Simple Model

Divorce Laws and Intra-Household Bargaining

Thomas H. Jørgensen

2025

Plan for today

- Divorce law and intra-household bargaining
 Voena (2015): "Yours, Mine, and Ours: Do Divorce Laws Affect the Intertemporal Behavior of Married Couples?"
 - Limited commitment model as last time different notation \rightarrow good to see again but different!

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Reading guide:

- 1. What are the main research questions?
- 2. What is the (empirical) motivation?

3. What are the central mechanisms in the model?

4. What is the simplest model in which we could capture these?

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Reading guide:

- 1. What are the main research questions?
 - How does divorce laws affect saving and female labor supply in marriage?
 - What are the welfare consequences of unilateral divorce?
- 2. What is the (empirical) motivation?

3. What are the central mechanisms in the model?

4. What is the simplest model in which we could capture these?

Empirical Motivation: I

Reduced Form evidence from the US
 Using time- and state variation in adoption in unilateral divorce

Years since introduction of unilateral divorce

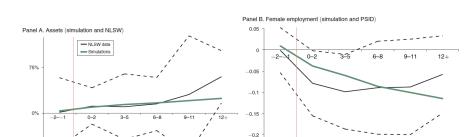
Introduction

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• Reduced Form evidence from the US

Using time- and state variation in adoption in unilateral divorce



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— PSID data

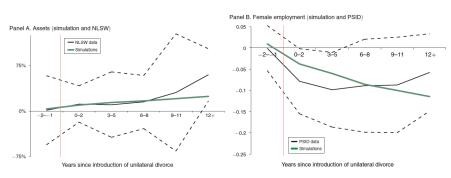
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Introduction

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Interpretation: women with low bargaining power pre-reform:
 unilateral → threat to leave → increase bargaining power → work less.

Introduction

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- 1. Unilateral vs. mutual consent divorce [One can decide vs. both has to agree]
- 2. Community vs. title-based division of property [50-50 vs. individual ownership]

Table: Mutual \rightarrow Unilateral (rows 1+2, Tab. 2).

	Savings	Employment	
Community Title-based	<u>†</u>	<u></u>	increased power of women (last slide) no sign. effect (everything is private)

Outline

Model and Mechanisms

 c_t^J : consumption of member $j \in \{H, W\}$

Model Overview

Choices:

```
P_t^W: labor market participation, wife (men always work)
  A_{t+1}^{j}: assets of member j \in \{H, W\}
   D_t: divorce
• States (\omega_t):
  A_t^j: assets of member i \in \{H, W\}
  z_t^J: income shock (perm)
  \mathcal{E}_t^J: match quality shock (love)
  h_t^W: human capital, wife only.
  \Omega_t: divorce laws.
  (\tilde{\theta}_{\star}^{W}, \tilde{\theta}_{\star}^{H}): bargaining weights (in unilateral/limited commitment).
   (Childbirth occurs at predetermined ages, perfect foresight)
```

Income is

$$\begin{split} \log(y_t^j) &= \ln(h_t^j) + z_t^j \\ z_t^j &= z_{t-1}^j + \zeta_t^j, \quad \zeta_t^j \sim \textit{iid} \mathcal{N}(0, \sigma_{7^j}^2) \end{split}$$

Human capital is

$$\log(h_t^j) = \log(h_{t-1}^j) - \delta(1 - P_{t-1}^j) + (\lambda_0^j + \lambda_1^j t) P_{t-1}^j$$

• Why only need to keep track of h_t^W ?

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• Why only need to keep track of h_t^W ? Because since men always work, $P_t^H = 1$, we have

$$\begin{split} \log(h_t^H) &= \log(h_{t-1}^H) + (\lambda_0^H + \lambda_1^H t) \\ &= \log(h_{t-2}^H) + (\lambda_0^H + \lambda_1^H (t-1)) + (\lambda_0^H + \lambda_1^H t) \\ &= \underbrace{\log(h_0^H)}_{\text{estimated as intercept}} + \sum_{s=1}^t (\lambda_0^H + \lambda_1^H s) \end{split}$$

If heterogeneity in initial condition, we would solve for a grid of h_0^H .

