

**Comments on Jeremy Greenwood and Nezih Guner's  
"Marriage and Divorce Since World War II:  
Analyzing the Role of Technological  
Progress on the Formation of Households"**

Justin Wolfers

Wharton School, University of Pennsylvania

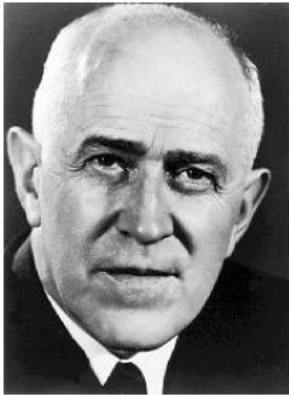
CEPR, CESifo, IZA and NBER

*NBER Macroeconomics Annual, Cambridge, April 4 2008.*

---

# Economie d'avant garde

*Journal of Economic Perspectives—Volume 21, Number 2—Spring 2007—Pages 27–52*



*William F. Ogburn*

## Research Report No. 8

January 2008--revised

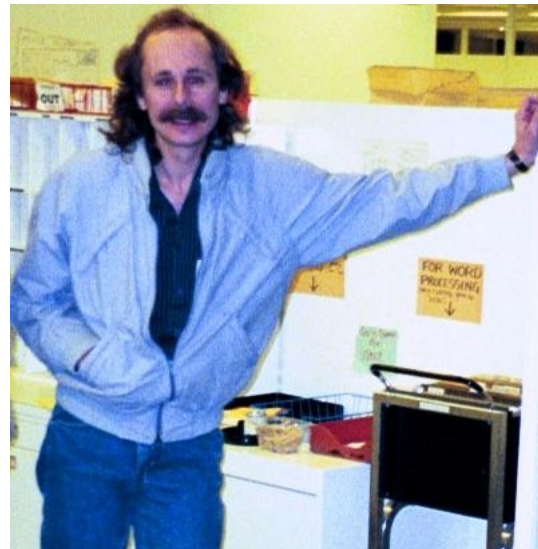
MARRIAGE AND DIVORCE SINCE WORLD WAR II:  
ANALYZING THE ROLE OF TECHNOLOGICAL PROGRESS ON THE  
FORMATION OF HOUSEHOLDS

by

Jeremy Greenwood and Nezih Guner

## Marriage and Divorce: Changes and their Driving Forces

Betsey Stevenson and Justin Wolfers



# Greenwood agenda

---

- ❑ Document the “second industrial revolution”
  - ▶ Vast changes in the technology of household production
- ❑ Argue that these changes explain patterns of
  - ▶ Female labor force participation (Greenwood, Seshadri and Yorugoklu, 2005)
  - ▶ Fertility (Greenwood, Seshadri and Vandembroucke, 2005)
  - ▶ Leisure (Greenwood and Vandembroucke, 2005)
  - ▶ Marriage and divorce (this paper)

## Marriage and divorce beyond Greenwood

- ❑ Many competing explanations of marriage and divorce patterns:
  - ▶ Changes in wage structures (discrimination, inequality)
  - ▶ Changes in legal structure of marriage
  - ▶ Diffusion of birth control and the pill => Female education
  - ▶ Social norms, sexual mores => Non-marital sex; cohabitation
  - ▶ Household bargaining
  - ▶ Matching technology (sexually-integrated workplaces; online dating)

# Simple model of marriage and divorce

---

- ❑ We can consider the marriage and divorce model separately from the time allocation model
  - ▶ “recall that  $L^m(.)$  and  $L^s(.)$  are not functions of the matching parameters”
- ❑ What determines marriage and divorce?
  - ▶  $U^{\text{marriage}} = U(C^{\text{single}} + \text{ec. value of marriage}) + \text{“marital bliss” } [b_i]$
  - ▶  $U^{\text{single}} = U(C^{\text{single}})$
- ❑ Marriage and divorce like any search problem:
  - ▶ Marry if  $b_{i,t} > b^{M^*}$  and  $b^{M^*} = f(\text{ec. value of marriage})$
  - ▶ Divorce if  $b_{i,t} < b^{D^*}$  and  $b^{D^*} = f(\text{ec. value of marriage})$
- ❑ Computational experiment: Shock *ec. value of marriage*

