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Effect of Education on Premarital Sex and Marriage in Taiwan

Minja Kim Choe and Hui-Sheng Lin

Minja Kim Choe is a Senior Fellow with the East-West Center's Research Program, Population and Health Studies, Honolulu, Hawaii.

Hui-Sheng Lin is the Deputy Director at the Taiwan National Institute of Family Planning, Taichung, Taiwan.

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AYARR
Asian Young Adult Reproductive Risk Project

This research is a product of the East-West Center's Asian Young Adult Reproductive Risk (AYARR) project, supported by USAID through its MEASURE Evaluation Project. The AYARR project supports a research network devoted to producing an Asian regional perspective on young adult risk behaviors through secondary and cross-national comparative investigation of large-scale, household-based surveys of youth.

The project presently involves investigators and national surveys in six Asian countries. The government of **Hong Kong** (now the Hong Kong Special Administrative Region) has supported area-wide youth surveys, both household-based and in-school, in 1981, 1986, 1991, and 1996. The 1994 **Philippines**' Young Adult Fertility and Sexuality Survey (YAFS-II) was conducted by the Population Institute, University of the Philippines, with support from the UNFPA. **Thailand**'s 1994 Family and Youth Survey (FAYS) was carried out by the Institute for Population and Social Research at Mahidol University, with support from the UNFPA. In **Indonesia**, the 1998 Reproduksi Remaja Sejahtera (RRS) baseline survey was funded by the World Bank and by USAID through Pathfinder International's FOCUS on Young Adults program. The RRS was carried out by the Lembaga Demografi at the University of Indonesia under the supervision of the National Family Planning Coordinating Board (BKKBN). The **Nepal** Adolescent and Young Adult (NAYA) project, which includes the 2000 NAYA youth survey, is being carried out by Family Health International and the Valley Research Group (VaRG) with support from USAID to Family Health International (FHI). The **Taiwan** Young Person Survey (TYPF) of 1994 was carried out by the Taiwan Provincial Institute of Family Planning (now the Bureau for Health Promotion, Department of Health, Taiwan) with support from the government of Taiwan.

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In most of the traditional civilized societies, sexual intercourse is viewed as an activity reserved for adults and between married couples. Variations are observed in most societies. In some societies where marriage process takes some duration of time, it may be socially acceptable that the marrying couple begins to have sexual intercourse before the "official" date of marriage. In many societies, it is often considered normal that single adult men engage in sexual activity with commercial sex workers although sexual activity of single women is not considered as acceptable behavior in most societies except for those working as commercial sex workers.

The traditional norm on premarital sexual behavior is well understood because sexual intercourse among single adolescents and young adults are associated with certain risks. The risk of contracting sexually transmitted infections is high among sexually active single persons. Sexual activity, especially between partners without marriage plans, may result in unwanted pregnancies. Unwanted pregnancies may lead to induced abortions, unwanted childbearing, or premature or unwanted marriage. These events, in turn, may have adverse consequences on health as well as social, economic, and psychological welfare later in life of the couple engaging in sex as well as their children.

Until the mid-1900s, marriage and sexual behavior of Chinese men and women, including those of Taiwan, followed norms based on patriarchal family system. Marriage was early and universal except for men in lowest socioeconomic status who could not afford to get wives. It was considered essential for women to be sexually faithful to husbands by having no premarital sex and not remarrying after widowhood. Men, on the other hand, often had premarital sex, extramarital sex, and remarried after widowhood. Prostitution is thought to have been widespread (Fricke, Chang, and Yang 1994).

Taiwan has experienced remarkable social, economic, and demographic changes that affect lives of adolescents and young adults. Among them are increased educational opportunities for both men and women, increasing employment opportunities for women, rising age at first marriage, and increasing proportions of men and women who never marry (Hermalin, Liu, and Freedman 1994; Lin, Choe, and Tsuya 1999; Lin, Lee, and Thornton 1994). Arranged marriages are decreasing and love matches are increasing (Thornton, Chang, and Lin 1994).

Associated with rising age at marriage and increasing love matches are changes in dating behavior and premarital sexual intimacy. A study based on a series of national surveys of married women reports that the proportion of women who began to have sexual relationship with husband before marriage increased from 11 percent among 1960–64 marriage cohort to 40 percent among 1980–84 marriage cohort (Thornton, Chang, and Yang 1994). The study also reports that the proportion of women who have dated men other than their husbands increased substantially, but premarital sex with men who were not their husbands were minimal until early 1980s. Two island-wide surveys of senior high school, vocational high school, and college students report that the proportion of students with premarital sexual experiences increased from 6% to 12% among male students and from 1% to 7% among female students between 1984 and 1995 (Lin and Lin 1996).

As age at marriage continues to rise and attitudes of young adults continue to become more tolerant of non-traditional behavior, it is likely that the sexual behavior among Taiwanese youth will

change as well. In addition, widespread knowledge about and easy access to contraceptive methods make it easier for young adults to engage in sexual activities with much reduced risks of unwanted childbearing and sexually transmitted infections. It is likely that increasing proportions of young men and women would engage in sexual activity even when they do not plan to marry. It is also likely that men's premarital sexual activity with commercial sex workers become less frequent and their sexual activity with women friends become more frequent.

