) show that the Becker–Coase theorem, according to which divorce law changes do not impact divorce rates, holds only under restrictive assumptions if households consume both public and private goods.

[51] Whether this leads to a change in divorce rates and in what direction, among other things, depends on the degree to which divorce decisions are driven by economic versus noneconomic motives. In my model, all noneconomic or emotional motives for divorce are captured by love shocks.

8.2 External Validity

I close this section by providing an attempt to gauge the external validity of my findings. To this end, I compare simulation results obtained based on my structural model to evidence from previous studies. As empirical benchmarks, I draw on evidence from various countries and time frames, as well as evidence from other divorce law changes and tax reforms.

8.2.1 External Validity Check: Divorcees' Response to Maintenance Payments

I provide several comparisons between empirical findings from previous studies and simulation results based on my structural model. Specifically, I use my estimated model to simulate increases in child support payments that correspond to policy changes studied in previous studies. Formally, I increase the policy parameter b_1 in my model (the parameter that controls the slope of child support in the non-custodial payer's income) to match the targeted increase in child support payments. Table 11 summarizes the empirical evidence from each considered reduced-form study (in column 4) and the respective model simulation results (in column 3). The magnitude of the policy variation leveraged in each considered study is reported in column 2.

The simulation results show that my model does a good job at matching the evidence from Rossin-Slater and Wüst (2018), Graham and Beller (1989), Barardehi et al. (2020) and Ong (2020). Specifically, my simulation results are small in magnitude and well within the 95% confidence intervals reported by Rossin-Slater and Wüst (2018). [52] My simulations also broadly match the magnitude of the empirical results of Graham and Beller (1989), Barardehi et al. (2020), and Ong (2020), overstating the impact relative to Graham and Beller (1989) by -0.16 weekly work hours and understating the impact relative to Barardehi et al. (2020) by -0.1 weekly work hours, and understating the impact on labor income relative to Ong (2020) by 1 percentage point. At the same time, my model more strongly understates the impact of child support on weekly work hours relative to the findings in Friday (2021) and Cancian et al. (2013). Please note that the results from the reduced-form literature are somewhat mixed, therefore my model necessarily cannot provide a good fit for each study. Moreover, note that with the exception of Rossin-Slater and Wüst (2018) the reduced-form evidence pertains to contexts different from the one captured by my data (Graham and Beller (1989), Friday (2021), Barardehi et al. (2020), and Cancian et al. (2013) use U.S. data, Ong (2020) combines data from the U.S., the U.K., Australia, and Switzerland). This may partially explain the discrepancies between my model simulations and some of the considered reduced-form evidence.

[52] The 95% confidence intervals implied by Rossin-Slater and Wüst's (2018) estimates are $[-0.0077, 0.0633]$ for the effect on ex-wives' log-income, $[-0.0038, 0.0156]$ for the effect on ex-wives' employment, $[-0.0192, 0.0392]$ for the effect on ex-husbands' log-income, and $[-0.0084, 0.0087]$ for the effect on ex-husband's employment.

Table 11: External validity checks: divorcees' labor supply

Variable	ΔCS	Simulation	External evidence	Source
$\Delta ln(w_f^{div} h_f^{div})$	1,000 DKK	-0.0009	No significant effect	Rossin-Slater and Wüst (2018)
$\Delta P(h_f^{div} > 0)$	1,000 DKK	-0.0004	No significant effect	Rossin-Slater and Wüst (2018)
Δh_f^{div}	6,700 DKK	-0.28	-0.12	Graham and Beller (1989)
Δh_f^{div}	6,700 DKK	-0.28	-1.07	Friday (2021)
Δh_f^{div}	44,146 DKK	-1.15	-1.25	Barardehi et al. (2020)
$\Delta ln(w_m^{div} h_m^{div})$	1,000 DKK	$-0.72 \cdot 10^{-4}$	No significant effect	Rossin-Slater and Wüst (2018)
$\Delta P(h_m^{div} > 0)$	1,000 DKK	$-0.36 \cdot 10^{-4}$	No significant effect	Rossin-Slater and Wüst (2018)
$\Delta ln(h_m^{div})$	6,700 DKK	-0.001	-0.03	Cancian et al. (2013)
$\Delta ln(w_m^{div} h_m^{div})$	$0.06 \cdot \mathbb{E}[w_m^{div} h_m^{div}]$	-0.02	-0.03	Ong (2020)

Notes: This table compares model simulation results to external empirical evidence from studies that estimate divorcees' labor supply responses to policy variation in child support payments. The simulated outcome variables are selected to match the outcome reported in each study. All simulation results are computed based on model simulations for $N = 20,000$ couples.

8.2.2 External Validity Check: Married Couples' Response to Maintenance Payments

I perform two external validity checks to gauge whether my model realistically captures the link between post-divorce allocations and married couples' behavior. First, I assess whether my model is consistent with evidence by Lafortune and Low (forthcoming). Lafortune and Low (forthcoming) document that an increase in the probability of homeownership reduces female labor supply and increases male labor supply in married couples. [53] To explore whether the empirical results by Lafortune and Low (forthcoming) are broadly in line with the quantitative predictions of my model, I simulate the introduction of an unconditional lump-sum transfer to be paid from ex-husband to ex-wife that equals a fraction Υ of the price of a house. I obtain an estimate of the mean house price within my sample by multiplying the Danish house-price-to-income ratio averaged across my sample period (which is at 8.5) with the mean household income that I observe among divorcing couples in my estimation sample. [54] Figure 7 displays the simulation results. A direct comparison with the empirical results by Lafortune and Low (forthcoming) can be drawn for $\Upsilon = 0.1$ and is presented in Table 12. My model simulations match the empirical findings by Lafortune and Low (forthcoming) in sign and broadly in magnitude. Considering the magnitudes more closely, my model predicts a larger reduction in married women's work hours and a somewhat smaller response in men's work hours relative to the findings by Lafortune and Low (forthcoming). Figure 7 shows that to obtain a response in men's work hours that matches the evidence by Lafortune and Low (forthcoming), a slightly larger transfer of 13% ($\Upsilon = 0.13$) rather than 10% of the value of a house is needed.

Second, I consider empirical evidence by Rangel (2006). Rangel (2006) studies a reform in Brazil that increased alimony payments from 0 to approximately 25-30% of divorced men's income. This reform can be

[53] Lafortune and Low (forthcoming) argue that "as the family home is more often allocated to the mother in divorce proceedings", owning a home provides “insurance to the lower earning partner”, thereby increasing the incentives for household specialization.

[54] See Boverket (2017) for the Danish house-price-to-income ratio across my sample period.

mimicked directly in my model. I simulate a shift from 0 alimony payments to payment's of 27.5% of men's income. The simulation results are displayed in Table 12. My simulations broadly match the evidence by Rangel (2006), who documents a decrease of $\approx -3\%$ in women's work hours (my model yields -4%) and finds no statistically significant effect on men's work hours in response to the reform (my model yields a small increase of 0.2%).

These results confirm that the magnitude of the link between post-divorce allocations and married couples' behavior in my structural model is broadly consistent with external empirical evidence. Please note that the external evidence was not targeted in the structural estimation of my model. Moreover the external evidence pertains to different countries and time frames than my data do (Lafortune and Low (forthcoming) use U.S. data from 2004-2008, Rangel (2006) studies Brazil in the 1990s). These differences may help explain the remaining discrepancies between my model and the considered external evidence.

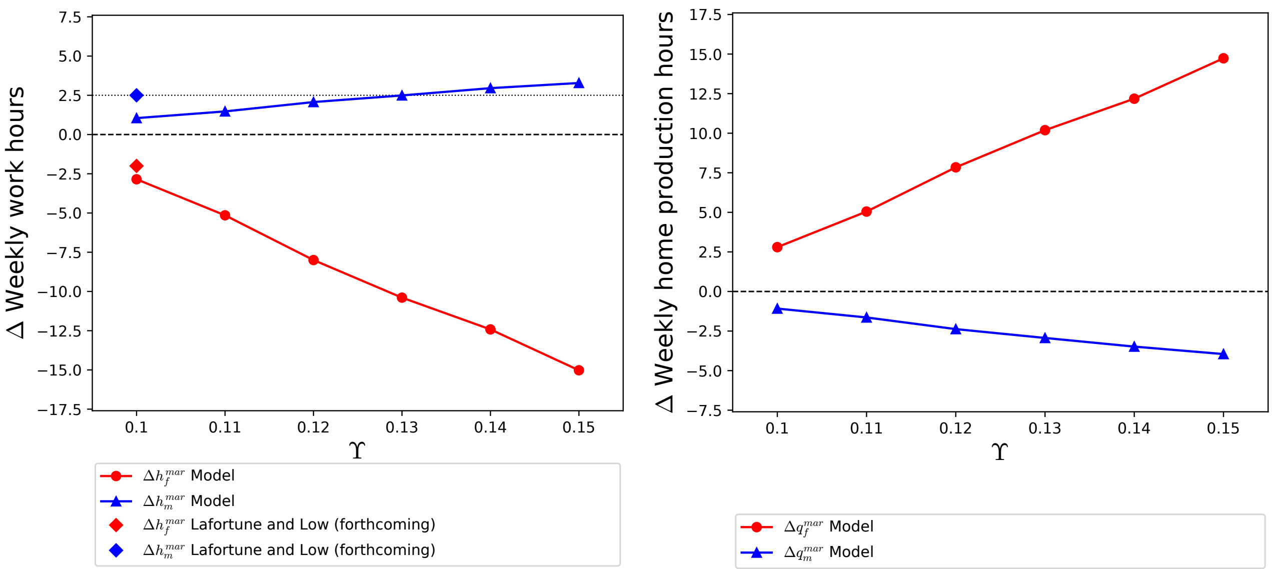
Table 12: External validity checks: married couples' labor supply

Variable	Simulation	External evidence	Policiy variation	Source
Δh_f^{mar}	-2.85	-2	Post-divorce lump sum	Lafortune and Low
Δh_m^{mar}	+1.05	+2.5	Post-divorce lump sum	Lafortune and Low
$\Delta ln(h_f^{mar})$	-0.04	-0.03	Increase in alimony	Rangel (2006)
$\Delta ln(h_m^{mar})$	+0.002	No significant effect	Increase in alimony	Rangel (2006)

Notes: This table compares model simulation results to external empirical evidence from Lafortune and Low (forthcoming) and Rangel (2006). The empirical results from Lafortune and Low (forthcoming) are compared to a simulated introduction of lump-sum transfers that equal 10% of the average value of a house. The results from Rangel (2006) are compared to a simulated shift from zero alimony payments to alimony payments of 27.5% of men's income. All simulation results are computed based on model simulations for $N = 20,000$ couples.

Figure 7: The effect of introducing lump-sum transfers on married couples time use

Panel A: Weekly work hours | Panel B: Weekly home production hours



Notes: The figures display mean simulated work hours (Panel A) and home production hours (Panel B) for lump-sum transfers from ex-husband to ex-wife that equal a share Υ of the average value of a house. A quantitative comparison to the corresponding empirical evidence by Lafortune and Low (forthcoming) can be drawn for $\Upsilon = 0.1$. Computed based on model simulations for $N = 20,000$ couples.

8.2.3 Comparisons to related policy reforms

To put the magnitude of my findings into perspective, I compare them to external evidence from two divorce law changes, the introduction of unilateral divorce in the U.S. (Stevenson (2008)) and the legalization of divorce in Ireland (Bargain et al. (2012)). Moreover, I describe how my simulation results compare to evidence from tax reforms in Denmark. In the following I summarize each considered comparison:

Stevenson (2008) finds that the introduction of unilateral divorce in U.S. states led to a 1 percentage point increase in the labor force participation of married women. I compare this estimate to the impact of shutting down maintenance payments (switching from the status quo to $M_f = 0$) in my estimated model, which pushes toward higher female labor supply, as it increases women's need to self-insure against financial losses upon divorce. The simulation results show a 0.74 percentage point increase in female labor force participation, i.e., an effect size of 74% of the impact that Stevenson (2008) estimates for the switch from unilateral to mutual-consent divorce in the U.S.

Bargain et al. (2012) estimate that the legalization of divorce in Ireland led to an increase in married women's labor supply of 1.6 - 2.5 weekly hours. My model simulations show that shutting down maintenance payments leads to an increase in married women's work hours by 0.51 weekly work hours, i.e., $20 - 32\%$ of the effect that Bargain et al. (2012) document for the legalization of divorce. Note that in Section 7 I simulate a divorce ban in my model and find an increase of 1.5 weekly work hours among married women, approximately in line with the lower range of estimates by Bargain et al. (2012).

