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Empirical Investigation of Declining Childbirth: Psychosocial and Economic Conditions in Japan

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Abstract

Background: For the past two decades, more and more women in certain European countries, Japan, and the United States are giving birth to their first child at a considerably later age than ever before. It remains unclear as to what extent this age-related general fertility decline is affected by changing social and cultural norms.
Method: The Global Centers of Excellence Survey was conducted by Osaka University in Japan (n=5313) in 2009. Multivariate regression analyses were conducted to examine the impact of psychosocial norms, cultural differences, and economic conditions on the perception of childbearing.
Results: The findings suggest that a subjective measure of happiness has a significant influence on childbearing. A society with income inequalities between classes discourages childbearing. It is observed that women's higher labor force participation generates a negative impact on mother-child relations which causes discouragement of childbearing. A higher female labor force participation stemmed from a transition of a traditional society into a modern and market-oriented society discourages childbearing.
Conclusions/implications: A woman's decision to delay childbearing is based on her perception of psychosocial norms with surrounding economic environment and her own value of opportunity in the market oriented society. Childbearing also imposes psycho-economic burdens on the working population under mix of a traditional, patriarchal society, and a modern market oriented framework. Childbearing incentives could be a strategic policy to encourage positive attitudes of childbearing in general and proper welfare policy, labor law(s), employment conditions, and social security system for a working mother with a child or children.

Key words: Childbearing, socioeconomic factors, psychosocial norms, subjective happiness

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Introduction

The rate of women giving birth between the ages of 20 to 39 years has decreased by about 3 percent in the past few years in the U.S. (Hamilton, 2011) and the trend continues, except for a rise in women giving birth between the ages of 40 and 49 years in the United States (Heck et al., 1997). In the Western Europe, the falling fertility rate reveals contemporary changes in social norms and polarization in the Western European nations (Lutz 2006; Vos, 2009). This trend can be seen in a number of Asian countries as well. For the past decade, Japan has been experiencing declining fertility along with an aging population (Atoh, 2008; Lam 2009; Tanaka-Naji, 2009). In fact, in 2011 the Taiwanese government announced fertility rate of 0.9 percent — the world's lowest on record (Jennings, 2011). It is clear that a low birth rate is becoming a significant issue for developed nations. While women in the United States, the selected Western European nations, Canada, Asia (especially Japan, Korea, and Taiwan) are undergoing this now-common demographic change, it is unclear as to what extent the age-related fertility decline is affected by cultural, socioeconomic, and healthcare factors.

Even though there is a growing trend to postpone childbearing till later in life, many women in Canada are not aware of the consequences of this (such as an increased risk of infertility) in spite of efforts of the Canadian Task Force on Preventive Health care and the Society of Obstetricians and Gynecologists of Canada raise awareness of variety of risk by delayed childbearing (Tough et al., 2006; Johnson et al., 2012). The trend toward delayed childbearing is a general phenomenon in Western Europe and the United States. Declining fertility causes a rise in the aging population and affects a nation's welfare by impacting, for example, social security and national health insurance because of shrinking workforce with less social security tax contribution under the aging population. Vos (2009) accounts this to changes in the socio-structural and economic environment, such as increased gender equity, the role of the breadwinner, family structures, and living standards. Specifically, alongside changes in women's working opportunities, working patterns, and employment conditions, young women are giving birth to fewer children from 100.43 births per 1,000 women in 2000 to 85.53 births in 2010 by the age of mother between 18 and 29 years old in the United States. (Brewster and Rindfuss, 2000).

As women delay childbearing, the total number of births per woman decreases. This changing demographic structure affects the future growth of the population. Japan is recording delayed childbirth, leading to smaller family sizes, an increased likelihood of childlessness, and an overall decline in the fertility rate of the nation. A number of factors have been proposed in the demographic and sociological literature to explain the phenomenon of delayed childbearing and declining fertility in industrialized nations. This includes changes in the societal expectations of women after they complete their education, emerging workforce structures, and attitudes toward childbearing within different cultures**.** Maternal education and knowledge have been identified as one of the strongest predictors of declining fertility and childbearing (Tough et al., 2006). Kumagai (2010) states a different view of declining fertility. He argues that it is caused by the dual structure of families caught between a patriarchal traditional family structure and the modern family role of women, which involves both an increase in economic activity and the attainment of higher education. Lam (2009) highlights the role of the patriarchal society in Japan. Women enter the labor market with a higher education, thereby changing their typical family roles and social and economic conditions and contributing to gender equality. This affects fertility as women are more inclined to pursue educational goals, develop their careers, and achieve economic independence prior to starting a family.

