

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., Bertrand 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? → *Marital surplus*
 - A match-specific “love” shock.
 - Public good, depends on time inputs and preferences.
- Why do couples break up? → *Change of marital surplus*
 - Love shock gets updated infrequently.
 - May lead to *love shock divorce*
 - Public good changes in response to labor market transitions (both EU and UE).
 - 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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Household specialization - Time Inputs

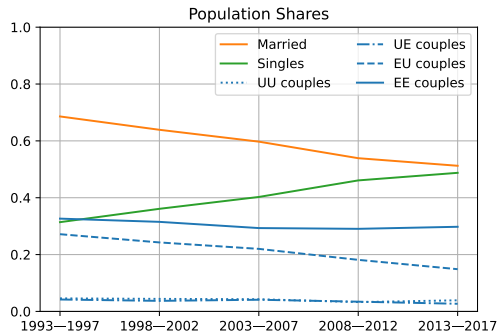
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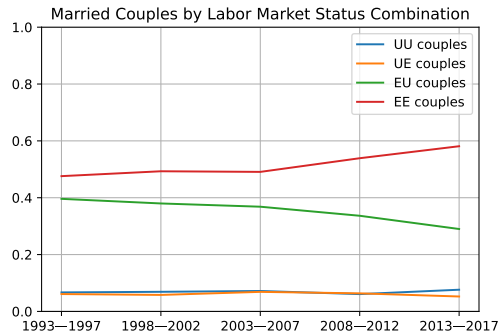
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Population Shares and Couple Types over Time

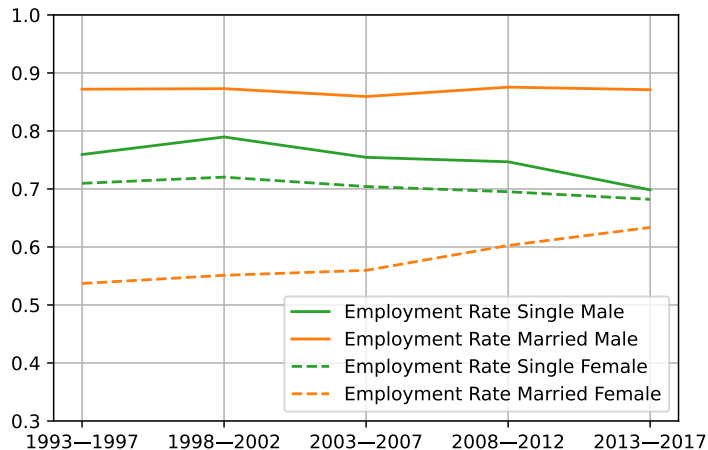


(a) Population Shares

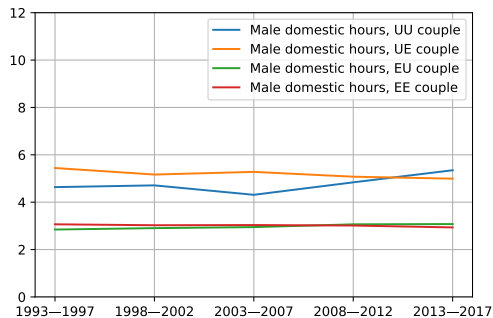


(b) Married Couples by Labor Market Status

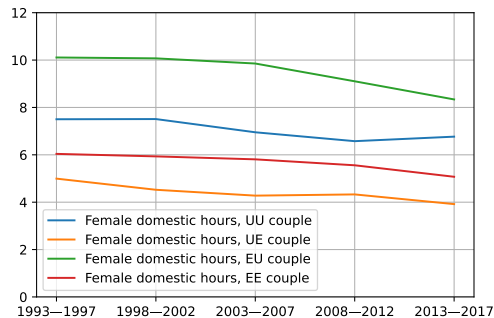
Employment Rates over Time



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 .

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

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

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

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

- 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 $S_{ij}^{-ll} (z_{ij}^{-ll}) = 0$
 - Define marriage probability $\alpha_{ij}^{-ll} = (1 - G(z_{ij}^{-ll}))$
- 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

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

Note: the outflow consists of divorces due to shocks, $\delta (1 - \alpha_{ij}^{-ll})$, 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

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

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., $R_j^{l,-l} (z, I_i^{-l}, w_j) = R(w_j) = w_j$.
- The reservation wage of an unemployed single (defined by $V_j^e (R_j^u) = V_j^u (b_j)$), is

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

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

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, $\{\hat{\sigma}_i^{u,l}(z), \hat{\sigma}_j^{u,-l}(z)\}$ and $\{\hat{\sigma}_i^u, \hat{\sigma}_j^u\}$,
 - 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 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 → GMM identification

Theoretical moments 1: yearly transition probabilities

- Example: unemployed single woman gets married and starts working

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

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 $H_j(\underline{w}_j) = 0$ gives the wage earnings distribution $H_j(w_j)$.

