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Measures of Marriage and Divorce

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Section A

Indicators of Marriage

Marriage

- ◆ *Marriage*—Legal union of persons of opposite sex
- ◆ The legality of the union may be established by civil, religious, or other means as recognized by the laws of each country

Consensual Union

- ◆ *Consensual Union*—Establishment of a marital union without recorded legal sanction

Marriage

- ◆ Let M = Number of marriages
- P = Mid-year population
- P_{15+} = Mid-year population age 15 and older
- P_{15+}^m = Number of men age 15 and older
- $P_{15+}^f = W_{15+}$ = Number of women age 15 and older

Crude Marriage Rate (CMR)

- ◆ *Crude Marriage Rate*—Number of marriages per 1,000 population

$$= \frac{M}{P} * 1000$$

General Marriage Rate (GMR)

- ◆ *General Marriage Rate*—Number of marriages per 1,000 population age 15 and older

$$= \frac{M}{P_{15+}} * 1000$$

Marriage

- ◆ Important note:
 - Most measures of marriage are sex-specific
 - In the remaining measures, whenever the rates are calculated for women, the same calculations can be done for men

General Marriage Rate for Women and Men

- ◆ General marriage rate for women (GMR^f)

$$GMR^f = \frac{M}{P_{15+}^f} * 1000 \approx 2 * GMR$$

- ◆ General marriage rate for men (GMR^m)

$$GMR^m = \frac{M}{P_{15+}^m} * 1000$$

- ◆ Note: $GMR^f \neq GMR^m$

Exercise

General Marriage Rate

- ◆ Calculate the general marriage rate for women and compare it to the general marriage rate for Brazil (1988) based on the following data

Brazil, 1988

Number of marriages	:	951 236
Total population 15+	:	92 852 000
Total female population 15+	:	46 706 000

You have 15 seconds to calculate the answer. You may pause the presentation if you need more time.

Exercise Answer

General Marriage Rate

- ◆ The correct answers for the general marriage rates are as follows:

GMR

10.24

GMR^f

20.37

Brazil, 1988

Number of marriages	:	951 236
Total population 15+	:	92 852 000
Total female population 15+	:	46 706 000

Age-Specific Marriage Rate (ASMR)

- ◆ *ASMR*—Number of marriages per 1,000 women (or men) of age “a”

$$= \frac{M_a}{W_a} * 1000$$

- ◆ Where M_a = Number of marriages to women of age “a”
 W_a = Mid-year population of women of age “a”

Exercise

Age-Specific Marriage Rate

- ◆ Calculate the age-specific marriage rate for women 25–29 for Brazil (1988) based on the following data:

Brazil, 1988

Number of marriages, women 25-29:	161 086
Female population 25-29:	6 362 000

You have 15 seconds to calculate the answer. You may pause the presentation if you need more time.

Exercise Answer

Age-Specific Marriage Rate

- ◆ The correct answer for the age-specific marriage rate for women 25–29 for Brazil (1988) is as follows:
 - **25.32**

Brazil, 1988

Number of marriages, women 25-29:	161 086
Female population 25-29:	6 362 000

Order-Specific Marriage Rate (OSMR)

- ◆ *OSMR*—Number of order “i” marriages per 1,000 persons age 15 and older with marriage order “i-1”

$$= \frac{M_i}{P_{15+}^{i-1}} * 1000$$

- ◆ Where M_i = Number of marriages of order “i”
 P_{15+}^{i-1} = Mid-year population age 15+ with marriage order “i-1”

Order-Specific Marriage Rate (OSMR)

- ◆ Note:
 - OSMR is normally sex-specific
 - It can also be age-specific

OSMR for women

$$\frac{M^i}{W_{15+}^{i-1}} * 1000$$

OSMR for men

$$\frac{M^i}{P_{15+}^{m,i-1}} * 1000$$

$$\sum_{i=1}^W \text{OSMR} \neq \text{GMR}$$

First Order-Specific Marriage Rate

- ◆ First order-specific marriage rate is used for a nuptiality life table

$$\frac{M^1}{P_{15+}^s} * 1000$$

- ◆ Where M^1 = Number of first marriages
 P_{15+}^s = Mid-year population of never-married (single) persons
- ◆ Note: Is usually calculated sex-specific

Age-Order Specific Marriage Rate (AOSMR)