Complementarities in HH  
production and consumption



# Could they fail to fit the facts?

---

- ❑ Free parameters determining marriage and divorce
  - ▶ If single: Search for a partner:  $b_i \sim S(\mu_s, \sigma_s)$
  - ▶ If married,  $b$  evolves:  $b_{i,t} = (1-\rho) \mu_m + \rho b_{t-1} + \sigma_m \sqrt{(1-\rho^2)} \xi \quad \xi \sim N(0,1)$ 
    - Simpler case:  $[\rho=0] : b^{\text{married}} \sim M(\mu_m, \sigma_m)$
- ❑ Marriage and divorce decisions:
  - ▶ Marry if  $b_{i,t} > b^{M*}$  and  $b^{M*} = f(\text{value of marriage})$ 
    - ⇒ Marriage rate =  $1 - S(b^{M*})$
    - ⇒ d Marriage rate / d value of marriage =  $s(b^{M*})$
  - ▶ Divorce if  $b_{i,t} < b^{D*}$  and  $b^{D*} = f(\text{value of marriage})$ 
    - ⇒ Divorce rate =  $M(b^{M*})$
    - ⇒ d Divorce rate / d value of marriage =  $-m(b^{M*})$
- ❑ Following a shock to the economic value of marriage
  - ▶ Four parameters  $(\mu_s, \sigma_s, \mu_m, \sigma_m)$  will always hit four facts
    - Marriage and divorce rates in 1950 steady state
    - Marriage and divorce rates following a shock to the ec. value of marriage (yr 2000)
      - Trends in the economic value of marriage will create trends in marriage and divorce rates
  - ▶ **This holds for any shock to the economic value of marriage**
    - Gender wage differentials, contraception, education, sexual mores etc.

# Hitting the marriage and divorce facts

---

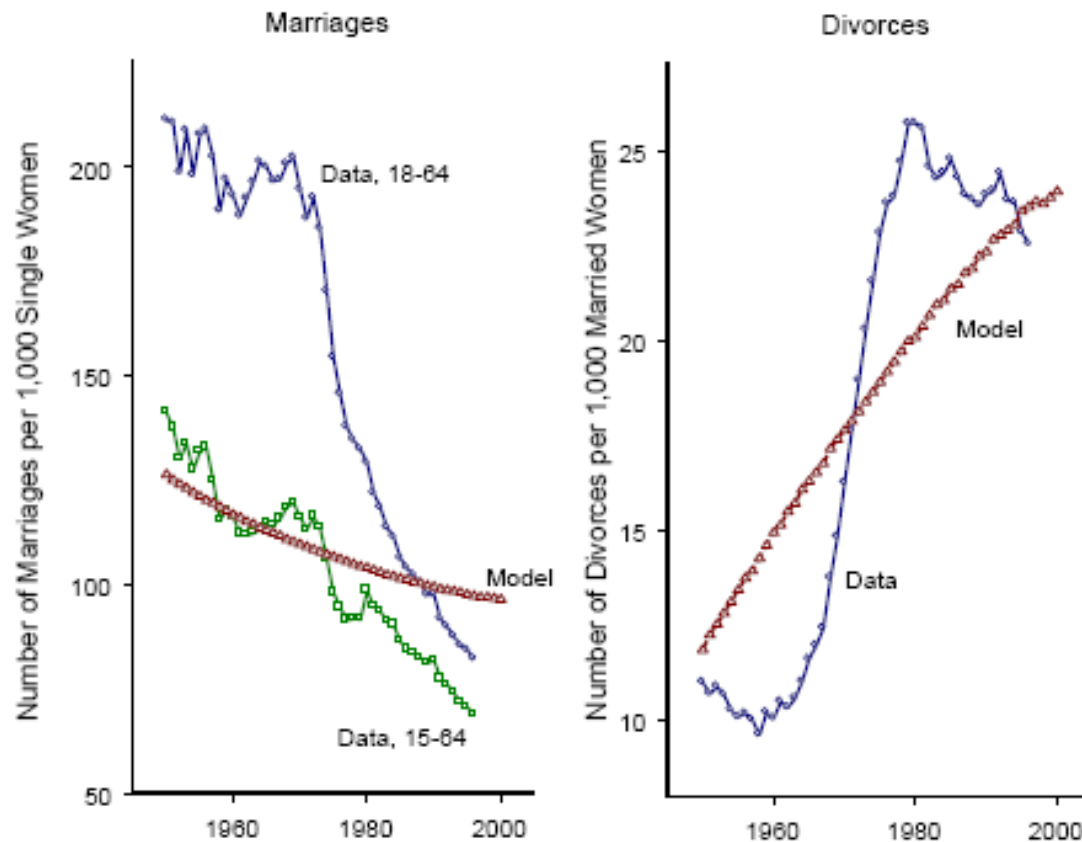


Figure 7: Rates of Marriage and Divorce, 1950-1996 – U.S. Data and Model

# Which other facts do they hit?

TABLE 3: THE INITIAL AND FINAL STEADY STATES

	1950		2000	
	Model	Data	Model	Data
Fraction married	0.816	0.816	0.694	0.625
Probability of divorce	0.011	0.011	0.024	0.023
Probability of marriage	0.129	0.211	0.096	0.082
Duration of marriages	31.36	29.63	22.47	20 to 24

} used in estimation

## □ Fraction married

- ▶ If 1950 and 2000 are steady states
  - ⇒ “Fraction married” simply reflects steady-state marriage, divorce and death rates
- ▶ If not steady states, also a function of history (of marriage, divorce and death rates)
  - Failing to match %married is a failure of the auxiliary assumption that 1950 and 2000 are steady states

## □ Duration of marriage

- ▶ Recall,  $b^{Married}$  evolves:  $b_{i,t} = (1-\rho) \mu_m + \rho b_{t-1} + \sigma_m \sqrt{(1-\rho^2)} \xi$
- ▶  $\rho$  determines the duration of marriage
- ▶ What is the duration of marriage in 2000?
  - Model:  $(div\ rate^{SS} + death\ rate^{SS})^{-1}$
  - “Fact”: Life tables