Kleven and Schultz (2014) estimate taxable income elasticities, leveraging Danish tax reforms that occurred in the 1980s and 1990s. [55] They estimate taxable income elasticities of 0.05 for small tax changes and of 0.2-0.3 for a large salient tax reform. I compare their estimates to elasticities of male divorcees' labor income with respect to child support and alimony in my estimated model. Specifically, I focus on changes in b_1 and τ, the two policy parameters that enter divorced men's budget constraints like linear tax rates. My simulation results show that the average taxable income elasticity with respect to b_1 is 0.13 while the average taxable income elasticity with respect to τ is 0.26. The response to child support payments thus corresponds to an intermediate value in the range of estimates by Kleven and Schultz (2014), while the responsiveness to alimony payments corresponds to the upper range of their estimates of the taxable income elasticity.

8.2.4 Cross-Country Differences

In many OECD countries, child support and alimony payments are calculated according to rules and guidelines that resemble the Danish system (see, e.g., de Vaus et al. (2017) and Skinner et al. (2007)). In particular, maintenance payments are computed as a function of both the maintenance payer's and the maintenance receiver's labor incomes. This fundamentally gives rise to the policy tradeoff between providing insurance, enabling married couples to specialize efficiently, and maintaining labor supply incentives for divorcees, which I study in this paper. In the following, I provide a brief discussion of cross-country differences in aspects that shape this policy tradeoff.

First, gender inequality in labor supply and labor earnings is relatively low in Denmark compared to many other OECD countries. In particular, female labor force participation is relatively high, [56] and the rate of part-time employment among female workers is relatively low in Denmark compared to other OECD countries. [57] The gender earnings gap historically was relatively low in Denmark, although other OECD countries have recently converged to the Danish level. [58] The gender earnings gap being lower in Denmark suggests that divorcing women in Denmark may be more economically self sufficient and less in need of post-divorce consumption insurance. In this sense, the welfare maximizing magnitude of child support payments, according to my estimated framework, can be viewed as a conservative lower bound when applied to other countries. [59]

Second, regarding the impact of maintenance payments on married and divorced couples' labor supply incentives, the external validity checks that I provide in Sections 8.2.1 and 8.2.2 support that my results

[55] For a formal definition of the elasticity of taxable income see Saez et al. (2012).

[56] 4-5 percentage points higher than in Germany, in the U.K., and in the U.S. see, e.g., OECD (2020).

[57] See, e.g., OECD (2018), OECD (2020). Moreover the part-time employment rate is relatively high among men, see, e.g., OECD (2018), OECD (2020) and Lind and Rasmussen (2008).

[58] Kleven et al. (2019) document that this is the case, e.g., for the U.K. and the U.S.

[59] Moreover, note that the enforcement of child support and alimony in many countries is lower than in Denmark (see, e.g., Weiss and Willis (1985), Del Boca and Flinn (1995) and Case et al. (2003)), reinforcing that an increase in consumption insurance provided to divorcees is likely more needed in other OECD countries than in Denmark. The Danish fertility rate has been very close to the OECD average since the 1990s, and has been moderately below average before, reinforcing that child support is at least as relevant in other OECD countries than in Denmark.

extend remarkably well to other time periods and countries (including the U.S., the U.K., Australia, and Switzerland). Moreover, Section 8.2.2 confirms that the link between maintenance payments and married couples' household specialization implied by my estimated framework is in line with external evidence from the U.S. and Brazil. Finally, note that Denmark's divorce rate since the 1990s has been somewhat higher than Germany's and that of the U.K. but markedly lower than the U.S. divorce rate (see OECD (2019)), indicating the relative importance of child support and alimony payments in each of these countries.

9 Welfare Analysis

In light of the policy tradeoff between providing insurance, enabling couples to choose efficient time allocations, and maintaining labor supply incentives, it is interesting to ask what the welfare maximizing child support and alimony policy is. In this section, I draw welfare comparisons between different child support and alimony policy regimes and solve for the welfare maximizing policy. Moreover, I assess how close maintenance policies bring couples to a first best allocation (as defined and characterized in Section 7).

Optimal (b, τ)-Policy To study how child support and alimony policies affect couples' welfare, I consider the ex-ante well-being of women and men. In particular I consider the sum of time period zero expected discounted utilities of women, $\mathbb{E}\big[V_{f0}^{mar}\big]$, and men, $\mathbb{E}\big[V_{m0}^{mar}\big]$, as welfare criterion (i.e., the utilitarian welfare criterion with equal weights): [60]

$$W = \mathbb{E}\big[V_{f0}^{mar}\big] + \mathbb{E}\big[V_{m0}^{mar}\big].$$

To find the welfare maximizing policy, I search for the combination of policy parameters $(b, \tau) = (b_0, b_1, b_2, b_n, \tau)$ that maximizes W. Figures H.3 and H.4 display the dependence of the welfare criterion, W, on each policy parameter. I find that the welfare maximizing combination of policy parameters is

$$\begin{aligned} (b_0^*, b_1^*, b_2^*, b_n^*, \tau^*) &= (43.8, 0.037, 0.0017, 1.11, 0.18) \\ &= (1.82\tilde{b}_0, 1.32\tilde{b}_1, 0.0017, 1.41\tilde{b}_n, 0.9\tilde{\tau}). \end{aligned}$$

A welfare maximizing policy reform would thus 1. increase the lump sum amount of child support by 82% 2. strengthen the dependence of child support on the non-custodial parent's income by 32% 3. leave the dependence of child support on the income gap between custodial and non-custodial parent close to zero 4. make child support slightly convex in the number of children (rather than concave) and 5. reduce the dependence of alimony on the income gap between higher and lower earner by 10% relative to that under the status quo. Switching to this policy would increase child support payments by 88%, reduce alimony payments by 10% and increase overall maintenance payments by 40%.

[60] Note that the variables that expectations are taken over include n_0 the initial number of children that a couple has, i.e., welfare is evaluated for the average couple at the beginning of marriage.

Optimal t_D-Policy Additionally, as alternative policy space, I consider a backward looking maintenance schedule that only depends on variables determined before the time period when a couple gets divorced. Intuitively, this policy space lessens labor supply disincentives for divorcees, as maintenance payments do not depend on post-divorce work hours. At the same time, it also reduces insurance, as payments do not respond to post-divorce changes in income (e.g., negative wage shocks experienced by the payment receiver). Therefore, whether such maintenance schedules are welfare improving relative to the status quo policy is ex-ante unclear. Formally, I consider the following maintenance schedule

$$M_f = M_f\bigg(n_{ft_D}, n_{mt_D}, w_{ft_D}\overline{h}_f, w_{mt_D}\overline{h}_m\bigg), \tag{10}$$

where t_D denotes the time of divorce, w_{ft_D}, w_{mt_D} denote female and male wages at time t_D, and $\overline{h}_f, \overline{h}_m$ are the population averages across female and male work hours. [61] In the following, I will refer to policies in the policy space defined by (10) as t_D-policies. To find the optimal t_D-policy I search for the combination of policy parameters that maximizes the utilitarian welfare criterion, W, subject to (10). I find the welfare maximizing combination of policy parameters at $(b_0, b_1, b_2, b_n, \tau) = (25.7, 0.052, 0.0006, 0.9, 0.14)$. Switching to this policy would increase child support payments by 63%, reduce alimony payments by 54% and increase overall maintenance payments by 5%.

Welfare Comparisons I draw comparisons between the welfare maximizing (b, τ)-policy, the welfare maximizing t_D-policy, and the first best scenario that serves as benchmark of what policy could attain. Table 13 presents a range of average outcomes for each considered scenario, as well as consumption changes upon divorce estimated from specification (9).

The welfare maximizing (b, τ)-policy brings couples closer to the considered first best scenario in several dimensions: First, compared to the status quo the first best scenario is characterized by full mutual consumption insurance between spouses ($c_f^{mar}/c_m^{mar} = c_f^{div}/c_m^{div}$). The welfare maximizing (b, τ)-policy, while not attaining full mutual insurance, increases the mean ratio of female-to-male consumption in divorced couples bringing it closer to the mean consumption ratio of married couples. Note that the increase in divorced couples' consumption ratio is driven both by a smaller consumption drop for female divorcees, Δc_f, and an increased consumption drop for male divorcees, Δc_m, relativ to the status quo. Second, the welfare maximizing (b, τ)-policy brings the time allocation of divorced couples closer to the first best allocation, leading to reduced work hours and increased home production hours for divorced women and to the opposite effect for divorced men. Third, the welfare maximizing (b, τ)-policy reduces the fraction of divorcing couples compared to the status quo, pushing it slightly toward the first best scenario.

In comparison, the welfare maximizing t_D-policy is more efficient at mitigating consumption losses upon divorce. The welfare maximizing t_D-policy leads to a substantially mitigated consumption drop for female divorcees ($\Delta c_f = -0.19$ vs. $\Delta c_f = -0.27$ under the status quo) and a small consumption hike for divorced

[61] I use population averages across work hours rather than actual work hours in period t_D to avoid invoking strong labor supply disincentives in the time period of divorce.

men ($\Delta c_m = 0.06$ vs. $\Delta c_m = 0$ under the status quo). Note that although this policy reduces the consumption drop for female divorcees considerably by 30%, there is scope for more redistribution, as the mean consumption ratio in divorced couples at $c_f^{div}/c_m^{div} = 0.75$ shows. Comparing time allocations between the welfare maximizing (b, τ)-policy and the welfare maximizing t_D-policy, shows that the reduction in overall consumption losses is obtained by upholding divorcees' labor supply incentives: female divorcees and especially male divorcees work more hours under the welfare maximizing t_D-policy, implying that divorced couples have higher overall incomes that can be re-distributed between ex-wife and ex-husband.

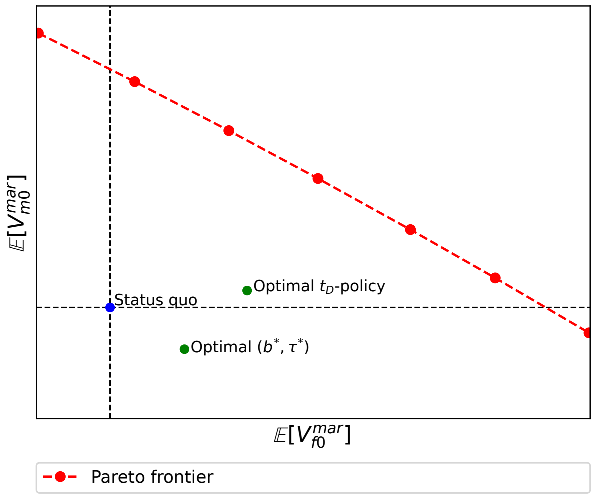
TABLE 13: Mean outcomes: status quo, optimal (b, τ)-policy, optimal t_D-policy, and first best

Variable	Status quo	(b^*, τ^*)	Optimal t_D-policy	First best
Work hours female (divorced)	27.7	27.2	28.0	23.7
Home production hours female (divorced)	20.9	21.4	20.6	24.8
Work hours male (divorced)	30.2	30.5	32.8	32.7
Home production hours male (divorced)	12.6	12.4	10.7	10.8
Consumption ratio $\left(\frac{c_f}{c_m}, \text{divorced}\right)$	0.72	0.76	0.75	1.08
Work hours female (married)	30.1	30.1	30.4	29.7
Home production hours female (married)	18.4	18.4	18.1	18.7
Work hours male (married)	33.3	33.3	32.6	33.1
Home production hours male (married)	10.1	10.1	10.7	10.3
Consumption ratio $\left(\frac{c_f}{c_m}, \text{married}\right)$	1.06	1.06	1.06	1.08
Δc_f	-0.27	-0.25	-0.19	-0.10
Δc_m	0.00	-0.03	0.06	-0.10
% divorced in T	27.3	27.4	27.1	18.3

Notes: Mean outcomes for each considered policy regime and the first best allocation at $\mu = \mu_0 = 1.13$, by marital status, computed based on model simulations for $N = 20,000$ couples.

Finally, I compare women's and men's ex-ante utility under each considered scenario. Figure 8 shows that the welfare maximizing (b, τ)-policy makes women better off, while men are made worse off than under the status quo. By contrast, the optimal t_D-policy makes women and men better off compared to the status quo and the optimal (b, τ)-policy. Switching to the welfare maximizing t_D-policy, on average, is a Pareto improvement compared to either of these scenarios.

Figure 8: Welfare comparison: Status quo, optimal maintenance policy and first best



Notes: The figure shows the mean expected discounted utility for women and men under the status quo policy, the optimal (b, τ)-policy, the optimal t_D-policy, and the first best frontier for $\mu \in (0.85, 1.05)$. Computed based on model simulations for $N = 20,000$ couples.

10 Conclusion

In this paper, I study how child support and alimony payments affect married and divorced couples' decision-making and how payments should be designed to maximize couples' welfare. In particular, I study the policy tradeoff between providing consumption insurance and incentivizing efficient household specialization while maintaining labor supply incentives for divorcees. I estimate a structural framework that captures this policy tradeoff using Danish microdata. The estimated model reproduces the observed evolution of work hours around divorce and the implied increase in gender inequality upon divorce. Several external validity checks confirm that the estimated model is broadly consistent with empirical evidence from other time periods and countries (including external evidence from Australia, Brazil, the U.S., the U.K., and Switzerland).

