Explaining a Marriage Paradox: Call for the Computer Simulation Studies Based on a Simple Mathematical Model.

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Social Science and Social Computing: Steps to Integration (CCPV Workshop)

May 22–23, 2010, Honolulu, Hawai'i, USA

1. Introduction: Marriage Paradoxes

- "Marriage Paradoxes"
  - e.g. Frey & Eichenberger (1996)

- Empirical evidence deviates from predictions from the "rational" view of marriage.

1. Introduction: Marriage Paradoxes

- One example of the Marriage Paradoxes:
- Kimura's (2000) simple RC model
  - enabling us to directly estimate the proportion of the unmarried women.
  - lackluster fit of the estimation to the Japanese longitudinal data.

1. Introduction: Marriage Paradoxes

- What shall I do?
- Two Alternatives:

(1) Introducing “cognitive” elements

(2) Computer simulation studies

- Introducing the time dimension
- Elaboration on the “matching” mechanism
- And more ...

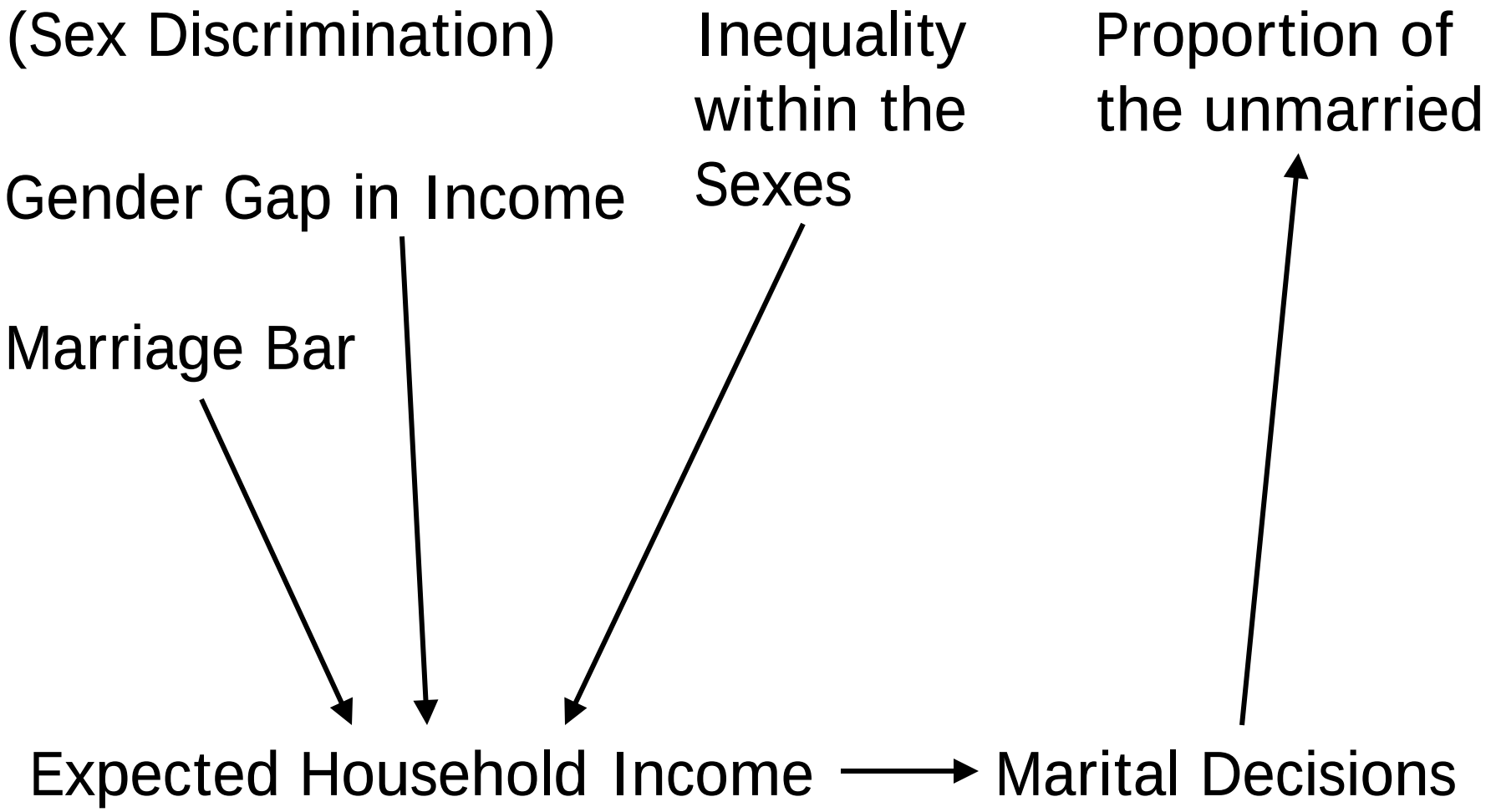
Outline of this presentation

- Kimura's (2000) model (revisited)
- Description of the datasets
- Estimation vs. Reality
- Alternatives for Future Research