Education and Premarital Sex

In this paper, we examine the effect of education on the probability and timing of experiencing premarital sex and of marriage among women and men in Taiwan. It is likely that high level of education is associated with lower level of sexual activity at young ages and later age at marriage. Education is the main activity among adolescents and young adults and is usually considered to be a part of growing up. Therefore, adult behavior such as marriage and sexual intercourse are usually postponed until they complete their education and establish social and economic independence as an adult. Thus, higher education would be associated with lower level of sexual activity and lower probability of marriage at young ages. Not surprisingly, studies have found that educational attainment is the most powerful determinant of the timing of first marriage and teenage pregnancies among Taiwanese women (Casterline 1980; Lin 1988; Lin 1998).

When education continues for long period after attaining physical adulthood, however, it is natural that some people engage in sexual activity and marriage before completion of education. Even then, higher education may be associated with lower probability of premarital sex for several reasons. More educated women and men are more likely to be aware of risks associated with premarital sex such as increased risks of contracting sexually transmitted infections and of unwanted pregnancies. More educated men and women are also more likely to successfully control the biological urges to engage in premarital sexual activities.

On the other hand, it is possible that among older young adults, especially after completion of their education, higher education is associated with higher probabilities of premarital sex as well as of marriage. More educated men and women are likely to have more opportunities to meet companions of opposite sex and develop intimate relationships. Because education is one of the most important indicators of an individual's potential for economic and social achievement, men and women with higher education may be attracted more by the opposite sex as companions and future spouses. More educated men and women are also more likely to have non-traditional attitudes, to be better able to "protect" themselves against risks, and therefore engage in premarital sex more frequently than less the educated.

Gender and Premarital Sex

In general, women face more serious consequences of risks associated with premarital sex such as unwanted pregnancies and sexually transmitted infections than men. Therefore, women may avoid premarital sex more than men and among women. Men, on the other hand, face less serious consequences of premarital pregnancies. In addition, it is believed that prostitution has been prevalent historically in Taiwan (Spence 1984; Wolf 1972). These factors make it likely that men are more likely to have premarital sexual experience than women, by using commercial sex workers. It is also likely that men's premarital sexual behavior is not associated strongly with such social factors as the level of education. Thus, the effect of education on premarital sex is likely to be strong among women but not so strong among men.

Data

We use the 1994 Taiwan Young People Survey conducted by at Taiwan National Institute for Family Planning. Altogether 1,200 men and 3,600 women were selected by a three-stage (townships, neighborhoods, individuals) stratified random sampling of the 15–29 year olds in the Taiwan area. The response rates were 74% for men and 77% for women, resulting in 884 men and 2,766 women with completed questionnaires. The survey collected information on retrospective histories of education, residential mobility, employment, marriage, and sexual activity. The survey also collected a variety of information on dating behavior, premarital sex, spouse selection, and engagement.

Special considerations were given for the collection of information concerning premarital sexuality which was considered sensitive about which it is difficult to get accurate information. The survey used a separate short questionnaire to be self-administered after the completion of interview of the main questionnaire. The respondents were asked to fill out this form in privacy, put the completed questionnaire in the envelope provided, seal it himself/herself and hand over to the interviewer. The envelopes were stamped "Strictly confidential. Not to be opened." In order to encourage the respondents to complete the short questionnaire completely and accurately, interviewers explained the purpose of the research and confidentiality of the data to respondents.

After leaving the respondent's home, the interviewer entered respondent's ID number of the main questionnaire on the envelope of the self-administered questionnaire for later linking of the two parts of questionnaire. All respondents, men and women, regardless of marital status, were given the self-administered questionnaire. Questions differed slightly for married and single persons.

Method

Our main purpose is to estimate the effects of education on the probabilities of having premarital sex and of marrying at ages 15–28, controlling for the effects of other covariates known to affect the probabilities of premarital sex and marriage.[1] There are four possible categories that describe the combination of marital status and the experience of premarital sex: (1) being single without sexual experience, (2) being single with sexual experience, (3) being married with premarital sexual experience, and (4) being married without premarital sexual experience. Figure 1 shows how a person can move from one category to another in one year.

A person who is single and has no sexual experience at the beginning of a year can change to any of the other three categories during the one-year period or remain in the same category until the end of the year. A person who is single and have sexual experience at the beginning of a year can change to being married with premarital sexual experience during the one-year period or remain in the same category. By definition, married persons cannot change categories. We will estimate the annual transition probabilities of each possible transition from one category to another as indicated by arrows in Figure 1.

For the analysis presented in this paper, we consider the premarital sex with future spouse after engagement as a part of marriage process and not as premarital sex. Single men and women who are engaged and have had premarital sex with only one partner are reclassified as having had no

[1] The survey included men and women of ages 15–29. We therefore have incomplete information on the events at age 29 and our analysis of events is limited to ages 15–28.

premarital sex. This resulted in changes for 0.4 percent of single men and 0.5 percent of single women. Married men and women who reported having first sexual intercourse before marriage but after engagement and having only their spouse as sexual partner are reclassified as having had no premarital sex. This resulted in reclassifying 13 percent of married men and 24 percent of married women.

First we compute life tables based on the events (first premarital sex and marriage) during the five years before the survey for each sex. We begin with constructing "person-year" records. From each respondent in the survey, records pertaining to each year for the five-year period before the survey are constructed. These records will have all the information about the person from the survey as well as some additional information pertaining to the year. The key variable of the "person-year" record is the age of the respondent at the beginning of the year. The "person-year" records will be generated only for the years when respondent's age falls within 15–28 range. Other variables such as the marital status at the beginning of the year, whether the person had experienced premarital sex before the beginning of the year, how long the person has been out of school at the beginning of the year, and whether events such as premarital sex and marriage took place during the year are created and added to the "person-year" records. Annual transition probabilities among the four categories are computed from the "person-year" records, and these probabilities are used for computing life tables.

