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by:

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Influence of age of child on differences in life satisfaction of
males and females: A comparative study among
East Asian countries

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April 2012

Abstract

Using individual-level data for China, South Korea, and Japan for 2006, this research examines how life satisfaction for married males and females in East Asian countries is influenced by the age of their children. Our results show that the life satisfaction of males is barely affected by a child of the relationship, whereas the life satisfaction of females with a young child is lower than that of females who do not have a child. This result holds for countries at different development stages. There is also a gender differential regarding the effect of young children on life satisfaction. Furthermore, the more developed the country, the greater this difference becomes.

Keywords: Life satisfaction, child, East Asian countries, Ordered probit.

JEL Classification codes: D19, J13, J16

1. Introduction

Life satisfaction has long been a topic of interest to sociologists but not economists. Existing works have developed economic models that offer an explanation as to why parents need to have children from an economic perspective (for example, Becker 1981; Barro and Becker 1989; Boldrin and Jones 2002; Moav 2005)¹. In recent years, a number of economists have investigated the impact of socioeconomic conditions on different measures of subjective well-being (SWB), measured as self-reported levels of happiness or life satisfaction (for an excellent review, see Dolan et al. 2008). These empirical studies primarily focus on the effects of microeconomic and macroeconomic conditions on individual well-being (life satisfaction and happiness).² The family structure seems to be one of the key determinants of SWB. The empirical evidence from economics of happiness literature states that having children increases SWB (Dolan et al. 2008). However, in psychology literature, there are several studies that suggest that the presence and number of children decrease life satisfaction (for instance, White et al. 1986; Tsang et al. 2003; Twenge et al. 2003).

Child care is needed more when children are young, particularly before they enter primary school. In addition, females are likely to spend much more time on childrearing than males. These factors lead us to infer that the effect of children on parental satisfaction appears to depend on the age of the child and gender of the parent. In recent sociological literature, Dew and Wilcox (2011) examined how the presence of a child influences life satisfaction, but not the effect that the child's age may have

¹ Children can be considered as an investment good, or may serve as cheap labor. Another reason to have children is for their support in old age as a way of reducing economic uncertainty and to secure economic, physical, and emotional care.

² The influence of happiness on various facets of modern life has been also examined. For instance, Sabatini (2011) found a positive relationship between happiness and health status.

on life satisfaction. Clark et al. (2008) used German panel data to show that parents' life satisfaction decreased over time, with higher levels at the birth of a child, and lower levels when the child is 5 years old. However, it is unclear how the impact of the age of a child on life satisfaction differs across genders. Furthermore, many studies suggesting a negative impact of children on life satisfaction have focused on individualistic countries such as the United States and Canada. Nevertheless, the relationship between children and life satisfaction may also vary according to cultural context (for example, Dillon and Beechler 2010). In this paper, we are interested to see if this effect can be found in collectivist cultures, as in Asia (Moghaddam et al. 1993). There are differences in economic development and cultural values among Asian countries, thus, it is of interest to compare the influence of the child's age on parental life satisfaction in these countries.

The aim of this paper is to examine the association between children's age and life satisfaction across genders using a large individual dataset from several Asian countries (China, South Korea, and Japan) at different stages of development. This study is the first attempt at a cross-country analysis of the association between age of child and life satisfaction in three major Asian countries—China, Japan, and South Korea. We use compatible cross-country (individual-level) data that enable us to consistently compare results among the countries. The key contribution of this paper is to provide a comparative approach regarding the association between age of children and life satisfaction, and to determine whether this varies for men and women. The remainder of the paper is organized as follows.³ Section 2 provides the hypothesis.

³ Given the cross-sectional nature of the data, we are not able to provide our results in terms of cause and effect, but rather, in terms of association. Indeed, one might also argue the existence of reverse causality between children and life satisfaction.

Section 3 describes the data and empirical methodology. Section 4 reports the main empirical results, and section 5 concludes.

2. Hypothesis

Females typically cannot work for a while after they give birth. From the view point of economics, females are thought to have a comparative advantage with respect to helping with homework and providing child care (Becker 1981). Males have a comparative advantage at working to earn money. According to data of the World Bank, in 2006 the ratio of female to male tertiary enrollment was 88, 66, and 96 for Japan, South Korea, and China, respectively⁴. This suggests that parents are more inclined to invest in a son's rather than a daughter's education in East Asian countries. Consequently, the higher human capital of males results in higher wages in the labor market compared with females. This leads to females becoming housewives rather than full-time employees in the workplace. Recently, researchers have paid much attention to the role played by "identity" in human behavior. In the case of housework, females may consider doing that task as part of their self image. Thus, time for housework increases their utility (Akerlof and Kranton 2000).

After giving birth, women are likely to devote more of their time and energy to their children. They spend less time with their spouse and devote more time to domestic duties (Nomaguchi and Milkie 2003; Dew and Wilcox 2011)⁵.

The existence of a child can increase the utility of parents, and thus a child can

⁴ See <http://data.worldbank.org/indicator/SE.ENR.TERT.FM.ZS> (accessed January 6, 2012).

⁵ It is also plausible that life satisfaction can decline because the expectations of women regarding equitable and fair work are not met (Twenge et al. 2003; Dew and Wilcox 2011), including a husband's lack of contribution to housework. Women are happier when they can share their domestic tasks and child care with their husbands (for instance, Amato et al. 2003).

be considered as a consumption good in the utility function (Becker 1981). That is, a child has a positive effect on life satisfaction of parents. Alternatively, parents are obligated to provide child care when the child care market has not been well developed. Providing child care reduces leisure time and decreases utility. Time for child care is thus considered the cost of a child. As a result, children have a negative effect on utility. That is, children can reduce the life satisfaction of a female. Considering the positive and negative effects of having a child, children can reduce life satisfaction when the negative outweigh the positive effects.

The relationship between life satisfaction and children may also vary according to the age of the child. The amount of time required for child care is greater when the child is young because infants require almost constant attention and care. Older children demand less care and spend much of their time in school. Thus, they create less of a conflicting role for parental caregivers (Kalenkoski et al. 2009; Twenge et al. 2003). It seems plausible that life satisfaction declines after the birth of a child and recovers as the child becomes older and more independent.

