

# Measuring Child Costs in Japan and Korea

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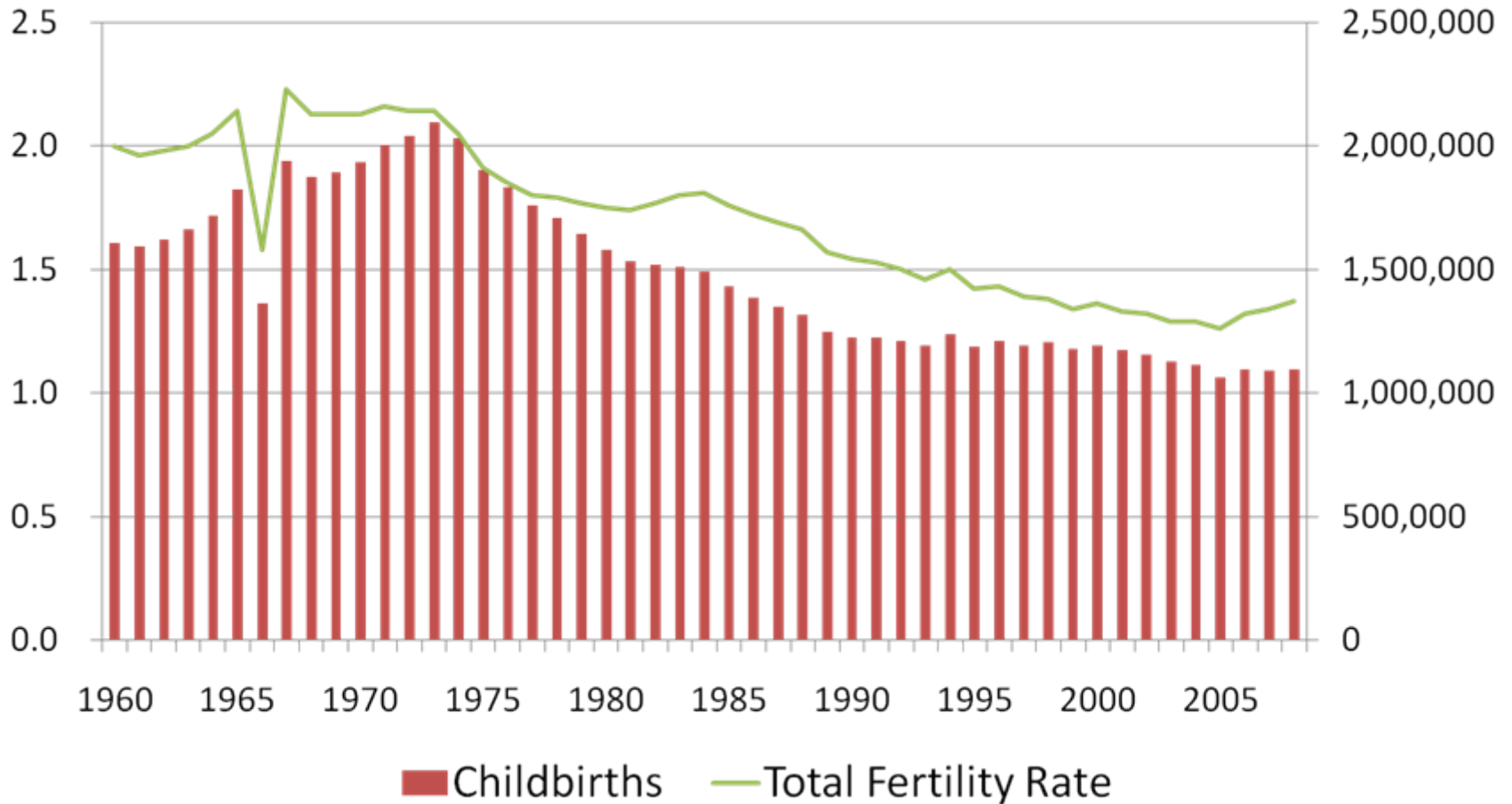
# Motivations

- Low birthrates threatens the social security system
  - Pay-as-you-go system
- There were much debate about child costs
- Surprisingly few rigorous studies have been made at estimating child costs in Japan and Korea
  - Should the government compensate young families
  - If so, how much?