Economic opportunities delay women from getting married, and in turn bearing a child. Economic competiveness (related to economic development due to globalization) encourages women to get higher education, which affects the general working patterns of both men and women because of women's career aspiration with higher education which corresponds with low birth rates (Lutz, 2006). As consumers in a materially oriented society, women in the labor force strive to gain better living conditions and amenities by working longer hours which means fewer opportunities for childbearing. Working prospect, employment situations and working patterns cause a decline in fertility as the maternal age increases. Although fertility/birth rates among women aged 35 and over increase in Western Europe, Canada, the United States and Japan, the rises are not large enough to offset the decline of fertility/birth rates among younger women.

To our knowledge, there are few studies that have examined the perceptions of quality of life, attitudes, and opinions toward government welfare policies in terms of childbearing decisions. This study intends to find the aforementioned influences on childbearing attitudes of policy predictors by using a theory-based structural approach. This study fills the literature gap by shedding light on people's perceptions of poverty, income inequality, government welfare and

socio-family norms. Since a recent change in socioeconomic environments with dual structure of families correspond to a decline in childbearing and, in turn, lead to a dramatic increase in the aging population and significant decline in population in general, a comprehensive and integrated study on the declining birth rate is important for policy makers.

Methods

Data sampling measures

The study used the Global Centers of Excellence (COE) Survey (n=5313), conducted in 2011 by Osaka University in Japan. This used a two-stage stratified random sampling; the nationwide survey was divided into ten areas, which included cities, towns, and villages. Under a stratification standard, each regional area was further divided into four blocks based on the size of population from a large municipal town to smaller one with a stratification [Block 1: seirei shitei toshi, a city designated by a government ordinance; block 2: a city with 100,000 people or more; block 3: a city with fewer than 100,000 people; and block 4: a town or village]. The four blocks consisted of 40 stratums in total.

The distribution of samples (a cross-section) was based on the relative population size of the municipalities surveyed. Sample ages ranged from 20 to 69 years. The survey used the public announced basic unit of the National Population Census as the basic selection unit. Each selection unit was based on an array of geographical census units with accurate geospatial random sampling in order to meet the target age and gender cluster.

The following steps were taken when selecting the sampling spot (first sampling unit): (1) the sampling unit for the first stage unit (FSU) was a census unit taken from the latest census; (2) sampling spots were distributed in proportion to the population (approximately 15 samples per spot); (3) the sampling interval was calculated within each stratum (total population in the stratum/the number of FSUs in the stratum), and the FSUs were determined by the systematic sampling; and (4) the municipality in each stratum was categorized using a municipality code determined by the government.

By setting up systematic, single-stage cluster samples, each point in the nationwide survey included about 15 samples and each stratification was randomly selected using the municipality code of the census unit. Selection of individuals involved about 15 observations, which were randomly sampled by systematic sampling in each spot (FSU). The sampling interval varied according to the arrangement type in the inhabitant list.

In addition to general sociodemographic and economic information, the Global COE Survey contains exclusive data on perceptions of quality of life, government economic and welfare policies, equity, health status, risky health behaviors, psychosocial norms and characteristics, socioeconomic values, and the desired number of children. Table 1 shows the descriptive statistics of variables in this study.

Structural model

Economic well-being in the predisposing factor, perception of the psycho-economic factor, subjective measure of happiness is a quasi/proxy of quality of life, and government welfare policy in the enabling factor in addition to sociodemographic factor in Table 1 are associated with childbearing since these factors represent a changing social and economic environments of a transition between a traditional patriarchal and market oriented consumerist society. These factors are constructed in a structural model to investigate the impact of various influences on childbearing in the context of the PRECEDE-PROCEED (PP) model framework (Figure 1). The line of research on childbearing and its related policy implications originated from the PP model (Green and Kreuter, 2005; Chen et al.,2011), which offers some concepts and analytical tools to help analyze childbearing measures, i.e. number of children wanted. By applying behavioral theory, the six behavioral measures related to childbearing are incorporated with the PP model framework. In this study, the PP model contains sociodemographic, health, risky-behavioral, predisposing, enabling, and reinforcing factors, as well as government welfare and regulation.

Predisposing factors of the PP model include knowledge, awareness, personal attitudes, values, and beliefs. Enabling factors comprise access to childbearing facilities, availability of childcare resources, economic resources, social networks, etc. Reinforcing factors encompass the different types of feedback and rewards pertaining to childbearing. Reinforcing factors can be derived from family, friends, peers, self, and others who control the benefits and gains of childbearing. For government policy and regulation as a measure, this study has considered taxes, income equality, social security, and the burden of healthcare expenditures.

Empirical specifications

The basic structural framework is shown in Figure 1. Perception of childbearing and of happiness which is a subjective measure from scale 0 with very unhappy to 10 with very happy that represent a proxy predictor of quality of life are endogenous and interdependent: the arrows show that psycho-economic, socio-demographic, enabling, reinforcing, and predisposing factors are predictors of childbearing and happiness. As an exclusion criteria, this study focuses on

women between the ages of 22 and 45.

