

## Interactions of socioeconomic determinants, offspring sex preference, and fertility behaviour

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### Abstract

*Using path analysis and the 5 per cent PUMS data of the 1990 and 2000 [US] censuses, this study examines: (1) the correlation between Chinese-American sex preference for children and their fertility behavior; and (2) the interaction between the sex preference and its socioeconomic determinants. Of the normative and non-normative factors investigated in this study, offspring sex preference is the greatest stimulus to Chinese fertility. Of the socioeconomic variables, women's educational attainment plays a primary role in depressing the impact of son preference, in addition to their increasing stay in the host society. However, these two factors do not work on husbands in the same way, demonstrating men's inflexible attitudes toward gender roles in the family and in society. Son preference exerts a positive impact on American-Chinese fertility and prevents further decline; still, this influence has been diminishing since 1990, as observed in this study.*

**Keywords:** *Chinese fertility, offspring sex preference, socioeconomic determinants.*

### Résumé

*Cet article se sert d'une analyse des pistes causales et des données du PUMS à 5% (Public Use Microdata Sample – Échantillon de microdonnées à grande diffusion) pour examiner (1) la corrélation entre le choix du sexe des Sino-Américain pour leurs enfants et leurs comportements procréateurs, et (2) l'interaction entre le choix du sexe et ses déterminants socio-économiques. Des facteurs normatifs et non-normatifs qui ont été étudiés dans cet article, les choix du sexe des enfants est le plus grand stimulus pour la fécondité des Chinois. Des variables socio-économiques, l'atteinte aux études des femmes joue un rôle principal dans l'affaiblissement de l'impact du choix de garçons en plus de la longueur de temps passé dans la société d'accueil. Cependant, ces deux facteurs ne fonctionnent pas de la même manière sur leurs maris, ce qui démontrent les attitudes inflexibles des hommes quant aux rôles de genre dans la famille et la société. La tendance à favoriser le choix d'un fils exerce un impact positif sur la fécondité sino-américaine, ce qui aide à prévenir que son déclin s'accroisse. Pourtant, cette influence est en baisse depuis les années 90 ainsi qu'observée dans cet article.*

**Mots-clés :** *Fécondité chinoise, choix du sexe des enfants, déterminants socio-économiques.*

## Introduction

Asians are today proportionally the fastest-growing racial group in America. Since the beginning of the 1970s, they have constituted more than one-third of the legal immigrants to this country. During the period of 1970–2000, the Asian population increased by 714 per cent, compared with increases in Hispanics of 389 per cent, American-Indians of 212 per cent, and African-Americans of 153 per cent. In the 2000 [US] census, there were more than ten million Asians, making up about 3.6 per cent of the American population. In 2008, Asians reached about 15 millions, and their share of the population increased to 5.1 per cent.<sup>1</sup> The rapid growth in Asian Americans is expected to continue during the twenty-first century. Studying their fertility behaviour, especially the interaction between their cultures and fertility behavior, would help us to understand American population trends in the future.

This paper examines the correlations between fertility behavior and cultural determinants in terms of sex preference for children among Chinese-Americans. We choose Chinese-Americans as the target population because of their larger size relative to other segments of Asian-Americans, making it possible to obtain appropriate data in conducting an empirical study of statistical significance. In addition, their strong Confucian heritage distinguishes them from the predominantly White-Christian culture, and generates more difficulties for them to acculturate to American life in comparison with Europeans and even with other minority groups such as Blacks and Hispanics. Therefore, research in this field would interest not only demographers but also scholars in other disciplines.

## Literature review

The correlation between offspring sex preference and fertility has drawn attention from demographers and scholars in various disciplines. Using a variety of measurements, including parity progression ratios, sex ratios, and the expressed desire for a particular gender composition, researchers have demonstrated that the preference for children of a certain sex varies among cultures. People in Asian and Middle Eastern countries tend to have a son preference, while cultures with a Spanish heritage exhibit a slight preference for daughters. Other ethnicities show a preference for gender balance, with varying degrees of son preference (Coombs 1977; Bongaarts 2001; Bhat and Zavier 2003).

Son preference, which is considered a pattern consistent with the cross-cultural predominance of patriarchy, is extremely strong in Eastern Asian countries and regions, including Japan, Korea, Taiwan, and China. It is often said that son preference in these countries and regions can be traced back to Confucian beliefs (Arnold 1985; Knodel et al. 1996; Dodoo 1998; Clark 2000; Merli and Smith 2002). In a patriarchal society, it is the son who is entitled to retain the family name. So, the essence of son preference rests on the continuation of life from parents to children, through which short life merges into long life, and human life is mingled with nature. This has become a religious comfort to these people. Studies have repeatedly shown that filial piety and son preference have a strong impact on Chinese fertility behaviour (Huang 1982; Arnold and Liu 1986; Freedman 1986; Cooney and Li 1994). Recently, an empirical study using the 2001 and 2006 census data has discovered a clear son preference among Chinese immigrants to Canada

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1. The figures are obtained from the data of the Statistical Abstract of the US and the 2000 and 1970 censuses.