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

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 |

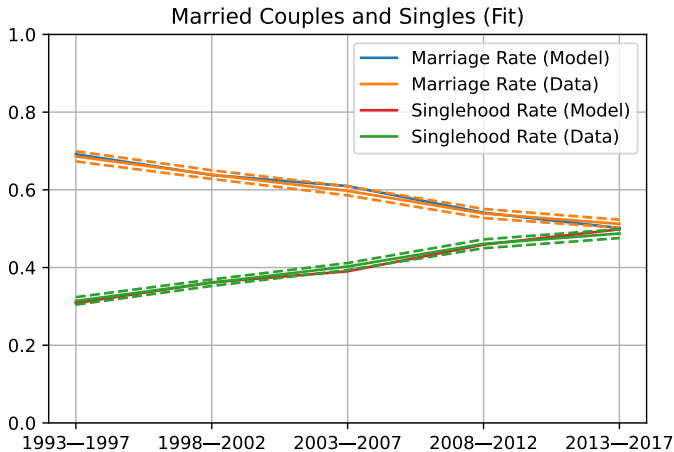
Estimated Parameters Values (1993–2017)

| 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 |

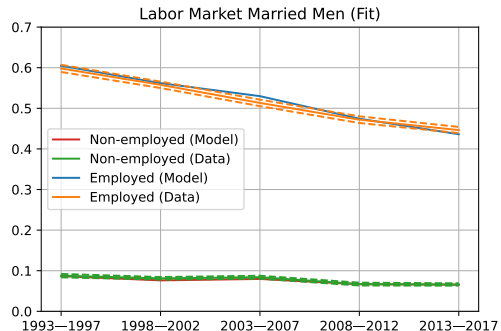
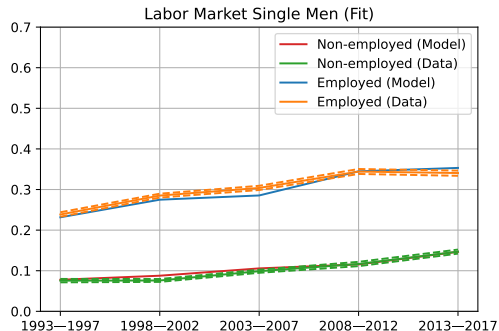
Estimated Parameters Values (1993–2017)

| 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 |

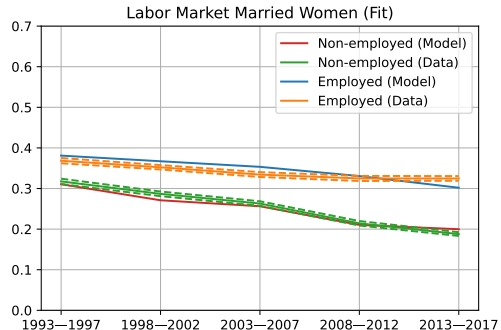
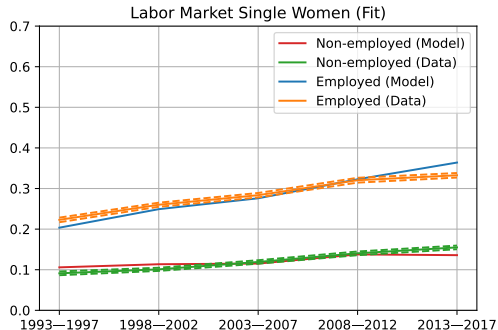
Fit: Marriage Market



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

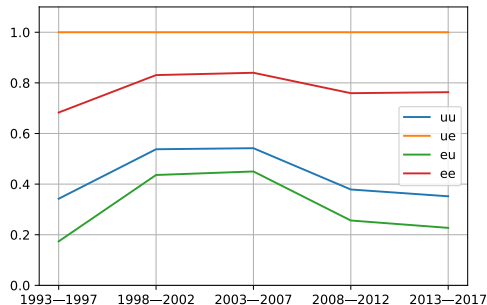
Table: Estimated Labor and Marriage Market Parameters Over Time

| 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 |

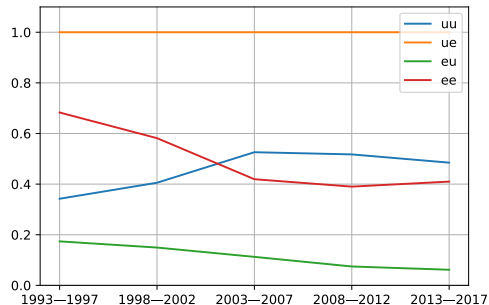
Source: Authors' calculations based on the SOEP.