2. Kimura's Simple Model

- Kimura's (2000) simple model
  - An expected value model with assumptions on the distribution of income and on the M-F matching

  - Predictions of the effects of sex discrimination and inequality within the sexes on marriage


(Sex Discrimination)
Inequality within the Sexes
Proportion of the unmarried
Gender Gap in Income
Marriage Bar
Expected Household Income
Marital Decisions

2. Kimura's Simple Model
2.1 Individual Decision on Marriage

- Expected value model for a woman's decision on marriage

<u>Definitions</u>

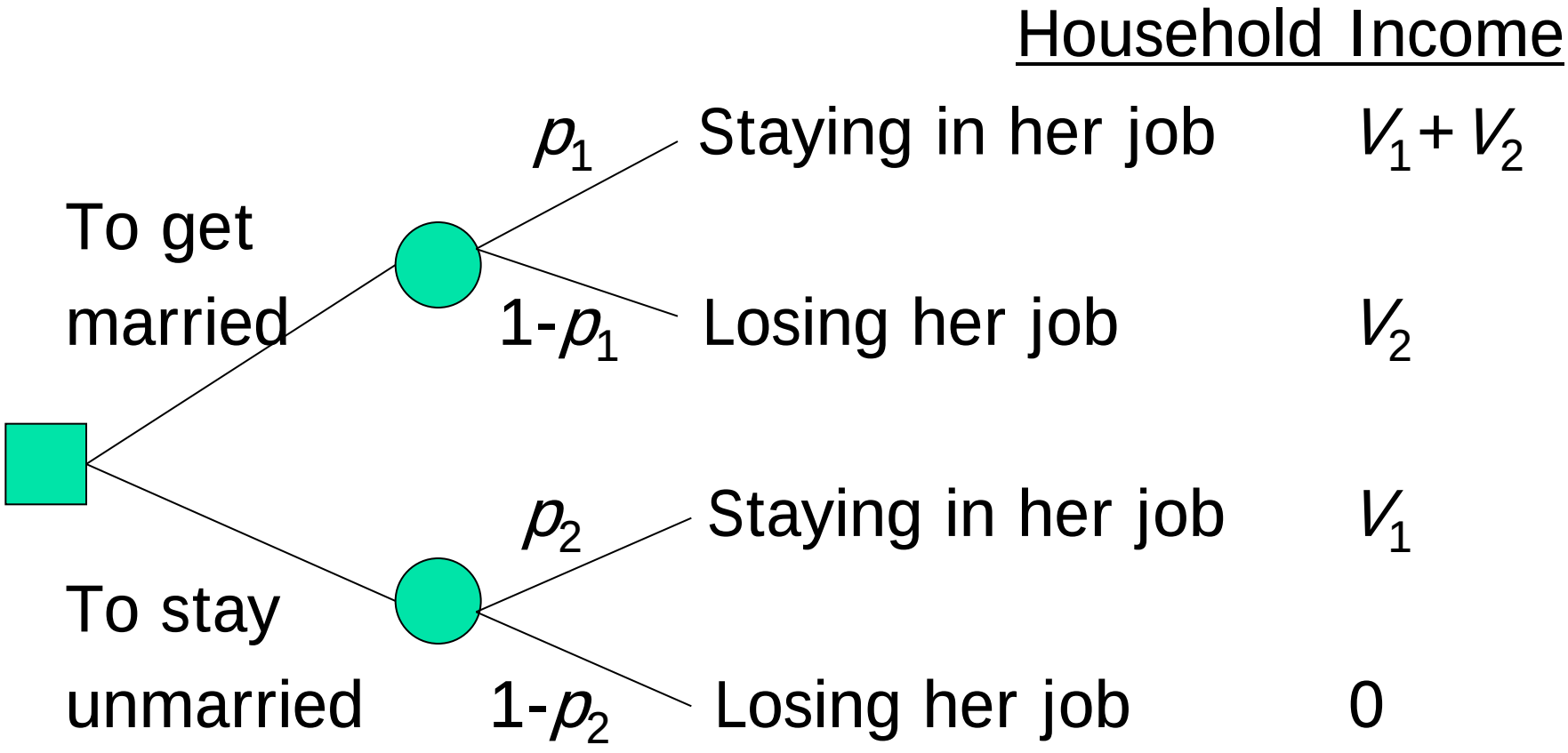
V_1: Woman's own income

V_2: Husband's income

p_1: P (Staying in her job | To get married)

p_2: P (Staying in her job | To stay unmarried)

2. Kimura's Simple Model
2.1 Individual Decision on Marriage



2. Kimura's Simple Model
2.1 Individual Decision on Marriage

- To get married $\Leftrightarrow$ $V_2 / V_1 > p_2 - p_1$

- Two Types of Sex Discrimination
  - The Gender gap in income
    - V_2 / V_1
  - The "marriage bar"
    - $p_2 - p_1$

2. Kimura's Simple Model
2.2 Assumptions on Income & Matching

Assumption 1

V_1, V_2 are subject to a log-normal distribution respectively.

