Experiment to Analyze the Phenomenon of Declining Marriage Rates Using an Agent Model

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1. Introduction

According to “The Fourteenth Japanese National Fertility Survey in 2010” [1], although nearly 90% of single people report that they “intend to marry eventually,” the rate at which people stay unmarried for their entire lifetime is continuously increasing. In actuality, a phenomenon of declining marriage is occurring in which people who wish to get married cannot help but give up. Demographers, economists, and sociologists have numerously conducted studies regarding marriage such as theoretical studies and statistical experimental studies based on individual data and panel data. The various primary factors of declining marriage rates are being verified, but the values and standards leading up to marriage for individuals are diverse. For that reason, the primary factors of declining marriage rates are highly complicated. Moreover, it does not necessarily mean that each person gets married as a conclusion to rational behavior, and there may be people who marry as a result of human behavior. In this manner, the trend for marriage in society as a whole is extremely intricate, but would it be possible to reproduce it within a computer? In this paper, an actual simulation will be tested using a simple matching model based on an agent model.

2. Model

In this paper, a simple matching model based on an agent model will be designed and constructed, an actual simulation will be conducted, and the analysis of the phenomenon of declining marriage will be tested. In this chapter, the framework of the standard model that will serve as a benchmark will be indicated. In the following chapters, the results of the simulation will be presented and a comparative review will be conducted.

Model Overview:
On the X-Y plane, numerous male Agents (M) and female Agents (F) will be placed. Each agent will meet an agent of the opposite sex while repeatedly moving in each step. If they mutually meet conditions regarding marriage, they will be married by means of a certain probability. The following agent attributes are given:

- The type of employment status (Regular employment, Non-regular employment)
- The co-residence with parents when single (Living/Not Living with Parents)
The economic strength of the subject and the parents
Whether they focus on or do not focus on economic strength as a condition for a marriage partner

By making agents have such attributes, the decrease in economic strength of the young such as the increase in temporary employment and the lifestyles seen in whether living or not living with parents when single, will be analyzed in terms of how they influence marriage.

Space Design:
The space will be a toroid X-Y plane with size $100 \times 100$. A toroid plane is a plane where the left end and right end, the upper end and lower end of the plane are connected.

Agent:
The agent will be classified into 2 groups: the male agent, Agent (M), and female agent, Agent (F). Only the initial-value of the parameter will be different in both types of agents, but the types of parameters they have and the rules for actions are the same.

The time scale within simulation:
The start of the simulation will be Step 0, and 12 steps will equal 1 year.

Agent Distribution:
At the beginning of the simulation, 105 units of Agent (M) and 100 units of Agent (F) are distributed onto the space (X-Y plane). The distribution placement of each agent is random. After every year (every 12 steps) additional 105 units of Agent (M) and 100 units of Agent (F) will be distributed upon the space. The distribution placement of each agent is random. The reason why the unit numbers of Agent (M) are more than Agent (F) is because it is modeled after the current situation in which the number of births for males is larger compared to females.

There is the need for a little attention, but as mentioned below the agent is 20 years old at the time of distribution upon to the space. Accordingly, the 105 units of Agent (M) and 100 units of Agent (F), which are distributed on year 0, are all 20 years old. In the year 1 after 12 steps, the 105 units of Agent (M) and 100 units of Agent (F) which were distributed in year 0 will all turn 21 years old, and the newly distributed 105 units of Agent (M) and 100 units of Agent (F) in year 1 will be 20 years old. The same applies for the following, for instance in step 360 the agents that were distributed in year 0 will all be 50 years old and agents from ages 20-50 will exist in the space. Therefore the 105 units of Agent (M) and 100 units of Agent (F), which are distributed in the same year, are the same birth cohort group and agents which are distributed in year $n$ will be called $n^{th}$ generation.