# Life tables v. facts: Estimating “marriage duration”

## □ Time series

Age	Divorces per thousand married women							
	1970	1975	1980	1985	1990	1995	2000	2005
15-19	26.9	34.7	42.4	48.4	48.6			
20-24	33.3	40.3	47.2	46.8	46			
25-29	25.7	31.8	37.8	35.6	36.6			
30-34	18.9	24.1	29.2	28.6	27.9			
35-39	14.8	19.1	23.3	23.4	23.1			
40-44	11.9	14.3	16.7	19.6	19.3			
45-49	8.5	9.7	10.8	12.6	13.8			
50-54	5.6	6.1	6.6	7.4	8.2			
55-69	3.5	3.7	3.8	4.2	4.8			
60-64	2.3	2.5	2.7	2.7	2.9			
65+	1.3	1.4	1.4	1.6	1.4			
Total	14	16.8	19.5	19.2	18.7	17.0	15.8	14.1

## □ Life table

Read across to infer marriage durations

Birth cohort	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65+
1975-79	48.6	46	36.6	27.9	23.1	19.3	13.8	8.2	4.8	2.9	1.4
1970-74	48.4	46	36.6	27.9	23.1	19.3	13.8	8.2	4.8	2.9	1.4
1965-69	42.4	46.8	36.6	27.9	23.1	19.3	13.8	8.2	4.8	2.9	1.4
1960-64	37.9	47.2	35.6	27.9	23.1	19.3	13.8	8.2	4.8	2.9	1.4
1955-59	33.3	36.5	37.8	28.6	23.1	19.3	13.8	8.2	4.8	2.9	1.4
1950-54		25.7	28.4	29.2	23.4	19.3	13.8	8.2	4.8	2.9	1.4
1945-49			18.9	22.0	23.3	19.6	13.8	8.2	4.8	2.9	1.4
1940-44				14.8	17.6	16.7	12.6	8.2	4.8	2.9	1.4
1935-39					11.9	12.6	10.8	7.4	4.8	2.9	1.4
1930-34						8.5	8.2	6.6	4.2	2.9	1.4
earlier							5.6	6.6	3.8	2.7	1.4

\* 1975 data reflect interpolation from 1970 and 1980

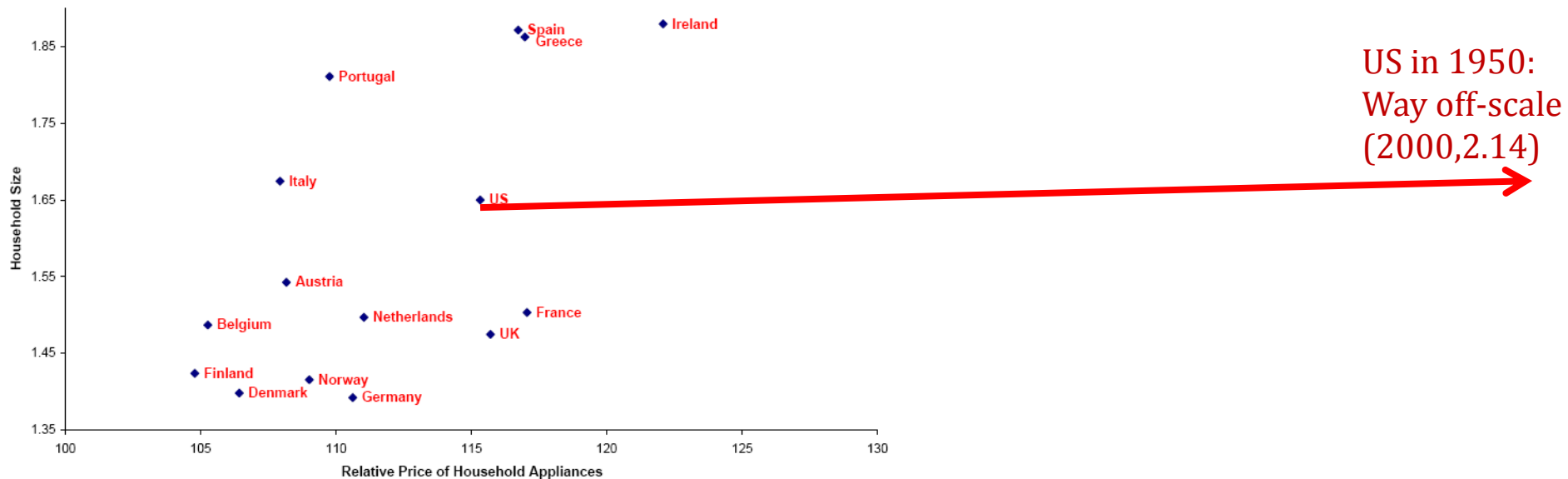


# Further facts: Time series versus cross-section

## ❑ Cross country

- Range of relative price of household appliances = 20%
- Yielding range of predicted household size of around 0.4