Based on the estimated structural framework, I find that increasing child support leads to smoother consumption paths around divorce and a moderate reduction in labor supply among divorced women and men. By contrast, increasing alimony comes with more substantial labor supply disincentives and is less efficient in providing consumption insurance.

Comparing the status quo to a range of counterfactual policies and hypothetical first best scenarios, I find scope for welfare improvements, including Pareto improvements that benefit women *and* men. My results show that, within the status quo policy space, the welfare maximizing policy involves increasing child support payments and lowering alimony payments relative to the Danish status quo. I further analyze policy changes that make maintenance payments backward looking, i.e., maintenance schedules that only depend on variables determined before a couple gets divorced. My results show that such policy changes, compared to the status quo, are more efficient in providing consumption insurance, and Pareto dominate in terms of welfare.

References

Ábrahám, Á. and S. Laczó (2017): "Efficient Risk Sharing with Limited Commitment and Storage," *The Review of Economic Studies*, 85, 1389–1424.

Adda, J., C. Dustmann, and K. Stevens (2017): "The Career Costs of Children," *Journal of Political Economy*, 125, 293–337.

Aizer, A. and S. McLanahan (2006): "The Impact of Child Support Enforcement on Fertility, Parental Investments, and Child Well-Being," *The Journal of Human Resources*, 41, 28–45.

Altonji, J. G. and L. M. Segal (1996): "Small-Sample Bias in GMM Estimation of Covariance Structures," *Journal of Business and Economic Statistics*, 14, 353–366.

Attanasio, O., H. Low, and V. Sánchez-Marcos (2008): "Explaining Changes in Female Labor Supply in a Life-Cycle Models," *American Economic Review*.

Autor, D., A. Kostøl, M. Mogstad, and B. Setzler (2019): "Disability Benefits, Consumption Insurance, and Household Labor Supply," *American Economic Review*, 109, 2613–54.

Barardehi, I. H., P. Babiarz, and T. Mauldin (2020): "Child Support, Consumption, and Labor Supply Decisions of Single-Mother Families," *Journal of Family and Economic Issues*, 41, 530–541.

Bargain, O., L. González, C. Keane, and B. Özcan (2012): "Female labor supply and divorce: New evidence from Ireland," *European Economic Review*, 56, 1675–1691.

Bayot, D. and A. Voena (2015): "Prenuptial Contracts, Labor Supply and Household Investments," *working paper*.

Boverket (2017): "Bostadsmarknaderna i Norden 2000–2016 eng: The housing markets in Nordic countries 2000–2016]," *Karlskrona, Sweden: Boverket*.

Brown, M., C. J. Flinn, and J. Mullins (2015): "Family Law Effects on Divorce, Fertility, and Child Investment," *working paper*.

Browning, M. and M. Gørtz (2012): "Spending Time and Money within the Household," *Scandinavian Journal of Economics*, 114, 681–704.

Browning, M. and S. Leth-Petersen (2003): "Imputing Consumption from Income and Wealth Information," *The Economic Journal*, 113, F282–F301.

Cancian, M., C. J. Heinrich, and Y. Chung (2013): "Discouraging Disadvantaged Fathers' Employment: An Unintended Consequence of Policies Designed to Support Families," *Journal of Policy Analysis and Management*, 32, 758–784.

Case, A. C., I.-F. Lin, and S. S. McLanahan (2003): "Explaining Trends in Child Support: Economic, Demographic, and Policy Effects," *Demography*, 40, 171–189.

Chiappori, P., B. Fortin, and G. Lacroix (2002): "Marriage Market, Divorce Legislation, and Household Labor Supply," *Journal of Political Economy*, 110, 37–72.

Chiappori, P., M. Iyigun, J. Lafortune, and Y. Weiss (2016): "Changing the Rules Midway: The Impact of Granting Alimony Rights on Existing and Newly-Formed Partnerships," *The Economic Journal*.

Chiappori, P., M. Iyigun, and Y. Weiss (2015): “The Becker-Coase Theorem Reconsidered,” *Journal of Demographic Economics*, 81, 157–177.

Chiappori, P. and Y. Weiss (2007): “Divorce, Remarriage, and Child Support,” *Journal of Labor Economics*, 25, 37–74.

Chiappori, P.-A. and M. Mazzocco (2017): “Static and Intertemporal Household Decisions,” *Journal of Economic Literature*, 55, 985–1045.

Clark, S. (2001): “Law, Property, and Marital Dissolution,” *The Economic Journal*, 109, 41–54.

de Vaus, D., M. Gray, L. Qu, and D. Stanton (2017): “The economic consequences of divorce in six OECD countries,” *The Australian journal of social issues.*, 52.

Del Boca, D. (2003): “Mothers, Fathers and Children after Divorce: The Role of Institutions,” *Journal of Population Economics*, 16, 399–422.

Del Boca, D. and C. J. Flinn (1995): “Rationalizing child-support decisions,” *The American Economic Review*, 1241–1262.

Del Boca, D. and R. Ribero (2001): “The Effect of Child-Support Policies on Visitations and Transfers,” *American Economic Review*, 91, 130–134.

Doepke, M. and F. Kindermann (2019): “Bargaining over Babies: Theory, Evidence, and Policy Implications,” *American Economic Review*, 109, 3264–3306.

Doepke, M. and M. Tertilt (2016): *Families in Macroeconomics*, Elsevier, vol. 2B of *Handbook of Macroeconomics*, 1789–1891.

Eika, L., M. Mogstad, and O. L. Vestad (2020): “What can we learn about household consumption expenditure from data on income and assets?” *Journal of Public Economics*, 189, 104163.

Elliott, D. B. and T. Simmons (2011): “Marital Events of Americans: 2009,” *American Community Survey Reports, ACS-13.*

Fella, G., G. Gallipoli, and J. Pan (2019): “Markov-chain approximations for life-cycle models,” *Review of Economic Dynamics*, 34, 183 – 201.

Fernández, R. and J. C. Wong (2016): “Free to Leave? A Welfare Analysis of Divorce Regimes,” *American Economic Journal: Macroeconomics*, 9, pp. 72–115.

Fisher, H. and H. Low (2015): “Financial implications of relationship breakdown: Does marriage matter?” *Review of Economics of the Household*, 13, 735–769.

——— (2016): “Recovery From Divorce: Comparing High and Low Income couples,” *International Journal of Law, Policy and the Family*, 30, 338–371.

Flinn, C. J. (2000): “Modes of Interaction Between Divorced Parents,” *International Economic Review*, 41, 545–578.

Friday, C. (2021): “The Impact of Child Support Income on the Labor Supply of Its Recipients,” *working paper.*

Friedberg, L. (1998): "Did Unilateral Divorce Raise Divorce Rates? Evidence from Panel Data," *The American Economic Review*, 88, 608–627.

Goussé, M. and M. Leturcq (2022): "More or less unmarried. The impact of legal settings of cohabitation on labour market outcomes," *European Economic Review*, 149, 104259.

Graham, J. W. and A. H. Beller (1989): "The Effect of Child Support Payments on the Labor Supply of Female Family Heads: An Econometric Analysis," *The Journal of Human Resources*, 24, 664–688.

Gray, J. S. (1998): "Divorce-Law Changes, Household Bargaining, and Married Women's Labor Supply," *American Economic Review*, 88, 628–42.

Holzer, H. J., P. Offner, and E. Sorensen (2005): "Declining employment among young black less-educated men: The role of incarceration and child support," *Journal of Policy Analysis and Management*, 24, 329–350.

Johnson, W. R. and J. Skinner (1986): "Labor Supply and Marital Separation," *The American Economic Review*, 76, 455–469.

Judd, K. (1998): *Numerical Methods in Economics*, vol. 1, The MIT Press, 1 ed.

Kaplan, G. (2012): "Moving Back Home: Insurance against Labor Market Risk," *Journal of Political Economy*, 120, 446 – 512.

Kleven, H., C. Landais, and J. E. Søgaard (2019): "Children and Gender Inequality: Evidence from Denmark," *American Economic Journal: Applied Economics*, 11, 181–209.

Kleven, H. J. and E. A. Schultz (2014): "Estimating Taxable Income Responses Using Danish Tax Reforms," *American Economic Journal: Economic Policy*, 6, 271–301.

Kocherlakota, N. R. (1996): "Implications of efficient risk sharing without commitment," *The Review of Economic Studies*, 63, 595–609.

Kopecky, K. A. and R. M. Suen (2010): "Finite state Markov-chain approximations to highly persistent processes," *Review of Economic Dynamics*, 13, 701 – 714.

Lafortune, J. and C. Low (2017): "Tying the Double-Knot: The Role of Assets in Marriage Commitment," *American Economic Review*, 107, 163–67.

——— (forthcoming): "Collateralized Marriage," *American Economic Journal: Applied Economics*.

Ligon, E., J. P. Thomas, and T. Worrall (2002): "Informal insurance arrangements with limited commitment: Theory and evidence from village economies," *The Review of Economic Studies*, 69, 209–244.

Lind, J. and E. Rasmussen (2008): "Paradoxical Patterns of Part-Time Employment in Denmark?" *Economic and Industrial Democracy*, 29, 521–540.

Lise, J. and K. Yamada (2018): "Household Sharing and Commitment: Evidence from Panel Data on Individual Expenditures and Time Use," *The Review of Economic Studies*.

Low, H., C. Meghir, L. Pistaferri, and A. Voena (2018): "Marriage, Labor Supply and the Dynamics of the Social Safety Net," Working Paper 24356, National Bureau of Economic Research.

Lund, C. G. and R. Vejlin (2015): "Documenting and Improving the Hourly Wage Measure in the Danish IDA Database," *Aarhus University, Working paper series.*

Marcet, A. and R. Marimon (2011): "Recursive Contracts," *working paper.*

Mazzocco, M. (2007): "Household intertemporal behaviour: A collective characterization and a test of commitment," *The Review of Economic Studies*, 74, 857–895.

McClements, L. D. (1977): "Equivalence scales for children," *Journal of Public Economics*, 8, 191–210.

McFadden, D. (1989): "A Method of Simulated Moments for Estimation of Discrete Response Models Without Numerical Integration," *Econometrica*, 57, 995–1026.

Newey, W. K. and D. McFadden (1994): "Chapter 36 Large sample estimation and hypothesis testing," Elsevier, vol. 4 of *Handbook of Econometrics*, 2111 – 2245.

OECD (2013): "Pensions at a Glance 2013," *OECD Publishing, Paris.*

——— (2018): "OECD Employment Outlook 2018," *OECD Publishing, Paris.*

——— (2019): "Society at a Glance 2019: OECD Social Indicators," *OECD Publishing, Paris.*

——— (2020): "OECD Labour Force Statistics 2020," *OECD Publishing, Paris.*

Ong, P. (2020): "The effect of child support on labor supply: An estimate of the Frisch elasticity," *working paper.*

Page, M. and A. Stevens (2004): "The Economic Consequences of Absent Parents," *Journal of Human Resources*, 39.

Pakes, A. and D. Pollard (1989): "Simulation and the asymptotics of optimization estimators," *Econometrica: Journal of the Econometric Society*, 1027–1057.

Rangel, M. A. (2006): "Alimony rights and intrahousehold allocation of resources: evidence from Brazil," *The Economic Journal*, 116, 627–658.

Reynoso, A. (2018): "The impact of divorce laws on the equilibrium in the marriage market," *working paper.*

Rossin-Slater, M. and M. Wüst (2018): "Parental responses to child support obligations: Evidence from administrative data," *Journal of Public Economics*, 164, 183 – 196.

Saez, E., J. Slemrod, and S. H. Giertz (2012): "The Elasticity of Taxable Income with Respect to Marginal Tax Rates: A Critical Review," *Journal of Economic Literature*, 50, 3–50.

Skinner, C., J. Bradshaw, and J. Davidson (2007): "Child support policy : an international perspective," *Research Report, Social Policy Research Unit, University of York.*

Stevenson, B. (2007): "The Impact of Divorce Laws on Marriage-Specific Capital," *Journal of Labor Economics*, 25, 75–94.

——— (2008): "Divorce Law and Women's Labor Supply," *Journal of Empirical Legal Studies*, 5, 853–873.

Tannenbaum, D. I. (2020): "The Effect of Child Support on Selection into Marriage and Fertility," *Journal of Labor Economics*, 38, 611–652.

Trabandt, M. and H. Uhlig (2011): "The Laffer curve revisited," *Journal of Monetary Economics*, 58, 305 – 327.

Voena, A. (2015): "Yours, Mine, and Ours: Do Divorce Laws Affect the Intertemporal Behavior of Married Couples?" *American Economic Review*, 105, 2295–2332.