Moreover as mentioned below when the agent reaches 80 years old, that agent disappears from within the space. Thus, in the case that the number of the step if sufficiently large (i.e. after 60 years) it means that there will always be agents from the ages of 20-80 on the space.
Agent Attributes:

The agent’s primary attributes are: $|\text{Age}|$, $|\text{Presence/Absence of Intention to Marry}|$, $|\text{Currently Marriage Hunting or not}|$, $|\text{Type of Employment (Regular Employee, Non-regular Employee)}|$, $|\text{Living/Not Living with Parents}|$, $|\text{Individual Personality}|$, $|\text{Personal Economic Strength}|$, $|\text{Parents’ Economic Strength}|$, $|\text{Personal Standard of Living}|$, $|\text{Emphasis/No Emphasis on Economic Strength}|$, $|\text{Aggressiveness}|$, $|\text{Perspective (Within Realm of Activity)}|$, $|\text{Relocation Distance}|$, $|\text{Personality (Requirements of potential spouses)}|$, $|\text{Economic Strength (Requirements of potential spouses)}|$, and $|\text{Age Difference (Requirements of potential spouses)}|$. Below, we will provide a simple description of each of these attributes, as well as the setting of parameter values within the standard model.

Age:

Each agent holds age as an attribute. The agent is 20 years old when it is placed in the space, and then thereafter that agent’s age will rise every year (i.e., every 12 steps) by 1 year-of-age. 80 years-of-age is the upper age limit, and agents that have reached 80 years old will disappear from existence within the space.

Presence/Absence of Intention to Marry:

Each agent holds $|\text{Presence/Absence of Intention to Marry}|$ as an attribute. According to survey results [1], the percentage of respondents from among unmarried males who reported “I have no intention to marry ever” was only 9.4%. The percentage of unmarried females reporting “I have no intention to marry ever” was only 6.8%. Roughly 90% of unmarried respondents answered, “I intend to marry eventually.” Additionally, from the premise that those who are married generally had an intention to marry in the past, we set the percentage of male agents holding an intention to marry at 93% and the percentage of females holding intention to marry at 95%.

Currently Marriage Hunting or not:

This attribute defines those single agents that have an intention to marry and are under the age of 50, and who engage in so-called “marriage hunting” activities. From the age of 50 until the age of 80, agents are considered to not be engaging in marriage hunting. There are three main reasons for selecting the age of 50. Those are: (1) This paper is interested in the phenomenon of declining marriages among younger age groups; (2) Even in simulation, there are not many successes in marriage hunting beyond the age of 50; and (3) The standard age for lifetime non-marriage rates is 50, and the simulation similarly predicted this at age 50.

Type of Employment (Regular Employee, Non-regular Employee):

In order to analyze the effects of economic factors on marriage, this paper divides $|\text{Type of Employment}|$ into the two categories of regular and non-regular employment. Each agent is given an initial value of regular or non-regular employment based on probability, and that value is fixed throughout the agent’s lifetime. Referencing recent Labor Force Survey results, the regular employment rate was set at 80% for Agent (M), non-regular employment for Agent
(M) was set at 20%, regular employment for Agent (F) was set at 60%, and non-regular employment for Agent (F) was set at 40%.

Living / Not Living with Parents:

According to survey results [1], the rate of co-residence with parents is high among unmarried people in Japan. In 2010, 66.7% of single males in regular employment and 83.7% of those in part-time work lived with their parents. Among single females, 76.3% of those regular employment and 85.6% of those in part-time work lived with their parents. Therefore, the |Living / Not Living with Parents| attribute is established by probability. Referencing survey results, |Living / Not Living with Parents| is dependent on |Type of Employment (Regular Employee, Non-Regular Employee)|.

In the standard model, the probability at which Agent (M) engaged in regular employment lives with his parents is 70%, while Agent (M) in non-regular employment lives with his parents at a probability of 80%. The probability that Agent (F) engaged in regular employment lives with her parents is set at a probability of 75%, while the probability that Agent (F) engaged in non-regular employment lives with her parents is 85%. All others are assumed to not be living with their parents.

Individual Personality:

In survey results [1], 95.1% of unmarried males and 98.2% of unmarried females consider and emphasize personality as a condition in their marriage partners. Therefore, a numeric value is applied to |Individual Personality| as an agent attribute. The |Individual Personality| fixed value is given as a random number corresponding with a normal distribution N(50, 10²).