The following equations describe the basic structural model of analysis:

$CB_i = \alpha_0 + \alpha_1 HA_i + P_i\alpha_2 + R_i\alpha_3 + E_i\alpha_4 + X_i\alpha_5 + S_i\alpha_6 + \varepsilon_i$ .....[1] and

$HA_i = \beta_0 + \beta_1 CB_i + P_i\beta_2 + R_i\beta_3 + E_i\beta_4 + X_i\beta_5 + S_i\beta_6 + \omega_i$ .....[2].

Equations 1 and 2 represent the relationship between the health behavioral choice of individual "i" and a person reveals the preference of number of children. Factors will influence an individual's preference of number of children, and ε_i is an unobserved error, generally assumed to satisfy $e(\varepsilon_i \mid HA, P, R, E, S, X)=0$. ω_i is an unobserved error, generally assumed to satisfy $e(\omega_i \mid CB, P, R, E, S, X)=0$. CB_i represents child wants, i.e., childbearing of individual i and HA_i denotes happiness of individual i. P_i, R_i, and E_i are vectors of the presumably exogenous variables of the predisposing, reinforcing, and enabling factors of individual i, respectively, that potentially influence childbirth. Equations 1 and 2 show the influential composition. S_i and X_i are vectors of additional determinants of child wants and sociodemographic and psycho-economic factors, respectively. Both childbearing (CB) and happiness (HA) — consisting of predisposing (P), reinforcing (R), enabling (E), psycho-economic (X), and socio-demographic (S) factors that will influence child wants and quality of life — are also incorporated in the extended PP model in Figure 1 to observe influential determinants.

The association between the quality of life and happiness is positive, and both indicators are possibly simultaneously determined within this study. The relationship between childbearing and happiness is an ambiguous association, and could be positive or negative. Parents want to have a certain number of children under prevailing constraints, such as economic, psychological, social, and demographic factors which are influenced by government policy and regulations, e.g. social security retirement benefits, welfare policy for working mother, working regulation/condition for working mothers, etc. Within the given constraints, number of children is determined by maximizing parents' utility, i.e., satisfaction and happiness.

Childbearing and raising children generate an economic, psychological, and physical burden. The burden is generally that of cost. An increase in costs will be transformed into the pecuniary term of childbearing and happiness of having a child. This transformation or change depends on an individual psycho-economic factor and prevailing constraints and leads to an individual optimal decision. The classical behavioral theory of marginal utility may be applied directly to the decision whether to bear a child or not. In a neoclassical world, with perfect information and a competitive market, the study assumes all relative prices of other consumption

goods are given. However, an increase in the general price level i.e., an increase in the cost of living affects the decision to bear a child.

Statistical analysis

Multivariate multiple-regression analysis was conducted to examine the effects of psychosocial norms, cultural perception, and social values on childbearing (CB) and happiness (HA). For this estimation, we used the method of two-stage least squares (2SLS) since random shock affects the number of children wanted by individuals and also affects their subjective happiness, i.e., a proxy of quality of life. This study treated happiness as endogenous and employed the instrumental variable (IV) approach in the context of simultaneous equations.

Results

Table 2 presents the results from the 2SLS method of the factors associated with the positive perception of childbearing that the definition is shown in Table 1. Table 3 presents the results from the perception of happiness. All of the results reported in Tables 2 and 3 used heteroskedasticity-robust standard errors. Thus, heteroskedasticity does not threaten the internal validity of the multivariate multiple-regression analysis with the definition of variables in Table 1. The variance inflation factors (vifs) for regressions range from 1.08 to 3.22 in Table 2. Vifs of Table 3 are between 1.45 and 2.45, and all vifs are less than 10. As a rule of thumb, when analyzing standardized data, a vif < 10 indicates a nonharmful multicollinearity. The major focus of this study is on the childbearing decision, and the analysis is as follows:

Happiness effect on childbearing

The primary parameter of interest in this study is the influence of the perception of happiness on childbearing. For the happiness effect, as happiness level increases by a unit, childbearing on average increases by about 0.825 units (Table 2). In percent terms, a 10 percent rise in happiness level will increase childbearing by 24.87 percent [=0.825x(6.42/2.13)x10] and the net effect of the other statistically significant factors together will raise it by 4.32 percent (see the definition in Table 1). The total effect is an increase of 29.19 percent in childbearing. The happiness effect on childbearing is positively 4.8 times larger than the other factors put together in Table 2. Interestingly, childbearing does not necessarily create happiness; its coefficient shows a negative sign with statistically significant influence (Table 3). A 1 unit increase in childbearing will lower 0.854 units of happiness level. More precisely, in percent terms, a 10 percent rise in childbearing will lower happiness level by 2.83 percent [=0.854x(2.13/6.42)x10] in Table 3.