Figure 1: Relative Price of Household Appliances and Household Size, 2001

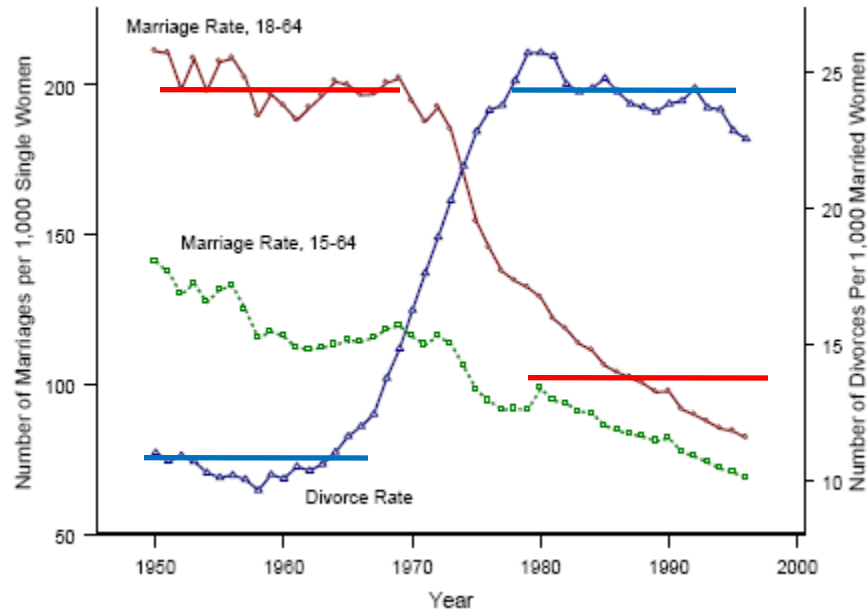


## ❑ U.S findings: Changes from 1950-2000

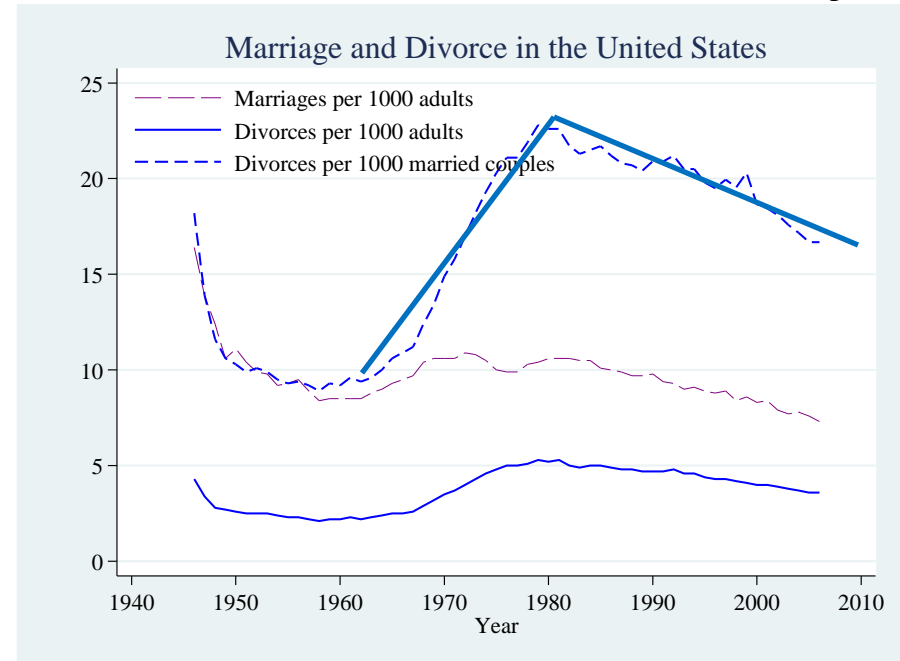
- Household durables prices were 20 times higher in 1950
- Real wages were one-third as large in 1950
- “Causing” household size to decline from 2.14 to 1.65

