

## Japan As a Shrinking Society: What Is the Condition for Recovering the Replacement Level of Fertility?

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【RC11RC41/2】 JS-86 : Japan's Experience with Population Aging .Policy  
Challenges and Innovations  
Saturday, July 19, 2014: 12:30 PM-2:20 PM Room: 304

## Introduction

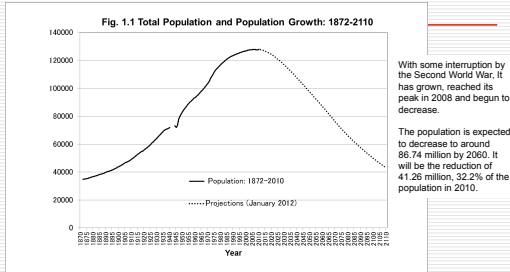
- Japan has entered the post-demographic transitional phase and will be the fastest aging- and shrinking country in the world.
- This should be called "a shrinking society "(Kaufmann 2005), characterized with the below replacement fertility, rapidly aging and decreasing population.
- Is this merely as the possible historical consequence of demographic transition from high birth and death rates to low ones ?
- It begins to threaten the sustainability of Japanese Society itself with the increasing dependency ratio.

## Contents of Presentation

- 1) Population prospects of Japan from past to future
- 2) Effects of the increasing life expectancy and those of declining fertility on the dependency ratio
- 3) Historical relations between life expectancy of women and replacement fertility
- 4) The causal model of demographic transition in Japan
- 5) The condition for recovering the replacement level of fertility and discussion on the policy measures and social innovations

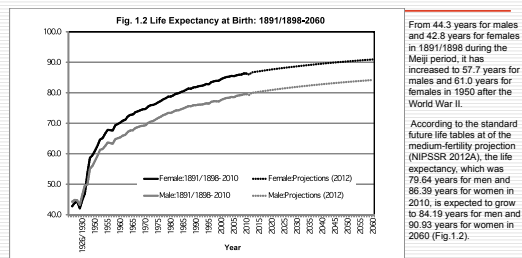
## 1. Population Prospects of Japan

### From Population Growth to Decline :1872—2110



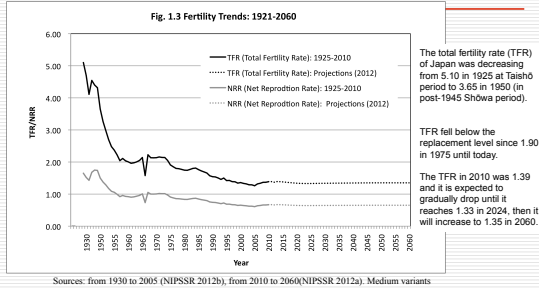
Sources: from 1870 to 2005, Statistics Bureau (2006: 88-90), from 2010 to 2110(NIPSSR 2012a).

### Expanding Life Expectancy 1891—2060

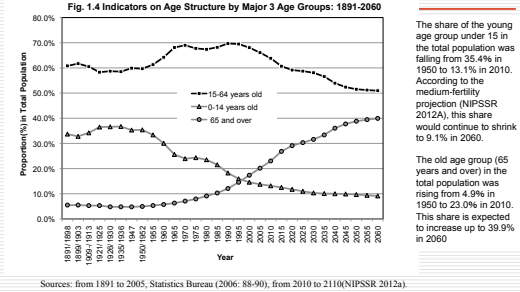


Sources: from 1930 to 2005 (NIPSSR 2012b), from 2010 to 2060(NIPSSR 2012a). Medium variants

## Declining Fertility 1930—2060



## Changing Age Structure 1891/1898—2060



## 2. Effects of the life expectancy and fertility on the dependency ratio

### Demographic Care Cost (1)

- Intergenerational Contract : The generation in working age is responsible for growing up the following generation in pre working age and for taking care of the preceding generation in post working age (Kaufmann 2005).