Predisposing factors

The key parameters of the predisposing factor are “Being poor is due to inequality rather than laziness.” and “It is unacceptable that disparities in income are widening.” (the 5-point scale; strongly agree =1 ~ strongly disagree =5) in Table 2. The sign of coefficient depends on each statement which is carefully shown the scale. The negative signs of the 1st (-0.027) and the 3rd questions (-0.060) in the predisposing factor are that a target person agrees the statement. Thus, the interpretation is that the target person thinks that the poverty is due to inequality, not because of laziness, and the widening income disparities are unacceptable. Individuals presume that unfairness does not cause poverty, but it stems from other reasons. Iindividuals with the perception of income inequality tend to be more inclined toward the idea of less childbearing. By contrast, the positive sign (0.109) with a statistically significant coefficient shows that individuals disagree the statement and accept that more and more people are becoming poor. The individuals with this kind of perception tend to have more children. Interestingly, the statement with the positive sign (0.038) states that individuals disagree "When there is greater competitiveness, illegal activity and cheating increase." The individuals assume the market/economic competition is not necessary to be related to illegal and cheating activities and those individuals are apt to have more childbearing. The society with rising income inequality discourages individuals from childbearing in Japan.

Reinforcing and enabling factors

In Table 2 we see the influence of reinforcing and enabling factors on childbearing. “A mother’s holding a job has a negative impact on the development of a good relationship with her primary school children as motherhood” is in the category of the reinforcing factor and “It is acceptable to receive social security, even if you are ineligible” is in the category of the enabling factor with the 5-point scale (strongly agree ~ strongly disagree). The former states that women with a child/children generally have difficulty giving birth to and raising children under the current environment, such as working hour schedule, deficiency of nursery schools, and costs of nursery. Similarly, the latter factor is negative and statistically significant and implies that the development of a welfare system (i.e. less strict requirements for social security retirement benefits) will encourage childbearing, other aspects held constant. Using the elasticity concept, we predict that the impact of these factors on childbearing will be reduced by 0.7 percent by “a mother holding a job” and by 1.7 percent by “the current requirements for social security retirement benefits,” if these factors of perception intensify by 10 percent. Interestingly, both

coefficients involve an application of policy. For example, the government policy and regulations would help working generations since childbearing dilute their savings, e.g. welfare policy of nursery school subsidies for working mother, working regulation/condition by employers for working mothers, social security retirement benefits with less stringent requirements for their retired period, etc.

Psycho-economic factors

The next set of influential factors, termed here psycho-economic, are presented in Figure 1 and Table 2. All five related factors are statistically significant, differing from zero (fulfillment, anxiety, stress, depression, loneliness). The net psycho-related factors resulted in a 10 percent increase in all factors that would increase childbearing by 1.12 percent. The results suggest that a fulfilling life would include a larger number of children sine higher anxiety, stress, depression, and loneliness would adversely affect childbearing in general. Economic factors (private employment and standard of living) show statistically significant results, and female part-time employees are in an environment better suited to childbearing than full-time employees. In addition, private sectors of employment status will decrease incentives for childbearing. An increase in standard of living generally lowers the number of children because an increase in income, i.e. standard of living is associated with an intensive quantity/quality of educational investment for children with less number of children. This result implies an inverse relationship between economic development and low fertility/childbearing.

Socio-demographic and health related factors

Among socio-demographic factors, marriage is statistically and significantly different from zero, and married person generally have a greater want for a child/children than a single/unmarried person. The result of the health-related factor — self-perception of personal health, or subjective health — obtained from the study reveals a positive relationship between good health status and childbearing incentives. Thus, health capital investment in parents is vital and promotes to have more children.

Happiness

In Table 3 the net magnitude of happiness regression predicts that a 1 unit increase in level of happiness perception is associated with a 1.474 unit increase in perception of happiness level. The result of the childbearing coefficient is negative and statistically significant. The result captures that an increase in desire to bear children will reduce perception of happiness, and the impact is much larger than the net effect of all statistically significant coefficient variables

together: childbearing=-1.81 vs. total effect excluding childbearing variable=1.474 (=mean*statistically significant coefficients). The results raise the question why childbearing negatively influences, or reduces, happiness perception. Among socio-demographic factors, women are happier than men; married persons possess greater happiness perception; and as age advances, people in general possess less happiness.