(Almond et al. 2009). This normative influence would certainly also be seen among the Chinese in the United states.

Son preference has been perceived as containing a pro-natalist effect, because a certain number of sons is required to ensure the survival of at least one son in an agricultural society, thus increasing the demand for a large family (Cleland et al. 1983; Coale 1984; Banister 1987). Even if a large number of children was no longer necessary to guarantee a male child reaches adulthood in a modern society today, studies have found, women in South Korea who had all previous children as girls were still more likely to conceive another child compared to those with boys (Park and Cho 1995; Larsen et al. 1998). These studies have noted that the gender of previous children could also affect birth spacing. Women with only girls as previous children would time their next birth more rapidly than those with only boys as previous children.

Little evidence of son preference has been found in the contemporary United States. Studies have consistently reported that Americans generally favour at least one son and one daughter (Clare and Kiser 1951; Freedman and Whelpton 1960; Williamson 1976; Yamaguchi and Ferguson 1996). This long-term societal shift from man-dominant role attitudes to shared-gender roles or egalitarianism started with the late 1950s, accelerated between the 1960s and the 1970s, and has continued into the new century (Thornton and Freedman 1979; Cherlin and Walters 1981; Pollard and Morgan 2002).

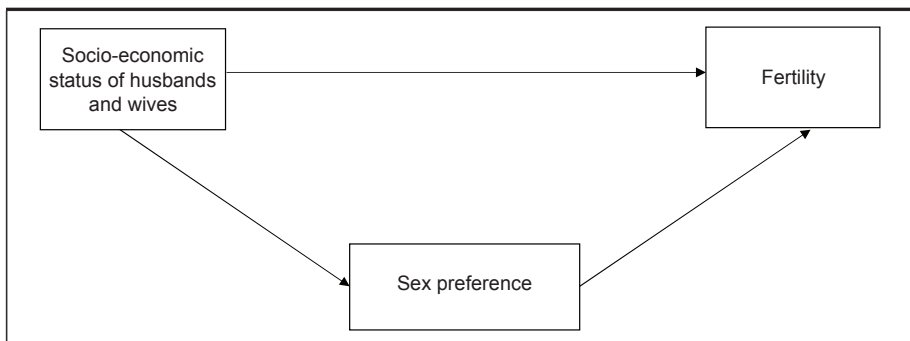
Offspring sex preference affects fertility behaviour when people make decisions on the next birth. In other words, fertility behavior is determined by the sex composition of previous children. Under the influence of desire for at least one son and one daughter, American families with children of the same sex are reported to be more likely to have, or intend to have, more children (Clare and Kiser 1951; Freedman and Whelpton 1960; Sloane and Lee 1983). While the degree of desire for more children in families with only sons is not significantly different from that in those with only daughters, families with mixed sex children would be more likely to stop childbearing. Yamaguchi and Ferguson (1995) noted that the sex composition of previous children did not affect birth spacing among Americans. But Teachman and Schollaert (1989) discovered that both White and Black American women who had two children of the same sex tended to time their third birth more rapidly than women whose children had a gender balance.

Sex ratios of newborn babies could be biased if sex-selective abortion (or infanticide) is applied to achieving a preferred sex composition. The ratio of male to female births substantially exceeding the biological norm of 1.05 has been observed in some Asian countries including India, China, and South Korea (Zeng 1993; Park and Cho 1995; George 2002; Gupta et al. 2003; Qi and Mason 2005; Jha 2006; Bhat et al. 2007). We have seen a number of media reports and research papers recently concerning the effects on sex ratios among Asian-Americans as brought on by sex-selective abortion, especially sex determination techniques through a blood test as early as 5 weeks after conception. Some researchers investigated the sex ratios of American-born children aged 12 years or younger of Chinese, Korean, and Asian Indian ethnicities, and found that a male-biased sex ratio was particularly evident for third-born and fourth-born children (Echavarri 2007; Ortner 2009; Roberts 2009).<sup>2</sup> In a recently published paper, Abrevaya (2009) observed a

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2. These reports and papers have generated a debate between pro-life and pro-choice groups. On September 23, 2008, two congressmen Trent Franks and Jeff Fortenberry introduced a bill to "prohibit discrimination against the unborn on the basis of sex or race." However, grievance has arisen in Asian-American community. Some doubted the data and methods

**Figure 1. Theoretical model.**



significant son preference in Chinese-American families in the earlier 1966–79 period. Chinese families with only girls as previous children were more likely to have a third child than those with only boys. But his attention still focused on the influence on sex ratio of new-born children.