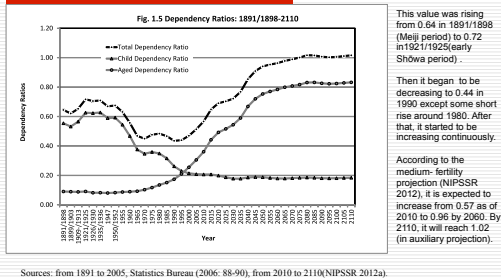
#### A) Actual value ≡ Dependency Ratio

$$\text{Total Care Cost}_{\text{actual}} = \text{Child Care Cost}_{\text{actual}} + \text{Elderly Care Cost}_{\text{actual}}$$

$$\text{Child Care Cost}_{\text{actual}} = \frac{\text{number of population aged 0-14}}{\text{number of population aged 15-64}}$$

$$\text{Elderly Care Cost}_{\text{actual}} = \frac{\text{population aged 65 and over}}{\text{population aged 15-64}}$$

## Historical Change of Dependency Ratio :1891/1898—2110



### Demographic Care Cost (2)

#### B) Minimum Value: Age structure of Stable Population of Life Table (NRR=1) .

- The effects of the rising longevity on the demographic care cost of working age population in future (generation interval c.a. 30 years)

$$\text{Total Care Cost}_{\text{minimum}} = \text{Child Care Cost}_{\text{minimum}} + \text{Elderly Care Cost}_{\text{minimum}}$$

$$\text{Child Care Cost}_{\text{minimum}} = \frac{\text{stable population aged 0-14}}{\text{stable population aged 15-64}}$$

$$\text{Elderly Care Cost}_{\text{minimum}} = \frac{\text{stable population aged 65 and over}}{\text{stable population aged 15-64}}$$

## Demographic Care Cost (3)

$$T(r) = \left( \frac{J_0}{E_0} \times R \right) + \left( \frac{A_0}{E_0} + R \right) + (1)$$

C) Optimal Value (NRR < 1, the effect of the fertility):  
Age structure of Stable Population at Life Table + Fertility Level.

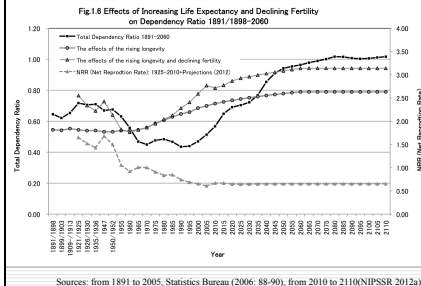
➤ The effects of the decreasing fertility on the demographic care cost at any given life expectancy in time series.

$$\text{Total Care Cost}_{\text{optimum}} = \text{Child Care Cost}_{\text{optimum}} + \text{Elderly Care Cost}_{\text{optimum}}$$

$$\text{Child Care Cost}_{\text{optimum}} = \frac{\text{stable population aged 0-14}}{\text{stable population aged 15-64}} \times \text{NRR}$$

$$\text{Elderly Care Cost}_{\text{optimum}} = \left[ \frac{\text{stable population aged 65 and over}}{\text{stable population aged 15-64}} \right] + \text{NRR}$$

## Effects of the expanding life expectancy and Below Replacement Fertility on the Dependency Ratio

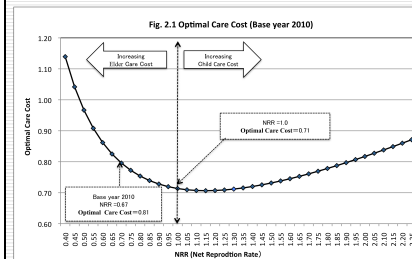


The minimum value, based on the stable population structure of the life tables at the replacement level of the fertility, shows the gradual trend with the increasing life expectancy. It began to rise up smoothly from 0.58 in 1975 and it is expected to increase consistently from 0.71 as of 2010 and will reach 0.79 by 2060.

Sources: from 1891 to 2005, Statistics Bureau (2006: 88-90), from 2010 to 2110 (NIPSSR 2012a).

## 3. Historical relations between life expectancy of women and replacement fertility

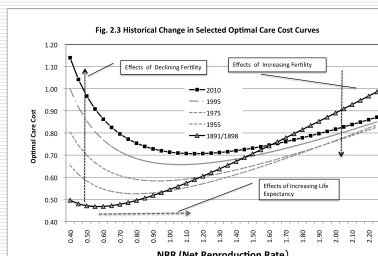
## Optimal Care Cost and Net Reproduction Rate



- 1) Fertility close to the replacement level (NRR=1) the optimal care cost stays around the minimum value of 0.71.
- 2) Fertility above the replacement level (NRR>1) the optimal care cost is rising because of the increasing child care cost up to 0.885 at NRR of 2.25.
- 3) Fertility below the replacement level (NRR<1), the optimal care cost is also rising because of the increasing elderly care cost up to 1.23 at NRR of 0.40.