• Match quality (love) is an AR(1) process

$$\xi_t^j = \xi_{t-1}^j + \epsilon_t^j, \quad \epsilon_t^j \sim iid\mathcal{N}(0, \sigma^2)$$

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 Singles (share childcare costs):

$$A_{t+1}^{j} = (1+r)A_{t}^{j} + (y_{t}^{j} - d_{t}^{k}/2) \cdot P_{t}^{j} - c_{t}^{j} \cdot e(k)$$
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Couples $(A_t = A_t^H + A_t^W)$:

$$A_{t+1} = (1+r)A_t + y_t^H + (y_t^W - d_t^K)P_t^W - x_t$$

where expenditures are (couples have econ. of scale, $\rho \geq 1$)

$$x_t = [(c_t^H)^{\rho} + (c_t^W)^{\rho}]^{\frac{1}{\rho}} e(k)$$

(2)

Preferences

• Individual preferences are [my notation]

$$u(c_t^i, P_t^i, D_t^i) = \frac{(c_t^i)^{1-\gamma}}{1-\gamma} - \psi P_t^i + \xi_t^i (1 - D_t^i)$$

where

 γ is the CRRA coefficient

 ψ is the dis-utility of working

 ξ_t^i is a marital match shock ("love")

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Value of a Divorcee

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- (expected) Value of entering period t as divorced ($\approx V^s$)

$$V_t^{jDR}(\omega_t) = \pi_t^{j\Omega_t} V_t^{jR}(\omega_t) + (1 - \pi_t^{j\Omega_t}) V_t^{jD}(\omega_t)$$

where V_t^{jR} is value of re-marriage (defined next) and

$$\begin{split} V_t^{jD}(\omega_t) &= \max_{c_t^j, P_t^j} u(c_t^j, P_t^j, 1) \\ &+ \beta \underbrace{\{\pi_{t+1}^{j\Omega_t} \mathbb{E}_t[V_{t+1}^{jR}(\omega_{t+1})] + (1 - \pi_{t+1}^{j\Omega_t}) \mathbb{E}_t[V_{t+1}^{jD}(\omega_{t+1})]\}}_{\mathbb{E}_t[V_{t+1}^{jDR}(\omega_{t+1})]} \end{split}$$

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• Outside option is (my notation)

$$V_{i\,t}^{m\to s}(\omega_t;\kappa) = V_t^{jD}(\omega_t,(A_{t-1}-CD)\kappa_i)$$

where *CD* is divorce costs (tab 3), $\kappa_j=0.5$ in community property. $_{_{11/27}}$

Value of a Remarried

- **Re-marriage** is absorbing. See footnote 7.
- In turn,

$$V_t^{jR}(\omega_t) = u(c^{j*R}, P^{j*R}) + \beta \mathbb{E}_t[V_{t+1}^{jR}(\omega_{t+1})]$$

where

$$\begin{split} c^{W*R}, c^{H*R}, P^{W*R} &= \arg\max_{c^{W}, c^{H}, P^{W}} \theta u(c^{H}, 1, 0) + (1 - \theta) u(c^{W}, P^{W}, 0) \\ &+ \beta \mathbb{E}_{t} [\theta V_{t+1}^{HR}(\omega_{t+1}) + (1 - \theta) V_{t+1}^{WR}(\omega_{t+1})] \end{split}$$

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Value of a Remarried

- **Re-marriage** is absorbing. See footnote 7.
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- This means that, in the model, divorce can only happen once.
- ullet Reason is computational: Assets brought into the marriage is private Keeping track of assets from all previous marriages would be unfeasible. No second divorce ullet does not need to keep track of individual assets.

• Two cases:

- Mutual Consent: Both must prefer divorce for it to happen. Committed by law (there are exceptions).
- 2. *Unilateral divorce:* If one prefers divorce, they can divorce. Limited commitment.
 - See lecture note for my notation, I follow Voena (2015).