(e.g. Aitchson and Brown 1957)

$\log V_1 \sim N(\mu_1, \sigma_1)$, and

$\log V_2 \sim N(\mu_2, \sigma_2)$.

2. Kimura's Simple Model
2.2 Assumptions on Income & Matching

Assumption 2

A woman is randomly matched with only one marriage candidate.

(There is no other chance for marriage.)

2. Kimura's Simple Model

2.3 Estimated Proportion of the Unmarried Women

$$P(\text{Unmarried}) = P\{\log V_2 - \log V_1 \le c\}$$
$$= P\{Z \le Z_c\}$$

where

$$Z = \frac{(\log V_2 - \log V_1) - (\mu_2 - \mu_1)}{\sqrt{\sigma_1^2 + \sigma_2^2}}$$

$$Z_c = \frac{c - (\mu_2 - \mu_1)}{\sqrt{\sigma_1^2 + \sigma_2^2}}$$

$$c = \log(p_1 - p_2)$$

2. Kimura's Simple Model

- Test of estimations (as well as "predictions") from this model
- Using the data of Japan, 1965-2000

Notice: This presentation reports only the result of a preliminary analysis.

3. Data: Official Statistics of Japan, 1965-2000

(1) Japanese National Census
[Statistical Bureau, Management and Coordination Agency, Japan]

(2) Basic Survey of Wage Structure
[Policy Planning and Research Department, Ministry of Labor, Japan]

3. Data: Official Statistics of Japan, 1965-2000

(3) Labor Force Survey

[Statistical Bureau, Management and Coordination Agency, Japan]

Notice:

I will pay special attention to regular/full-time employment (in non-agricultural sectors) here.