Despite a lot of concern with the issue of sex ratios and sex-selective abortion among Asian-Americans, we do not find any systematic or deeper investigation into the correlation between offspring sex preference and their fertility—that is to say, how and in what direction offspring sex preference affects family size. Particularly, as a normative factor, how does offspring sex preference work together with non-normative factors in determining fertility behaviour? This research intends to answer this question. Moreover, socioeconomic determinants behind offspring sex preference have often been ignored in pioneer studies. Another goal of this research is to examine how socioeconomic factors determine the formation of offspring sex preference when making fertility decisions.

Having a child is generally a joint decision made by a wife and husband in a family. Son preference is a normative product of a patriarchal society. Breaking the norm means an attitudinal shift from a dominant male role to an equal gender role. In that transition process, men and women might act differently. This attitudinal gap between men and women has never been explored before. This study attempts to inspect this issue also.

## Methods and data

A person's fertility behaviour is associated with normative and non-normative or structural factors. It is especially true for a minority member. There is also a correlation between normative and non-normative or structural factors. Normative influence on a person is made within structural constraints or affected by his/her socioeconomic status (Lee and Lee 1959; Frisbie and Bean 1978; Easterlin et al. 1980; Trovato 1981; Halli 1987). Figure 1 illustrates the theoretical model, in which Chinese marital fertility behaviour is determined by offspring sex preference, a normative factor, and the socioeconomic status or structural factors of the husband and the wife in a family. At the same time, people's attitudes towards offspring sex preference are influenced by structural factors, which thus determine fertility behaviour indirectly through offspring sex preference, as well.

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used in these reports and papers. We are planning a research project in an attempt to explore the correlation between son preference and sex ratios of children among Asian-Americans thoroughly and systematically.

In this model, a Chinese wife's socioeconomic status is operationalized as individual educational attainment, income, age, and immigrant status. To simplify the analysis, a Chinese husband's socioeconomic status is operationalized as two variables: individual educational attainment and immigration status; as the most important variables in describing the socioeconomic characteristics of a Chinese man, they are adequate to serve our purposes for this research. Period status is a common variable shared by both Chinese wives and husbands.

Highly educated people or the elite are more likely to be open to new worldviews. So, we hypothesize that the variables of education and income will be negatively correlated with fertility and also negatively correlated with the strength of influence of son preference. As older people would be more traditional and would bear more children than young people, we hypothesize that the variable of age will exert a positive impact on fertility and son preference.

Immigration status refers to whether a Chinese person is foreign-born or American-born. Since the American-born Chinese would more likely integrate themselves with the mainstream culture, we assume that these Chinese will be less likely to be linked to pronatalist traditions and son preference. In contrast, the foreign-born Chinese would retain more attachments to "old world" norms. Therefore we assume that they will be more likely to have more children and will be more likely to be affected by son preference. According to the assimilation theory, traditional influence on immigrants varies with the length of exposure to the host country. Studies have shown that later groups of Asian immigrants would demonstrate more son preference than earlier groups (Okun 1996; Almond et al. 2009). So we further hypothesize that son preference and pronatalist tradition will be diminished with increasing exposure to the host society among the foreign-born Chinese or immigrants.

Period status is treated as a socioeconomic variable because fertility and reproductive norms change over time. Since the 1960s, almost all ethnicities in the United States have experienced fertility declines. Americans as a whole have gradually shifted from traditional gender role attitudes to shared roles and egalitarianism (Cherlin and Walters 1981; DiMaggio et al. 1996; Bianchi and Casper 2000). In examination of such historical consequences and influences, we hypothesize that the most recent cohort of Chinese-Americans found in the 2000 census will be less traditional in terms of offspring sex preference and family size than those found in the 1990 census.

This study employs the 5 per cent Public Use Microdata Samples (PUMS) of the 1990 and 2000 [US] censuses (individual files). The units of analysis are currently married Chinese women (aged 18–40) with children. White married women in the same age group are used as a reference group. To simplify analysis as well as to avoid any cultural bias, Chinese and White women in interracial marriages are not considered. There were 15,629 Chinese and 1,349,036 White women of such characteristics in the PUMS of the 1990 and 2000 censuses, covering all the fifty states and the District of Columbia.

The term "Chinese" is used to designate the population of Chinese origin or descent in the United States. The term "Whites" refers to those who are not identified as Hispanics. The large sample size and the broad coverage make the PUMS data superior to the National Survey of Family Growth (NSFG) and the Current Population Survey (CPS), which have long been used by researchers in this field. Using the PUMS data, we are able to explore the fertility behaviour of Asian-Americans like the Chinese, who have been omitted by most surveys because of the small group size in comparison with the Hispanic and African-American ethnicities.