For the predisposing factor, responses to the statement "being poor is due to unfairness rather than laziness (5-point scale; strongly agree ~strongly disagree)" show that a positive coefficient of happiness is based on the perception of disagreement on the positive association between poverty and unfairness in Table 3. The coefficients of "in general, most people are trustworthy" (5-point scale; strongly trustworthy ~ least trustworthy)" and "husbands should work outside the home, and wives should keep up the household" (5-point scale; strongly agree ~ strongly disagree) are both negative and statistically significant in the category of the reinforcing factor. Individuals who have trustworthy people around tend to be happier. In contrast the phrases, "husbands should work . . .wives should keep . . ." points to a patriarchal society with a negative coefficient on happiness that contradicts traditional society. Thus, the current Japanese society is a mix of a traditional, patriarchal society and a modern framework that fuses consumerism, globalization, and a competitive, market-oriented economy. In the category of enabling factors in Table 3, issues connected to "expansion of social security eligibility" and "government financial responsibility to support indigent people"are against a welfare society that is heavily dependent upon government.

Conclusion and Policy Implications

The findings for Japan indicate that an increase in happiness has a significant influence on childbearing. Meanwhile, predisposing, reinforcing, and enabling factors also reveal some mix of influence on childbearing. A society with income inequality between classes discourages childbearing. This inequality possibly stems from educational attainment. Individuals work harder and longer hours to reduce gaps in income equality. A materialistic society marked by consumerism encourages the individual to obtain higher human capital through higher education and a greater participation in the labor force. A new, expanded market-oriented framework of society and life persuades individuals to place less emphasis on childbearing. Thus, the burden of combining employment conditions with a change in family roles must be balanced by a labor market policy that encourages childbearing. In addition, our findings suggest that women's

higher labor force participation tends to generate a negative impact on the development of a good relationship with primary school children as motherhood since lack of social support including employers and government supports reduce motherhood awareness. In turn, the transition of a traditional society to a modern, market-oriented society discourages childbearing. However, the findings demonstrate that individuals expect to live in a well-developed welfare society, where good and less stringent social security benefits, supports by the governments for working mothers, and less income disparity exist. The current socioeconomic environment discourages incentives for childbearing behaviors/efforts.

In the globalized economy and its competitive marketplace, individuals suffer from anxiety, stress, depression, and loneliness. Our findings validate that these factors lead to lower rates of childbearing. Importantly, the study confirms that self-perceived good health encourages childbearing. Good healthcare settings are vital within the national health insurance framework. The Japanese national healthcare program is a better healthcare system from a welfare society's point of view. It provides equal accessibilities to healthcare services and equity of health of population than a mixed-healthcare system as, for example, in the United States, where health disparity and inaccessibility to healthcare is observed. Health education is another important policy issue. Formal and informal health education raises health capital, which encourages healthier behaviors. A government-initiated welfare policy is critical to change current socioeconomic and demographic structures (Gauthier, 2007).

Our findings confirm that Japanese society is transitioning from a patriarchal society to a modern, materialistic, consumerist consumerized, and market-oriented society. The results indicate that a patriarchal society (which some individuals ascribe to) negatively influences happiness.

The study is limited in that the data are self-reported and perceptions of childbearing rely on the subjective measure of individuals. In addition, we do not separate such perceptions between male and females. This reflects the idea that childbearing is a joint decision (note that individuals aged 65 and older are not included in the study). This study employs perception of happiness as an aspect of quality of life. In spite of these limitations, the study makes a contribution to the existing literature concerning declining fertility and childbearing issues. The results of this study shed light on factors of childbearing incentives and their policy implications. Future research should develop and examine the composite nature of various perceptions that influence childbearing behaviors and incentives in culturally different societies or countries.

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Table 1. Descriptive statistics of variables used in the present study (n=4,037)