We then estimate the effects of education on the transition probabilities using discrete-time event-history analysis approach. Specifically, we estimate the age-specific annual transition probabilities (probabilities of events) for ages 15 through 28 for men and women with different levels of education, controlling for the effects of other covariates using multivariate analysis models. Previous studies have identified some key factors associated with variations in premarital sexual behavior. Physical maturity, family's socioeconomic background, characteristics of community, and the degree of closeness to parents have been identified as key factors associated with risk-taking behavior among adolescents and youths including premarital sexual behavior (CDC 1994; Goodson et al. 1997; Kann et al. 1993; Neumark-Sztainer et al. 1996; Resnick et al. 1997; Udry et al. 1986). Five covariates are included in the multivariate models as proxies of these factors: (1) age of the "person-year" record; (2) childhood residence; (3) socioeconomic status of family; (4) the respondents' level of communication with mother; and (5) the respondents' level of communication with father.

Two sets of multivariate models are estimated. For persons who are single and have no premarital sexual experience, we estimate the effect of education and other covariates on three possible transition probabilities (see Figure 1) using multinomial logit regression models. For persons who are single and have premarital sexual experience, we estimate the effect of education and other covariates on the probability of marriage using binary logit regression models.

The level of education of the respondent is measured by the number of years since leaving school in the "person-year" record. The survey has information on the highest level of school and grade completed. From this, we first estimated the age at which the respondent completed his/her education. For example, for the person whose level of education is completion of senior high school, we assume that the person was in school until age 18 and not in school after that. For this person, the variable indicating years since completion of education is zero for ages 15 through 18, 1 for age 19, 2 for age 20, and so on. This approach allows us to treat education as a variable whose value changes with age.

Childhood residence is coded as a dummy variable indicating whether the respondent was living in urban areas continuously since age 12 or not. Although this is not a perfect measure of continuous urban residence for each age in last five years, it is the best measure we can extract from the survey. We use father's level of education as a proxy for the socioeconomic status of the family. It

is coded as one if father had more than junior high school education, and as zero otherwise. The level of communication with parents is represented by two dummy variables: one for communication with mother and one for the communication with father. If the respondent replied yes to the question, "When you are in trouble or worried about something, do you talk to your mother?" the communication with mother is coded as one. We construct the variable indicating communication with father similarly.

For women, we fit models for three groups of ages: 15 through 18, 19 through 23, and 24 through 28. This approach allows us to estimate different effects of education for different age groups. The first age group includes typical ages of senior high school students. The remaining ages are divided into two groups of same sizes. For men, due to small sample size and very low probabilities of marriage under age 19, we combined age groups 15 through 23.

We limit the analysis to the events during the five-year period preceding the survey. We impose the five-year window for two reasons. First, variables such as childhood residence and communication with parents reflect the situation at the time of survey, and become inadequate if we try to apply them to situation in the past. Second, because the survey collected information from persons under age 30, the events in distant past are limited to persons of younger ages. For example, on events five years before survey, our data is limited to events among persons under age 25. In order to minimize these problems, we chose a "window" which is relatively short, but long enough to have reasonable number of events to be analyzed. As discussed earlier, we expect that both the level of premarital sex and its relationship with education to differ by gender. We therefore estimate models separately for men and women.

Once the coefficients of multinomial and binary logit models are estimated, we apply multiple classification analysis technique to compute age-specific transition probabilities by levels of education. The multiple classification analysis technique amounts to substituting appropriate values of age and years since completion of education in the estimated model equations holding other variables at their sample means, and estimating the transition probabilities. The age-specific transition probabilities can be put together to compute cumulative statistics using life table methods. For example, we can compute proportions of men and women in four categories of marital status and the experience of premarital sex at exact ages 27.

Descriptive Statistics

Table 1 shows the descriptive statistics of the characteristics of the respondents used in the analysis. Respondents are divided about equally in the three 5-year age groups. Distribution of marital status reflects late mean age at first marriage, especially among men. Slightly over half of the respondents lived in urban areas continuously since age 12. The educational level is high and there is no gender difference in average years of education. Men are more likely than women to have more than 12 years of education. Slightly over a quarter of respondents have fathers with more than junior high school education. The level of communication with mother is much higher than the level of communication with father for both sexes. The level of communication with father is slightly higher among male youths than among female youths, and the level of communication with mother is slightly higher among female youths than among male youths.

Table 2 shows percentages of men and women who report that they had premarital sex by age and marital status. Premarital sex is rare among teen-agers. Among men age 20 or older, premarital sex is very common. Nearly half of men age 20–24 and almost two-thirds of men age 25–29 have experienced premarital sex. Slightly smaller proportions of women have experienced premarital sex.

Large gender differences are found in proportions of single persons who had premarital sex (30% for men and 11% form women) and married persons who had premarital sex with someone whom they did not marry (42% for men and 12 % for women). The observed gender difference is consistent with the norm that demands sexual abstinence among single women and condones sexual permissiveness among men. It is likely that some men are having premarital sex with commercial sex workers. At the same time, it is possible that the reporting of premarital sex is less complete among women than among men.