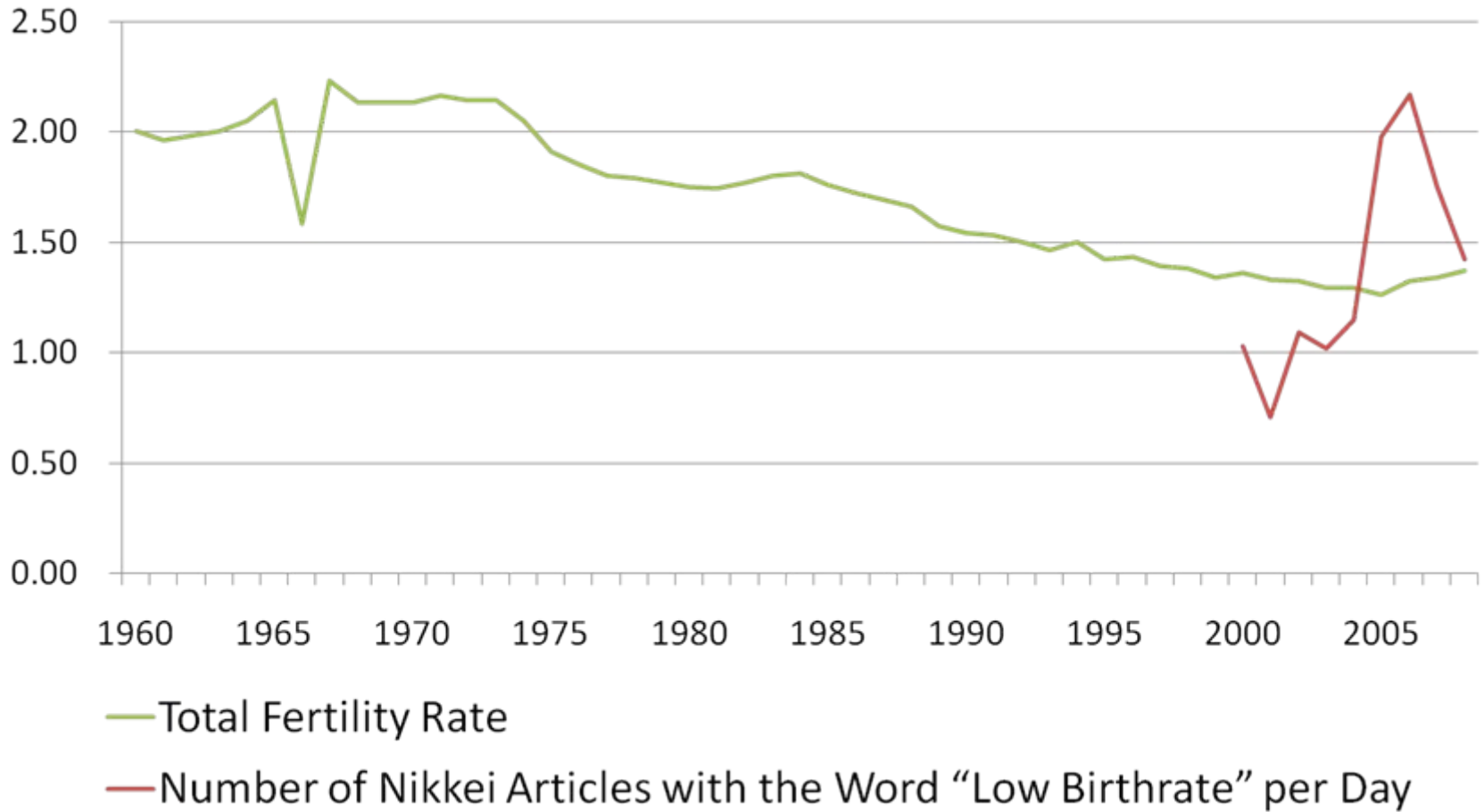
# Contributions

- Estimation of child costs using Japanese and Korean unit record data
- Use of multiple births as the dummy variable
  - Fertility is treated as a choice variable
- Implications for the population policy of Japan and Korea