Source: NIPSSR(2012b) Life Table (2010)

## Historical Change of Optimum Care Cost's Curves

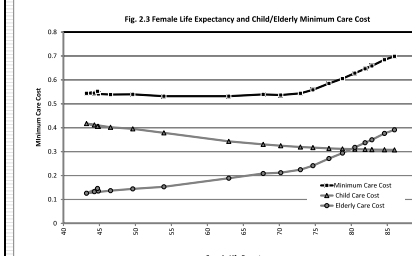


Sources: from 1891 to 2005, Statistics Bureau (2006: 88-90), 2010 (NIPSSR 2012b).

From Meiji 24/34 (1891/1898) to Showa 30 (1950) after the World War II When NRR was below 1.0, the optimum care cost stayed at low. The curve leaned to left and the care cost increased linearly according to the value of NRR.

From 1975 to 2010 The bottom of the care cost curve shifted up to the higher value and its position moved to the right side, namely the higher NRR, since 1975, with the expanding life expectancy to keep the optimum care cost at least.

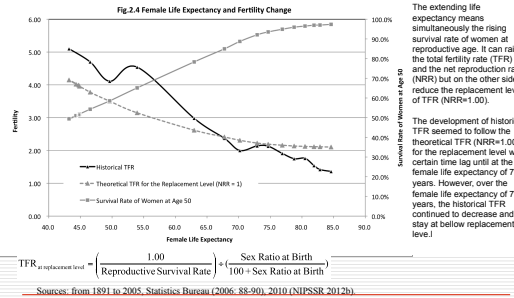
## The Effects of the Rising Longevity on the Child/ Elderly care cost



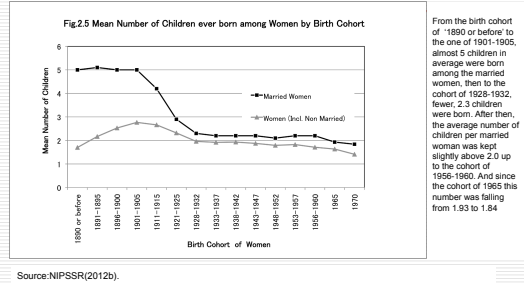
From the female life expectancy of 40 years to that of 70 years, the total care cost were stable at the value in 0.53-0.54. However, this stability was in fact the offset between decreasing child care cost and increasing elderly care cost.

Sources: from 1891 to 2005, Statistics Bureau (2006: 88-90), from 2010 to 2110 (NIPSSR 2012a).

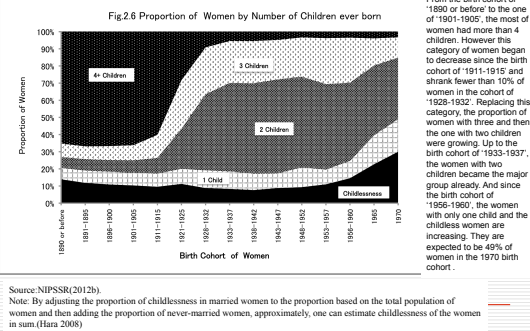
## The Effects of the Rising Survival Rate of Women at Age 50 on Fertility



## Decreasing Number of Children



## Proportion of the Women by the Number of Children ever born



## 4. Causal Model of the Demographic Transition in Japan

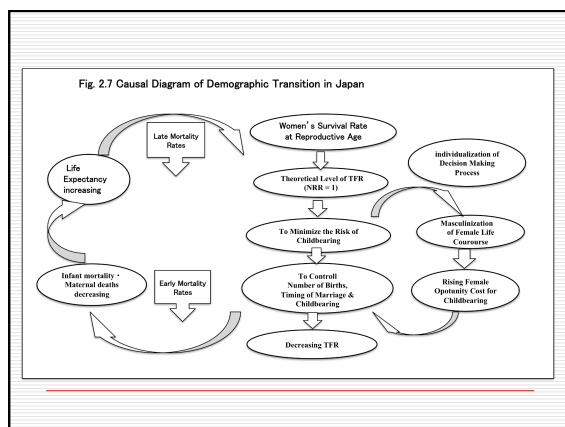
### The first phase

(life expectancy of women from 40 years to 70 years)

1. With the modernization, the infant mortality and the maternal deaths began to decrease.
2. The average life expectancy of female was extended and also the survival rate of women at reproductive age rose.
3. This made the replacement of fertility, lower than ever. It creates the pressure to keep the number of births/children small (If not, it should have canceled the new condition).
4. Despite the conflict between traditional social norm to maximize the number of births and the real interest of women (and her children) to minimize the risk, this process should have been gradually advanced.