Selected characteristics associated with premarital sex are available in the survey. Table 3 shoes some of these characteristics by gender and level of education. Majority of sexually active singe persons had sex with more than one partner, and men are more likely than women to have had multiple sexual partners. Married men are about three times more likely than married women to have had premarital sex with someone they did not marry. Men and women with lower education are slightly more likely to have had sex with more than one partner. The table also shows that the majority of sexually active single men and women use contraceptives regularly (always or most of the time). Contraceptive use at first premarital sex, on the other hand, is not high. Contraceptive use is higher among the more educated. Slightly more than half of the respondents who used a contraceptive method at first sex used condoms (not shown in the table). About half of the respondents had their first sex at their or partner's residence (home or dormitory). Hotels and hostels were used very frequently as a venue for the first sexual intercourse. Use of hotels/hostels is more common among less educated than among more educated. Men are also more likely to have had first sex at hotels/hotels. Some men reported having their first sex at brothels.

These characteristics indicates that risks associated with premarital sex such as sexually transmitted infection and unwanted pregnancies is likely to be higher among the less educated than the more educated. The less educated men and women seem to have premarital sex with uncommitted partners more often, and use contraceptives less frequently. Less educated men are much more likely to have had first sexual experience at a brothel than more educated men.

Current level of premarital sex and marriage

The current level of premarital sex and marriage are measured by the age-specific transition probabilities based on the events during the five-year period before the survey. Figure 2 shows four sets of the age-specific transition probabilities for women and men. The transition from being single with no premarital sexual experience to being single with premarital sexual experience (by having first premarital sexual during the year) is much higher among men than among women at all ages. Among men, it rises quickly up to age 18, shows small fluctuations between ages 18 and 26, and then rises rapidly again. Among women, it rises more slowly up to age 21 then changes little after that.

The age pattern of the transition from being single with no premarital sexual experience to being married with no premarital sexual experience (by marriage during the year) shows similar pattern for women and men except that the transition begins to rise earlier for women than for men, and is higher for women than for men at all ages. The probability peaks shortly after age 25 for both men and women. The transition from being single with no premarital sexual experience to being married with premarital sexual experience (by having first premarital sex and then marrying during the same year) has low probability, rises slowly and steadily with age, and is higher for women than for men. The transition from being single with premarital sexual experience to being married with premarital sex (by marriage during the year) shows strikingly different age patterns by gender. Among women the probability is high at young age then declines with age, whereas among men, the

probability is very low at young age, rises significantly after age 21, peaks at age 26, and then declines.

These age patterns of transition rates result in "synthetic" or "estimated" proportions of men and women in different marital statuses and sexual experiences as shown in Figure 3. By age 27, 42 percent of women have had premarital sexual experience, 53 percent are married, and 23 percent are both married and have premarital sexual experience. Among men, 57 percent of women have had premarital sexual experience, 31 percent of are married, and 20 percent are both married and have premarital sexual experience.

In summary, sexual activity begins earlier among men than among women and marriage begins earlier among women than among men. Premarital sex is much more prevalent among men than among women. Premarital sex is more closely related to marriage among women then among men, in the sense that the probability of marriage is very high among women who have experienced premarital sexual experiences, married women are less likely to have had sex with someone they did not marry.

Estimates from Multivariate Analysis

As discussed earlier, we estimate the effect of education on premarital sex and marriage by two sets of multivariate models: multinomial logit model for transition from being single with premarital sexual experience (Figure 1) and binary logit models for transition from being single with premarital sexual experience. The effect of education is estimated by the covariate that indicates the number of years since leaving school, as mentioned earlier in the method section. Table 4 shows the estimated coefficients of multinomial and binary logit models for women and men for different age groups (The complete set of estimated coefficients are shown in Appendix, Tables A1 through A4.).

Among women, estimated coefficients for "premarital sex vs. none" is positive and statistically significant for ages 15–18 and 19–23. The longer a woman has been out of school, the more likely she is to have premarital sex when the effects of age, urban residence, father's education, communication with mother, and communication is father is controlled. The coefficient is much larger for ages 15–18 than for ages 19–23. Thus, we find that lower education is associated with higher probability of having premarital sex before age 24, and the effect is larger at younger ages. Among women with no sexual experience, lower education is also associated with higher probability of marriage at all ages, whether it is preceded by premarital sex or not. The probability of marriage among single women with premarital sex, however, shows entirely different pattern. Education has no effect at ages under 24, but for ages 24–28, the estimated coefficient is negative and statistically significant, indicating that marriage probability among women with premarital sex is higher for more educated than less educated. In other words, it is more likely that premarital sex is followed by marriage if women have higher level of education.

Among men, education has little effect on the probabilities of premarital sex or marriage. The only exception is that before age 23, lower education is associated with marriage which is preceded by premarital sex.

The estimated multinomial and binary logit coefficients are used to estimate transition probabilities for men and women with selected set of characteristics. To illustrate the effect of education, we estimated transition probabilities for women and men who were in school until age 15 (9 years of education or completion of junior high school), until age 18 (12 years of education or completion of senior high school), and until age 22 (16 years of education or completion of four-year

college) holding all other covariates in the model at their sample means. The resulting transition probabilities are used to compute life tables and to estimate proportions of women and men in each category of marital status (single or married) and experience of premarital sex (yes or no) at each age. These estimated age-specific distributions are shown in Figure 4a for women and in Figure 4b for men.

