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

1 Introduction

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.(

Figure 1: Child support rules

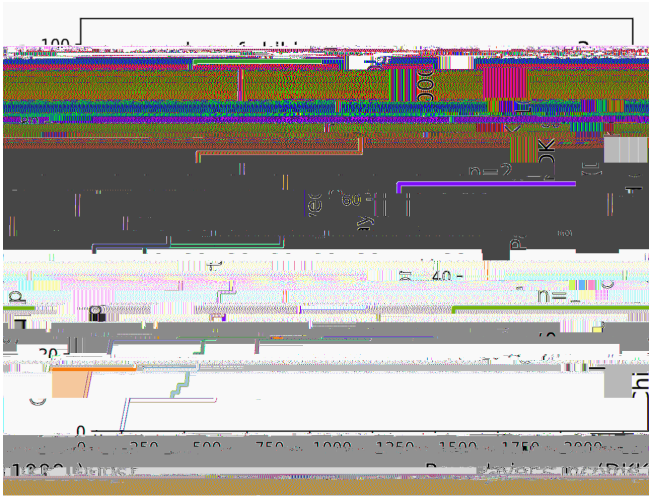


Figure 2:

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 $M_f(n$

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 K4(3(o)8.-0.4(o)-0.2((l)-0.49.827.8(wi)-

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 coe□cient estimates are presented in Panels C and D of Figure 3

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.

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

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)):

$$F_x(c_{ft}, c_{mt}, n_t) = e$$

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

$$\iota_{mt} \quad = \quad \arg\max_{\iota_{mt}} \; u_m^{div}(c_{mt}, \;\; _{mt}, Q_{mt}) + \beta \mathrm{E}_t[V_{mt+1}^{div}(\tilde{\Omega}_{t+1}^{div})]$$

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 $\Omega_t^{mar} = (\mu_t, A_t, n_t, K_{ft}, K_{mt}, \ _{ft}, \ _{mt}, \xi_{ft}, \xi_{mt})$, and denote a married couple's choice variables by $\iota_t = (c_{ft}, c_{mt}, h_{ft}, h_{mt}, q_{ft}, q_{mt}, \ _{ft}, \ _{mt}, A_{t+1}, D_t)$, 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:

$$\iota_t \quad = \quad \arg\max_{\iota_t} \ \mu_t$$

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

Table 1: Preset parameters

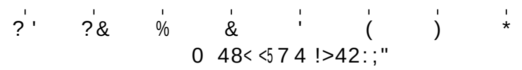
estimates $\hat{\theta}$

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.

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		

Figure 6: Untargeted moments: Relative consumption around divorce



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 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

$$
cs_{ft} = -cs_{mt} = \begin{cases} n_{ft}^{b_n}\left(b_0 + b_1 w_{mt}h_{mt} + b_2(w_{mt}h_{mt} - w_{ft}h_{ft})\right) & \text{if custodial} = f, \\ -n_{mt}^{b_n}\left(b_0 + b_1 w_{ft}h_{ft} + b_2(w_{ft}h_{ft} - w \right. & \end{cases}
$$

where $cs_{ft} > 0$ if child support flows from ex-husband to ex-wife and $cs_{ft} < 0$ 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 suppm/Ty10m/Ty23-47-362.8(i)-0.4(n)-39872(D)-0.2(en)-0.4(m)

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				

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					

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

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)

$\Delta ln(w_m^{div}$

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 ≈ −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%).

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 af

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

$$M_f = M_f$$

men ($\Delta c_m = 0.06$

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

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