Personal Economic Strength:

In order to analyze the effects of economic factors on marriage, a numeric value is applied to the agent’s personal economic strength. High numeric values correspond with circumstances in which economic strength and lifetime earnings are high, and one’s future livelihood can be easily foreseen upon marriage. Low values correspond with circumstances in which economic strength and lifetime earnings are low, and there is concern about future livelihood. The |Personal Economic Strength| is fixed value and is dependent on the |Type of Employment (Regular Employee, Non-regular Employee)| attribute. A fixed value is given as a random number corresponding with a normal distribution N(600, 200²) for those agents engaged with an employment type that is regular employment, and a fixed random number corresponding with a normal distribution N(200, (200/3)²) is given in those instances in which the agent’s employment type is non-regular employment.

Parents’ Economic Strength:

In the case of living together with parents, considering the possibility that the economic strength of parents will influence the living standards of the single individual or marriage conditions, each agent will maintain |Parents’ Economic Strength| as an attribute. Since the generation of the parents of individuals in the current marriageable age group experienced high
rate of economic growth in Japan and had few males engaged in non-regular employment, it was possible to build economic prospects after marriage. Therefore, the value of $|\text{Parents' Economic Strength}|$ will be given a random number complying with the normal distribution $N(600, 200^2)$.

**Personal Standard of Living:**
In the case that the agent lives apart from the parent, the value of $|\text{Personal Economic Strength}|$ of the agent will be the agent’s $|\text{Personal Standard of Living}|$. In the case that the agent is living with parents, the agent’s $|\text{Personal Economic Strength}|$ will be the bigger value of the agent’s $|\text{Personal Economic Strength}|$ and $|\text{Parents' Economic Strength}|$ in this model.

**Emphasis/No Emphasis on Economic Strength:**
According to the results $[1]$, 38.7% of males and 93.9% of females responded that they stress or consider economic strength as conditions for their marriage partners. Therefore each agent was given $|\text{Emphasis/No Emphasis on Economic Strength}|$ as an attribute and that presence or absence was randomly provided. In the standard model the Agent $M$ will have a 30% probability of emphasizing economic strength in a marriage partner and the Agent $F$ will have a 90% probability of emphasizing economic strength in a marriage partner.

**Aggressiveness:**

**Perspective (Within Realm of Activity):**

**Relocation Distance:**
Within unmarried people, there may be those who have a large circle of friends and have many encounters being social and aggressive and there are those who are not. Thus, aggressiveness was given as an attribute to each agent, but data concerning aggressiveness was not obtained. Regarding the $|\text{Aggressiveness}|$ of marriage hunting, random numbers were given by uniform distribution $[0, 1]$. Moreover, each agent will search the opposite within the realms of their perspective while moving on the space, but the $|\text{Perspective (Within Realm of Activity)}|$ and the $|\text{Relocation Distance}|$ of the agent will be in proportion to $|\text{Aggressiveness}|$. The $|\text{Perspective (Within Realm of Activity)}|$ and the $|\text{Relocation Distance}|$ of the agent will be provided with $(|\text{Aggressiveness}| \times (\text{adjustment factor}) + 1)$. The adjustment factor of the standard model will be set to be

Next, referring to the responses for “conditions desired for the marriage partner” and “desired age difference with the marriage partner” in the findings, as conditions desired for the marriage partner of the agent $|\text{Personality (Requirements of potential spouses)}|$, $|\text{Economic Strength (Requirements of potential spouses)}|$, and $|\text{Age Difference (Requirements of potential spouses)}|$ were given as attributes.

**Personality (Requirements of potential spouses):**
Hypothesizing that the same level of oneself will be desired of the marriage partner, the value of $|\text{Personality (Requirements of potential spouses)}|$ will be the $|\text{Individual personality}|$
multiplied by 0.8.

**Economic Strength (Requirements of potential spouses):**
In the case of the agent emphasizing economic strength in the marriage partner the value of the \( \text{Economic Strength (Requirements of potential spouses)} \) will be the \( \text{Personal Standard of Living} \) multiplied by 0.8. In the case of the agent not emphasizing economic strength in the marriage partner, the value of \( \text{Economic Strength (Requirements of potential spouses)} \) will not be designated.