Variables	Min.	Max.	Mean	Standard Deviation
Dependent variable				
• How many children do you want?	0	5	2.13	.967
• How would you rate your current level of happiness? (scale 0-10; very unhappy ~ very happy)	0	10	6.42	1.786
Independent variables				
Predisposing factor				
• Being poor is due to inequality rather than laziness. (5-point scale; strongly agree ~ strongly disagree)	1	5	3.15	.778
• It is unacceptable that more and more people are becoming poor. (5-point scale; strongly agree ~ strongly disagree)	1	5	1.71	.765
• It is unacceptable that disparities in income are widening. (5-point scale; strongly agree ~ strongly disagree)	1	5	1.94	.830
• When there is greater competition, illegal activity and cheating increase. (5-point scale; strongly agree ~ strongly disagree)	1	5	2.53	.827
Reinforcing factor				
• In general, most people are trustworthy. (5-point scale; strongly trustworthy ~ least trustworthy)	1	5	2.87	.742
• A mother with a job negatively impacts the development of a good relationship with her primary school children as motherhood. (5-point scale; strongly agree ~ strongly disagree)	0	5	1. 64	1. 697
• It is more important for a wife to help her husband's career than for her to pursue a career. (5-point scale; strongly agree ~ strongly disagree)	0	5	1.75	1.770
• Husbands should work outside the home, and wives should manage the household. (5-point scale; strongly agree ~ strongly disagree)	0	5	3.36	1. 006
Enabling factor				
• It is acceptable to receive social security, even if you are ineligible. (5-point scale; strongly agree ~ strongly disagree)	1	5	3.78	.969
• It is the government's responsibility to take care of those who cannot take care of themselves financially. (5-point scale; strongly agree ~ strongly disagree)	1	5	2.80	.884
• Although an economy regulated by market forces widens the income gap between the rich and the poor, it makes people wealthier in general; so overall, people are better off. (5-point scale; strongly agree ~ strongly disagree)	1	5	3.07	.762
• I feel happy when I do a good deed that I think benefits others (such as picking up trash in a park). (5-point scale; strongly agree ~ strongly disagree)	1	5	2.01	.714
Psycho-economic factor				
• My daily life is fulfilling. (5-point scale; particularly true for me ~ doesn't hold true at all for me)	1	5	2.56	.864
• I am worried about my health. (5-point scale;	1	5	2.87	1.069

strongest anxious of health ~ least anxieties of health)				
• I have been feeling stressed lately. (5-point scale; strongest stress ~ least stress)	1	5	2.80	1.057
• I have been feeling depressed lately. (5-point scale; strongest depressed ~ least depressed)	1	5	3.34	1.109
• I have been feeling lonely lately. (5-point scale; particularly true for me ~ doesn't hold true at all for me)	1	5	3.77	1.069
• Female part-time employee =1, otherwise = 0.	0	1	.19	. 392
• Private employment status =1, otherwise = 0.	0	1	.44	.497
• On what level do you think your standard of living lies? (scale 0-10; lowest level ~ highest level)	0	10	5.19	1.556
• Approximately how much was your annual earned income before taxes, including bonuses and business income in 2010? (scale 1-10; $0 ~ $140,000 or more)	1	10	3.17	1.939
Sociodemographic factor				
• Gender (female=1, otherwise = 0)	0	1	0.53	.499
• Marital status (married =1, otherwise = 0)	0	1	.80	.401
• Age (years)	22	65	48.45	10.93
• Female age 22-45 =1, otherwise = 0	0	1	0.21	0.41
• Years of education (years)	9	19	12.27	2.004
Health-related factor				
• How would you describe your current health status? (5-point scale; excellent=5 ~ poor=1	1	5	2.63	.943
Behavioral factor				
• Do you drink alcoholic beverages? (Scale 1-6) 1=no drink at all 2= hardly drink 3=sometimes 4= a can of beer per day or its equivalent 5=3 cans of beer per day or its equivalent 6=5 cans of beer per day or its equivalent	1	6	2.62	1.358
• Do you smoke? (Scale 0-7) 0= never smoke 1= < 1 cigarette per day 2= 1-5 cigarettes per day 3= 6-10 cigarettes per day 4= 11-20 cigarettes per day 5= 21-30 cigarettes per day 6= 31-40 cigarettes per day 7= 41 cigarettes or more per day	0	7	1.59	2.388

Table 2. Empirical results of two-stages least squares: Perceptions of childbearing and its influential factors in the Global COE Survey in Japan (n= 4037)