By age 27, more than half of women with 9 years of education have experienced premarital sex but only 35 percent of women with 16 years of education have done so (Table 5). Among single women, the proportion with premarital sexual experience is higher among the less educated, but among married women, the proportion with premarital sex goes up slightly with increasing level of education. This is mainly because more educated women have higher probability of marriage after having experienced premarital sex. Among men, little variations are observed in distributions of marital status and the experience of premarital sex by level of education.

In summary, women tend to behave more traditionally than men: premarital sex is more closely related to marriage among women than among men. Among women, higher education is associated with more traditional behavior: more educated women exhibit closer relationship between premarital sex and marriage. At any fixed age, the less educated women are more likely to have had premarital experience than the more educated women. The lifetime experience of premarital sex, however, is not likely to have large differentials by education. More educated women, because they marry at much later age than the less educated, have longer time exposed to premarital sex, and it is likely that the proportion with premarital sexual experience will eventually reach the level for less educated. The risks associated with premarital sex, however, is lower among more educated women than less educated women because premarital sex is closely related to marriage among the more educated. Among men education has little effect on premarital sex or marriage.

Discussion

Prevalence of premarital sex is high among Taiwan youth. The prevalence is somewhat higher among men than among women. Premarital sex is more closely related to marriage among women than among men in two aspects: the proportion of married men who had premarital sex with someone who is not his wife is much larger than the proportion of married women who had premarital sex with someone who is not her husband, and women's premarital sexual experience is much more likely to be followed by marriage than men's premarital sexual experience. These gender differences suggest that either (1) women are underreporting their premarital sexual activities especially when they are not followed by marriage whereas men do not have similar pattern of underreporting, or (2) a significant proportion of men are having premarital sex with commercial sex workers. It is likely that both causes are operating. It is interesting, however, to note that the gender differences in premarital sexual behavior observed in Taiwan is much smaller than those observed in neighboring Southeast Asian countries such as Thailand and Philippines (Podhisita and Pattaravanich 1995; Xenos, Raymundo, and Lusterio 1997). Considering socioeconomic conditions in the three countries, it is likely that commercial sex is less prevalent in Taiwan than in the Philippines or Thailand.

The level of education has large and statistically significant effect on premarital sex and marriage among women, but not much effect among men. Women with less education are more likely to marry early and more likely to experience premarital sex than women with more education. Furthermore, women with less education are more likely to experience premarital sex and remain single than women with more education. Thus, less educated women behave "more traditionally" than more educated women by marrying early but more educated women behave "more traditionally" by having close relationship between premarital sex and marriage. At the same time, behavior of less

educated women is associated with "higher risks" than the behavior of more educated women by having premarital sex at early ages and having premarital sex that are not followed by marriage.

Descriptive statistics also indicate that less educated men and women are more likely to have multiple sexual partners and engage in premarital sex without use of contraceptive methods. Less educated men are also more likely to have sex with commercial sex workers.

Several further research questions emerge from the analysis presented in this paper. We need to understand why more educated women are less likely to have premarital sex and why their premarital sex is more closely related to marriage than less educated women. We have presented a few hypotheses at the beginning but further studies are needed to verify each hypothesis carefully. Another further research question is whether the sexual activities of less educated women are more likely to be the result of sexual coercion or violence. Whether less educated women and men experience more sexually transmitted infections and unwanted pregnancies or childbearing is yet another issue that requires further study.

References

Casterline, John B., 1980. *The Determinants of Rising Female Age at Marriage: Taiwan, 1905-1976*. Ph.D. Dissertation. University of Michigan.

Center for Disease Control (CDC). 1994. Health Risk Behaviors among Adolescents Who Do and Do Not Attend School—United States, 1992. *Morbidity and Mortality Weekly Report 1994,* 43: 129–132.

Fricke, Thomas E., Jui-Shan Chang, and Li-Shou Yang. 1994. Historical and Ethnographical Perspectives on the Chinese Family, pp. 22–48. A. Thornton and H. Lin (eds.). *Social Change and the Family in Taiwan*. Chicago: The University of Chicago Press.

Goodson, P., A. Evans, and E. Edmundson. 1997. Female Adolescents and Onset of Sexual Intercourse: A Theory-based Review of Research From 1984 to 1994. *Journal of Adolescent Health* 21: 147–156.

Hermalin, Albert, P. K. C. Liu, and D. Freedman. 1994. The Social and Economic Transformation of Taiwan, pp. 49–87. A. Thornton and H.-S. Lin (eds.). *Social Change and the Family in Taiwan*. Chicago: The University of Chicago Press.

Kann, L., W. Warren, J. T. Collins, J. Ross, et al. 1993. Results from the National School-Based 1991 Youth Risk Behavior Survey and Progress Toward Achieving Related Health Objectives for the Nation. *Public Health Reports 1993*, 108 (Supp): 47–55.

Lin, Hui-Sheng. 1988. *The Determinants of the Timing of Marriage for Women in Taiwan*. Ph.D. Dissertation. University of Michigan.

Lin, Hui-Sheng. 1998. *A Preliminary Report of the Survey of Teenage Mothers in Taiwan*. Working paper. Taichung: Taiwan National Institute of Family Planning.

Lin, Hui-Sheng, M. K. Choe, and N. O. Tsuya. 1999. *Marriage in Taiwan, Japan, and South Korea*. Paper presented at the 1999 Annual Meeting of the Population Association of America, 25–27 March, 1999, New York.

Lin, Hui-Sheng, M. L. Lee, and A. Thornton. 1994. Trends in the Timing and Prevalence of Marriage, pp. 202–263. A. Thornton and H.-S. Lin (eds.). *Social Change and the Family in Taiwan*. Chicago: The University of Chicago Press.