Love Shock Divorce Share

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



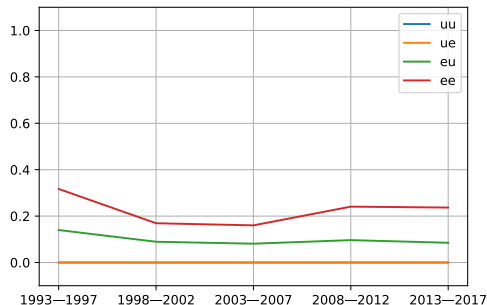
(e) Share of Love Shock Divorces



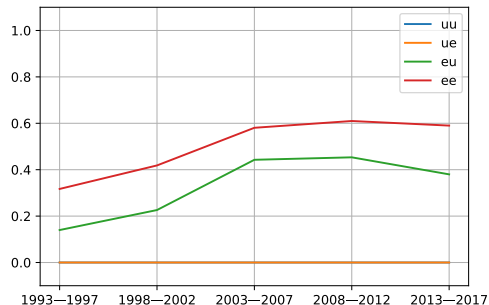
(f) Counterfactual (key parameters fixed 93-97)

Labor Market Divorce Share, Male Transition

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



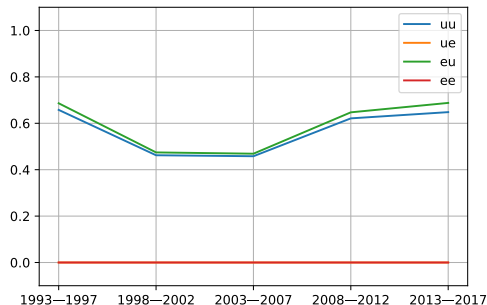
(g) Labor Market Divorce Share Men



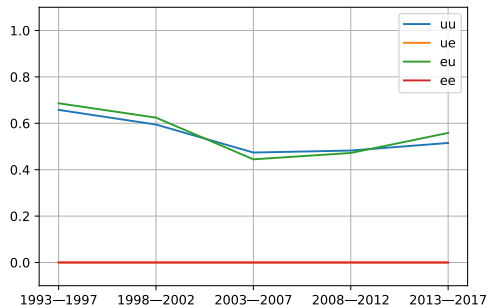
(h) Counterfactual (key parameters fixed 93–97)

Labor Market Divorce Share, Female Transition

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



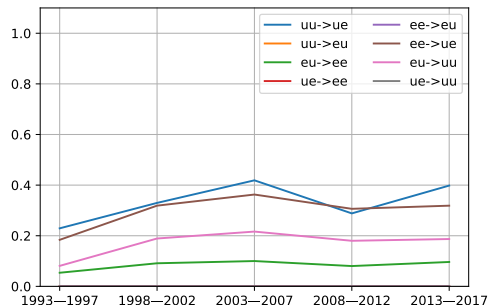
(i) Labor Market Divorce Share Women



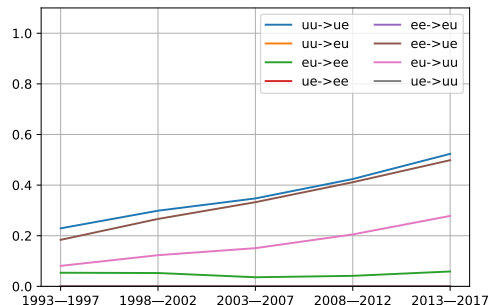
(j) Counterfactual (key parameters fixed 93–97)

Divorce Share by Transition Type

- $\tau_{i,j}^{-l,l} \left(\tau_{j,i}^{l,-l} \right)$ divided by $\tau_{i,j}^{-l,l} + \bar{\tau}_{i,j}^{-l,l} \left(\tau_{j,i}^{l,-l} + \bar{\tau}_{j,i}^{l,-l} \right)$ 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.
- μ_j and μ_i increase due to (1).
- Reservation wages decrease further due to (2) as b_i and b_j fall.
- Transitions into employment become more likely.
- Some transitions trigger a divorce (“direct effect”).
- Conditional on survival of the marriage, domestic hours and surplus may decrease.
- 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 → 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.