- ◆ Let M_a^i = Number of marriages of order "i" to women (or men) of age "a"
- P_a^{i-1} = Mid-year population of women (or men) of age "a" who are at marriage order "i-1"

Age-Order Specific Marriage Rate (AOSMR)

- ◆ *AOSMR*—Number of marriages of order “i” per 1,000 women of age “a” who are at their “i-1th” marriage

$$= \frac{M_a^i}{W_a^{i-1}} * 1000$$

Some Relationships

◆ Note that: $\sum_i \text{AOSMR} \neq \text{ASMR}$

– Since:
$$\text{ASMR} = \sum_i \frac{M_a^i}{W_a^{i-1}} * \frac{W_a^{i-1}}{W_a}$$

◆ Also that: $\sum_a \text{AOSMR} \neq \text{OSMR}$

– Since:
$$\text{OSMR} = \sum_a \frac{M_a^i}{W_a^{i-1}} * \frac{W_a^{i-1}}{W_{15+}}$$

Total Marriage Rate (TMR)

- ◆ *Total Marriage Rate*—Total number of marriages a person will have at the end of his/her marriageable age if he/she follows the given schedule of marriage

$$= \sum_{a=15}^{65+} \frac{M_a}{P_a}$$

- ◆ Note: Is sex-specific

Total First Marriage Rate (TMFR)

$$\text{TFMR} = \sum_a^{65+} \frac{M_a^1}{P_a}$$

TFMR \leq 1.0 for cohort rate,
but period rate can be above 1.0

◆ Note: $\text{TMR}^m > \text{TMR}^f$

$\text{TMR} - \text{TFMR} = \text{TRMR}$ (Total remarriage rate)

Exercise

Total First Marriage Rate (TMFR)

- ◆ Calculate the total first marriage rate for women from Brazil (1988) based on the following data

Age Group	1st Marriages	Population
-20	311 233	32 885 000
20-24	346 361	6 875 000
25-29	161 086	6 362 000
30-34	61 085	5 443 000
35-39	29 653	4 479 000
40-44	16 503	3 590 000
45+	25 315	12 735 000

You have 15 seconds to calculate the answer. You may pause the presentation if you need more time.

Exercise Answer

Total First Marriage Rate (TMFR)

- ◆ The correct answer for the age-specific marriage rate for women 25–29 for Brazil (1988) is as follows:
 - **0.55**

Age Group	1st Marriages	Population
-20	311 233	32 885 000
20-24	346 361	6 875 000
25-29	161 086	6 362 000
30-34	61 085	5 443 000
35-39	29 653	4 479 000
40-44	16 503	3 590 000
45+	25 315	12 735 000

Singulate Mean Age at Marriage (SMAM)

- ◆ Estimate of the mean age at first marriage approximated by indirect method from cross-sectional data on marital status by age
 - Mean age at marriage of women marrying before they reach 50

Singulate Mean Age at Marriage (SMAM)

- ◆ Basic assumptions:
 - The change in the proportion single from age “ x ” to age “ $x+1$ ” is a measure of the proportion of a birth cohort who married at that age if no woman dies between her 15th and 55th birthday
 - The risk of marriage has remained constant (otherwise we estimate the mean for some average cohort)

Singulate Mean Age at Marriage (SMAM)

- Let S_i, S_j = Proportions of women single at ages i, j , then

$$SMAM = \frac{\left[\left(\sum_{i=15}^{49} S_i * 5 \right) + 1,500 \right] - \left[\left(\frac{\sum_{i=45}^{49} S_i + \sum_{j=50}^{54} S_j}{2} \right) * 50 \right]}{100 - \left(\frac{\sum_{i=45}^{49} S_i + \sum_{j=50}^{54} S_j}{2} \right)}$$

Other Measures

- ◆ Mean and median ages (of first marriage, of remarriages)
- ◆ Percent single
- ◆ Age of groom by age of bride
- ◆ Duration of marriage

Standardization

- ◆ Most of the marriage measures can and should be standardized for comparisons
- ◆ Can be done by direct or indirect method
- ◆ Used for comparative marriage analyses
- ◆ Example: Age-standardized first marriage rate of the U.S. (1960), using England and Wales (1961) as standard-direct method

Age Group	Male First Marriage Rates U.S.	Single Male Population England and Wales	Expected First Marriages U.S.A
15-19	0.031	1,604,910	49,752
20-24	0.210	989,661	207,829
25-29	0.190	425,643	80,872
30-34	0.111	262,656	29,155
35-44	0.060	373,918	22,435
45-64	0.019	498,549	9,472
65+	0.011	158,846	1,747
Total	Crude = 70.7	4,314,183	401,262