Lin Hui-Sheng and Su-Hui Lin. 1996. *Knowledge of, Attitude toward, and Practice of Sex and Their Changes among Senior High, Senior Vocational, and College Students in Taiwan*. Paper presented in the Fourth Congress of Sexology, July 6, 1996, Taipei.

Neumark-Sztainer, D., M. Story, S. French, et al. 1996. Patterns of Health-Compromising Behaviors among Minnesota Adolescents: Sociodemographic Variations. *American Journal of Public Health* 86: 1599–1606.

Podhisita, Chai, and Umaporn Pattaravanich. 1995. *Youth in Contemporary Thailand, Results From The Family and Youth Survey*. Bangkok: Institute for Population and Social Research, Mahidol University.

Resnick, M. D., P. S. Bearman, R. W. Blum, et al. 1997. Protecting Adolescents from Harm. *Journal of American Medical Association* 278: 823–832.

Spence, Jonathan D. 1984. *The Memory Palace of Matteo Ricci*. New York: Viking Press.

Thornton, A., J. S. Chang, and H. S. Lin. 1994. From Arranged Marriage toward Love Match, pp.148–177. A. Thornton and H.-S. Lin (eds.). *Social Change and the Family in Taiwan*. Chicago: The University of Chicago Press.

Udry, J. R., L. M. Talbert, N. M. Morris. 1986. Biological Foundations for Adolescent Female Sexuality. *Demography* 23: 217–230.

Wolf, Margery. 1972. *Women and the Family in Rural Taiwan*. Stanford: Stanford University Press.

Xenos, Peter, Corazon M. Raymundo, and Clarinda R. Lusterio. 1997. *Casual, Commercial, and Committed: A Typology of Premarital Sex in the Philippines*. East-West Center Working Papers, Population Series No. 95. Honolulu: East-West Center.

Figure 1. Schematic diagram of annual transition: Marital status and experience of premarital sex.

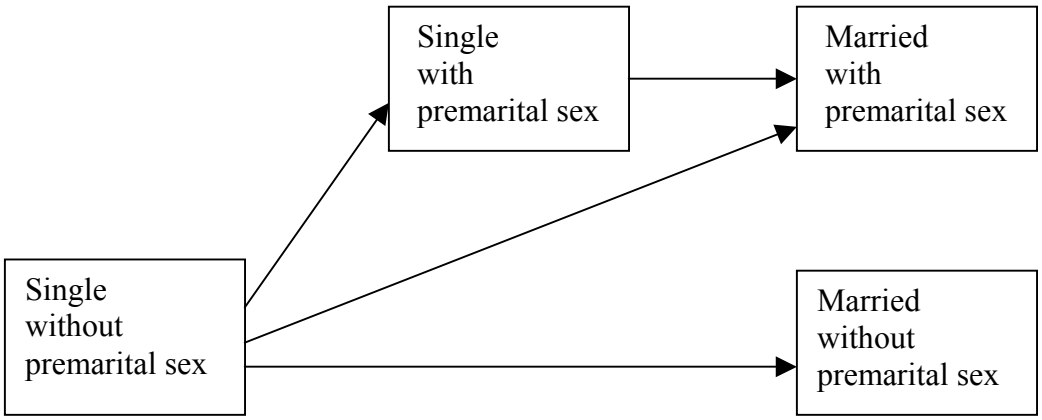


Figure 2. Age-specific transition probabilities of marital status and premarital sexual experience, Taiwan 1989-93