Bastian Schulz

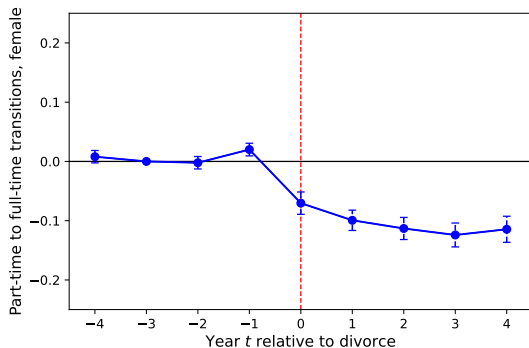
bastian.schulz@econ.au.dk

Literature

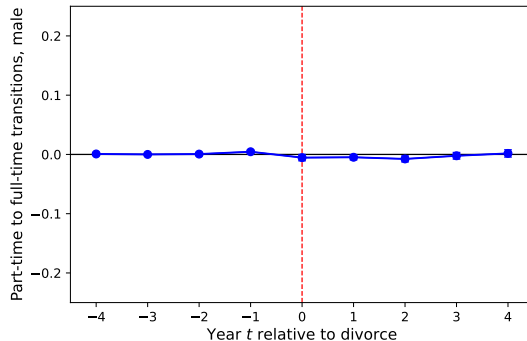
- Unemployment, especially male unemployment, is associated with an increase in the divorce rate (e.g. Jensen and Smith, 1990; Hansen, 2005; Amato and Beattie, 2011).
- Marriage/divorce rates negatively correlated with unemployment over the business cycle (e.g. Schaller, 2013; González-Val and Marcén, 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).

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

Female

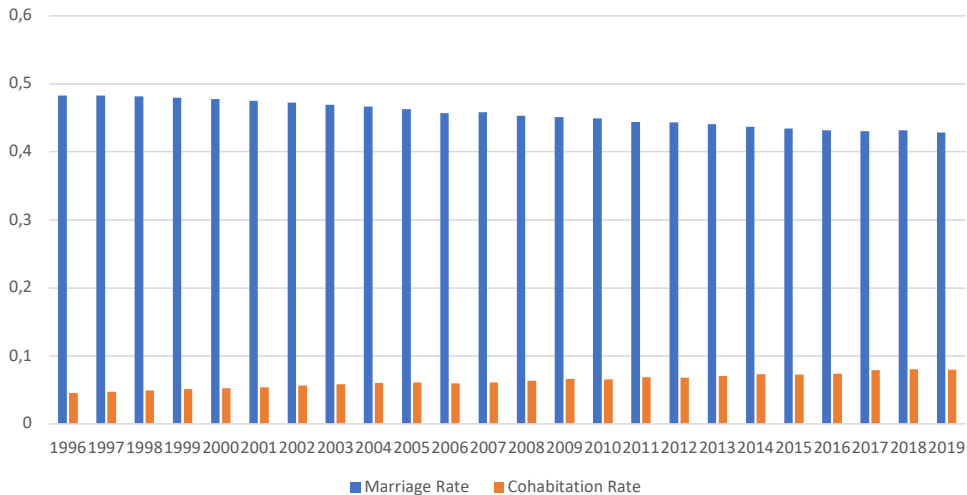


Male



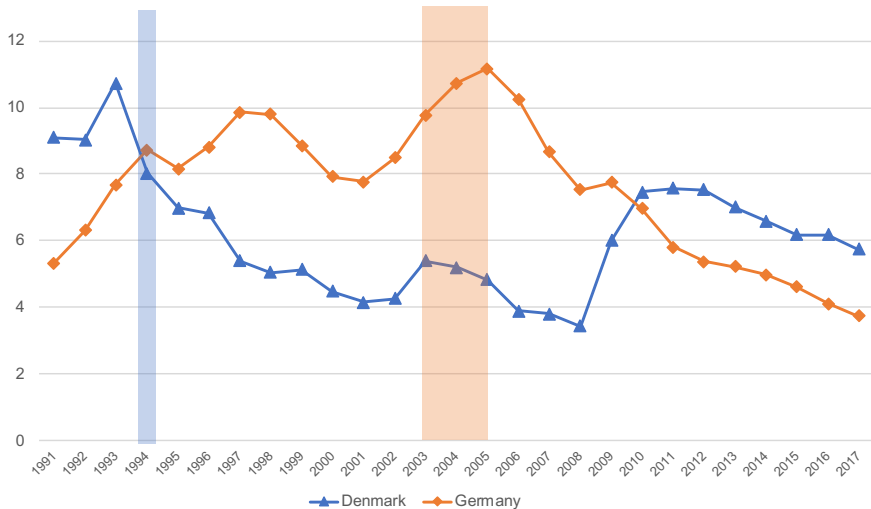
- Relative to matched control group: no divorce, matched in $t - 3$.