Weiss, Y. (1997): "The Formation and Dissolution of Families: Why Marry? Who Marries Whom? And What Happens upon Divorce?" in *Handbook of Population and Family Economics*, ed. by M. R. Rosenzweig and O. Stark, Elsevier, vol. 1, Part 1 of *Handbook of Population and Family Economics*, chap. 3, 81 – 123.

Weiss, Y. and R. J. Willis (1985): "Children as Collective Goods and Divorce Settlements," *Journal of Labor Economics*, 3, 268–292.

——— (1993): "Transfers among Divorced Couples: Evidence and Interpretation," *Journal of Labor Economics*, 11, 629–679.

Wolfers, J. (2006): "Did Unilateral Divorce Laws Raise Divorce Rates? A Reconciliation and New Results," *American Economic Review*, 96, 1802–1820.

Online Appendix

A Maintenance Payments, Details and Functional Forms

In this appendix, I present details on how maintenance payments are computed and the exact functional forms for computing child support and alimony payments. From 1980 to 2013, the policy parameters were adjusted from year to year by the Danish state administration to account for inflation. Throughout the paper, I use the year 2004 values of the Danish maintenance policy parameters and deflate wages (and other money amounts) taking 2004 as the base year. [62]

Child Support, Functional Form Child support cs depends on the number of children an ex-couple has and the non-custodial parent's labor income. Suppose ex-spouse s is the custodial parent of n_s children. If the non-custodial ex-spouse $\tilde{s}$ earns annual labor income $I_{\tilde{s}}$, then the child support that $\tilde{s}$ needs to pay to s is given by

$$cs(n_s, I_{\tilde{s}}, B) = nB \cdot \sum_{k=0}^{K} a_k \mathbf{1}\big\{b_k(n) \leq I_{\tilde{s}} < b_{k+1}(n)\big\} \tag{11}$$

where the year 2004 values of the parameters that enter into (11) are $B = 9420$ (DKK), $K = 5$ (i.e., child support varies across 6 income brackets) and of a_k and $b_k(n)$, which are given in Tables A.1 and A.2.

Table A.1: Child support policy parameters 1

a_0	a_1	a_2	a_3	a_4
1	1.25	1.5	2	3

Notes: Source: Danish State Administration (*Statsforvaltning*).

Table A.2: Child support policy parameters 2

n	1	2	3
$b_0(n)$	0	0	0
$b_1(n)$	320	340	370
$b_2(n)$	340	370	410
$b_3(n)$	370	410	460
$b_4(n)$	550	650	750
$b_5(n)$	1000	1250	1400
$b_6(n)$	$+\infty$	$+\infty$	$+\infty$

Notes: Source: Danish State Administration (*Statsforvaltning*).

[62] Information on policy parameters for past years was provided by the Danish State Administration (*Statsforvaltning*).

Alimony, Functional Form Alimony payments depend on both ex-spouses' labor incomes. Generally alimony payments equal a fraction τ of the ex-couple's labor income difference. Additionally, there are several caps on alimony payments that ensure that

1. If the receiver's labor income is below C_1, alimony payments equal $\tau \cdot (I_s - C_1)$.
2. The maintenance payer's labor earnings net of maintenance payments are not less than C_2.
3. The maintenance receiver's labor earnings plus maintenance payments do not exceed C_3.

Denote by l the lower earner and by H the higher earner in terms of annual labor income net of child support payments and by $\tilde{I}_L$, $\tilde{I}_H$ the respective annual labor incomes net of child support. Then, the alimony payments that L is entitled to receive from H are given by

$$alim(\tilde{I}_H, \tilde{I}_L) = \begin{cases} \tau \cdot (\tilde{I}_H - \tilde{I}_L) & \text{if } \tilde{I}_L \geq C_1 \text{ and } \tilde{I}_H - C_2 \geq \tau \cdot (\tilde{I}_H - \tilde{I}_L) \text{ and } C_3 - \tilde{I}_L \geq \tau \cdot (\tilde{I}_H - \tilde{I}_L) \\ \tau \cdot (\tilde{I}_H - C_1) & \text{if } \tilde{I}_L < C_1 \text{ and } \tilde{I}_H - C_2 \geq \tau \cdot (\tilde{I}_H - \tilde{I}_L) \text{ and } C_3 - \tilde{I}_L \geq \tau \cdot (\tilde{I}_H - \tilde{I}_L) \\ \max\{\tilde{I}_H - C_2, 0\} & \text{if } \tilde{I}_H - C_2 < \tau \cdot (\tilde{I}_H - \tilde{I}_L) \\ \max\{C_3 - \tilde{I}_L, 0\} & \text{if } C_3 - \tilde{I}_L < \tau \cdot (\tilde{I}_H - \tilde{I}_L) \end{cases} \tag{12}$$

By this functional form, it is ensured that, 1. if the receiver's labor income is below C_1, alimony payments are capped by $\tau \cdot (I_s - C_1)$, 2. the maintenance payer's labor earnings net of maintenance payments are at least C_2, 3. the maintenance receiver's labor earnings plus maintenance payments are capped by C_3. The 2004 values for the parameters that enter into (12) are given by $\tau = 0.2$, $C_1 = 90000$, $C_2 = 204000$ and $C_3 = 230000$.

Maintenance Payments: Data vs. Imputations Previous work on U.S. data generally found low compliance with maintenance policies data and has therefore mainly focused on understanding how compliance behavior may respond to policy changes (Weiss and Willis (1985); Weiss and Willis (1993); Del Boca and Flinn (1995); Flinn (2000)). [63] In Denmark, in contrast, maintenance policies are more strongly enforced by the government. [64]

To explore to what extent maintenance payments correspond to the institutional rules on the intensive margin I impute annual maintenance payments for each divorced couple in my sample based on the Danish institutional rules described in Section 2 and check to what extent the imputations conform with maintenance payments recorded in the administrative data.

Regarding the extensive margin, I compute the fraction of divorcees who are mandated to pay maintenance but are observed to make zero payments, which is at 17% in my data. [65]

[63] For a survey of these studies see Del Boca (2003).

[64] In Denmark, if the ex-spouse mandated to pay maintenance refuses to make the payments a public agency helps to collect the outstanding payments. In the case of non-compliance, this agency can withhold tax refunds (see Rossin-Slater and Wüst (2018)).

[65] See also Rossin-Slater and Wüst (2018), who find the same compliance rate.

Figure A.1: Maintenance payments, data and imputations

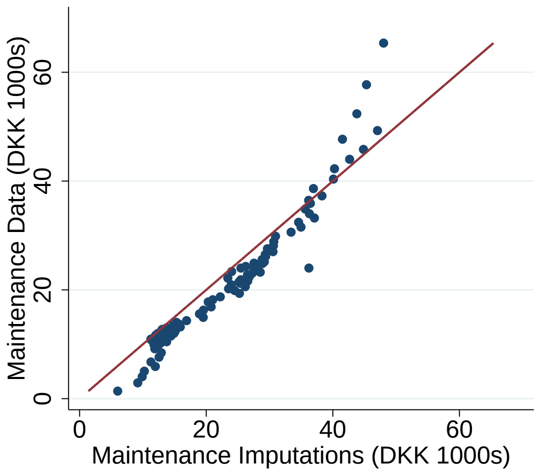


Figure A.2: Maintenance payments by payer's labor income, data and imputations

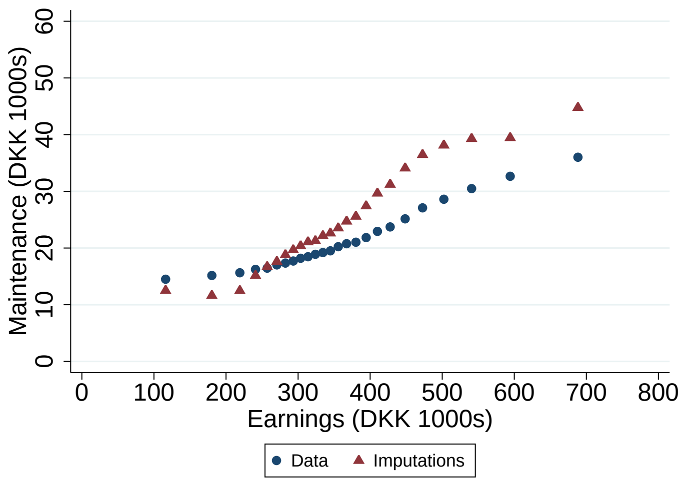
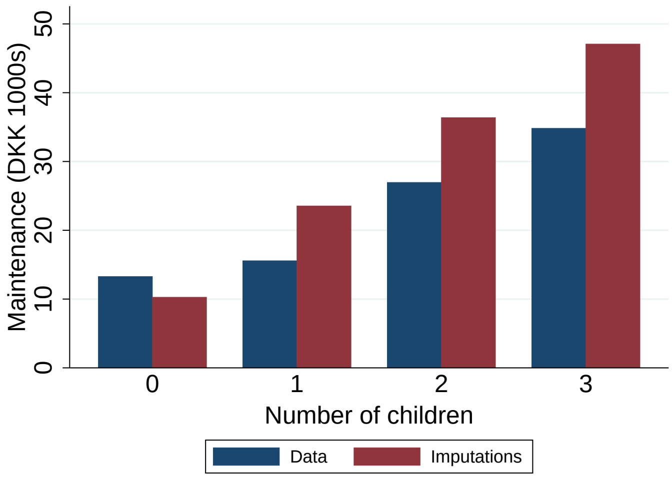


Figure A.3: Maintenance payments by no. children, data and imputations



Notes: The figures are based on the population of divorced couples in my sample. Figure A.1 and A.2 display binned scatter-plots, where each dot corresponds to a percentile of the underlying distribution.

Regarding the intensive margin, Figures A.1 - A.3 illustrate how well the imputations match the observed data for divorced couples with positive observed maintenance payments. Figure A.1 plots average imputed maintenance payments against observed maintenance payments in a binned scatter plot. The plot exhibits some small deviations but by and large is clustered around the 45-degree line, confirming that on average, the imputations of maintenance payments are close to the payments observed in the data. Figure A.2 shows how maintenance payments evolve with the maintenance payer's labor income in the observed data and for my imputations of maintenance payments. Both the maintenance imputations and the maintenance data exhibit a positive gradient in the payer's labor income that is steepest between 300,000 and 500,000 DKK and somewhat flatter outside this income range. This gradient, however, is somewhat steeper in the imputations than in the data. Figure A.3 shows imputed and actual annual maintenance payments by number of children. My imputations capture that maintenance payments are increasing in the number of children divorced couples have and the magnitude of the increase is similar in my imputations and in the data. The level of maintenance payments however is higher in the imputations than in the data for couples with 1,2 and 3 children, while it is somewhat lower for couples with 0 children. Overall, the displayed relationships show that the institutional rules about maintenance payments are reflected in the actual payments, although the precise amounts deviate to some extent.

B Consumption Imputations

In this appendix, I lay out the accounting identities and structural assumptions that I leverage to impute consumption.

Imputing Household Consumption Expenditures Using data on labor income, changes in asset positions and maintenance payments allows me to impute household consumption expenditures using simple accounting identities. In the further analyses, it will be useful to distinguish between three types of individuals: married individuals, divorced single individuals, and divorced individuals who have remarried or are cohabiting with a new partner. Denote by D_{it} a dummy variable that indicates whether i is divorced at age t and by R_{it} a dummy that indicates whether i is remarried or cohabiting with a new partner at age t. I impute the consumption expenditures of individual i's household, E_{it}, using the following accounting identity:

$$E_{it} = \begin{cases} w_{it}^{net} h_{it} + \tilde{w}_{it}^{net} \tilde{h}_{it} + A_{it} - (1+r)^{-1} A_{it+1}, & \text{if} \quad D_{it} = 0, \\ w_{it}^{net} h_{it} + M_{it} + A_{it} - (1+r)^{-1} A_{it+1}, & \text{if} \quad D_{it} = 1 \text{ and } R_{it} = 0, \\ w_{it}^{net} h_{it} + \tilde{w}_{it}^{net} \tilde{h}_{it} + M_{it} + A_{it} - (1+r)^{-1} A_{it+1}, & \text{if} \quad D_{it} = 1 \text{ and } R_{it} = 1, \end{cases}$$

where r is the per annum interest rate, w_{it}^{net} is i's after-tax wage h_{it} are i's work hours, $\tilde{w}_{it}^{net}$, $\tilde{h}_{it}$ are the after tax wage and work hours of i's spouse or cohabiting partner, and A_{it} are household-level assets. M_{it} are maintenance payments (positive if received and negative if paid by i). As an approximation of the Danish tax schedule I set $w_{it}^{net} = (1-\nu) w_{it}$ and set the linear tax rate to equal $\nu = 0.47$, following Trabandt and Uhlig (2011). [66]

Imputing Individual Consumption To compute individual consumption from household-level consumption expenditures, I invoke equivalence scales to account for expenditures for children and economies

[66] Trabandt and Uhlig (2011) provide a linear approximation of the Danish tax schedule based on national product and income accounts data.

of scale in the household. I assume the following expenditure functions for married and divorced households:

$$E_{it} = \begin{cases} e(n_{it})(c_{it}^{\rho} + \tilde{c}_{it}^{\rho})^{\frac{1}{\rho}} & \text{if} \quad D_{it} = 0, \\ e(n_{it})c_{it} & \text{if} \quad D_{it} = 1 \text{ and } R_{it} = 0, \\ e(n_{it})(c_{it}^{\rho} + \tilde{c}_{it}^{\rho})^{\frac{1}{\rho}} & \text{if} \quad D_{it} = 1 \text{ and } R_{it} = 1, \end{cases}$$

where n_{it} is the number of children living in i's household and the McClements scale e determines expenditures for children as a fraction of their parents' consumption. c_{it} denotes i's consumption, and $\tilde{c}_{it}$ denotes i's spouse's consumption at age t. [67] For $\rho > 1$, this specification admits for economies of scale in married and cohabiting households, I set $\rho = 1.403$, which is an intermediate value for the magnitude of economies of scale estimated in previous studies (see Voena (2015)).

