Marriage and Divorce under Labor Market Uncertainty

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Idea

- Two-way interaction between the marital and employment status of individuals

  1. Being married, and to whom, affects labor market outcomes.
     - household specialization, gender identity (e.g., Betrand et al., 2015)
     - marital wage premia, joint search (e.g., Pilossoph & Wee, 2021).
  2. Labor market outcomes affect who marries and who divorces.
     - employed men are more desirable partners (e.g., Autor et al., 2019)
     - labor market transitions may cause divorce (e.g., Folcke & Rickne, 2020)
     - marital sorting based on wages, employment (e.g., Goussé et al., 2017).

- Existing (structural) work largely abstracts from this two-way interaction. Literature

Theoretical Contribution

- Model of simultaneous search and matching in marriage and labor markets.
- Why do individuals get married? $\rightarrow$ *Marital surplus*
  - A match-specific "love" shock.
  - Public good, depends on time inputs and preferences.
- Why do couples break up? $\rightarrow$ *Change of marital surplus*
  - Love shock gets updated.
    $\rightarrow$ May lead to *love shock divorce*
  - Public good changes in response to labor market transitions (both EU and UE).
    $\rightarrow$ May lead to *labor market transition divorce*
- Aggregate developments in the labor market can have feedback effects on marriage.

Empirical 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).

Outline

1. Empirical Facts
2. Model
3. Estimation
4. Application

Empirical Facts

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

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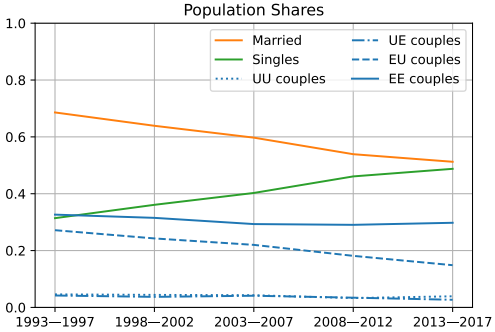
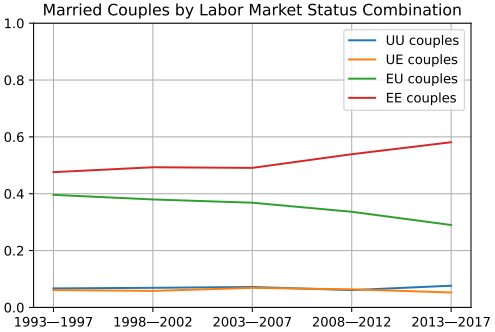
Population Shares and Couple Types over Time



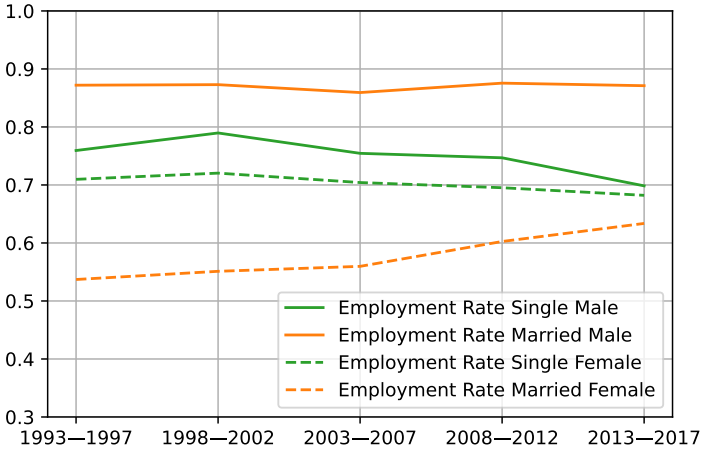
(a) Population Shares



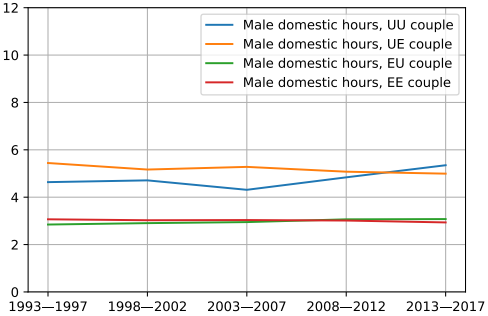
(b) Married Coupes by Labor Market Status