Marriage and Cohabitation



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Unemployment Rate and Major Labor Market Reforms



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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.

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The Value of Singlehood

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

$$\begin{aligned}
 rV_j^l(I_j^l) &= \underbrace{u_j^l(I_j^l)}_{\text{Flow utility}} + \underbrace{q_j \left[V_j^u(b_j) - V_j^l(I_j^l) \right]}_{\text{Job separation if employed}} \mathbb{1}[l = e] \\
 &+ \underbrace{\max_{\sigma_j} \left[\sigma_j \mu_j \int \max \left[V_j^e(w'_j) - V_j^l(I_j^l), 0 \right] dF_j(w'_j) - c(\sigma_j) \right]}_{\text{Search intensity choice}} \\
 &+ \underbrace{\lambda_{ij} \iiint \max \left[V_j^{l,-l}(z', I_i^{-l}, I_j^l) - V_j^l(I_j^l), 0 \right] dG(z') s_i d\hat{H}_i^s(I_i) di}_{\text{Option value of finding a (male) partner}}
 \end{aligned}$$

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

The Value of Marriage

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

The Surplus of Marriage

- independent of income due to quasi-linearity of utility, strictly increasing in z . [Go back](#)

$$[r + \delta + q_i + q_j] S_{ij}^{-ll}(z) = v_{ij}^{-ll}(z) + \delta \int_{z_{ij}^{-ll}}^{\infty} S_{ij}^{-ll}(z') dG(z')$$

$$\text{Gains from search for } i \Leftarrow + \frac{c'(\hat{\sigma}_{i,j}^{-l,l})^{1+\kappa}}{1+\kappa} - \frac{c'(\hat{\sigma}_i^{-l})^{1+\kappa}}{1+\kappa}$$

$$\text{Gains from search for } j \Leftarrow + \frac{c'(\hat{\sigma}_{j,i}^{l,-l})^{1+\kappa}}{1+\kappa} - \frac{c'(\hat{\sigma}_j^l)^{1+\kappa}}{1+\kappa}$$

$$+ q_i \max \left[0, S_{ij}^{ul}(z) \right] + q_j \max \left[0, S_{ij}^{-lu}(z) \right]$$

$$- \lambda_{ij} \beta_i \int_j \sum_{l \in \{u,e\}} s_j^l \int_{z_{ij}^{-ll}}^{\infty} S_{ij}^{-ll}(z') dG(z') dj$$

$$- \lambda_{ij} \beta_j \int_i \sum_{l \in \{u,e\}} s_i^{-l} \int_{z_{ij}^{-ll}}^{\infty} S_{ij}^{-ll}(z') dG(z') di$$

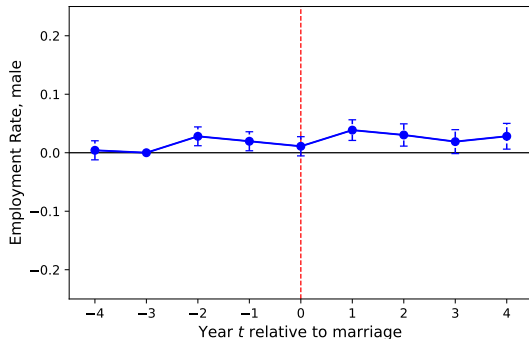
Solution Method

- 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 $\alpha_{ij}^{ll} \equiv (1 - G(z_{ij}^{ll}))$, 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.