A collectivist culture is characterized by tight social connectedness and conformity to social norms. This type of culture fosters familial relationships that require loyalty, cooperation, duty, and reciprocity from all members (Moghadoam et.al. 1993). In Asian countries based on such a culture, "regarding childcare, grandparents and other members of the extended family are more likely to cooperate in raising children." (Dillon and Beechler 2010, p. 10). Even in Asian countries, the traditional values stemming from a collectivist culture change as a consequence of economic development. The mother's child rearing burden becomes larger as family support for raising a child becomes smaller. In other words, an increase in burden for the mother

might be caused in part by a decline of social capital in developed countries (Putnam 2000). Furthermore, the opportunity cost of child care appears to increase as the human capital of females increases. In more developed countries, females have more education. Thus, their human capital is greater. In addition, females are more likely to have opportunities for higher earnings in these countries. Consequently, the opportunity cost of a child becomes higher. Hence, the existence of a child is thought to result in decreased life satisfaction in developed countries.

The argument above can be formalized in a simple empirical model, which is based heavily on Cigno (1991, Ch. 6). The cost of a child is convincingly assumed to be negatively associated with life satisfaction of parents. Hence, an increase in the cost of a child leads to a decrease in the parents' life satisfaction. Under such an assumption, the cost function of a child is expressed as:

Let b denote the rate of benefits payable to the parents for each child, and e the expenditure for a child. The total opportunity cost of childrearing is expressed as $f_i(h, w_i)$ where h is denoted as the home time devoted to a child and w the wage rate. Suffix i is the gender of parents. Furthermore, h is a decreasing function of the age of a child represented as g . w is an increasing function of human capital represented as k . In addition, w increases with d , denoting level of economic development in the country where parents live. The total cost of a child function $C_i()$ is written as

$$C = c_i(b, e, h, w_i) = e - b - f_i(h(g), w_i(k, d)). \quad (1)$$

c_i increases with increases in e and f_i , and decrease with increases in b .

Furthermore, f_i is specified as:

$$f_i(h(g), w_i(k, d)) = \frac{1}{g} k_i^\alpha d^\beta \quad (2)$$

where $\alpha > 0, \beta > 0$.

It is possible for C to be negative, and thus rearing a child can increase parents' life satisfaction. C can be negative even if e and f_i are positive if b is large enough. Partial differential equations are:

$$\frac{\partial f_i}{\partial a} = \frac{\beta}{g} k_i^x a^{\beta-1} > 0 \quad (3)$$

$$\frac{\partial f_i}{\partial x} = \frac{x}{g} k_i^{x-1} a^\beta > 0 \quad (4)$$

And then,

$$\frac{\partial^2 f_i}{\partial x \partial g} = -\frac{x}{g^2} k_i^{x-1} a^\beta < 0 \quad (5)$$

As seen in (3), the cost of a child is higher in more developed countries. We interpret (4) as suggesting that increases in i 's human capital results in an increase in the cost of a child. If (5) is true, the cost of a child is high when i 's human capital is high, and the child is young. To put it differently, an interaction between increases in i 's wage rate and a decrease in the child's age leads to an increase in the cost of a child, which results in a decrease in i 's life satisfaction.

We assume that the human capital of females is lower than that of males. Therefore, females are more likely to spend time on childrearing than on earning money. That is, the cost of a child is higher for females than for males. The hypothesis can be postulated as follows:

Hypothesis: Females experience greater life dissatisfaction compared with males when the child is young. This negative effect of small children on life satisfaction is greater in more developed countries.

3. Data and methodology

3.1. Data

The empirical analysis in this paper is based on micro data collected from the CGSS (Chinese General Social Surveys), JGSS (Japanese General Social Surveys), and Korean Social Surveys (Korea), which were conducted in 2006 and provided by the East Asian Social Survey Data Archive (EASSDA 2006). These surveys provide rich information regarding respondents' demographic and socioeconomic status and other particular aspects of the surveyed country. The surveys were designed uniformly and have common questionnaires, which make them largely comparable with each other. With the aim of comparing the effect of age of child on life satisfaction between different countries, we used the integrated EASS data collected by participating institutions in China, South Korea, and Japan.⁶ In the first survey round, the questionnaire incorporated a special module on "Family in East Asia (EASS 2006)". This family module questionnaire included questions concerning behaviors and attitudes of respondents toward their family members and relatives. Specifically, it focused on intergenerational support, attitudes toward the obligation to support aged parents, and attitudes toward primogeniture.⁷ Three survey rounds have been conducted so far.

From the three countries, China, South Korea, and Japan, 7,872, 2,500, and 3,998 individuals were invited to participate in the survey, respectively. The survey

⁶ The participating institutions in China, South Korea, and Japan were the Department of Sociology, Renmin University of China (Beijing); Survey Research Center, Sungkyunkwan University (Seoul); and JGSS Research Center, Osaka University of Commerce (Osaka). The Institution of Taiwan also participated in EASS. This paper attempts to compare countries representing different stages of economic development. Taiwan and Korea were considered to be at a similar stage. Hence, Taiwan was excluded in this paper.

⁷ The data were provided by the website of EASS (<http://www.eass.info/about/about01.php>) accessed on November 1, 2009.

collected data from 3,208 (China), 1,605 (South Korea), and 2,130 (Japan) individuals, with response rates of 38.5%, 65.7%, and 59.8%, respectively⁸. The construction of samples used in this research is shown in Table 1. Furthermore, we excluded those who had missing values for the dependent variable, life satisfaction. As a result, the sample included 3,208 respondents from China, 1,603 from South Korea, and 2,125 from Japan when it was limited to those who responded to the question regarding life satisfaction.⁹ Furthermore, after excluding observations from those without valid answers for key explanatory variables such as age, education, and household income, the sample size was 2,247 individuals from China, 959 from South Korea, and 1,021 from Japan. Final sample size was gender balanced across the surveyed countries (see Table 1).