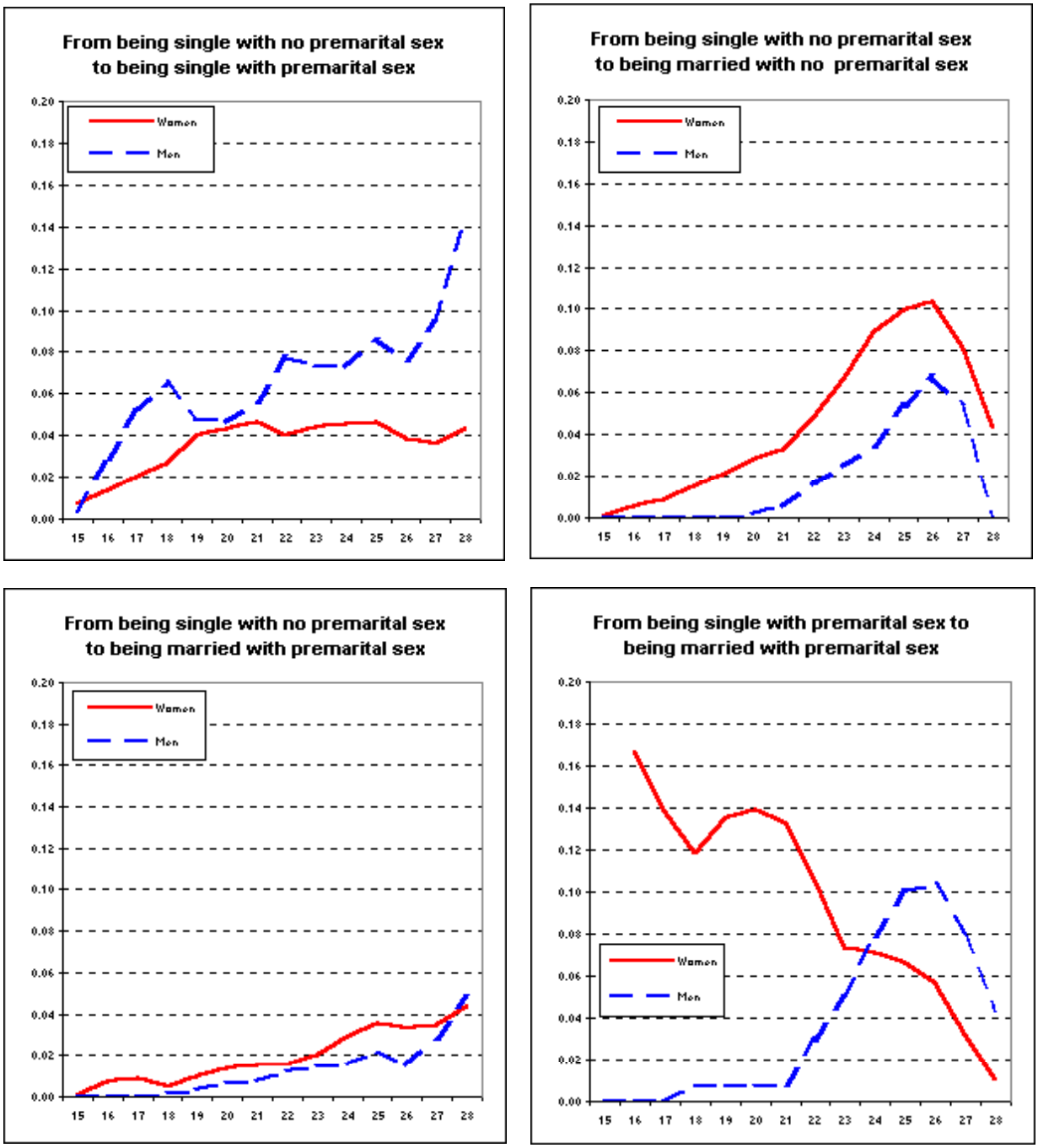
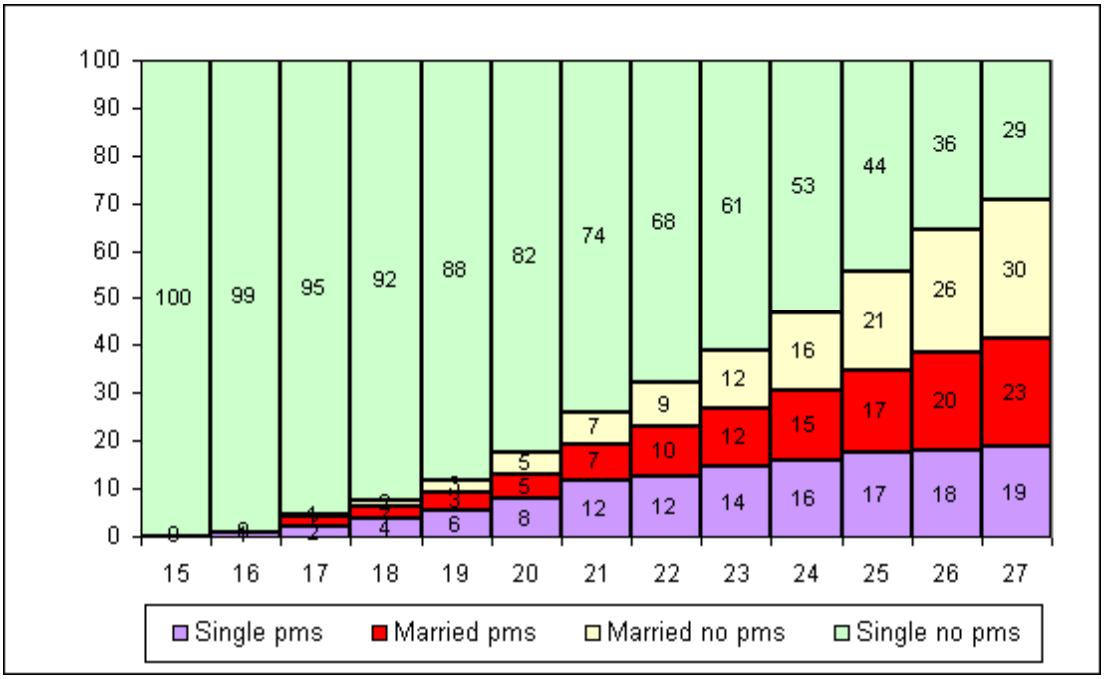


Figure 3. Estimated percent distribution of men and women by marital status and experience of premarital sex based on transition probabilities during 1989-93, Taiwan