Cohabitation

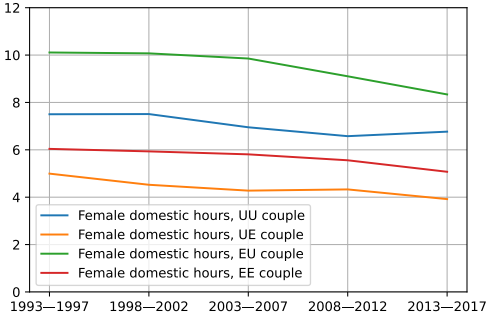
Employment Rates over Time



Domestic Work Hours over Time



(c) Married Males



(d) Married females

Event Study Analysis

- Show evolution of outcome Y around event E
- Relative to control group (no event), matched in $t-3$.
- $Y = \{EmploymentRate, WorkHours, DomesticHours, LifeSatisfaction\}$
- $E = \{Marriage, Divorce\}$
- Around marriage, employment rate and work hours increase for men (with anticipation) and decrease for women. Employment rate Work Hours
- Around divorce,
  - employment rate decreases for men (with anticipation), and increases for women. Click
  - work hours increase significantly in advance of a divorce for women. Click
  - domestic hours increase significantly in advance of a divorce for men. Click
  - life satisfaction decreases in advance, slow recovery. Click

Model

Model Components

- 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, exogenous type-dependent wage offer distributions.
  - **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
  - Preferences
  - Time Inputs

Utility

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

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

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

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

$$h_f = \overline{h} - \overline{l}_j^l - e_f \text{ and } h_m = \overline{h} - \overline{l}_i^l - e_m$$

- 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.

Marital Surplus

Decisions

- Singles search for partners in the marriage market. The Value of Singlehood The Value of Marriage
- Upon meeting, potential couples draw match-specific ("love") shock.
- Given the love shock, households maximize the surplus by setting optimal home hours and search intensities.
  - Define endogenous love-shock thresholds $S_{ij}^{-ll}\left(z_{ij}^{-ll}\right) = 0$
  - Define marriage probability $\alpha_{ij}^{-ll} = \left(1 - G\left(z_{ij}^{-ll}\right)\right)$
- If the maximized surplus is positive, couples bargain over transfers. Bargaining
- Couples reoptimize when a match-specific shock hits or in case of EU/UE-transitions.
- 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 $\bar{\tau}_{i,j}^{-l,l} + \bar{\tau}_{j,i}^{l,-l}$.

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

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

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

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

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

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.

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

- We estimate the model on the pan-European supercomputer LUMI in Finland.
- 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 singles and couples conditional on employment.
  3. Wage-earnings distribution for males and females (conditional on marital status).
- We have analytical expressions for all theoretical moments $\rightarrow$ GMM identification

Theoretical moments 1: yearly transition probabilities

- Example: 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

- Example: unemployed singles:

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

- Example: 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

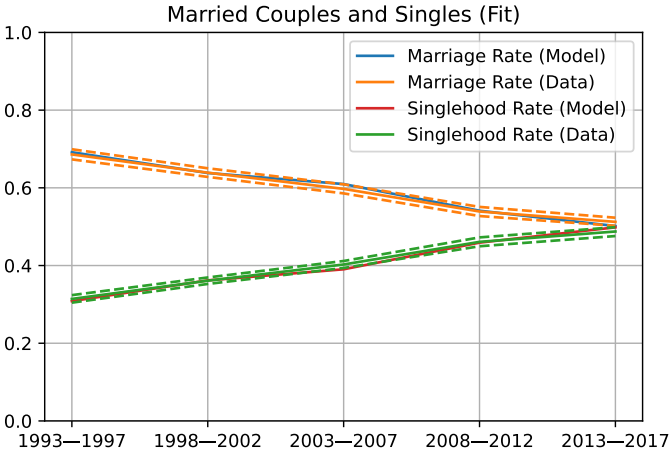
Estimated Parameters Values (1993–2017)

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

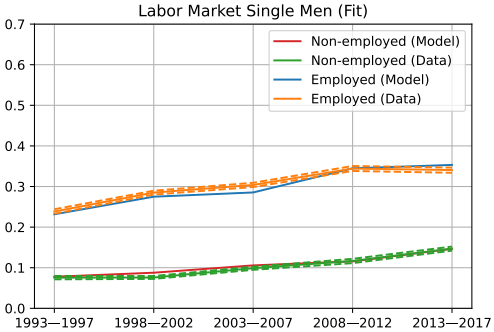
Estimated Parameters Values (1993–2017)

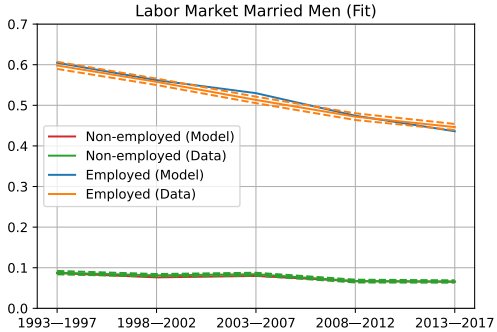
Parameter	Symbol	Value	Standard Error
Marriage market matching efficiency	ϕ	0.036762	0.016128
Male bargaining power	β_y	0.404279	0.248721
Labor market matching efficiency female	μ_j	0.219364	0.056159
Labor market matching efficiency male	μ_i	0.131590	0.023248
Love shock standard deviation	σ_z	0.568898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