Imputing the individual consumption levels of married and cohabiting couples further requires fixing a value for the ratio of male consumption divided by female consumption. I fix this ratio to equal the average value of male consumption divided by female consumption observed in the DTUS data, $z = 0.92$. Denote by $s = s(i) \in \{f, m\}$ the gender of individual i (f for female, m for male). Individual consumption is imputed by

$$c_{it} \quad = \quad \begin{cases} (1 + z^{\rho})^{-\frac{1}{\rho}} e(n_{it})^{-1} E_{it} & \text{if} \quad D_{it} = 0, \ s(i) = f, \\ (1 + z^{-\rho})^{-\frac{1}{\rho}} e(n_{it})^{-1} E_{it} & \text{if} \quad D_{it} = 0, \ s(i) = m, \\ e(n_{it})^{-1} E_{it} & \text{if} \quad D_{it} = 1. \end{cases}$$

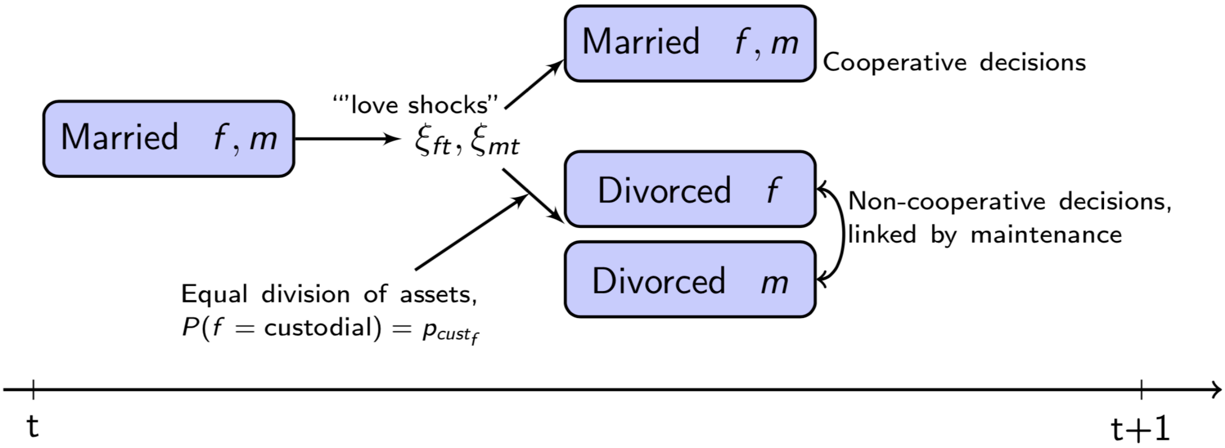
For part of my sample, these imputations yield negative consumption or unrealistically high consumption values. I therefore drop couples with negative consumption or consumption above the 98th or below the 2nd percentile. The described imputation procedure takes into account that i may share finances with a partner in case (s)he remarries or cohabits with a new partner post-divorce. In this case, (i.e., if $D_{it} = 1, R_{it} = 1$) $\tilde{c}_{it}$ denotes i's new partner's consumption level.

[67] I set $e(0) = 1$, $e(1) = 1.23$, $e(2) = 1.46$ and $e(n) = 1.69$ for $n > 3$. These values conform to the McClements (1977) scale for children aged 8-10. To be consistent with my structural model in which couples are restricted to having at most three children, I treat households with more than three children (less than 5% of my sample) as if they had exactly three children.

C Model Appendix

C.1 Timing of Divorce Decisions

Figure C.1: Timing of divorce decisions



C.2 Retirement

This subsection provides a formal outline of the values of retirement (for married and divorced couples). As described in Section 5, there are two key differences in retirement relative to pre-retirement decision-making: 1. model agents work zero hours, i.e., allocate their complete time budget between home production and leisure. 2. in every time period model agents receive a pension which is a function of their pre-retirement wage. [68] Accordingly, the value functions of divorced and married retirees are given as follows.

Divorced Retirees Divorced retirees f and m in every time period $t \in \{T, ..., T + T_R - 1\}$ choose $\iota_s = (c_{st}, q_{st}, \ell_{st}, A_{st+1})$ to solve the following recursive problem:

$$\begin{aligned} \iota^*_{st} &= \arg\max_{\iota_{st}} \;\; u^{div}_s(c_{st}, \ell_{st}, Q_{st}) + \beta \mathbb{E}_t[V^{div}_{st+1}(\tilde{\Omega}^{div}_{t+1})] \qquad (13) \\ \text{s.t.} \;\; x^{div}_{st} &= R_s(w_{sT}) + (1 + r)A_{st} - A_{st+1} \\ Q_{st} &= F^{div}_Q(q_{st}) \\ H_s &= q_{st} + \ell_{st} \, , \end{aligned}$$

where $R_s(w_{sT})$ specifies pensions as a function of the last pre-retirement wage. Note that the state vector in retirement is thus reduced to $\Omega^{div}_t = (A_{ft}, A_{mt}, n_{ft}, n_{mt}, w_{fT}, w_{mT})$. The value of retirement for divorcees

[68] This is consistent with the Danish divorce law, which specifies that pension rights are not divided upon divorce.

f and m is defined recursively by

$$V_{st}^{div}(\Omega_t^{div}) \quad = \quad u_s^{div}(c_{st}^*, \ell_{st}^*, Q_{st}^*) + \beta \mathbb{E}_t[V_{st+1}^{div}(\Omega_{t+1}^{*div})], \tag{14}$$

for $t \in \{T, ..., T+T_R-1\}$, where $Q_{st}^* = F_{Q_s}^{div}(q_{st}^*)$, and $V_{st}^{div}(\Omega_t^{div}) = u_s^{div}(c_{st}^*, \ell_{st}^*, Q_{st}^*)$ for $t = T+T_R$.

Married Retirees Married retirees, f and m, in every time period $t \in \{T, ..., T+T_R-1\}$ choose $\iota_t = (c_{ft}, c_{mt}, q_{ft}, q_{mt}, \ell_{ft}, \ell_{mt}, A_{t+1}, D_t)$. Conditional on staying married, $D_t = 0$, and for given relative bargaining power μ_t f and m jointly solve the problem

$$\begin{aligned} \iota_t^* \quad &= \quad \arg\max_{\iota_t} \quad \mu_t \big[u_f^{mar}(c_{ft}, \ell_{ft}, Q_t, \xi_{ft}) + \beta \mathbb{E}_t[V_{ft+1}]\big] \\ &\quad\quad +u_m^{mar}(c_{mt}, \ell_{mt}, Q_t, \xi_{mt}) + \beta \mathbb{E}_t[V_{mt+1}] \\ \text{s.t.} \quad x_t^{mar} \quad &= \quad R_f(w_{fT}) + R_m(w_{mT}) + (1+r)A_t - A_{t+1} \\ Q_t \quad &= \quad F_Q^{mar}(q_{ft}, q_{mt}) \\ H_f \quad &= \quad q_{ft} + \ell_{ft} \\ H_m \quad &= \quad q_{mt} + \ell_{mt} \end{aligned} \tag{15}$$

The value of retirement for married spouse s in $t \in \{T, ..., T+T_R-1\}$ is given by

$$V_{st}^{mar}(\Omega_t^{mar}) = u_s(c_{st}^*, \ell_{st}^*, Q_t^*, \xi_{st}) + \beta \mathbb{E}_t[V_{st+1}], \tag{16}$$

where $c_{st}^*, q_{st}^*, \ell_{st}^*$ are the respective components of ι^*, $Q_t^* = F_Q^{mar}(q_{ft}^*, q_{mt}^*)$. V_{sT}^{mar} is the value of retiring as part of a married couple for spouse $s \in \{f, m\}$. The $t+1$ continuation value V_{st+1} is given by

$$V_{st+1} = D_{t+1} V_{st+1}^{div}(\Omega_{t+1}^{div}) + (1 - D_{t+1}) V_{st+1}^{mar}(\Omega_{t+1}^{mar})$$

for $t \in \{T, ..., T+T_R-1\}$ and by

$$V_{st} = (1 - D_t)\big[\mu_t u_f^{mar}(c_{ft}^*, \ell_{ft}^*, Q_t^*, \xi_{ft}) + u_m^{mar}(c_{mt}^*, \ell_{mt}^*, Q_t^*, \xi_{mt})\big] + D_t V_{st}^{div}$$

for $t = T + T_R$.

Divorce decisions, the evolution of μ_t, and asset division/allocation of custody upon divorce follow the steps described in Section 5, i.e., are the same pre- and post-retirement.

C.3 Computational Details

This appendix provides details on the numerical solution and the structural estimation of the model.

Model Solution The model is solved by backward recursion, i.e., for each time period t the model agents' problem is solved on a grid of points in the state space, taking the continuation values in $t+1$ as given. I first solve the model for divorced couples (i.e., I solve for the values of divorce $V_{ft}^{div}, V_{mt}^{div}$) and then solve the decision problem of married couples, using the values of divorce as input.

Approximations For the model solution I solve the model for a discrete grid of points in the state space and use numerical approximation techniques to compute continuation values and best-response functions of divorcees at points off the discrete grid. In particular, I use *linear interpolation* to interpolate between points on the asset grid A_t, A_{ft}, A_{mt} and the relative bargaining weight in married couples μ_{ft} and *Gauss-Hermite quadrature* (see Judd (1998)) to approximate integrals taken over the distribution of the wage shocks, $\epsilon_{st} \overset{iid}{\sim} \mathcal{N}(0, \sigma_{s\epsilon})$. For the approximation of the law of motion of the "love shocks" ξ_{ft}, ξ_{mt} I use Rouwenhorst's method for discretizing highly persistent processes (see Kopecky and Suen (2010) and Fella et al. (2019)).

Estimation For the minimization of the MSM criterion function, I use *basin-hopping*, a global optimization routine. The *basin-hopping* algorithm uses the *Nelder-Mead* algorithm for finding local minima, and upon successful completion of *Nelder-Mead*, it perturbs the coordinates of the obtained local minimum (stochastically) and reiterates the local minimization procedure several times. Upon completion of several local minimization steps, the algorithm selects the smallest of the obtained local minima.