The survey included non-married people and those who did not have a child. This paper focused on effect of age of children, rather than the presence of a child. Hence, those who did not have a child were excluded from the sample. In addition, I restricted the sample to only married people for the purpose of exploring the influence of spouse's characteristics on life satisfaction. The mean age of the sample was 45.0 (China), 46.8 (South Korea), and 54.5 (Japan).

3.2. *Dependent variable*

The dependent variable was self-reported life satisfaction. This measure was

⁸ No analysis was conducted on the non-participants because information about them was not available. The response rate for South Korea, 65.7%, was almost equivalent to that for Japan 59.8%. However, that for China, 38.5%, was far lower than that for South Korea or Japan. There seem to be various reasons why such a gap existed. For instance, the quality and technique of investigators differed.

⁹ The number of missing values excluded from the study was 622, 552, and 618 for China, South Korea and Japan, respectively.

derived from the respondents' answer to the question, "All things considered, how satisfied are you with your life as a whole these days?" on a five-point scale (1 = "strongly dissatisfied" to 5 = "strongly satisfied")¹⁰. As can be seen in Figure 1, the distribution of life satisfaction varies across East Asian countries. The most frequent response in China and South Korea was 3. However, in China, the rate of those who responded 2 (dissatisfied) was about 45 %, which is far higher than the rate of those who responded 4 (satisfied). On the other hand, in South Korea, the rate of those who responded 4 (satisfied) was about 30 %, which is far higher than the rate of those who responded 2 (dissatisfied). Hence, Korean respondents were more likely to be satisfied with their life than Chinese respondents. The rate of participants in Japan who responded 4 (satisfied) was 37 %, which was almost the same as the rate of those who responded 3. Furthermore, the rate of Japanese participants who responded 5 (very satisfied) was about 10 %, which is approximately two times higher than that of Koreans. This suggests that Japanese individuals are more inclined to be satisfied with their lives than are Koreans. These results considered together imply that degree of life satisfaction is positively associated with level of economic development.

3.3. *Independent variables*

Variable definitions and summary statistics of the independent variables used for the estimations are reported in Table 2. As mentioned earlier, the psychological and economic costs of having a child are profoundly associated with the age of the child. For instance, the time required for active care is longer when the child is younger (see

¹⁰ The five-point scale for life satisfaction could have over-generalized the results, representing a limitation of the data. Caution should be exercised when the results of estimations are interpreted.

Kalenkoski et al. 2009). Thus, age of child appears to be associated with life satisfaction. Hence, *Child_12*, *Child13_18*, and *Child_19* are incorporated to capture the age of child effect.¹¹ The period prior to a child entering junior high school is captured by *Child_12*, when a mother must pay special attention to child care. For instance, primary school students finish their school day early, and they are too young to look after themselves. Thus, it is necessary for parents to take care of the younger children outside of school hours. After entering junior high school, children often develop into troubled teenagers, and so the relationship between child and parent enters a different stage, which is captured by *Child13_18*. Parents are required to make an effort to maintain a good relationship with their child, leading to higher economic and psychological costs. Once the teenage years have passed, a child becomes an adult and is considered to be independent of their parents, captured by *Child_19*.¹² The reference group holds those who do not have any children. If the cost of raising a child is the main reason for a decrease in parents' life satisfaction as proposed by the hypothesis, *Child_12* and *Child13_18* are predicted to take the negative sign. The coefficient's absolute value of *Child_12* is greater than that of *Child13_18*. In addition to the age of the child, *Number of children* was incorporated as an independent variable to capture the effect of quantity of children. Because of "economies of scale", the

¹¹ The education system is similar in China, South Korea, and Japan as follows: elementary school age is 6–12-year-olds. After graduating from elementary school, students advance to junior high school (3 years) and then to high school (a further 3 years). This means that students usually graduate from high school at 18 years old. After completing high school, university is a further 4 years. Information regarding the education systems in China, South Korea, and Japan can be accessed as follows: http://www.mext.go.jp/b_menu/hakusho/html/hpbz198103/index.html. (accessed on July 28, 2010); <http://education.stateuniversity.com/pages/1400/South-Korea-EDUCATIONAL-SYSTEM-OVERVIEW.html>. (accessed on July 28, 2010); and <http://www.edu.cn/20041203/3123354.shtml>. (accessed on July 28, 2010).

¹² Once a child becomes independent, the parents' cost of having a child is thought to be invariable.

marginal cost of rearing children decreases as the number of children increases. On the other hand, the positive effect of rearing children on life satisfaction declines if marginal utility decreases as the number of children increases. It is not clear whether the marginal cost of rearing children outweighs the marginal utility. Accordingly, *Number of children* took both signs. Number of children was slightly over 2 in South Korea and Japan. Number of children was 1.7 in China, although a one-child policy was adopted in 1979. Prior to that, there was no restriction on number of children. This might be the reason why the number of children was more than 1 in China.

Education level of partners is usually considered a control variable in life satisfaction literature (for instance, White and Rogers 2000). The wife's education level has a positive effect on the husband's earnings and vice versa (e.g., Mano and Yamamura 2011; Yamamura and Mano 2012). There are a number of studies suggesting that the quality of marital relationships is positively associated with partners' education level (e.g., Stanley et al. 2006; Halfrod et al. 2003). In this study, education level was coded as years of schooling completed by respondents and their spouses (*Education* and *Spouse's education*). Females lose a large amount of their potential income as a consequence of leaving work to give birth and raise children.¹³ The higher a female's opportunity cost becomes, the higher her education level (Cabinet Office, Government of Japan 2005). In our sample as presented in Table 2, average *Education* for females was 7.6, 11.9, and 12.1 years in China, South Korea, and Japan, respectively. This suggests that years of schooling are greater in more developed countries. Furthermore, in all countries, *Education* for females was less than

¹³ In Japan, if a female university graduate returns to employment as a part-time or casual worker, her rate of lost earnings will be over 80% of her potential lifetime wages (Cabinet office, Government of Japan 2005, Ch. 3).