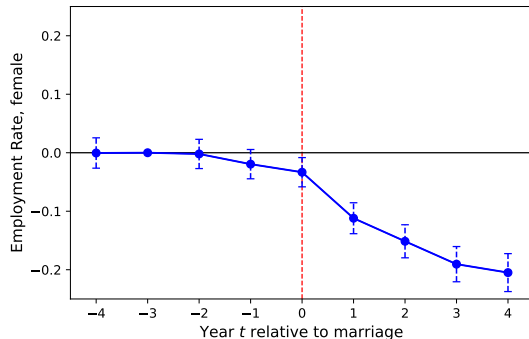
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Event Study: Employment Rate around Marriage

Male



Female

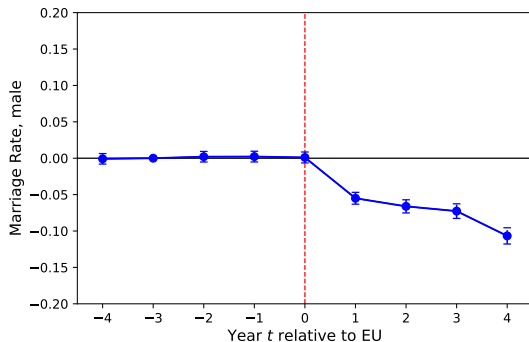


- Relative to matched control group: no marriage, matched in $t - 3$.

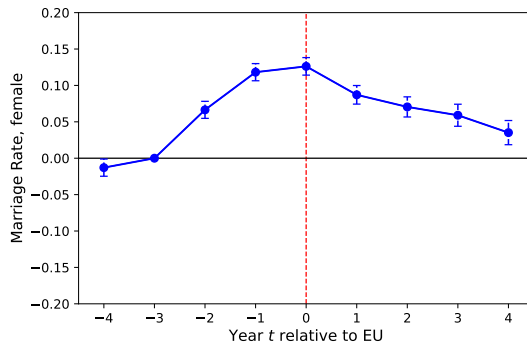
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Event Study: Marriage Rate around EU Transition

Male



Female

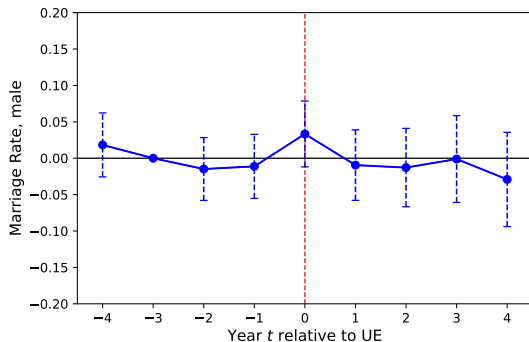


- Relative to matched control group: no EU Transition, matched in $t - 3$.

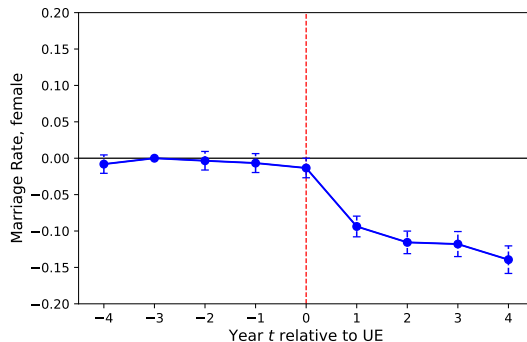
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Event Study: Marriage Rate around UE Transition

Male



Female

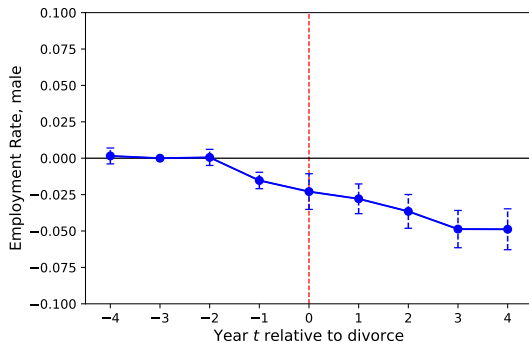


- Relative to matched control group: no UE Transition, matched in $t - 3$.