U.S. age-standardized first marriage rate =
 $401,262 / 4,314,183 \times 1,000 = 93$

Gross Nuptiality Table

- ◆ Assumes no person dies before passing through the marriageable ages
- ◆ Same techniques as in life table construction
- ◆ Allows one to determine what proportion of a cohort of single persons would be married at various ages assuming that the marriage rates used continues to prevail and there is no mortality

Net Nuptiality Table

- ◆ Takes into account mortality as well as marriage
- ◆ Indicates the pace at which a group of single persons is decreased annually by marriage and death

Net Nuptiality Table

- ◆ Also gives the probability of a single person marrying at each year of age according to the current nuptiality and mortality rates
- ◆ Provides information on the average age at marriage
- ◆ Multiple-decrement life table techniques are needed

Summary

- ◆ Marital status provides a static representation of the population with respect to its marital composition
- ◆ Measures on marriage focus on the dynamic aspect
- ◆ Marriage information are mainly derived from vital statistics whereas marital status is primarily analyzed from census and survey data

Summary

- ◆ Marriage rates directly measure changes in population composition characteristics rather than changes in population size
- ◆ But if the change in population size is considered a function of the broader process of reproduction—which in most societies occurs through formation of families—then the rates of family formation and dissolution are part of population dynamics

Section B

Indicators of Divorce

Divorce

- ◆ *Divorce*—Separation of the husband and wife by a judicial decree which confers on the parties the right to remarriage

Crude Divorce Rate

- ◆ *Crude Divorce Rate*—Number of divorces per 1,000 population

$$= \frac{\text{Div}}{P} * 1000$$

- ◆ Where Div = Number of divorces
P = Mid-year population

General Divorce Rate

- ◆ *General Divorce Rate*—Number of divorces per 1,000 persons age 15 and more

$$= \frac{\text{Div}}{P_{15+}} * 1000$$

- ◆ Where Div = Number of divorces
P₁₅₊ = Mid-year population 15 and older

Exercise

Crude and General Divorce Rates

- ◆ Calculate the crude divorce rate and the general divorce rate for Brazil (1988) based on the following data:

Brazil, 1988

Number of divorces	:	33,437
Total population 15+	:	92,852,000
Total population	:	144,428,000

You have 15 seconds to calculate the answer. You may pause the presentation if you need more time.

Exercise Answer

Crude and General Divorce Rates

- ◆ The correct answers for the crude divorce rate for Brazil (1988) are as follows:
 - **Crude Divorce Rate = 6.45 divorces per 1,000 population**
 - **General Divorce Rate = 10.03 divorces per 1,000 persons age 15+**

Brazil, 1988

Number of divorces	:	33,437
Total population 15+	:	92,852,000
Total population	:	144,428,000

Divorce Rate Among Married Couples

- ◆ *Divorce Rate Among Married Couples*—
Number of divorces per 1,000 married persons

$$= \frac{\text{Div}}{P_m} * 1000$$

- ◆ Where P_m = Mid-year population of married persons
- ◆ Note: Can be sex-specific

Age-Specific Divorce Rate

- ◆ *Age-Specific Divorce Rate*—Number of divorces per 1,000 women (or men) of age “a”

$$= \frac{\text{Div}_a^f}{P_a^f} * 1000$$

- ◆ Where Div_a^f = Number of divorces by women age “a”
 P_a^f = Mid-year population of women age “a”

Exercise

Age-Specific Divorce Rates

- ◆ Calculate the age-specific divorce rates for women 30–34 and 40–44 for Brazil (1988) based on the following data

Brazil, 1988		
Age Group	Divorces	Population
30–34	6,689	5,443,000
40–44	4,825	3,590,000

You have 15 seconds to calculate the answer. You may pause the presentation if you need more time.