Education for males. The difference in *Education* between males and females was 1.2, 1.0, and 0.5 years in China, South Korea, and Japan, respectively. It follows from this that the difference in human capital between genders diminishes in accordance with economic development. That is, it is appropriate to argue that the mother's opportunity cost of a child becomes higher in more developed countries, reducing life satisfaction. This is consistent with the hypothesis proposed earlier.

Negative experiences like unemployment are expected to influence life satisfaction. Unemployment affects individuals beyond simply income loss; it also influences people at an emotional level, and often leads to depression. The stress resulting from one partner being unemployed and the necessity of taking care of a child may also aggravate partner life satisfaction. To consider the employment status of the respondents, we included a dummy variable that takes a value of 1 when the individual is unemployed. The sign for *Unemployment* is expected to be negative.

Few studies have addressed the relationship between family income and life satisfaction, and the empirical evidence is mixed. While some studies find a positive association between family income and marital happiness (Amato et al. 2003), others find no association (Amato and Rogers 1997). To take into account family income, we included household income (*Income*) measured as the total net income of the household from all sources. Traditional research has argued that happiness does not change or very slightly increases with age (Diener et al. 1999; Argyle 2001). In more recent works ascertaining the determinants of life satisfaction, the coefficient sign for age was negative while that for the square of age was positive. Further, both were statistically significant (e.g., Alesina et al. 2004; Blanchflower & Oswald 2004, 2008; Di Tella & MacCulloch 2008). Hence, there is a U-shape association between life

satisfaction and age. This implies that the effect of age on life satisfaction is non-linear. Hence, to control for respondents' and spouses' ages, respondent and spouse generation dummies were included as independent variables (Bjørnskov et al. 2008a).

Apart from the independent variables taken into account in the present study, there are several other variables, including institutional condition, which can influence life satisfaction (Helliwell 2006; Heilliwel & Huang 2008; Dorn et al. 2008). Political factors can also affect life satisfaction. Bjørnskov et al. (2007) used cross country data to show that government size is negatively associated with life satisfaction. Bjørnskov et al. (2008b) found, based on the data of 60,000 individuals from 66 countries, that spending or revenue decentralization increases well-being, while greater local autonomy is beneficial only via government consumption spending. In addition to economic, political, and institutional factors, roles played by human development and culture were examined in Bjørnskov et al. (2008a). In this paper, a number of institutional factors were found to have a different impact on subjective-wellbeing according to specification. Further, Bjørnskov et al. (2010) provided evidence that the association between formal institutions and subjective well-being differs among poor and rich countries. They suggested that the effects of economic-judicial institutions on happiness dominate those of political institutions in low-income countries, while an additional beneficial effect of political institutions is observed in middle- and high-income countries.

3.4. *Methodology*

As life satisfaction is ordered and discrete, an ordered probit model was used (for more details, see Greene 1997). Ordered probit analysis has been used in the

literature to examine the determinants of life satisfaction (e.g., Lee and Ono 2008; Oshio et al. 2011). The estimated function takes the following form:

$$\begin{aligned} \text{Life Satisfaction}_i = & \alpha_1 \text{Child_12}_i + \alpha_2 \text{Child13_18}_i + \alpha_3 \text{Child_19}_i + \alpha_4 \text{Number of} \\ & \text{Children}_i + \alpha_5 \text{Education}_i + \alpha_6 \text{Spouse's education}_i + \alpha_7 \text{Unemployment}_i + \alpha_8 \\ & \text{Income}_i + e_i + u_i, \end{aligned}$$

where *Life Satisfaction* represents the dependent variable in the case of the respondent, α represents regression parameters, e_i is the vector of generation dummies, and u_i is the error term that follows a standard normal distribution.

When the coefficient takes the positive sign, a positive change in the independent variable decreases the probability of the lower ranked outcome and increases the probability of the highest ranked outcome. However, “the marginal effects of the regressors on the probability are not equal to the coefficients” (Greene 1997, p. 927). Therefore, we encounter a difficulty in the interpretation of coefficients. Instead of coefficients, the marginal effects can be calculated in each dependent variable category (Greene 1997, p. 927–931). Hence, for a closer examination of estimation results, in addition to coefficients, as presented in Table 5, we also report the marginal effects of key variables such as *Child_12*, *Child13_18*, and *Child_19* in $\text{Prob}(\text{Life Satisfaction} = 1)$, $\text{Prob}(\text{Life Satisfaction} = 2)$, $\text{Prob}(\text{Life Satisfaction} = 3)$, $\text{Prob}(\text{Life Satisfaction} = 4)$, and $\text{Prob}(\text{Life Satisfaction} = 5)$.

4. Estimation results and interpretation

4.1. Child age dummy

Tables 4 and 5 display the results for males and females, respectively. Starting

with the results for males, Table 4 shows that *Child_12*, *Child 13_18*, and *Child_19* take the positive sign in columns (1) and (3). Furthermore, *Child 13_18* is statistically significant in columns (1) and (3). In addition, *Child 12* is statistically significant in column (3). These results can be interpreted as suggesting that a young child improves males' life satisfaction in China and Japan. This implies that the benefit of a child outweighs the cost. This might be partly because the husband is less inclined to spend time on childrearing, and thus opportunity cost is sufficiently low. In contrast, *Child_12*, *Child 13_18*, and *Child_19* take the negative sign in column (2), while being statistically insignificant. Therefore, the age of the child does not influence males' life satisfaction in South Korea. This suggests that the cost of a child neutralizes the benefit of a child.

For females, the coefficients for *Child_12* and *Child 13_18* produced negative signs in columns (2) and (3). Furthermore, *Child_12* was statistically significant at the 1 % level in columns (2) and (3). In addition, *Child 13_18* was statistically significant at the 1 % level in column (3). However, it is interesting to observe that *Child_19* took the negative sign in column (2) and the positive sign in column (3). Furthermore, results were not statistically significant. This implies that the cost of a child outweighs the benefit in South Korea and Japan when the child is small. However, the cost neutralizes the benefit after the child graduates from high school. In contrast, coefficients for *Child_12*, *Child 13_18*, and *Child_19* were not statistically significant in column (1). It follows from this that the cost of a child neutralizes the benefit of a child in China, regardless of the child's age. These results reveal that the presence of children before they enter junior high school reduces life satisfaction in females in South Korea and Japan. Teenagers in junior high school have a detrimental effect on

life satisfaction for females only in Japan, not in South Korea. In addition, the age of a child has no effect on life satisfaction of females in China.