### The first phase (continued)

5. As a result, the life expectancy of women was extended from 40 years to 70 years and the average number of children per married women was reduced from 5 to 2.
6. The increasing life expectancy and the decreasing fertility made the proportion of child population to the one of working age population smaller and reduced the child care cost of the Japanese Society. As for the elderly care, the proportion of aged population stayed at small. This advantage should have realized the rapid economic growth in 1960s.



## The second phase

(life expectancy of women over 70 years.)

7. The life expectancy of women was extended beyond 70 years, the child/youth mortality and the death rates of the working ages are closing nearly to 0 and only the late mortality rates have rest to decrease. The elderly care cost grows continuously, as a sum, the total care cost exceeded 0.70.
8. On the other hand, the trend of late marriage and the timing shift of the child bearing toward the age of 30 and over were spreading among the women who chose the best timing to minimize the risk on the childbearing/child care.

## The second phase (continued)

9. This type of decision making dose not exclude to remain single through the life, and also to be the women with only one child or with childlessness. As a result, the fertility was going lower than the replacement level.
10. This effect of the lowest low fertility was added to the effect of the rising longevity. The optimal total care cost increased from 0.8 to 0.9 and at last the population began to decrease.

## 5. The conditions for recovering the replacement level of fertility, the policy measures and social innovations

## Backgrounds of Below Replacement Level of Fertility

- ❑ The modernization of Japanese society was very adaptive and successful in the first phase. The demographic bonus brought the economic growth from 1960's to 1970's.
- ❑ In the same process, the individualization of reproduction was going on.
- ❑ The responsibility for the child/elderly care was shifted from family as a whole to woman as an individual.

## Backgrounds(continued)

- ❑ The reduction of average number of births changed the life course of women.
- ❑ The education and employment opportunities were expanded and the timing of marriage and the childbearing became more adjustable for decision making and basically shifted to higher ages.
- ❑ So called the 'masculinization' of female's life course (Esping-Andersen 2009) are going on.

### The conditions for recovering the replacement level of fertility

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- ❑ To change the cost/benefit balance of childbearing and childcare, especially for the women, toward plus value.
  - ❑ To grantee the reproductive right for having children as well as not having child.
  - ❑ A society also should take the responsibility for the reproduction to keep itself sustainable.
  - ❑ The massive shift of social investment for growing up the following generation from taking care of the preceding generation.
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### The policy measures and social innovations

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- ❑ Government sends the clear message to recover the replacement level of fertility as policy target.
  - ❑ Governmental affirmative actions and the diversity campaign should be taken in central government agencies and major business enterprises to promote the gender equality.
  - ❑ The budget amount for the family should be more than ten times of the present scale of family support expenditure (the income redistribution policy from the elder generation to next generation).
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### The policy measures and social innovations (continued)

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- ❑ The social security systems for elder population should be essentially constricted to the minimum guarantee (as safety net in a long life).
  - ❑ To minimize the total amount of social security benefits for elder population and the burden of the current workers' contributions and taxes.
  - ❑ That will create effective demand. It is also expected that the relative wealthy and healthy elder people will expend more money from their savings and means.
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### Conclusions

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### The Principle of the Sustainable Population

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- ❑ T.R. Malthus wrote in his first edition of the Principle of Population (1798) : Population, when unchecked, increased in a geometrical ratio.
  - ❑ Japan as a shrinking society, one should add, decreased also in a geometrical ratio.
  - ❑ more exactly, when unchecked to be deviated from the replacement level of fertility, confront the increasing demographic care cost and lost its sustainability.
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### What's going on ?

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- ❑ The driving force of the demographic transition of Japan was to reduce the average number of children per woman and to keep the risk on the childbearing and childcare at minimum.
  - ❑ The cost/benefit imbalance in childbearing/childcare for women's life course in Japan makes the fertility stay below replacement level and it accelerates the increase of elderly care cost.
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## What's going on ? (continued)

- ❑ That is nothing other than the 'saving' of the child care cost by the preceding generation and this cost will be shifted to the following generation.
- ❑ The demographic onus magnifies the relative volume of the burden in future generation.
- ❑ Japan as a shrinking society is going to confront the limits of sustainability.
- ❑ We must take up the policy challenges and innovations to avoid this on going crises.