Exercise Answer

Age-Specific Divorce Rates

- ◆ The correct answers for the age-specific divorce rate are as follows:
 - **1.23 divorces per 1,000 women 30–34**
 - **1.34 divorces per 1,000 women 40–44**

Brazil, 1988

Age group	Divorces	Population
30–34	6,689	5,443,000
40–44	4,825	3,590,000

Duration-Specific Divorce Rate

- ◆ Let Div_d = Number of divorces to persons who have been married for a duration d
- ◆ P_{mar}^d = Mid-year married population of persons who have been married for a duration d

Duration-Specific Divorce Rate

- ◆ *Duration-Specific Divorce Rate*—Number of divorces per 1,000 persons who have been married for a duration “d”

$$= \frac{\text{Div}_d}{P_{\text{mar}}^d} * 1000$$

Order-Specific Divorce Rate

- ◆ Let Div^i = Number of divorces of order "i"
- P_{mar}^i = Mid-year married population of persons who have been married "i" times
- P_{div}^{i-1} = Mid-year population of persons divorced "i-1" times

Order-Specific Divorce Rate

- ◆ *Order-Specific Divorce Rate*—Number of divorces of order “i” per 1,000 persons who have been married “i” times

$$= \frac{\text{Div}^i}{P_{\text{mar}}^i} * 1000$$

- ◆ Note: It may be hard to get the denominator

Order-Specific Divorce Rate

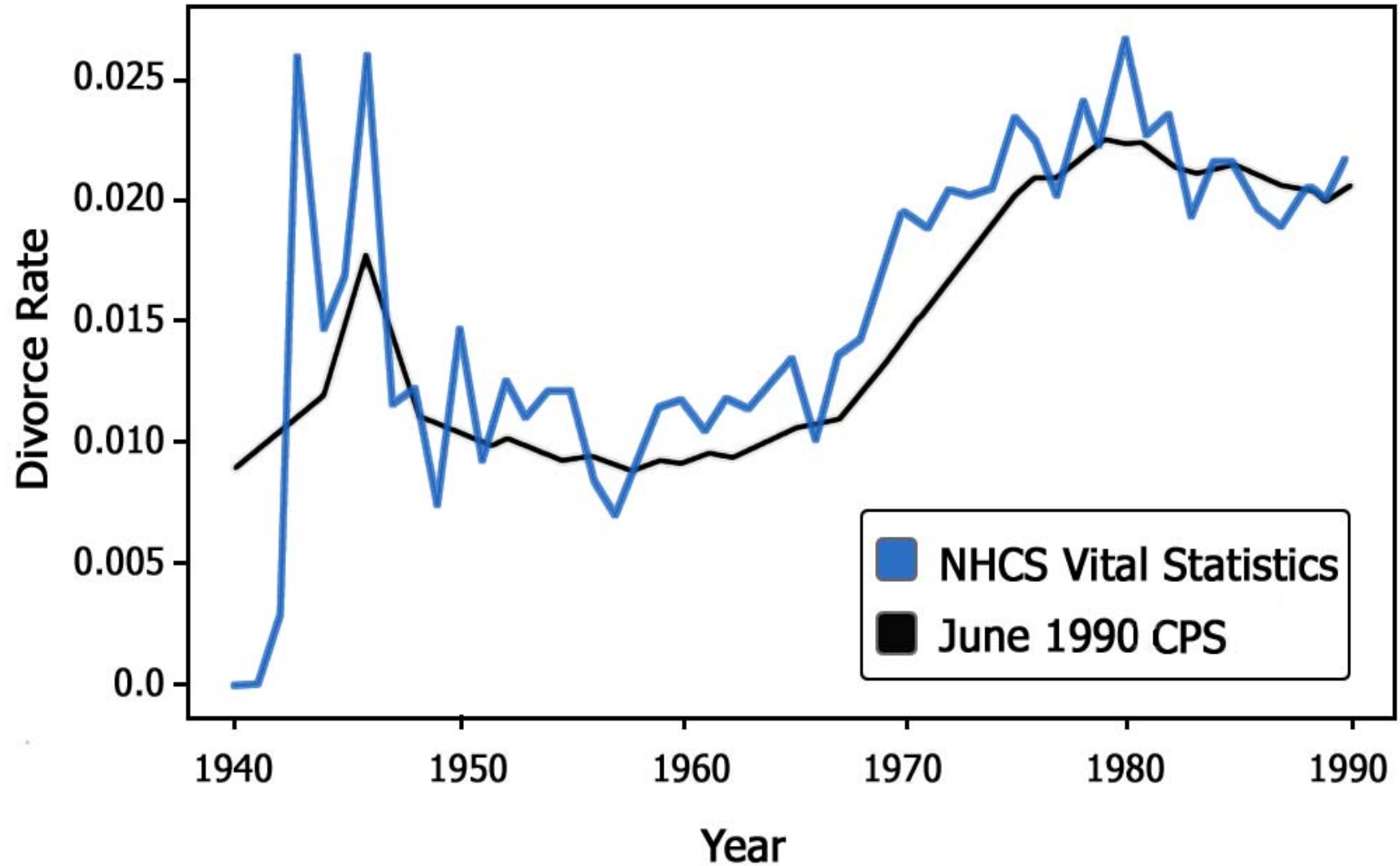
- ◆ Alternatively:
 - Number of divorces of order “i” per 1,000 persons who have divorced “i-1” times