It is interesting to observe that *Number of children* was not statistically significant in all estimations in Tables 3 and 4. The marginal cost of a child declines as number of children increases. Accordingly, the marginal cost of a child does not outweigh the marginal benefit of a child.

4.2. Marginal effect of a child's age

For a closer examination of the effects of *Child_12*, *Child 13_18*, and *Child_19* exhibited in Table 4, Table 5 (a), (b), and (c) shows a marginal effect on the life satisfaction of females in China, South Korea, and Japan, respectively. In Table 5 (a), *Child_12*, *Child 13_18*, and *Child_19* are not statistically significant, which is consistent with results in Table 4. This means that age of a child does not influence life satisfaction for females in China.

We now turn to South Korea. As shown in column (1) of Table 5 (b), coefficients for *Child_12*, *Child 13_18*, and *Child_19* are 0.02, 0.007, and 0.001, respectively. That is, the marginal effect of age of a child declines as the child becomes older. Furthermore, coefficients for *Child_12* are statistically significant at the 1 % level, whereas those for *Child 13_18* and *Child_19* are not statistically significant. This implies that females who have a child that is younger than junior high school age have a 2% higher probability of being strongly dissatisfied with life. We see from column (5) of Table 5 (b) that coefficients for *Child_12*, *Child 13_18*, and *Child_19* are -0.04, -0.01, and -0.002, respectively. In line with column (1), the marginal effect of the age of a child diminishes as the child becomes older. In addition, coefficients for *Child_12*

are statistically significant at the 1 % level, whereas those for *Child 13_18* and *Child_19* are not statistically significant. It follows from this that females who have a child that is younger than junior high school age have a 4% lower probability of being strongly satisfied with life. Apart from columns (1) and (5), results in other columns shows that, in South Korea, the marginal effect of age is smaller as the child becomes older.

Focusing attention on Japan, we look at Table 5(c). In column (1), coefficients for *Child_12*, *Child 13_18*, and *Child_19* are 0.01, 0.008, and 0.001, respectively. This means that the marginal effect of a child's age declines as the child becomes older. Furthermore, *Child_12* and *Child 13_18* are statistically significant, whereas *Child_19* is not. We interpret this as suggesting that females who have a child that is younger than junior high school age have a 1% higher probability of being strongly dissatisfied with life, whereas females who have a high school student have a 0.8% higher probability of being strongly dissatisfied with life. With respect to column (5), coefficients for *Child_12*, *Child 13_18*, and *Child_19* are -0.05, -0.03, and -0.0008, respectively. Similar to results in column (1), *Child_12* and *Child 13_18* are statistically significant, whereas *Child_19* is not. Furthermore, females who have a child that is younger than junior high school age have a 5% lower probability of being strongly satisfied with life, whereas females who have a high school student have a 3% lower probability of being strongly satisfied with life. Apart from columns (1) and (5), results in other columns show that, in Japan, the marginal effect of age is smaller as the child becomes older.

As presented in columns (1)–(5) of Table 5 (b) and (c), combined results for South Korea and Japan show that the marginal effect of *Child_12* in Japan is greater

than the effect in South Korea, with the exception of column (1). Considering results for China, South Korea and Japan together lead us to argue that the negative effect of having young children is greater in more developed countries. Combined results of Tables 3, 4, and 5 strongly support the hypothesis proposed in Section 2.

4.3. Control variables

Concerning the results for males exhibited in Table 3, coefficients for *Income* take the positive sign and are statistically insignificant in columns (2) and (3). This result is in line with previous evidence in life satisfaction literature (Amato and Rogers 1997). Consistent with our theoretical predictions, *Unemployment* yields the negative sign and is statistically significant in column (2). That is, economic condition is considered to be the major determinant of life satisfaction in South Korea and Japan. In contrast, *Income* and *Unemployment* do not influence life satisfaction in China. In addition, results of *Income* and *Unemployment* for females exhibited in Table 4 are similar to those in Table 3. The socio-economic system of China, which is based on socialism, is different from South Korea and Japan. Therefore, in China, unemployed and low income people are more likely to be secured socially through, for instance, income redistribution. This might be one of the reasons why Chinese people are not affected by *Income* and *Unemployment*.

4.4. Discussion

The results of *Income* can be interpreted differently as follows. As assumed in the model, wage rate was positively associated with level of economic development and seemed to affect life satisfaction through various channels. This is in line with the

argument that wage rate increases the opportunity cost of childrearing, which influences life satisfaction.

As also observed in Western countries (Akerlof and Kranton 2000), disparity concerning child care and housework between males and females exists and persists in Asian countries. There is evidence that females who live with their parents are more likely to participate in the labor market (Sasaki 2002; Mano and Yamamura 2011). A reason for this is that the parents (grandparents) can raise the child, enabling the mother to work. For instance, in a traditional Japanese farming village, “women are usually also employed ... in households with a grandmother, she often takes care of young children, while the mother works in the field” (Henry 1981, p. 87). Support for child care through family ties and community network appears to be on the wane because long-term economic development has led to a decline in social capital (Putnam 2000).

Japan experienced rapid economic growth in the post-war period and has become one of the most developed countries worldwide. Thus, Japanese women have had to address childcare issues, and the childcare industry is considered to be essential to help mothers raise their children, rather than with reciprocal care via informal social networks. Nevertheless, nursery schools, for example, are in short supply in Japan, and mothers are more likely to raise a child than to also participate in the labor market because of a shortage of childcare services (Cabinet Office, Government of Japan 2005; Date and Shimizutani 2007). Korea has experienced incredible economic growth the last 50 years, and is now also considered to be a highly developed country. China, despite decades of rapid growth, however, has a per capita GDP (PPP) that is only a quarter of the level in South Korea.