# Patterns in Marriage and Divorce: Two Views

## Greenwood-Guner history



## Stevenson-Wolfers history



### Analyze shift between two steady-states

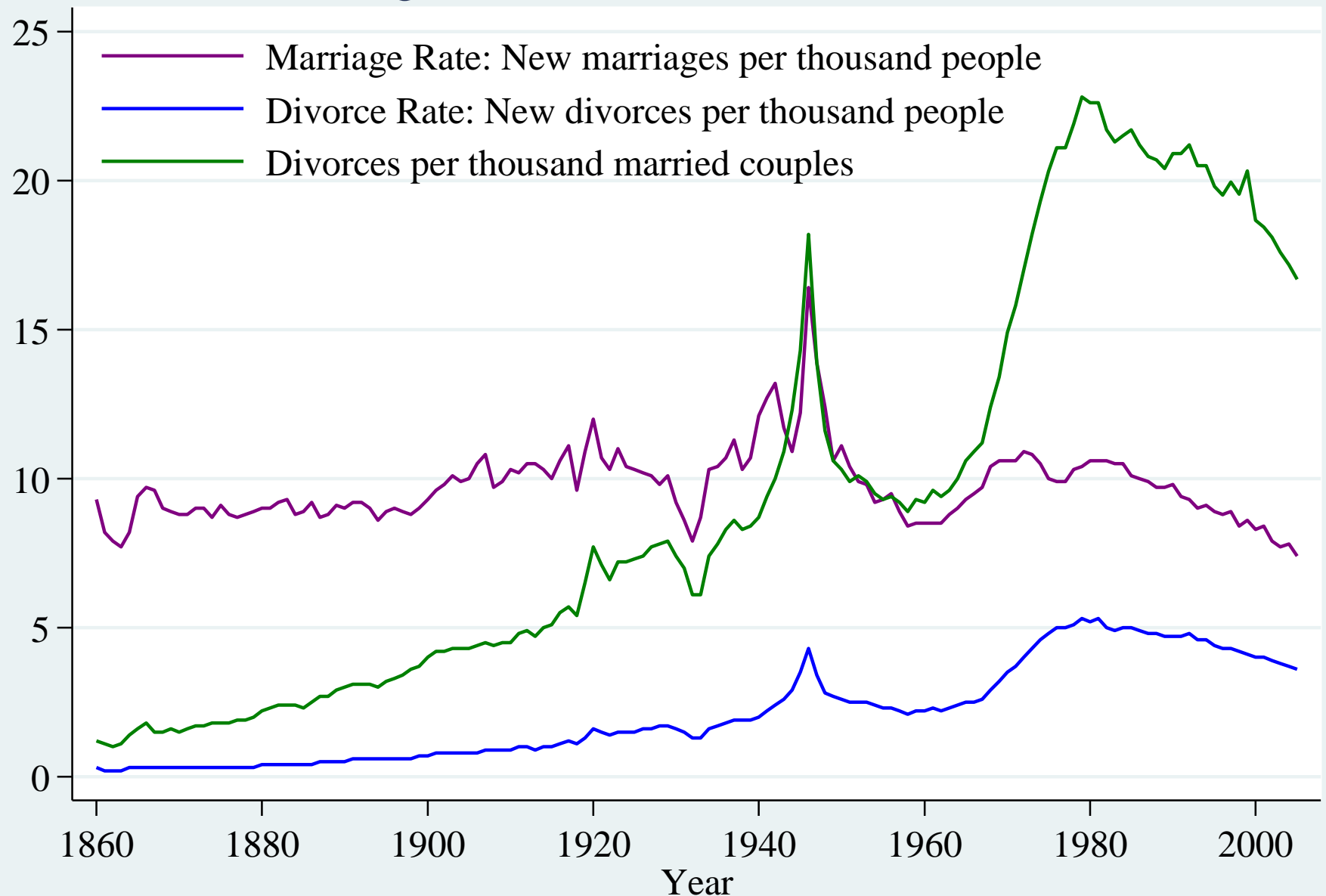
- 1950s high marriage, low divorce
- 1990s low divorce, high marriage

### 1950s is a period of turmoil, not steady-state

### Three interesting trends:

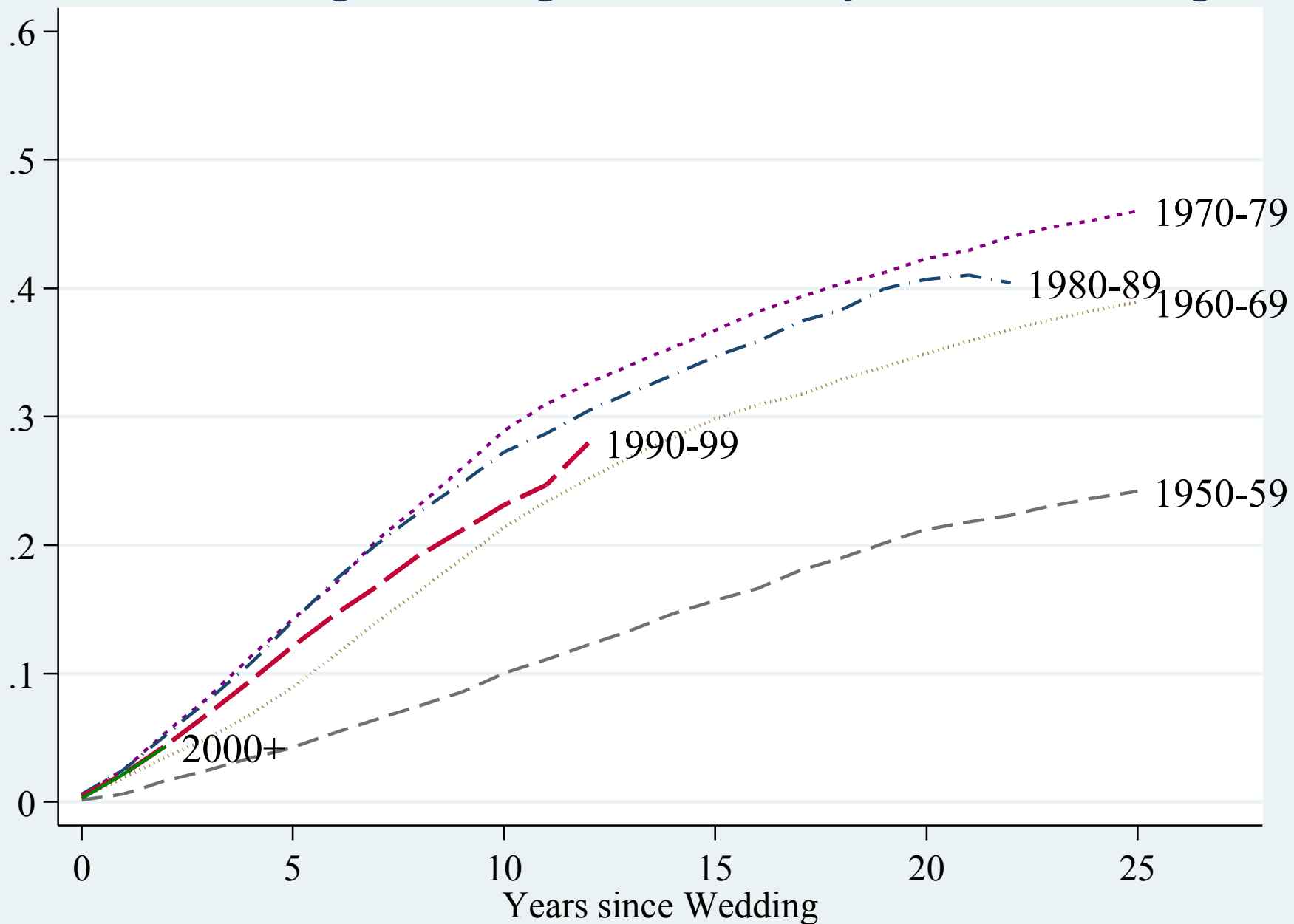
- Post-war decline in divorce
- Mid-'60's-late 70's rise in divorce
- Subsequent decline in divorce

