Marriage and Divorce under Labor Market Uncertainty

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The Idea

- The marital and employment statuses of individuals are interrelated:
  1. Being married, and to whom, correlates with labor market outcomes.
  2. Labor market outcomes affect who marries whom.
  3. Important gender differences in these associations.
- Understanding this interaction is critical to learn more about:
  1. Gender equality in labor market outcomes
  2. Feedback effects of labor market reforms on the marriage market
- Both theoretical and empirical models mostly abstract from this interaction.

Choices

- Consider the choices individuals make in marriage and labor markets:
  1. Marriage market: Do I marry? Who? Do I get a divorce?
     $\rightarrow$ Marital stability, sorting, between-household inequality
  2. Labor market: Do I work? How many hours? How do I (we) organize my (our) time?
     $\rightarrow$ Trade-off between labor supply and home production
     $\rightarrow$ Household specialization, gender differences in outcomes Evidence
- Interaction:
  1. My labor market status affects who I can marry.
  2. Changing labor market status affects marital stability.
- Choices include dynamic considerations, well suited for a search framework.
- Search naturally generates the sluggishness of labor and marriage markets.

Theoretical Contribution

- We develop a new model of simultaneous search and matching in both markets.
- Marriage market:
  - TU, random search, ex-ante heterogeneity (Shimer & Smith, 2000).
  - Match-specific "love shocks" (Goussé et al., 2017).
  - Men and women share resources by Nash bargaining.
- Labor market:
  - On-the-job search model (Burdett & Mortensen, 1998):
  - **Endogenous search intensity** depends on marital surplus (via reservation wage).
  - Employed workers lose their job at an exogenous rate.
- Marital surplus depends on *love shock* $\times$ *public good* (domestic work hours):
  - Domestic work hours choice, trade-off with leisure, employment status constraint.
  - Differences in returns to domestic work hours induce specialization.

Applied Research Agenda

- We confront the model with German household survey data.
- GSOEP and IAB-PASS. In total available from 1983–2019.
- Key advantage: detailed information on domestic work hours and labor supply.
- Four applications:
  1. Stylized facts, event study analysis of the interaction, support of modeling choices.
  2. Structural estimation of the model with different degrees of heterogeneity.
     - Employment status heterogeneity (Paper I, today)
     - Additional heterogeneity (age, education, children, Paper II)
  3. Application to the German “labor market miracle” in the 2000s. (Paper I, today)
  4. Application to marital sorting and inequality (Paper II).

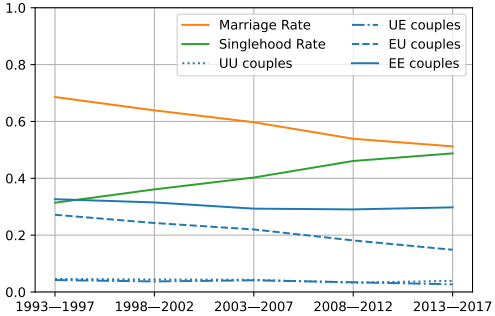
Literature

- Unemployment, especially male unemployment, is associated with an increase in the divorce rate (e.g. Jensen and Smith, 1990; Hansen, 2005; Amato and Beattie, 2011).
- Marriage/divorce rates negatively correlated with unemployment over the business cycle (e.g. Schaller, 2013; González-Val and Marcén, 2017a/b).
- Does female labor market participation decrease or increase marital stability? (Newman and Olivetti, 2018 vs. Folke and Rickne, 2020).
- Marriage market matching models (with and without frictions, TU/NTU): Becker (1973/74), Burdett & Coles (1997), Shimer & Smith (2000), Jacquemet & Robin (2012), Choo & Siow (2006), Choo (2015), Chiappori et al. (2015).
- Most closely related: Goussé et al. (2017), Greenwood et al. (2016).
- Also related: models of joint search: Guler et al. (2012), Pilossoph & Wee (2021), Fang & Shephard (2019).

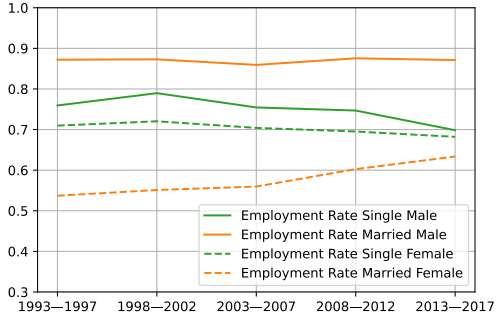
Outline

Descriptive Evidence

Shares of Married and Employed Population over Time

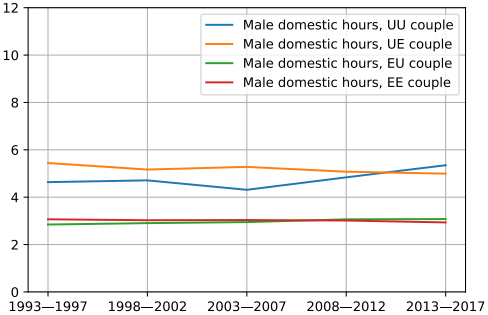


(a) Married Couples and Singles

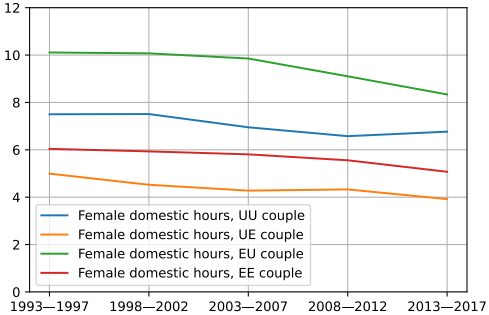


(b) Married and Single Employment

Domestic Work Hours over Time

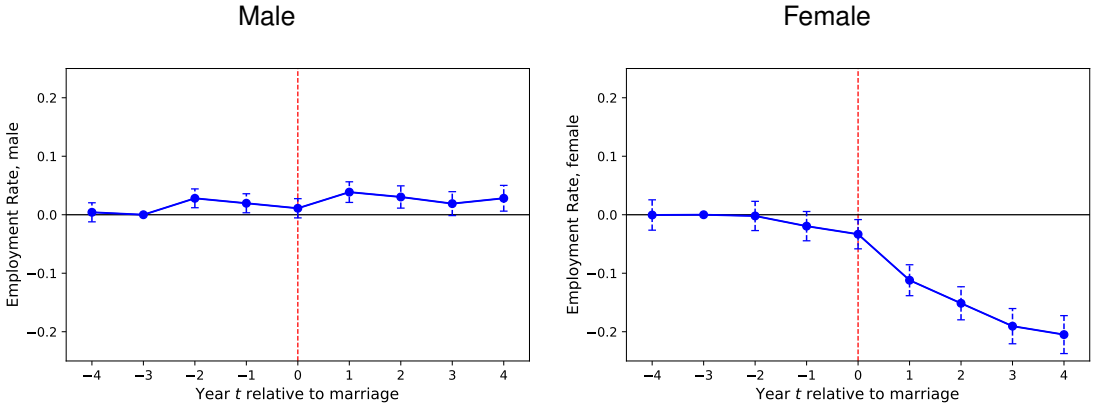


(c) Married Males



(d) Married females

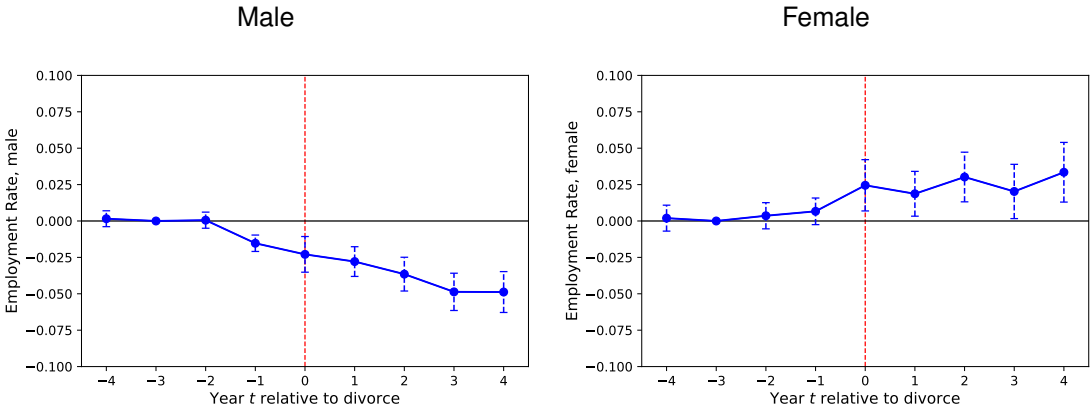
Event Study: Employment Rate around Marriage



- Relative to matched control group: no marriage, matched in $t-3$.