• Two cases:

- 1. Mutual Consent: Both must prefer divorce for it to happen. Committed by law (there are exceptions).
- 2. Unilateral divorce: If one prefers divorce, they can divorce. Limited commitment. See lecture note for my notation, I follow Voena (2015).
- **Timing-issue**: The bargaining weight is updated in current period. (See guide)

• Couples $(D_{t-1} = 0)$ in *mutual consent* regime solve

$$\begin{split} V_t(\omega_t) &= \max_{c_t^H, c_t^W P_t^W, A_{t+1}^H, A_{t+1}^W, D_t} \\ &(1 - D_t) \bigg(\theta u(c_t^H, 1, 0) + (1 - \theta) u(c_t^W, P_t^W, 0) + \beta \mathbb{E}_t[V_{t+1}(\omega_{t+1})] \\ &+ D_t \bigg(\theta \{ u(c_t^H, 1, 1) + \beta \mathbb{E}_t[V_{t+1}^{HDR}(\omega_{t+1})] \} \\ &+ (1 - \theta) \{ u(c_t^W, P_t^W, 1) + \beta \mathbb{E}_t[V_{t+1}^{WDR}(\omega_{t+1})] \} \bigg) \end{split}$$

with constant bargaining weights θ and $1 - \theta$.

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$$\begin{split} V_t(\omega_t) &= \max_{c_t^H, c_t^W P_t^W, A_{t+1}^H, A_{t+1}^W, D_t} \\ &(1 - D_t) \left(\frac{\theta}{\theta} u(c_t^H, 1, 0) + (1 - \frac{\theta}{\theta}) u(c_t^W, P_t^W, 0) + \beta \mathbb{E}_t[V_{t+1}(\omega_{t+1})] \right) \\ &+ D_t \left(\frac{\theta}{\theta} \{ u(c_t^H, 1, 1) + \beta \mathbb{E}_t[V_{t+1}^{HDR}(\omega_{t+1})] \} \right) \\ &+ (1 - \frac{\theta}{\theta}) \{ u(c_t^W, P_t^W, 1) + \beta \mathbb{E}_t[V_{t+1}^{WDR}(\omega_{t+1})] \} \end{split}$$

with constant bargaining weights θ and $1-\theta$.

• Subject to *non*-participation constraints, when $D_t = 1$,

$$V_{H,t}^{m \to s}(\omega_t; \kappa) = u(c_t^H, 1, 1) + \beta \mathbb{E}_t[V_{t+1}^{HDR}(\omega_{t+1})] > V_t^{HM}(\omega_t)$$
$$V_{W,t}^{m \to s}(\omega_t; \kappa) = u(c_t^W, P_t^W, 1) + \beta \mathbb{E}_t[V_{t+1}^{HDR}(\omega_{t+1})] > V_t^{HM}(\omega_t)$$

Household Planning: Mutual Consent

Divorce only if both want a divorce.

Household Planning: Mutual Consent

- Divorce only if both want a divorce.
- If one is unhappy in the marriage, say the wife θ remains unchanged asset-split in divorce, κ_m , is changed in his favor until he is indifferent \rightarrow she transfers wealth in divorce to convince him to accept divorce.

• Couples $(D_{t-1} = 0)$ in *unilateral* regime solve

$$V_{t}(\omega_{t}) = \max_{c_{t}^{H}, c_{t}^{W} P_{t}^{W}, A_{t+1}^{H}, A_{t+1}^{W}, D_{t}}$$

$$(1 - D_{t}) \left(\tilde{\theta}_{t+1}^{H} u(c_{t}^{H}, 1, 0) + \tilde{\theta}_{t+1}^{W} u(c_{t}^{W}, P_{t}^{W}, 0) + \beta \mathbb{E}_{t} [V_{t+1}(\omega_{t+1}) + D_{t} \left(\tilde{\theta}_{t+1}^{H} \{ u(c_{t}^{H}, 1, 1) + \beta \mathbb{E}_{t} [V_{t+1}^{HDR}(\omega_{t+1})] \} \right)$$

$$+ \tilde{\theta}_{t+1}^{W} \{ u(c_{t}^{W}, P_{t}^{W}, 1) + \beta \mathbb{E}_{t} [V_{t+1}^{WDR}(\omega_{t+1})] \} \right)$$

where $\tilde{\theta}_{t+1}^j = \tilde{\theta}_t^j + \mu_t^j$ and μ_t^j are Lagrange multipliers on