# Marriage and Divorce in the United States



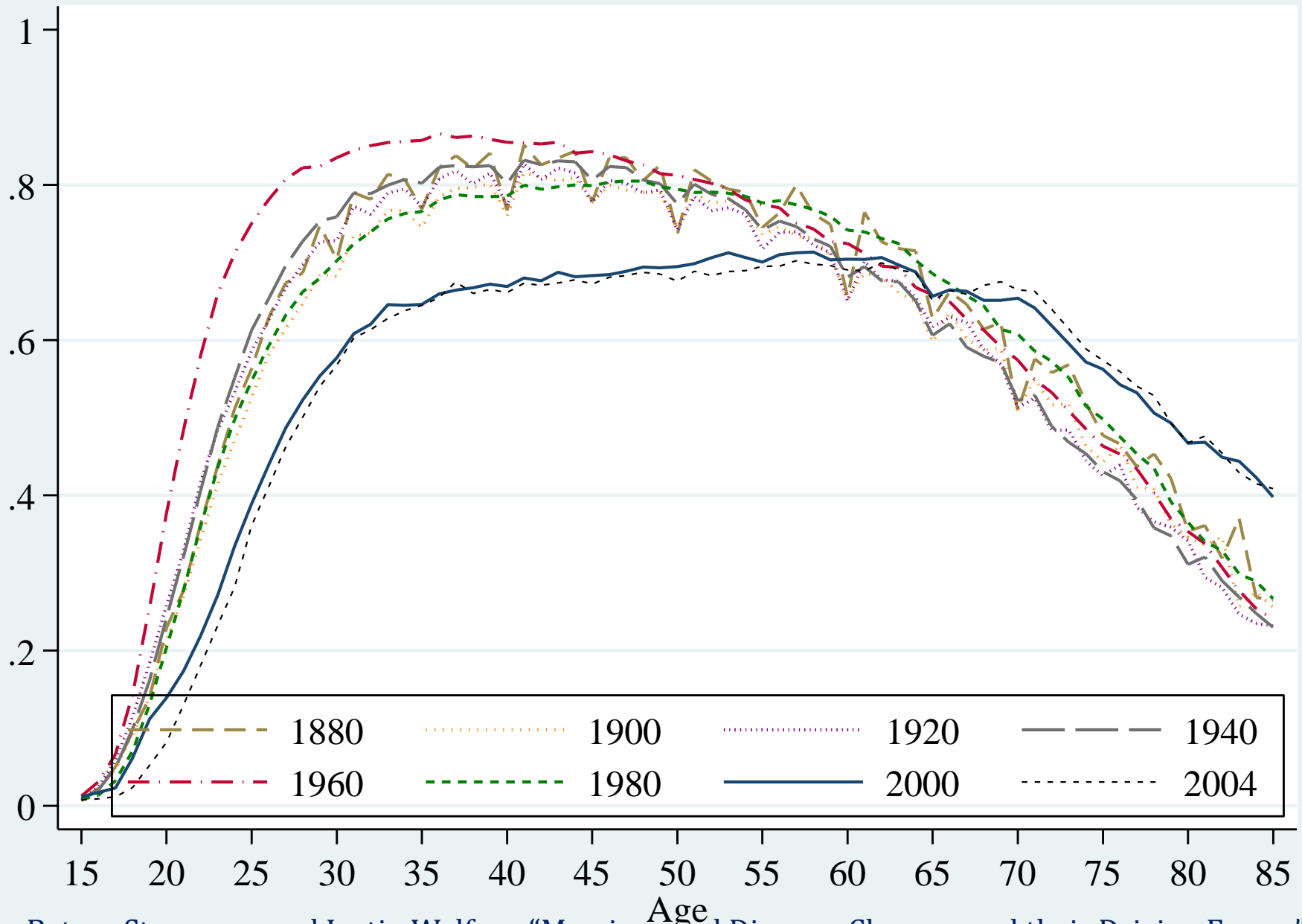
Source: Stevenson and Wolfers (2007)