**Age Difference (Requirements of potential spouses):**
According to findings, there are many males who desire a younger person of the opposite sex and many females who desire an older person of the opposite sex. Referring to the findings [1], regarding the Agent \((M)\), 8% will desire less than 7 years younger, 49% will desire 1 to 6 years younger, 36% will desire 1 year younger to 1 year older and 7% will desire an older person. In the Agent \((F)\), 5% will desire a younger person, 29% will desire 1 year younger to 1 year older, 61% will desire 1 to 6 years older and 5% will desire more than 7 years older.

**Each step of the simulation:**
In each step, each agent conducting marriage hunting will move upon the space according to the size of the \( \text{Relocation Distance} \) value one has and will search whether an unmarried agent of the opposite sex exists within the range of one’s \( \text{Perspective (Within Realm of Activity)} \). If an unmarried agent of the opposite sex exists, the agent will choose one unit from within those and will conduct a marriage matching judgment. If a marriage is formed as a result of the judgment, the said agent and the agent who is the marriage partner will be in a marriage status and will stop marriage hunting. If an agent of the opposite sex does not exist in the range of one’s \( \text{Perspective (Within Realm of Activity)} \), that agent will do nothing and end with the step.

**Rules of \( \text{Marriage Matching Judgment} \):**
In the case that Agent \((M)\) and Agent \((F)\) mutually fulfill conditions A, B and C it was established that they would marry at a certain probability. In the case of the standard model, the probability was provided as 0.5.

**Condition A.** The partner clears the condition \( \text{Personality (Requirements of potential spouses)} \)

**Condition B.** The partner clears the condition \( \text{Age Difference (Requirements of potential spouses)} \)

**Condition C.** (In the case of agents which emphasize economic strength in marriage partners) the partner clears the condition \( \text{Economic Strength (Requirements of potential spouses)} \)

The above is the outline of the model. The results of the simulation will be indicated in the
next chapter and an examination will be conducted.

3. Simulation Results and Observations

In accordance with the designs from the previous chapter, utilizing the simulator (the artisoc 3.0 of Kozo Keikaku Engineering Inc.) the simulation of the constructed model was conducted. The simulation results were probabilistic and fluctuated every time. Additionally, early steps were influenced from the initial condition. There the results from the generation number 0 through generation number 99 were disposed and the gender specific marriage rate in each age of each cohort group regarding the generation that was distributed in year 100 (generation number 100) through the generation that was distributed in year 199 (generation number 199) was averaged. Figure 1 is the average of the cumulative first marriage rate (marriage rate) by age in generation number 100 through generation number 199 and is stable. In this study, utilizing the average value of the gender cumulative first marriage rate when at the time of turning 50 years old in generation number 100 through generation number 199, the evaluation of the simulation results was conducted. When describing the model with the parameter set up from the last preceding section as the standard model, the results for the standard model are 55.0% for males and 58.6% for females for the cumulative first marriage rate at the age of 50 years old. The detailed simulation results of the standard model were shown in Table 1.

![Figure 1 Simulation Results of the Averaged Cumulative First Marriage Rate by Age](image)

The simulation results of the standard model (55.0% for males and 58.6% for females in the cumulative first marriage rate at the age of 50 years old or when replacing it with proportion never married was 45.0% for males and 41.4% for females.), compared with the actual values (In the 2010 National Census Results 20.1% of males in the proportion never married and 10.6% of females in the proportion never married. In the 1995 Birth Cohort, 20.1% was the estimated value for women in the proportion never married by the National Institute of Population and Security Research), the marriage rates can be observed as rather low, but dealing with divorce which was no included in the model this time can be considered as the cause.
The estimated numbers for the 2011 demographic statistics are about 670,000 cases of marriage for 2011, 235,000 cases for divorce and the percentage for divorce cases are increasing annually. Moreover in the breakdown of the approximate 670,000 cases of marriage, there are not only cases where it is the first marriage for both husband and wife, but there are combinations of first marriage and remarriage and remarriages for both. The combination of where it is the first marriage for both husband and wife, occupied approximately 88.9 of the number of marriage cases in 1970, but in current years it is about 75. Thus for a more detailed analysis it is considered necessary to include divorce and remarriage in the model. Furthermore cohabitation was not included in the development model at this point in time. In the survey results [1], the percentage of cohabitation experience in unmarried people from the age of 18 to 34 years old was only 5.5 for unmarried males and only 5.8 for unmarried females which is on the decline, and those currently cohabiting are 1.6 for both unmarried males and unmarried females.