**Table 1. Parity progression probability and ranking for Chinese and Whites.**

| Sex of Children | Chinese            |      |        | Whites             |      |           |
|-----------------|--------------------|------|--------|--------------------|------|-----------|
|                 | Probability        | Rank | Cases  | Probability        | Rank | Cases     |
| <b>Parity 2</b> |                    |      |        |                    |      |           |
| M               | 0.619<br>(0.00538) | 1    | 8,138  | 0.684<br>(0.00079) | 1    | 704,089   |
| F               | 0.624<br>(0.0056)  | 2    | 7,489  | 0.684<br>(0.00083) | 1    | 644,947   |
| Total           | 0.622<br>(0.00388) |      | 15,629 | 0.684<br>(0.00057) |      | 1,349,036 |
| <b>Parity 3</b> |                    |      |        |                    |      |           |
| MM              | 0.260<br>(0.00857) | 2    | 2,558  | 0.389<br>(0.00137) | 2    | 248,282   |
| FF              | 0.374<br>(0.01022) | 3    | 2,219  | 0.392<br>(0.00148) | 1    | 213,325   |
| MF              | 0.226<br>(0.00588) | 1    | 4,936  | 0.312<br>(0.00098) | 3    | 425,234   |
| Total           | 0.267<br>(0.00445) |      | 9,703  | 0.353<br>(0.00071) |      | 886,841   |
| <b>Parity 4</b> |                    |      |        |                    |      |           |
| MMM             | 0.202<br>(0.02078) | 2    | 346    | 0.329<br>(0.00297) | 1    | 46,681    |
| FFF             | 0.290<br>(0.02253) | 4    | 371    | 0.325<br>(0.00321) | 2    | 39,832    |
| MMF             | 0.172<br>(0.01231) | 1    | 832    | 0.269<br>(0.00185) | 4    | 111,035   |
| FFM             | 0.210<br>(0.01256) | 3    | 975    | 0.272<br>(0.00191) | 3    | 104,466   |
| Total           | 0.208<br>(0.00772) |      | 2,524  | 0.287<br>(0.00114) |      | 302,014   |
| Mean Fertility  | 1.839              |      |        | 1.989              |      |           |

Notes: Standard errors are reported in parentheses.

Sources: the PUMS individual files, the 2000 census.

We do not find fertility questions in the 2000 census. In determining the sex of children, measuring parities, and calculating the number of children-ever-born, we use the information of “co-resident children” in both the 1990 and 2000 censuses. In doing so, there would be no problems with families of below-college-age children, but there would be some concerns with families of college-age or above-college-age children, for these families may not report these children as co-residents. This type of family would generate a problem in measuring parities and calculating the number of children-ever-born, thus affecting the accuracy of analyses and conclusions. We have not found researchers expressing their concerns with this issue when using the census data in their studies. To overcome the disadvantage, we limit the discussion to married women (for both the Chinese and Whites) under age 40. According to American vital statistics, the mean age of the first birth was 26.7 in 1970, 27.8 in 1980, 29.1 in 1990, and 30.1 in 2000 for Chinese mothers, while it was 23.4, 24.2, 25.0, and 25.7 separately for (non-Hispanic)

Whites.<sup>3</sup> Therefore, it would be safe to assume that approximately all the families in this study did not misreport their children as co-residents, and that there is no bias with measuring parities and calculating numbers of children-ever-born. Furthermore, few births occur after age 40. Thus, limitation of the mother's age would serve our purposes very well.

In the following descriptive analyses, we will use cross-tabulation and probabilities progressing to the next birth to illustrate the general trend of offspring sex preference and the effects on fertility behaviour of Chinese-Americans in comparison with Whites. Then, a path analysis and an empirical test will be conducted on the theoretical model displayed in Figure 1.

## Descriptive analysis

Exploring the effects of offspring sex preference on fertility is meant to test the effect of the sex composition of previous children on the next birth. Given that preference for sons is more influential than preference for balanced gender, we hypothesize that Chinese families with only girl(s) will be more likely to have another birth than those with only boy(s) or those with mixed-sex composition.

Table 1 presents parity progression probabilities for Chinese and White women aged 18–40. Since few women in PUMS have more than four children, discussion will be limited to the timing of parities 2, 3, and 4 in this table, where M illustrates the sex of the previous child as a male (or boy) and F as a female (or girl). MM represents the sex composition of the previous two children as only boys, FF is only girls, and MF is one boy and one girl. MMM means the sex composition of the previous three children is only boys, FFF is only girls, MMF is two boys and one girl, and FFM is two girls and one boy.

From a comparison of the probabilities between the Chinese and Whites, a few facts are brought to light. First, Chinese-Americans show a strong son preference, as suggested by the magnitude of progression probabilities. At all three parities, Chinese-Americans who have only girls as previous children (i.e., F at parity 2, FF at parity 3, and FFF at parity 4) possess the largest value of likelihood, higher than not only those with only boys but also those with mixed-sex composition.

