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**Reproductive Contributions of Foreign Wives in Taiwan:
Similarities and Differences among Major Source Countries**

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SEDAP Research Paper No. 258

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Abstract

In light of the entrenchment of sub-replacement fertility and the sharp increase in the stock of foreign wives in Taiwan in recent years, this research studies the reproductive contributions of Taiwan's foreign wives from the top five source countries (China, Vietnam, Indonesia, Thailand, and the Philippines), based mainly on an application of a multinomial logit model to the micro data of the 2003 census of foreign wives.

Our main findings are as follows. First, the overall fertility level of the foreign wives was probably somewhat higher than that of the native-born women and definitely lower than the replacement level. Second, among the five nationalities, those from China were much less reproductive than those from the other countries, mainly because the former were more prone to (1) having a rather old marriage age, (2) having a very large spousal age gap, (3) being separated or divorced, (4) having their current marriage being their second marriage, and (5) having a veteran as the husband. Third, among the four Southeast Asian nationalities, those from Indonesia and the Philippines were more reproductive than those from Thailand and Vietnam. This contrast was a muted reflection of the fertility difference in countries of origin. Fourth, for every nationality, marriage duration and marriage age were the most powerful explanatory factors and must be included in the model to avoid getting misleading estimated coefficients of other less powerful explanatory factors, whereas current age was a spurious factor that should not be used in the model. Fifth, in the context of marriage duration and marriage age, the explanatory factors with rather strong explanatory powers for at least one nationality included spousal age gap, marital status, remarriage status, co-residence with parent, and wife's employment status. Sixth, the expected negative effect of wife's educational attainment on lifetime fertility turned out to be either non-existent or modest. In particular, it had practically no effect on the probability of being childless. These findings implied that getting better educated foreign wives could increase the quality of their children with little or no reduction in the number of their children and in their probability of being childless.

Keywords: ASEAN countries, China, international marriage, international migration, fertility, Taiwan

JEL classification code: J130

Résumé

À la lumière du retranchement de la fécondité et de l'augmentation considérable du nombre de conjointes d'origine étrangères à Taiwan ces dernières années, cet article examine la contribution en matière de reproduction des épouses étrangères à Taïwan provenant des cinq principaux pays d'origine (Chine, Vietnam, Indonésie, Thaïlande, et les Philippines), en se basant principalement sur l'analyse d'un modèle logit multinomial utilisant des micro données du recensement de 2003 des épouses étrangères.

Nos principales constatations sont les suivantes. Premièrement, le niveau de fécondité global des femmes étrangères était sans doute un peu plus élevé que celui des femmes nées à Taiwan et certainement inférieur au seuil de remplacement. Ensuite, parmi les cinq nationalités, les femmes Chinoises étaient beaucoup moins fertiles que celles des autres pays, principalement parce que les premières étaient plus enclins à (1) à se marier à un âge plus avancé, (2) à avoir une grande différence d'âge avec leur conjoint, (3) à être séparées ou divorcées, (4) à être dans un second mariage, et (5) à avoir un mari âgé. Troisièmement, parmi les quatre nationalités de l'Asie du sud-est, les femmes provenant de l'Indonésie et des Philippines étaient plus enclins à procréer que les femmes thaïlandaises et vietnamiennes. Ce contraste ne faisait que refléter la différence de fécondité dans les pays d'origine. En quatrième lieu, pour chaque nationalité, la durée et l'âge du mariage sont les facteurs explicatifs les plus puissants et doivent être inclus dans le modèle afin d'éviter des coefficients trompeurs provenant de facteurs explicatifs plus limités, en revanche il existe une relation « spurieuse » avec l'âge et donc cette dernière ne devrait pas être utilisée dans le modèle. Cinquièmement, en ce qui concerne la durée et l'âge du mariage, les facteurs explicatifs déterminants pour au moins une des nationalités figurant dans notre échantillon comprenaient l'écart d'âge entre les conjoints, l'état matrimonial, le remariage, la cohabitation avec les parents et le statut professionnel de l'épouse. Sixièmement, les effets négatifs attendus de la scolarité des épouses sur leur fertilité s'avéraient inexistantes ou modestes. En particulier, ils n'avaient pratiquement aucun effet sur la probabilité de se retrouver sans enfant. Ces conclusions impliquent que s'accoupler avec des épouses étrangères mieux éduquées pourrait renforcer la qualité de leurs enfants sans réduire significativement leurs nombres ou d'accroître leur probabilité de se retrouver sans enfant.

Reproductive Contributions of Foreign Wives in Taiwan: Similarities and Differences among Major Source Countries

1. Introduction

The economic globalization of Taiwan since the 1980s was accompanied by major societal changes. One of these changes has been the progressive internationalization of the household. Two important underlying reasons for this change have been shortages of native-born domestic helpers and native-born brides.

The shortage of native-born domestic helpers is mainly related to the well-known unwillingness of native-born workers of industrialized societies to take low-status, tedious, and dead-end jobs (Piore, 1979). Unlike the government of Japan which prohibits the employment of foreign maids by private households, the government of Taiwan, being aware of the existence of increasingly large numbers of undocumented foreign domestic helpers, has permitted private households to hire foreign helpers for caring sick, disabled or very old persons since 1992 (Wu and Wang, 2001). Although officially the foreign maids are to be hired for care purpose, they are usually required by their employers to do any kinds of household chores.¹ The expanding demand for foreign domestic helpers in Taiwan has been induced not only by major societal changes such as the increasing numbers of double-income couples and the massive migration of the younger generation of rural origins to the labor markets in major cities making the instrumental care of elderly parents by their adult children infeasible, but also by the desires of many housewives to avoid various familial problems such as the domination by the mother-in-law, recurring frictions with co-resident parent(s)-in-law, the mother-in-law's competition for the affection of the husband, and the disagreement about the sharing of household chores with the husband (Lan, 2002).

The shortage of native-born brides is related to several factors. First, the tendency for females to select husbands with higher socioeconomic status makes it difficult for some males of low socioeconomic status to find a native-born spouse. This difficulty

¹ In households that own a store or a vending stand, foreign maids are also asked to help run the business. There are also cases in which a foreign helper hired for the care of an elderly parent actually works mainly as a nanny for infants.

was further aggravated by the rapid increase in the proportion of females with university and even graduate degrees since the 1980s (Yang and Tsai, 2007). Second, the selective out-migration of young adult females from rural and mountainous areas helps create serious localized shortages of native-born potential brides. Third, the conflict between (1) the custom of taking a younger female as wife and (2) the entrenchment of the spindle-shaped age composition as a consequence of the persistently sub-replacement fertility level creates a long-term relative shortage of potential native-born brides. Fourth, the gender-selective abortion of female fetuses has a lagged effect of reducing the chance of finding a native-born bride (Chen, 2008; Lin, 2009). Fifth, the changes in values and attitudes among native-born young females result in a decreased local supply of obedient and persevering wives that some men want to have (Jones, 2007).

The economic globalization of Taiwan has involved not only (1) massive expansion of the operations of Taiwanese businesses towards Mainland China and Southeast Asian countries where labor costs are substantially lower, but also (2) large-scale importation of low-skilled labor by manufacturing and construction firms. Furthermore, these increased overseas involvements also increased the numbers and activities of brokerage firms as well as various forms of interpersonal connections between Taiwan and other countries (Wang and Chang, 2002). These developments have helped facilitate increases in the supply of foreign domestic helpers and foreign wives to Taiwan, mostly from lower wage countries. According to the annual statistical reports of Ministry of The Interior (MOI, 2008), the combined stock of foreign “care workers” and “domestic helpers” employed in Taiwan increased rapidly from 17,407 persons in 1995 to 131,067 in 2005 and 162,228 in 2007. In 2007, there were 21,559 marriages between Taiwanese grooms and non-Taiwanese brides (Chen, 2008), and the year-end stock of the foreign brides of Taiwanese husbands has increased to 372,741 persons (MOI, 2008).

To avoid wordiness, we use the term “foreign wives” to represent those who were the wives of Taiwanese citizens and did not have Taiwanese citizenship *at marriage*. Thus, according to our definition, those from Mainland China (China for short), Hong Kong, and Macao are parts of the pool of foreign wives, although they belong to separate categories in official statistics. Also note that in both our and official categorizations, the wives from Hong Kong and Macao are not included as part of the

wives from China, because the socioeconomic connections with Taiwan have been different between Hong Kong and Macao on the one hand and Mainland China on the other.

With respect to long-term demographic effects, there is a major difference between foreign domestic helpers and foreign wives. The former are introduced into Taiwan in the fashion of a revolving door (i.e. the stay of each of them in Taiwan is legally restricted to only a few years) and hence have little direct long-term demographical effect. In contrast, the latter are legally permitted to settle down in Taiwan on a long term basis and contribute to the reproduction of the native-born population, although some of the former have the chance of getting acquainted with a Taiwanese man and becoming a foreign wife later.

In light of their long-term demographic significance, the reproductive contributions of Taiwan's foreign wives are chosen as the focus of this paper. We are mainly interested in the characterization and explanation of the reproductive outcomes of the foreign wives from the five most important source countries. Our research is based on the micro data of Taiwan's 2003 Census of Foreign Spouses, which has a very large number of individual records and rather rich information on potentially relevant causal factors.

The organization of the remaining part of the paper is as follows. The nature of the data is described in section 2. The observed fertility patterns are presented in section 3. In section 4, we formulate a multivariate model to explain the fertility outcomes, describe the statistical method, and introduce the explanatory factors to be included in the model. Our multivariate findings are presented in Section 5. In section 6, our work is then related to those of two other studies that used the same empirical data. A concluding discussion and policy suggestions are presented in section 7. Estimation results that cannot be conveniently included in the text are set aside in a series of appendix tables and appendix figures.

2. The Data

The universe of Taiwan's 2003 Census of Foreign Spouses included 240,837 residents who were spouses of Taiwanese citizens and did not have Taiwanese citizenship at the time of marriage. Among them, 224,196 were foreign wives of

Taiwanese men and 16,641 were foreign husbands of Taiwanese women. The couples with both partners being foreigners were not part of the universe and hence are beyond the scope of this research. With the coverage rates of 74.7% for the foreign wives and 50.5% for the foreign husbands, the micro data set of the census included the records of 167,505 foreign wives and 8,404 foreign husbands. Among the foreign wives, the top five specific reasons for under-coverage were (1) disappeared (25.1%), (2) moved to another place (migration, 18.5%), (3) failed to meet after repeated visits (16.4%), (4) unoccupied dwelling or incorrect address (11.7%), and (5) divorced (6.3%) (Su et al, 2006, p. 15). Similar to the population censuses of all countries, the extents of under-coverage were biased with respect to certain personal attributes.² According to the analysis of Su et al (2006), the under-coverage problem was more serious for the foreign spouses from China than for those from Southeast Asian countries, whereas the under-coverage was not biased with respect to educational attainment. So far no attempt has been made to create a weight variable to adjust for the biases in under-coverage. The implications of the under-coverage biases on the interpretations of our findings will be discussed later.

In selecting the sample of foreign wives for our in-depth analysis, we impose three restrictions. The first restriction is that the year of marriage be between 1980 and 2003. Our lack of interest in the pre-1980 marriages is related to the fact that Taiwan's fertility regime was going through very rapid transition in the 1960s and 1970s (Yang and Tsai, 2007), and the fact that only a very small proportion of the foreign wives got married before 1980. Among the 167,505 foreign wives in the original data set, as many as 163,998 (or 97.91%) got married in 1980-2003, whereas only 3,507 (or 2.09%) did so before 1980. It is interesting to note the following two distinctive features of the pre-1980 group. First, most of them got married at extremely young ages: as many as 75.0% of them had the marriage ages of less than 15 years. Second, a large majority of them (67.0%) were from Mainland China, Hong Kong and Macao. Thus, they mainly reflected the traditional Chinese culture of early marriage.

We further restrict that the marriage age be between 15 and 44 years. Since it was

² Take the 2001 population census of Canada for example. The net under-coverage rate differed substantially with respect to age: 7.19% for the 20-24 age group versus 0.84% for the 55-64 age group (Statistics Canada, undated, p. 65). In light of such a serious bias, Statistics Canada has not used census data as the denominators for computing age-specific birth and death rates. Instead, the denominators were based on a series of population estimates.

very unlikely that the marriage ages in the period since 1980 could have been less than 15 years, we assume that the 0-14 age interval contained a high proportion of the records with misreported or miscoded marriage ages and hence should be excluded from our analysis. The exclusion of the records in the 45+ age interval from our analysis was due to the fact that extremely few births occurred to those in this age interval. This restriction had a rather small effect on the reduction of the sample size. Only 1.53% and 3.78% of those married in 1980-2003 were younger than 15 years and older than 44 years at marriage, respectively. With this restriction, the sample size became 155,283 persons.

Our last restriction is that the foreign wives be from the top five countries of origin: China, Vietnam, Indonesia, the Philippines, and Thailand. Since these five nationalities represented as many as 95.8% of the sample, this restriction resulted in very little loss of information. There are two main reasons for paying attention to the countries of origin. First, in a preliminary analysis, we found that the effect of marriage age on fertility differed substantially among the original nationalities of the foreign wives. Second, the assimilation of the second generation is expected to differ systematically among source countries, especially between those originated from China on the one hand and those originated from Southeast Asian countries on the other. As a consequence of this additional restriction, the sample size became 148,688. In our multivariate analysis, the sample size is further reduced to 147,707, because there were 981 foreign wives whose husband's age was missing so that their spousal age gap, which was one of the more important explanatory factors, could not be computed. Note that in the census, the children born to the foreign wives only included the ones conceived with their Taiwanese husbands.

3. Observed Patterns

The overall fertility rate of the foreign wives, which is computed as the number of children ever born with Taiwanese husbands divided by the number of foreign wives, was 0.90 child per woman. It varied substantially among the five major source countries, ranging from 0.77 child for those from China to 1.44 children for those from the Philippines. These values were inappropriate indicators for reflecting the potential reproductive contributions of different nationality groups, because they were seriously affected by the large difference in average marriage duration—only 3.85 years for those

from China but as high as 6.51 years for those from the Philippines.

A better fertility measure is the *lifetime fertility rate (LTFR)*, which is defined as the average number of children born to the foreign wives whose marriage duration was ten or more years. Since practically all reproductions of foreign wives took place within ten years since marriage, *LTFR* can be meaningfully compared with *TFR* (total fertility rate). The *LTFR* of all five nationality groups combined was 1.58 children, which was substantially lower than the replacement *TFR* of 2.08 children. Thus, the reproductive contribution of the foreign wives cannot be expected to help prevent the long-term shrinkage of the base of Taiwan's population pyramid and the long-term decline of Taiwan's total population.

To the extent that the *LTFR* of the foreign wives could be compared to Taiwan's observed *TFR* in recent years (1.24 children in 2003 and 1.12 children in 2006), we could infer that the foreign wives made greater reproductive contributions than did the Taiwan-born women. But, a more meaningful comparison should be based on the tempo-adjusted *TFR* (Bongaarts and Feeney, 1998; Bongaarts, 2008). It has been shown by Wang and Liu (2008) that the tempo-adjusted *TFR* of Taiwan as a whole was at the level of 1.52 children between 2001 and 2005. Since the *LTFR* of all five nationality groups of foreign wives combined was 1.58 children, the average reproductive contribution of these foreign wives somewhat surpassed the national level by about 0.06 child per woman. Another useful reference value is the completed fertility rate of the cohort of all of Taiwan's women born in 1970, whose reproductions were mostly achieved in the 1990s and the early years of the 2000s. This reference value was estimated by Wang and Liu (2008) to be 1.54 children. Based on this reference value, we may infer that the reproductive contribution of these foreign wives still exceeded the national average, although by only 0.04 child per woman.

With a *LTFR* of only 1.40 children, the wives from China were distinguished as having the lowest fertility level among those from the top five source countries. The *LTFRs* for the foreign wives from the other source countries were: 1.64 children for the Vietnamese, 1.67 children for the Thais, 1.85 children for the Filipinas, and 2.03 children for the Indonesians. Compared with the estimated tempo-adjusted *TFR* of Taiwan (1.52 children) in 2001-2005, we found that the reproductive contributions of the foreign wives from the four Southeast Asian countries were higher than that of the

Taiwan-born women, whereas the reproductive contribution of those from China was lower.

The usefulness of *LTFR* as a general measure of fertility level might be largely undermined by the fact that the cross-sectional data of the census did not allow the distinction between the effect of marriage year (i.e. the time of marriage) and the effect of marriage duration. Without this distinction, the representativeness of *LTFR* would be in doubt if the reproductive behaviors of different marriage cohorts (i.e. cohorts that got married in different periods) differed sharply. In Figure 1, we see that the fertility rate tended to increase with marriage duration in a relatively smooth and nearly monotonic way for each of the five nationality groups. This finding suggests that the effect of marriage duration was much more important than the effect of marriage cohort. In other words, it is reasonable to assume that different marriage cohorts shared highly similar reproductive behaviors. Thus, for the foreign wives under consideration, *LTFR* could be considered as a representative measure of the lifetime reproductive contribution of the foreign wives from each of the five source countries.

Figure 1. Observed fertility rates of Taiwan's foreign wives from the top five source countries by marriage duration

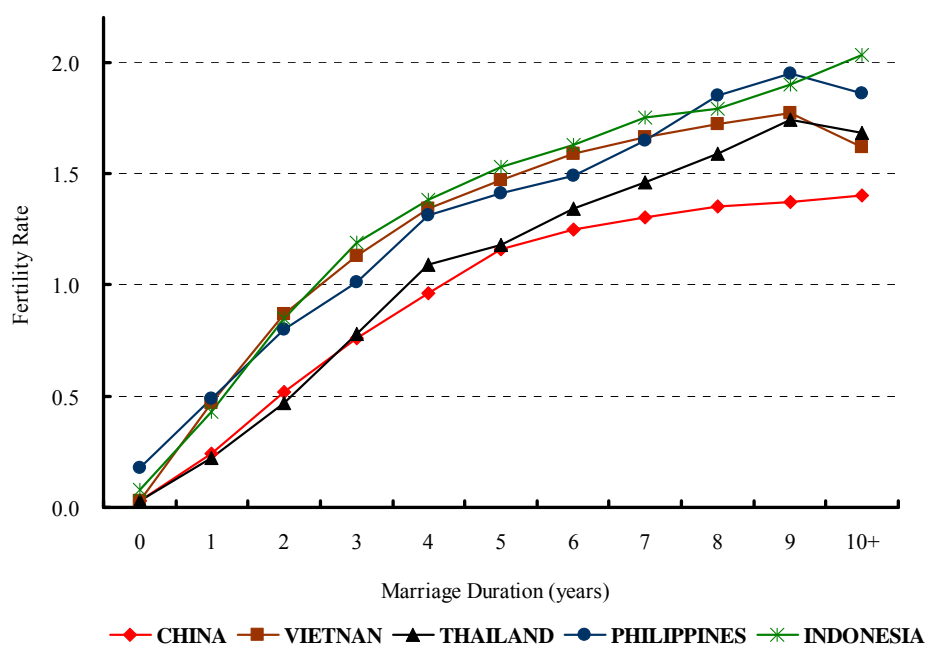


Figure 1 suggests that the proportion of childless foreign wives decreased quite rapidly during the first few years of marriage, so that for every nationality group, more than half of *LTFR* was accomplished by the 4th year of marriage. For the five top source countries combined, the childless proportion decreased extremely rapidly from 96.7% in year 0, to 66.1% in year 1, and 38.7% in year 2. For the Vietnamese wives, the decline in the childless proportion in the first two years was particularly sharp: from 97.4% in year 0, to 53.9% in year 1, and 21.7% in year 2. This very sharp decline did not fit well with the statement that “Taiwanese male spouses want their heirs to be born as soon as possible, while Vietnamese female spouses try to delay childbirth by contraception and to work as long as possible, thereby making more remittances to their home country” (Kojima, undated, p. 7). Beyond the 7th years, the fertility curves approached a plateau. The minor decline at the end of the curves for those from the Philippines and Thailand probably reflected cohort effects, whereas the similar decline for those from Vietnam was probably untrustworthy due to the very small number (only 154 persons) of Vietnamese wives with the marriage duration of 10 or more years.