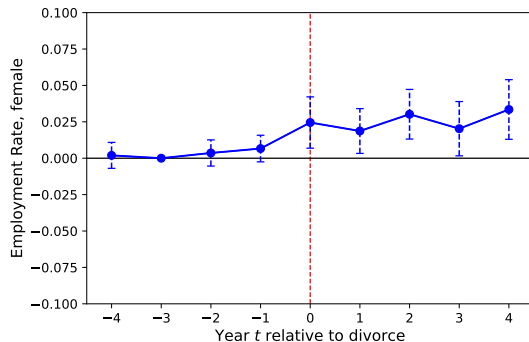
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Event Study: Employment Rate around Divorce

Male



Female

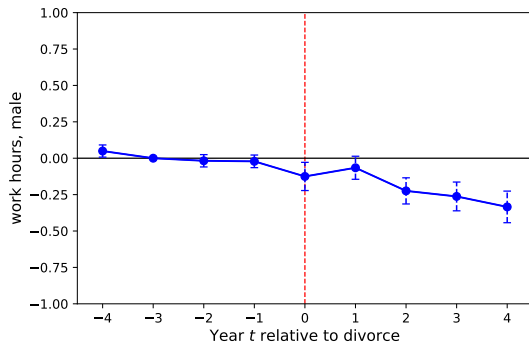


- Relative to matched control group: no divorce, matched in $t - 3$.

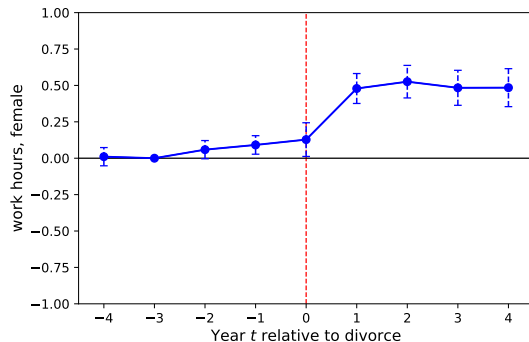
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Event Study: Work Hours around Divorce

Male



Female

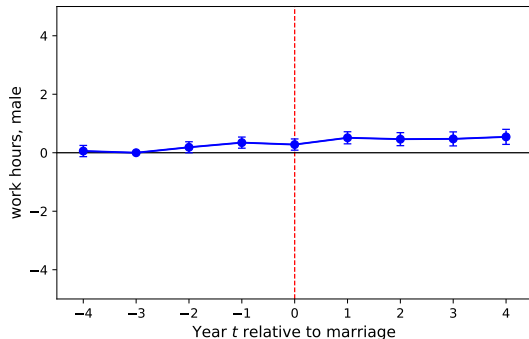


- Relative to matched control group: no divorce, matched in $t - 3$.

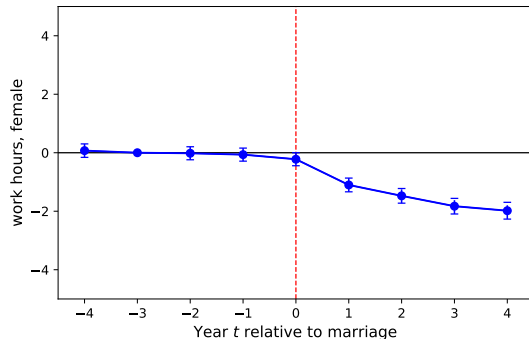
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Event Study: Work Hours around Marriage

Male



Female

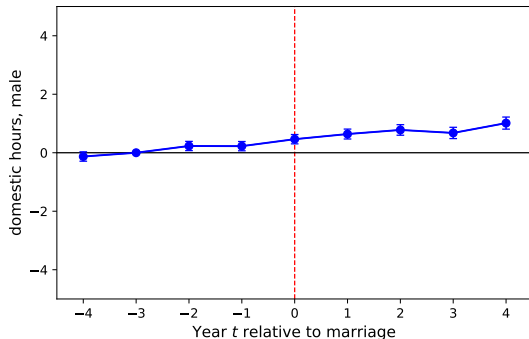


- Relative to matched control group: no divorce, matched in $t - 3$.

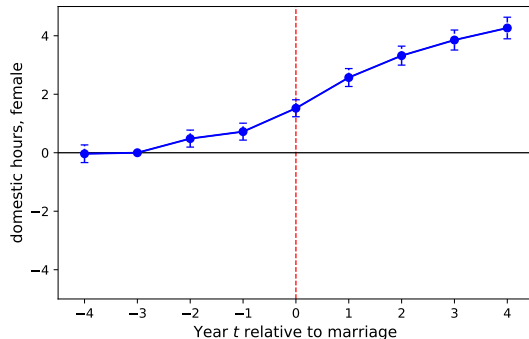
[Go back](#)

Event Study: Domestic Hours around Marriage

Male



Female

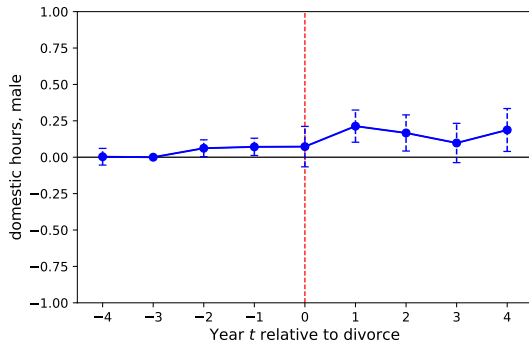


- Relative to matched control group: no divorce, matched in $t - 3$.