In this paper, the results of the standard model were established as benchmarks, and a simulation regarding the following society was performed and a comparison with the standard model was conducted. The results of the simulation are Table 2.

(Model-0) Standard Model (as benchmarks)
(Model-1) Economic Growth Society Model
(Model-2) Male-Dominated Society Model
(Model-3) Society in which non-regular employment increases
(Model-4) Society in which the number of single people living with their parents declines
(Model-5) Society in which non-regular employment increases, but singles’ cohabitation with parents decreases

(Table 1) Simulation Results of the Standard Model

<table>
<thead>
<tr>
<th>who intend to marry</th>
<th>% of regular employees</th>
<th>% of Living with parents</th>
<th>Economic Strength</th>
<th>Personality</th>
<th>Aggressiveness</th>
</tr>
</thead>
<tbody>
<tr>
<td>unmarried n=3987</td>
<td>63.9%</td>
<td>76.7%</td>
<td>392.0</td>
<td>48.8</td>
<td>0.482</td>
</tr>
<tr>
<td>married n=5772</td>
<td>92.2%</td>
<td>69.5%</td>
<td>610.3</td>
<td>50.4</td>
<td>0.502</td>
</tr>
<tr>
<td>total n=9759</td>
<td>80.6%</td>
<td>72.5%</td>
<td>521.1</td>
<td>49.7</td>
<td>0.494</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>who intend to marry</th>
<th>% of regular employees</th>
<th>% of Living with parents</th>
<th>Economic Strength</th>
<th>Personality</th>
<th>Aggressiveness</th>
</tr>
</thead>
<tbody>
<tr>
<td>unmarried n=3405</td>
<td>61.0%</td>
<td>87.9%</td>
<td>456.4</td>
<td>49.5</td>
<td>0.481</td>
</tr>
<tr>
<td>married n=5857</td>
<td>60.7%</td>
<td>73.8%</td>
<td>432.1</td>
<td>50.4</td>
<td>0.521</td>
</tr>
<tr>
<td>total n=9262</td>
<td>60.8%</td>
<td>79.0%</td>
<td>441.0</td>
<td>50.1</td>
<td>0.507</td>
</tr>
</tbody>
</table>

The Economic Growth Society Model is the society where the generation of the children becomes more enriched than the parent generation. The simulation was conducted by setting the economic strength of the parent low in the standard model. It is a rather extreme presumption,
but by adjusting the way of giving |Parent’s Economic Strength| to each agent with those currently in non-regular employment, the normal distribution of $N(200, (200/3)^2)$ was given. The simulation result will be indicated in Table 2.

(Model–2) Male-Dominated Society Model

The Male-Dominated Society Model is a society where most males are in regular employment and many females are in non-regular employment. In this model, the simulation was conducted by increasing the rate of regular employment in males and setting the rate of regular employment in females low. Specifically, compared with the standard model the rate of regular employment in males was increased 1.2 times and the rate of regular employment in females was set to 0.5 times. The simulation result will be indicated in Table 2.

(Model–3) Society in which non-regular employment increases

As mentioned before, in the current Japanese society regular employees are decreasing and non-regular employees are increasing, especially in the young. This trend is considered to continue henceforth, so the simulation was conducted with the case of the percentage of regular employees decreasing. The simulation was conducted in a setting where the percentage of regular employees in the standard model is multiplied by 0.9, 0.8 ... to 0.5. The simulation result will be indicated in Table 2.