In addition to *LTFR*, it is useful to compare the distributions of the foreign wives across the number of child births among the five nationality groups. These distributions are shown for the marriage duration of 10+ years in Figure 2(a), and for the marriage duration of 7 to 9 years in Figure 2(b). Since the curve in Figure 2(a) for those from Vietnam might not be reliable due to the smallness of the sample size, we also created the curves in Figure 2(b). Both Figures 2(a) and 2(b) indicate that those from Vietnam were most capable of achieving the ideal family size of two children (about 50%), with a relatively low proportion being childless (about 10%) as well as a relatively low proportion having three children (also about 10%). Based on Figure 2(a), we make the following comparisons. Compared with the wives from the Southeast Asian countries, those from China were distinguished by having the highest proportion remaining childless (22%) and the lowest proportion achieving the ideal family size of two children (38%). The proportion having three children was the highest for those from Indonesia (26%) and the Philippines (21%). Although those from Indonesia and the Philippines were also more prone to having four or more children than their counterparts from the other three countries, the proportion attaining such a high fertility was very low for all five source countries (less than 5%).

Figure 2(a). Observed distributions of Taiwan's foreign wives with respect to the numbers of children ever born with their Taiwanese husbands: for marriage duration = 10+ years

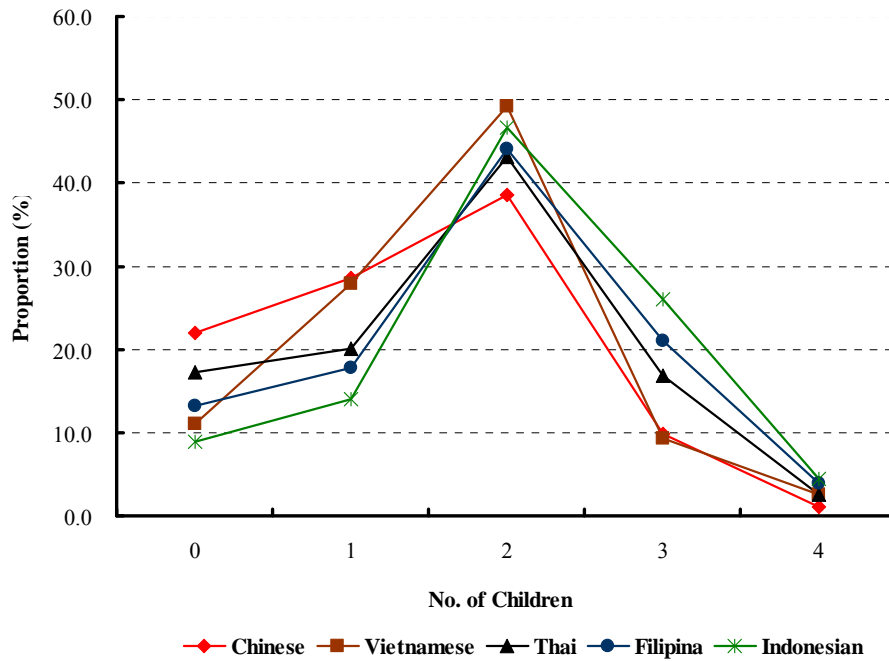
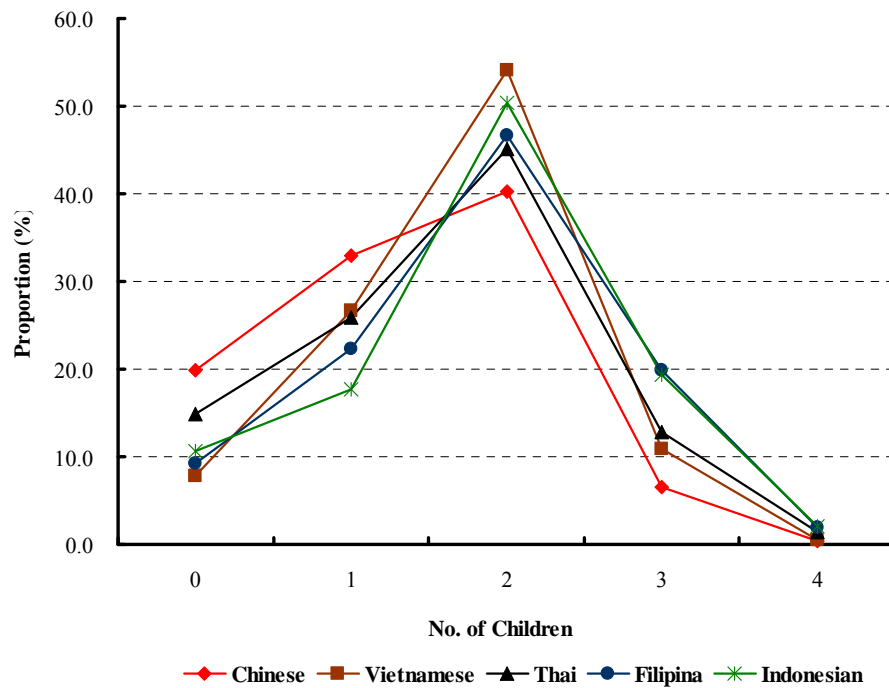


Figure 2(b). Observed distributions of Taiwan's foreign wives with respect to the numbers of children ever born with their Taiwanese husbands: for marriage duration = 7-9 years



The reproductive outcomes of the foreign wives from each source country depended not only on marriage duration but also on other factors like marriage age, spousal age gap, employment status, and living arrangement. Since such factors differed substantially among the source countries and could be changed by the husbands, the wives themselves and their families as well as by marriage brokers and government interventions, it is useful to assess the effects of such factors on the reproductive outcomes of the foreign wives. Since it is very likely that the explanatory powers of some of the factors overlap with each other, it is essential to carry out this assessment in a multivariate framework. The possibility that failure to control for the effects of other factors in assessing the effect of a given factor could lead to a very misleading inference can be demonstrated by the following example. We found that among the Chinese wives in our selected sample, those whose marriage with their Taiwanese husband was their second marriage had a *LTFR* of only 0.32 child. To a large extent, this very low *LTFR* was due to (1) the fact that this subgroup of women had a very high mean marriage age (35.2 years) and a very large average spousal age gap (20.1 years), and (2) the fact that both marriage age and spousal age gap also had negative effects on fertility rate. In other words, without controlling for the effects of marriage age and spousal age gap in a multivariate model, the effect of being the second marriage would be seriously overstated.

4. Formulation of the Multivariate Model and Specification of Explanatory Variables

We choose to use a multinomial logit model to investigate how various personal attributes affected the reproductive outcomes of the foreign wives. This model has the following advantages over a multiple regression model. First, it completely avoids the possibility of generating negative predicted fertility rates that does not make any substantive sense. At an early stage of our investigation, we tried a multiple regression model and found that the predicted fertility rates for some groups of foreign wives turned out to be negative. Second, in addition to being able to generate substantively sensible predicted fertility rates, the multinomial logit model can explicitly deal with the distribution of wives among the number of children they managed to produce. This distribution is a substantively important aspect of the reproductive outcomes. For example, if an increase in the average marriage age of wives resulted in a decrease in fertility rate, it is useful to know whether the decrease involved a sharp reduction in the

probability of being childless or in the probability of having only one child. The former outcome would be a serious threat to the continuation of the family line, whereas the latter outcome would not. Third, since some personal factor such as husband's employment status may enhance the ability of achieving the ideal family size of two children rather than increasing or decreasing the fertility rate,³ a multinomial logit model can effectively deal with this kind of possibility, whereas a multiple regression model can not. Neither can a Poisson regression model, a negative binomial regression model, nor an order logit model. A price to be paid for these advantages of using a multinomial logit model is that the programming task requires much more effort, and that the computing time becomes much longer.

Since extremely few of the foreign wives gave birth to more than 4 children, we assume that there were only 5 alternatives in the choice set, namely {0, 1, 2, 3, 4}. Strictly speaking the last alternative {4} represented "4 or more children". But, for practical purpose, it basically represented "4 children".

Using the alternative of giving birth to 2 children as the reference alternative, we use a multinomial logit model of the following form:

$$\ln\left(\frac{P_{ij}}{P_{i2}}\right) = \sum_{\substack{k=0 \\ k \neq 2}}^4 [\beta_{0k} D_{jk} + \sum_{m=1}^M \beta_{mk} X_{im} D_{jk}] \quad (1)$$

where P_{ij} is the probability that person i gives birth to j children (for $j=0, 1, 3, 4$); $\ln(\)$ is natural log function; D_{jk} is an alternative-specific dummy variable such that it assumes the value of 1 if the subscript j is equal to the subscript k ; X_{im} is the m -th explanatory variable representing an observable attribute of person i ; β_{0k} and β_{mk} are unknown coefficients to be estimated. Note that all explanatory variables representing personal attributes enter into the model as interactions with the alternative-specific dummy variables in the form of $X_{im}D_{jk}$.

The unknown coefficients are estimated by maximizing the following likelihood

³ In light of the entrenchment of sub-replacement fertility level since the mid-1980s, the government of Taiwan has been promoting the two-child family as an ideal model: "Two Children is Exactly Right" (Tsay, 2003). It is interesting to note that the historical fertility decline of Japan towards the replacement level was accompanied by a *reduction* in the proportion of women being childless (Ochiai, 1994). In other words, it was a transition towards the two-child ideal family model.

function:

$$\prod_{i=1}^n \prod_{j=0}^4 P_{ij}^{Y_{ij}} \quad (2)$$

where Y_{ij} is a dummy variable such that it assumes the value of 1 if the data show that person i has given birth to j child(ren); and n is the number of foreign wives. The iterative computation of the estimated coefficients is based on the Newton-Raphson algorithm with an adjustable step size (Bonnans et al, 2003; Fletcher, 1987).⁴

The goodness of fit for a given specification of the model is measured by: $\rho^2 = 1 - L_g / L_o$, where L_g is the log likelihood of the given specification of the model, and L_o is the log likelihood of the null model (i.e. the model with all coefficients of the interactions $X_{im}D_{jk}$ set to zero).⁵ The upper bound of ρ^2 is usually substantially less than 1.0 so that a value of 0.2 may indicate a very good fit (McFadden, 1974).

As suggested by Figure 1, it is important that the model contains the personal attribute of marriage duration as a control. To avoid unintended systematic bias that may arise by using a specific functional form (e.g. a quadratic form), we make the sensible decision of using as many as ten dummy variables to control for the effect of marriage duration on the probabilities of the reproductive alternatives (and ultimately on the fertility rate). Using zero year (i.e. less than one year) as the reference category for marriage duration, these ten dummy variables represent, 1, 2, 3, ...9, 10+ years, respectively.

Based on the literature and our own understanding of reproductive behaviors, the following additional personal attributes are considered to be potentially useful explanatory factors. First of all, since the intensity of reproduction tends to decrease sharply from the early 30s for both physiological and socioeconomic reasons (Rizzi and Rosina, 2006), we choose *age at marriage* as another key personal attribute to be included in our model. For socioeconomic and perhaps physiological reasons, a very

⁴ The use of adjustable step size is an extremely convenient feature. We have found that by letting the step size be a number greater than 0 and less than or equal to 1, we could conveniently start with 0 for all the parameters to be estimated and avoid the problem of divergence. Of course, the smaller the step size, the slower the convergence. In our own work, we usually use a step size of 0.8. In the most difficult case, convergence occurred after we let the step size be 0.07.

⁵ Since our sample sizes are very large, the difference between ρ^2 and adjusted ρ^2 is negligible. For convenience, we use ρ^2 as the measure of goodness of fit.

large age gap between husband and wife is bound to have a negative effect on reproductive outcome. Thus, we also select *spousal age gap* (husband's age minus wife's age) as an explanatory factor. Since disruptions in marriages are also likely to have negative effects on reproductive outcomes, we also select *marital status* as an explanatory factor.

Whether the current marriage with the Taiwanese husband is the second marriage of the wife can also have a negative effect on the foreign wife's willingness and ability to reproduce. If a previously married woman had given birth to a child in her home country, she might have a strong emotional attachment and financial commitment to her child and kin in her native land, so that she might plan to return to live in her native land after the death of, or the divorce from, her Taiwanese husband. For such a woman, it is quite rational to have no child or at most one child with the Taiwanese husband. If such a woman was from China, she might have been sterilized under the one-child policy so that she could only serve as a "companion" of her Taiwanese husband without the possibility of yielding any child. Thus, we also choose *remarriage status* as an explanatory factor.

Recent literature on the extremely low fertilities of southern and eastern European and advanced Asian countries has highlighted the extreme difficulty of married women in carrying the double burden of household and occupational works (e.g. Ochiai, 1994; McDonald, 2000a and 2000b; Jones, 2007). Co-residence with the husband's parents may help alleviate this difficulty and hence increase the willingness to reproduce. Furthermore, such co-resident families may assign a high value to the continuation of the family line and hence encourage the birth of at least one child, especially a son. The co-resident arrangement can also facilitate the applications of sanctions by parents to enforce their preference (Weinstein, et al, 1990). Therefore, we also choose *living arrangement* as an explanatory factor.

A large body of theoretical and empirical work on fertility transition have highlighted and demonstrated the negative effect of wife's educational attainment on fertility level (Becker, 1981; Ryder and Westoff, 1971; Freedmen, Peng, Takeshita and Sun, 1963; Hermalin, 1974; Chang, Freedman and Sun, 1987; Chang and Lee, 2001; Sun, 2001). Some empirical studies also indicated that husband's educational attainment also had a negative effect on fertility in the early stage of Taiwan's fertility

transition (Mueller, 1972; Chang and Tsao, 1981). It would be interesting to see if educational attainment remained an influential fertility determinant for the foreign wives after the transition to replacement fertility was completed. Therefore, we also choose the *educational attainments of both wife and husband* as additional explanatory factors.

A distinctive demographic phenomenon of Taiwan was an overabundance of spouseless veterans, which resulted from a large influx of young soldiers from Mainland China in the late 1940s (Chen, 2008). Among the older veterans with modest economic status, the continuation of the family line was probably not an important reason for getting a foreign wife. To them, a foreign wife was expected to satisfy their sexual needs and to be their care providers. Therefore, we also select *husband's veteran status* as an explanatory factor. Being married to a veteran is expected to have a negative effect on reproductive outcome.

In light of the unwillingness of many Taiwanese husbands to share household chores with their wives, it is likely that the foreign wives who held “fixed jobs” (i.e. not temporary jobs) were less willing to reproduce. In contrast, the husbands who held fixed jobs might have a stronger confidence in his family's future prospect. This confidence might enable them to achieve the ideal two-child family. Thus, we also choose the *employment statuses of both wife and husband* as additional explanatory factors. We expect these two factors to have rather different effects on reproductive outcomes.

About 10% of Taiwan's foreign wives are married to disabled men who had difficulty in finding willing Taiwanese wives. To the extent that disabled men on average lived shorter lives and had less income security, there might be incentives for their foreign wives to restrict their fertility. Thus, we also choose *husband's health status* as an explanatory factor.

Finally, for various contextual reasons, the fertility level in Taiwan has been lower in highly urbanized regions than in the rest of the country since at least the late 1950s (Freedmen et al, 1963; Hermalin, 1974). Expecting that the reproductive behaviors of the foreign wives were also subject to such contextual influences, we also select the *place of residence* as an explanatory factor.

A few salient features of the five nationality groups can be easily seen from the summary statistics of our chosen explanatory factors (Table 1).

Table 1. Summary statistics of the personal attributes that have systematic effects on the reproductive contributions of the foreign wives of Taiwanese husbands

Explanatory Factor	Source country of Taiwan's Foreign Wives					
	China	Vietnam	Indonesia	Thailand	Philippines	All Five
1. Marriage duration: Mean (year)	3.85	2.64	5.15	5.38	6.51	3.73
2. Age at Marriage						
<i>Mean (year):</i>	27.51	21.84	23.59	27.77	26.30	25.30
<i>Distribution (%):</i>						
15-18 years	0.3	14.0	17.1	2.2	1.7	6.5
19-24 years	38.7	67.2	49.6	29.7	37.2	48.4
25-29 years	31.1	13.7	17.7	34.1	38.0	24.4
30-35 years	16.8	4.0	10.0	23.2	17.9	12.3
36-44 years	13.1	1.1	5.6	10.8	5.2	8.3
3. Spousal Age Gap						
<i>Mean (year):</i>	12.20	14.00	11.10	7.20	7.10	12.40
<i>Distribution (%):</i>						
< 10 years	47.5	23.8	40.0	66.3	65.3	40.2
10-14 years	23.7	32.0	31.6	17.2	19.1	26.9
15-19 years	11.5	27.3	20.3	9.2	10.1	17.3
20 or more years	17.3	17.0	8.1	7.3	5.6	15.6
4. Marital Status (%)						
Separated	2.3	0.5	0.8	1.0	0.9	1.5
Divorced	2.0	0.8	0.8	0.9	0.8	1.4
Widowed	1.0	0.4	0.9	1.4	1.4	0.8
Married	94.7	98.3	97.5	96.7	96.9	96.2
5. Wife's Remarriage Status (%)						
Second Marriage	15.4	1.0	2.5	10.0	1.5	9.1
6. Living Arrangement (%)						
With parent	39.7	59.4	55.8	41.6	45.5	47.8
7. Wife's Educational Attainment (%)						
< High School	60.8	77.0	70.6	66.2	33.0	66.4
High School	28.5	19.4	24.3	22.6	27.8	25.1
College or higher	10.7	3.6	5.1	11.2	39.3	8.5
8. Husband's Educational Attainment (%)						
< High School	46.2	55.6	61.5	49.1	45.7	50.9
High School	38.3	37.5	33.9	36.4	30.9	37.3
College or University or higher	15.5	6.9	4.6	14.6	23.5	11.8
9. Husband's Veteran Status (%)						
Veteran	12.4	1.7	1.9	5.0	2.4	7.5
10. Wife's Employment Status (%)						
Fixed Job	14.4	16.4	22.1	33.1	30.6	16.7
11. Husband's Employment Status (%)						
Fixed Job	69.3	81.2	78.5	80.2	79.0	74.5
12. Husband's Health Status (%)						
Disable	9.0	9.7	10.5	6.6	9.3	9.4
13. Place of Residence (%)						
Metropolitan area	46.8	34.6	22.4	37.0	34.2	39.7
Sample size (person)	78,777	44,879	17,377	3,181	3,493	147,707

Note: The percentages are computed across the categories of each personal attribute. For a personal attribute with only two categories, one of the categories is not shown in the table.