Variables	Coefficient	Standard Error	P>Z	95% Conf.	Interval
How would you rate your current level of happiness?	0.825	0.356	0.021	0.127	1.522
Predisposing factor					
• Being poor is due to inequality rather than laziness.	-0.027	0.042	0.522	-0.109	0.055
• It is unacceptable that more and more people are becoming poor.	0.109	0.044	0.014	0.022	0.196
• It is unacceptable that disparities in income are widening.	-0.060	0.037	0.099	-0.132	0.011
• When there is greater competition, illegal activity and cheating increase.	0.038	0.032	0.244	-0.026	0.101
Reinforcing factor					
• In general, most people are trustworthy.	-0.013	0.043	0.765	-0.096	0.071
• A mother with a job negatively impacts the development of a good relationship with her primary school children ass motherhood.	-0.047	0.026	0.070	-0.097	0.004
• It is more important for a wife to help her husband's career than for her to pursue a career.	-0.035	0.029	0.233	-0.091	0.022
Enabling factor					
• It is acceptable to receive social security, even if you are ineligible.	-0.094	0.037	0.010	-0.166	-0.022
• It is the government's responsibility to take care of those who cannot take care of themselves financially.	-0.005	0.033	0.885	-0.069	0.060
• Although an economy regulated by market forces widens the income gap between the rich and the poor, it makes people wealthier in general; so overall, people are better off.	0.047	0.030	0.116	-0.012	0.105
• I feel happy when I do a good deed that I think benefits others (such as picking up trash in a park).	0.032	0.050	0.526	-0.067	0.130
Psycho-economic factor					
• My daily life is fulfilling.	0.416	0.218	0.057	-0.012	0.845
• I am worried about my health.	0.066	0.033	0.047	0.001	0.131
• I have been feeling stressed lately.	-0.101	0.044	0.021	-0.186	-0.015
• I have been feeling depressed lately.	-0.096	0.057	0.090	-0.207	0.015
• I have been feeling lonely lately.	-0.173	0.082	0.034	-0.333	-0.014
• Female full-time employee	0.106	0.092	0.248	-0.074	0.286
• Female part-time employee	0.167	0.094	0.076	-0.018	0.353
• Private employment status.	-0.114	0.058	0.048	-0.226	-0.001
• On what level do you think your standard of living lies?	-0.312	0.130	0.016	-0.566	-0.057
• Approximately how much was your annual earned income before taxes, including bonuses and business income in 2010?	0.015	0.014	0.295	-0.013	0.044
Socio-demographic factor					
• Gender	-0.148	0.121	0.220	-0.385	0.089
• Married	0.350	0.128	0.006	0.099	0.601
• Age	-0.003	0.003	0.393	-0.010	0.004

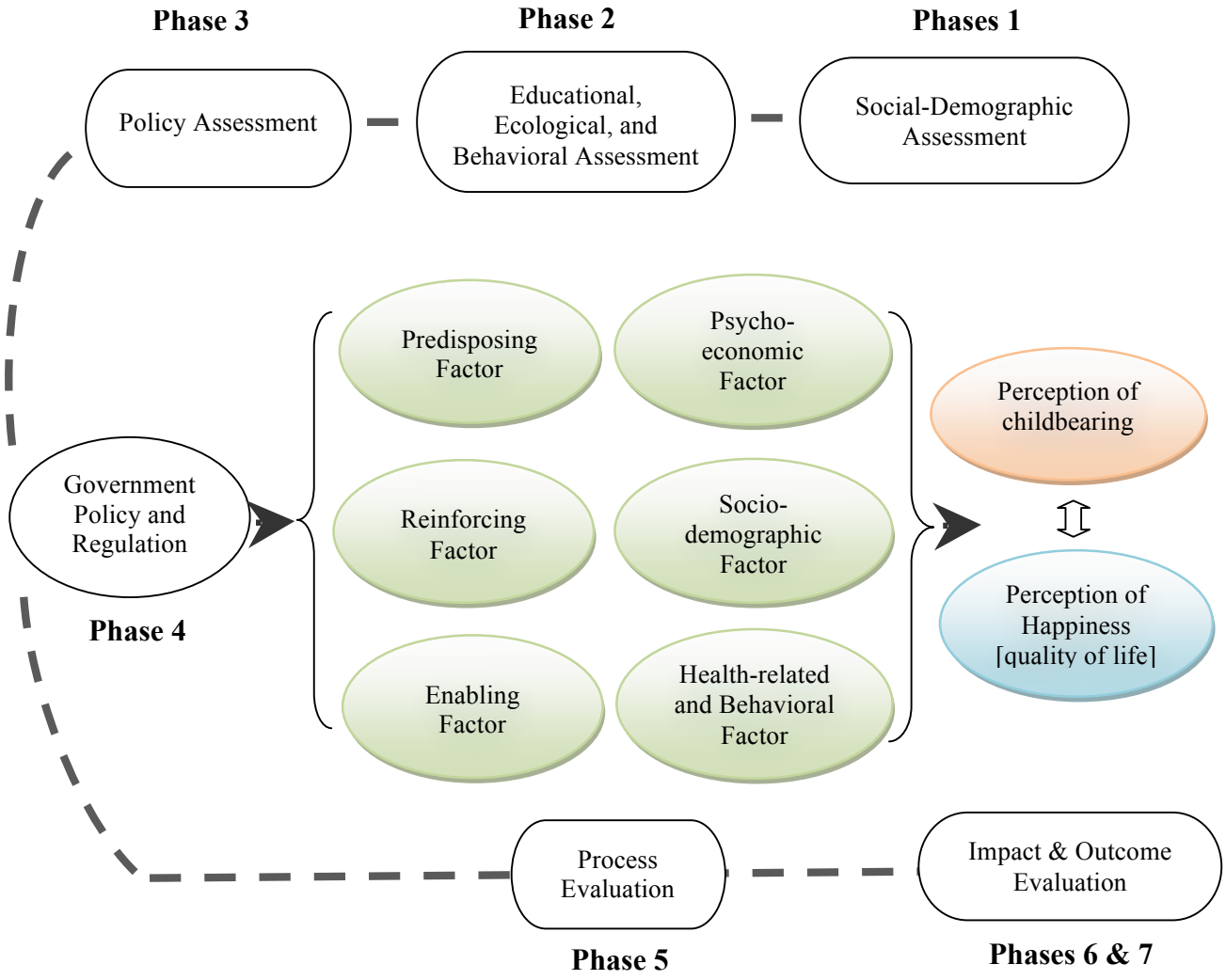
• Female age 22-45	-0.108	0.080	0.177	-0.265	0.049
• Years of education	-0.019	0.013	0.158	-0.045	0.007
Health-related factor					
• How would you describe your current health status?	0.105	0.051	0.040	0.005	0.205
cons	-1.322	1.658	0.425	-4.573	1.928
Number of observations	4,037				
Wald chi-square (28)	185.89				
Prob>Chi square	0.0000				
R-squared	0.2135				
Root MSE	1.3662				