Marriage around EU | Marriage around UE

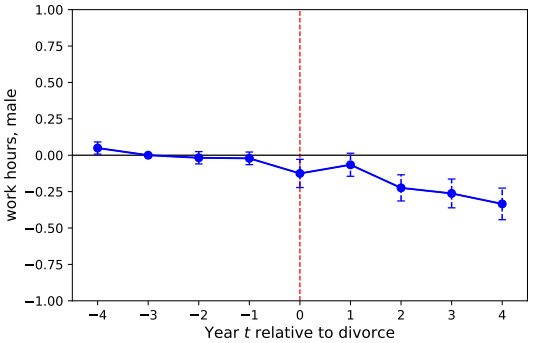
Event Study: Employment Rate around Divorce



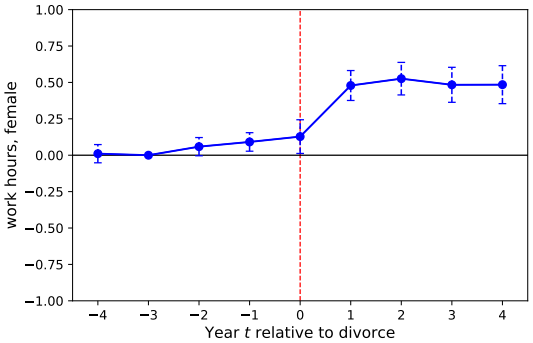
- Relative to matched control group: no divorce, matched in $t - 3$.

Event Study: Work Hours around Divorce

Male



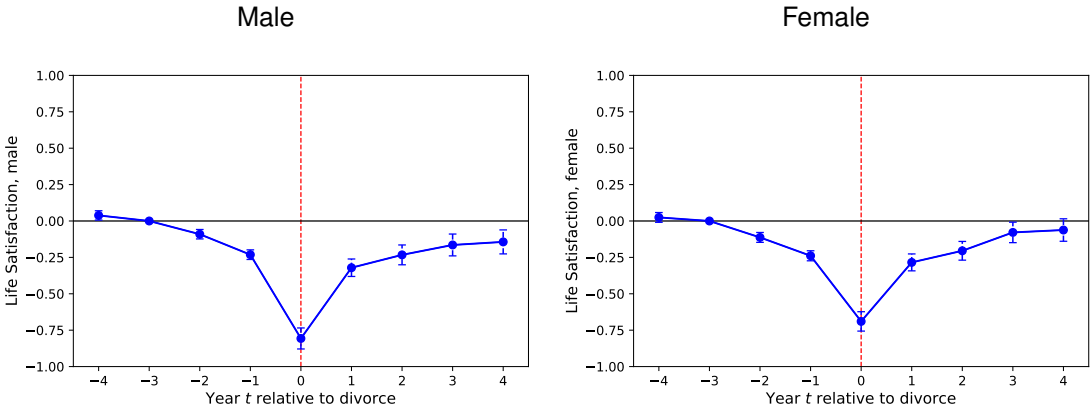
Female



- Relative to matched control group: no divorce, matched in $t-3$.

Work Hours around Marriage | Domestic Hours around Marriage | Domestic Hours around Divorce

Event Study: Life Satisfaction around Divorce



- Relative to matched control group: no divorce, matched in $t-3$.

Model

Utility

- We assume quasi-linear preferences in consumption c_f, leisure e_f, and a household public good y.

$$u(c_f, e_f, y) = c_f + \zeta_x e_f + y$$

$$\text{with } y = \begin{cases} \left(X_j^l\right)^{1-\alpha_x} (h_f)^{\alpha_x} & \text{if single female} \\ \left(zX_{ij}^{-ll}\right)^{(1-\gamma_y-\gamma_x)} (h_m)^{\gamma_y} (h_f)^{\gamma_x} & \text{if married.} \end{cases} \quad (1)$$

$$c_f = I_j^l + t \text{ and } c_m = I_i^{-l} - t$$

$$\overline{h} = l_j^l + h_f + e_f \text{ and } \overline{h} = l_i^l + h_m + e_m$$

- Linearity in consumption implies that income changes affects the couples' joint utility in the same way as single utilities. $\Rightarrow$ Surplus is independent of spouses' income.
- But changes in domestic hours affect the surplus and may lead to divorce.

Decisions

- Singles search for partners in the marriage market. The Value of Singlehood
- Upon meeting, potential couples draw match-specific (“love”) shock.
- Couples bargain over transfers, hours, and search intensities, value functions depend on shock and labor market statuses. Bargaining
- Surplus is invariant to EE transitions (linear utility assumption). Marital Surplus
- While married, couples renegotiate when match-specific shock hits or in case of EU/UE-transitions. The Value of Marriage
- Specifically, taking up a job implies less hours for home production and leisure.
- No commitment, efficient divorce in case of negative surplus.

Flow Equation System

$$
\begin{aligned}
\text{ee:}\quad & \lambda\alpha_{ij}^{ee}s_i^e s_j^e + \bar{\tau}_{i,j}^{u,e}m_{ij}^{ue} + \bar{\tau}_{j,i}^{u,e}m_{ij}^{eu} &=& \left[\delta\left(1-\alpha_{ij}^{ee}\right) + \underline{\tau}_{i,j}^{e,e} + \bar{\tau}_{i,j}^{e,e} + \underline{\tau}_{j,i}^{e,e} + \bar{\tau}_{j,i}^{e,e}\right] m_{ij}^{ee} \\
\text{eu:}\quad & \lambda\alpha_{ij}^{eu}s_i^e s_j^u + \bar{\tau}_{i,j}^{u,u}m_{ij}^{uu} + \bar{\tau}_{j,i}^{e,e}m_{ij}^{ee} &=& \left[\delta\left(1-\alpha_{ij}^{eu}\right) + \underline{\tau}_{i,j}^{e,u} + \bar{\tau}_{i,j}^{e,u} + \underline{\tau}_{j,i}^{u,e} + \bar{\tau}_{j,i}^{u,e}\right] m_{ij}^{eu} \\
\text{ue:}\quad & \lambda\alpha_{ij}^{ue}s_i^u s_j^e + \bar{\tau}_{i,j}^{e,e}m_{ij}^{ee} + \bar{\tau}_{j,i}^{u,u}m_{ij}^{uu} &=& \left[\delta\left(1-\alpha_{ij}^{ue}\right) + \underline{\tau}_{i,j}^{u,e} + \bar{\tau}_{i,j}^{u,e} + \underline{\tau}_{j,i}^{e,u} + \bar{\tau}_{j,i}^{e,u}\right] m_{ij}^{ue} \\
\text{uu:}\quad & \lambda\alpha_{ij}^{uu}s_i^u s_j^u + \bar{\tau}_{i,j}^{e,u}m_{ij}^{eu} + \bar{\tau}_{j,i}^{e,u}m_{ij}^{ue} &=& \left[\delta\left(1-\alpha_{ij}^{uu}\right) + \underline{\tau}_{i,j}^{u,u} + \bar{\tau}_{i,j}^{u,u} + \underline{\tau}_{j,i}^{u,u} + \bar{\tau}_{j,i}^{u,u}\right] m_{ij}^{uu}
\end{aligned}
$$

Note: the outflow consists of divorces due to shocks, $\delta\left(1-\alpha_{ij}^{-ll}\right)$, and labor market transitions that lead to a divorce, $\underline{\tau}_{i,j}^{-l,l} + \underline{\tau}_{j,i}^{l,-l}$. Some labor market transitions don't lead to divorce but transform the couple into a different labor market type $\bar{\tau}_{i,j}^{-l,l} + \bar{\tau}_{j,i}^{l,-l}$.