--Vietnamese and Indonesian wives tended to get married at much younger ages than their Chinese, Thai, and Filipina counterparts. The mean age at marriage was 21.8 for those from Vietnam and 23.6 for those from Indonesia, compared with 27.5 for those from China, 27.8 for those from Thailand, and 26.3 for those from the Philippines. Beneath this large difference in mean age at marriage was the fact that the proportion

getting married at the very young ages of 15-18 was 14.0% for those from Vietnam and 17.1% for those from Indonesia, compared with less than 3% for those from each of the three remaining countries.

--The foreign wives from all five major source countries had very large and very different average spousal age gaps, ranging from 7.1 and 7.2 years for those from the Philippines and Thailand to 12.2 and 14.0 years for those from China and Vietnam. These values were greater than the corresponding values of all first marriages (2.7 years) and all remarriages (6.1 years) that took place in Taiwan in 2008 (MOI, www.ris.gov.tw/gateway: “年結婚年齡中位數與平均數”, created on May 19, 2009).

--Second marriage involved much higher proportions of Chinese and Thai wives (15.4% and 10.0%) than Vietnamese, Thai, and Filipina wives (1.0%, 2.5%, and 1.5%).

--While the propensity to co-reside with the husband's parent(s) was quite high for all five foreign nationalities, Vietnamese and Indonesian wives were much more prone to co-residing with parents than were their Chinese, Thai, and Filipina counterparts. The co-residing proportion was 59.4% for Vietnamese wives and 55.8% for Indonesian wives, compared with 39.7%, 41.6%, and 45.7% for their Chinese, Thai, and Filipina counterparts, respectively. For reference, Lin (2009) found from Taiwan's 2002 National Survey on Knowledge, Attitude and Practice of Health Promotion that 38% of currently married women in the 20-44 age group in Taiwan co-resided with their husbands' parents or their own parents.

--Filipina wives were by far the best educated and did not fit into the poorly educated stereo-type of foreign wives in Taiwan, whereas Vietnamese and Indonesian wives were mostly poorly educated. The proportion of the foreign wives with at least a college education was as high as 39.3% for the Filipinas, compared with only 3.6% for the Vietnamese and 5.1% for the Indonesians. For reference, Lin (2009) showed that 29% of Taiwan's currently married women in the 20-44 age group in 2002 had more than 12 years of education.

--Among the five source countries, husband's educational attainment was positively correlated with wife's educational attainment.

--Chinese wives were more prone to marrying veterans (12.4%) than were those of the other nationalities: 5.0% for the Thais, 2.4% for the Filipinas, and less than 2% for the Vietnamese and Indonesians.

--Thai and Filipina wives were much more likely to hold fixed jobs (33.1% and 30.6%) than were Chinese and Vietnamese wives (14.4% and 16.4%), while Indonesian wives were between these two extremes (22.1%).

Some of these salient features may help account for the observed differences in reproductive outcomes among the nationality groups.

All of our chosen explanatory factors are categorized and represented by dummy variables in our multinomial logit model. The reference category for each explanatory factor and the categories represented by the dummy variables are shown later in Table 2. To specify the appropriate intervals for marriage age, we used a regression model in which a large number of dummy variables, each representing a single year of marriage age between 16 and 44 years, were used to explain the variation in the number of children in the context of marriage duration and other explanatory factors. The detailed patterns of the estimated coefficients of these dummy variables were then used to group the consecutive single years into five categories that had small intra-category variability and large inter-category differences: 15-18, 19-24, 25-29, 30-35, and 36-44. For spousal age gap, we started with seven categories (< -5; -5 to -1; 0-4; 5-9; 10-14; 15-19; and 20+) in the regression model and ended up with four categories (< 10; 10-14; 15-19; and 20+). Educational attainments for both wives and husbands were similarly reduced from six to three categories (< high school; high school; college+). With respect to place of residence, we used the geo-codes at the administrative level of large cities and prefectures to define two categories: metropolitan areas and non-metropolitan areas. The former includes all large cities as well as Taipei Prefecture, which is mostly the suburban area surrounding Taipei City, whereas the latter includes the remaining areas of Taiwan.

5. Multivariate Findings

We applied the multinomial logit model to each of the five nationality groups separately. In general, the explanatory variables with a t-ratio of less than 2.0 in magnitude were removed from the model, because their estimated coefficients were considered to be not significantly different from zero. However, when a set of estimated coefficients associated with a substantive variable (e.g. the dummy variable representing husband's high school educational attainment) showed a substantively sensible pattern, we chose to keep the whole set of the corresponding interactions in the

model, even though one or two of the estimated coefficients in the set were associated with a t-ratio of less than 2.0 in magnitude. In general, the nationality-specific models fitted the data quite well: the values of ρ^2 ranged between 0.1523 for the Filipina wives and 0.3077 for the Chinese wives.

To make the interpretations of the estimated results relatively easy to understand, we will first present a step-by-step inference from the estimation result for the Chinese nationality and then deal with the similarities and differences among the five source countries.

5.1. Step-by-step Inference from the Estimation Result of the Chinese Model

The estimated coefficients of the model for the foreign wives from China are shown in Table 2. With respect to the effect of marriage duration, the increasingly negative coefficients associated with the alternative of childlessness (from -2.20 for one year to -9.84 for 10 or more years) imply that the probability of being childless tended to decrease monotonically as marriage duration of the Chinese wives increased. Similarly, the increasingly negative coefficients associated with the alternative of having one child (from -2.03 for 2 years to -5.17 for 10 or more years) imply that the probability of having one child also tended to decrease monotonically as marriage duration increased. Since the coefficients of the interactions between the dummy variables representing marriage durations and the dummy variables representing the three- and four-child alternatives turn out to be not significantly different from zero, these findings imply that the decreases in the probabilities of being childless and having one child that were caused by an increase in marriage duration were compensated for by not only an increase in the probability of having two children but also increases in the probabilities of having three and four children. These changes in the probabilities in turn imply that the fertility rate was expected to increase with marriage duration, as suggested by the observed curve of fertility rate for the Chinese wives in Figure 1.

With respect to the effects of marriage age, the positive coefficients for the alternatives of being childless and having one child reveal that progressive increases in marriage age beyond the early 20s enhanced strongly the probability of being childless and moderately the probability of having one child, whereas the negative coefficients for the alternative of having three children show that such an increase in

marriage age reduced the probability of having three children. These are expected findings. However, it turned out unexpectedly that relative to those whose marriage ages were 19-24, those who got married at the ages of 15-18 years were more prone to having one child and especially no child. This finding is unexpected in the sense that the younger the marriage age, the longer the time to menopause, and hence the longer the exposure to the risk of pregnancy.

Table 2. Estimation Results of the Best Specification of the Multinomial Logit Model for Explaining the Variation in the Number of Children born to the Chinese Wives of Taiwanese Husbands.

Explanatory Factors	Number of Births (Reference = 2)							
	0		1		3		4	
	Coeff.	t-ratio	Coeff.	t-ratio	Coeff.	t-ratio	Coeff.	t-ratio
Constant	7.17	44.4	4.03	27.4	-1.71	-24.0	-4.10	-16.7
1. Duration of Marriage (ref.= 0 year)								
1 year	-2.20	-31.1	----	----	----	----	----	----
2 years	-5.25	-32.4	-2.03	-13.6	----	----	----	----
3 years	-6.86	-43.1	-3.26	-22.4	----	----	----	----
4 years	-7.70	-48.3	-3.93	-27.0	----	----	----	----
5 years	-8.41	-52.3	-4.36	-29.9	----	----	----	----
6 years	-8.73	-53.8	-4.54	-31.1	----	----	----	----
7 years	-9.01	-54.4	-4.66	-31.6	----	----	----	----
8 years	-9.31	-54.8	-4.79	-32.1	----	----	----	----
9 years	-9.50	-54.6	-4.96	-32.8	----	----	----	----
10 or more years	-9.84	-59.2	-5.17	-34.9	----	----	----	----
2. Age at Marriage (ref.= 19-24 years)								
15-18 years	1.00	4.5	0.63	4.0	----	----	----	----
25-29 years	0.42	14.3	0.22	9.1	-0.41	-6.8	----	----
30-35 years	1.49	33.0	0.64	15.3	-0.49	-4.1	----	----
36-44 years	3.51	29.4	1.35	11.1	-1.02	-2.0	----	----
3. Spousal Age Gap (ref.= less than 10 years)								
10-14 years	----	----	----	----	-0.26	-4.3	-0.54	-2.0
15-19 years	0.46	11.1	0.26	7.1	-0.47	-4.7	-0.86	-1.9
20 or more years	1.47	26.5	0.76	14.4	-0.30	-2.2	----	----
4. Marital Status (ref.= Married)								
Separated	3.21	19.3	1.15	6.6	----	----	----	----
Divorced	1.65	15.3	0.45	4.1	----	----	----	----
Widowed	----	----	0.54	6.4	----	----	----	----
5. Wife's Remarriage Status (ref.= other)								
2nd Marriage	1.74	21.8	0.71	8.7	----	----	----	----
6. Living Arrangement (ref.= other)								
With Parent	-0.79	-28.3	-0.22	-9.7	----	----	-0.60	-2.7
7. Wife's Education (ref.= less than High Sch.)								
High School	----	----	0.16	8.2	----	----	-0.76	-2.6
College or University or higher	0.27	6.2	0.39	10.5	-0.22	-2.3	-0.49	-1.2
8. Husband's Education (ref.= less than High Sch.)								
High School	0.05	1.5	0.12	4.8	-0.17	-2.9	-0.31	-1.3
College or higher	0.27	6.7	0.29	8.4	-0.24	-2.8	-0.38	-1.0
9. Husband's Veteran Status (ref.= other)								
Veteran	0.39	6.6	0.23	4.2	----	----	----	----
10. Wife's Employment Status (ref.= other)								
Fixed Job	0.31	8.3	0.29	9.5	0.28	4.6	0.44	1.9
11. Husband's Employment Status (ref.= other)								
Fixed Job	-0.41	-11.9	-0.17	-5.6	-0.22	-3.4	-0.39	-1.6
12. Husband's Health Status (ref.= Able)								
Disable	0.20	5.7	----	----	----	----	----	----
13. Residence (ref.= other)								
Metropolitan Area	0.39	14.7	0.27	11.8	----	----	----	----
Rho-square = 0.3077								

Note: The category of "City" included not only the 7 large cities but also Taipei Prefecture.

Since we feel that these qualitative interpretations of the estimated coefficients are not concrete enough, we discontinue the direct interpretations of the estimated coefficients for other explanatory factors and proceed to create the information in Tables 3 and 4 that show more concretely the effects of the explanatory factors on (1)

the probabilities of having different numbers of children at the end of reproductive career (i.e. with the marriage duration being 10 or more years) and (2) the lifetime fertility rate (*LIFR*). The values in Tables 3 and 4 are created from the estimated coefficients in Table 2 in the following way. First, we let all the estimated coefficients of the model be zero, except for those associated with the four constant terms and those associated with the dummy variable representing 10 or more years of marriage duration. Under this restriction, the model yields 0.04, 0.20, 0.63, 0.11, and 0.01 for the probabilities of giving birth to 0, 1, 2, 3, and 4 children, respectively (see the row for the “Reference Group” in Tables 3 and 4). In other words, for the wives in the reference group (including those who had the marriage age being 19-24 years, the spousal age gap being less than 10 years, the marital status being “married”, the remarriage status being not the second marriage, the living arrangement being not co-residing with parent, the wife’s and husband’s education being less than high school graduation, the husband being a non-veteran, the wife’s and husband’s employment status being not having a fixed job, the husband’s health status being not disable, and the place of residence being in non-metropolitan area), 4%, 20%, 63%, 11%, and 1% were predicted to give birth to 0, 1, 2, 3, and 4 children, respectively. This predicted probability distribution of reproduction implied a predicted *LIFR* of 1.85 children for the wives in the reference group (see the row for the reference group in Table 3).

Second, for assessing the effect of changing marriage age from the reference level (19-24 years) to another level, say 36-44 years, we further let the estimated coefficients of the interactions involving the corresponding dummy variable (3.51 for 0 child, 1.35 for 1 child, and -1.02 for 3 children) enter into the model. The predicted probability distribution became: 0.50, 0.27, 0.22, 0.01, and 0.00 (see the row for the group with marriage year being 36-44 years in Table 3). In other words, the Chinese wives who got married at the very late ages of 36-44 years were predicted by the model to have the probability distribution at the completion of reproductive career as: 50% remaining childless, 27% having one child, 22% having two children, 1% having three children, and 0% having four children. The *LIFR* implied by this distribution was only 0.76 child.

Third, to show the effect of changing the marriage age from the reference group (19-24) to the group in question (36-44), we subtract the row of the group in question by the row of the reference group in Table 3. The resulting difference between the two

probability distributions was: 0.45, 0.07, -0.41, -0.10, and -0.01, whereas the resulting difference in *LTFR* was -1.09 (see the corresponding row in Table 4). In other words, the major impact of changing the marriage age was a sharp reduction in the proportion with two children by 41 percentage points, and a sharp increase in the proportion without any child by 45 percentage points, resulting in a sharp decrease in *LTFR* by 1.09 children.

The other rows of Tables 3 and 4 are similarly computed as in the second and third steps. With these two tables, we can get a more concrete sense of the reproductive outcomes and the effects of the changes in various explanatory factors.

Table 3. The Predicted Probability Distributions and Fertility Rates of Different Groups of Chinese Wives at the Completion of Reproductive Career: Based on the Application of a Multinomial Logit Model to the Micro Data of the 2003 Census of Foreign Spouses.

Explanatory Factor	Probabilities of Having Different Numbers of Births					Lifetime Fertility Rate
	0	1	2	3	4	
Reference Group	0.04	0.20	0.63	0.11	0.01	1.85
1. Age at Marriage (ref.= 19-24)						
15-18 years	0.09	0.30	0.50	0.09	0.01	1.62
25-29 years	0.06	0.24	0.61	0.07	0.01	1.72
30-35 years	0.15	0.30	0.49	0.05	0.01	1.47
36-44 years	0.50	0.27	0.22	0.01	0.00	0.76
2. Spousal Age Gap (ref.= less than 10 yrs)						
10-14 years	0.04	0.21	0.65	0.09	0.01	1.81
15-19 years	0.07	0.25	0.61	0.07	0.00	1.69
20 or more years	0.14	0.32	0.47	0.06	0.01	1.48
3. Marital Status (ref.= Married)						
Separated	0.44	0.26	0.26	0.05	0.00	0.92
Divorced	0.17	0.24	0.49	0.09	0.01	1.51
Widowed	0.04	0.30	0.55	0.10	0.01	1.74
4. Wife's Remarriage Status (ref.= other)						
2nd Marriage	0.18	0.29	0.45	0.08	0.01	1.45
5. Living Arrangement (ref.= other)						
With Parent	0.02	0.17	0.68	0.12	0.01	1.92
6. Wife's Education (ref.= less than High Sch.)						
High School	0.04	0.23	0.61	0.11	0.00	1.81
College or University or higher	0.05	0.27	0.58	0.08	0.01	1.72
7. Husband's Education (ref.= less than High Sch.)						
High School	0.04	0.23	0.63	0.10	0.01	1.79
College or University or higher	0.05	0.26	0.60	0.08	0.01	1.73
8. Husband's Veteran Status (ref.= other)						
Veteran	0.06	0.24	0.59	0.11	0.01	1.77
9. Wife's Employment Status (ref.= other)						
Fixed Job	0.05	0.24	0.56	0.13	0.01	1.82
10. Husband's Employment Status (ref.= other)						
Fixed Job	0.03	0.18	0.68	0.10	0.01	1.87
11. Husband's Health Status (ref.= Able)						
Disable	0.05	0.20	0.62	0.11	0.01	1.83
12. Residence (ref.= other)						
Metropolitan Areas	0.06	0.24	0.58	0.11	0.01	1.76

With respect to the effects of increasing spousal age gap on the *LTFR* of the Chinese wives, we also see from Table 4 that the increase to 10-14 years resulted in a reduction by only 0.04 child, that the increase to 15-19 years resulted in a modest reduction by 0.15 child, and that the increase to 20+ years resulted in a moderate reduction by 0.37 child, which turned out to be the same as the effect of raising

marriage age from 19-24 years to 30-35 years and much smaller than the reduction (1.09 child) resulting from raising marriage age to 36-44. Thus, in terms of the effects on *LTFR*, we have learned that a large spousal age gap had relatively small effect unless the gap was very large, and that a large spousal age gap was not as influential as a late marriage age. In terms of the effects on the probability distribution, unlike the effect of raising marriage age to 36-44 years which shifted the probability overwhelmingly towards the childless alternative, an increase in spousal age gap to 20+ years helped raise the probabilities of being childless and having one child almost equally (by 10% and 12%, respectively). In other words, with respect to the continuation of the family line, a very late marriage was a much more serious threat than a very large spousal age gap.

Table 4. The Effects of Various Factors on the Lifetime Fertility Performances of the Mainland Chinese Wives of Taiwanese Husbands: Based on the Application of a Multinomial Logit Model to the Micro Data of the 2003 Census of Foreign Spouses.