Economic development can further increase the economic and psychological costs for females of raising children. In other words, the effect of having young children on life satisfaction depends on the changes in socioeconomic conditions.

5. Conclusion

Socioeconomic conditions vary across East Asian countries. However, they also appear to share similar cultural backgrounds that differ from those of Western countries. Furthermore, East Asian countries have experienced the rapid economic growth and so the social and family ties were thought to change drastically. This seems to influence life satisfaction. Hence, it is worthwhile to examine family relationships and life satisfaction by comparing East Asian countries. Using individual-level data from EASS (East Social Survey) from 2006, this study examines how the age of children influences the life satisfaction of males and females in China, South Korea, and Japan.

We found via the ordered probit estimation that (1) life satisfaction of males is positively affected by the presence of small children, whereas the life satisfaction of females who have a child younger than 12 years old is lower than that of females with no children. (2) The greater the marginal effect of age of the child, the more developed a nation's economic condition.

We considered that finding (1) is due to the imbalance of child care between males and females result in each country. That is, females are more likely to be the primary caregiver for young children and so feel the associated stress from it, putting pressure on their psychological state. The division of labor within a household is a further reason for the differences in life satisfaction between genders. In our

interpretation, the opportunity cost of childrearing becomes higher where people have attained higher levels of education and in more developed country. Accordingly, childrearing affects female life satisfaction to a greater degree in the process of economic development. Thus, we derive the argument that life satisfaction is in part influenced by the division of labor within households and the opportunity cost of child care.

As found by prior works (Sasaki 2002; Mano and Yamamura 2010), female labor supply partly depends on whether females live with their parents or not. In addition, Shields et al. (2009) showed that life satisfaction is affected by the characteristics of the parents' neighborhood. That is, help from parents and reciprocity arrangements with other community members appear to play a significant role in reducing the physical and psychological burden of child care. Hence, the effect of young children on life satisfaction is considered varied, and dependent on socioeconomic conditions such as family structure and networks within the neighborhood. Economic development is strongly related to family structure and neighborhood relationships, which are, however, not considered in detail in this paper. Furthermore, it is interesting to compare the most developed Western countries with Japan because while they are all labeled 'developed countries', they have very different historical and cultural backgrounds. Thus, these are issues that require further investigation in future studies.

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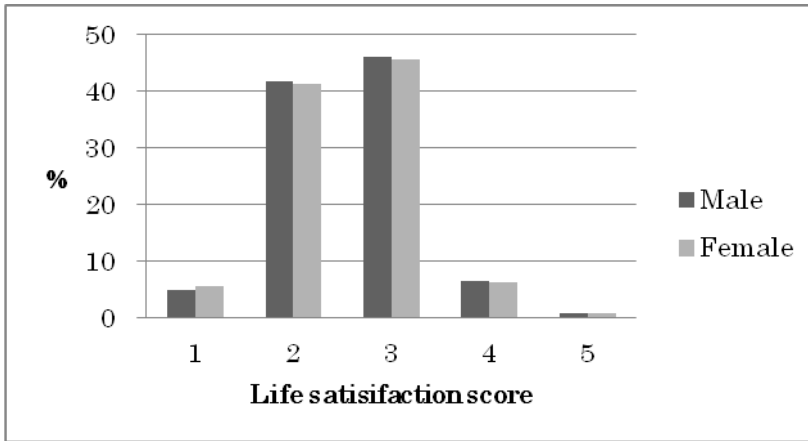
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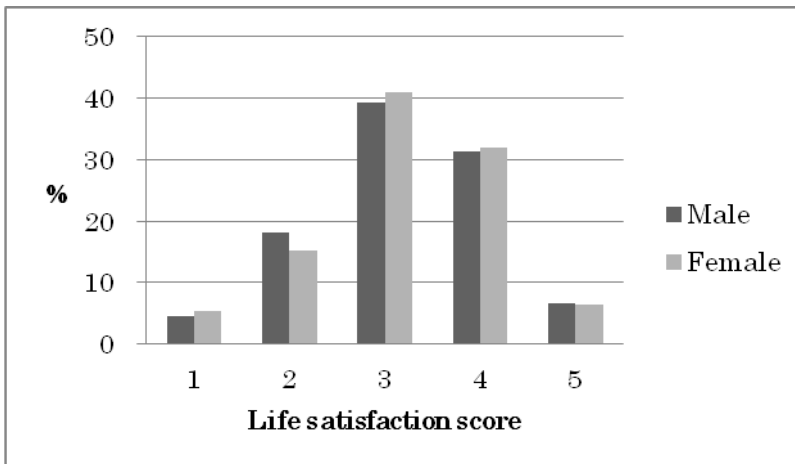
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Figure 1. Ratings of life satisfaction by gender from 1 (strongly dissatisfied) to 5 (strongly satisfied)

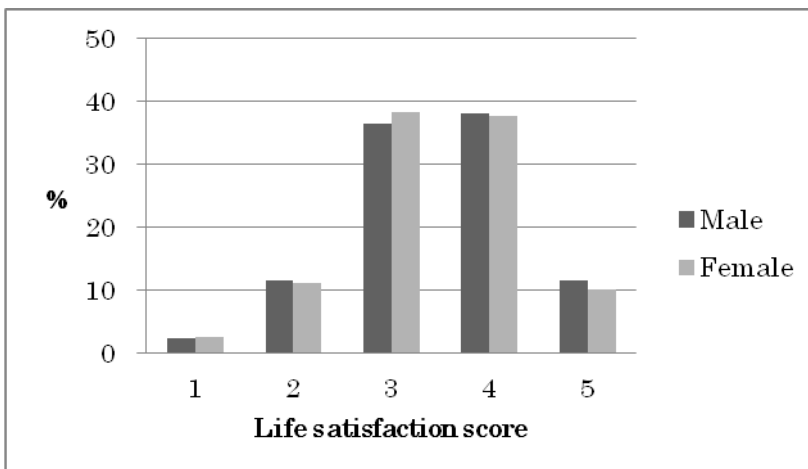
(a) China



(b) South Korea



(c) Japan



Source: EASS data 2006.