Second, son preference shows stronger effects at higher parities. For instance, the difference in magnitude between FF and MM at parity 3, and the difference in magnitude between FFF and MMM at parity 4, are all significantly higher than that between F and M at parity 2.

Whites do not show such a pattern. At parity 3, although Whites who have only girls have a higher likelihood than those who have only boys, the margin is only 0.003. At parity 4, Whites who have only girls have a lower likelihood (rather than higher) than those who have only boys (0.325 versus 0.329).<sup>4</sup>

Third, the role played by preference for balanced gender should not be ignored. At parity 3, although Chinese women with only boys (i.e., the MM group) have a lower likelihood than those with only girls (i.e., the FF group), they are more likely to bear another

3. See the [US] Department of Health and Human Services' *National Vital Statistics Reports*, vol. 51, no. 1.

4. The higher likelihood to have another child for both Chinese and White women with boys does not necessarily mean a preference for daughters. Since we use children-ever-born as the fertility measurement, the higher likelihood could be caused by a female survival rate that is higher than the male rate.



birth than those with mixed-sex composition (i.e., the MF group). At parity 4, Chinese women with only boys (i.e., the MMM group) show a higher likelihood than those with two boys and one girl (i.e., the MMF group). Obviously, the most likely goal for these Chinese is to have a girl, reflecting the effect of preference for balanced gender.

Despite the role that gender balance plays in driving Chinese fertility, the influence for son preference is dominant. It can be seen not only from the fact that the Chinese having only girls always possess the highest values of likelihood at all three parities, but also that at parity 4 the FFM group retains a higher likelihood than the MMF group. For those who have already achieved the goal of at least one boy and one girl, hoping to have another son overtakes the desire for bearing another girl. Moreover, as shown in Table 1, the FFM group also holds a higher likelihood than the MMM. That is to say, the two top probabilities all go to the groups who hope to have a boy.

Based on magnitudes of progression probability, we ranked the effect on fertility of the sex composition of previous children (see the column “Rank” in Table 1). The value of 1 always indicates the lowest level of effect. The highest level of effect is 2 at parity 2, 3 at parity 3, and 4 at parity 4. These ranking values will be used in the following path analysis.

## Comprehensive analysis

We have analyzed the general situation of Chinese sex preference for children in comparison with Whites. Now we need to conduct a comprehensive analysis to examine interactions of all the variables as illustrated by the theoretical model in Figure 1. Path analysis, a form of multiple-regression developed by Wright in 1934 and applied to demography originally by Duncan (1966), is the statistical tool to achieve the goal. The role of path analysis in causal model development rests on the interpretation and decomposition of a dependent variable. It helps to make explicit logic of conventional regression calculations.

Of the socioeconomic variables in this model, there are two education variables (i.e., wife’s education or FEDU and husband’s education or MEDU), referring to years of schooling for Chinese married man and women; two immigration status variables (i.e., wife’s immigration status or FIMG and husband’s immigration status or MIMG), operationalized as the number of years Chinese married men and women lived in the United States (American-born Chinese are awarded 50 years plus their age); one period or historical influence variable (PERIOD), a dummy variable, coded as 1990=0, 2000=1; and two other ratio variables, Chinese wife’s income (FINCOME) and age (FAGE).

Chinese fertility is measured by the number of children-ever-born (CEB), derived from the co-resident children in the 1990 and 2000 censuses. It is very rare for Chinese families to have more than four children. Therefore, the discussion will be limited to married couples with less than five children.

In this section, we will still use the effects of sex composition of previous children on fertility as the measurement of offspring sex preference. In the path model, sex preference is an ordinal variable. And the coding is consistent with the rankings of progression probabilities in Table 1. It is coded as 0 if Chinese families have an only child, since offspring sex preference would not play any role in motivating these people. For families with two children, it is coded as 1 for those with a boy as previous child, and 2 for those with a girl as previous child. For families with three children, it is coded as 1 for those with one boy and one girl as previous children, 2 for those with only boys as previous children, and 3 for those with only girls as previous children. For families with four children, it is coded as



**Table 2. Matrix of zero-order correlation coefficients between social-economic status and sex preference on CEB.**

|   |                | 1 | 2     | 3     | 4      | 5      | 6      | 7      | 8      | 9      |
|---|----------------|---|-------|-------|--------|--------|--------|--------|--------|--------|
| 1 | FINCOME        |   | 0.089 | 0.168 | 0.128  | 0.264  | 0.056  | 0.14   | -0.044 | -0.074 |
| 2 | FAGE           |   |       | 0.067 | 0.052  | -0.045 | 0.07   | -0.002 | 0.212  | 0.241  |
| 3 | PERIOD         |   |       |       | -0.048 | -0.011 | -0.117 | 0.031  | -0.066 | -0.091 |
| 4 | FIMG           |   |       |       |        | 0.147  | 0.373  | -0.058 | 0.053  | 0.059  |
| 5 | FEDU           |   |       |       |        |        | 0.069  | 0.618  | -0.167 | -0.243 |
| 6 | MIMG           |   |       |       |        |        |        | 0.164  | 0.09   | 0.093  |
| 7 | MEDU           |   |       |       |        |        |        |        | -0.084 | -0.143 |
| 8 | SEX PREFERENCE |   |       |       |        |        |        |        |        | 0.79   |
| 9 | CEB            |   |       |       |        |        |        |        |        | —      |