C.4 First Best Allocation

This appendix provides a formal description of the first best allocation defined in section 7. The first best allocation solves a dynamic problem in which married as well as divorced couples make Pareto-efficient decisions, subject to a fixed Pareto-weight, μ. Denote the vector of choice variables by

$$\iota_t = (c_{ft}, c_{mt}, h_{ft}, h_{mt}, q_{ft}, q_{mt}, \ell_{ft}, \ell_{mt}, A_{t+1}, D_t)$$

. For divorced couples, the first best allocation solves

$$\begin{aligned}
\iota_t^{fb,div} &= \arg\max_{\iota_t} \ \mu\big[u_f^{div}(c_{ft}, \ell_{ft}, Q_{ft}) + \beta\mathbb{E}_t[V_{ft+1}^{fb,div}]\big] \\
&\quad + u_m^{div}(c_{mt}, \ell_{mt}, Q_{mt}) + \beta\mathbb{E}_t[V_{mt+1}^{fb,div}] \\
\text{s.t.} \quad x_{ft}^{div} + x_{mt}^{div} &= (1-\nu)(w_{ft}h_{ft} + w_{mt}h_{mt}) + (1+r)A_t - A_{t+1} \\
Q_{ft} &= F_{Q_f}^{div}(q_{ft}) \\
Q_{mt} &= F_{Q_m}^{div}(q_{mt}) \\
H_f &= h_{ft} + \ell_{ft} + q_{ft} \\
H_m &= h_{mt} + \ell_{mt} + q_{mt},
\end{aligned}$$

where the continuation values are defined by

$$V_{st}^{fb,div} = \quad u_s^{div}\big(c_{st}^{fb,div}, \ell_{st}^{fb,div}, Q_{st}^{fb,div}\big) + \beta\mathbb{E}_t[V_{st+1}^{fb,div}]. \tag{17}$$

For married couples, the first best allocation solves

$$\begin{aligned}
\iota_t^{fb,mar} &= \arg\max_{\iota_t} \ \mu\big[u_f^{mar}(c_{ft}, \ell_{ft}, Q_t, \xi_{ft}) + \beta\mathbb{E}_t[V_{ft+1}^{fb}]\big] \\
&\quad + u_m^{mar}(c_{mt}, \ell_{mt}, Q_t, \xi_{mt}) + \beta\mathbb{E}_t[V_{mt+1}^{fb}] \\
\text{s.t.} \quad x_t^{mar} &= (1-\nu)(w_{ft}h_{ft} + w_{mt}h_{mt}) + (1+r)A_t - A_{t+1} \\
Q_t &= F_Q^{mar}(q_{ft}, q_{mt}) \\
H_f &= h_{ft} + \ell_{ft} + q_{ft} \\
H_m &= h_{mt} + \ell_{mt} + q_{mt}
\end{aligned}$$

where the continuation values are defined by

$$\begin{aligned}
V_{st}^{fb} &= \quad (1-D_t)V_{st}^{fb,mar} + D_t V_{st}^{fb,div} \\
V_{st}^{fb,mar} &= \quad u_s^{mar}(c_{st}^{fb,mar}, \ell_{st}^{fb,mar}, Q_t^{fb,mar}, \xi_{st}) + \beta\mathbb{E}_t[V_{st+1}^{fb}]
\end{aligned}$$

and where $D_t = 1$ is an indicator variable that indicates divorce. Finally, married couples divorce if divorce is Pareto efficient, i.e., if (and only if) [69]

$$\mu V_{ft}^{fb,div} + V_{mt}^{fb,div} > \mu V_{ft}^{fb,mar} + V_{mt}^{fb,mar}.$$

D Directly Estimated Parameters

Initial Relative Bargaining Power To inform my choice of the initial relative bargaining power μ_0 I use data on couples consumption from the DTUS. Survey respondents in the DTUS report their own and their spouses private consumption level. I reweight the data to match the age distribution of my main sample. The average ratio between male and female consumption based on the reweighted data is 0.92. My structural model implies the following relationship between relative consumption and relative bargaining power:

$$\mu_t = \left(\frac{c_{ft}}{c_{mt}}\right)^{\eta}.$$

[69]It can be shown that under this condition no allocation in marriage or divorce exists that Pareto dominates $c_{ft}^{fb,div}, c_{mt}^{fb,div}, h_{ft}^{fb,div}, h_{mt}^{fb,div}$.

I use this relationship to inform my choice of the initial relative bargaining power μ_0, i.e., I set $\mu_0 = (0.92)^{\eta} = (0.92)^{-1.5} = 1.13$.

Child Custody To estimate the probability that the mother takes custody after divorce, $P(\text{custodial} = f)$, I use Danish register data on children's main residence after divorce. Among divorcing parents in my sample, I observe that three years after divorce, in 79% of cases, all children live with their mother. In 8% of all cases, all children live with their father. In 13% of all cases some children live with each parent. I attribute half of the cases in which some children live with each parent to female and male custody, respectively, i.e., I set $P(\text{custodial} = f) = 0.86$. A limitation of my data is that I cannot identify parents who share *physical* custody after divorce. As described by Rossin-Slater and Wüst (2018), Danish parents who share physical custody are exempt from making or receiving child support payments. [70] According to Danish survey data from 2007, Rossin-Slater and Wüst (2018) report that 22% of divorced fathers have either joint or sole physical custody, while in 78% of divorce cases the mother has sole physical custody. This evidence suggests that the non-compliance rate in my data may reflect couples who are exempt from making child support payments because they share physical custody. [71]

Maintenance I estimate the probability of non-compliance, $P(\Xi_t = 0 \text{ for all } t)$, and the probability of discontinuation of maintenance payments $P(\Xi_{t+1} = 0|\Xi_t = 1)$ using data on maintenance payments between divorced couples from Danish register data. I set $P(\Xi_t = 0 \text{ for all } t)$=0.17, the fraction of zero payers in the data. I estimate the probability of discontinuation of maintenance payments $P(\Xi_{t+1} = 0|\Xi_t = 1)$ by matching the average duration of maintenance payments in the data. I code maintenance payments as having ended if I observe zero payments in three subsequent years. If maintenance payments are still ongoing at the end of my sample period I assume that they last until the youngest child turns 18, or for at least 8 years to reflect the duration of alimony payments, which is between 6 and 10 years. The measured average maintenance duration in the data is 8.4 years. It is easy to show that the expected duration of maintenance payments equals $P(\Xi_{t+1} = 0|\Xi_t = 1)^{-1}$. I thus set $P(\Xi_{t+1} = 0|\Xi_t = 1) = \frac{1}{8.4} = 0.12$.

Initial Distribution of Children and Fertility Process The parameters determining the distribution of the number of children are the initial (period 1) distribution of children

$$p_{n_1}(n) = P(n_1 = n) \quad \text{for} \quad n \in \{0, 1, 2, 3\}$$

[70] Note that even in cases of shared *legal* custody, one parent may have sole *physical* custody (see, e.g., Rossin-Slater and Wüst (2018)). While legal custody pertains to the right to make decisions about a child's life, physical custody determines with which parent the child resides post divorce.

[71] Note that I observe zero maintenance payments for 17% of all divorced couples. Assuming these couples share physical custody, and adding the share of couples where all children reside with their father post divorce yields 25%. This number is broadly consistent with the 22% of divorced fathers reported by Rossin-Slater and Wüst (2018) as having joint or sole physical custody.

and the probabilities of giving birth to an additional child as a function of the model time period t and the number of children already present in the household: [72]

$$p_n(t, n_t) = P(\text{birth}|t, n_t) \quad \text{for} \quad n_t \in \{0, 1, 2\},\ 1 \le t < T.$$

I estimate $p_{n_1}(n)$ and $p_n(t, n_t)$ by computing the corresponding sample means and Markov transition probabilities from the Danish birth register data. The estimates for p_{n_1} are reported in Table D.1. The matrix of estimated Markov transition probabilities is presented in Table D.2. Note that for $t \ge 4$ (i.e., after 12 years of marriage), birth probabilities are generally practically equal to 0.

Table D.1: Initial no. of children, empirical distribution

n	0	1	2	3
$p_{n_1}(n)$	0.34	0.37	0.25	0.04

Notes: Source: Danish birth register.

Table D.2: Fertility process

	$n = 0$	$n = 1$	$n = 2$
$p_n(t = 1, n_1 = n)$	0.25	0.23	0.05
$p_n(t = 2, n_2 = n)$	0.08	0.19	0.04
$p_n(t = 3, n_3 = n)$	0.02	0.06	0.03
$p_n(t = 4, n_4 = n)$	0.01	0.01	0.01
$p_n(t \ge 5, n_5 = n)$	0.00	0.00	0.00

Notes: Source: Danish birth register.

E Policy Simulations Appendix

E.1 Approximating Child Support in a Low-Dimensional Policy Space

To conduct counterfactual policy experiments in a policy space with a manageable number of parameters that have meaningful interpretations, I approximate the complex Danish child support schedule in a lower-dimensional space.

First, I use maintenance payments as observed in my data and deduct alimony payments as predicted by the exact alimony formula given in Appendix A, thereby obtaining estimated child support payments.

[72] Note that I allow couples to have at most 3 children, i.e., $p_n(t, 3) = 0$ for all t.

[73] Denote the thusly obtained child support estimate by $\tilde{cs}_{it}$. I then use $\tilde{cs}_{it}$ as dependent variable in a nonlinear least squares regression on the lower-dimensional child support policy space, given by (18). Note that for the approximation I fix b_2, as under the status quo Danish child support policy, child support payments do not depend on the custodial parent's income. The thusly obtained coefficient estimates are $\hat{b}_0 = 8020$, $\hat{b}_1 = 0.028$ and $\hat{b}_n = 0.79$. The R-squared of this nonlinear least squares regression is 95%. Note that the value of $\hat{b}_0$ depends on the considered frequency of child support payments. The parameter estimates are obtained using approximate data on annual child support payments. To arrive at the frequency of my model, in which one time period corresponds to three years, $\hat{b}_0$ thus needs to be tripled.

$$\underset{b_0,b_1,b_n}{\arg\min} \quad \left(\widetilde{cs}_{it} - n_{it}^{b_n}(b_0 + b_1 I_{it})\right)^2 \tag{18}$$

E.2 Standard Errors for Policy Counterfactuals

To translate the standard errors of my structural parameter estimates (reported in Table 3) into standard errors of my policy simulation results, I make use of the delta method, i.e., I use that

$$\sqrt{N}(g(\hat{\theta}) - g(\theta)) \to \mathcal{N}\left(0, \nabla g(\theta)'\Sigma\nabla g(\theta)\right),$$

where N denotes the sample size, $\hat{\theta}$ denotes the MSM-estimator of my structural parameters, g denotes the mapping from structural model parameters to a select policy counterfactual, ∇g denotes the gradient of g, and Σ denotes the covariance matrix of θ.

Based on this relationship, and given my estimate of the covariance matrix of structural model parameters $\hat{\Sigma}$, I estimate the standard error of $g(\hat{\theta})$ by

$$\frac{1}{\sqrt{N}}\nabla g(\hat{\theta})'\hat{\Sigma}\nabla g(\hat{\theta}).$$

To this end, I approximate the gradient $\nabla g(\hat{\theta})$ numerically by perturbing each element of $\hat{\theta}$. The resulting standard errors for the main policy counterfactuals I consider are presented in Tables E.1 - E.4. In particular, the tables report the counterfactual changes relative to the status quo with the standard errors reported given in brackets. The policy counterfactuals, with very few exceptions, are statistically significant. This supports the results of my policy simulations by showing that they do not hinge on the point estimates of my structural parameters but persist when the standard errors of my structural estimates are taken into account.

[73] Recall that my data do not include separate observations on child support and alimony but do include maintenance payments, i.e., the sum of child support and alimony.

Table E.1: The effect of varying child support on divorced couples' time use, policy counterfactuals and standard errors

Intercept, b_0	0	$b_0^{'}$	$b_0^{''}$
Work hours female	0.448***	−0.786***	−1.439***
	(0.031)	(0.032)	(0.033)
Home production hours female	−0.423***	0.759***	1.391***
	(0.028)	(0.025)	(0.024)
Work hours male	-0.012	0.492***	0.930***
	(0.082)	(0.080)	(0.078)
Home production hours male	0.010	−0.353***	−0.667***
	(0.028)	(0.027)	(0.028)
Slope in payer's income, b_1	0	$b_1^{'}$	$b_1^{''}$
Work hours female	0.431***	−1.061***	−1.481***
	(0.027)	(0.031)	(0.028)
Home production hours female	−0.406***	1.024***	1.431***
	(0.014)	(0.021)	(0.020)
Work hours male	0.131*	−0.166**	−0.353***
	(0.080)	(0.075)	(0.073)
Home production hours male	−0.104***	0.134***	0.278***
	(0.026)	(0.033)	(0.036)
Slope in income gap, b_2	0	$b_2^{'}$	$b_2^{''}$
Work hours female	-	−1.082***	−1.320***
		(0.028)	(0.025)
Home production hours female	-	1.044***	1.269***
		(0.011)	(0.018)
Work hours male	-	−1.816***	−4.867***
		(0.080)	(0.098)
Home production hours male	-	1.366***	3.700***
		(0.045)	(0.059)
Curvature in no. of children, b_n	0	$b_n^{'}$	$b_n^{''}$
Work hours female	0.388***	−0.747***	−1.295***
	(0.029)	(0.026)	(0.035)
Home production hours female	−0.364***	0.722***	1.252***
	(0.027)	(0.017)	(0.024)
Work hours male	0.084	0.173**	0.233***
	(0.082)	(0.080)	(0.077)
Home production hours male	−0.070**	−0.119***	−0.152***
	(0.028)	(0.028)	(0.030)

Notes: Counterfactual changes relative to the status quo for different child support policy regimes for divorced couples. Computed based on model simulations for $N = 20,000$ couples. Standard errors are computed based on the delta method. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table E.2: The effect of varying child support on married couples' time use, policy counterfactuals and standard errors