Fit: Marriage Market

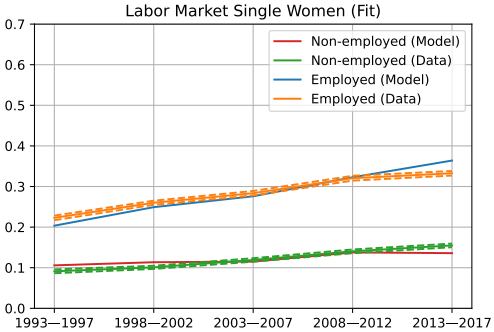


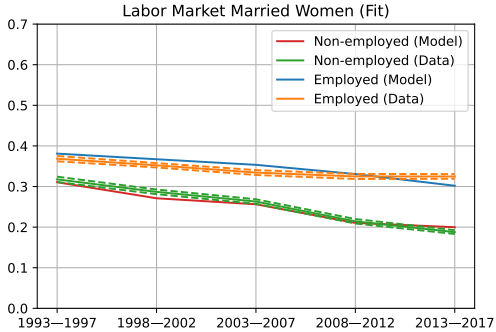
Fit: Labor Market Men





Fit: Labor Market Women





Application

What are the marriage market implications of the “German labor market miracle”?

The German labor market miracle

- Unemployment rate fell from more than 11% (2005) to below 4% (2017). Click
- Comprehensive labor market reforms from 2003–2005 (Hartz reforms).
  - e.g., means-testing, UI, job search assistance, various liberalizations.
- Favorable business cycle conditions during the 2000s, wage moderation.
- Very resilient labor market in the “Great Recession”, furlough schemes.
- Female employment relatively more affected (Burda & Seele, 2020).
- Other reforms:
  - Public child care reforms (2005–2008).
  - Parental leave reform (2007).
- What is the effect on the marriage market?

Re-estimate Key Parameters

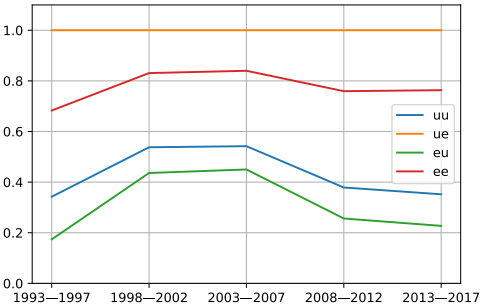
Table: Estimated Labor and Marriage Market Parameters Over Time

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

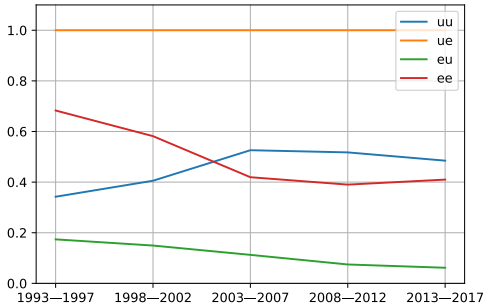
Source: Authors' calculations based on the SOEP.

Love Shock Divorce Share

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



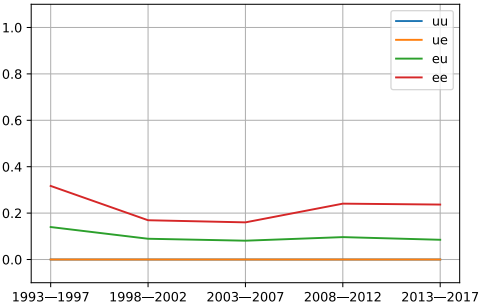
(e) Share of Love Shock Divorces



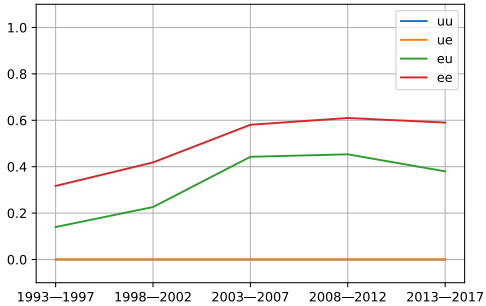
(f) Counterfactual (key parameters fixed 93–97)