4. Estimation vs. Reality

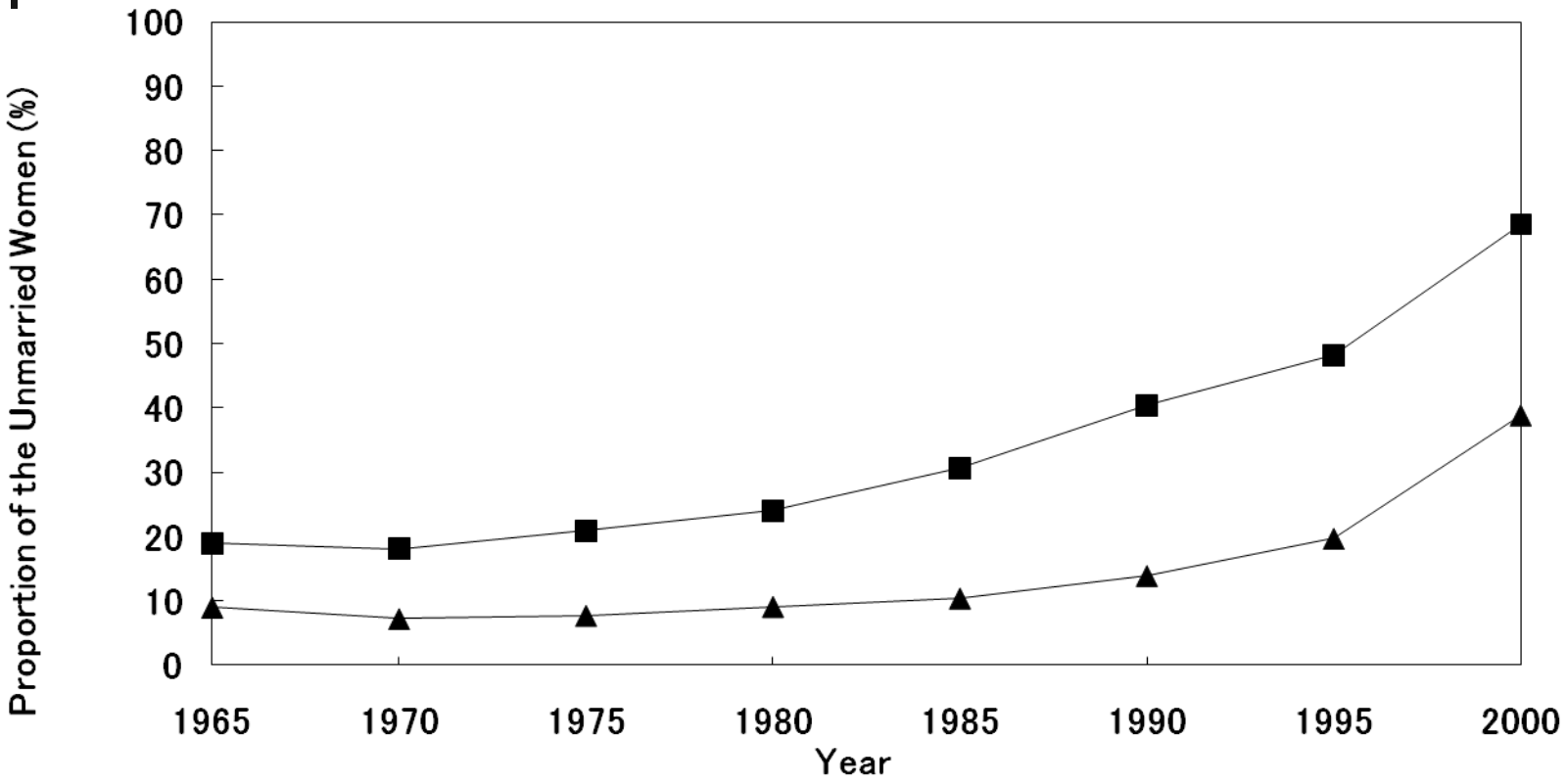


Fig.1 Trend in the Proportion of the Unmarried Women

4. Estimation vs. Reality

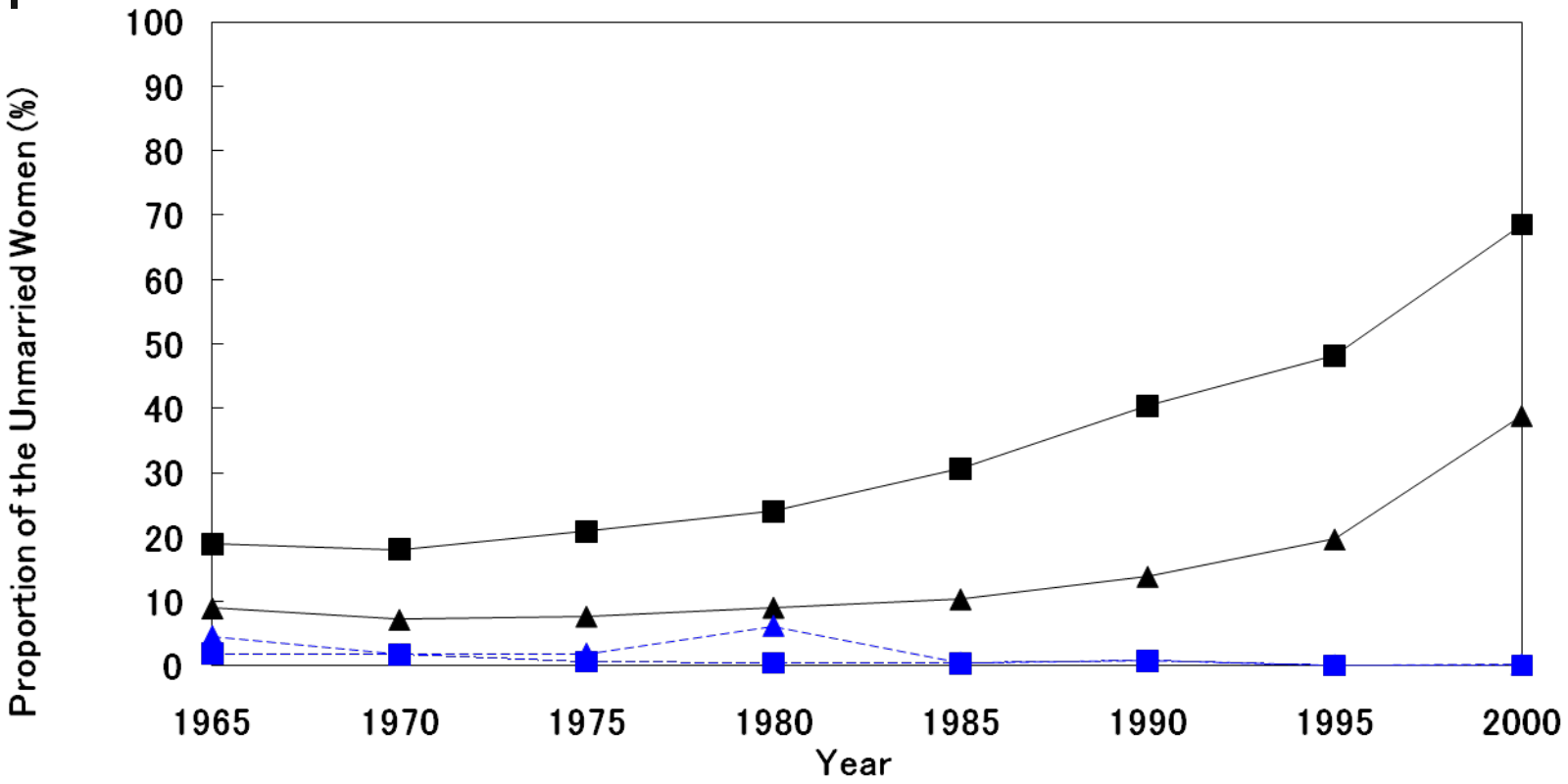


Fig.1 Trend in the Proportion of the Unmarried Women

4. Estimation vs. Reality

- Overall fit of the estimation
  - The estimated proportions of the unmarried women cannot replicate the actual trend of the proportions of the unmarried women except for the women aged 30-34 from 1965 to 1980.
- Little support to Kimura's (2000) model

5. Alternatives for Future Research

(1) Introducing “cognitive” elements

- Risk parameter
- Weight function: $p \rightarrow \pi(p)$
  - Cumulative prospect theory
  - Tversky and Kahneman (1992)

5. Alternatives for Future Research

(2) Computer simulation studies

- Introducing the time dimension
- Elaboration of the “matching” mechanism
- Modeling “differential association”
- Women’s part-time working after their marriage ... and so forth

Any questions or suggestions?

Appendices

A1. Predictions from Kimura's Model

A2. Trends in Japan, 1965-2000

- A2.1 Gender Gap in Income
- A2.2 The "Marriage Bar"
- A2.3 Inequality within the Sexes
- A2.4 Summary

A3. Estimation of Mean and Standard Deviation

A1. Predictions from Kimura's Model

Prediction 1.

Gender gap in income $(\mu_2 - \mu_1)$ ↑

→ *P* (Unmarried) ↓

Prediction 2.

Severity of the "marriage bar" $(p_2 - p_1)$ ↑

→ *P* (Unmarried) ↑

A1. Predictions from Kimura's Model

Prediction 3.

Inequality of income within the sexes (σ_1^2 or σ_2^2) ↑ ⇒ *P* (Unmarried) ↑

where $\mu_2 - \mu_1 > c$.

(cf. Sen ([1972] 1997) on the measures of income inequality)

Notice:

Since $c < 0$, $Z_c < 0$ where $\mu_2 - \mu_1 > c$.