• Couples
$$(D_{t-1} = 0)$$
 in $\underline{unilateral}$ regime solve
$$V_t(\omega_t) = \max_{c_t^H, c_t^W P_t^W, A_{t+1}^H, A_{t+1}^W, D_t}$$

$$(1 - D_t) \left(\tilde{\theta}_{t+1}^H u(c_t^H, 1, 0) + \tilde{\theta}_{t+1}^W u(c_t^W, P_t^W, 0) + \beta \mathbb{E}_t [V_{t+1}(\omega_{t+1})] \right)$$

$$+ \tilde{\theta}_{t+1}^{W} \{ u(c_t^W, P_t^W, 1) + \beta \mathbb{E}_t[V_{t+1}^{WDR}(\omega_{t+1})] \}$$

 $+ D_t \left(\tilde{\theta}_{t+1}^H \left\{ u(c_t^H, 1, 1) + \beta \mathbb{E}_t \left[V_{t+1}^{HDR}(\omega_{t+1}) \right] \right\} \right)$

where $\tilde{\theta}_{t+1}^j = \tilde{\theta}_t^j + \mu_t^j$ and μ_t^j are Lagrange multipliers on

participation constraints, when
$$D_t = 0$$
,
$$V_{H,t}^{m \to s}(\omega_t; \kappa = \frac{1}{2}) \leq V_t^{HM}(\omega_t)$$

$$V_{W,t}^{m \to s}(\omega_t; \kappa = \frac{1}{2}) \leq V_t^{WM}(\omega_t)$$

(3)

Individual value of remaining in marriage (RHS of constraint) is

$$V_t^{jM}(\omega_t) = u(c_t^{j*}, P_t^{j*}, 0) + \beta \mathbb{E}_t[V_{t+1}^j(\omega_{t+1})]$$

where c_t^{j*} , P_t^{j*} , A_{t+1}^{j*} are optimal choices from eq. (3) and

$$V_{t+1}^{j}(\omega_{t+1}) = (1 - D_{t+1}^{*})V_{t+1}^{jM} + D_{t+1}^{*}V_{t+1}^{jD}$$

is individual value of entering as married in t+1.

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is individual value of entering as married in t + 1.

• Choices are made as a household (with weights on individual utility) individual values are only based on own utility (and future).

- Beginning of period bargaining weights, $\tilde{ heta}_t^j$, are in ω_t .
- If both participation constraints are not violated at $\tilde{\theta}_t^H$ and $\tilde{\theta}_t^W$, the Lagrange multipliers are zero and $\tilde{\theta}_{t+1}^j = \tilde{\theta}_t^j$ is not updated.

- Beginning of period bargaining weights, $\tilde{ heta}_t^j$, are in ω_t .
- If both participation constraints are not violated at $\tilde{\theta}_t^H$ and $\tilde{\theta}_t^W$, the Lagrange multipliers are zero and $\tilde{\theta}_{t+1}^J = \tilde{\theta}_t^J$ is not updated.
- **To solve** this model (last time + note)
 - 1. solve the model for couples assuming they remain together, for a grid of bargaining weights.
 - 2. If, for a given weight, one spouse is not satisfied $(V_t^{jD} > V_t^{jM})$, update the weight on that spouse until indifferent $(V_t^{jD} = V_t^{jM})$. If the other spouse wants to remain in marriage at this new weight, then update weight and carry on! Otherwise, divorce.

Outline

Model and Mechanisms

Estimation and Counterfactuals

Simple Mode

Estimation

• 2-step estimation:

- 1. calibrate (preset) parameters in Table 3+4
- 2. estimate by SMM 3 parameters in Table 5 using policy variation from mutual to unilateral

TABLE 5—ESTIMATED STRUCTURAL PARAMETERS AND MATCH OF THE AUXILIARY MODEL

Parameter	Symbol	Estimate	Standard error
Standard deviation of preference shocks	σ	0.0008	0.0004
Disutility from labor market participation	ψ	0.0107	0.0025
Husbands' Pareto weight	θ	0.7	0.0155
Auxiliary model parameter	Symbol	Target	Simulated
Effect of uni. divorce on savings in CP	ϕ_1	13.54 percent	13.43 percen
Effect of uni. divorce on participation in CP	ϕ_2	-6.93 pcpt	-6.86 pcpt
Baseline participation rate in CP	ϕ_3	55.97 percent	56.03 percen
Baseline divorce probability in CP	ϕ_4	19.44 percent	19.44 percen