Labor Market Divorce Share, Male Transition

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



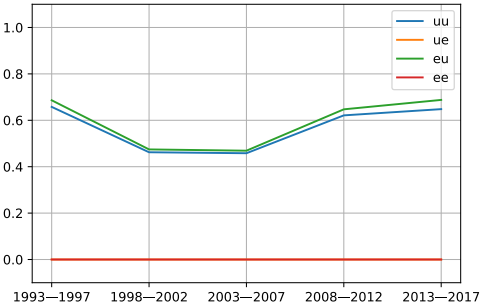
(g) Labor Market Divorce Share Men



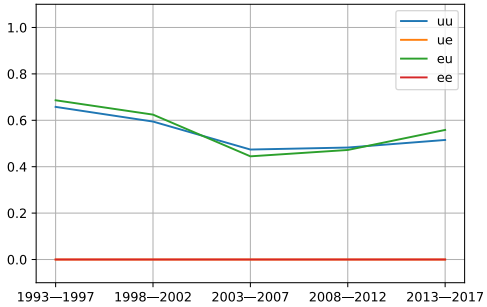
(h) Counterfactual (key parameters fixed 93–97)

Labor Market Divorce Share, Female Transition

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



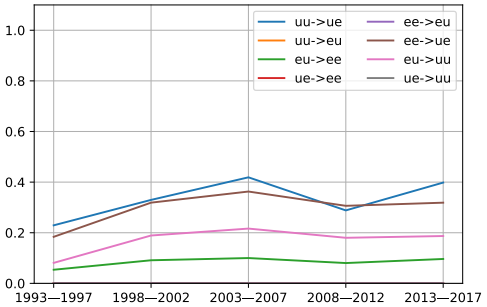
(i) Labor Market Divorce Share Women



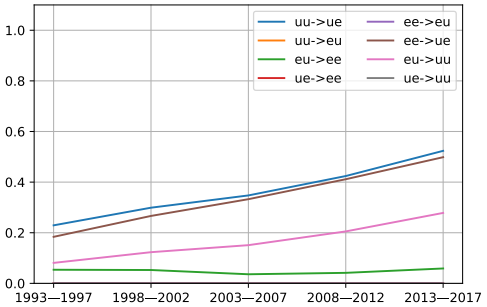
(j) Counterfactual (key parameters fixed 93–97)

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.

$\rightarrow$ Some transitions trigger a divorce ("direct effect").

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

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

Conclusions

- We present a novel structural model that highlights the interaction between decisions made in labor and marriage markets.
- In this 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 transition divorces) and indirectly (potentially more low-surplus couples).
- In ongoing work, we study the effects of the interaction on marital sorting and income inequality (full heterogeneity).

Thank you for your attention.

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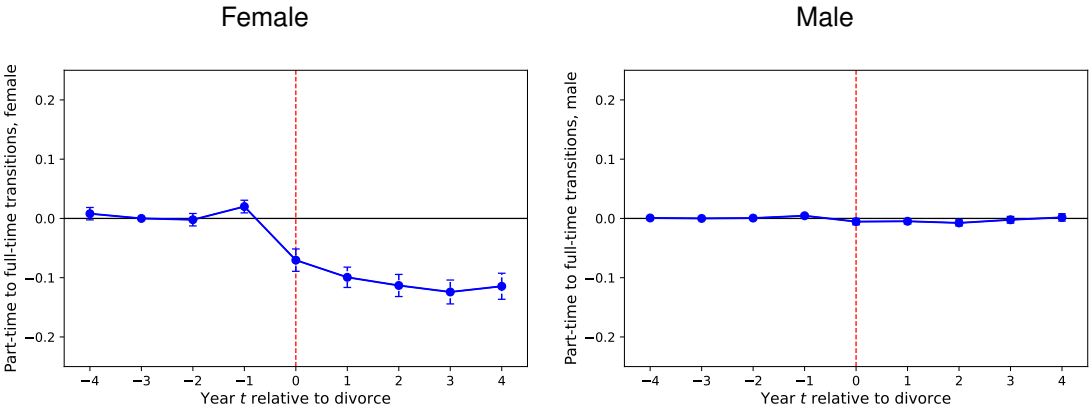
Literature