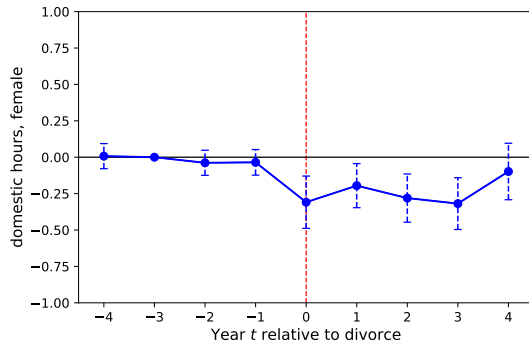
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Event Study: Domestic Hours around Divorce

Male



Female

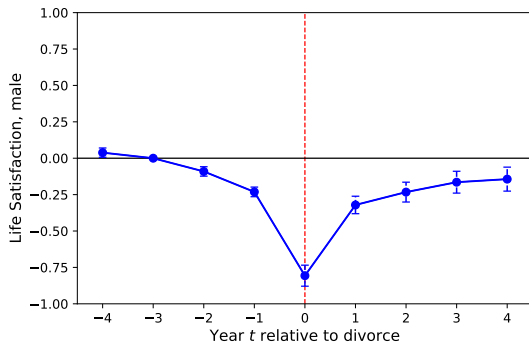


- Relative to matched control group: no divorce, matched in $t - 3$.

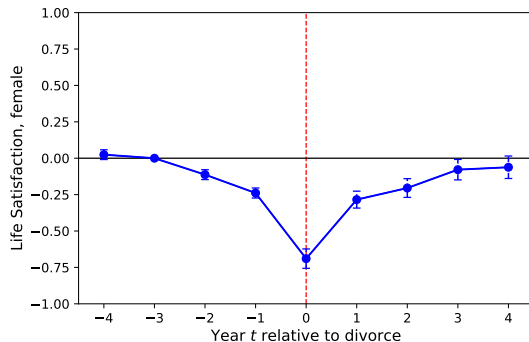
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Event Study: Life Satisfaction around Divorce

Male



Female

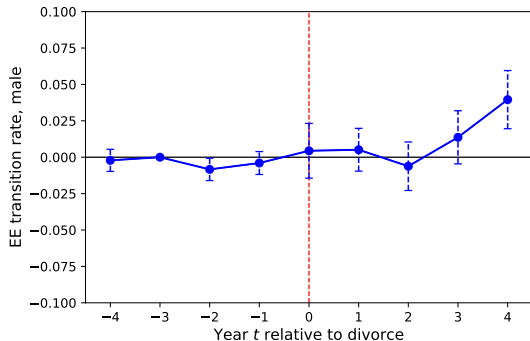


- Relative to matched control group: no divorce, matched in $t - 3$.

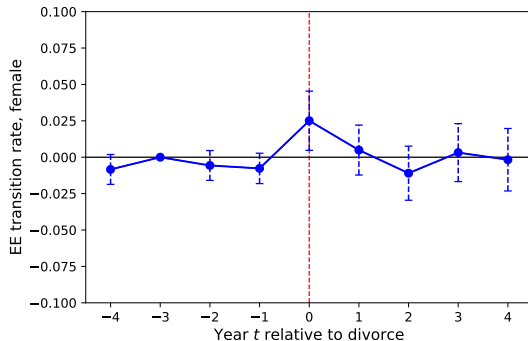
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Event Study: EE Rate around Divorce

Male



Female



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

[Go back](#)

Identification

- Marriage market transitions identify the parameters $\{\lambda^{\dots}, \mu_z, \sigma_z, \delta\}$.
- Labor market transitions identify the parameters $\{\beta_{\mu\dots}\}$, $\{\beta_{\vartheta\dots}\}$, and $\{\beta_{q\dots}\}$.
- 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.