Simulation: A

 Effects from mutual to unilateral in community (50-50) regime

Simulation: A

- Effects from mutual to unilateral in community (50-50) regime
- Mutual:

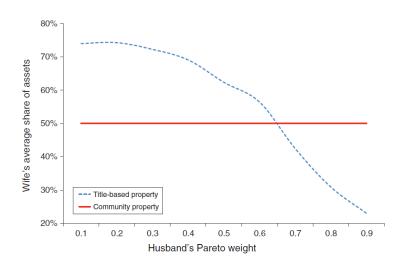
 $\theta = 0.7$ consumption share of women: 39%

• Unilateral:

19% re-bargained their power consumption share of women: 41% labor supply: \downarrow 6.86pp.

Simulation: B

• Effects of property division regimes



Divorce laws and consumption insurance

TABLE 6—DIVORCE LAWS AND CONSUMPTION INSURANCE AGAINST INCOME SHOCKS

	Married couples					
	N	Women				
Regimes	Mutual consent	Unilateral divorce	Mutual	Unilateral divorce		
Title-based	0.372	0.410	0.233	0.207		
Community property	0.371	0.390	0.235	0.192		
Equitable distribution	0.375	0.384	0.238	0.197		

Notes: The table reports the estimates of coefficients μ^{j} obtained from the regressions

$$\Delta \log(c_{ii}^H) = \kappa^H + \mu^H \Delta \log(y_{ii}^H) + \nu^{iH} \mathbf{X}_{ii}^j + e_{ii}^H$$
 and
 $\Delta \log(c_{ii}^W) = \kappa^W + \mu^W \Delta \log(y_{ii}^W) + \nu'^W \mathbf{X}_{i}^j + e_{ii}^W$

in each legal regime, where X_h^i are spouse f^s age and age squared. The coefficients are estimated on data obtained from simulating the model using the preset parameters and the estimated parameters for a sample of simulated households. I account for the differential selection of couples out of marriage because of divorce laws by simulating income and consumption profiles using only the policy functions of married couples.

- 1. Men have more consumption insurance under mutual (lower pass-through of income shocks; col 1 < col 2)
- 2. Property division does not matter in mutual (col 1 + 3 constant across rows)

Outline

Simple Model

Simple Model 000

Our simple model

- Same model as last time (see notebook)
- We cannot model the same counterfactuals as Alessandra Voena in our simple model.
 - But we can **change wealth distribution upon divorce**.

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- We cannot model the same counterfactuals as Alessandra Voena in our simple model.

But we can **change wealth distribution upon divorce**.

• Now, κ_i denotes the share of wealth to member i, $\kappa_1 + \kappa_2 = 1$.

$$\begin{split} V_{j,t}^{m}(a_{t-1}, \psi_{t}, \mu_{t-1}) &= D_{t}^{\star} V_{j,t}^{m \to s}(\kappa_{j} a_{t-1}, \psi_{t}, \mu_{t-1}) \\ &+ (1 - D_{t}^{\star}) V_{j,t}^{m \to m}(a_{t-1}, \psi_{t}, \mu_{t-1}) \end{split}$$

Next Time

Next time:

Marriage and Divorce (in Denmark).

Literature:

Bruze, Svarer and Weiss (2015): "The Dynamics of Marriage and Divorce" [full commitment]

- Read before lecture
 - Reading guide:

Section 1: Introduction + overview. Read.

Section 2: Data, Skim.

Section 3: Marriage patterns. Read (many figures).

Section 4: Model. Key, get the idea.

Section 5: Estimation, Skim.

Section 6: Results Read

Simple Model

References I

Bruze, G., M. Svarer and Y. Weiss (2015): "The Dynamics of Marriage and Divorce," Journal of Labor Economics, 33(1), 123-170.

VOENA, A. (2015): "Yours, Mine, and Ours: Do Divorce Laws Affect the Intertemporal Behavior of Married Couples?," American Economic Review, 105(8), 2295–2332.