Intercept, b_0	0	$b_0^{'}$	$b_0^{''}$
Work hours female	0.145^{***}	-0.267^{***}	-6.026^{***}
	(0.051)	(0.045)	(0.077)
Home production hours female	-0.144^{***}	0.260^{***}	5.916^{***}
	(0.050)	(0.040)	(0.072)
Work hours male	-0.110^{*}	0.140^{**}	1.816^{***}
	(0.062)	(0.062)	(0.075)
Home production hours male	0.098	-0.118^{**}	-2.048^{***}
	(0.060)	(0.056)	(0.059)
Slope in payer's income, b_1	0	$b_1^{'}$	$b_1^{''}$
Work hours female	0.192^{***}	-0.194^{***}	-0.702^{***}
	(0.054)	(0.044)	(0.042)
Home production hours female	-0.189^{***}	0.186^{***}	0.686^{***}
	(0.053)	(0.040)	(0.040)
Work hours male	-0.090^{*}	0.091^{*}	0.101^{*}
	(0.050)	(0.053)	(0.059)
Home production hours male	0.092^{*}	-0.093^{*}	-0.104^{*}
	(0.054)	(0.052)	(0.056)
Slope in income gap, b_2	0	$b_2^{'}$	$b_2^{''}$
Work hours female	-	-0.298^{***}	-0.753^{***}
		(0.040)	(0.050)
Home production hours female	-	0.287^{***}	0.729^{***}
		(0.042)	(0.047)
Work hours male	-	-0.165^{***}	-0.246^{***}
		(0.062)	(0.060)
Home production hours male	-	0.150^{***}	0.182^{***}
		(0.059)	(0.057)
Curvature in no. of children, b_n	0	$b_n^{'}$	$b_n^{''}$
Work hours female	0.173^{***}	-0.313^{***}	-0.431^{***}
	(0.053)	(0.043)	(0.051)
Home production hours female	-0.172^{***}	0.304^{***}	0.421^{***}
	(0.053)	(0.040)	(0.040)
Work hours male	-0.088^{*}	0.098^{**}	0.157^{***}
	(0.048)	(0.049)	(0.054)
Home production hours male	0.089^{*}	-0.093^{**}	-0.145^{***}
	(0.054)	(0.056)	(0.056)

Notes: Counterfactual changes relative to the status quo for different child support policy regimes for married couples. Computed based on model simulations for $N = 20,000$ couples. Standard errors are computed based on the delta method. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table E.3: The effect of varying alimony (τ) on divorced couples' time use

τ	0	0.1	0.3	0.4
Work hours female	1.463^{***}	0.715^{***}	-0.564^{***}	-1.244^{***}
	(0.027)	(0.029)	(0.017)	(0.026)
Home production hours female	-1.399^{***}	-0.683^{***}	0.544^{***}	1.200^{***}
	(0.024)	(0.016)	(0.016)	(0.012)
Work hours male	0.953^{***}	0.525^{***}	-0.858^{***}	-2.032^{***}
	(0.088)	(0.080)	(0.016)	(0.082)
Home production hours male	-0.709^{***}	-0.393^{***}	0.642^{***}	1.523^{***}
	(0.028)	(0.027)	(0.042)	(0.042)

Notes: Counterfactual changes relative to the status quo for different alimony regimes for divorced couples. Computed based on model simulations for $N = 20,000$ couples. Standard errors are computed based on the delta method. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table E.4: The effect of varying alimony (τ) on married couples' time use

τ	0	0.1	0.3	0.4
Work hours female	0.431^{***}	0.239^{***}	-0.058	-0.125^{***}
	(0.059)	(0.054)	(0.078)	(0.045)
Home production hours female	-0.429^{***}	-0.239^{***}	0.052	0.117^{***}
	(0.060)	(0.053)	(0.069)	(0.042)
Work hours male	-0.198^{***}	-0.082^{***}	0.043^{*}	0.081^{**}
	(0.066)	(0.060)	(0.025)	(0.042)
Home production hours male	0.205^{***}	0.121^{*}	-0.016	-0.041
	(0.067)	(0.062)	(0.078)	(0.058)

Notes: Counterfactual changes relative to the status quo for different alimony regimes for married couples. Computed based on model simulations for $N = 20,000$ couples. Standard errors are computed based on the delta method. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

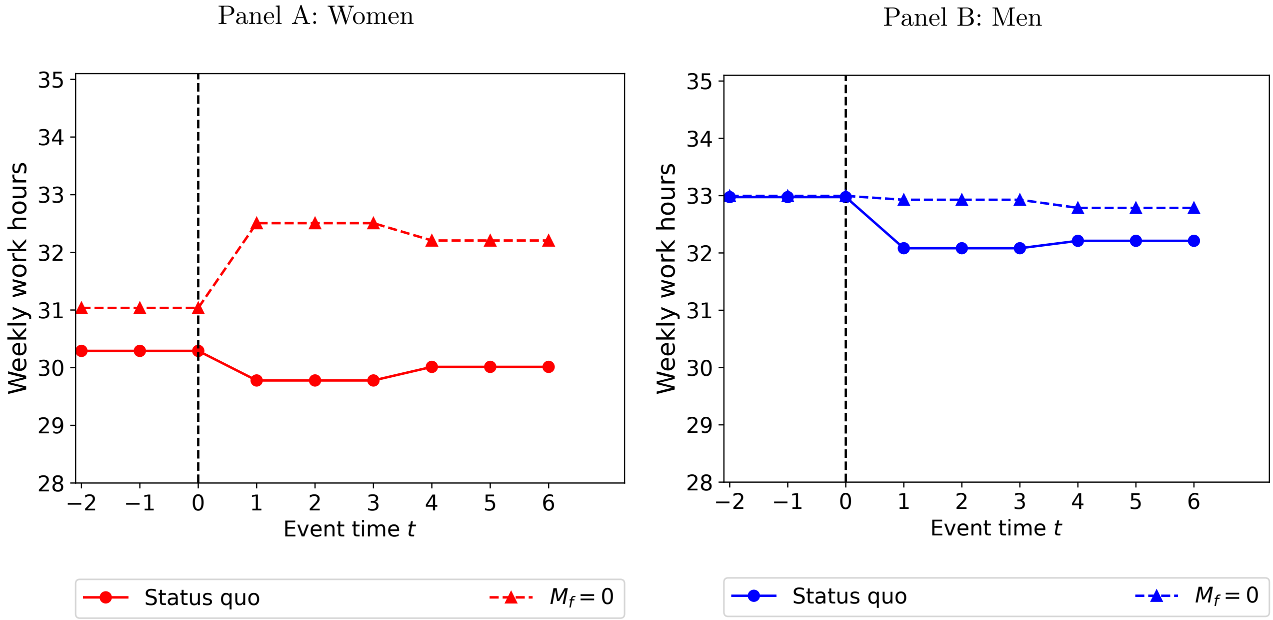
F Additional counterfactuals

F.1 Decomposition: Evolution of Work Hours Around Divorce

The empirical finding that men and women reduce work hours after divorce could be driven by various explanations. Two salient channels are disincentives from maintenance payments and changes in home production technology around divorce. These hypotheses are challenging to distinguish empirically, but can be examined based on my estimated structural model. To this end, I simulate a policy scenario in which all maintenance payments (child support and alimony payments) are entirely shut down ($M_f = -M_m = 0$). I then compare event studies (following the specification outlined in Section 4) estimated on data simulated under 1.) the $M_f = 0$ policy scenario and 2.) the status quo policy. The purpose of this comparison is to reveal how work hours would evolve around divorce if there were no (dis)incentive effects from maintenance payments but only a change in the utility from home production.

Figure F.1 displays the event-study coefficient estimates. The results show that in the absence of maintenance payments, women would increase their work hours post divorce by approximately 1 hour per week. This is compared to the reduction in work hours by 0.7 hours under the status quo policy. In contrast, men, in the absence of maintenance payments, leave their work hours almost unchanged around divorce. This is compared to the reduction in male work hours of 0.98 hours under the status quo. Taken together, these simulations suggest that women and men reduce their work hours post divorce due to the incentive effects of maintenance payments rather than to changes in home production.

FIGURE F.1: Decomposing the evolution of work hours around divorce



Notes: The figures present coefficient estimates from simulated event studies around divorce, under the status quo policy (solid line) and for counterfactual policy scenario in which all maintenance payments are shut down (dashed line). Panel A and Panel B display estimates for women and men, respectively. The simulation results are computed based on model simulations for $N = 20,000$ couples.

F.2 Robustness Check: Public Home Production in Divorce

Throughout my main analysis I have maintained that divorcees' home production is a private good. To gauge the sensitivity of my results to this assumption, I explore an alternative model specification in which a part of divorcees' home production is public. Specifically, I consider a model specification where the intra-period utility function of a divorced non-custodial parent is given by

$$u_s^{div}(c,\ell,Q) = \frac{c^{1+\eta_s}}{1+\eta_s} + \psi_s \frac{\ell^{1+\gamma_s}}{1+\gamma_s} + B\left(\frac{Q^{1+\kappa}}{1+\kappa} + \pi b n_t \frac{\tilde{Q}^{1+\kappa}}{1+\kappa}\right), \tag{19}$$

where Q denotes the own household good of the non-custodial parent, and $\tilde{Q}$ denotes the custodial parent's household good. (Recall that n_t denotes the number of children, and b captures by how much utility generated from the household good increases in the number of children.)

$\pi \in [0,1]$ captures the degree to which home production by the custodial parent remains a public good post divorce. Note that (19) nests the main specification of my model for $\pi = 0$. In the following, I explore the case $\pi = 1$, where home production by the custodial parent remains fully public post divorce.

To ensure that this alternative specification fits the targeted empirical moments, I re-estimate the structural model parameters, following the steps described in section 6. Next, I use the re-estimated model and search the policy parameter space for the welfare maximizing (b, τ)-policy (as described in section 9). I then draw comparisons between the welfare maximizing (b, τ)-policies under fully public home production by the custodial parent ($\pi = 1$) and under my main specification (i.e., assuming home goods of divorcees are private, $\pi = 0$).

If find that the welfare maximizing (b, τ)-policy under $\pi = 1$ is

$$(b_0^{**}, b_1^{**}, b_2^{**}, b_n^{**}, \tau^{**}) = (1.86\tilde{b}_0, 1.43\tilde{b}_1, 0.0026, 1.44\tilde{b}_n, 0.95\tilde{\tau}),$$

where $\tilde{b}_0$, $\tilde{b}_1$, $\tilde{b}_n$, $\tilde{\tau}$ denote the status quo policy parameters. Comparing this to the welfare maximizing (b, τ)-policy under $\pi = 0$ (i.e., under my main specification, cf. section 9)

$$(b_0^{*}, b_1^{*}, b_2^{*}, b_n^{*}, \tau^{*}) = (1.82\tilde{b}_0, 1.32\tilde{b}_1, 0.0017, 1.41\tilde{b}_n, 0.9\tilde{\tau})$$

shows that, qualitatively, the policy conclusions remain unchanged: To maximize the utilitarian welfare criterion, W, all parameters that control child support payments are to be increased, while alimony payments are to be reduced relative to the status quo.

Quantitatively, fully public home production by the custodial parent ($\pi = 1$) yields across-the-board higher policy parameters than assuming home goods of divorcees are private ($\pi = 0$). Under $\pi = 1$, the welfare maximizing (b, τ)-policy increases maintenance payments by 56% relative to the status quo, vs. 40% under $\pi = 0$ (see section 9). Intuitively, under $\pi = 1$, both divorced parents value home production hours spent in the custodial parent's home (to the extent that kids are present). For this reason, additional time spent on home production receives a higher weight in the welfare criterion, counteracting (to some degree) the negative welfare impact of labor supply disincentives of maintenance payments.

Taken together, these results suggest that policy recommendations based on my model, fall between the maintenance policies summarized by $(b_0^{*}, b_1^{*}, b_2^{*}, b_n^{*}, \tau^{*})$ and $(b_0^{**}, b_1^{**}, b_2^{**}, b_n^{**}, \tau^{**})$ and involve an increase in maintenance payments between 40% and 56%, depending on the value assumed for π. This analysis demonstrates that even when varying π, i.e., when relaxing the assumption that home production of divorcees is private, the recommended policy parameters fall within reasonably tight bounds.

G Additional Tables

Table G.1: Summary statistics, Danish register data

Variable	Mean	Std. Dev.
Age	38.65	7.60
Employed female	0.91	0.29
Employed male	0.95	0.22
Part-time work (<34 weekly hours) female	0.19	0.39
Part-time work (<34 weekly hours) male	0.14	0.34
Weekly hours worked female	29.25	13.74
Weekly hours worked male	31.75	12.28
Annual earnings female (DKK 1000s)	230	151
Annual earnings male (DKK 1000s)	317	233
No. of children (cond. on married)	1.48	1.00
% divorced after 15 years	23.58	42.45
% divorced after 25 years	27.16	44.48

Notes: Summary statistics from Danish register data. Pooled sample of 4,312,826 couple-year observations.