Variable acronyms used in the table:

FINCOME - Income of women

FAGE - Age of women

PERIOD - Time of cohort

FIMG - Immigrant status of women

FEDU - Education of women

MIMG - Immigrant status of women

MEDU - Education of men

SEX PREFERENCE - Offspring sex preference

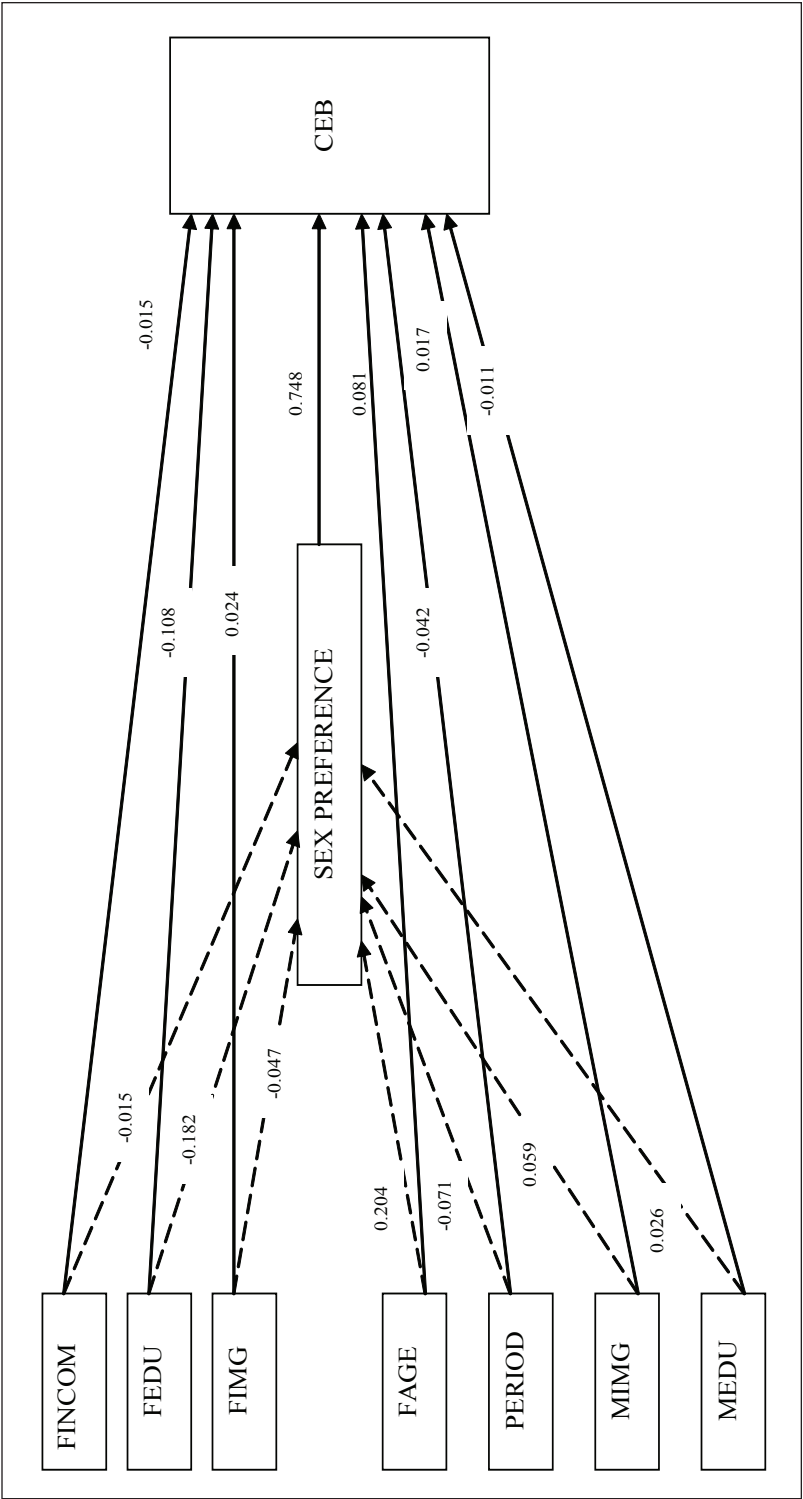
CEB - Children ever born

1 for those with two boys and one girl as previous children, 2 for those with only boys as previous children, 3 for those with two girls and one boy as previous children, and 4 for those with only girls as previous children. The coding reflects the effect of a preference for sons, and a preference for gender balance for each parity, as illustrated in Table 1.