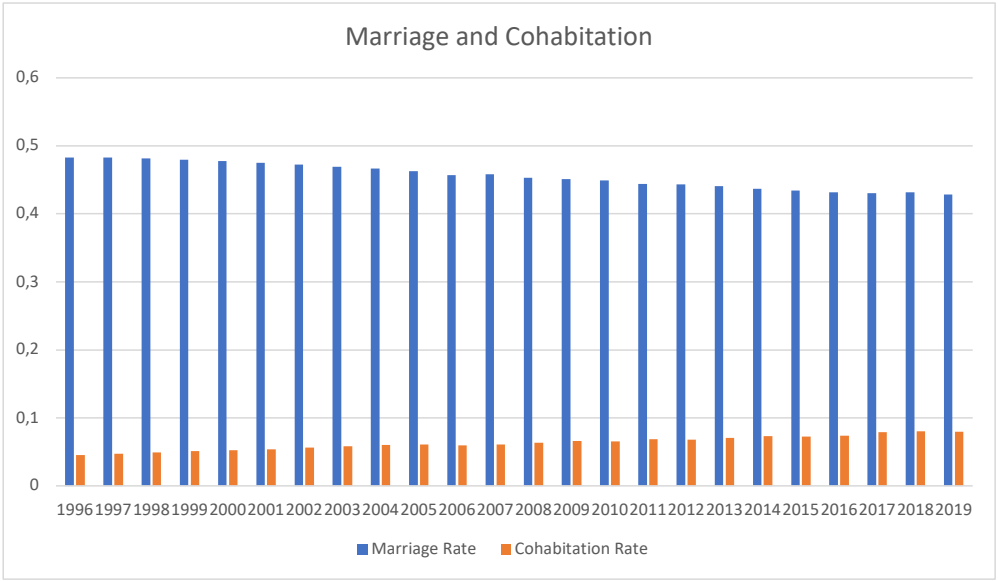
- Unemployment, especially male unemployment, is associated with an increase in the divorce rate (e.g. Jensen and Smith, 1990; Hansen, 2005; Amato and Beattie, 2011).
- Marriage/divorce rates negatively correlated with unemployment over the business cycle (e.g. Schaller, 2013; González-Val and Marcén, 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).
- Models of joint search: Guler et al. (2012), Pilossoph & Wee (2021), Fang & Shephard (2019).
- Most closely related: Goussé et al. (2017), Greenwood et al. (2016).

Go back

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

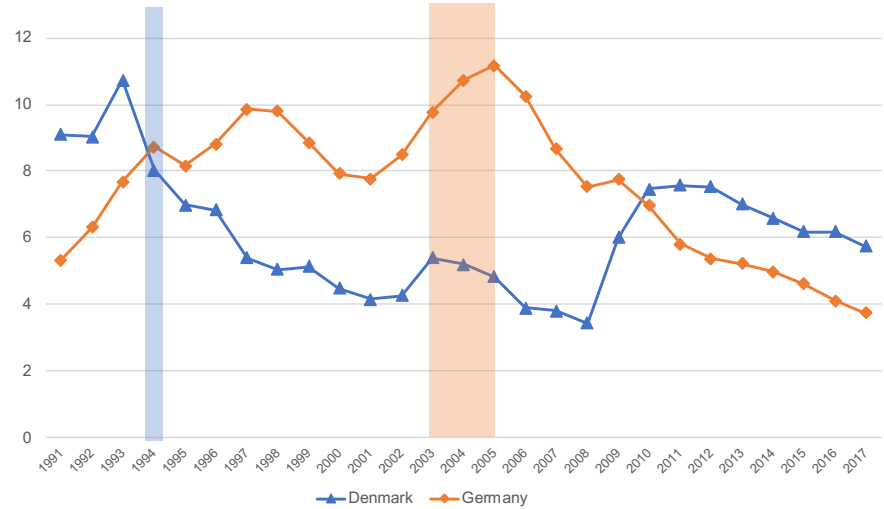


- Relative to matched control group: no divorce, matched in $t-3$.


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

Unemployment Rate and Major Labor Market Reforms



Go back

Bargaining - No Commitment

- Bargaining powers are (β_i, β_j), with $\beta_i + \beta_j = 1$.
- 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.

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.

Go back

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. Go back

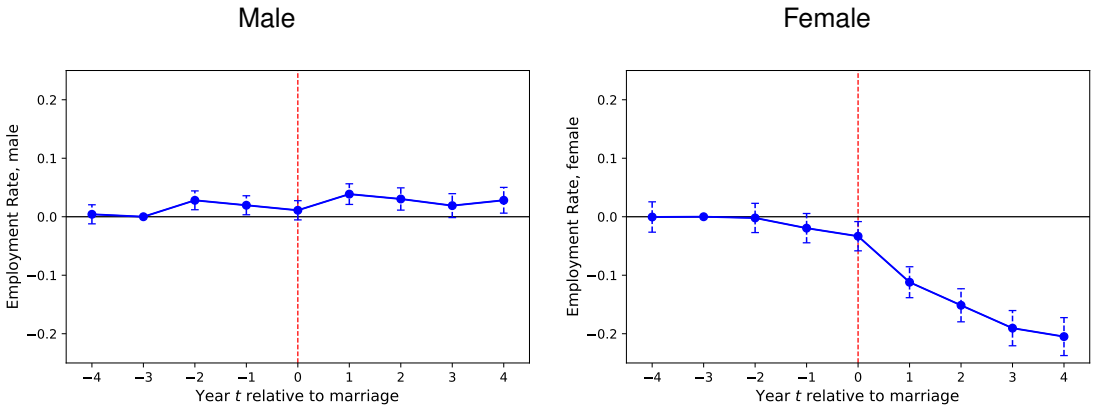
$$
\begin{aligned}
\left[r+\delta+q_i+q_j\right] S_{ij}^{-ll}\left(z\right) &= v_{ij}^{-ll}\left(z\right)+\delta\int_{z_{ij}^{-ll}}^{\infty} S_{ij}^{-ll}\left(z'\right) dG\left(z'\right) \\
\textit{Gains from search for } i \Leftarrow &+ \frac{c'(\widehat{\sigma}_{i,j}^{-l,l})^{1+\kappa}}{1+\kappa}-\frac{c'(\widehat{\sigma}_{i}^{-l})^{1+\kappa}}{1+\kappa}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