Endogenous Search Intensity and Reservation Wages

Endogenous search intensity and reservation wages depend on

- employed married/single: current wage.
- unemployed single: UI, home production, marriage market option value.
- unemployed married:
  - UI,
  - labor market status and type of spouse,
  - match-specific shock,
  - household public good.

Reservation Wages: Singles

- While employed, the reservation wage is equal to the current wage irrespective of marital status, i.e., $R_j^{l,-l}\left(z, I_i^{-l}, w_j\right) = R\left(w_j\right) = w_j$.
- The reservation wage of an unemployed single (defined by $V_j^e\left(R_j^u\right) = V_j^u\left(b_j\right)$), is

$$R_j^u = b_j - \zeta_x\left(l_j^u - l_j^e\right) + \xi_y\left(X_j^u - X_j^e\right) + \lambda\beta_x \int_i \sum\nolimits_{-l} \left(\overline{S}^{-lu}_{z_{ij}^{-lu}} - \overline{S}^{-le}_{z_{ij}^{-le}}\right) s_i^{-l} di.$$

where $\bar{S}^{-ll}_{z_{ij}^{-ll}} \equiv \int_{z_{ij}^{-ll}}^{\infty} S_{ij}^{-ll}(z) dG(z)$.

Reservation Wages: Married

- Unemployed married female j with a partner of type i and emp. status $-l$.

- Definition:

$$R_{j,i}^{u,-l}(z) = R_j^u + r\left(S_{ij}^{-lu}(z) - \max\left[0, S_{ij}^{-le}(z)\right]\right)$$

- A married individual faces on top of a single individual additional gains or losses associated with the effect of a changed labor market status on marital surplus.
  - If after a transition into employment the z is still high enough (above z_{ij}^{-le}), the couple will stay married and the marital surplus changes from $S_{ij}^{-lu}(z)$ to $S_{ij}^{-le}(z)$.
  - If z is too small (below z_{ij}^{-le}), the labor market transition will lead to a divorce and hence to a loss of the full marital surplus, i.e., $S_{ij}^{-lu}(z)$.

Interaction with Love Shock

- Consider what happens when the couple is hit by a negative love shock:
  - decrease the reservation wage (due to lower marital surplus) and
  - increase the labor market search intensity of the unemployed spouse.
  - make a transition into employment more likely.
  - make a divorce more likely.
- Note two things:
  1. The couple is currently married, so $S_{ij}^{-lu}(z) > 0$. Thus, reservation wage of unemployed married is (weakly) higher compared to unemployed single.
  2. But, the lower the love shock z, the lower is current marital surplus. Thus, the reservation wage is lower and search intensity higher ...

Search Equilibrium

- The equilibrium is characterized by:
  - a set of surplus functions $S_{ij}^{ll}(z)$,
  - search intensities for unemployed married and single individuals, $\{\widehat{\sigma}_i^{u,l}(z), \widehat{\sigma}_j^{u,-l}(z)\}$ and $\{\widehat{\sigma}_i^u, \widehat{\sigma}_j^u\}$,
  - love shock threshold values z_{ij}^{ll},
  - the distributions of married couples m_{ij}^{ll} for each type ij and labor market status ll,
  - and single distributions s_i^l, s_j^l.
- Solution algorithm: alternating fixed-point iterations, three model blocks. Details

Estimation

Structural Estimation

- Multiple versions: employment status heterogeneity (today),
  + heterogeneous education, age, number of children (one or two-dim. het.).
- We target the following groups of moments:
  1. Yearly transition probabilities between:
     - married/single
     - employment/unemployment
     - EE-transition if employed
     - and combinations thereof
  2. domestic work hours of unemployed singles and couples.
  3. Wage-earnings distribution moments for males and females.
- We have analytical expressions for all theoretical moments $\rightarrow$ GMM identification

Theoretical moments 1: yearly transition probabilities

- Unemployed single woman gets married and starts working:

$$
\begin{aligned}
\Pr\left[s_j^u \to \int_i \sum\nolimits_{-l} m_{ij}^{-le} di\right] &= \int_0^1 \lambda_j^u e^{-\lambda_j^u t} dt \int_0^1 \tau_j^u e^{-\tau_j^u t} dt \\
&\quad + \int_0^1 \tau_j^u e^{-\tau_j^u t} \left(\int_t^1 \lambda_j^e e^{-\lambda_j^e x} dx - \int_t^1 \lambda_j^u e^{-\lambda_j^u x} dx \right) dt \\
&\quad + \int_0^1 \lambda_j^u e^{-\lambda_j^u t} \left(\int_t^1 \widehat{\tau}_{j,i}^{u,-l} e^{-\widehat{\tau}_{j,i}^{u,-l} x} dx - \int_t^1 \tau_j^u e^{-\tau_j^u x} dx \right) dt, \\
&= \frac{\tau_j^u}{\lambda_j^e + \tau_j^u} \left(1 - e^{-\left(\lambda_j^e + \tau_j^u\right)}\right) - \left(1 - e^{-\tau_j^u}\right) e^{-\lambda_j^e} \\
&\quad + \frac{\lambda_j^u}{\lambda_j^u + \widehat{\tau}_{j,i}^{u,-l}} \left(1 - e^{-\left(\lambda_j^u + \widehat{\tau}_{j,i}^{u,-l}\right)}\right) - \left(1 - e^{-\lambda_j^u}\right) e^{-\widehat{\tau}_{j,i}^{u,-l}}.
\end{aligned}
$$

Theoretical moments 2: domestic hours

- Unemployed singles:

$$h_i^u = \left(\frac{\alpha_y}{\zeta_y}\right)^{1/(1-\alpha_y)} X_i^u \text{ and } h_j^u = \left(\frac{\alpha_x}{\zeta_x}\right)^{1/(1-\alpha_x)} X_j^u$$

- Unemployed married women with unemployed husband.

$$h_{j,i}^{u,u} = \frac{\int_{z_{ij}^{uu}}^{\infty} z' dG(z')}{\int_{z_{ij}^{uu}}^{\infty} dG(z')} X_{ij}^{uu} \left(2\frac{\gamma_y}{\zeta_y}\right)^{\gamma_y/(1-\gamma_y-\gamma_x)} \left(2\frac{\gamma_x}{\zeta_x}\right)^{(1-\gamma_y)/(1-\gamma_y-\gamma_x)}$$

Theoretical moments 3: wage earnings distribution

- Solving the following differential equation numerically with the boundary condition $H_j\left(\underline{w}_j\right) = 0$ gives the wage earnings distribution $H_j\left(w_j\right)$.