Explanatory Factor	Probabilities of Having Different Numbers of Births					Lifetime Fertility Rate
	0	1	2	3	4	
Reference Level	0.04	0.20	0.63	0.11	0.01	1.85
1. Age at Marriage (ref.= 19-24)						
15-18 years	0.05	0.10	-0.13	-0.02	0.00	-0.23
25-29 years	0.02	0.04	-0.02	-0.04	0.00	-0.12
30-35 years	0.11	0.10	-0.14	-0.06	0.00	-0.37
36-44 years	0.45	0.07	-0.41	-0.10	-0.01	-1.09
2. Spousal Age Gap (ref.= less than 10 yrs)						
10-14 years	0.00	0.01	0.02	-0.02	0.00	-0.04
15-19 years	0.02	0.05	-0.02	-0.05	-0.01	-0.15
20 or over years	0.10	0.12	-0.16	-0.05	0.00	-0.37
3. Marital Status (ref.= Married)						
Separated	0.39	0.06	-0.38	-0.07	-0.01	-0.92
Divorced	0.13	0.04	-0.14	-0.03	0.00	-0.33
Widowed	-0.01	0.10	-0.08	-0.01	0.00	-0.11
4. Wife's Remarriage Status (ref.= other)						
2nd Marriage	0.13	0.09	-0.18	-0.03	0.00	-0.39
5. Living Arrangement (ref.= other)						
With Parent	-0.02	-0.03	0.05	0.01	0.00	0.07
6. Wife's Education (ref.= less than High Sch.)						
High School	0.00	0.03	-0.02	0.00	-0.01	-0.04
College or University or higher	0.01	0.07	-0.05	-0.03	0.00	-0.13
7. Husband's Education (ref.= less than High Sch.)						
High School	0.00	0.02	0.00	-0.02	0.00	-0.05
College or University or higher	0.01	0.05	-0.03	-0.03	0.00	-0.11
8. Husband's Veteran Status (ref.= other)						
Veteran	0.02	0.03	-0.04	-0.01	0.00	-0.08
9. Wife's Employment Status (ref.= other)						
Fixed Job	0.01	0.04	-0.07	0.02	0.00	-0.03
10. Husband's Employment Status (ref.= other)						
Fixed Job	-0.01	-0.02	0.05	-0.02	0.00	0.02
11. Husband's Health Status (ref.= Able)						
Disable	0.01	0.00	-0.01	0.00	0.00	-0.02
12. Residence (ref.= other)						
Metropolitan Areas	0.02	0.04	-0.05	-0.01	0.00	-0.08

With respect to the effects of marital status, the negative effect on the *LTFR* of the Chinese was very strong (by 0.92 child) for being separated, moderate (by 0.33 child) for being divorced, and modest (by 0.11 child) for being widowed. The very strong

negative effect of being separated resulted from a massive shift of probability (by almost 40 percentage points) from the two-child alternative to the childless alternative, whereas the very modest effect of being widowed resulted mainly from a modest shift of probability from the two-child alternative to the one-child alternative. Being divorced was similar to being separated in the sense that the change in probability distribution was mainly a shift from the two-child alternative to the childless alternative, although the effect of being divorced was substantially weaker than the effect of being separated.

With respect of the effects of remarriage status on the reproductive outcomes of the Chinese wives, the current marriage being the wife's second marriage had a moderately strong negative effect on *LTFR*, reducing it by 0.39 child. This reduction mainly resulted from a decrease in the probability of having two children by 18 percentage points and an increase in the probability of being childless by 13 percentage points.

The effects of the changes in the remaining explanatory factors on the *LTFR* of the Chinese wives were all rather modest. Living with parent helped raise *LTFR* by 0.07 child, which was mainly achieved by modest shifts of probability from the childless and one-child alternatives to the two-child alternative. In line with much of the literature, wife's educational attainment contributed to lowering *LTFR*: the achievement of high school education reduced *LTFR* by 0.04 child, which mainly resulted from shifting probability from the two-child alternative to the one-child alternative; the achievement of college or higher education further reduced *LTFR* by 0.09 child, which resulted mainly from modest shifts of probability from the three-child and two-child alternatives to the one-child alternative. It is worth noting that compared with the negative effects of women's educational attainment on Taiwan's *TFR* (Hermalin, 1974; Chang, Freedman, and Sun, 1987) from the 1960s to the mid-1980s, these effects were very modest. Husband's educational attainment also turned out to have modest negative effects on the *LTFR* of the Chinese wives: the achievement of high school education resulted in a reduction of *LTFR* by 0.05 child, which resulted from a modest shift of probability from the three-child alternative to the one-child alternative; the achievement of college or higher education resulted in a further reduction of *LTFR* by 0.06 child, which resulted mainly from shifting probability modestly from the three-child and two-child alternatives to the one-child alternative. An interesting finding is that both wife's and

husband's educational attainments had practically no effect on the probability of being childless. Having a veteran husband reduced the *LTFR* of the Chinese wives by 0.08 child, which resulted mainly from a modest shift of probability from the two-child alternative to the one-child and childless alternatives.

It is interesting that the effect of wife's employment status on the *LTFR* of the Chinese wives was opposite to the effect of husband's employment status. Having a fixed job for wife reduced *LTFR* by 0.03 child, which resulted mainly by a shift of probability from the two-child alternative to the one-child alternative. This finding probably reflected the difficulty in taking care of household chores while holding a regular job. Having a fixed job for husband had a very modest effect of raising *LTFR* by 0.02 child, which resulted mainly from the fact that a positive effect of shifting probability from the one-child alternative to the two-child alternative was canceled by the negative effect of shifting probability from the three-child alternative to the two-child alternative. Essentially, the effect was a concentration of probability into the ideal family size of two children.

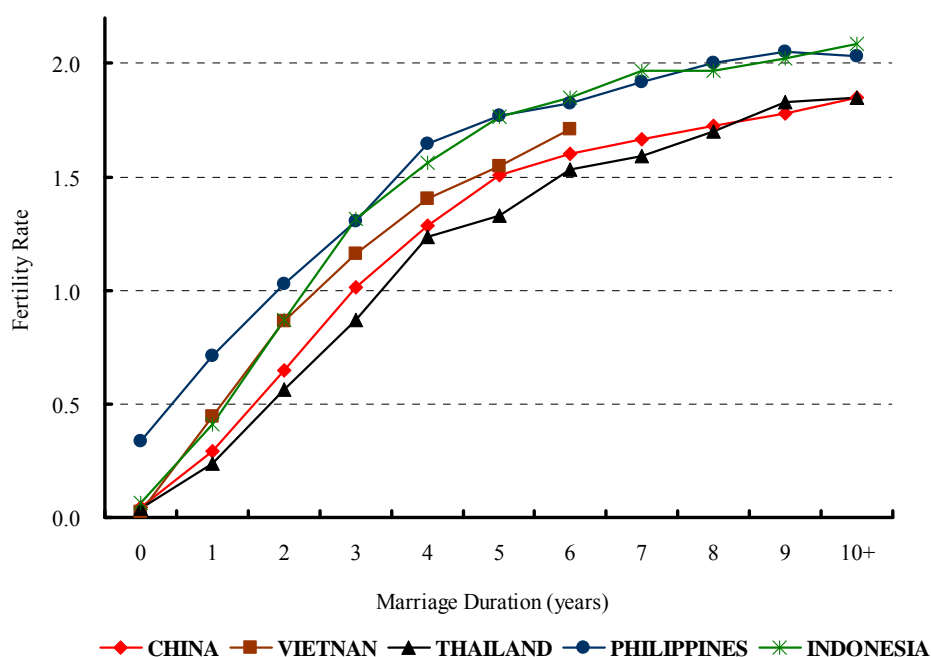
Marrying a disabled husband had very trivial effects on both the probability distribution and the *LTFR* of the Chinese wives, resulting in a very slight decrease in *LTFR* by only 0.02 child, which resulted from a very slight shift of probability from the two-child alternative to the childless alternative. Finally, residing in metropolitan area resulted in a modest decrease in *LTFR* by 0.08 child, which resulted mainly from a modest shift of probability from the two-child alternative to the one-child alternative.

5.2. Similarities and Differences among the Five Source Countries

As shown in Table 1, the Vietnamese wives were distinguished from the other four nationality groups by having the shortest average marriage duration of only 2.64 years. In other words, most of them were very recent entrants into the marriage market of Taiwan. Mainly as a consequence of this recency, the estimated coefficients of the dummy variables representing marriage durations beyond six years turned out to be relatively unreliable and to fluctuate irregularly around a high plateau. Thus, to obtain reliable and a substantively meaningful estimation result for Vietnamese wives, we replace the open-ended dummy variable "10+ years" by "6+ years". With this modification of the Vietnamese model, we find that the Vietnamese wives shared the following common property with those of the other four nationality groups: the

predicted fertility rate tended to be a monotonically increasing function of marriage duration. This is shown in Figure 3 for the reference group in the model of each of the five nationalities. This common property substantiates in a multivariate context that the effect of marriage duration was much more important than the effect of marriage cohort, despite the fact that technically the cross-sectional data of the census could not be used to separate these two effects.

Figure 3. Predicted fertility rates of the reference groups of Taiwan's foreign wives from the top five source countries: by marriage duration



A few features shown in Figure 3 are worth noting. First, the fertility curve started at a higher level for the Filipina wives than for those of the other nationalities. This feature suggests that the Filipina wives were more prone to entering Taiwan as foreign workers and to having sexual relationships with their Taiwanese husband before the marriage was formally arranged. Second, for marriage duration of three or more years, the predicted fertility rates showed a clear three-way contrast: (1) a relatively high level for the wives from Indonesia and the Philippines, (2) an intermediate level for the wives from Vietnam, and (3) a relatively low level for the wives from Thailand and China. This contrast corresponded to a large extent to the relative fertility levels in the source countries. We found in the 2003 World Population Data Sheet of the PRB that among these five source countries, the *TFRs* were the highest in the Philippines (3.5) and

Indonesia (2.6), and the lowest in Thailand (1.7) and China (1.7), while being intermediate in Vietnam (2.3).⁶ This finding suggests that somehow the fertility levels of Taiwan's foreign wives were partially affected by the prevailing fertility levels of the source countries. Third, for the foreign wives from China, the observed *LTFR* (1.40) shown in Figure 1 turned out to be substantially lower than the corresponding predicted *LTFR* of the reference group (1.85) in Figure 3. To gain further insight into this finding, it is useful to see how the reproductive outcomes of the wives of different source countries were subject to the effects of the other explanatory factors (Table 5).

Table 5. The Effects of Various Factors on the Lifetime Fertility Rates of the Foreign Wives of Taiwanese Husbands: Based on the Application of a Multinomial Logit Model to the Micro Data of the 2003 Census of Foreign Spouses.

Explanatory Factor	Source Countries				
	China	Vietnam	Indonesia	Thailand	Philippines
Reference Group	1.85	1.71	2.09	1.85	2.03
1. Age at Marriage (ref.= 19-24)					
15-18 years	-0.23	-0.06	----	0.26	----
25-29 years	-0.12	-0.10	-0.09	-0.16	-0.10
30-35 years	-0.37	-0.26	-0.36	-0.35	-0.32
36-44 years	-1.09	-0.85	-1.25	-1.06	-0.89
2. Spousal Age Gap (ref.= less than 10 yrs)					
10-14 years	-0.04	----	----	----	-0.01
15-19 years	-0.15	-0.03	----	-0.11	----
20 or more years	-0.37	-0.19	-0.15	-0.26	-0.37
3. Marital Status (ref.= Married)					
Separated	-0.92	-0.54	-0.33	-0.26	-0.09
Divorced	-0.33	-0.08	-0.08	----	----
Widowed	-0.11	----	----	----	----
4. Wife's Remarriage Status (ref.= other)					
2nd Marriage	-0.39	-0.22	-0.20	-0.50	-0.11
5. Living Arrangement (ref.= other)					
With Parent	0.07	0.08	0.06	0.21	0.09
6. Wife's Education (ref.= less than High Sch.)					
High School	-0.04	----	----	----	----
College or University or higher	-0.13	----	----	----	0.03
7. Husband's Education (ref.= less than High Sch.)					
High School	-0.05	-0.03	-0.11	----	----
College or University or higher	-0.11	-0.01	-0.20	----	----
8. Husband's Veteran Status (ref.= other)					
Veteran	-0.08	-0.02	-0.12	-0.41	----
9. Wife's Employment Status (ref.= other)					
Fixed Job	-0.03	-0.21	-0.09	-0.15	-0.20
10. Husband's Employment Status (ref.= other)					
Fixed Job	0.02	0.06	-0.01	0.06	-0.03
11. Husband's Health Status (ref.= Able)					
Disable	-0.02	-0.06	-0.05	----	-0.03
12. Residence (ref.= other)					
Metropolitan Area	-0.08	-0.07	-0.04	-0.12	-0.12
Maximum Achievable LTFR	1.93	1.85	2.14	2.09	2.14

⁶ This three-way contrast in *TFR* persisted in the 2005 and 2008 World Population Data Sheets (WPDS): relatively high for the Philippines (3.5 in 2005 and 3.3 in 2008) and Indonesia (2.6 in both 2005 and 2008), intermediate for Vietnam (2.2 in 2005 and 2.1 in 2008), and relatively low in Thailand (1.7 in 2005 and 1.6 in 2008) and China (1.6 in both 2005 and 2008). Although the values in the WPDS were for the most recent year, which may not be the current year in some cases, this contrast has undoubtedly prevailed in the recent decade.

With respect to the effects of marriage age on reproductive outcomes, the foreign wives of all five source countries shared the same pattern of progressively decreasing *LFR* as marriage age became increasingly older than 19-24 years. Among the foreign wives whose marriage ages were 36-44 years, those from China, Indonesia, and Thailand experienced greater deficits of 1.09, 1.25, and 1.06 children, respectively, whereas those from Vietnam and Philippines experienced lesser deficits of 0.85 and 0.89 child, respectively. The effects of marrying at the very young ages of 15-18 were inconsistent among the five nationalities: relative to those with marriage ages of 19-24, there were a deficit of 0.23 child for the Chinese, a deficit of 0.06 child for the Vietnamese, a surplus of 0.26 child for the Thais, and a zero effect for the Indonesians and the Filipinas. The deficits for the Chinese and Vietnamese wives required further investigation, because they were against the simple idea that longer exposure to the risk of pregnancy tends to result in higher *LFR*.

The negative effects of spousal age gap up to 15-19 years on *LFR* turned out to be either modest or nonexistent for the wives from each of the five source countries, with the largest effect being only 0.15 child on the Chinese. The negative effects of having the longest age gap of 20+ years were moderate for the Chinese (by 0.37 child), the Filipinas (by 0.37 child) and the Thais (by 0.26 child) but were modest for the Vietnamese (by 0.19 child) and the Indonesians (by 0.15 child).

With respect to the effects of marital status on *LFR*, widowhood had only a modest negative effect on the Chinese (by 0.11 child) and no effect on all Southeast Asian nationalities. The negative effect of being divorced was moderate for the Chinese (by 0.33 child), modest for the Vietnamese and the Indonesians (both by 0.08 child) and nonexistent for the Thais and Filipinas. For the wives from each of the five source countries, the negative effect of being separated was greater than those of being divorced and widowed. It was very strong for the Chinese (by 0.92 child), rather strong for the Vietnamese (by 0.54 child), moderate for the Indonesians (by 0.33 child) and the Thais (by 0.26 child), and modest for the Filipinas (by 0.09 child).

The negative effect of the current marriage being the second marriage on *LFR* was rather strong for the Chinese (by 0.39 child) and the Thais (by 0.50 child), moderate for the Vietnamese (by 0.22 child) and the Indonesians (by 0.20 child), and modest for the Filipinas (by 0.11 child).

Living with parent had the expected positive effect on *LTFR* for the wives from each of the five source countries. It was moderate for the Thais (by 0.21 child) and modest for the Chinese (by 0.07 child), the Vietnamese (by 0.08 child), the Indonesians (by 0.06 child), and the Filipinas (by 0.09 child).

The effects of wife's educational attainment on *LTFR* were either modest or mostly nonexistent. It had no effect on the Vietnamese, the Indonesians, and the Thais. The expected negative effects could only be detected for the Chinese (by 0.04 child for achieving high school graduation, and by an additional 0.09 child for achieving a college degree). In the case of the Filipinas, the achievement of a college degree was somehow associated with an *increase* by 0.03 child.

The effects of husband's educational attainment on *LTFR* were mostly either rather modest or nonexistent. They were nonexistent for the Thais and the Filipinas. Its only moderate effect was a reduction by 0.20 child for the Indonesians whose husbands had achieved college or higher education, relative to those with less than high school education. This moderate reduction in *LTFR* resulted mainly from a shift of a sizable probability (10%) from the three-child alternative primarily to the two-child and secondarily to one-child alternatives. It had no effect on the probability of being childless (Appendix Table 6).

Except for the Thais, the negative effects of being the wife of a veteran on *LTFR* were mostly modest or nonexistent. They were modest for the Chinese (by 0.08 child), the Vietnamese (by 0.02 child), and the Indonesians (by 0.12 child) and nonexistent for the Filipinas. For the Thais, the effect was a rather large reduction by 0.41 child, which resulted mainly from decreases in the probabilities of having two children (by 17%) and three children (by 7%) and increases in the probabilities of having one child (by 13%) and no child (by 11%) (Appendix Table 9).

With respect to wife's employment status, having a fixed job had a negative effect on the *LTFR* of the wives from each of the five source countries. The effect was moderate for the Vietnamese (by 0.21 child) and the Filipinas (by 0.20 child) and modest for the Thais (by 0.15 child), the Indonesians (by 0.09 child), and the Chinese (by 0.03 child). In the case of the Vietnamese and Filipinas, the moderate decrease in *LTFR* resulted mainly from a shift of probability from the two-child alternative to the one-child and no-child alternatives (Appendix Tables 3 and 12).

With respect to husband's employment status, having a fixed job had very modest and inconsistent effects on *LTFR*. It had positive effects on the Chinese (by 0.02 child), the Vietnamese (by 0.06 child), and the Thais (also by 0.06 child). It had negative effects on the Indonesians (by 0.01 child) and the Filipinas (by 0.03 child). For the Vietnamese, the increase in *LTFR* resulted mainly from a shift of probability from the one-child alternative to the two-child alternative (Appendix Table 3), whereas for the Thais, the increase in *LTFR* resulted mainly from a shift of probability from the no-child alternative to the two-child alternative (Appendix Table 9). It is worth remembering that underneath the near zero effects on *LTFR* for the Chinese and the Indonesians was some increase in the concentration of probability into the two-child alternative from both sides (Table 4 and Appendix Table 7).

Having a disabled husband had no effect on the *LTFR* of the Thais and only reduced the *LTFR* of the wives from the other four source countries to a modest extent: by 0.06 child for the Vietnamese, 0.05 child for the Indonesians, 0.03 child for the Filipinas, and 0.02 child for the Chinese. In the case of the Vietnamese and Indonesians, the decrease in *LTFR* resulted mainly from a shift of probability from the two-child alternative to the one-child alternative.

Finally, residing in metropolitan areas had negative effects on the *LTFR* of the wives from all five source countries. The effects were all modest, ranging from 0.04 child for the Indonesians to 0.12 child for the Thais and the Filipinas. The decrease for the Thais resulted mainly from shifting probability from the three-child alternative to all three lower alternatives, whereas the decrease for the Filipinas resulted mainly from shifting probability from the two-child alternative to the two lower alternatives.

5.3. Relative Explanatory Powers of the Explanatory Factors

Although the current marriage being the wife's second marriage had a greater negative effect on *LTFR* for the Thai wives (by 0.50 child) than for the Chinese wives (by 0.39 child), the explanatory power of remarriage status for the variation in reproductive outcomes might be greater for the Chinese wives than for the Thai wives, because those with the current marriage being the second marriage represented a higher proportion of the Chinese wives (15.4%) than the Thai wives (10.0%).