Table G.2: Model fit, work hours and home production hours

Moment	Children	Model	Data	Std. dev. (data)
Work hours female (married)	0	30.9	29.1	11.8
	1	30.4	30.3	10.2
	2	29.9	30.7	9.7
	3	29.8	27.9	11.9
Work hours female (divorced)	0	29.0	23.7	12.3
	1	28.0	27.9	12.7
	2	27.5	28.0	13.5
	3	26.7	23.3	13.3
Work hours male (married)	0	33.6	30.9	12.9
	1	33.5	32.6	11.6
	2	33.2	33.2	13.3
	3	32.7	31.7	11.7
Work hours male (divorced)	0	29.3	26.1	14.8
	1	29.8	30.5	13.1
	2	30.5	31.1	13.4
	3	30.9	30.0	14.2
Home production hours female (married)	0	17.5	13.6	7.3
	1	18.1	16.5	8.3
	≥ 2	18.7	19.3	8.3
Home production hours female (divorced)	0	19.4	9.6	6.0
	1	20.5	19.0	6.8
	≥ 2	21.6	21.9	6.8
Home production hours male (married)	0	9.1	10.5	7.2
	1	9.7	10.5	8.2
	≥ 2	10.7	9.9	8.1
Home production hours male (divorced)	0	13.2	8.0	7.4
	1	12.9	11.1	6.9
	≥ 2	12.2	13.5	6.9

Notes: Moments from model simulations for 20,000 couples at the MSM-estimated parameter values and targeted data moments. Data moments are computed from Danish administrative data (on 322,732 couples), with the exception of mean home production hours, which are obtained from the *Danish Time Use Survey* (which includes 2,105 households).

Table G.3: The effect of changing child support on divorce rates

	0	Status quo	$b_k^{'}$	$b_k^{''}$
Intercept, b_0	28.5	27.3	27.4	27.5
Slope in payer's income, b_1	28.6	27.3	27.4	27.5
Slope in income gap, b_2	-	27.3	27.0	26.5
Curvature in no. of children, b_n	28.8	27.3	27.3	27.2

Notes: Displayed are fractions of couples ever getting divorced for different child support policy regimes. Computed based on model simulations for $N = 20,000$ couples. b_k' and b_k'' denote parameter values that would ceteris paribus double and triple child support payments relative to the status quo policy.

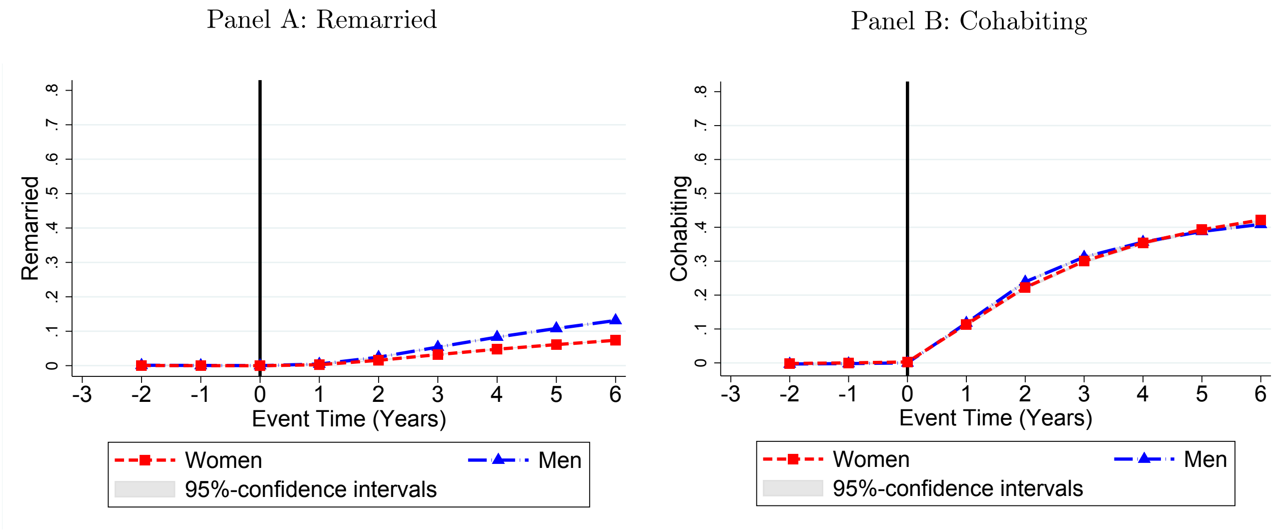
Table G.4: The effect of changing alimony (τ) on divorce rates

τ	0	0.1	0.2	0.3	0.4
ever divorced (%)	29.1	28.3	27.3	27.2	27.1

Notes: Divorce rates for different alimony policy regimes, computed based on model simulations for $N = 20,000$ couples.

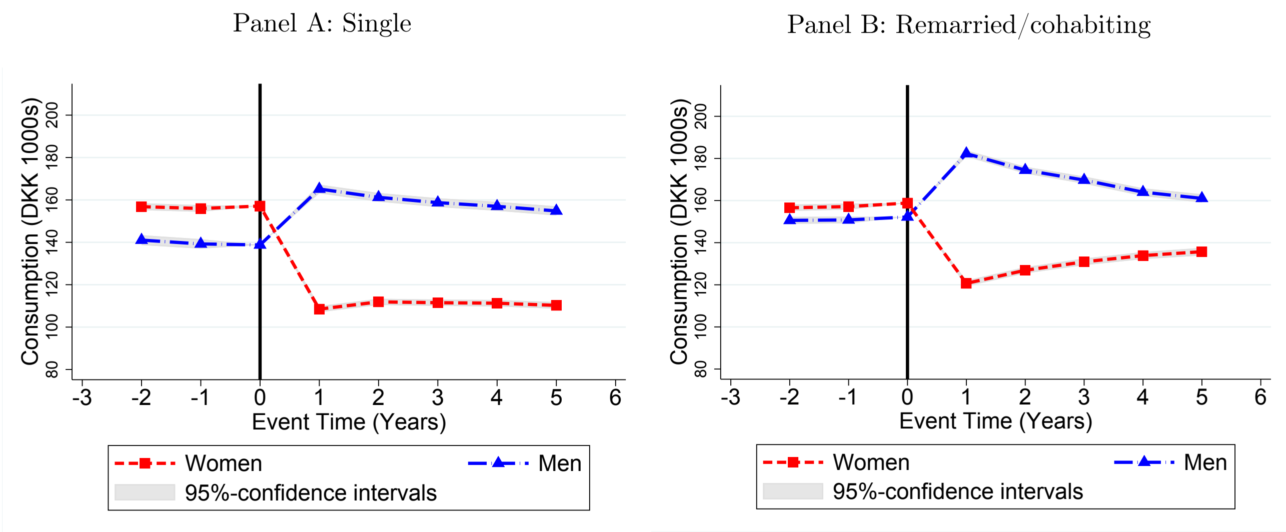
H Additional Figures

Figure H.1: Fraction remarried/cohabiting after divorce



Notes: This figure displays the fractions of remarried divorcees (Panel A) and divorcees living with a new partner (Panel B) across time relative to the year of divorce.

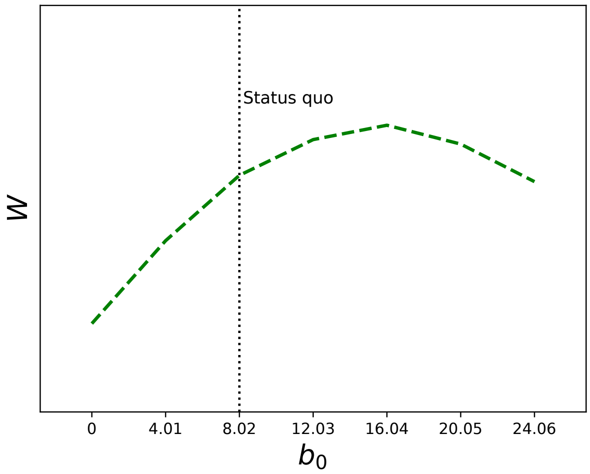
Figure H.2: Imputed consumption around divorce, single vs. remarried/cohabiting



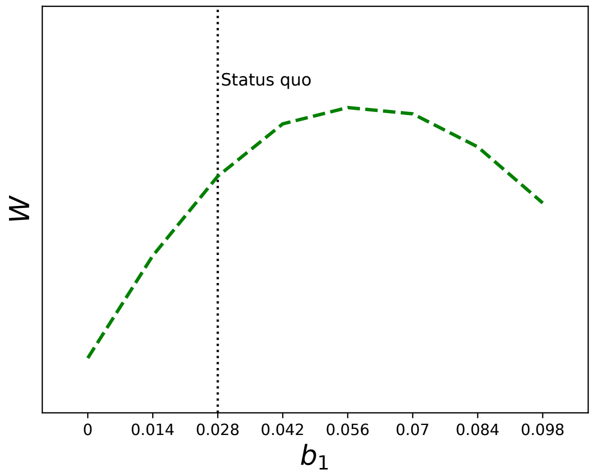
Notes: The figures display the evolution of (imputed) consumption around divorced, separately for divorcees who remain single (Panel A) and for divorcees who find a new partner (Panel B) within the first 5 years post divorce. Displayed are normalized coefficient estimates from event study regressions. The event study regressions are run separately for women and men and include age and calendar year fixed effects. Each figure is based on a balanced panel of 42,290 divorcing couples, who are observed for at least two years prior and six years post divorce.

Figure H.3: Welfare comparisons, varying child support

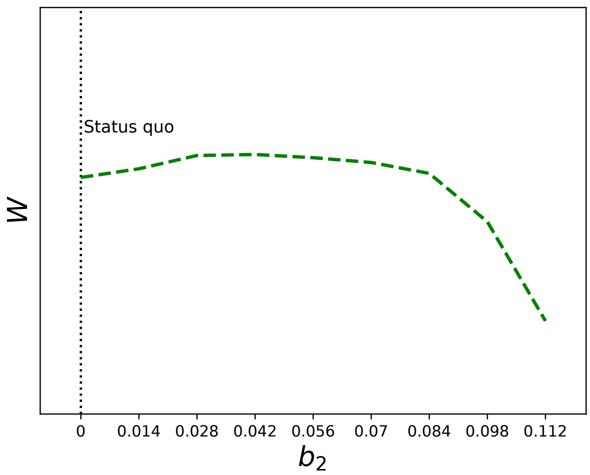
Lump sum component, b_0



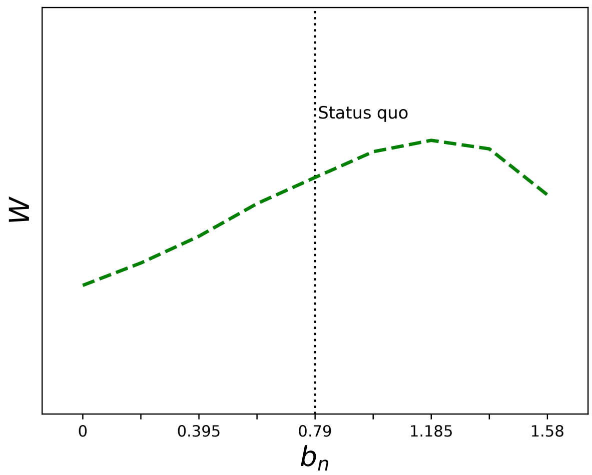
Slope in payer's income, b_1



Slope in income gap, b_2

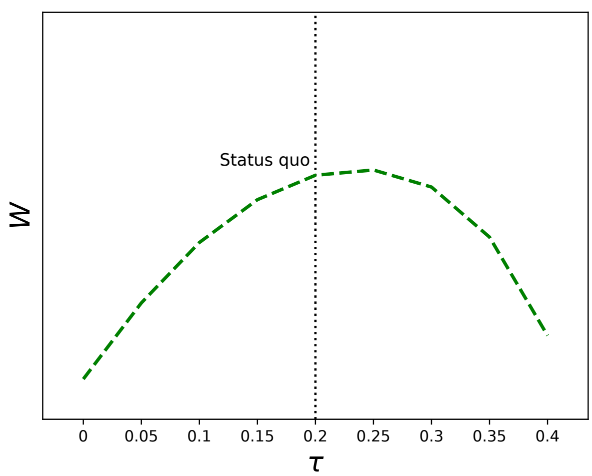


Curvature in no. of children, b_n



Notes: Plotted is the utilitarian welfare criterion (under equal weights, $\lambda = 1$) for counterfactual policy scenarios in which aspects of child support payments are changed. Each figure is based on model simulations for 20,000 couples.

Figure H.4: Welfare comparisons, varying alimony payments, τ



Notes: Plotted is the utilitarian welfare criterion (under equal weights, $\lambda = 1$) for counterfactual policy scenarios in which alimony changes are varied. Each figure is based on model simulations for 20,000 couples.