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: Employment Rate around Marriage

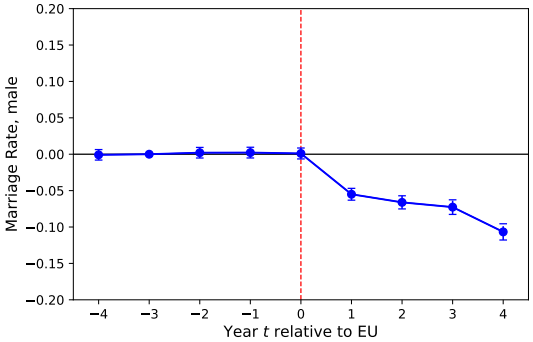


- Relative to matched control group: no marriage, matched in $t-3$.

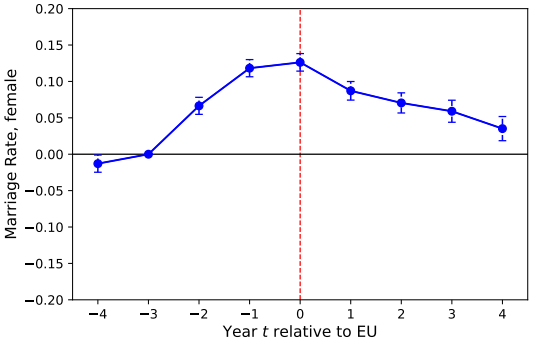
Go back

Event Study: Marriage Rate around EU Transition

Male



Female

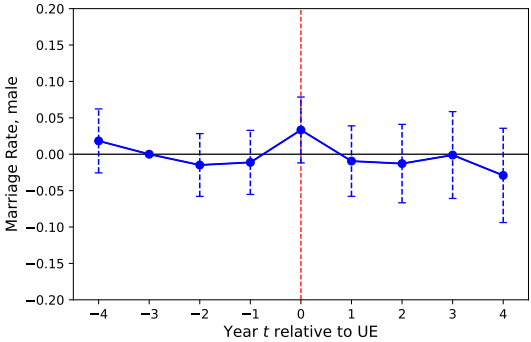


- Relative to matched control group: no EU Transition, matched in $t-3$.

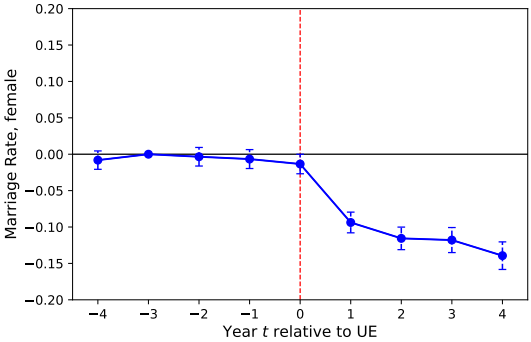
Go back

Event Study: Marriage Rate around UE Transition

Male



Female

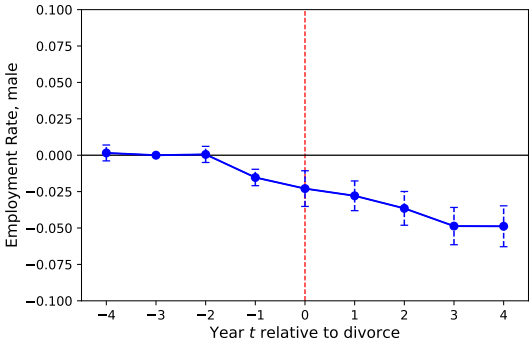


- Relative to matched control group: no UE Transition, matched in $t-3$.