To assess the relative explanatory power of an explanatory factor (say, spousal age

gap) in the model of each source country, we delete the dummy variable(s) representing the explanatory factor in question from the model and observe the resulting decrease in ρ^2 . The greater the decrease, the greater the explanatory power of the deleted factor. We call this decrease the *marginal contribution in ρ^2* . When the explanatory powers of two explanatory factors (say, wife's and husband's educational attainments) overlaps to some extent, the *marginal contribution in ρ^2* will understate the explanatory power of the deleted factor, if the values of the coefficients of the dummy variables remaining in the model are allowed to change. To avoid such understatement, we do not allow such changes to occur in computing the *marginal contribution in ρ^2* for each of the deleted factors. Unfortunately, conventional statistical procedures for applying multinomial logit model, such as CATMOD in SAS, do not allow the user to prefix the values of the coefficients of some explanatory variables. We overcome this problem by writing our own estimation module in SAS.

The values of the *marginal contribution in ρ^2* in Table 6 show that marriage duration had by far the greatest explanatory power, whereas marriage age had the second greatest explanatory power. This was true for the wives from each of the five source countries. The fact that the explanatory power of marriage duration was much greater than that of any other explanatory factor had a very important methodological implication: if we forget to include it in the model, we will be exposed to a very high risk of getting highly misleading estimated coefficients for some other explanatory factors. For example, if we forget to include in the Chinese model the dummy variables representing marriage duration, the coefficient of the interaction between the dummy variable representing veteran status and the dummy variable representing the childless alternative will be reversed from 0.39 to -0.34, and the coefficient of the interaction between the dummy variable representing veteran status and the dummy variable representing the one child alternative will also be reversed from 0.23 to -0.07. In other words, if we forget to control for the effect of marriage duration, we will be forced by the estimation result to make the nonsensical inference that the marriage to a veteran had a fertility enhancing effect. An underlying reason for this nonsensical statistical result was that the complexity of the real-world involved the fact that among the Chinese wives, those marrying veterans had higher average marriage duration than did those marrying non-veterans (4.73 versus 3.72 years). Actually, veterans were part of the pioneers who widened the bridal market for Taiwanese men on Mainland China.

Table 6. Explanatory Powers of the Explanatory Factors in the Multinomial Logit Models of the Reproductive Performance Taiwan's Foreign Wives from the Top Five Source Countries.

Explanatory Factor	Country of Origin				
	China	Vietnam	Indonesia	Thailand	Philippines
Marginal Contribution in ρ^2 , based on the Fixed Coefficient Method					
1. Duration of Marriage	0.1766	0.2774	0.1865	0.1698	0.1066
2. Age at Marriage	0.0301	0.0077	0.0364	0.0307	0.0236
3. Spousal Age Gap	0.0079	0.0025	0.0012	0.0060	0.0067
4. Marital Status	0.0086	0.0015	0.0009	0.0007	0.0004
5. Wife's Remarriage Status	0.0077	0.0002	0.0012	0.0045	0.0008
6. Living Arrangement	0.0060	0.0038	0.0021	0.0102	0.0037
7. Wife's Education	0.0011	----	----	----	0.0006
8. Husband's Education	0.0007	0.0004	0.0021	----	----
9. Husband's Veteran Status	0.0003	0.0000	0.0003	0.0023	----
10. Wife's Employment Status	0.0007	0.0059	0.0028	0.0069	0.0094
11. Husband's Employment Status	0.0011	0.0006	0.0010	0.0023	0.0004
12. Husband's Health Status	0.0002	0.0004	0.0003	----	0.0004
13. Place of Residence	0.0013	0.0008	0.0005	0.0016	0.0032
Rho-square	0.3077	0.2738	0.2084	0.2658	0.1522

Note: For place of residence, the category of "City" includes not only the 7 large cities but also Taipei Prefecture.

In terms of explanatory power, the rankings of the remaining explanatory factors differed among the five nationality groups. Using the value of 0.0020 as the cutoff value of the *marginal contribution in ρ^2* for explanatory factors to be considered as relatively important, the ranked order of the remaining explanatory factors that were relatively important are as follows:

--for Chinese wives: marital status (0.0086), spousal age gap (0.0079), remarriage status (0.0077), and living arrangement (0.0060);

--for Vietnamese wives: wife's employment status (0.0059), living arrangement (0.0038), and spousal age gap (0.0025);

--for Indonesian wives: wife's employment status (0.0028), living arrangement (0.0021), and husband's educational attainment (0.0021);

--for Thai wives: living arrangement (0.0102), wife's employment status (0.0069), spousal age gap (0.0060), remarriage status (0.0045), veteran status (0.0023), and husband's employment status (0.0023);

--for Filipina wives: wife's employment status (0.0094), spousal age gap (0.0067), living arrangement (0.0037), and place of residence (0.0032).

To the extent that these explanatory factors are subject to policy interventions, and

to the extent that raising the lifetime fertility of foreign wives towards the replacement level is desirable, the above findings suggest the effects of the intervention are likely to differ systematically among the five source countries. For example, a policy designed to reduce the rates of separation and divorce would have a greater effect in raising the fertility level of the Chinese wives than on the wives from Southeast Asian countries. In contrast, a policy designed to reduce the burden on working wives would have a greater fertility enhancing effects on Southeast Asian wives than on Chinese wives.

From the information in Tables 5 and 6, we learn the main reasons for the observed *LTFR* of Chinese wives (1.40 child) to be much lower than those of the wives of other nationalities: their marriage ages were relatively high; they were more prone to being separated or divorced; their spousal age gaps were relatively high; their current marriages were more likely to be their second marriage; and they were less likely to live with the husband's parents (see Table 1).

How much can the *LTFR* of each nationality be raised by policy intervention? To help answer this question, we define the maximum achievable *LTFR* for each nationality as the predicted *LTFR* of a group of wives with the most favorable values of all the explanatory factors. It turned out that the maximum achievable *LTFR* is 1.93 children for Chinese wives, 1.85 children for Vietnamese wives, 2.14 children for Indonesian wives, 2.09 children for Thai wives, and 2.14 children for Filipina wives. Since these values cluster around the replacement level, it seems that the most that can be hoped for is that the foreign wives reproduce just enough daughters to match their own number. Since it is unlikely that policy measures can manage to induce such changes as making all marriage ages to be younger than 25 years, all spousal age gap to be less than 10 years, all marriages to be the first marriage and to remain intact until the end of fecundity, and all wives to co-reside with parents, the probability for achieving these maximal values is practically zero. Therefore, our overall assessment is that the reproductive contribution of the foreign wives will remain at the sub-replacement level, irrespective of policy interventions.

6. Comparison with Other Studies

The reproductive contributions of the foreign wives of Taiwanese husbands have also been analyzed by Chen (2008) and Kojima (undated), based on the same data base as the one used in this paper. The scopes of their studies are wider than ours. Here we

try to relate our study to theirs in terms of the assessment of the effects of explanatory factors on the numbers of children born to the foreign wives with their Taiwanese husbands.

The samples selected by Chen and Kojima were different from ours. Chen imposed the restrictions that the current age of the foreign wives be greater than 20 years, that the marriage duration be at least three years, and that the sources of the foreign wives be Mainland China or Southeast Asia. Her sample size was 88,518 persons, which was much smaller than ours (147,707). The main reason for the large difference in sample size was her removal of those whose marriage duration was less than three years. In light of our finding that the fertility rates increased very sharply from zero year to two years of marriage, this removal resulted in a loss of a lot of useful information. Kojima imposed the restriction that the current age of the foreign wives be less than 35 years. His sample size was 125,649. Keeping in mind that both marriage duration and marriage age turned out to have strong systematic effects on the fertility of the foreign wives in a sensible way, and that current age is a spurious variable that was mathematically equal to marriage age (a negative factor) plus marriage duration (a positive factor), we believe that current age should not be used as a criterion for sample selection.

With respect to the choice of multivariate model, Chen used a Poisson regression model, whereas Kojima used both a linear regression model and a multinomial logit model. Linear regression model and Poisson regression model are less versatile than multinomial logit model in the sense that the former two models are, by design, incapable of revealing such non-simplistic but substantively important effects as that for the Chinese wives, their attainment of college education shifted the probabilities from the two- and three-child alternatives to the one-child alternative *but had practically no effect on the probability of being childless*, and that for the Indonesian wives, their husbands' attainment of college education shifted a large amount of probability from the three-child alternative primarily to two-child alternative and secondarily to one-child alternative *but had no effect on the probability of being childless*.

In his application of multinomial model, Kojima stopped at reporting the estimated coefficients of the explanatory variables. In contrast, we have proceeded

further by computing the estimated marginal effects on the probabilities of having different numbers of children and on the lifetime fertility rate. Consequently, we are able to provide such specific information as that with respect to the effects of marital status on the *LTFR* of the Chinese wives, being separated resulted in a very large loss of 0.92 child, whereas being widowed led to a modest loss of 0.11 child (Table 4). Whereas Kojima and Chen remained silent about the assessment of the relative importance of different explanatory factors, we have written our own SAS programs to generate the *marginal contribution in ρ^2* for such an assessment. Consequently, we are able to provide such specific information as that for the Chinese wives, the *marginal contribution in ρ^2* was 0.0086 for marital status and 0.0011 for wife's education, implying that the former was much more important than the latter.

With respect to the wife's age as an explanatory factor, both Chen and Kojima used the current age instead of the marriage age. With the reference category being the 45+ age group, Chen found that the estimated coefficients were 1.088 for the 20-29 age group, 0.993 for the 30-34 age group, 0.880 for the 35-39 age group, and 0.665 for the 40-44 age group. Chen described this spurious finding as "significantly different from other fertility studies" (Chen, 2008, p. 346) and then provided an implausible interpretation. Since her model also included marriage duration as an explanatory factor, this finding was to some extent a perverse reflection of the fact that those with a younger marriage age tended to have a higher *LTFR*. Since Kojima failed to include marriage duration (by far the most important explanatory factor) in both of his models, it is not surprising that his estimated coefficients for the dummy variables representing current age happened to show various non-interpretable patterns.

The omission of marriage age from the multivariate model ran the risk of generating a misleading estimated coefficient for the dummy variable representing the remarriage status, because remarried wives tended to have a much higher marriage age, and because the wives with a much higher marriage tended to have a much lower fecundity. In Chen's model, the estimated coefficient of this dummy variable assumed an unrealistically large negative coefficient of 1.078, implying that the remarried status could cause the fertility to decrease by 66%. Somehow Kojima did not consider remarriage status as an explanatory factor in his models.

In his two models, Kojima included a dummy variable which assumes the value of

1 if the wife's place of residence four year ago was not in Taiwan. We recognize that this variable was actually a dichotomized proxy for marriage duration. Since we have demonstrated that marriage duration was by far the most powerful explanatory factor, it is not surprising that among all explanatory variables in the two models, this variable turned out to have the coefficients with the greatest magnitudes in both of his models.

Another methodological issue worth discussing is Chen's attempt at testing the hypothesis that as a consequence of the lingering tradition of son preference in the Taiwanese society, the foreign wives whose first child was a girl would tend to give birth to more children. To test this hypothesis, she used a dummy variable, "first female child", which assumes the value of 1 if the first child was a girl and the value of 0 otherwise. The estimated coefficient of this variable turned out to be as large as 0.343, which implied that "Migrant women whose first child is a girl have births that are 41% higher, on average, than those women having a male first child"(Chen, 2008, p. 348). This very strong effect was actually an artifact of her failure to exclude from her input data file all the childless wives. Since there were many childless wives in her sample, the estimated coefficient of this dummy variable is bound to be a highly significant positive value, even if the hypothesis is not true. Therefore, a proper test of this hypothesis is yet to be done.

What Chen and Kojima have clearly demonstrated was that the lingering son preference was reflected by unnaturally high sex ratio of the children of the foreign wives, implying the existence of gender-selective abortions against female fetuses. We found that the overall sex ratio of the children born to the foreign wives was 119, which was higher than the sex ratio of all infants born in Taiwan in 2002 and 2003 (110).⁷ It can be inferred from the information by the order of birth provided by Kojima (undated) and Lin (2009) that the difference between the foreign and native wives in using gender-selective abortions against female fetuses was particularly large for the first-order births.

With respect to the potential effects of the wife's source country, Chen used a dummy variable to distinguish Chinese wives from Southeast Asian wives, whereas

⁷ The sex ratio of the births of by Taiwan's foreign wives (119) was similar to that of Mainland China: 116.9 in 2000 and 120.5 in 2005 (Yuan and Tu, 2004; Bhattacharjya et al, 2008). It is interesting to note that the sex ratios of the children born to Taiwan's foreign wives did not differ significantly among the five major source countries.

Kojima used a set of dummy variables to contrast other countries to China. Since both of them do not let any of these country-specific dummy variables to interact with any other factors, they implicitly assumed that the effects of any other factor such as the wife's education attainment were invariant among the source countries, whereas our use of country-specific models was not accompanied by such a restrictive assumption. Chen's model showed that relative to being from Southeast Asia, being from China was associated with a fertility shortage by 14.8%. With more refined specification of the source countries, Kojima's regression model showed that being from China was associated with the lowest fertility level, whereas among those from the Southeast Asian countries, those from Indonesia and the Philippines had the highest fertility level. These findings were similar to ours. Our country-specific models allowed us to infer that the main reasons for the observed *LFR* to be much lower for those from China than for those from the Southeast Asian countries were that those from China were (1) most concentrated in the oldest (36-44) marriage age category and in the longest spousal age gap category (20+ years), (2) most likely to have the current marriage being the second marriage, (3) most likely to be separated or divorced, and (4) most likely to marry a veteran.

A common finding of Chen and Kojima was that the estimated coefficients of the dummy variables for both wife's and husband's educational attainments were rather small in magnitude. This finding is consistent with our finding that the explanatory powers of these two explanatory factors were rather small. Another common finding was that urban residence had a negative effect on fertility, but the urban/rural difference was not large.

Two explanatory factors that were included in Kojima's models but were omitted in Chen's and our models were wife's and husband's occupations. We omitted these explanatory factors, because they were defined only for those with fixed jobs, who represented only a small minority of the foreign wives. Kojima used two dummy variables to represent (1) agriculture/forestry/fishery and (2) blue collar jobs, respectively. For both wives and husbands, engagement in the former occupation had a somewhat stronger fertility enhancing effect than engagement in the latter occupation. However, the effects were quite modest: the former was about 0.1 child, whereas the latter was about 0.05 child.

In sum, there were some major methodological differences between our work and those of Chen and Kojima. We hope that the readers would consider these differences in judging and interpreting the different and similar empirical findings.

7. Concluding Discussion

As late as 1970, around the time when western European countries started to enter into the Second Demographic Transition towards the entrenchment of sub-replacement fertility levels, the TFR of Taiwan was still at a high level of 4.0, which was even higher than the TFRs of Australia, Canada and United States at the peaks of their post-World War II baby-booms (Romaniuc, 1984; McDonald, 2000c). Rapid economic growth and successful promotion of a popular family planning program through the 1970s helped the rapid transition of Taiwan's TFR to the replacement level in 1983 (Chang, et al, 1987; Sun, 2001). Several developments since the 1980s helped set the context of an entrenched sub-replacement fertility level that is important for understanding the reproductive performances of both native-born and foreign wives in Taiwan.

One of these developments was a rapid progress of gender-equality in individual-oriented institutions (especially the education system), accompanied by a slow progress of gender-equality in family-oriented institutions (McDonald, 2000a, 2000b, and 2007; Yang and Tsai, 2007). This development has not only helped raise the opportunity cost of having children but also made the life of married women stressful and exhausting. Consequently, more women were motivated to postpone, or even to abstain from, marriage and childbearing.

Another development was the progressive entrenchment of neo-liberalism. Motivated by profit maximization and threatened by market competition, businesses in Taiwan have reduced the job security and real wages of their workers, especially the new entrants and those without sophisticated skills. Young adults became increasingly pessimistic about their ability to have a steady income sufficient to sustain the expenses of a household. The entrenchment of neo-liberalism has also made it impossible for the allocation of sizable public funds to child benefits and to childcare and maternity or paternity leave programs.

There were other relevant developments such as the decrease in the willingness of young wives to co-reside with their husbands' parents and the increase in the risk of

divorce (Yang and Tsai, 2007). It used to be common in Taiwan for the elderly to co-reside with their married sons and to provide the essential service of caring for their children. As such intergenerational co-residence became less common, the arrangement of, and the payment for, childcare became a more serious challenge for double-income couples, especially those with low income and unstable employment. With respect to the risk of divorce, the annual divorce rate for married women in Taiwan has increased from 0.39% in 1980 to 1.32% in 2003 and then declined somewhat to 1.13% in 2008.⁸ The proportion of women aged 15+ who were divorced increased from 1.0% in 1980 to 5.4% in 2003 and 6.9% in 2008.⁹ Married women fearing divorce are more likely to focus on the development of their own income generating capacities and to postpone or avoid child birth, whereas divorced women tend to avoid being pregnant.

Although repeated surveys have shown that the average number of children desired by the married women in Taiwan continued to be greater than two, the above-mentioned developments have combined to create a context in which the TFR of Taiwan has been pulled down to an extremely low level of about 1.1 or 1.2 in recent years. Being abruptly inserted as individuals into the households in Taiwan, the foreign wives were undoubtedly subject to the constraints of this context. The effects of these constraints were particularly strong on the wives from the two countries with the highest fertility (Indonesia and the Philippines) so that their *LTFRs* became substantially lower than the TFRs of their home countries. Although in Taiwan the foreign wives from these two countries remained to be more fertile than the foreign wives from the other three major source countries, the difference in their *LTFRs* in Taiwan, especially after controlling for the effects of other factors, became much smaller than the difference in the TFRs of their countries of origin (Figures 1 and 3). The pervasiveness of the constraints of this context was also reflected by our findings that the negative effects of wife's educational attainment were mostly non-existent or rather modest in the case of the wives from China, and that the positive effects of co-residence with husband's parents on *LTFR* were either modest or at best moderate

⁸ These divorce rates were computed by the authors from the data of MOI at www.ris.gov.tw/gateway in two tables: “歷年結婚、離婚對數、粗結婚率及粗離婚率” (created on May 19, 2009) and “歷年十五歲以上人口數按性別及婚姻狀況分” (created on February 19, 2009). We restricted the denominator to include only married women.

⁹ The values of the proportion being divorced were also computed by the authors from the data in the second table mentioned in the previous footnote.

(Table 5).

A better understanding of the reproductive contributions of the foreign wives depends on the awareness that for a large majority of them, the escape from individual and/or familial economic hardship was a major motivation for their current marriage, and that many of them had maintained and wanted to maintain a long-term connection with the kin and friends left behind. Many of the marriages were rather similar to a business contract without a long-term commitment to remain in Taiwan. This could be especially true for those whose current marriage was their second marriage, because they were more likely to have one or more dependent children left in their home country. They tended to make regular remittances to their kin and often urged or pressured their Taiwanese husbands to build a house in their hometown. Reproduction for the Taiwanese husband's family tended to be avoided or restricted. Thus, we were not surprised to find that for the wives from China and Thailand whose marriages were more likely to be a second marriage (Table 1), the negative effect of second marriage on *LTFR* was as large as 0.39 and 0.50 child, respectively (Table 5).