$$\frac{dH_j\left(w_j\right)}{dw_j} = q_j \vartheta_j \frac{1 - H_j + \frac{\int_i \sum_{-l} \int_{z_{ij}^{-lu}}^{\infty} \sigma_{j,i}^{u,-l}\left(R_{j,i}^{u,-l}(z')\right)\left[1-F_j\left(R_{j,i}^{u,-l}(z')\right)\right]\left(I_{w_j > R_{j,i}^{u,-l}(z')} - 1\right) dG(z') m_{ij}^{-lu}}{\sigma_j^e\left(R_j^u\right)\left[1-F_j\left(R_j^u\right)\right]s_j^u + \int_i \sum_{-l} \int_{z_{ij}^{-lu}}^{\infty} \sigma_{j,i}^{u,-l}\left(R_{j,i}^{u,-l}(z')\right)\left[1-F_j\left(R_{j,i}^{u,-l}(z')\right)\right] dG(z') m_{ij}^{-lu}}}{q_j + \mu_j \sigma_j^e\left(w_j\right) e^{-\vartheta_j \max\left[w_j - \underline{w}_j, 0\right]}}.$$

Estimated Parameter Values (1993–2017)

Parameter	Symbol	Value	Standard Error
Output elasticity male hours married	γ_y	0.061323	0.021414
Output elasticity female hours married	γ_x	0.294871	0.019642
HH public good EE	X_{ij}^{ee}	1.548974	0.068714
HH public good EU	X_{ij}^{eu}	1.350209	0.078273
HH public good UE	X_{ij}^{ue}	0.868113	0.015459
Wage offer dist shape female	ϑ_j	0.624682	0.074795
Wage offer dist shape male	ϑ_i	0.329124	0.023045
HH public good single male E	X_i^e	0.939130	0.012839

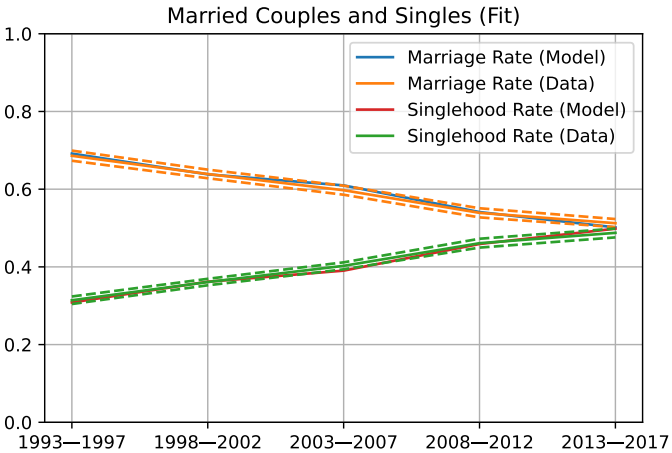
Estimated Parameters Values (1993–2017)

Parameter	Symbol	Value	Standard Error
Output elasticity male hours single	α_y	0.213736	0.057096
Leisure coefficient male	ζ_y	0.100001	0.032220
HH public good single female E	X_j^e	1.682180	0.036696
Output elasticity female hours single	α_x	0.364880	0.032255
Leisure coefficient female	ζ_x	0.216164	0.024980
Quit rate female	q_j	0.095941	0.001725
Quit rate male	q_i	0.012372	0.000486
Love shock arrival rate	δ	0.078570	0.010320

Estimated Parameters Values (1993–2017)

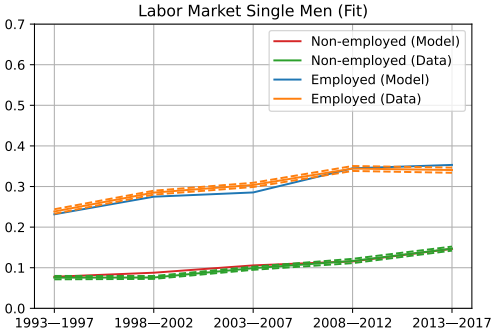
Parameter	Symbol	Value	Standard Error
Marriage market matching efficiency	ϕ	0.036762	0.016128
Male bargaining power	β_y	0.404279	0.248721
Labor market matching efficiency female	μ_j	0.219364	0.056159
Labor market matching efficiency male	μ_i	0.131590	0.023248
Love shock standard deviation	σ_z	0.568898	0.113556
Love shock mean	μ_z	0.792456	0.060588

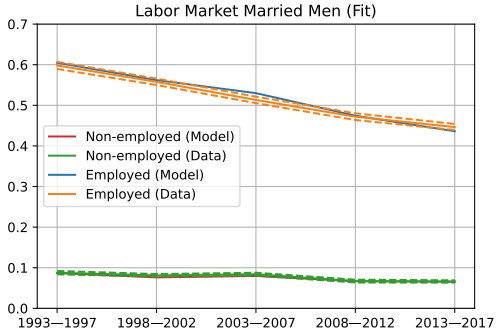
Fit: Marriage Market



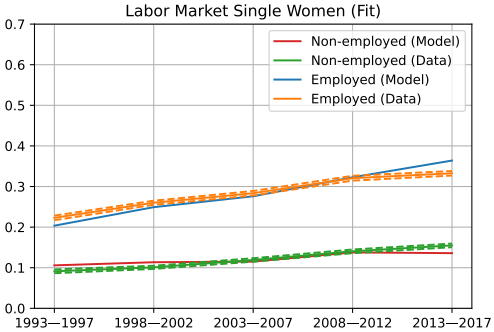
Cohabitation

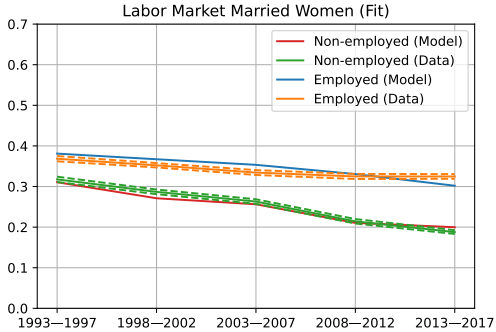
Fit: Labor Market Men





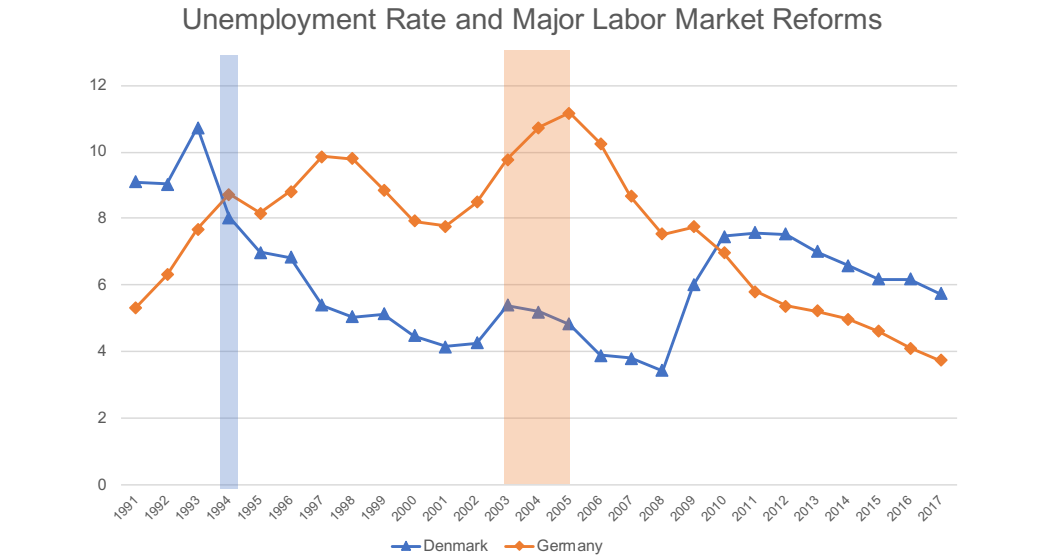
Fit: Labor Market Women





Application

What are the marriage market implications of this development?