Thank you for your attention !

## Acknowledgments · References

### Acknowledgments:

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### References:

Esping-Andersen, Gosta. 2009. *The incomplete revolution: adapting to women's new roles*. Cambridge: Polity Press. Japanese edition: Esping-Andersen, Gosta 2011. *Byoudo to kouritu no futushi kakumei: Atarashi jusei no yakuwari* (trans. Osawa, Mari.). Tokyo: Iwanami Shoten.

Hara, Toshihiko. 2008. Increasing Childlessness in Germany and Japan: Toward a Childless Society?. *International Journal of Japanese Sociology* 2008, Number 17:44-62.

Hara, Toshihiko. 2012. Shukugen suru shakai-Kodomo ga heru to naze waruika (A Shrinking Society: What means Decreasing Child Population. *SCJ Journal of Design & Nursing* 6-1.113-120.

Health and Welfare Statistics Association. 2009. *Waga kuni no seimeihyo 2009 nen 4 gatsu ban* (Life Tables for Japan) (CD-R). Tokyo: Health and Welfare Statistics Association.

Japan Institute for Labour Policy and Training. 2013. Table 9-5: Public social expenditure by policy area, at current prices/in percentage of GDP. Data book of International Labor Statistics 2013. <http://www.jil.go.jp/english/estats/databook/2013/09.htm>. Accessed 30 November 2013.

Kaufmann, Franz-Xaver. 2005. *Schrumpfende Gesellschaft*. Frankfurt: Suhrkamp. Japanese edition: Kaufmann, Franz-Xaver. 2011. *Shukugensuru shakai-Jinko genshou to sono kiketsu* (trans. Hara, Toshihiko, and Uozumi, Akiyo.). Tokyo: Hara Shobo.

Malthus, Thomas Robert. 1897. *An Essay on the Principle of Population*. <http://129.237.201.53/books/malthus/population/malthus.pdf>. Accessed 30 November 2013.

### References(continued)

Ministry of Internal Affairs and Communications Statistics Bureau. 2006. *The Historical Statistics of Japan Vol.1*. Tokyo: Japan Statistical Association. English edition: Ministry of Internal Affairs and Communications Statistics Bureau. 2012. <http://www.stat.go.jp/english/statistics/ki/index.htm>. Accessed 30 November 2013.

Ministry of Internal Affairs and Communications Statistics Bureau. 2011. 2010 Population Census Basic Complete Tabulation on Population and Households Japan. <http://www.e-stat.go.jp/SG1/estat/ListE.do?b1=000001034991&cycode=0>. Accessed 30 November 2013.

National Institute of Population and Social Security Research in Japan (NIPSSR). 2013. *Shakai hoshio hiyo toukei* (heisei 22 nendo). [http://www.ipss.go.jp/ss-cost/j/fss-h22/fss\\_h22.asp](http://www.ipss.go.jp/ss-cost/j/fss-h22/fss_h22.asp). English edition: National Institute of Population and Social Security Research in Japan (NIPSSR). 2013. *The Financial Statistics of Social Security in Japan* (FY 2010). <http://www.ipss.go.jp/ss-cost/e/fss-10/fss-10.asp>. Accessed 30 November 2013.

National Institute of Population and Social Security Research in Japan (NIPSSR). 2006. *Population Projection for Japan: 2006-2055* (December 2006). [http://www.ipss.go.jp/webj-ad/WebJournal/files/population/2008\\_4/05population.pdf](http://www.ipss.go.jp/webj-ad/WebJournal/files/population/2008_4/05population.pdf). ). Accessed 30 November 2013.

National Institute of Population and Social Security Research in Japan (NIPSSR). 2012a. *Population Projections for Japan* (January 2012). [http://www.ipss.go.jp/site-ad/index\\_english/iesuke/gh2401e.asp](http://www.ipss.go.jp/site-ad/index_english/iesuke/gh2401e.asp). Accessed 30 November 2013.

National Institute of Population and Social Security Research in Japan (NIPSSR). 2012b. *Population Statistics of Japan 2012/Year of 2012 (EXCEL)*. <http://www.ipss.go.jp/p-info/e/psj/2012/PSJ2012.asp>. Accessed 30 November 2013.

Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat. 2013. *World Population Prospects: The 2012 Revision*. <http://esa.un.org/unpd/wpp/index.htm>. Accessed 30 November 2013.

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