From the methodological point of view, we have made the following contributions. First, we have provided concrete measures of the effects of each explanatory factor in terms of (1) the magnitudes of changes in the probabilities associated with difference choice alternatives, and (2) the magnitude of a change in fertility rate. Second, we have introduced a method to properly assess the explanatory powers of different explanatory factors, using the *marginal contribution in ρ^2* . Third, we have demonstrated (1) the importance of including marriage duration and marriage age as essential explanatory factors and (2) the unsoundness of using current age as an explanatory factor.

With respect to some systematic biases in the under-coverage of the 2003 census, we suspect that in addition to the greater under-coverage of the wives from China than their Southeast Asian counterparts, those whose marital status was separated or divorced were less well covered than those who had the married status. Our suspicion was partly based on the finding that as many as 25% of the under-covered cases were due to disappearance, and the finding that only 1.4% of the foreign wives in our sample were shown to be divorced, whereas 5.4% of all women aged 15+ in Taiwan in 2003 had this marital status. It was shown in Liaw, Ochiai, and Ishikawa (2009) that in Japan foreign wives were more prone to being divorced than were native-born wives. This

was likely to be true in Taiwan, too. Due to such biases in the under-coverage of the census, the real fertility level of the foreign wives in Taiwan was likely to be somewhat lower than what was revealed in our analysis.

In conclusion, the overall fertility level of Taiwan's foreign wives who got married before age 45 was probably somewhat higher than that of the corresponding Taiwan-born women and was definitely much lower than the replacement level. Despite their low fertility level, as marriage duration increased, their distribution among the birth alternatives shifted towards a pattern in which the highest probability was for the two-child alternative. This was true for each of the five major source countries. Thus, the foreign wives were similar to native-born wives in having the ideal family size of two as the modal choice. The wives from China had the lowest fertility and were least capable of achieving the two-child family size, mainly because they were more prone to (1) having a rather old marriage age, (2) having a very large spousal age gap, (3) being separated or divorced, (4) having their current marriage being their second marriage, and (5) having a veteran husband.

To the extent that it is desirable to increase the fertility level of the foreign wives, we can make the following policy suggestions from our findings. First, marriage agencies be persuaded to look for potential brides who are less than 30 or 35 years old. Second, efforts be made to provide consultation services so that the risk of marriage break up can be reduced and intergenerational co-residence can be sustained. Since some of the separations and divorces were due to the fakeness of the original marriages, efforts should also be made to reduce fake marriages. Third, marriage agencies be persuaded to focus on never married women. Fourth, there is no need to prefer less educated women, because the negative effect of their educational attainment on their fertility is either non-existent or very modest. Finally, irrespective of any policy measure, the fertility level of Taiwan's foreign wives will remain sub-replacement.¹⁰

¹⁰ Chen (2008, p. 345, Table 3) incorrectly reported that the *TFR* for her sample of the foreign wives of Taiwanese husbands was as high as 3.45. First, she used the age (probably marriage age) of the foreign wives to categorize them into five-year age groups from 15-19 to 45-49. Second, for each age group, she computed an age-specific birth rate by dividing (1) the number of children *ever born* to the women in the age group by (2) the number of these women. Third, she summed up the seven age-specific birth rates, and multiplied 5 to the sum to get the value of *TFR*. Implicit in her computation was the incorrect assumption that the births took place within the time frame of 12 months.

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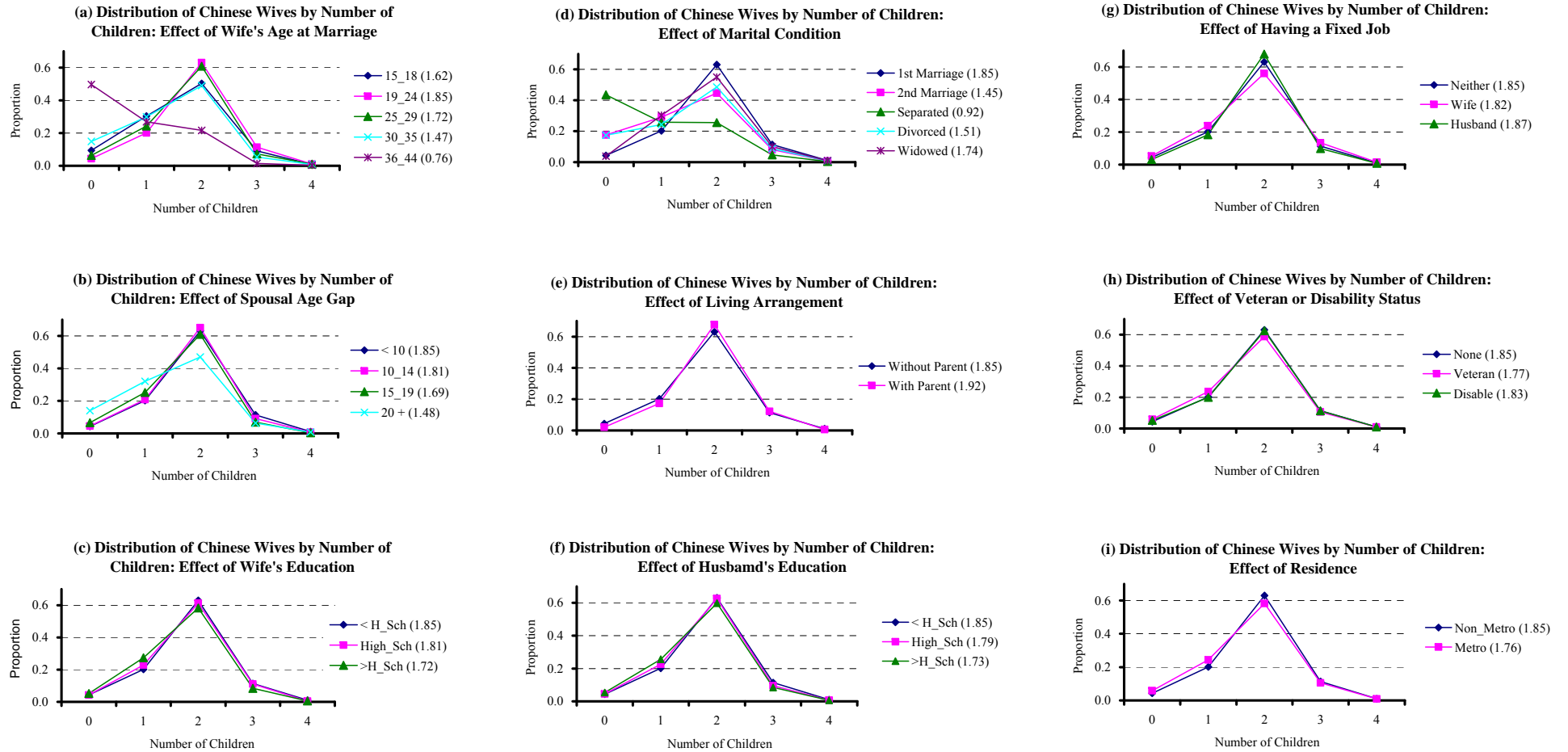
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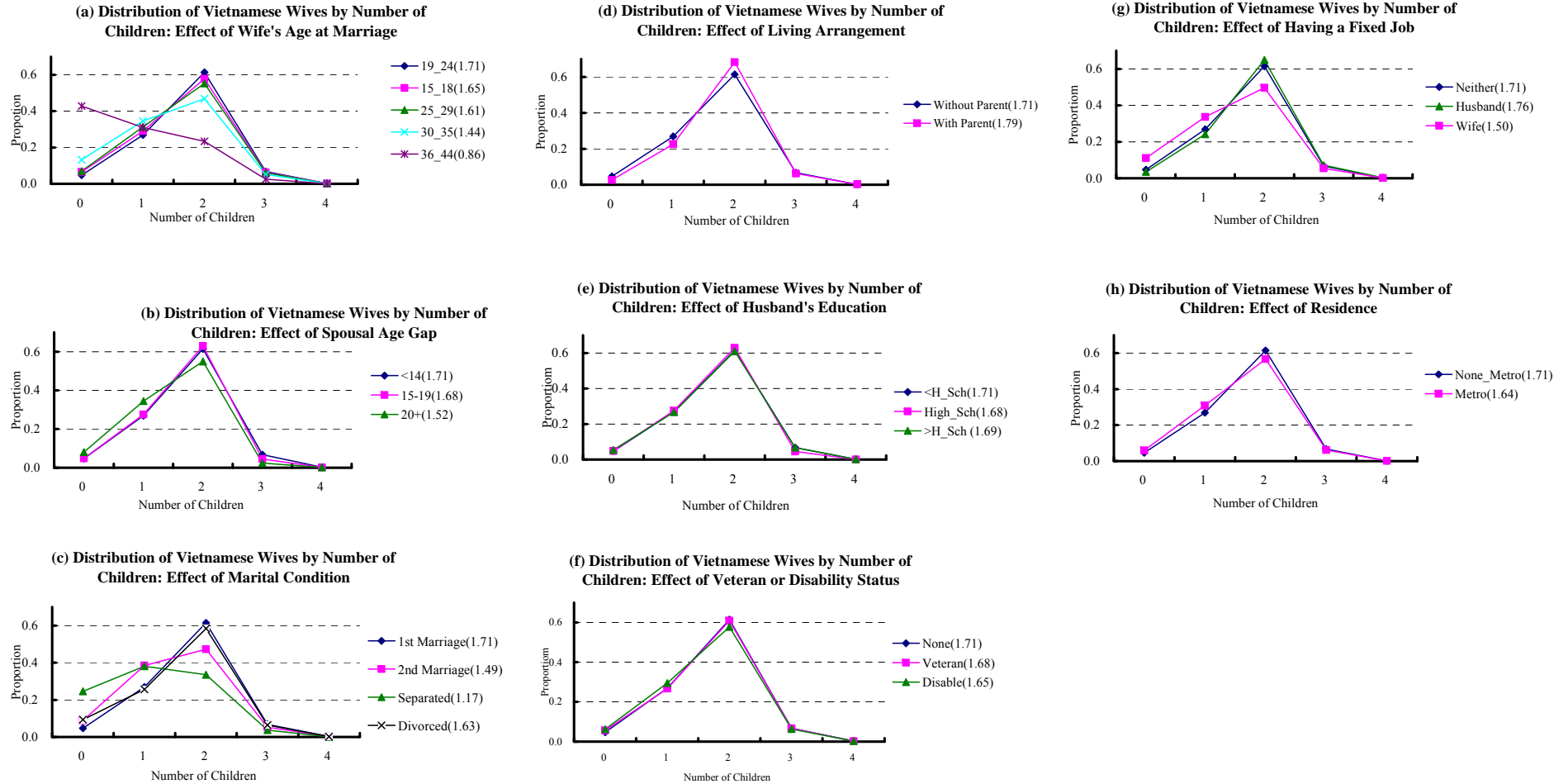
Appendix Figures:

Appendix Figure 1. Graphic Display of the Effects of Explanatory Factors on the Distribution of the Chinese Wives of Taiwanese Husbands over the Lifetime Number of Births, Assessed via a Multinomial Logit Model: the greater the difference between the curves, the greater the effects of the factor in question.



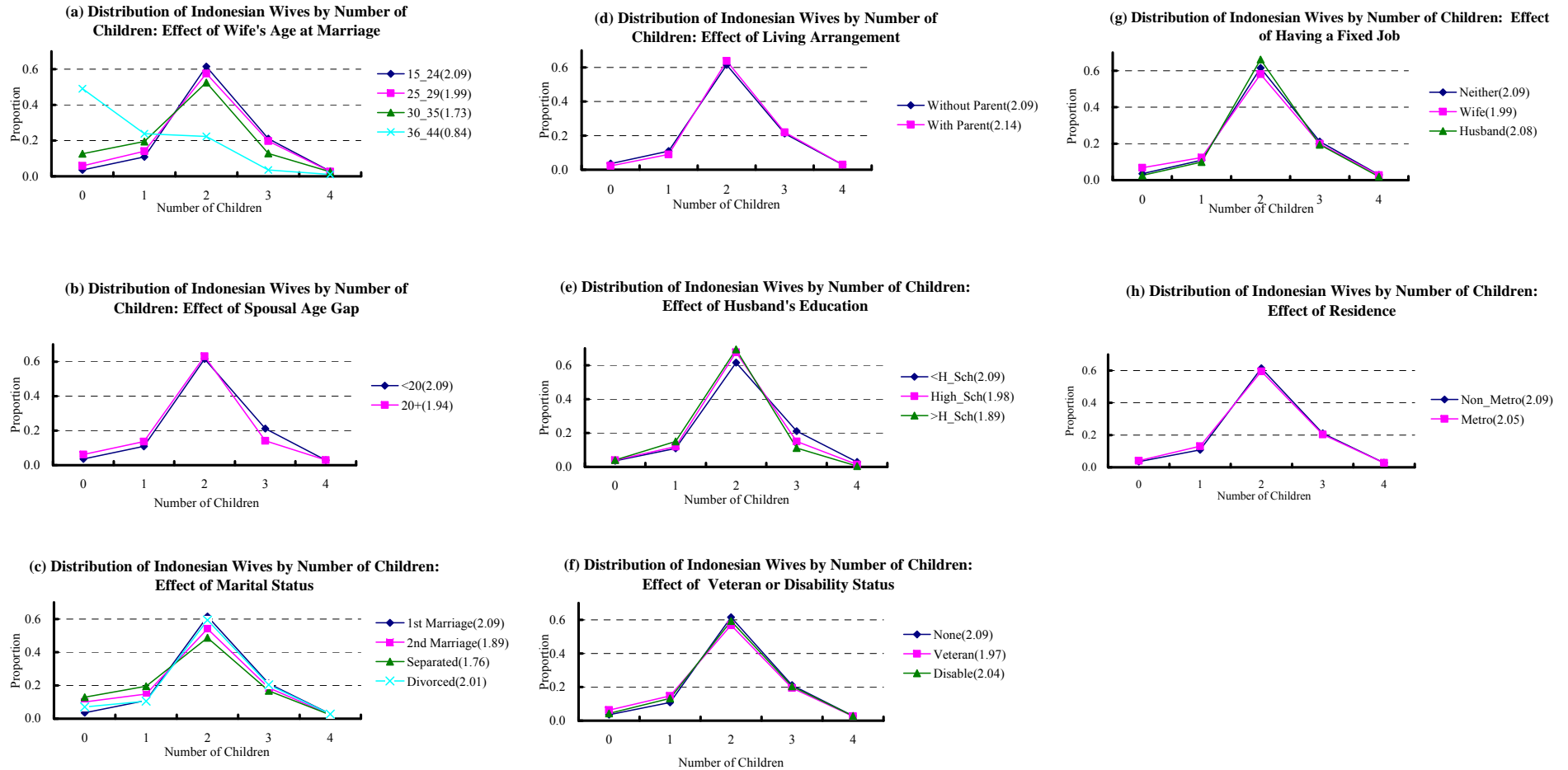
Note: The numbers in the legends are lifetime fertility rates.

Appendix Figure 2. Graphic Display of the Effects of Explanatory Factors on the Distribution of the Vietnamese Wives of Taiwanese Husbands over the Lifetime Number of Births, Assessed via a Multinomial Logit Model: the greater the difference between the curves, the greater the effects of the factor in question.



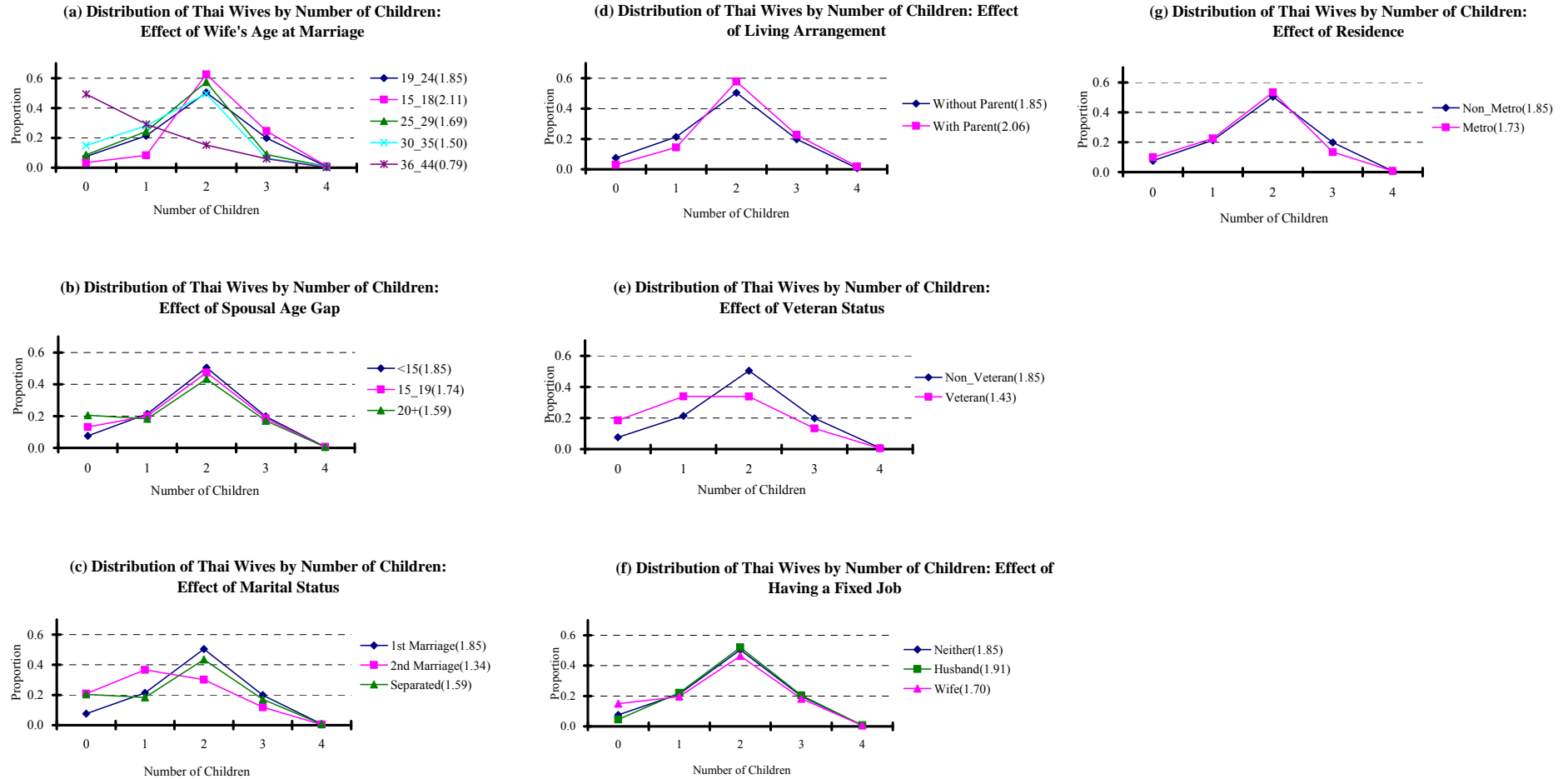
Note: The numbers in the legends are lifetime fertility rates.