A2. Trends in Japan, 1965-2000
A2.1 Gender Gap in Income

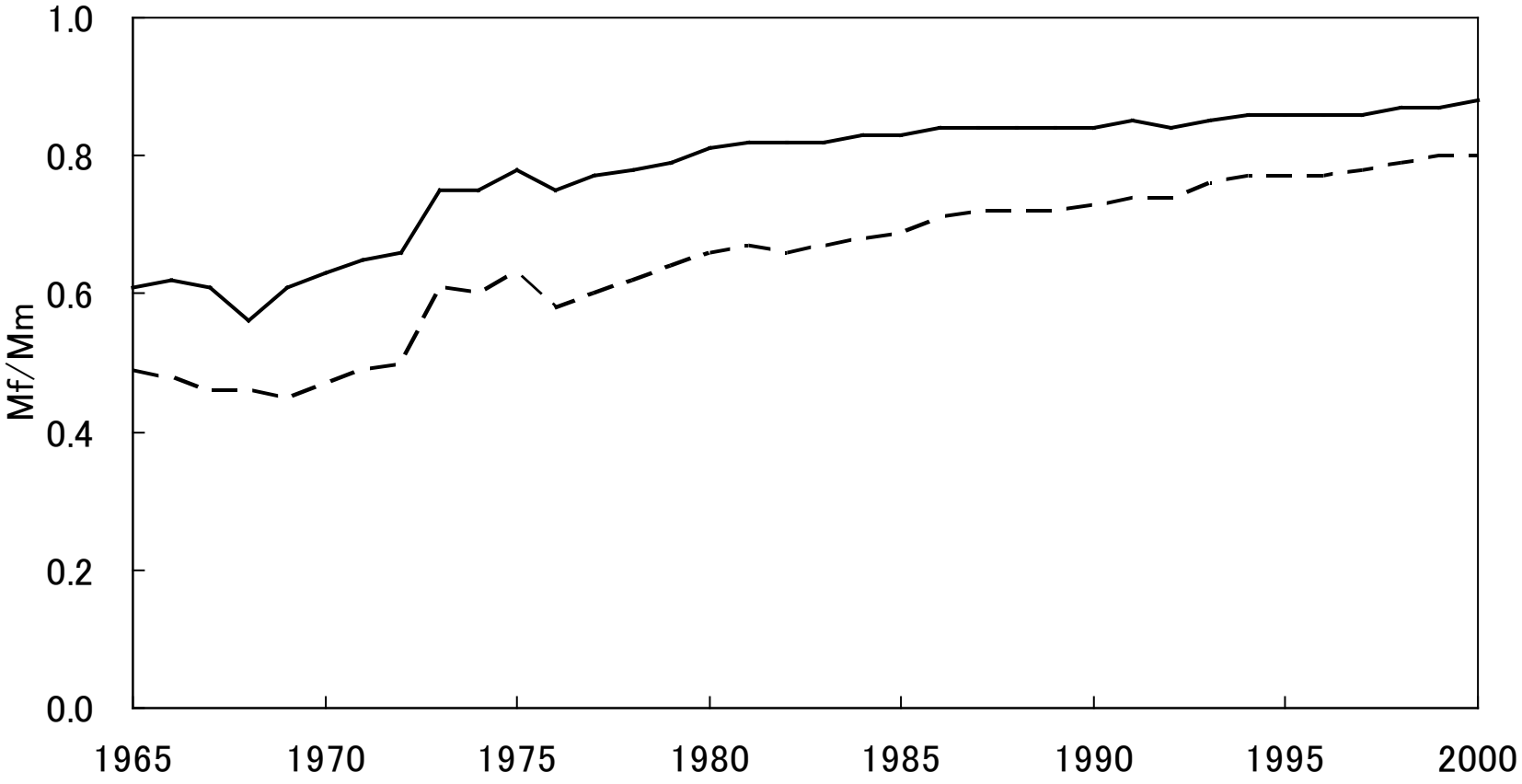


Fig.A1 Gender Gap in Income (Mf/Mm) in Japan, 1965-200

A2. Trends in Japan, 1965-2000
A2.2 The “Marriage Bar” (1)