Table 3. Empirical results of two-stages least squares: Perception of happiness and its influential factors in the Global COE Survey in Japan (n= 4037)

Variables	Coefficient	Standard Error	P>Z	95% Conf. Interval	
How many children do you want?	-0.854	0.408	0.036	-1.653	-0.056
Predisposing factor					
• Being poor is due to inequality rather than laziness.	0.115	0.038	0.002	0.041	0.189
• It is unacceptable that more and more people are becoming poor.	-0.034	0.045	0.446	-0.121	0.053
• It is unacceptable that disparities in income are widening.	0.014	0.040	0.725	-0.064	0.093
• When there is greater competition, illegal activity and cheating increase.	-0.050	0.031	0.105	-0.111	0.011
Reinforcing factor					
• In general, most people are trustworthy.	-0.152	0.048	0.002	-0.245	-0.058
• Husbands should work outside the home, and wives should manage the household.	-0.058	0.035	0.100	-0.126	0.011
• A mother with a job negatively impacts the development of a good relationship with her primary school children as motherhood.	0.004	0.032	0.896	-0.058	0.066
• It is more important for a wife to help her husband's career than for her to pursue a career.	0.005	0.035	0.885	-0.064	0.075
Enabling factor					
• It is acceptable to receive social security, even if you are ineligible.	0.052	0.029	0.078	-0.006	0.109
• It is the government's responsibility to take care of those who cannot take care of themselves financially.	0.089	0.035	0.010	0.021	0.157
• Although an economy regulated by market forces widens the income gap between the rich and the poor, it makes people wealthier in general; so overall, people are better off.	0.060	0.040	0.134	-0.019	0.140
• I feel happy when I do a good deed that I think benefits others (such as picking up trash in a park).	-0.163	0.044	0.000	-0.249	-0.077
Psycho-economic factor					
• My daily life is fulfilling.	-0.675	0.048	0.000	-0.770	-0.581
• I have anxieties about my health.	-0.046	0.030	0.119	-0.104	0.012
• I have been feeling stressed lately.	0.070	0.034	0.043	0.002	0.137
• I have been feeling depressed lately.	0.147	0.035	0.000	0.079	0.215
• I have been feeling lonely lately.	0.222	0.029	0.000	0.165	0.280
• On what level do you think your standard of living lies?	0.352	0.019	0.000	0.315	0.388
• Approximately how much was your annual earned income before taxes, including bonuses and business income in 2010?	0.014	0.016	0.382	-0.017	0.045
Socio-demographic factor					
• Gender	0.285	0.077	0.000	0.135	0.435
• Married	0.826	0.253	0.001	0.331	1.321
• Age	-0.012	0.004	0.001	-0.019	-0.005
• Years of education	0.012	0.014	0.375	-0.015	0.039

Health-related factor					
• How would you describe your current health status?	-0.108	0.033	0.001	-0.173	-0.043
Behavioral factor					
• Do you smoke?	-0.024	0.012	0.037	-0.047	-0.001
• Do you drink alcoholic beverages?	0.044	0.024	0.060	-0.002	0.091
cons	6.673	1.012	0.000	4.689	8.656
Number of observations	4037				
Wald chi-square (28)	2815.76				
Prob>Chi square	0.0000				
R-squared	0.2775				
Root MSE	1.5354				

Figure 1. Application of the PRECEDE-PROCEED model to perceptions of childbearing and of happiness



Note: The Precede-Proceed model (Green & Kreuter, 2005) is a planning model used to analyze and assess intervention/promotion for behavioral/achievement changes in childbearing within a given sociodemographic and psycho-economic environment. This model allows for a series of assessments and evaluations designed to help policy makers move from the recognition of problems and needs to increasing fertility through the analysis of needs and problems.