Appendix Figure 3. Graphic Display of the Effects of Explanatory Factors on the Distribution of the Indonesian Wives of Taiwanese Husbands over the Lifetime Number of Births, Assessed via a Multinomial Logit Model: the greater the difference between the curves, the greater the effects of the factor in question.



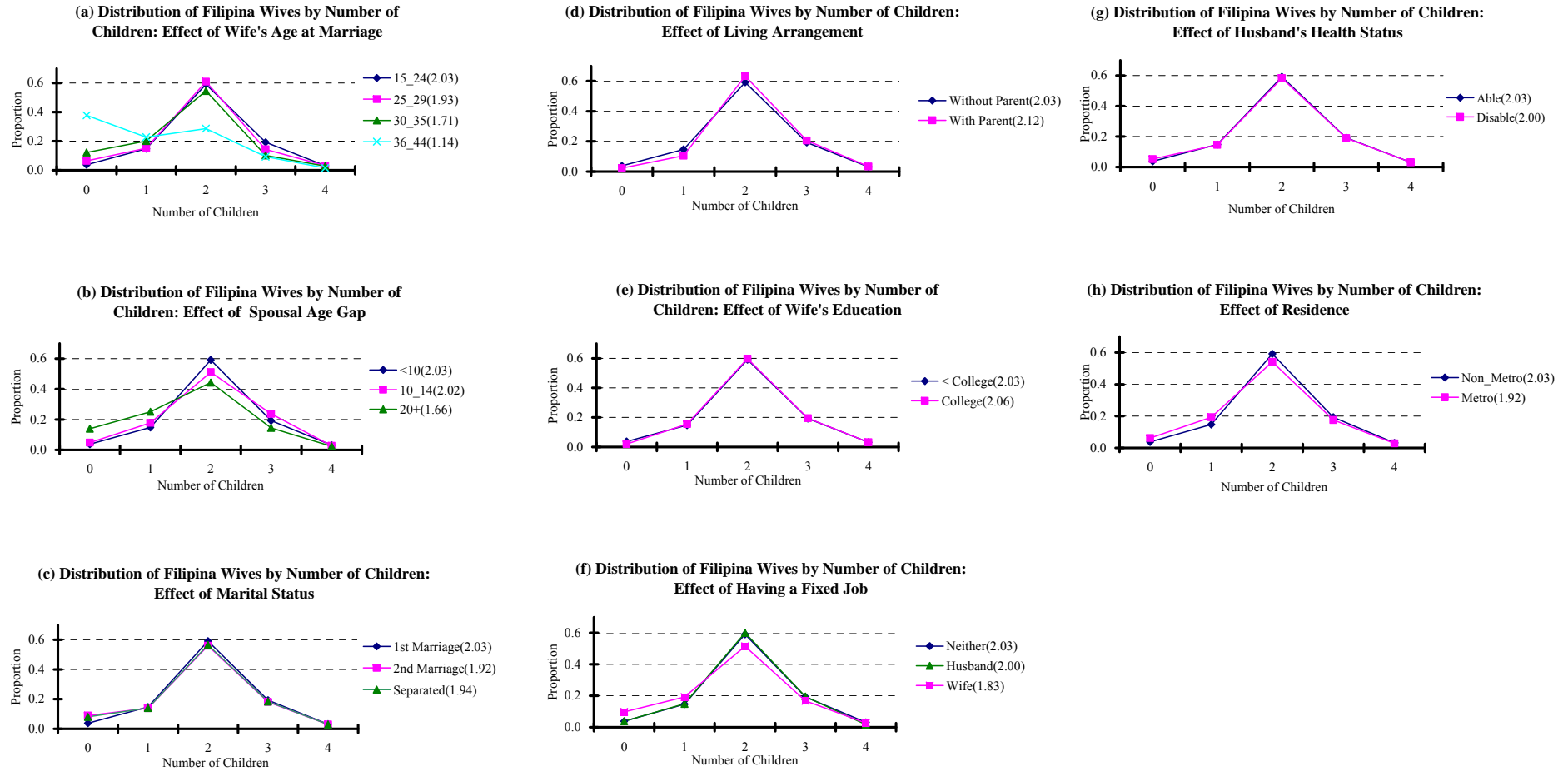
Note: The numbers in the legends are lifetime fertility rates.

Appendix Figure 4. Graphic Display of the Effects of Explanatory Factors on the Distribution of the Thai Wives of Taiwanese Husbands over the Lifetime Number of Births, Assessed via a Multinomial Logit Model: the greater the difference between the curves, the greater the effects of the factor in question.



Note: The numbers in the legends are lifetime fertility rates.

Appendix Figure 5. Graphic Display of the Effects of Explanatory Factors on the Distribution of the Filipina Wives of Taiwanese Husbands over the Lifetime Number of Births, Assessed via a Multinomial Logit Model: the greater the difference between the curves, the greater the effects of the factor in question.



Note: The numbers in the legends are lifetime fertility rates.

Appendix Tables:

Appendix Table 1. Estimation Results of the Best Specification of the Multinomial Logit Model for Explaining the Variation in the Number of Children born to the Vietnamese Wives of Taiwanese Husbands.

Explanatory Factor	Number of Births (Reference = 2)							
	0		1		3		4	
	Coeff.	t-ratio	Coeff.	t-ratio	Coeff.	t-ratio	Coeff.	t-ratio
Constant	8.16	51.0	4.38	34.4	-2.21	-29.0	-5.65	-21.8
1. Duration of Marriage (ref.= 0 year)								
1 year	-3.52	-36.6	----	----	----	----	----	----
2 years	-7.03	-44.6	-2.10	-16.6	----	----	----	----
3 years	-8.72	-56.0	-3.51	-28.5	----	----	----	----
4 years	-9.60	-60.0	-4.27	-34.3	----	----	----	----
5 years	-10.15	-60.1	-4.68	-36.6	----	----	----	----
6 or more years	-10.73	-64.7	-5.21	-41.1	----	----	----	----
2. Age at Marriage (ref.= 19-24 years)								
15-18 years	0.39	7.4	0.14	3.2	----	----	----	----
25-29 years	0.50	9.9	0.26	6.4	----	----	----	----
30-35 years	1.30	14.9	0.52	6.9	----	----	----	----
36-44 years	3.17	14.9	1.11	5.1	----	----	----	----
3. Spousal Age Gap (ref.= less than 10 yrs)								
10-14 years	----	----	----	----	----	----	----	----
15-19 years	----	----	----	----	-0.42	-4.2	-0.49	-0.9
20 or more years	0.65	12.8	0.36	8.1	-0.94	-5.0	----	----
4. Marital Status (ref.= Married)								
Separated	2.26	10.1	0.96	4.5	----	----	----	----
Divorced	0.74	5.4	----	----	----	----	----	----
Widowed	----	----	----	----	----	----	----	----
5. Wife's Remarriage Status (ref.= other)								
2nd Marriage	0.89	4.1	0.62	3.1	----	----	----	----
6. Living Arrangement (ref.= other)								
With Parent	-0.67	-18.2	-0.28	-9.3	-0.18	-2.1	----	----
7. Wife's Education (ref.= less than High Sch.)								
High School	----	----	----	----	----	----	----	----
College or University or higher	----	----	----	----	----	----	----	----
8. Husband's Education (ref.= less than High Sch.)								
High School	----	----	----	----	-0.41	-4.5	-1.19	-1.9
College or University or higher	0.16	3.2	----	----	-0.67	-3.0	----	----
9. Husband's Veteran Status (ref.= other)								
Veteran	0.18	1.9	----	----	----	----	----	----
10. Wife's Employment Status (ref.= other)								
Fixed Job	1.07	23.1	0.44	11.6	----	----	----	----
11. Husband's Employment Status (ref.= other)								
Fixed Job	-0.35	-7.6	-0.16	-4.4	----	----	----	----
12. Husband's Health Status (ref.= Able)								
Disable	0.34	5.9	0.15	3.2	----	----	----	----
13. Residence (ref.= other)								
Metropolitan Area	0.32	8.6	0.22	7.3	----	----	----	----
Rho-square = 0.2738								

Note: For duration of marriage, the last open-ended category is 6+.

Note: The category of "City" included not only the 7 large cities but also Taipei Prefecture.

Appendix Table 2 . The Predicted Probability Distributions and Fertility Rates of Different Groups of Vietnamese Wives at the Completion of Reproductive Career: Based on the Application of a Multinomial Logit Model to the Micro Data of the 2003 Census of Foreign Spouses.

Explanatory Factor	Probabilities of Having Different Numbers of Births					Lifetime Fertility Rate
	0	1	2	3	4	
Reference Level	0.05	0.27	0.61	0.07	0.00	1.71
1. Age at Marriage (ref.= 19-24 years)						
15-18 years	0.07	0.29	0.58	0.06	0.00	1.65
25-29 years	0.07	0.31	0.55	0.06	0.00	1.61
30-35 years	0.13	0.35	0.47	0.05	0.00	1.44
36-44 years	0.43	0.31	0.23	0.03	0.00	0.86
2. Spousal Age Gap (ref.= less than 10 years)						
10-14 years	----	----	----	----	----	----
15-19 years	0.05	0.28	0.63	0.05	0.00	1.68
20 or more years	0.08	0.34	0.55	0.02	0.00	1.52
3. Marital Status (ref.= Married)						
Separated	0.25	0.38	0.33	0.04	0.00	1.17
Divorced	0.09	0.26	0.58	0.06	0.00	1.63
Widowed	----	----	----	----	----	----
4. Wife's Remarriage Status (ref.= other)						
2nd Marriage	0.09	0.39	0.47	0.05	0.00	1.49
5. Living Arrangement (ref.= other)						
With Parent	0.03	0.23	0.68	0.06	0.00	1.79
6. Wife's Education (ref.= less than High Sch.)						
High School	----	----	----	----	----	----
College or University or higher	----	----	----	----	----	----
7. Husband's Education (ref.= less than High Sch.)						
High School	0.05	0.28	0.63	0.05	0.00	1.67
College or University or higher	0.05	0.27	0.61	0.07	0.00	1.69
8. Husband's Veteran Status (ref.= other)						
Veteran	0.06	0.27	0.61	0.07	0.00	1.69
9. Wife's Employment Status (ref.= other)						
Fixed Job	0.11	0.34	0.50	0.05	0.00	1.50
10. Husband's Employment Status (ref.= other)						
Fixed Job	0.04	0.24	0.65	0.07	0.00	1.76
11. Husband's Health Status (ref.= Able)						
Disable	0.06	0.29	0.58	0.06	0.00	1.65
12. Residence (ref.= other)						
Metropolitan Areas	0.06	0.31	0.57	0.06	0.00	1.64

Appendix Table 3. The Effects of Various Factors on the Lifetime Fertility Performances of the Vietnamese Wives of Taiwanese Husbands: Based on the Application of a Multinomial Logit Model to the Micro Data of the 2003 Census of Foreign Spouses.

Explanatory Factor	Probabilities of Having Different Numbers of Births					Lifetime Fertility Rate
	0	1	2	3	4	
Reference Level	0.05	0.27	0.61	0.07	0.00	1.71
1. Age at Marriage (ref.= 19-24 years)						
15-18 years	0.02	0.02	-0.04	0.00	0.00	-0.06
25-29 years	0.02	0.04	-0.06	-0.01	0.00	-0.10
30-35 years	0.08	0.08	-0.15	-0.02	0.00	-0.26
36-44 years	0.38	0.04	-0.38	-0.04	0.00	-0.85
2. Spousal Age Gap (ref.= less than 10 years)						
10-14 years	----	----	----	----	----	----
15-19 years	0.00	0.01	0.02	-0.02	0.00	-0.03
20 or more years	0.03	0.08	-0.06	-0.04	0.00	-0.19
3. Marital Status (ref.= Married)						
Separated	0.20	0.11	-0.28	-0.03	0.00	-0.54
Divorced	0.05	-0.01	-0.03	0.00	0.00	-0.08
Widowed	----	----	----	----	----	----
4. Wife's Remarriage Status (ref.= other)						
2nd Marriage	0.04	0.12	-0.14	-0.02	0.00	-0.22
5. Living Arrangement (ref.= other)						
With Parent	-0.02	-0.04	0.07	0.00	0.00	0.08
6. Wife's Education (ref.= less than High Sch.)						
High School	----	----	----	----	----	----
College or University or higher	----	----	----	----	----	----
7. Husband's Education (ref.= less than High Sch.)						
High School	0.00	0.01	0.02	-0.02	0.00	-0.03
College or University or higher	0.01	0.00	0.00	0.00	0.00	-0.01
8. Husband's Veteran Status (ref.= other)						
Veteran	0.01	0.00	-0.01	0.00	0.00	-0.02
9. Wife's Employment Status (ref.= other)						
Fixed Job	0.06	0.07	-0.12	-0.01	0.00	-0.21
10. Husband's Employment Status (ref.= other)						
Fixed Job	-0.01	-0.03	0.04	0.00	0.00	0.06
11. Husband's Health Status (ref.= Able)						
Disable	0.02	0.03	-0.04	0.00	0.00	-0.06
12. Residence (ref.= other)						
Metropolitan Area	0.01	0.04	-0.05	-0.01	0.00	-0.07

Appendix Table 4. Estimation Results of the Best Specification of the Multinomial Logit Model for Explaining the Variation in the Number of Children born to the Indonesian Wives of Taiwanese Husbands.

Explanatory Factor	Number of Births (Reference = 2)							
	0		1		3		4	
	Coeff.	t-ratio	Coeff.	t-ratio	Coeff.	t-ratio	Coeff.	t-ratio
Constant	6.81	22.0	4.10	16.2	-1.07	-17.5	-3.06	-21.5
1. Duration of Marriage (ref.= 0 year)								
1 year	-2.28	-12.2	----	----	----	----	----	----
2 years	-5.53	-17.7	-1.97	-7.7	----	----	----	----
3 years	-7.29	-23.8	-3.49	-14.0	----	----	----	----
4 years	-7.95	-25.8	-4.13	-16.5	----	----	----	----
5 years	-8.51	-27.1	-4.64	-18.3	----	----	----	----
6 years	-8.69	-27.5	-4.94	-19.3	----	----	----	----
7 years	-9.23	-28.8	-5.23	-20.3	----	----	----	----
8 years	-9.14	-28.5	-5.28	-20.5	----	----	----	----
9 years	-9.24	-29.3	-5.59	-21.8	----	----	----	----
10 or more years	-9.65	-30.5	-5.83	-22.7	----	----	----	----
2. Age at Marriage (ref.= 19-24 years)								
15-18 years	----	----	----	----	----	----	----	----
25-29 years	0.56	8.0	0.32	6.0	----	----	----	----
30-35 years	1.42	17.0	0.74	10.5	-0.34	-3.1	----	----
36-44 years	3.63	29.1	1.80	14.2	-0.76	-2.6	----	----
3. Spousal Age Gap (ref.= less than 10 years)								
10-14 years	----	----	----	----	----	----	----	----
15-19 years	----	----	----	----	----	----	----	----
20 or more years	0.53	5.6	0.20	2.5	-0.43	-3.3	----	----
4. Marital Status (ref.= Married)								
Separated	1.52	5.8	0.82	3.4	----	----	----	----
Divorced	0.72	3.3	----	----	----	----	----	----
Widowed	----	----	----	----	----	----	----	----
5. Remarriage Status (ref.= other)								
2nd Marriage	1.17	6.3	0.44	2.4	----	----	----	----
6. Living Arrangement (ref.= other)								
With Parent	-0.51	-9.4	-0.23	-5.5	----	----	----	----
7. Wife's Education (ref.= less than High Sch.)								
High School	----	----	----	----	----	----	----	----
College or University or higher	----	----	----	----	----	----	----	----
8. Husband's Education (ref.= less than High Sch.)								
High School	----	----	----	----	-0.44	-6.9	-0.80	-3.9
College or University or higher	0.20	2.5	----	----	-0.76	-3.9	-1.95	-1.9
9. Husband's Veteran Status (ref.= other)								
Veteran	0.66	3.5	0.38	2.3	----	----	----	----
10. Wife's Employment Status (ref.= other)								
Fixed Job	0.70	11.0	0.19	3.7	----	----	----	----
11. Husband's Employment Status (ref.= other)								
Fixed Job	-0.40	-6.1	-0.17	-3.2	-0.16	-2.3	-0.47	-2.8
12. Husband's Health Status (ref.= Able)								
Disable	0.23	2.7	0.24	3.6	----	----	----	----
13. Residence (ref.= other)								
Metropolitan Area	0.18	3.0	0.22	4.5	----	----	----	----

Rho-square = 0.2084

Note: The category of "City" included not only the 7 large cities but also Taipei Prefecture.

Appendix Table 5 . The Predicted Probability Distributions and Fertility Rates of Different Groups of Indonesian Wives at the Completion of Reproductive Career: Based on the Application of a Multinomial Logit Model to the Micro Data of the 2003 Census of Foreign Spouses.

Explanatory Factor	Probabilities of Having Different Numbers of Births					Lifetime Fertility Rate
	0	1	2	3	4	
Reference Level	0.04	0.11	0.62	0.21	0.03	2.09
1. Age at Marriage (ref.= 19-24 years)						
15-18 years	----	----	----	----	----	----
25-29 years	0.06	0.14	0.58	0.20	0.03	1.99
30-35 years	0.13	0.20	0.53	0.13	0.02	1.73
36-44 years	0.49	0.24	0.22	0.04	0.01	0.84
2. Spousal Age Gap (ref.= less than 10 years)						
10-14 years	----	----	----	----	----	----
15-19 years	----	----	----	----	----	----
20 or more years	0.06	0.14	0.63	0.14	0.03	1.94
3. Marital Status (ref.= Married)						
Separated	0.13	0.19	0.49	0.17	0.02	1.76
Divorced	0.07	0.10	0.59	0.20	0.03	2.01
Widowed	----	----	----	----	----	----
4. Wife's Remarriage Status (ref.= other)						
2nd Marriage	0.10	0.15	0.54	0.19	0.03	1.89
5. Living Arrangement (ref.= other)						
With Parent	0.02	0.09	0.64	0.22	0.03	2.14
6. Wife's Education (ref.= less than High Sch.)						
High School	----	----	----	----	----	----
College or University or higher	----	----	----	----	----	----
7. Husband's Education (ref.= less than High Sch.)						
High School	0.04	0.12	0.68	0.15	0.01	1.98
College or University or higher	0.04	0.15	0.69	0.11	0.00	1.89
8. Husband's Veteran Status (ref.= other)						
Veteran	0.06	0.15	0.57	0.20	0.03	1.97
9. Wife's Employment Status (ref.= other)						
Fixed Job	0.07	0.12	0.58	0.20	0.03	1.99
10. Husband's Employment Status (ref.= other)						
Fixed Job	0.03	0.10	0.66	0.19	0.02	2.08
11. Husband's Health Status (ref.= Able)						
Disable	0.04	0.13	0.59	0.20	0.03	2.04
12. Residence (ref.= other)						
Metropolitan Areas	0.04	0.13	0.60	0.20	0.03	2.05

Appendix Table 6 . The Effects of Various Factors on the Lifetime Fertility Performances of the Indonesian Wives of Taiwanese Husbands: Based on the Application of a Multinomial Logit Model to the Micro Data of the 2003 Census of Foreign Spouses.