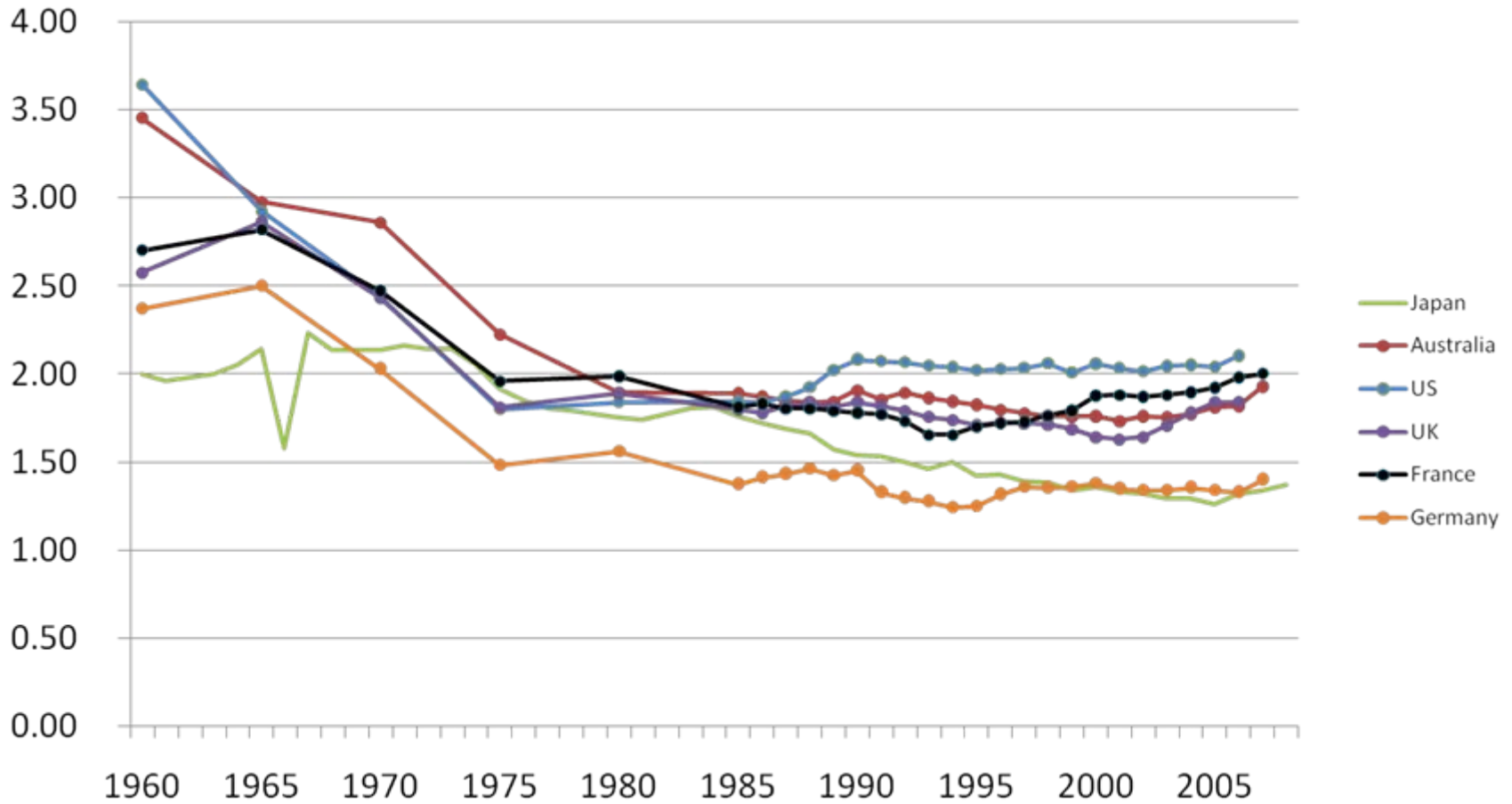
# Birthrate in Japan



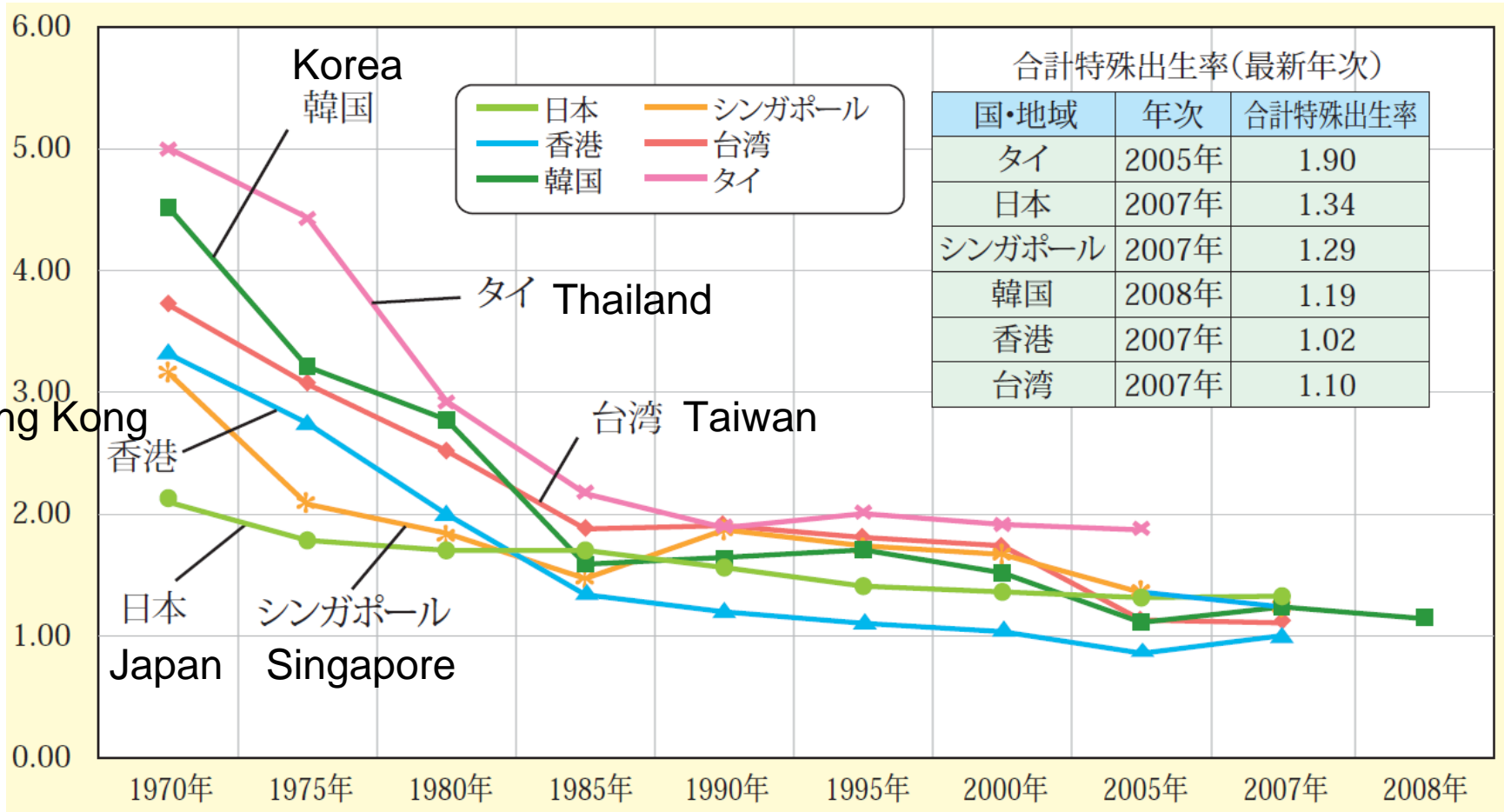
# Media Coverage in Japan

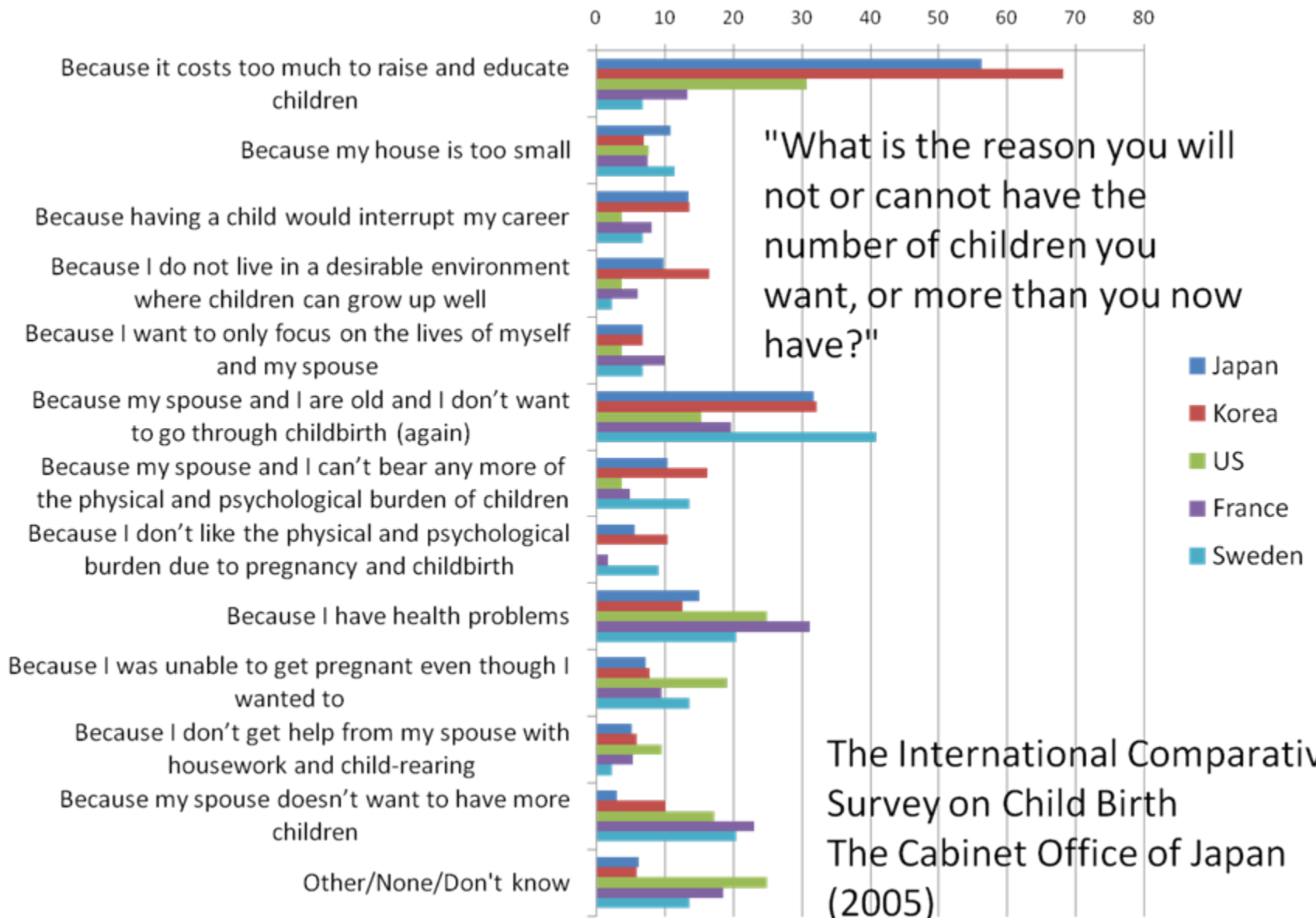


# Total Fertility Rates



# Total Fertility Rates of Asian Countries

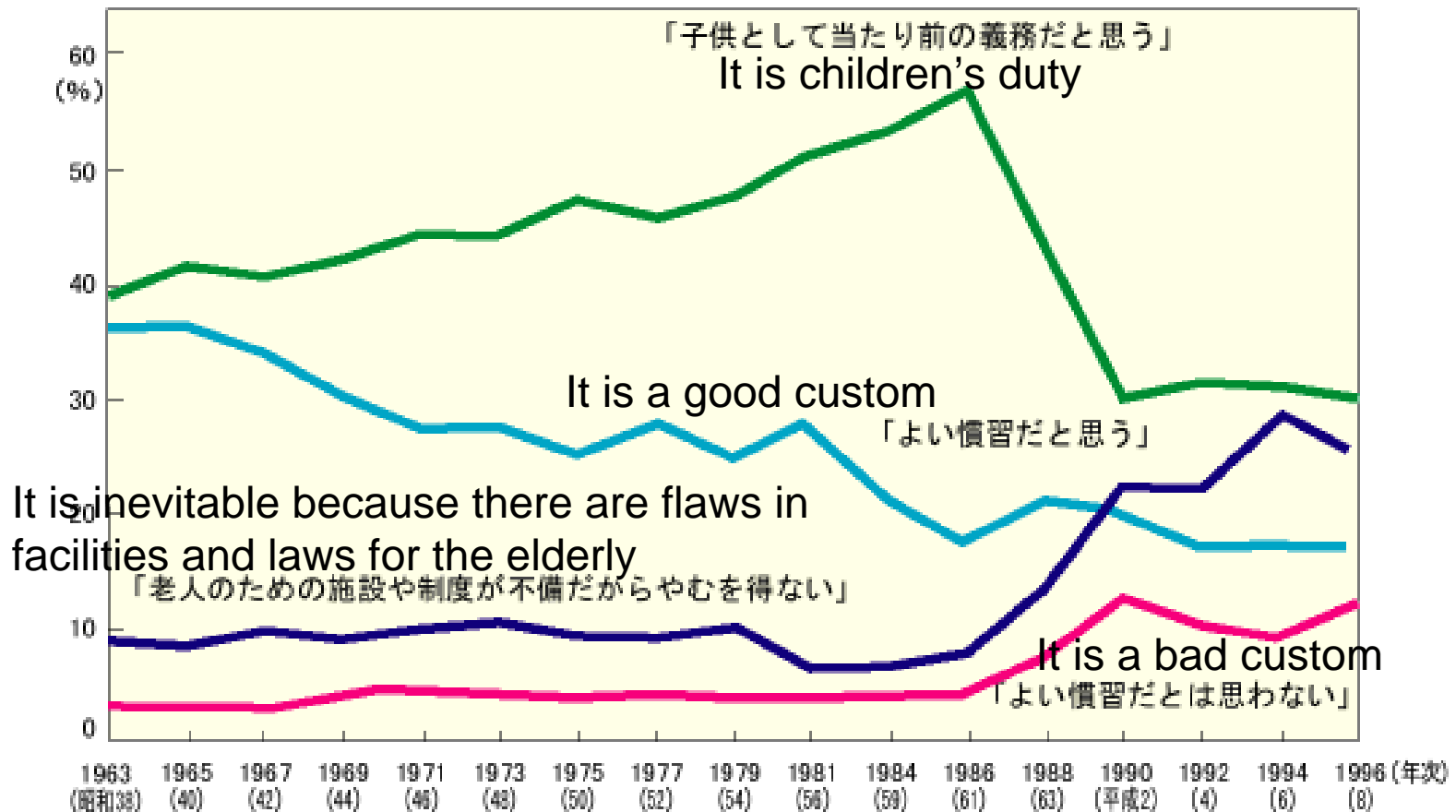






Answers of married Japanese women to the question "What do you think about looking after and caring for your aged parents?"

図2-11 老親扶養に対する意識



(注) 1. 「子供が老父母の面倒をみることを、どう思いますか」という質問に対する回答。  
 2. 既婚女子のみについて。「その他、無回答、分からない」は図から省略。

資料：毎日新聞社人口問題調査会「全国家族計画世論調査」

# Obstacles and Solutions for the Estimation

- Child cost estimation method
  - Engel method
  - Rothbarth method
- Endogeneity of the number of children
  - Use of families with twin data
- Data availability
  - National Survey of Family Income and Expenditure (Japan)