Table 2 presents the zero-order correlation matrix for four socioeconomic variables of Chinese married women, two socioeconomic variables of their husbands, one period variable, and one normative variable, represented by offspring sex preference, and the dependent variable of CEB as displayed in the theoretical model. The strongest correlation exists between offspring sex preference and CEB ( $r = 0.79$ ). CEB is also positively related with FAGE ( $r = 0.241$ ), FIMG ( $r = 0.093$ ), and MIMG ( $r = 0.059$ ), and negatively related with FINCOME ( $r = -0.074$ ), PERIOD ( $r = -0.091$ ), FEDU ( $r = -0.243$ ), and MEDU ( $r = -0.0143$ ).

Figure 2 displays the effects of sex preference and socioeconomic determinants on fertility. The path coefficients are the standardized partial regression coefficients (betas) from multiple regression equations. Each of them denotes the amount of standard deviation change in the dependent variable of a 1-standard-deviation change in the independent variables (controlled for other independent variables). All these independent variables are statistically significant at the 5 per cent level except for the variable of female income. The residual effects are not shown here. In Figure 2, Chinese fertility behaviour is first affected by offspring sex preference and socioeconomic determinants. Meanwhile, offspring sex preference—the strength of son preference in particular—is determined by the socioeconomic characteristics of Chinese married women and their husbands, which also work on fertility indirectly in combination with sex preference.

Figure 2. Empirical model.



**Table 3. Effects of independent variables on CEB.**

| Variable   | Total  | Direct           | Total Indirect | Indirect via Sex Preference | Other  |
|------------|--------|------------------|----------------|-----------------------------|--------|
| PREFERENCE | 0.790  | 0.747 (0.005) *  | 0.043          |                             |        |
| FEDU       | -0.243 | -0.108 (0.002) * | -0.135         | -0.182 (0.003) *            | 0.047  |
| FIMG       | 0.059  | 0.024 (0.001) *  | 0.035          | -0.047 (0.001) *            | -0.020 |
| PERIOD     | -0.091 | -0.042 (0.010) * | -0.049         | -0.071 (0.015) *            | 0.022  |
| FAGE       | 0.241  | 0.081 (0.001) *  | 0.160          | 0.204 (0.062) *             | -0.044 |
| FINCOME    | -0.074 | -0.015 (0.000) * | -0.059         | -0.015 (0.000) **           | -0.044 |
| MIMG       | 0.093  | 0.017 (0.001) *  | 0.076          | 0.059 (0.002) *             | 0.017  |
| MEDU       | -0.143 | -0.011 (0.002) * | -0.132         | 0.026 (0.003) *             | 0.158  |

\* statistically significant at 5% level

\*\* not statistically significant at 5% level

Standard errors are reported in parentheses.

Table 3 presents the total, direct, and indirect effects of these independent variables on CEB. The total effect of a variable on CEB is the zero-order correlation coefficient. The direct effect is the path coefficient between the independent variable and CEB. The indirect effect is the difference between the total effect and direct effect, and it could be decomposed into two components: the indirect effects on CEB via the sex preference and other (or joint or spurious) effects.

As for the correlation between fertility (or CEB) and its determinants, variables of FINCOME, FEDU, FAGE, and MEDU do not show any results conflicting with observations in pioneer studies; the discussion will therefore focus on the other variables.

Offspring sex preference exerts a positive direct effect on CEB, and it is the highest value of all effects ( $p = 0.748$ ), indicating that offspring sex preference, especially son preference, is the primary stimulus to Chinese fertility. The variable PERIOD is negatively correlated with CEB, suggesting a constant decline in fertility over time.

Interestingly, the time spent in this country for Chinese married women and their husbands (i.e., FIMG and MIMG) is positively related to fertility, and it denotes two possible facts. First, foreign-born Chinese or immigrants bore more children the longer they stayed in America. This fact can be explained by the disruption hypothesis, which states that the process of migration would interfere with fertility (Goldstein and Goldstein 1983). The interference derives from seasonal factors, spousal separation, or reduced fecundity owing to pressure typically associated with moving to a new place or country (Massey and Mullan 1984; Hervitz 1985). Disruption effects are posited to be temporary, occurring only for a short period of time. After the initial period, the level of fertility may resume its previous pace, or even accelerate in order to compensate for the disruption. Second, American-born Chinese bore more children than the foreign-born did; this will be explained below.

