The Family, Marriage, and Gender Inequality
quantitative analysis of economic situation after divorce

TANAKA Sigeto
(Tohoku University)
Trend in marital status

Population Census 1950-2005,
Men aged 25-69

Unmarried  Married  Widow  Divorced

0%  20%  40%  60%  80%  100%
Post-Divorce Life

Literature review:

- No quantitative analysis
- Research on single-motherhood
- Hypothesis of marital-life results
- Pre-marriage effect?
Recent findings

Tanaka (2008): Effect of interrupted career / young children after controlling pre-marriage status

Tanaka (2010): Similar results with more reliable data (NFRJ03)

→ Replication by other data
Contents

1. Sociological theory of inequality
2. Results from data analysis
3. Introduction to quantitative analysis
4. Implication from the findings
Social System Theory

<table>
<thead>
<tr>
<th>Family</th>
<th>Market</th>
<th>School</th>
</tr>
</thead>
<tbody>
<tr>
<td>State</td>
<td>Local community</td>
<td>......</td>
</tr>
</tbody>
</table>

Interaction between autonomous subsystems
Perspectives to inequality

Inequality:
Uneven distribution of resources

Resource:
Something scarce but needed by people
(1) Resulted distribution

- Poverty
- Variance, Gini coefficient, etc...
- 格差
(2) Discrimination

Different treatment based on social categories with no justified reason
No discrimination but ......

Reproduction of meritocracy:

- Early socialization by well-educated parents
  - Good academic performance
  - Good job / high wage

Injustice in this process?
(3) Stratification

Social process allocating people to the hierarchical order of status

Ascription

Stratification process

Resource
Gender stratification

Process of differentiating men/women on the hierarchical order of status
全国家族調査 (NFRJ)
By Japan Society of Family Sociology

★ Detailed information on kinship and life events
★ Huge number: 473, 494, 463 divorced
問15 去年1年間のお宅の収入（生計をともにしている家族全員の収入の合計）は、税込みでは次の中のどれに近いでしょうか。

| 1 | 収入はなかった | 6 | 600〜799万円台 |
| 2 | 100万円未満 | 7 | 800〜999万円台 |
| 3 | 100〜199万円台 | 8 | 1000〜1199万円台 |
| 4 | 200〜399万円台 | 9 | 1200万円以上 |
| 5 | 400〜599万円台 | 10 | わからない |

Annual household income
NFRJ98: on page 5/25
問8 去年1年間のお宅（生計をともにしている家族）の収入は、税込みでは次の中のどれに近いでしょうか。他の家族の方の収入も含めてお答えください。（○は1つだけ）

<p>| | | | | | | | |</p>
<table>
<thead>
<tr>
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</tr>
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<tbody>
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<td>収入はなかった</td>
<td>7</td>
<td>500～ 599 万円台</td>
<td>13</td>
<td>1100～1199 万円台</td>
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</tr>
<tr>
<td>2</td>
<td>100 万円未満</td>
<td>8</td>
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<td>14</td>
<td>1200～1299 万円台</td>
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<tr>
<td>3</td>
<td>100～199 万円台</td>
<td>9</td>
<td>700～ 799 万円台</td>
<td>15</td>
<td>1300～1399 万円台</td>
<td></td>
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</tr>
<tr>
<td>4</td>
<td>200～299 万円台</td>
<td>10</td>
<td>800～ 899 万円台</td>
<td>16</td>
<td>1400～1499 万円台</td>
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</tr>
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<td>5</td>
<td>300～399 万円台</td>
<td>11</td>
<td>900～ 999 万円台</td>
<td>17</td>
<td>1500～1599 万円台</td>
<td></td>
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</tr>
<tr>
<td>6</td>
<td>400～499 万円台</td>
<td>12</td>
<td>1000～1099 万円台</td>
<td>18</td>
<td>1600 万円以上</td>
<td></td>
<td></td>
</tr>
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</table>
問18 去年1年間のお宅（生計をともにしている家族）の収入は、税込みでは次の中のどれに近いでしょうか。他の家族の方の収入も含めてお答えください。（○は1つだけ）

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<th>答え</th>
<th>収入額区间</th>
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<tbody>
<tr>
<td>1</td>
<td>収入はなかった</td>
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<tr>
<td>2</td>
<td>100万円未満</td>
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<td>3</td>
<td>100〜129万円台</td>
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<td>8</td>
<td>500〜599万円台</td>
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<tr>
<td>9</td>
<td>600〜699万円台</td>
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<tr>
<td>10</td>
<td>700〜799万円台</td>
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<tr>
<td>11</td>
<td>800〜899万円台</td>
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<td>12</td>
<td>900〜999万円台</td>
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<tr>
<td>13</td>
<td>1000〜1099万円台</td>
</tr>
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<td>14</td>
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<td>15</td>
<td>1200〜1299万円台</td>
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<tr>
<td>16</td>
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<td>18</td>
<td>1500〜1599万円台</td>
</tr>
<tr>
<td>19</td>
<td>1600万円以上</td>
</tr>
</tbody>
</table>
Equivalent household income

Annual household income
\((\times 10,000\ \text{yen})\) before tax

400

500

\[
\text{Midpoint} = \frac{1}{\sqrt{\text{Household Size}}}
\]
Geometric mean

\[ G = \sqrt[n]{X_1 \times X_2 \times \cdots \times X_n} \]

\[ \log G = \frac{\log X_1 + \log X_2 + \cdots + \log X_n}{n} \]
Gender gap in EHI

F/M = 0.897  0.925  0.932

Male
Female

NFRJ98  NFRJ03  NFRJ08
Marital history and EHI: NFRJ98

- Male
- Female
Marital history and EHI: NFRJ03

1st Mar.  Widow  Div. Sp  Div. noSp  Unmarried

- Male
- Female
Marital history and EHI: NFRJ08

[Graph showing marital history and EHI for males and females with different marital statuses: 1st Mar., Widow, Div. Sp., Div. noSp., Unmarried.]
Summary