The German labor market miracle

- Comprehensive labor market reforms from 2003–2005 (Hartz reforms).
- Many simultaneous reforms (e.g., means-testing, UI, job search assistance, etc.).
- Favorable business cycle conditions during the 2000s, wage moderation.
- Female employment was relatively more affected by this development/the messreforms.
- Change in socially insured employment (Burda & Seele, 2020):
  - Women: **5.3%** in 2003–08 and **6.8%** in 2008–11.
  - Men: **2.7%** in 2003–08 and **3.5%** in 2008–11.
- What is the effect on the marriage market? More (labor market) divorces?

Flow Equation System

Equate inflows and outflows:

$$\lambda \alpha_{ij}^{-ll} s_i^{-l} s_j^{l} + \bar{\tau}_{i,j}^{-l',l} m_{ij}^{-l'l} + \bar{\tau}_{j,i}^{l',-l} m_{ij}^{-ll'} = \left[\delta \left(1 - \alpha_{ij}^{-ll} \right) + \underline{\tau}_{i,j}^{-l,l} + \bar{\tau}_{i,j}^{-l,l} + \underline{\tau}_{j,i}^{l,-l} + \bar{\tau}_{j,i}^{l,-l} \right] m_{ij}^{-ll}$$

The outflow consists of divorces driven by love shocks, $\delta \left(1 - \alpha_{ij}^{-ll} \right)$ and labor market transitions that lead to a divorce, $\underline{\tau}_{i,j}^{-l,l} + \underline{\tau}_{j,i}^{l,-l}$, where

$$\underline{\tau}_{j,i}^{u,-l} = \begin{cases} 0 & \text{if } z_{ij}^{-le} \leq z_{ij}^{-lu} \\ \mu_j \int_{z_{ij}^{-lu}}^{z_{ij}^{-le}} \sigma_{j,i}^{u,-l} \left(R_{j,i}^{u,-l} \left(z' \right) \right) \left[1 - F_j \left(R_{j,i}^{u,-l} \left(z' \right) \right) \right] dG \left(z' \right) & \text{if } z_{ij}^{-le} > z_{ij}^{-lu} \end{cases}$$

Re-estimate Key Parameters

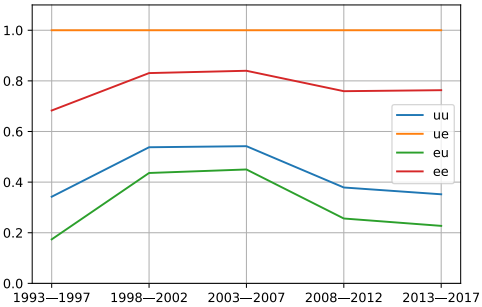
Table: Estimated Labor and Marriage Market Parameters Over Time

Parameter	Symbol	93–97	98–02	03–07	08–12	13–17
Wage offer dist shape female	ϑ_j	0.758	0.753	0.857	0.497	0.743
Wage offer dist shape male	ϑ_i	0.451	0.375	0.347	0.294	0.469
Quit rate female	q_j	0.103	0.105	0.085	0.090	0.090
Quit rate male	q_i	0.019	0.015	0.011	0.010	0.010
Matching efficiency female	μ_j	0.219	0.258	0.343	0.188	0.229
Matching efficiency male	μ_i	0.193	0.168	0.144	0.123	0.364
Love shock arrival rate	δ	0.109	0.117	0.088	0.070	0.062
Marriage market matching efficiency	ϕ	0.032	0.073	0.063	0.026	0.024

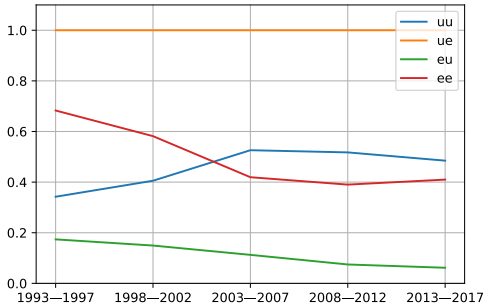
Source: Authors' calculations based on the SOEP.

Love Shock Divorce Share

- $\delta \left(1 - \alpha_{ij}^{-ll}\right)$ divided by total divorces for couple type over time:



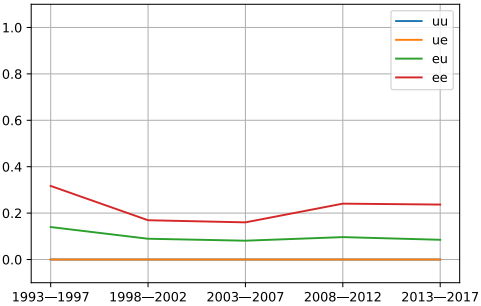
(e) Share of Love Shock Divorces



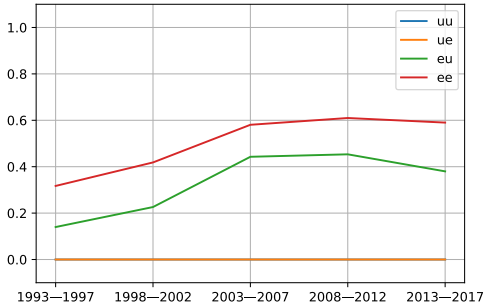
(f) Counterfactual (key parameters fixed 93–97)

Labor Market Divorce Share, Male Transition

- $\underline{\tau}_{i,j}^{-l,l}$ divided by total divorces for couple type over time:



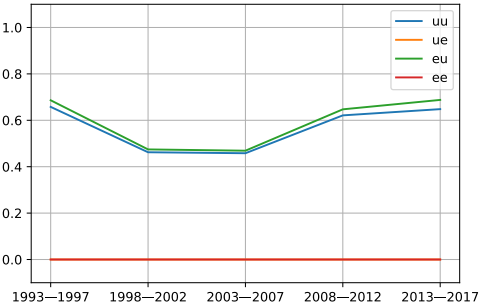
(g) Labor Market Divorce Share Men



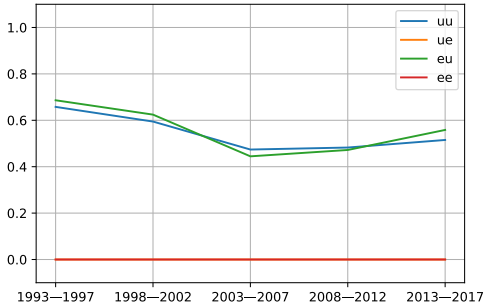
(h) Counterfactual (key parameters fixed 93–97)

Labor Market Divorce Share, Female Transition

- $\underline{\tau}_{j,i}^{l,-l}$ divided by total divorces for couple type over time:



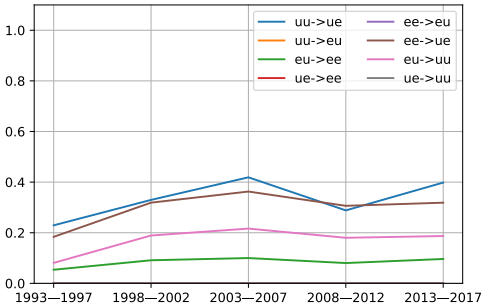
(i) Labor Market Divorce Share Women



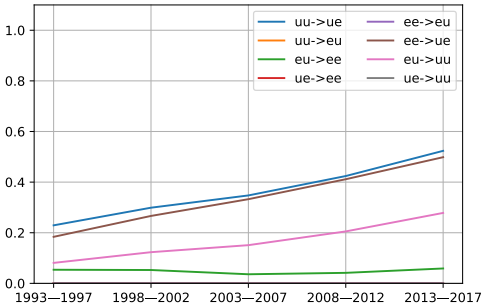
(j) Counterfactual (key parameters fixed 93–97)

Divorce Share by Transition Type

- $\underline{\tau}_{i,j}^{-l,l}\left(\underline{\tau}_{j,i}^{l,-l}\right)$ divided by $\underline{\tau}_{i,j}^{-l,l}+\bar{\tau}_{i,j}^{-l,l}\left(\underline{\tau}_{j,i}^{l,-l}+\bar{\tau}_{j,i}^{l,-l}\right)$ for transition type over time:



(k) Divorce Share by Transition Type



(l) Counterfactual (key parameters fixed 93–97)

Mechanism

- Starting point: think of a low-surplus marriage.
- The unemployed household member(s) have relatively low reservation wages.
- Exogenous changes to the labor market, e.g., due to the reforms:
  1. Labor demand and matching efficiency improved.
  2. UI benefits decreased.