Now we look at the correlation between offspring sex preference and its socioeconomic determinants. The two variables of Chinese women's education ( $p = -0.182$ ) and income ( $p = -0.015$ ) exert a negative effect on preference, proving the previous hypothesis that highly educated people, or *the elite*, are more likely to be open to new worldviews. The women's immigration variable also exerts negative effect ( $p = -0.047$ ), demonstrating that increased exposure to the host society would make the Chinese less traditional. That is to say, as compared with the foreign-born, American-born Chinese are less likely to be

associated with son preference but more likely to prefer a balanced gender. At the same time, the influence of son preference would decrease with a longer stay in the host society for foreign-born Chinese or immigrants.

A positive correlation exists between women's age and son preference ( $p = 0.204$ ), reflecting differing attitudes towards traditions across age groups. It seems that younger Chinese are more open to new ideas in terms of egalitarianism, while older ones are not.

The PERIOD variable shows a negative correlation with offspring sex preference ( $p = -0.076$ ), implying a declining influence of son preference since 1990. Of the women's variables, education holds the largest negative value ( $p = -0.243$ ). Therefore, women's education attainment plays a primary role in eroding the influence of son preference.

The two male variables—education and immigration (i.e., MEDU,  $p = 0.026$ ; and MIMG,  $p = 0.059$ )—are positively related to offspring sex preference, suggesting that husbands may behave differently from their wives. Educational attainment and a longer stay in this country do not make them more open to shared roles and egalitarianism. It may tell us that in comparison with women, men are less likely to support a social movement that leads to deteriorating patriarchal dominance. They might be more willing to stay in the current gender system that is beneficial to them.

## Discussion and conclusions

This study has examined the correlation between offspring sex preference and fertility behavior among Chinese-Americans using the 1990 and 2000 PUMS data. We have found that while Chinese-Americans prefer a gender balance, like Whites, they do show a strong son preference. The effect of son preference, which exceeds the preference for a gender balance, is not evident for the second birth but apparent for higher births. Of all the normative and non-normative or socioeconomic factors investigated, this research has uncovered the fact that offspring sex preference appears to be the greatest stimulus to Chinese fertility.

Fertility behavior of minorities and immigrants is affected by various socioeconomic factors, including educational (or occupational) attainment and opportunity, age, birth-place, and length of exposure to the host society. These factors also influence people's attitudes towards offspring sex preference. Or, stated in a different way, socioeconomic factors work on fertility in combination with offspring sex preference. Having empirically analyzed the direct and indirect effects, we discovered that women's educational attainment plays the greatest role in depressing the impact of son preference. However, it by no means denies the influence of son preference among the well-educated Chinese, especially when it comes to making decisions on later births.

This research has shown that increasing the length of stay in the United States would decrease the traditional influence on Chinese women. American-born Chinese are more likely to hold the same family value as Whites, while foreign-born Chinese are more likely to be associated with son preference, though the influence declines with the increasing length of stay in the US. According to Bongaarts and Potter (1983), if a couple bears children until they have at least one son, then they would have an average of 1.94 births. However, if a couple stops having children only after having a daughter and a son, then they would have an average of three births. This explains to some degree why American-born Chinese bear more children than foreign-born Chinese or immigrants.

The influence of son preference becomes stronger with increasing age, indicating attitudinal variety towards traditions across age groups. The younger Chinese are more open to new ideas, while the older ones do not want to break with the traditional world. However, the age effect can be viewed from different perspectives. Son preference is more effective at high-order births, and it usually occurs at the later stages of childbearing age. When approaching the end of this range, older women may feel more pressure from their ethnic traditions and therefore decide to have another birth in the hope of having at least one son.

In relation to son preference, Chinese men behave differently. The variable of education does not work as a depressing factor, as it does with women. For men, traditional influence does not diminish with increasing length of stay in this country, either. These findings may demonstrate men's inflexible attitudes toward gender roles in a family and in a society. Without pushing from women, men would not be willing to give up their dominant status awarded by the patriarchal society.

Chinese fertility is a period behaviour. This research reveals that the influence of son preference has been diminishing since 1990 [in the US]. Despite that, son preference will continue to sustain a positive influence on Chinese behaviour, since it helps to prevent further fertility decline. As observed, son preference mainly affects childbirth at higher parities. Those with final births beyond two children made up only 19 per cent of the total Chinese families in the 2000 [US] census. Therefore, son preference works only on a small portion of Chinese-Americans. This fact, along with Chinese achievement in education and their difficulty and hardship experienced in the immigration process explain well the low level of fertility possessed by the Chinese in America.

The issue of sex ratios of newborn children among Asian-Americans has drawn more and more attention as it arouses concern regarding the consequences brought by techniques of sex selective abortion. This issue has also set off debates between pro-life and pro-choice groups in the United States. We are planning a research project in an attempt to further explore effects on sex ratios of children caused by son preference among Asian-Americans.

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