F/M(div. noSp) = 0.572  0.668  0.752

1st marriage
M unmarried
F unmarried
M div. noSp
F div. noSp

NFRJ98  NFRJ03  NFRJ08

10,000 yen/year
Regression Analysis

\[ \hat{Y} = A \times B_1^{X_1} \times B_2^{X_2} \times \cdots \times B_n^{X_n} \]

\[ \Downarrow \]

\[ \log \hat{Y} = \log A + X_1 \log B_1 + X_2 \log B_2 + \cdots + X_n \log B_n \]

Decomposition of gender effect:
- Indirect (mediated) effect
- Interaction effect
- Direct (unidentified) effect
Indirect (mediated) effect: example

EHI for regular employment: 267
EHI for others: 167

Male regular employment: 42.6%
Female regular employment: 17.6%
Indirect (mediated) effect: example

\[
\hat{Y}_m = 267^{0.426} \times 167^{0.574} = 204
\]

\[
\hat{Y}_f = 267^{0.176} \times 167^{0.824} = 181
\]

\[
\frac{\hat{Y}_f}{\hat{Y}_m} = \frac{181}{204} = (\frac{167}{267})^{0.426-0.176}
\]

\[
= 0.889
\]

→ Female EFI is 11.1% reduced due to difference in employment status
Indirect (mediated) effect: example

\[ \hat{Y}_m = 204 \]
\[ \hat{Y}_f = 181 \]
Interaction effect: example

EHI for remarried men: 227
EHI for non-remarried men: 201
EHI for remarried women: 319
EHI for non-remarried women: 148

Male remarried: 55.9%
Female remarried: 31.4%
Interaction effect: example

\[ \hat{Y}_m = 215 \]

\[ \hat{Y}_f = 188 \]
Interaction effect: example

\[ \hat{Y}_m = 227^{0.559} \times 201^{0.441} = 215 \]
\[ \hat{Y}_f = 319^{0.314} \times 148^{0.686} = 188 \]

\[ \frac{\hat{Y}_f}{\hat{Y}_m} = \frac{188}{215} = 0.876 \]

→ Female EFI is 13.4% reduced due to difference related to remarriage
Direct (unidentified) effect

Female / male gap remained after all indirect/interaction effects are controlled

= if all variables were kept constant
OLS

All variables’ effects should be decomposed.

Ordinary Least Square method to determine all parameters simultaneously

Mean is OLS solution for one-variable regression
Evaluation of sampling error

Population (81,246,828)

Random sampling

Sample (10,000)

Statistical inference

(for NFRJ03)
Confidence interval

95% probability range of population value

Upper limit

Most likely value

Lower limit
Statistical test terminology

“Significant”
if \( C.I < 1 \) (=negative effect)
or \( 1 < \) (= positive effect)

“Not significant”
if \( 1 \) (=unclear effect)
In Table 5 (A)

Model 1
Direct negative effect of “female” after controlling age composition is …

\[0.683 \pm 0.799\]

Model 2
The effect is not significant

\[0.890 \pm 1.047\]
Result (Model 3)

- Age
- Education
- Employment
- Child
- Remarriage/Household
- Parent
- Gender

Diagram showing the relationship between these factors and EHI.
Effect of remarriage/household (female)

- Red: Remarried
- Yellow: Other
- Green: Co-res. Parent
- Blue: One-person
Effect of remarriage/household (male)

- Remarried
- Other
- Co-res. Parent
- One-person
Findings

- Female EHI is 10% lower than male
- Mainly caused by widowed/divorced
- Divorced men’s EHI is decreasing
- 4 factors of gender gap after divorce
### Four factors (female/male)

<table>
<thead>
<tr>
<th></th>
<th>NFRJ98</th>
<th>NFRJ03</th>
<th>NFRJ08</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pre-marriage:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>2.2%</td>
<td>6.4%</td>
<td>3.8%</td>
</tr>
<tr>
<td><strong>Marital life:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employment</td>
<td>10.6%</td>
<td>6.7%</td>
<td>9.8%</td>
</tr>
<tr>
<td>Children</td>
<td>4.5%</td>
<td>6.5%</td>
<td>5.3%</td>
</tr>
<tr>
<td><strong>Post-divorce:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Remarriage</td>
<td>10.8%</td>
<td>12.5%</td>
<td>6.1%</td>
</tr>
</tbody>
</table>
Policy Implication

Distance from stratification study to policy

✓ Social consensus about justice
→ Gender-equal policy since 1980s

✓ Implement of norm for subsystem
→ ?
Education

Gender

School / Family

Educational

Labor market / etc.

Living standards
Employment status

Gender
↓ Labor market / Family

Continuous career
↓ Labor market / Family

Living standards
Childrearing

Gender

↓  Family

Childcare/Custody

↓  Labor market / Family

Living standards
Remarriage

Gender

↓

Family

Remarriage

↓

Family

Living standards
Importance of Statistics

Monitoring system of inequality

- Real-time picture of stratification
- Strategic policy to stop stratification process
- Focus on minority
Acknowledgement

The data for this secondary analysis, National Family Research of Japan 1998 (NFRJ98) and National Family Research of Japan 2003 (NFRJ03) by the NFRJ Committee, Japan Society of Family Sociology, was provided by the Social Science Japan Data Archive, Information Center for Social Science Research on Japan, Institute of Social Science, The University of Tokyo.

The author gratefully acknowledge the permission for the use of the National Family Research of Japan 2008 (NFRJ08) data by the NFRJ Committee, Japan Society of Family Sociology.