$$= \frac{\text{Div}^i}{P_{\text{div}}^{i-1}} * 1000$$

Standardization of Divorce Rates

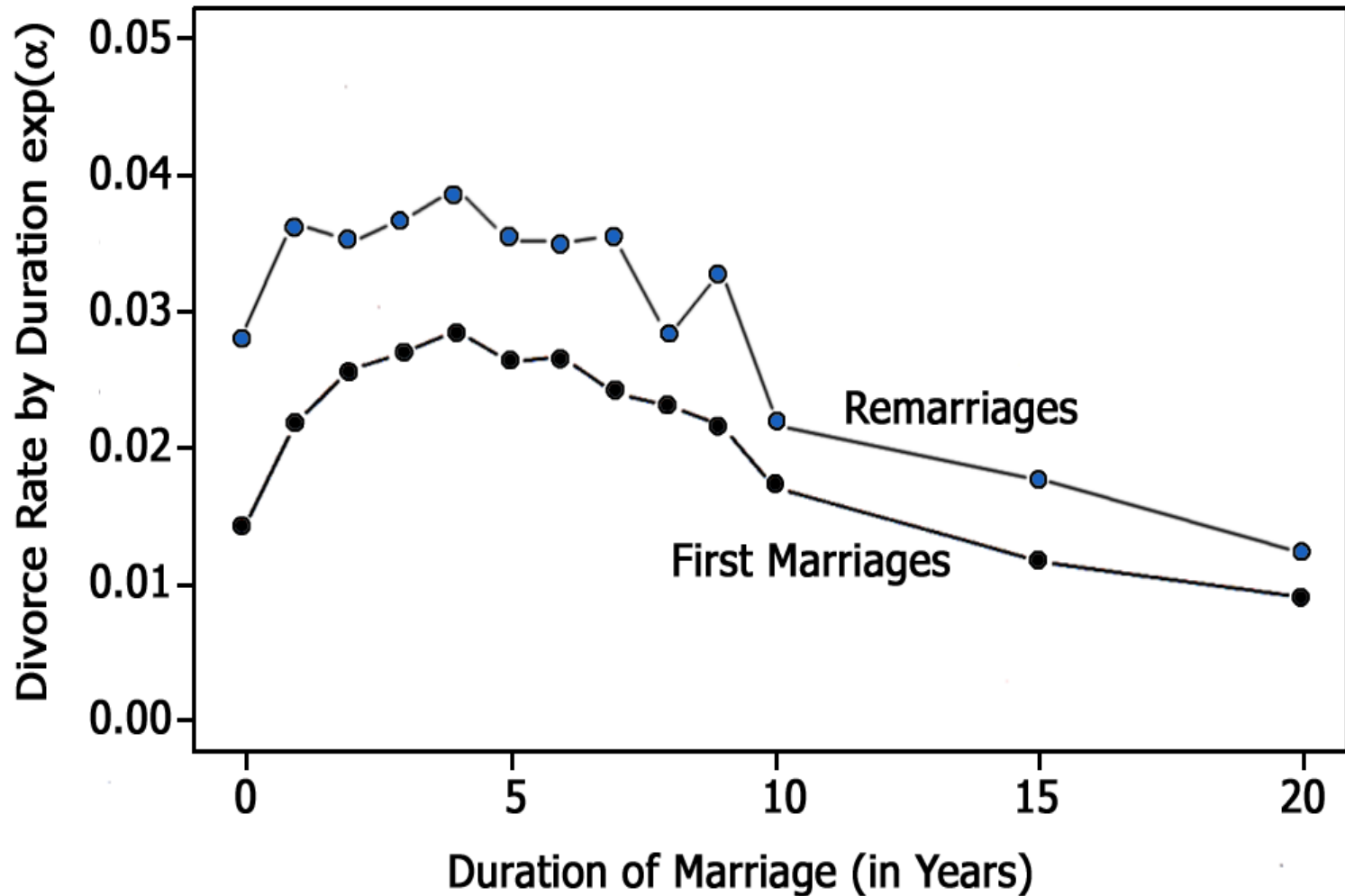
- ◆ Crude and general divorce rates can be standardized
- ◆ Can be done by direct or indirect method
- ◆ Used for comparative divorce analyses