  - Household Income and Expenditure Survey (Korea)

# Endogenous Fertility and Child Cost: A Contradiction (1)

- Child cost can be defined as welfare compensation for families with children
- But having children is parents' choice
- Then child costs and compensation should be negative
- To justify the positive compensations for families with children, we need some normative judgement

# Endogenous Fertility and Child Cost: A Contradiction (2)

- That said, we continue using common welfare measures like Engel's coefficient
- Although these measures no longer represent family welfare, they are used as measures of living standard of families

# Commonly Used Estimation Methods

- Engel Method
- Rothbarth Method
- Complete Demand System Method
- Subjective Method

# Engel Method

- Share of food consumption is assumed to represent the level of family welfare
- The effect of having a child on the share of food consumption is estimated
- A criticism
  - Engel coefficient of families with children tend to be higher than that of families without children because children consume mostly food

# Estimation Equation of Engel Method

- Common specification

$$Engel_i = \alpha + \beta \ln(Expenditure_i) + \gamma(z_i) + u_i$$

–  $z_i$ : demographic variable

# Rothbarth Method

- Expenditure on adult goods is assumed to represent the level of family welfare
- The effect of having a child on adult goods expenditure is estimated
- Criticisms
  - Possible changes in parents' tastes by having children
  - Equating tobacco and alcohol consumption with welfare



# Equivalence Scale

- Relative income needed to maintain utility level of a family with one more child compared to the reference family