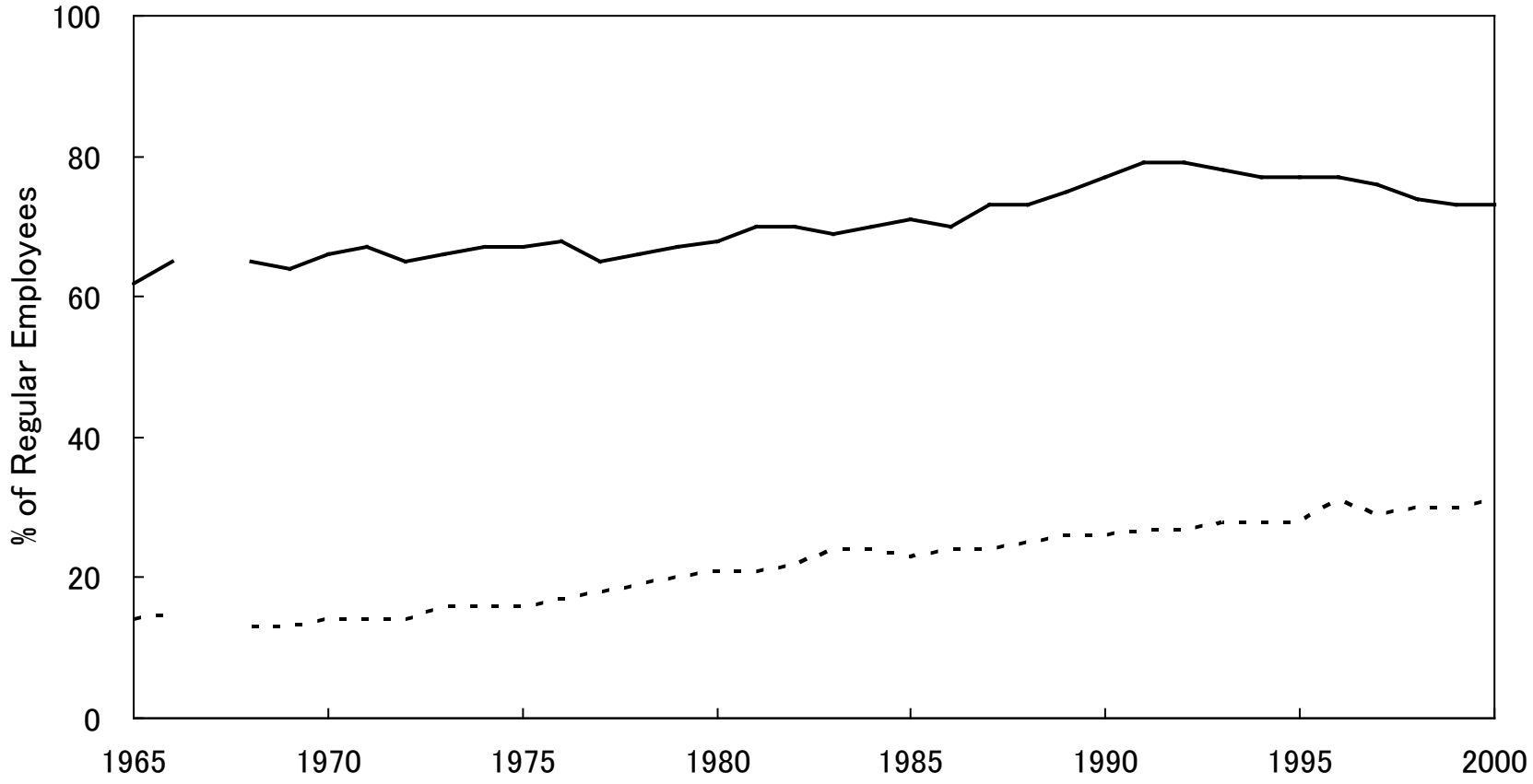


Fig.A2 Percentage of Regular Empoyees among Women Aged 25–29

A2. Trends in Japan, 1965-2000
A2.2 The “Marriage Bar” (2)