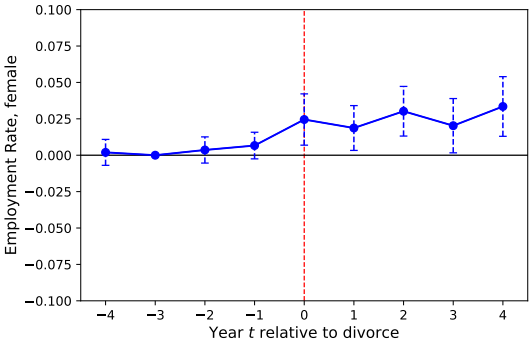
Go back

Event Study: Employment Rate around Divorce

Male



Female

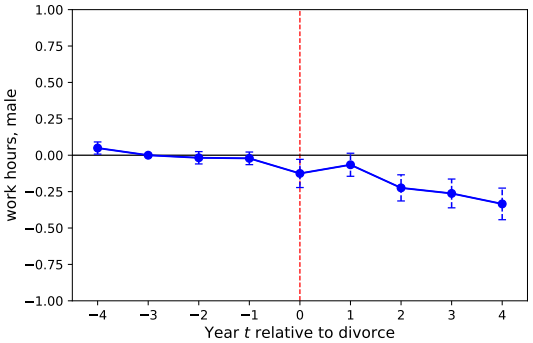


- Relative to matched control group: no divorce, matched in $t-3$.