# Literature: Child Costs

- Oyama (2006) : 1.12-1.26 (depends on the age of children)
  - Japanese Data
  - Rothbarth Method & Subjective Method
- Percival and Harding (2005): 1.15-1.42 (depends on the number of children)
  - Australian Data
  - Engel Method
- All treat the number of children as exogenous

# Use of Twins Birth in Existing Studies

- Female labor supply
  - A large number of studies
- Child labor and schooling
  - Rosenzweig and Wolpin (1980)
- Return to human capital investments
  - Exploiting genetic identity

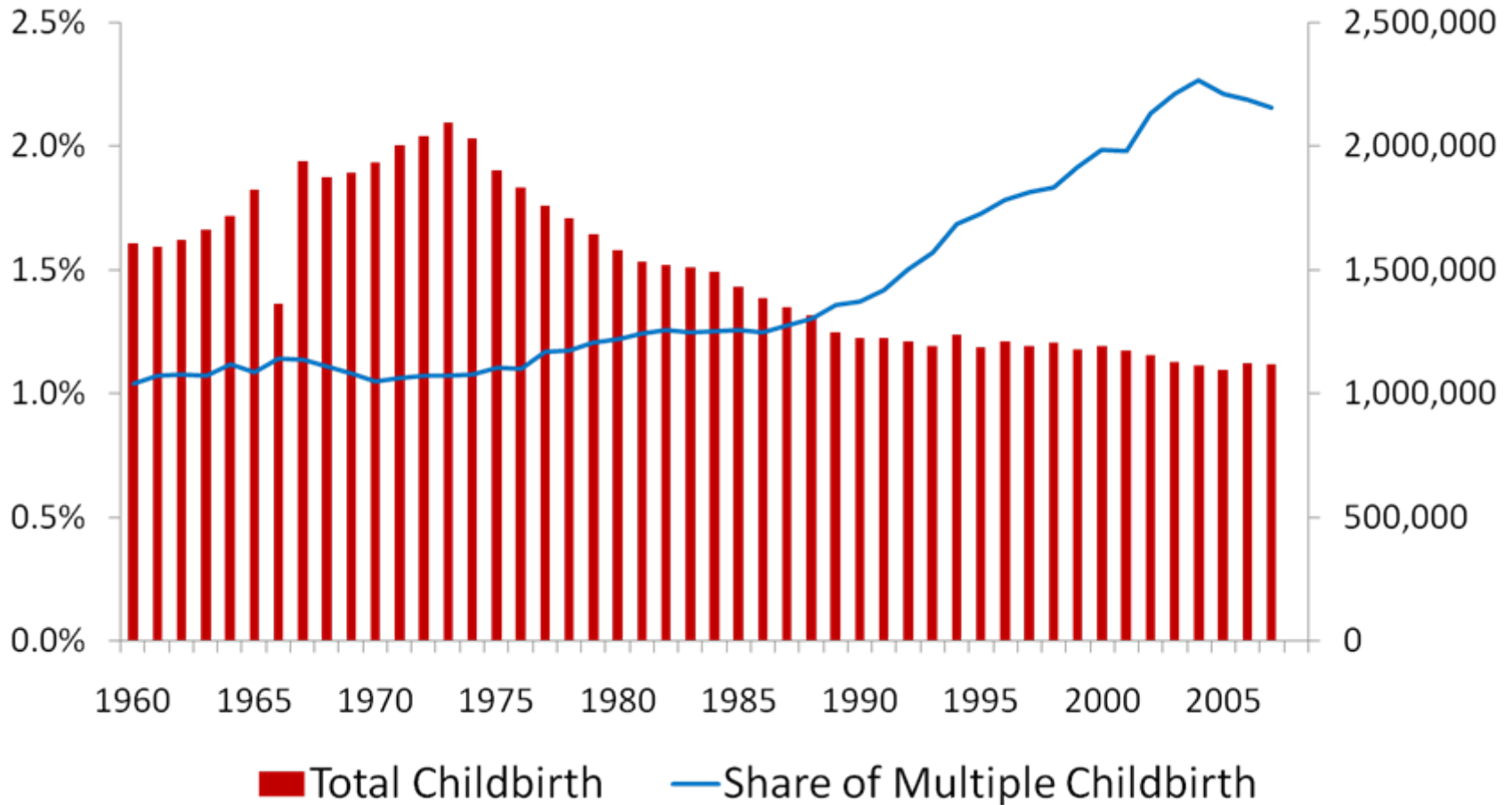
# Determinants of a Twins Birth (1)

- You almost cannot control the number of children per pregnancy
  - Hellin's Law
- But it does not mean that you cannot increase the probability of having a twins birth
  - Women with more births have more chance of having a twins birth
  - Women with no birth have no chance of having a twins birth

# Twins Birth IV

- Families with twins dummy
  - Not exogenous
- First birth twins dummy
  - Exogenous
  - Correlation with the number of children is weak
  - Indefinable for families without children
- Twins ratio
  - Not perfectly exogenous
  - Correlation with the number of children is higher
  - Indefinable for families without children