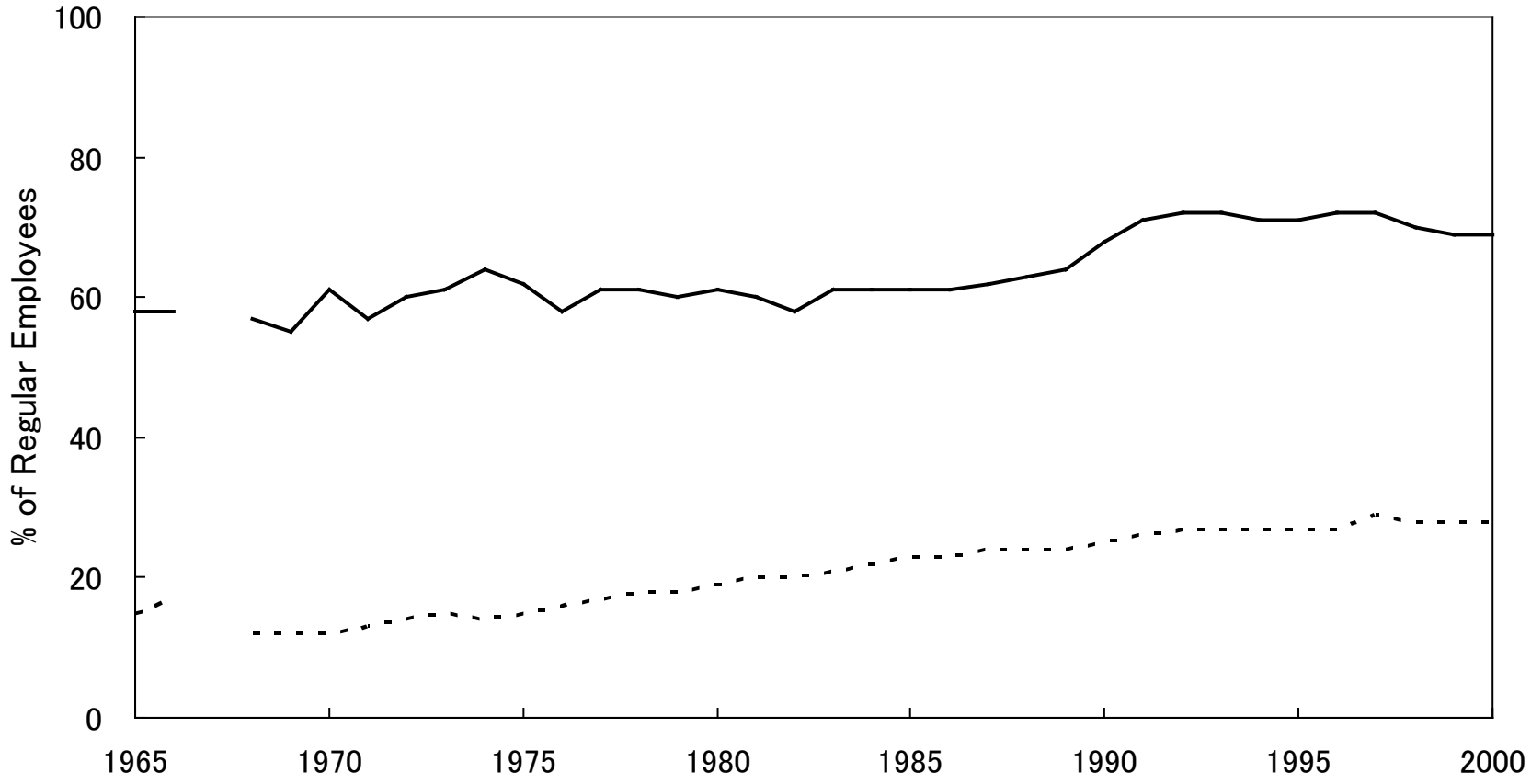


Fig.A3 Percentage of Regular Empoyees among Women Aged 30–34

A2. Trends in Japan, 1965-2000
A2.3 Inequality within the Sexes

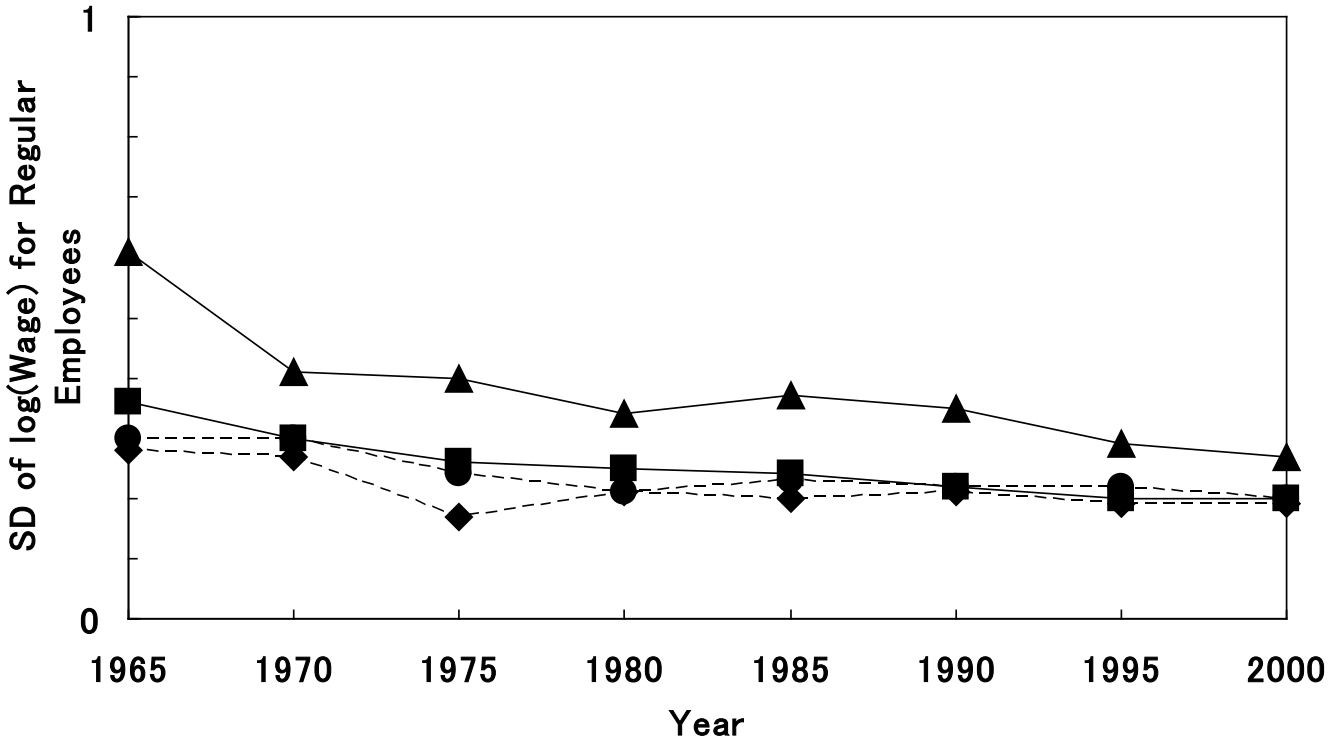


Fig.A4 Trend in Income Inequality within the Sexes

A2. Trends in Japan, 1965-2000
A2.4 Summary

- Decreasing gender gap in income

  ⇒ Confirming *Prediction 1* (?)

- Persisting “marriage bar”

  ⇒ Unable to confirm *Prediction 2*

- Slightly decreasing SD of log(income) (especially for women aged 30-34)

  ⇒ Opposite to *Prediction 3* (?)

A3. Estimation of Mean and Standard Deviation

On the assumption of a log-normal distribution such that $\log V \sim N(\mu, \sigma)$, we can estimate μ and σ as follows:

$\mu = \log M$ [M stands for median];

$$\sigma = \log \left\{ \frac{1}{2} \left[\frac{M}{P_{16}} + \frac{P_{84}}{M} \right] \right\}$$

[P_x stands for x-th percentile]

(Aitchson and Brown 1957, p.32)