Table 1. Construction of research sample

Description	China	S.Korea	Japan
Original sample	3208	1605	2130
Marriage satisfaction (dependent variable)	3208	1603	2125
Various independent variables	2247	959	1021
Male ^a	1005	424	509
Female ^b	1242	535	512

Note:

- a. Samples used in male estimations.
- b. Samples used in female estimations.

Table 2. Variable definitions and mean values

Variables	Definition	China		S.Korea		Japan	
		Male	Female	Male	Female	Male	Female
<i>Child_12</i>	Dummy variable: 1 if respondent has child less than 12 years old; otherwise 0 (%)	31.4	31.9	43.2	47.9	21.8	24.9
<i>Child_13_18</i>	Dummy variable: 1 if respondent has child between 13 and 18 years old; otherwise 0 (%)	25.9	27.4	31.0	30.7	14.1	20.2
<i>Child_19</i>	Dummy variable: 1 if respondent has child over 19 years old; otherwise 0 (%)	48.7	50.2	40.8	35.9	65.3	63.3
<i>Number of children</i>	Total number of children	1.7	1.7	2.3	2.2	2.1	2.1
<i>Education</i>	Years of schooling	8.8	7.6	12.9	11.9	12.5	12.1
<i>Spouse's education</i>	Spouse's years of schooling	7.9	9.2	11.7	13.2	12.0	12.7
<i>Unemployment</i>	Dummy variable: 1 if respondent is unemployed; otherwise 0 (%)	0.7	0.6	3.9	4.3	1.2	0.6
<i>Income</i>	Household income	21 ^a	22 ^a	352 ^b	354 ^b	10 ^c	10 ^c
<i>Generation 20</i>	Dummy variable: 1 if respondent's age is between 20-29; otherwise 0 (%)	9.2	13.4	2.0	5.1	2.8	3.4
<i>Generation 30</i>	Dummy variable: 1 if respondent's age is between 30-39; otherwise 0 (%)	26.5	28.0	21.9	34.0	14.2	15.8
<i>Generation 40</i>	Dummy variable: 1 if respondent's age is between 40-49; otherwise 0 (%)	25.2	26.0	37.8	34.5	13.9	21.0
<i>Generation 50</i>	Dummy variable: 1 if respondent's age is between 50-59; otherwise 0 (%)	24.8	21.6	17.1	15.3	22.7	26.4
<i>Generation 60</i>	Dummy variable: 1 if respondent's age is between 60-69; otherwise 0 (%)	14.3	11.0	11.5	8.2	25.1	22.9
<i>Generation 70</i>	Dummy variable: 1 if respondent's age is 70+ ; otherwise 0 (%)	0	0	9.7	2.9	21.3	10.5
<i>Spouse's Generation 20</i>	Dummy variable: 1 if spouse's age is between 20-29; otherwise 0 (%)	13.1	8.1	6.1	1.8	3.8	2.9
<i>Spouse's</i>	Dummy variable: 1 if spouse's age is between	28.6	25.8	31.5	27.0	16.3	12.3

<i>Generation 30</i>	30-39; otherwise 0 (%)						
<i>Spouse's</i>	Dummy variable: 1 if spouse's age is between	26.2	26.5	30.6	38.2	17.0	19.3
<i>Generation 40</i>	40-49; otherwise 0 (%)						
<i>Spouse's</i>	Dummy variable: 1 if spouse's age is between	22.8	23.8	16.7	16.2	25.1	24.8
<i>Generation 50</i>	50-59; otherwise 0 (%)						
<i>Spouse's</i>	Dummy variable: 1 if spouse's age is between	9.2	11.7	10.6	11.3	23.4	22.4
<i>Generation 60</i>	60-69; otherwise 0 (%)						
<i>Spouse's</i>	Dummy variable: 1 if spouse's age is 70+ ;	0.1	4.1	4.5	5.5	14.4	18.3
<i>Generation 70</i>	otherwise 0 (%)						

Note: Values for dummy variables are rates for observations that take the value of 1. Values of EDU and INCOME are mean values.

- a. Thousands of Yuan.
- b. Thousands of Won.
- c. Millions of Yen.

Table 3. Regression results for males' life satisfaction (ordered probit model)

Variables	(1)	(2)	(3)
	China	S.Korea	Japan
<i>Child_12</i>	0.01 (0.63)	-0.22 (-1.33)	0.18* (1.96)
<i>Child_13_18</i>	0.24** (2.35)	-0.23 (-1.50)	0.31** (2.34)
<i>Child_19</i>	0.05 (0.52)	-0.15 (-0.72)	0.38 (1.26)
<i>Number of children</i>	-0.03 (-0.64)	0.04 (1.09)	0.03 (0.56)
<i>Education</i>	-0.03 (-2.33)	0.01 (0.54)	-0.02* (-1.96)
<i>Spouse's education</i>	-0.01 (-1.15)	-0.006 (-0.47)	0.05* (1.71)
<i>Unemployment</i>	0.27 (0.67)	-0.94*** (-3.44)	-1.27 (-0.89)
<i>Income</i>	-1.78*10 ⁻⁶ (-0.84)	0.68*10 ⁻³ *** (2.90)	0.04*** (3.00)
<i>Generation 20</i>	<Reference group>		
<i>Generation 30</i>	0.003 (0.01)	-0.20 (-1.39)	0.40 (1.48)
<i>Generation 40</i>	0.23 (0.96)	-0.14 (-0.56)	0.19 (0.58)
<i>Generation 50</i>	0.64** (2.13)	-0.18 (-0.95)	0.32 (0.95)
<i>Generation 60</i>	0.67* (1.95)	-0.02 (-0.07)	0.34** (2.20)
<i>Generation 70</i>		0.50 (1.27)	0.54** (2.39)
<i>Spouse's Generation 20</i>	<Reference group>		
<i>Spouse's Generation 30</i>	0.04 (0.33)	0.45*** (3.22)	-0.39 (-0.89)
<i>Spouse's Generation 40</i>	-0.27 (-1.25)	0.24 (1.11)	-0.79 (-1.47)
<i>Spouse's Generation 50</i>	-0.58** (-2.35)	0.17 (0.76)	-0.47 (-1.21)
<i>Spouse's Generation 60</i>	-0.76** (-2.55)	-0.22 (-0.66)	-0.42 (-0.75)
<i>Spouse's Generation 70</i>	-0.58 (-0.58)	-0.70 (-1.19)	-0.74 (-1.26)
Observations	1005	424	509
Log pseudolikelihood	-1047	-556	-629

Note: Numbers in parentheses are z-statistics calculated using robust standard errors clustered at the region. *, **, and *** indicate significance at 10%, 5% and 1% levels.