Explanatory Factor	Probabilities of Having Different Numbers of Births					Lifetime Fertility Rate
	0	1	2	3	4	
Reference Level	0.04	0.11	0.62	0.21	0.03	2.09
1. Age at Marriage (ref.= 19-24 years)						
15-18 years	----	----	----	----	----	----
25-29 years	0.02	0.03	-0.04	-0.01	0.00	-0.09
30-35 years	0.09	0.09	-0.09	-0.08	0.00	-0.36
36-44 years	0.46	0.13	-0.39	-0.18	-0.02	-1.25
2. Spousal Age Gap (ref.= less than 10 years)						
10-14 years	----	----	----	----	----	----
15-19 years	----	----	----	----	----	----
20 or more years	0.03	0.03	0.02	-0.07	0.00	-0.15
3. Marital Status (ref.= Married)						
Separated	0.09	0.09	-0.13	-0.04	-0.01	-0.33
Divorced	0.04	0.00	-0.02	-0.01	0.00	-0.08
Widowed	----	----	----	----	----	----
4. Wife's Remarriage Status (ref.= other)						
2nd Marriage	0.07	0.04	-0.08	-0.03	0.00	-0.20
5. Living Arrangement (ref.= other)						
With Parent	-0.01	-0.02	0.02	0.01	0.00	0.06
6. Wife's Education (ref.= less than High Sch.)						
High School	----	----	----	----	----	----
College or University or higher	----	----	----	----	----	----
7. Husband's Education (ref.= less than High Sch.)						
High School	0.00	0.01	0.06	-0.06	-0.01	-0.11
College or University or higher	0.00	0.04	0.08	-0.10	-0.02	-0.20
8. Husband's Veteran Status (ref.= other)						
Veteran	0.03	0.04	-0.05	-0.02	0.00	-0.12
9. Wife's Employment Status (ref.= other)						
Fixed Job	0.03	0.01	-0.03	-0.01	0.00	-0.09
10. Husband's Employment Status (ref.= other)						
Fixed Job	-0.01	-0.01	0.05	-0.02	-0.01	-0.01
11. Husband's Health Status (ref.= Able)						
Disable	0.01	0.02	-0.02	-0.01	0.00	-0.05
12. Residence (ref.= other)						
Metropolitan Areas	0.01	0.02	-0.02	-0.01	0.00	-0.04

Appendix Table 7. Estimation Results of the Best Specification of the Multinomial Logit Model for Explaining the Variation in the Number of Children born to the Thai Wives of Taiwanese Husbands.

Explanatory Factor	Number of Births (Reference = 2)							
	0		1		3		4	
	Coeff.	t-ratio	Coeff.	t-ratio	Coeff.	t-ratio	Coeff.	t-ratio
Constant	6.42	10.7	3.06	7.1	-0.93	-8.3	-4.21	-10.2
1. Duration of Marriage (ref.= 0 year)								
1 year	-2.04	-4.6	----	----	----	----	----	----
2 years	-4.08	-6.6	-1.01	-2.1	----	----	----	----
3 years	-5.32	-8.8	-1.55	-3.4	----	----	----	----
4 years	-6.56	-10.8	-2.48	-5.5	----	----	----	----
5 years	-6.76	-11.2	-2.82	-6.3	----	----	----	----
6 years	-7.21	-11.8	-3.39	-7.5	----	----	----	----
7 years	-7.44	-12.2	-3.40	-7.6	----	----	----	----
8 years	-7.89	-12.7	-3.50	-7.7	----	----	----	----
9 years	-8.48	-12.6	-3.71	-7.8	----	----	----	----
10 or more years	-8.32	-13.8	-3.92	-8.9	----	----	----	----
2. Age at Marriage (ref.= 19-24 years)								
15-18 years	-0.99	-2.2	-1.15	-2.9	----	----	----	----
25-29 years	----	----	----	----	-0.94	-5.1	----	----
30-35 years	0.69	4.7	0.29	2.3	-1.12	-4.1	----	----
36-44 years	3.07	10.2	1.51	4.9	----	----	----	----
3. Spousal Age Gap (ref.= less than 10 years)								
10-14 years	----	----	----	----	----	----	----	----
15-19 years	0.62	3.6	----	----	----	----	----	----
20 or more years	1.15	5.7	----	----	----	----	----	----
4. Marital Status (ref.= Married)								
Separated	1.14	2.2	----	----	----	----	----	----
Divorced	----	----	----	----	----	----	----	----
Widowed	----	----	----	----	----	----	----	----
5. Wife's Remarriage Status (ref.= other)								
2nd Marriage	1.53	5.5	1.06	3.8	----	----	----	----
6. Living Arrangement (ref.= other)								
With Parent	-1.05	-8.3	-0.53	-5.1	----	----	0.82	1.7
7. Wife's Education (ref.= less than High Sch.)								
High School	----	----	----	----	----	----	----	----
College or University or higher	----	----	----	----	----	----	----	----
8. Husband's Education (ref.= less than High Sch.)								
High School	----	----	----	----	----	----	----	----
College or University or higher	----	----	----	----	----	----	----	----
9. Husband's Veteran Status (ref.= other)								
Veteran	1.29	4.0	0.86	2.8	----	----	----	----
10. Wife's Employment Status (ref.= other)								
Fixed Job	0.77	7.3	----	----	----	----	----	----
11. Husband's Employment Status (ref.= other)								
Fixed Job	-0.53	-4.1	----	----	----	----	----	----
12. Husband's Health Status (ref.= Able)								
Disable	----	----	----	----	----	----	----	----
13. Residence (ref.= other)								
Metropolitan Area	0.22	2.1	----	----	-0.45	-2.6	----	----
Rho-square = 0.2658								

Note: The category of "City" included not only the 7 large cities but also Taipei Prefecture.

Appendix Table 8 . The Predicted Probability Distributions and Fertility Rates of Different Groups of Thai Wives at the Completion of Reproductive Career: Based on the Application of a Multinomial Logit Model to the Micro Data of the 2003 Census of Foreign Spouses.

Explanatory Factor	Probabilities of Having Different Numbers of Births					Lifetime Fertility Rate
	0	1	2	3	4	
Reference Level	0.08	0.21	0.50	0.20	0.01	1.85
1. Age at Marriage (ref.= 19-24 years)						
15-18 years	0.03	0.08	0.63	0.25	0.01	2.11
25-29 years	0.09	0.24	0.57	0.09	0.01	1.69
30-35 years	0.15	0.28	0.50	0.06	0.01	1.50
36-44 years	0.49	0.29	0.15	0.06	0.00	0.79
2. Spousal Age Gap (ref.= less than 10 years)						
10-14 years	----	----	----	----	----	----
15-19 years	0.13	0.20	0.47	0.19	0.01	1.74
20 or more years	0.21	0.18	0.43	0.17	0.01	1.59
3. Marital Status (ref.= Married)						
Separated	0.20	0.18	0.43	0.17	0.01	1.59
Divorced	----	----	----	----	----	----
Widowed	----	----	----	----	----	----
4. Wife's Remarriage Status (ref.= other)						
2nd Marriage	0.21	0.37	0.30	0.12	0.00	1.34
5. Living Arrangement (ref.= other)						
With Parent	0.03	0.14	0.58	0.23	0.02	2.06
6. Wife's Education (ref.= less than High Sch.)						
High School	----	----	----	----	----	----
College or University or higher	----	----	----	----	----	----
7. Husband's Education (ref.= less than High Sch.)						
High School	----	----	----	----	----	----
College or University or higher	----	----	----	----	----	----
8. Husband's Veteran Status (ref.= other)						
Veteran	0.18	0.34	0.34	0.13	0.01	1.43
9. Wife's Employment Status (ref.= other)						
Fixed Job	0.15	0.20	0.46	0.18	0.01	1.70
10. Husband's Employment Status (ref.= other)						
Fixed Job	0.05	0.22	0.52	0.21	0.01	1.91
11. Husband's Health Status (ref.= Able)						
Disable	----	----	----	----	----	----
12. Residence (ref.= other)						
Metropolitan Areas	0.10	0.23	0.53	0.13	0.01	1.73

Appendix Table 9. The Effects of Various Factors on the Lifetime Fertility Performances of the Thai Wives of Taiwanese Husbands: Based on the Application of a Multinomial Logit Model to the Micro Data of the 2003 Census of Foreign Spouses.

Explanatory Factor	Probabilities of Having Different Numbers of Births					Lifetime Fertility Rate
	0	1	2	3	4	
Reference Level	0.08	0.21	0.50	0.20	0.01	1.85
1. Age at Marriage (ref.= 19-24 years)						
15-18 years	-0.04	-0.13	0.12	0.05	0.00	0.26
25-29 years	0.01	0.03	0.07	-0.11	0.00	-0.16
30-35 years	0.07	0.07	-0.01	-0.13	0.00	-0.35
36-44 years	0.42	0.08	-0.35	-0.14	-0.01	-1.06
2. Spousal Age Gap (ref.= less than 10 years)						
10-14 years	----	----	----	----	----	----
15-19 years	0.06	-0.01	-0.03	-0.01	0.00	-0.11
20 or more years	0.13	-0.03	-0.07	-0.03	0.00	-0.26
3. Marital Status (ref.= Married)						
Separated	0.13	-0.03	-0.07	-0.03	0.00	-0.26
Divorced	----	----	----	----	----	----
Widowed	----	----	----	----	----	----
4. Wife's Remarriage Status (ref.= other)						
2nd Marriage	0.13	0.15	-0.20	-0.08	0.00	-0.50
5. Living Arrangement (ref.= other)						
With Parent	-0.05	-0.07	0.07	0.03	0.01	0.21
6. Wife's Education (ref.= less than High Sch.)						
High School	----	----	----	----	----	----
College or University or higher	----	----	----	----	----	----
7. Husband's Education (ref.= less than High Sch.)						
High School	----	----	----	----	----	----
College or University or higher	----	----	----	----	----	----
8. Husband's Veteran Status (ref.= other)						
Veteran	0.11	0.13	-0.17	-0.07	0.00	-0.41
9. Wife's Employment Status (ref.= other)						
Fixed Job	0.07	-0.02	-0.04	-0.02	0.00	-0.15
10. Husband's Employment Status (ref.= other)						
Fixed Job	-0.03	0.01	0.02	0.01	0.00	0.06
11. Husband's Health Status (ref.= Able)						
Disable	----	----	----	----	----	----
12. Residence (ref.= other)						
Metropolitan Areas	0.02	0.01	0.03	-0.06	0.00	-0.12

Appendix Table 10. Estimation Results of the Best Specification of the Multinomial Logit Model for Explaining the Variation in the Number of Children born to the Filipina Wives of Taiwanese Husbands.

Explanatory Factors	Number of Births (Reference = 2)							
	0		1		3		4	
	Coeff.	t-ratio	Coeff.	t-ratio	Coeff.	t-ratio	Coeff.	t-ratio
Constant	3.78	5.9	2.90	7.3	-1.12	-12.7	-2.94	-11.6
1. Duration of Marriage (ref.= 0 year)								
1 year	-1.43	-2.7	----	----	----	----	----	----
2 years	-3.36	-5.1	-1.04	-2.4	----	----	----	----
3 years	-4.51	-6.9	-1.99	-4.8	----	----	----	----
4 years	-5.67	-8.8	-2.86	-7.0	----	----	----	----
5 years	-5.76	-8.9	-3.33	-8.1	----	----	----	----
6 years	-6.01	-9.2	-3.44	-8.3	----	----	----	----
7 years	-6.40	-9.8	-3.73	-9.1	----	----	----	----
8 years	-6.82	-10.3	-4.02	-9.7	----	----	----	----
9 years	-6.94	-10.2	-4.25	-10.0	----	----	----	----
10 or more years	-6.54	-10.2	-4.29	-10.6	----	----	----	----
2. Age at Marriage (ref.= 19-24 years)								
15-18 years	----	----	----	----	----	----	----	----
25-29 years	0.50	3.7	----	----	-0.32	-2.6	----	----
30-35 years	1.26	7.6	0.39	3.3	-0.55	-2.7	----	----
36-44 years	3.03	11.3	1.16	4.4	----	----	----	----
3. Spousal Age Gap (ref.= less than 10 years)								
10-14 years	0.39	2.4	0.33	2.9	0.35	2.6	----	----
15-19 years	----	----	----	----	----	----	----	----
20 or more years	1.60	7.1	0.82	4.2	----	----	----	----
4. Marital Status (ref.= Married)								
Separated	0.81	1.8	----	----	----	----	----	----
Divorced	----	----	----	----	----	----	----	----
Widowed	----	----	----	----	----	----	----	----
5. Remarriage Status (ref.= other)								
2nd Marriage	0.92	2.7	----	----	----	----	----	----
6. Living Arrangement (ref.= other)								
With Parent	-0.59	-5.0	-0.41	-4.6	----	----	----	----
7. Wife's Education (ref.= less than High Sch.)								
High School	----	----	----	----	----	----	----	----
College or University or higher	-0.23	-2.2	----	----	----	----	----	----
8. Husband's Education (ref.= less than High Sch.)								
High School	----	----	----	----	----	----	----	----
College or University or higher	----	----	----	----	----	----	----	----
9. Husband's Veteran Status (ref.= other)								
Veteran	----	----	----	----	----	----	----	----
10. Wife's Employment Status (ref.= other)								
Fixed Job	1.09	9.1	0.41	4.3	----	----	----	----
11. Husband's Employment Status (ref.= other)								
Fixed Job	----	----	----	----	----	----	-0.65	-2.0
12. Husband's Health Status (ref.= Able)								
Disable	0.33	1.9	----	----	----	----	----	----
13. Residence (ref.= other)								
Metropolitan Area	0.60	5.1	0.36	3.8	----	----	----	----
Rho-square = 0.1523								

Note: The category of "City" included not only the 7 large cities but also Taipei Prefecture.

Appendix Table 11 . The Predicted Probability Distributions and Fertility Rates of Different Groups of Filipina Wives at the Completion of Reproductive Career: Based on the Application of a Multinomial Logit Model to the Micro Data of the 2003 Census of Foreign Spouses.

Explanatory Factor	Probabilities of Having Different Numbers of Births					Lifetime Fertility Rate
	0	1	2	3	4	
Reference Level	0.04	0.15	0.59	0.19	0.03	2.03
1. Age at Marriage (ref.= 19-24 years)						
15-18 years	----	----	----	----	----	----
25-29 years	0.06	0.15	0.61	0.14	0.03	1.93
30-35 years	0.12	0.20	0.55	0.10	0.03	1.71
36-44 years	0.38	0.23	0.29	0.09	0.02	1.14
2. Spousal Age Gap (ref.= less than 10 years)						
10-14 years	0.05	0.18	0.51	0.24	0.03	2.02
15-19 years	----	----	----	----	----	----
20 or more years	0.14	0.25	0.44	0.14	0.02	1.66
3. Marital Status (ref.= Married)						
Separated	0.08	0.14	0.56	0.18	0.03	1.94
Divorced	----	----	----	----	----	----
Widowed	----	----	----	----	----	----
4. Wife's Remarriage Status (ref.= other)						
2nd Marriage	0.09	0.14	0.56	0.18	0.03	1.92
5. Living Arrangement (ref.= other)						
With Parent	0.02	0.10	0.63	0.21	0.03	2.12
6. Wife's Education (ref.= less than High Sch.)						
High School	----	----	----	----	----	----
College or University or higher	0.02	0.16	0.60	0.19	0.03	2.06
7. Husband's Education (ref.= less than High Sch.)						
High School	----	----	----	----	----	----
College or University or higher	----	----	----	----	----	----
8. Husband's Veteran Status (ref.= other)						
Veteran	----	----	----	----	----	----
9. Wife's Employment Status (ref.= other)						
Fixed Job	0.10	0.19	0.52	0.17	0.03	1.83
10. Husband's Employment Status (ref.= other)						
Fixed Job	0.04	0.15	0.60	0.20	0.02	2.00
11. Husband's Health Status (ref.= Able)						
Disable	0.05	0.15	0.58	0.19	0.03	2.00
12. Residence (ref.= other)						
Metropolitan Area	0.06	0.19	0.54	0.18	0.03	1.92

Appendix Table 12. The Effects of Various Factors on the Lifetime Fertility Performances of the Filipina Wives of Taiwanese Husbands: Based on the Application of a Multinomial Logit Model to the Micro Data of the 2003 Census of Foreign Spouses.

Explanatory Factor	Probabilities of Having Different Numbers of Births					Lifetime Fertility Rate
	0	1	2	3	4	
Reference Level	0.04	0.15	0.59	0.19	0.03	2.03
1. Age at Marriage (ref.= 19-24 years)						
15-18 years	----	----	----	----	----	----
25-29 years	0.03	0.00	0.02	-0.05	0.00	-0.10
30-35 years	0.08	0.05	-0.05	-0.09	0.00	-0.32
36-44 years	0.34	0.08	-0.31	-0.10	-0.02	-0.89
2. Spousal Age Gap (ref.= less than 10 years)						
10-14 years	0.01	0.03	-0.08	0.04	0.00	-0.01
15-19 years	----	----	----	----	----	----
20 or more years	0.10	0.10	-0.15	-0.05	-0.01	-0.37
3. Marital Status (ref.= Married)						
Separated	0.04	-0.01	-0.03	-0.01	0.00	-0.09
Divorced	----	----	----	----	----	----
Widowed	----	----	----	----	----	----
4. Wife's Remarriage Status (ref.= other)						
2nd Marriage	0.05	-0.01	-0.03	-0.01	0.00	-0.11
5. Living Arrangement (ref.= other)						
With Parent	-0.02	-0.04	0.04	0.01	0.00	0.09
6. Wife's Education (ref.= less than High Sch.)						
High School	----	----	----	----	----	----
College or University or higher	-0.02	0.01	0.01	0.00	0.00	0.03
7. Husband's Education (ref.= less than High Sch.)						
High School	----	----	----	----	----	----
College or University or higher	----	----	----	----	----	----
8. Husband's Veteran Status (ref.= other)						
Veteran	----	----	----	----	----	----
9. Wife's Employment Status (ref.= other)						
Fixed Job	0.06	0.05	-0.08	-0.02	0.00	-0.20
10. Husband's Employment Status (ref.= other)						
Fixed Job	0.00	0.00	0.01	0.00	-0.01	-0.03
11. Husband's Health Status (ref.= Able)						
Disable	0.01	0.00	-0.01	0.00	0.00	-0.03
12. Residence (ref.= other)						
Metropolitan Area	0.02	0.05	-0.05	-0.02	0.00	-0.12

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