(Model–4) Society in which the number of single people living with their parents declines

As mentioned before, in the current Japanese society the rate of single people living with parents is high. If the rate of single people living with their parents is lowered there is the possibility that marriage rates will recover, and therefore the simulation was conducted in the case where the percentage of single people living with parents decreases. The simulation was conducted of a society where single people living with parents decreases in a setting where the rate of living together in the standard model is multiplied by 0.9, 0.8 ... to 0.5. The simulation result will be indicated in Table 2.

(Model–5) Society in which non-regular employment is increasing, but singles’ co-residence with parents is decreasing

As mentioned before, the current Japanese society where regular employees are decreasing and non-regular employees are increasing, especially in the young, is said to be the primary factor in the decrease of marriage rates. However, there is also the possibility for marriage rates to recover by lowering the rate of single people living with their parents. Thus a simulation was conducted in the case where the increase in non-regular employment occurs simultaneously with the decrease of single people and their parents living together. The simulation was conducted presuming a case where the percentage of regular employees decreases to 80% compared to the standard mode and the rate of single people and parents living together decreases to 90, 80, and 70%. The simulation result will be indicated in Table 2.

The following things can be confirmed based on the results of the simulation.
Model/Type One

In the Economic Growth Society Model, a simulation was conducted involving a society in which the children's generation was held to be more affluent than the generation of their parents. The results of that simulation showed the marriage rate of the economic stability case setting the economic strength of the parent low in the standard model.

Table 2: Simulation Results of the Model 0 to 5

<table>
<thead>
<tr>
<th>Model</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Model-0) Standard Model</td>
<td>55.0%</td>
<td>58.6%</td>
</tr>
<tr>
<td>(Model-1) Economic Growth Society Model</td>
<td>69.4%</td>
<td>74.2%</td>
</tr>
<tr>
<td>(Model-2) Male-Dominated Society Model</td>
<td>58.1%</td>
<td>62.1%</td>
</tr>
<tr>
<td>(Model-3) Society in which non-regular employment increases</td>
<td>55.0%</td>
<td>58.6%</td>
</tr>
<tr>
<td></td>
<td>51.7%</td>
<td>55.0%</td>
</tr>
<tr>
<td></td>
<td>48.2%</td>
<td>51.5%</td>
</tr>
<tr>
<td></td>
<td>44.8%</td>
<td>47.7%</td>
</tr>
<tr>
<td></td>
<td>42.5%</td>
<td>45.3%</td>
</tr>
<tr>
<td></td>
<td>37.6%</td>
<td>40.4%</td>
</tr>
<tr>
<td>(Model-4) Society in which the number of single people living with their parents declines</td>
<td>55.0%</td>
<td>58.6%</td>
</tr>
<tr>
<td></td>
<td>55.8%</td>
<td>59.5%</td>
</tr>
<tr>
<td></td>
<td>58.4%</td>
<td>62.3%</td>
</tr>
<tr>
<td></td>
<td>59.1%</td>
<td>63.2%</td>
</tr>
<tr>
<td></td>
<td>60.9%</td>
<td>64.8%</td>
</tr>
<tr>
<td></td>
<td>62.3%</td>
<td>66.7%</td>
</tr>
<tr>
<td>(Model-5) Society in which non-regular employment increases, but singles' cohabitation with parents decreases</td>
<td>48.2%</td>
<td>51.5%</td>
</tr>
<tr>
<td></td>
<td>50.8%</td>
<td>54.1%</td>
</tr>
<tr>
<td></td>
<td>51.9%</td>
<td>55.6%</td>
</tr>
<tr>
<td></td>
<td>56.0%</td>
<td>59.7%</td>
</tr>
</tbody>
</table>

(Model-1) Society in which the economy is stable

In the Economic Growth Society Model, a simulation was conducted involving a society in which the children's generation was held to be more affluent than the generation of their parents. The results of that simulation showed the marriage rate of the economic stability case.
(69.4, 74.2) to be higher than the standard case (55.0, 58.6) when comparing the cumulative first marriage rates. Therefore, it was confirmed that economic development extends a positive effect to cumulative first marriage rates. The current rates of economic growth have been in a state of minimal increases and the earnings of younger age groups declining year-over-year, indicating the possibility that economic factors are having a substantial impact on the decline in marriage rates.