$\rightarrow$ μ_j and μ_i increase due to (1).

$\rightarrow$ Reservation wages decrease further due to (2) as b_i and b_j fall.

$\rightarrow$ Transitions into employment become more likely.

$\rightarrow$ Labor market divorce ("direct effect").

$\rightarrow$ Conditional on survival of the marriage, domestic hours and surplus decrease.

$\rightarrow$ Love shock divorce becomes more likely ("indirect effect").

Conclusions

- We present a novel structural model that highlights the interaction between decisions made in labor and marriage markets.
- In a first paper, we apply the model to the “German labor market miracle” and find significant feedback on the marriage market $\rightarrow$ more divorces, both directly (labor market divorces) and indirectly (more low-surplus couples).
- In a second paper, we study the effects of the interaction on marital sorting and income inequality (full heterogeneity).

Thank you for your attention.

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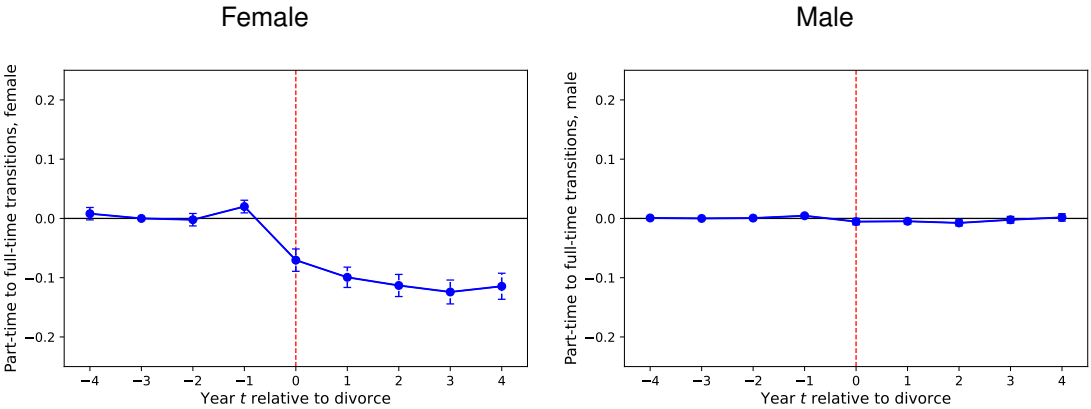
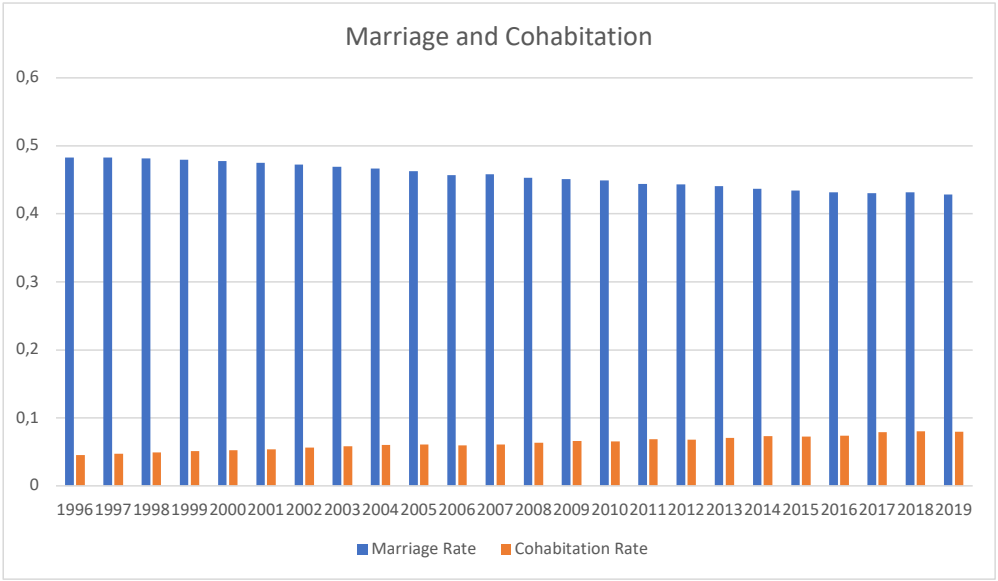
Event Study: Part-time to full-time transitions around Divorce



- Relative to matched control group: no divorce, matched in $t-3$.


Marriage and Cohabitation
0,6
0,5
0,4
0,3
0,2
0,1
0
1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019
Marriage Rate
Cohabitation Rate

Go back

Household specialization - Time Inputs

- Labor market work hours per day

	single		married			
	U	E	UU	UE	EU	EE
male	0.57	9.68	0.25	0.66	10.23	10.32
female	0.67	8.50	0.21	8.02	0.67	7.64

- Domestic work hours per day (childcare, errands, repairs, routine chores):

	single		married			
	U	E	UU	UE	EU	EE
male	3.21	2.62	4.99	5.42	3.08	3.13
female	6.00	3.97	7.39	4.57	9.89	5.90

Go back

Bargaining - No Commitment

- Bargaining powers are (β_i, β_j), with $\beta_i + \beta_j = 1$.
- Search intensities and transfers are chosen such that the Nash-Product,

$$\left[V_j^{l,-l}\left(z, I_i^{-l}, I_j^{l}\right) - V_j^{l}\left(I_j^{l}\right)\right]^{\beta_j}\left[V_i^{-l,l}\left(z, I_i^{-l}, I_j^{l}\right) - V_i^{-l}\left(I_i^{-l}\right)\right]^{\beta_i},$$

  is maximized subject to participation and feasibility constraints.
- If a labor market transition or a love shock occurs, search intensities $(\sigma_{i,j}^{-l,l}(.), \sigma_{j,i}^{l,-l}(.))$ and transfers (t_i, t_j) are (re)negotiated.
- Marital Surplus is defined as the gain from marriage for both spouses:

$$\begin{aligned} S_{ij}^{-ll}\left(z, I_i^{-l}, I_j^{l}\right) \equiv & \left[V_j^{l,-l}\left(z, I_i^{-l}, I_j^{l}\right) - V_j^{l}\left(I_j^{l}\right)\right] \\ + & \left[V_i^{-l,l}\left(z, I_i^{-l}, I_j^{l}\right) - V_i^{-l}\left(I_i^{-l}\right)\right] \end{aligned}$$

Go back

The Value of Singlehood

- The present value of being a single female with $l \in \{e, u\}$ satisfies:

$$rV_j^l\left(I_j^l\right) = \underbrace{u_j^l\left(I_j^l\right)}_{\text{Flow utility}} + \underbrace{q_j\left[V_j^u\left(b_j\right) - V_j^l\left(I_j^l\right)\right]\mathbb{1}\left[l=e\right]}_{\text{Job separation if employed}}$$

$$+ \underbrace{\max_{\sigma_j}\left[\sigma_j\mu_j\int\max\left[V_j^e\left(w_j'\right) - V_j^l\left(I_j^l\right), 0\right]dF_j\left(w_j'\right) - c\left(\sigma_j\right)\right]}_{\text{Search intensity choice}}$$

$$+ \underbrace{\lambda_{ij}\iiint\max\left[V_j^{l,-l}\left(z', I_i^{-l}, I_j^l\right) - V_j^l\left(I_j^l\right), 0\right]dG\left(z'\right)s_i d\widehat{H}_i^s\left(I_i\right)di}_{\text{Option value of finding a (male) partner}}$$

- $\widehat{H}_i^s\left(I_i\right)$ is the income distribution for singles of type i, incorporating the wage earnings distribution $H_i^s\left(w_i\right)$ and the unemployment rate u_i^s.