# Multiple Births in Japan



# Determinants of a Twins Birth (2)

- Infertility treatment
  - In vitro fertilization
  - Ovulation-inducing drugs
- Possible endogeneity of twins births from infertility treatments
  - Mental burden of infertility treatments
  - In vitro fertilization is costly
    - It costs about 300,000 yen (4,000 AUD)
    - Public financial support (100,000 yen, for low and middle income families)

# Determinants of Twin Birth (3)

- Mother's Age
- DNA



# Other Contamination of Twins

## Birth IV

- Health risk of multiple births
  - Both for children and mother
- Concentration of housework and its effect on parents' labor supply
- Concentration of expense
- Goods sharing/ no hand-me-downs

# Twin Identification

- Identification only by age
  - Small probability of non-twin same-age brothers being identified as twins
- Use of birth date is ideal, but
  - it is difficult to obtain exact birth date and large number of samples at the same time

# Household Micro Data of Japan

- National survey of family income and expenditure (1999)
  - Once in five years, about 50 thousand households
  - Not following the same households
  - Data are obtained from Institute of Economic Research, Hitotsubashi University
    - Experimental micro data provision started a few years ago and ended in 2008
    - Full-fledged data provision is expected to start in 2009
  - Never used for the estimation of child costs

# Other Household Micro Data of Japan

- The Japanese Panel Survey on Consumers (JPSC)
  - Yearly, 1500-2000 women aged between 24 and 34, 1993-2008
  - Three months average
  - Following the same women
  - The Institute for the Research on Household Economics
  - Oyama (2006) used the database

# Household Micro Data of Korea

- Household Income and Expenditure Survey (2003, 2004, 2005)
  - Monthly
  - Following the same households for several Months (8 months on average) each year
  - About 90 thousand obs, 10 thousand households each year
  - Data are obtained from KMDSS of Korea National Statistical Office

# Basic Statistics

	Japan 1999	Korea 2003-2005
Engel Coefficient	24.0%	30.3%
Monthly Consumption Expenditure	335114 yen (4196 AUD)	1942575 won (1909 AUD)
Persons per household	3.40	3.35
Persons under 18 per household	0.82	1.00

# Baseline Regression Equation

$$\begin{aligned} Engel_i &= \alpha + \beta \ln(Expenditure_i) \\ &+ \gamma_0(ShareofChildren_i) \\ &+ \gamma_1(ShareofSeniors_i) \\ &+ \gamma_2 \ln(FamilySize_i) + u_i \end{aligned}$$

- Children (0-17) Adults (18-64) Seniors (65-)
- Yearly dummies are included in the Korea regressions

# Instrumental Variables

	Endogenous Variables	Instrumental Variables
Type 1 (IV1)	Share of Children	Share of Multiple Births
Type 2 (IV2)	Share of Children Share of Seniors Log of Family Size	Twins Ratio Number of Adults Number of Seniors



# Regression Results

	Japan		Korea			
	OLS	IV1	OLS1	IV1	IV2	OLS2
In(Expenditure)	-0.135*** (0.001)	-0.135*** (0.001)	-0.095*** (0.000)	-0.093*** (0.001)	-0.096*** (0.001)	-0.097*** (0.000)
Share of Children	-0.066*** (0.002)	-0.062*** (0.013)	-0.071*** (0.001)	-0.079*** (0.006)	-0.083*** (0.016)	-0.072*** (0.002)
Share of Seniors	0.027*** (0.001)	0.027*** (0.005)	-0.006*** (0.001)	-0.010*** (0.003)	-0.006 (0.008)	-0.018*** (0.004)
In(FamilySize)	0.091*** (0.001)	0.089*** (0.004)	0.065*** (0.001)	0.058*** (0.006)	0.055*** (0.010)	0.067*** (0.001)
Adj R <sup>2</sup>	0.402	0.402	0.220	0.219	0.222	0.223
Sample Size	44,537	44,537	265,663	265,578	148,541	148,541

OLS1: all families, OLS2: only families with children

# Equivalence Scales

## One More Child

	Japan		Korea			
	OLS	IV1	OLS1	IV1	IV2	OLS2
Two adults One child	1.12	1.12	1.08	1.04	1.02	1.08
Tow adults Two children	1.11	1.11	1.08	1.06	1.04	1.08

# Estimation results

- Estimated equivalence scales of Japan (0.11-0.12) are lower than existing studies
- Estimated equivalence scales of Korea (0.02-0.08) are lower than those of Japan
- Estimated equivalence scales of Korea tend to be low in IV estimates
  - Estimated coefficient differences are statistically significant

# Policy Implication (1)

- We estimated child costs based on Engel method
- This does not mean that the compensation based on the child costs leads to more fertility
- The estimation of a fertility equation is necessary to evaluate the effect of compensation on fertility

# Policy Implication (2)

- Estimations of fertility equations could be very complicated and difficult for researchers to reach an agreement
- The advantage of the child cost estimations seems to lie in its relative simplicity
- Child benefits aimed at equality could be more socially acceptable than those aimed at inducing fertility