(Mode-2) Male-Dominated Society Model

In the Male-Dominated Society Model, mimicking the period of high economic growth in the 1960’s Japanese society, a simulation was conducted of a society in which all males were engaged in regular employment, and many females were in non-regular employment. The results showed that the marriage rates were higher in the Male-Dominated Society case (58.1, 62.1) than marriage rates in the standard model (55.0, 58.6) when comparing cumulative first marriage rates. Therefore, this indicates that the structural transformation of Japanese society from male-dominated society toward a gender-equal society is impacting declining rates of marriage.

(Model-3) Society in which non-regular employment increases

A simulation was conducted for the case in which the share of people engaged in regular employment decreases, and the share of people in non-regular employment increases. The results of the simulation confirmed that as the share of people in regular employment decreases and the share of people in non-regular employment increases, rates of marriage decline. It is predicted that the share of regular employment workers in Japanese society will decline, indicating the possibility that changes in economic structure are having a substantial impact on decline rates of marriage.

(Model-4) Society in which the number of single people living with their parents declines

There is culture called “parasite singles” in Japan, in which single people live with their parents. A simulation was conducted in which the rate of cohabitation with parents was decreased. The results of the simulation suggested that as the cohabitation rate is lowered, marriage rates increase. This indicates there being a possibility that cohabitation with parents among singles has an impact on declining marriage rates.

(Model-5) Society in which non-regular employment is increasing, but singles’ cohabitation with parents is decreasing

A simulation was conducted to determine if the phenomenon of declining marriage rates as a product of rising non-regular employment could be stopped by decreasing the number of unmarried people who cohabitate with their parents. As a result, the marriage rate in the standard model was (55.0, 58.6), and in the case where regular employment was decreased by 20% in the standard model the marriage rate was (48.2, 51.5). However, in contrast, in the case where regular employment was decreased by 20% but the rate of cohabitation with parents among singles was lowered by 20%, the marriage rate recovered to (51.9, 55.6), closing the same level as the standard model. When the cohabitation rate was lowered by 30%, the
marriage rate was higher than the standard model at (56.0, 59.7). This indicates one solution to overcome the phenomenon of declining marriage rates through the foreseen transformation of the economic makeup hereafter.

4. Conclusion

The model constructed in this paper is of a pioneering but very simple design, and deriving implications from the simulation results may still be insufficient. There may be a need to integrate the findings of statistical empirical research based on theoretical research, individual data and panel data, implement further refinements to the model, and construct a model that researchers can communally use. The following points can be offered as issues for further examination.

The first issue is the theoretical underpinning of “Requirements of potential spouses”. In this paper’s model, the requirements of potential spouses are held constant through each individual’s life. However, normally the conditions become stricter or looser as a person advances in age, and the points an individual emphasizes may change. It may be necessary to reference reservation levels in search theory, and make the requirements of potential spouse by each individual to change. In this model, the conditions differed by individual, but the conditions were taken to continue from the point at which the individual is 20 years of age without change. There is room for improvement in this regard.

Second, it may also be necessary to change the probability that a man and woman will actually marry one another when conditions are met so that it is dependent on age and other factors. In this paper’s model, by the rules of |Marriage Matching Judgment|, the probability that a man and women will marry one another in the event that their conditions are satisfied was set at fixed value (0.5). However, in actuality, the individual’s timing of marriage may have a substantial impact on this.

Third, it is necessary to consider the period of courtship. Normally, people reach marriage through a certain period of courtship, or seek a new dating partner when marriage is not reached. In survey results, the period of courtship is growing longer, and whereas the average dating period in 1987 was 2.54 years, it had grown to 4.24 years in 2010.

Fourth, as outlined in the preceding section, there is a need to include divorce and remarriage in the model. The combination of spouses in which both husband and wife are in their first marriage is at about the level of 75% in recent years. While the number of people who remain unmarried throughout their life is increasing, so too is the number of people who marry several times in their life. Therefore, it is necessary to include divorce and remarriage in the model.

References