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The Value of Marriage

$$
\begin{aligned}
& rV_j^{l,-l}\left(z, I_i^{-l}, I_j^{l}\right) = u_j^{l,-l}\left(z, I_i^{-l}, I_j^{l}\right) \\
+ \;& \delta \int \left[\max\left[V_j^{l}\left(I_j^{l}\right), V_j^{l,-l}\left(z', I_i^{-l}, I_j^{l}\right)\right] - V_j^{l,-l}\left(z, I_i^{-l}, I_j^{l}\right)\right] dG\left(z'\right) \\
+ \;& \widehat{\sigma}_{j,i}^{l,-l}\mu_j \int_{R_j^{l,-l}(z, I_i^{-l}, I_j^{l})} \left[\max\left[V_j^{e}\left(w_j'\right), V_j^{e,-l}\left(z, I_i^{-l}, w_j'\right)\right]\right. \\
- \;& \left. V_j^{l,-l}\left(z, I_i^{-l}, I_j^{l}\right)\right] dF_j\left(w_j'\right) - c\left(\widehat{\sigma}_{j,i}^{l,-l}\right) \\
+ \;& \widehat{\sigma}_{i,j}^{-l,l}\mu_i \int_{R_i^{-l,l}(z, I_i^{-l}, I_j^{l})} \left[\max\left[V_j^{l}\left(I_j^{l}\right), V_j^{l,e}\left(z, w_i', I_j^{l}\right)\right] - V_j^{l,-l}\left(z, I_i^{-l}, I_j^{l}\right)\right] dF_i\left(w_i'\right) \\
+ \;& q_j\left[\max\left[V_j^{u}\left(b_j\right), V_j^{u,-l}\left(z, I_i^{-l}, b_j\right)\right] - V_j^{l,-l}\left(z, I_i^{-l}, I_j^{l}\right)\right] \mathbb{1}\left[l = e\right] \\
+ \;& q_i\left[\max\left[V_j^{l}\left(I_j^{l}\right), V_j^{l,u}\left(z, b_i, I_j^{l}\right)\right] - V_j^{l,-l}\left(z, I_i^{-l}, I_j^{l}\right)\right] \mathbb{1}\left[-l = e\right]
\end{aligned}
$$

Go back

The Surplus of Marriage

- independent of income due to quasi-linearity of utility, strictly increasing in z.

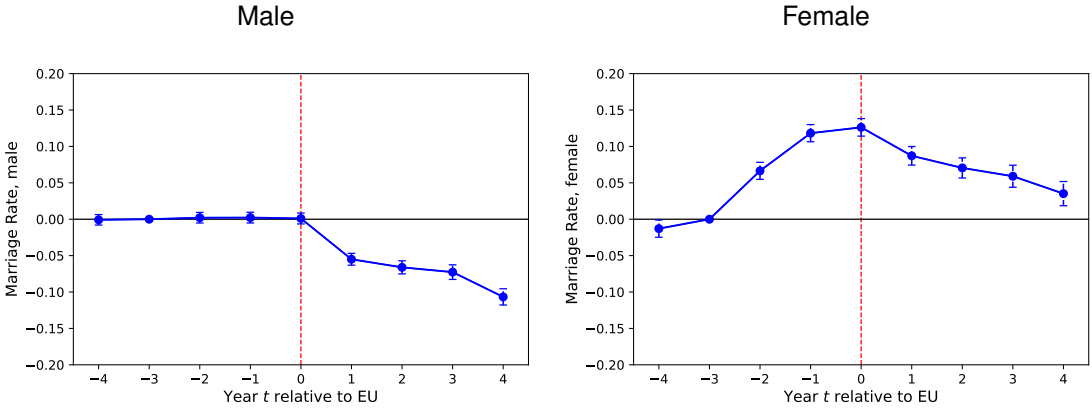
$$
\begin{aligned}
\left[r+\delta+q_i+q_j\right] S_{ij}^{-ll}(z) &= v_{ij}^{-ll}(z) + \delta \int_{z_{ij}^{-ll}}^{\infty} S_{ij}^{-ll}\left(z'\right) dG\left(z'\right) \\
\textit{Gains from search for } i \Leftarrow &+ \frac{c'(\widehat{\sigma}_{i,j}^{-l,l})^{1+\kappa}}{1+\kappa} - \frac{c'(\widehat{\sigma}_{i}^{-l})^{1+\kappa}}{1+\kappa} \\
\textit{Gains from search for } j \Leftarrow &+ \frac{c'(\widehat{\sigma}_{j,i}^{l,-l})^{1+\kappa}}{1+\kappa} - \frac{c'(\widehat{\sigma}_{j}^{l})^{1+\kappa}}{1+\kappa} \\
&+ q_i \max\left[0, S_{ij}^{ul}(z)\right] + q_j \max\left[0, S_{ij}^{-lu}(z)\right] \\
&- \lambda_{ij}\beta_i \int_j \sum_{l\in\{u,e\}} s_j^l \int_{z_{ij}^{-ll}}^{\infty} S_{ij}^{-ll}\left(z'\right) dG\left(z'\right) dj \\
&- \lambda_{ij}\beta_j \int_i \sum_{-l\in\{u,e\}} s_i^{-l} \int_{z_{ij}^{-ll}}^{\infty} S_{ij}^{-ll}\left(z'\right) dG\left(z'\right) di
\end{aligned}
$$

Solution Method

- Linear grids with, 1×1, 4×4, 5×5, 20×20 nodes.
- Three fixed point systems, alternating solution algorithm.
  1. Initialize the model.
  2. Find fixed point of first system of equations:
     - 16 integrated surplus equations.
  3. Find fixed point of second system of equations:
     - Compute reservation wages and search intensities.
     - Find the z_{ij}^{ll} thresholds at the point where the surplus is zero.
  4. z_{ij}^{ll} determine $\alpha_{ij}^{ll} \equiv \left(1 - G\left(z_{ij}^{ll}\right)\right)$, which determine m_{ij}^{ll}.
  5. Use flow equations and exog. distributions of i, j to find s_i^l, s_j^l.
  6. Go back to step 2. Repeat until convergence.

Go back

Event Study: Marriage Rate around EU Transition

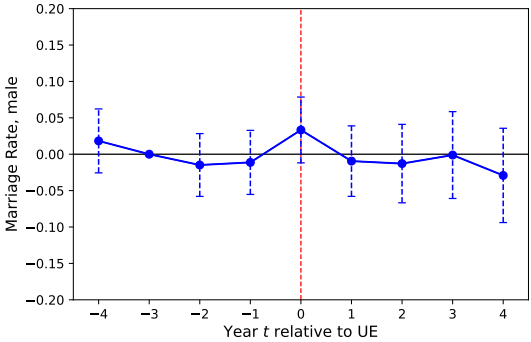


- Relative to matched control group: no EU Transition, matched in $t-3$.