Table 4. Regression results for females' life satisfaction (ordered probit model)

Variables	(1)	(2)	(3)
	China	S.Korea	Japan
<i>Child_12</i>	0.15 (1.36)	-0.37*** (-3.30)	-0.43*** (-2.82)
<i>Child_13_18</i>	0.15 (1.44)	-0.09 (-0.99)	-0.29*** (-2.61)
<i>Child_19</i>	-0.05 (-0.35)	-0.02 (-0.10)	0.05 (0.04)
<i>Number of children</i>	-0.03 (-0.66)	-0.02 (-0.88)	-0.06 (-0.70)
<i>Education</i>	-0.01 (-1.24)	0.01 (0.54)	0.02 (0.57)
<i>Spouse's education</i>	-0.01 (-1.20)	0.02 (1.08)	0.01 (0.30)
<i>Unemployment</i>	-0.50* (-1.85)	-0.48*** (-2.63)	-0.56* (-1.92)
<i>Income</i>	-3.38*10 ⁻⁶ (-1.65)	0.40*10 ^{-3**} (2.26)	0.06*** (3.44)
<i>Generation 20</i>	<Reference group>		
<i>Generation 30</i>	-0.05 (0.50)	0.14 (0.72)	-0.12 (-0.17)
<i>Generation 40</i>	-0.09 (-0.42)	-0.19 (-1.04)	-0.35 (-0.73)
<i>Generation 50</i>	-0.27 (-1.05)	-0.36 (-1.30)	-0.47 (-1.38)
<i>Generation 60</i>	-0.49** (-2.14)	-0.20 (-0.68)	-0.79** (-2.30)
<i>Generation 70</i>		-0.66 (-1.59)	-0.85** (-2.30)
<i>Spouse's</i>	<Reference group>		
<i>Generation 20</i>			
<i>Spouse's</i>	0.09 (0.51)	-0.44 (-1.57)	-0.12 (-0.27)
<i>Generation 30</i>			
<i>Spouse's</i>	0.42* (1.77)	-0.51* (-1.67)	-0.47* (-1.69)
<i>Generation 40</i>			
<i>Spouse's</i>	0.55** (2.11)	-0.56 (-1.27)	-0.63** (-2.39)
<i>Generation 50</i>			
<i>Spouse's</i>	0.95*** (3.09)	-0.60 (-1.34)	-0.10 (-0.26)
<i>Generation 60</i>			
<i>Spouse's</i>	1.04*** (3.95)	-0.46 (-0.96)	0.21 (0.55)
<i>Generation 70</i>			
Observations	1242	535	512
Log pseudolikelihood	-1340	-663	-620

Note: Numbers in parentheses are z-statistics calculated using robust standard errors clustered at the region. *, **, and *** indicate significance at 10%, 5% and 1% levels.

Table 5. Marginal effect of female estimations shown in Table 4.

(a) China

Variables	Strongly ^a dissatisfied (1)	Dissatisfied ^a (2)	Neither ^a (3)	Satisfied ^a (4)	Strongly satisfied ^a (5)
<i>Child_12</i>	-0.01 (-1.46)	-0.04 (-1.31)	0.03 (1.39)	0.01 (1.30)	0.002 (1.29)
<i>Child_13_18</i>	-0.01 (-1.45)	-0.04 (-1.41)	0.03 (1.46)	0.01 (1.41)	0.002 (1.33)
<i>Child_19</i>	0.005 (0.34)	0.01 (0.35)	-0.01 (-0.35)	-0.005 (-0.35)	-0.001 (-0.34)

(b) South Korea

Variables	Strongly ^a dissatisfied (1)	Dissatisfied ^a (2)	Neither ^a (3)	Satisfied ^a (4)	Strongly satisfied ^a (5)
<i>Child_12</i>	0.02*** (2.97)	0.05*** (3.50)	0.05*** (2.71)	-0.09*** (-3.32)	-0.04*** (-2.82)
<i>Child_13_18</i>	0.007 (0.93)	0.01 (0.97)	0.01 (1.03)	-0.02 (-0.96)	-0.01 (-1.05)
<i>Child_19</i>	0.001 (0.10)	0.003 (0.10)	0.003 (0.10)	-0.005 (-0.10)	-0.002 (-0.10)

(c) Japan

Variables	Strongly ^a dissatisfied (1)	Dissatisfied ^a (2)	Neither ^a (3)	Satisfied ^a (4)	Strongly satisfied ^a (5)
<i>Child_12</i>	0.01** (2.25)	0.09*** (2.84)	0.07*** (3.59)	-0.12*** (-3.36)	-0.05** (-2.43)
<i>Child_13_18</i>	0.008** (2.29)	0.05** (2.30)	0.05*** (2.78)	-0.07*** (-2.74)	-0.03** (-2.04)
<i>Child_19</i>	0.0001 (0.03)	0.001 (0.03)	0.001 (0.03)	-0.001 (-0.03)	-0.0008 (-0.03)

Note: Numbers in parentheses are z-statistics. *, **, and *** indicate significance at 10%, 5% and 1% levels, respectively. *, **, and *** indicate significance at 10%, 5% and 1% levels, respectively.

- a. In the questionnaire, marital satisfaction is evaluated by numerical numbers, ranging from 1 (dissatisfied) to 5 (satisfied).