Comparison of Crude Annual Divorce Rates



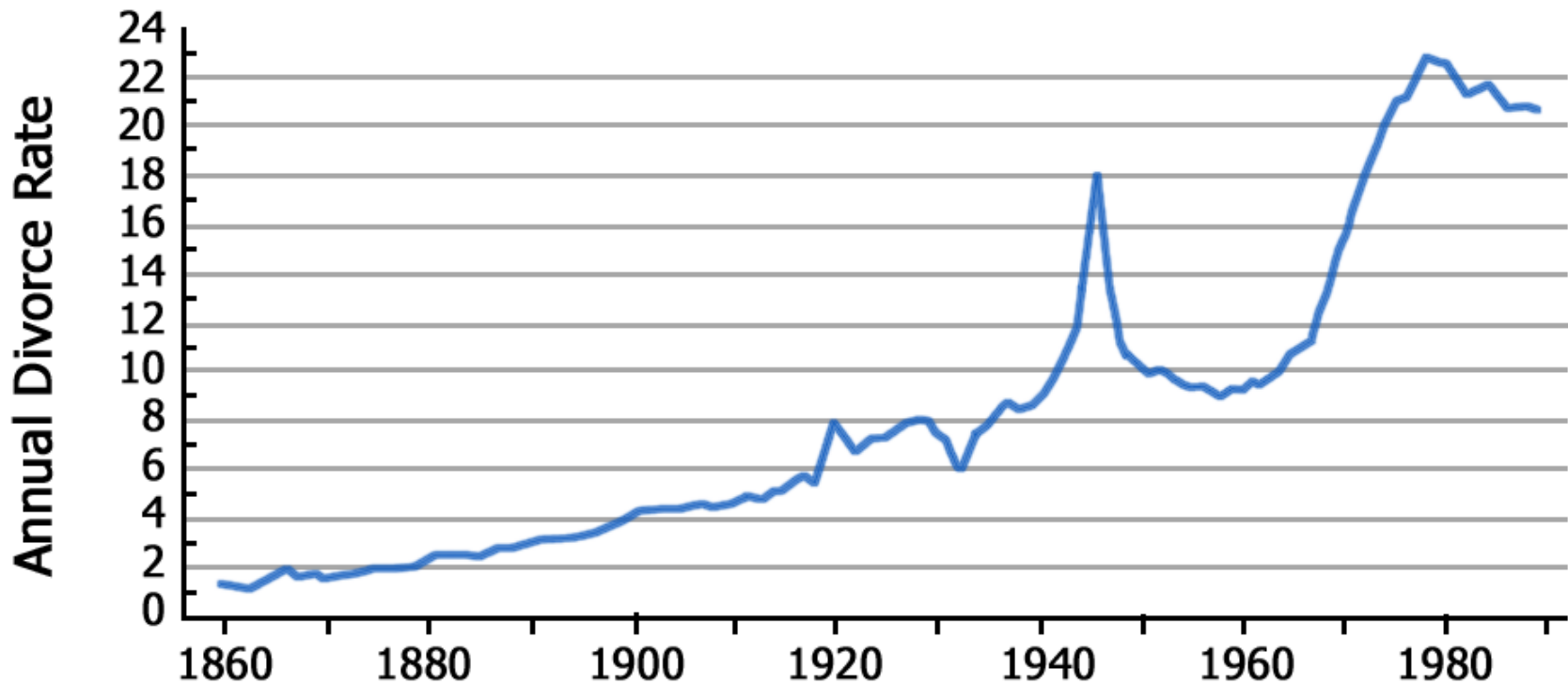
Adapted from Joshua R. Goldstein, The Leveling of Divorce in the United States, Demography, Volume 36 (3), August 1999