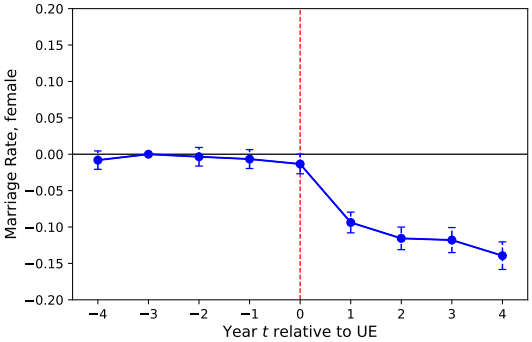
Go back

Event Study: Marriage Rate around UE Transition

Male



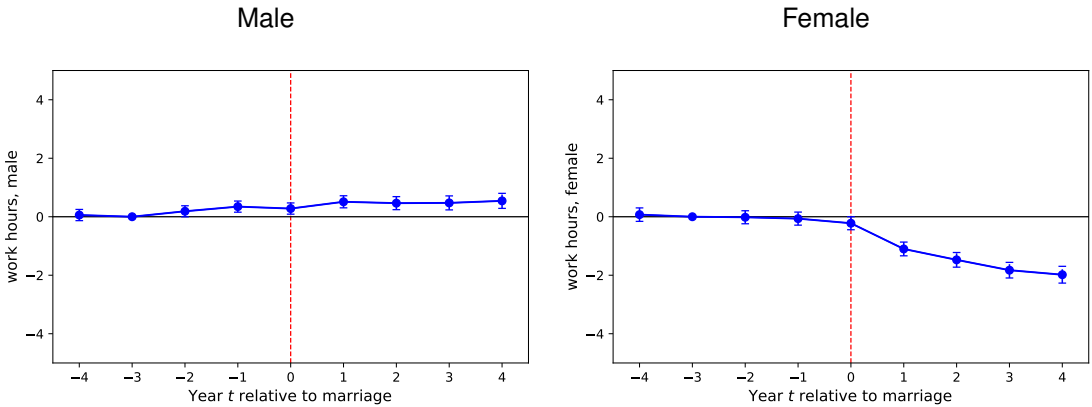
Female



- Relative to matched control group: no UE Transition, matched in $t-3$.

Go back

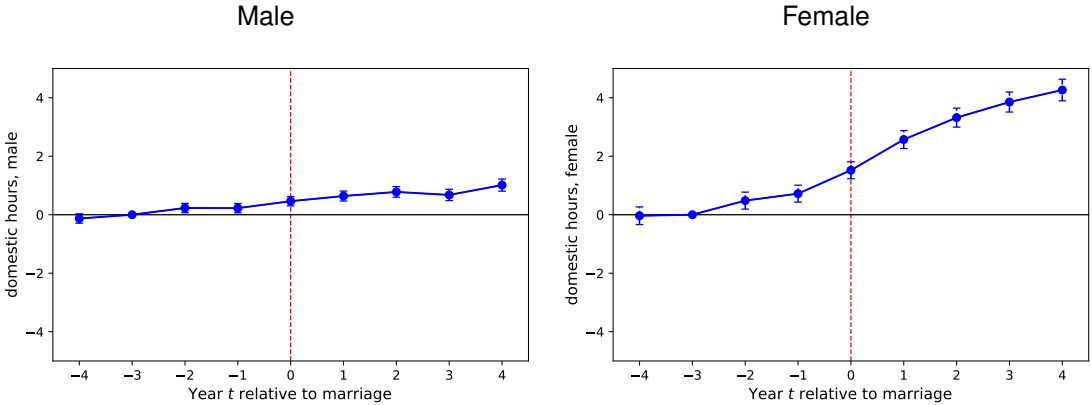
Event Study: Work Hours around Marriage



- Relative to matched control group: no divorce, matched in $t-3$.

Go back

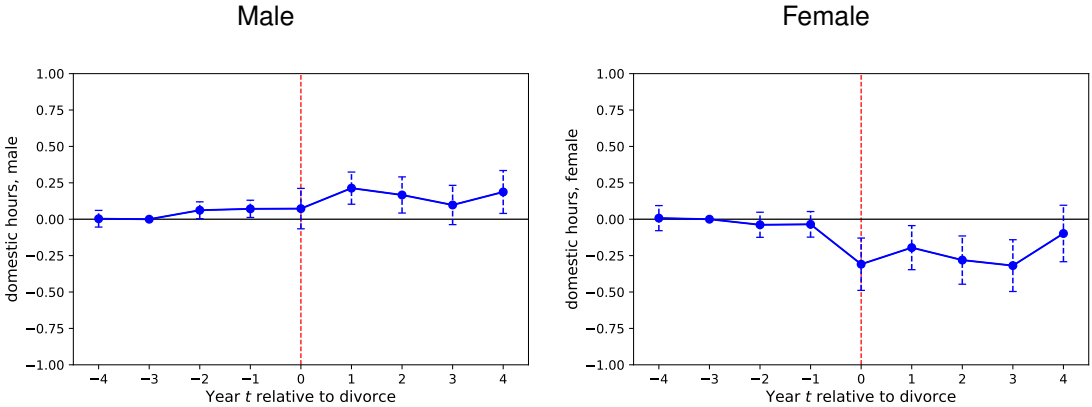
Event Study: Domestic Hours around Marriage



- Relative to matched control group: no divorce, matched in $t-3$.

Go back

Event Study: Domestic Hours around Divorce

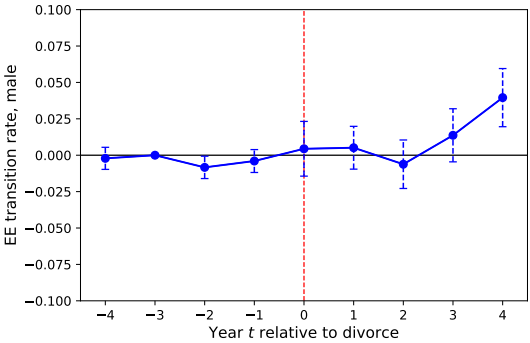


- Relative to matched control group: no divorce, matched in $t-3$.

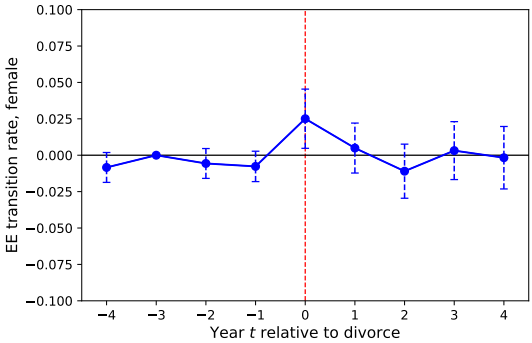
Go back

Event Study: EE Rate around Divorce

Male



Female



- Relative to matched control group: no divorce, matched in $t-3$.

Go back

Identification

- Marriage market transitions identify the parameters $\{\lambda^{\cdots}, \mu_z, \sigma_z, \delta\}$.
- Labor market transitions identify the parameters $\{\beta_{\mu\ldots}\}$, $\{\beta_{\vdots\vdots\ldots}\}$, and $\{\beta_{q\ldots}\}$.
- The reservation wage of unemployed individuals is a function of the difference in working hours and the household public good.
- The job finding probability linked to a certain reservation wage therefore identifies the preference parameters $\{\zeta_x, \zeta_y\}$ given the observed difference in working hours $l_j^u - l_j^e$.
- Household public good production parameters $\{\alpha_x, \alpha_y\}$ cannot be directly identified, since we do not observe the difference in the household public good $X_j^u - X_j^e$.
- To identify household public good parameters via job finding, we need to tie down the household public good for one labor market status.
- We use the time input into household production while being unemployed.

Go back