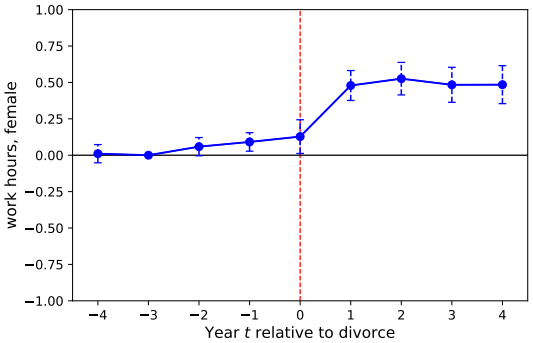
Go back

Event Study: Work Hours around Divorce

Male



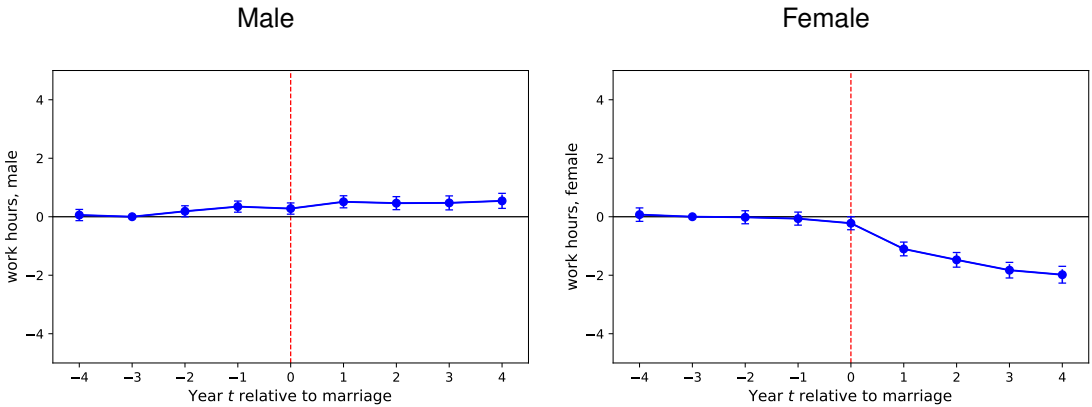
Female



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

Go back

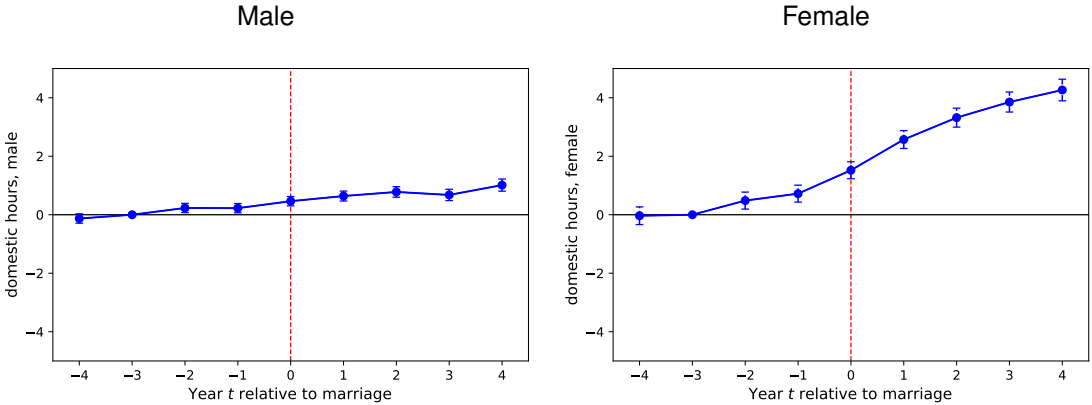
Event Study: Work Hours around Marriage



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

Go back

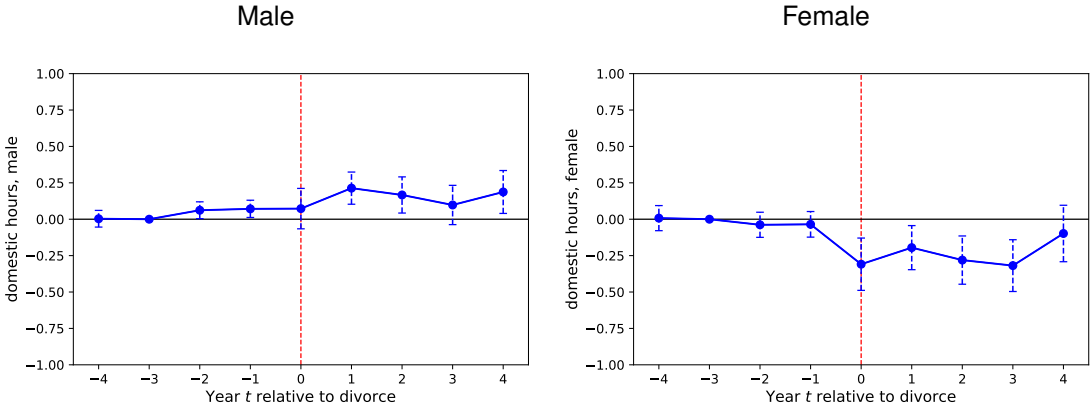
Event Study: Domestic Hours around Marriage



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

Go back

Event Study: Domestic Hours around Divorce

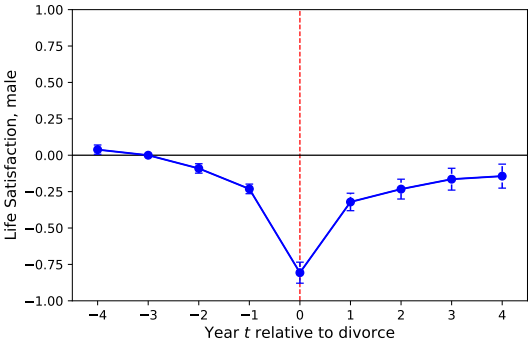


- Relative to matched control group: no divorce, matched in $t-3$.

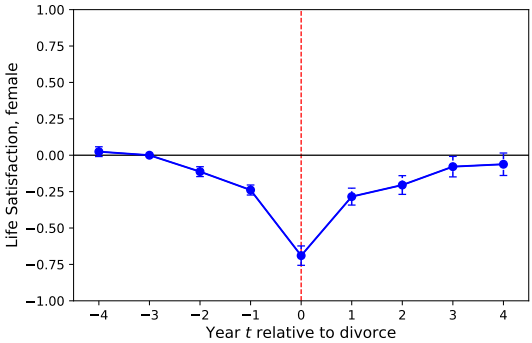
Go back

Event Study: Life Satisfaction around Divorce

Male



Female

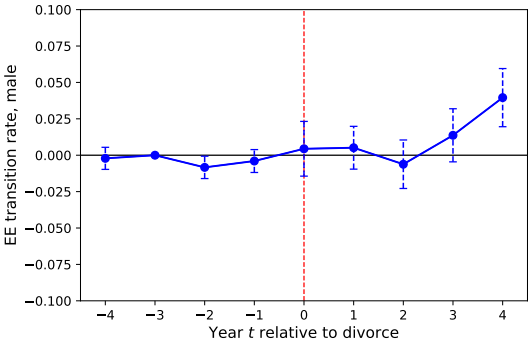


- Relative to matched control group: no divorce, matched in $t-3$.

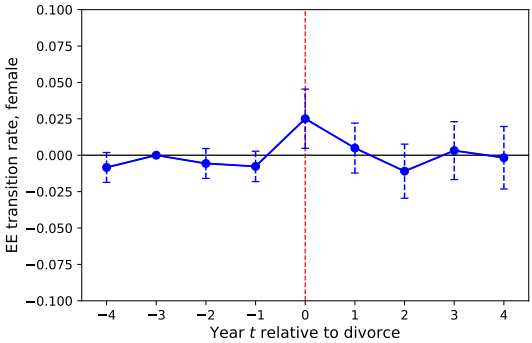
Go back

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 $\{\beta_{\mu\ldots}\}$, $\{\beta_{\vdots\ldots}\}$, 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