# Policy Implication (3)

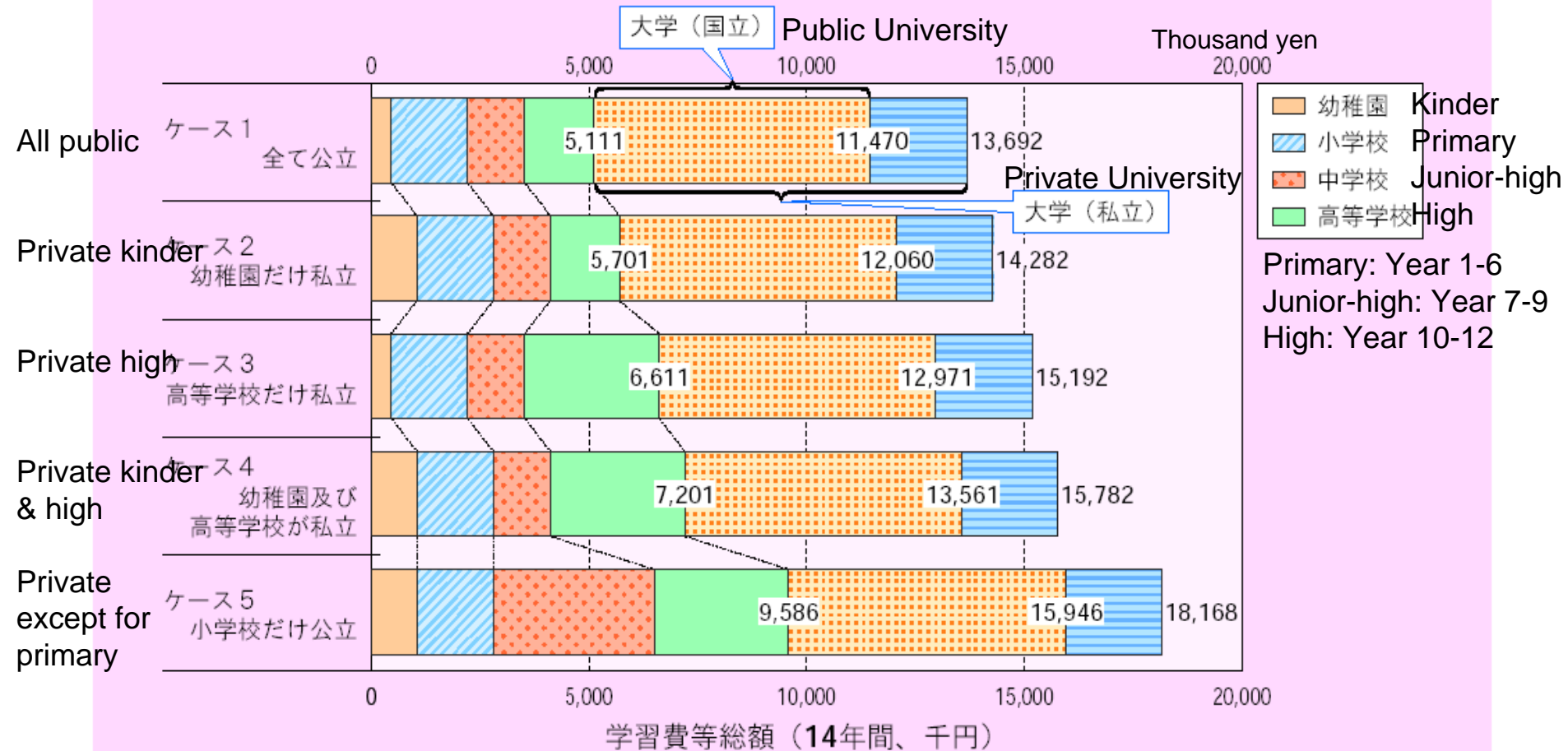
- Finally, it is worth emphasizing that once we take fertility as a choice variable of parents, welfare compensation loses its meaning as a base for child costs
- Therefore, the estimated “equivalence scales” are no more than estimations of child costs based on Engel coefficient, a seasoned and easy-to-understand living standard measure

# Child Support Payment of Japan

- Current child support payment
  - 5000 yen per month (About 1.5% of average monthly expenditure)
    - The first and the second child, 12 or younger
  - 10000 yen per month
    - In and after the third child, 12 or younger
    - All children, 3 or younger
  - Income limitation applies
  - If fully paid, 900,000 yen in total

第1-2-29図 幼稚園4歳から高等学校（14年間）と大学までの教育費等の総額

## Average Cost of Education in Japan



資料：文部科学省「子どもの学習費調査」、「学生生活調査」（2002（平成14）年度）

注：棒グラフ右の数値は、左から高等学校までの学習費総額の合計、国立大学（昼間部）に4年間通った場合、私立大学（昼間部）に4年間通った場合の数値。なお、大学の場合は学費の他、生活費を含む。



# Policies Proposed by Japanese Political Parties

- More Child Support Payment (Opposition DPJ)
  - 26,000 yen per month
    - All children 15 or younger
  - No income limitation
  - 4.8 trillion yen (36 billion Australian dollars)
- Negative Income Tax for Families with Low Income and with Children (Ruling LDP and Opposition DPJ)
  - 1-4 trillion yen?

# Other determinants of fertility

- Job security
  - Increasing non-regular employees
- Child care availability
- Child care leave benefit
- Parents' career
- Late Marriage
- Extra-marital childbearing
- Unobservable preferences