Estimated Marital Duration Effects for Divorce



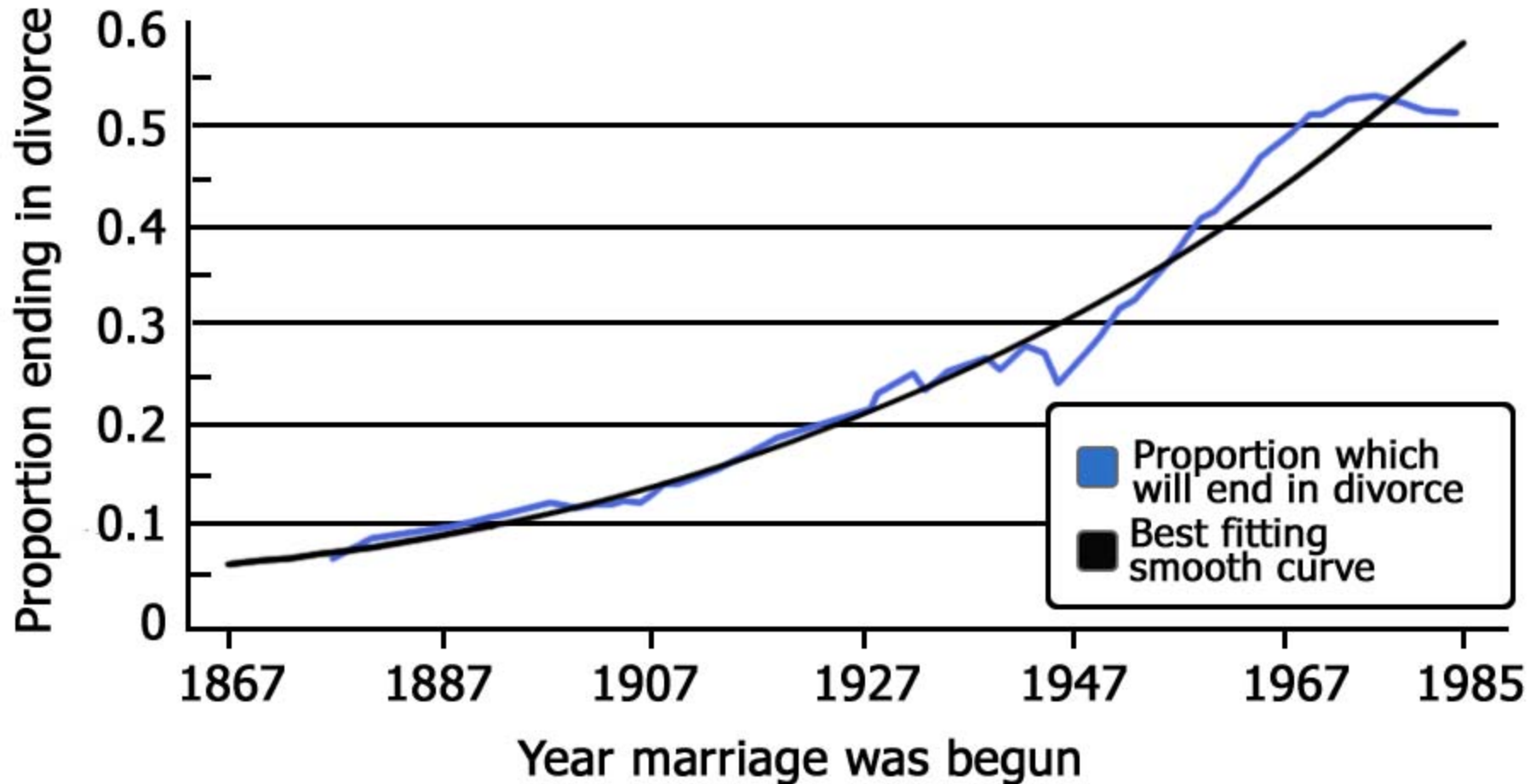
Adapted from Joshua R. Goldstein, The Leveling of Divorce in the United States, Demography, Volume 36 (3), August 1999

U.S. Annual Divorce Rate



*Adapted from Andrew J. Cherlin, Marriage, Divorce, Remarriage.
Harvard University Press, 1992*

Proportion of Marriages that Will End in Divorce



Adapted from Andrew J. Cherlin, Marriage, Divorce, Remarriage. Harvard University Press, 1992

Summary

- ◆ Measures on marriage and divorce focus on the dynamic aspect
- ◆ Divorce information is mainly derived from vital statistics
- ◆ Divorce rates measure changes in population composition characteristics rather than changes in population size