# First Marriages Ending in Divorce, by Year of Marriage



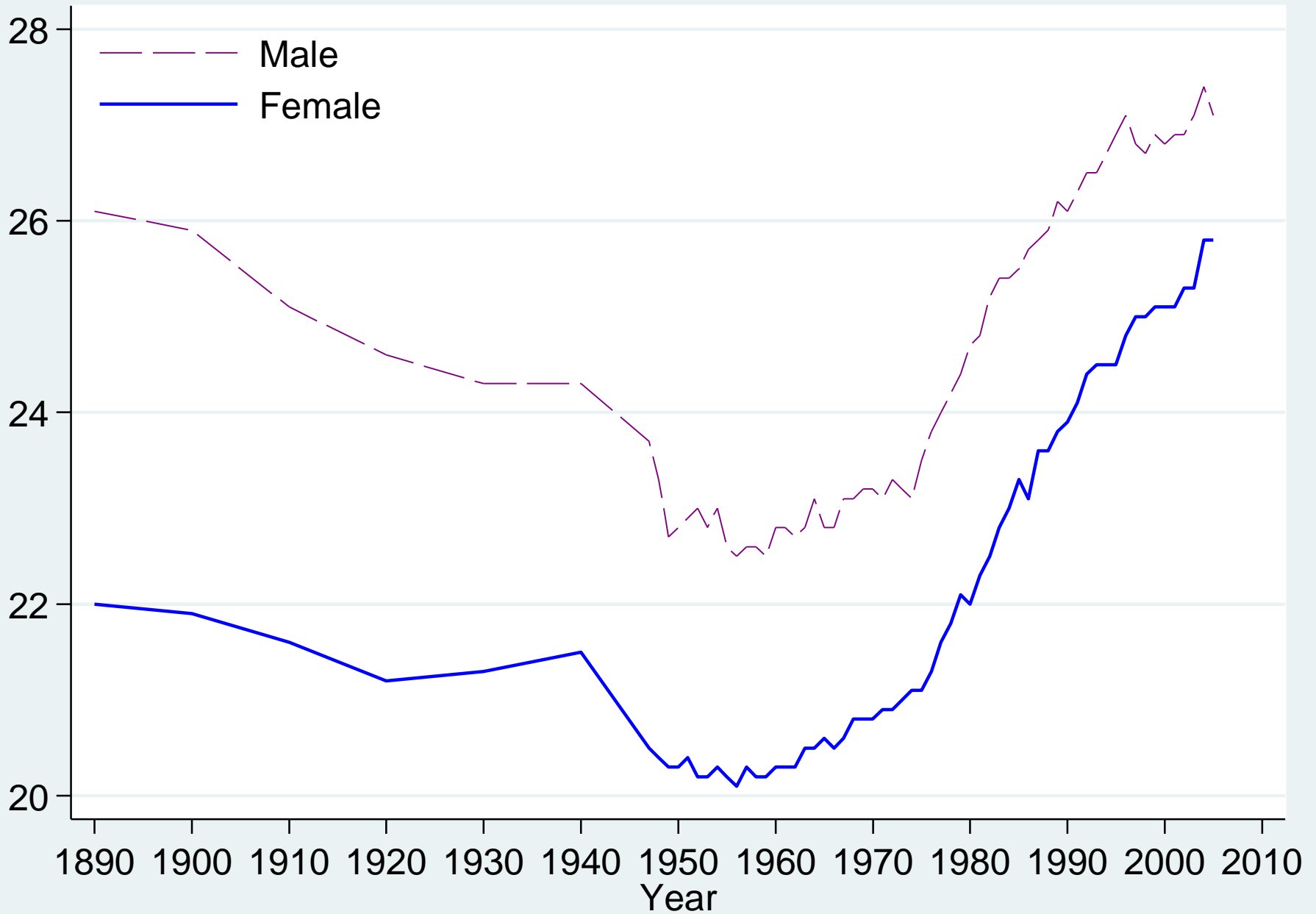
Source: Stevenson and Wolfers (2008), "Trends in Marital Stability"

# Marriage Rates by Age: 1880-2004

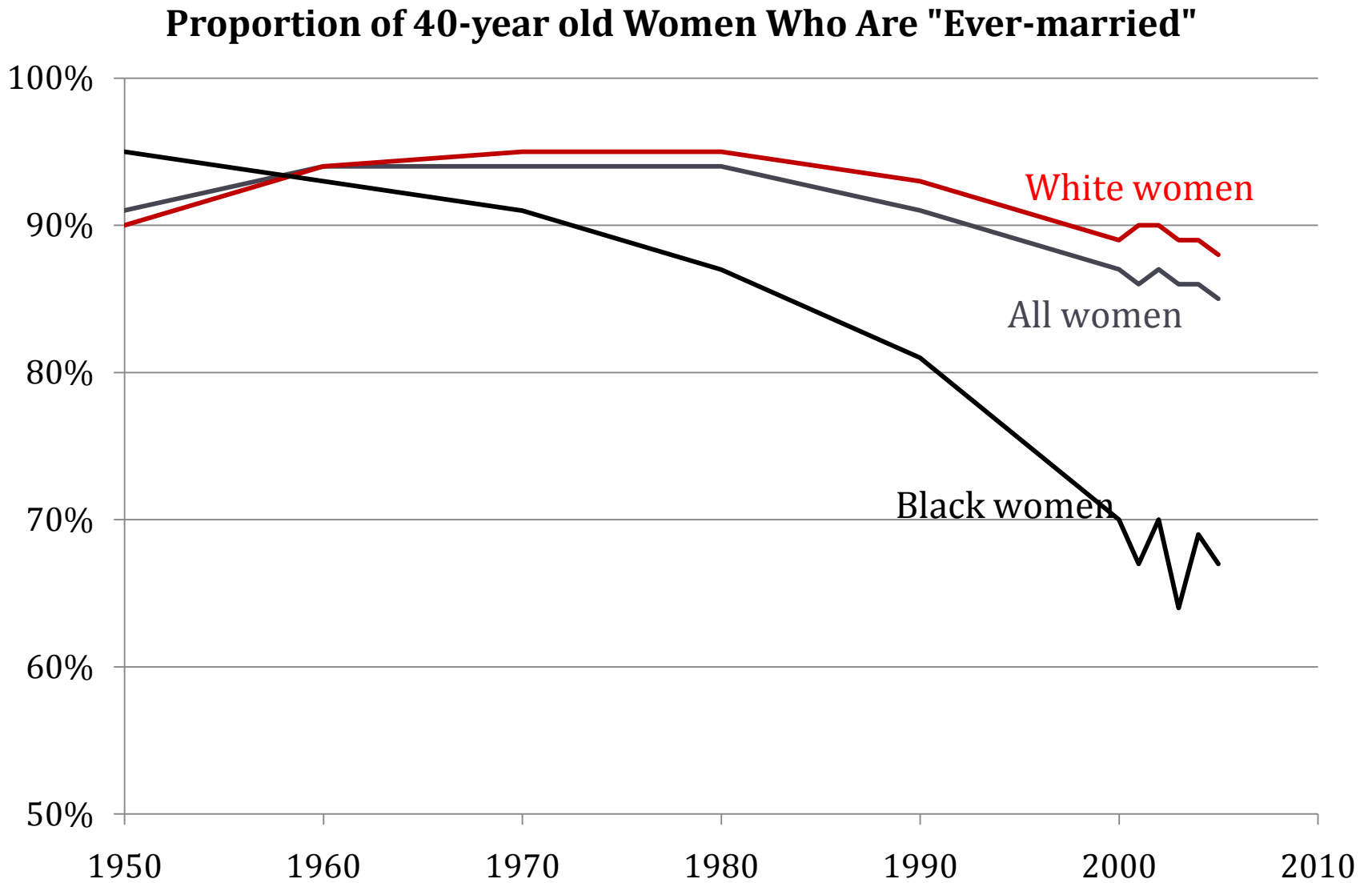


Source: Betsey Stevenson and Justin Wolfers, "Marriage and Divorce: Changes and their Driving Forces", *Journal of Economic Perspectives*, Spring 2007.

# Median Age of First Marriage



# Marriage rates



# A slightly different story...

---

- ❑ Pre-war: “Productive marriage”
    - ▶ Driven by Beckerian returns to specialization in household production
      - Wife specializes in home production; Husband specializes in market production
      - Optimal matching: Negative assortative mating (on market skills)
  - ❑ Post-war shocks reduce production complementarities
    - ▶ Norms: “Rosie the riveter”
    - ▶ Declining labor market discrimination against women
    - ▶ Contraceptive pill and abortion (Increasing investment in female education)
    - ▶ Household capital stock
      - Gets cheaper
      - Unskill-biased technical change
    - ▶ ...all reducing the production complementarities between husband and wife
  - ❑ **Adjustment period: 1960s and 1970s run-up in divorce due to mismatch**
    - ▶ **Choose partner under “productive marriage” regime**
    - ▶ **Discover mismatch for “hedonic marriage” => Transitory rise in divorce between ss**
  - ❑ Today’s marriage (“Hedonic marriage”)
    - ▶ Rising leisure => More important who we spend leisure with
    - ▶ Increasing role for consumption complementarities
    - ▶ Positive assortative matching (by education, skills, etc)
-