All women



All men

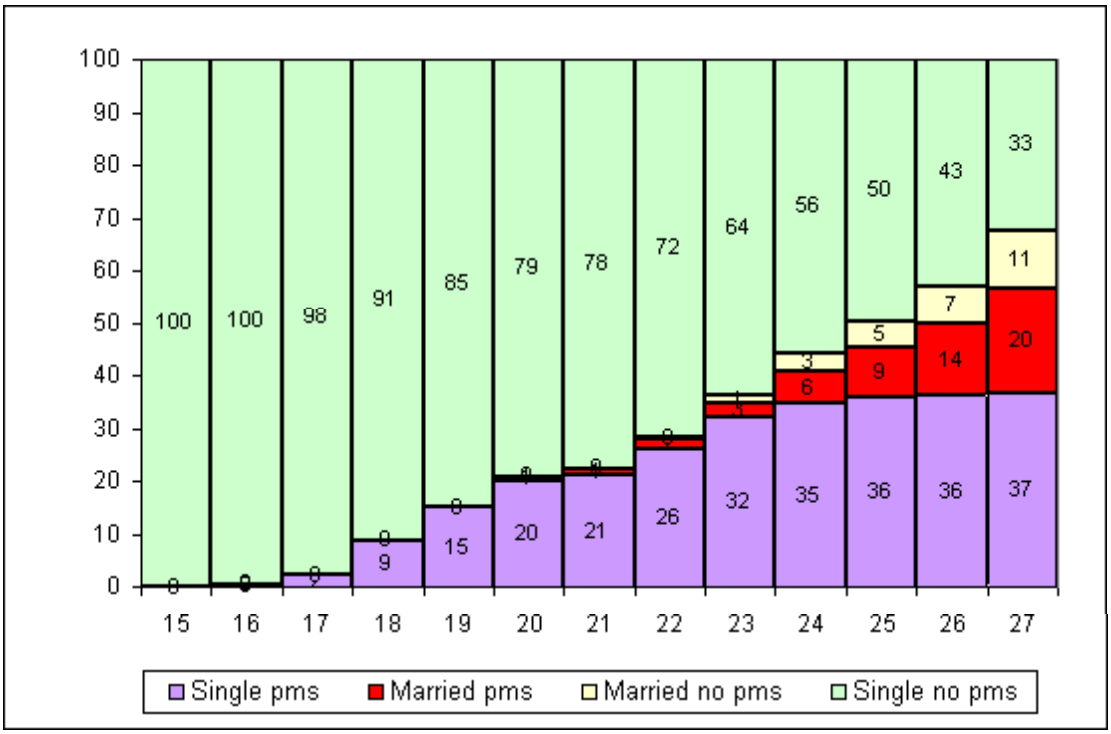
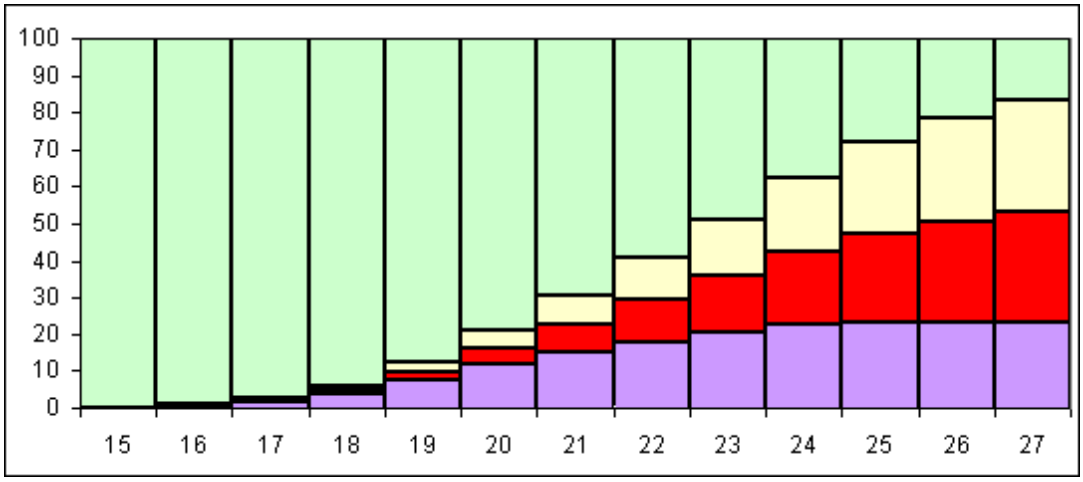
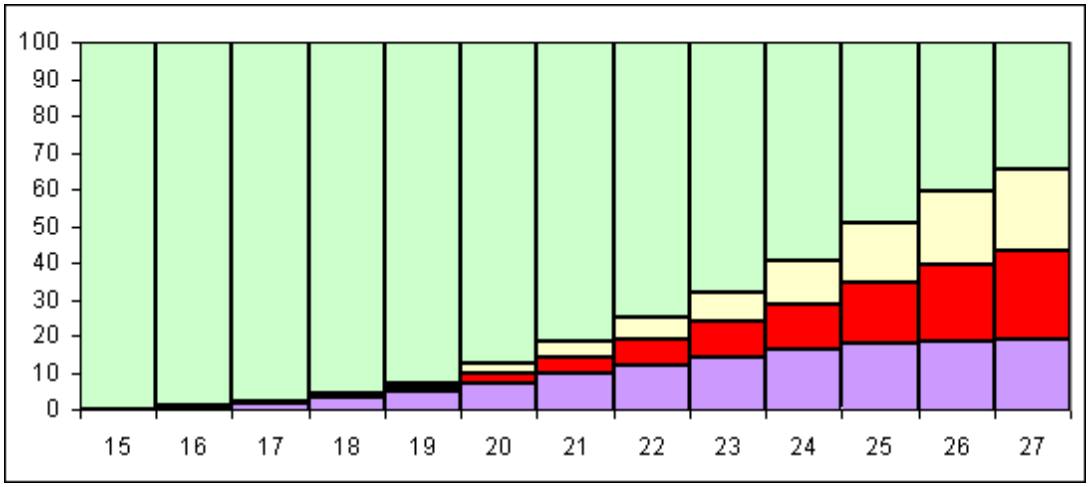


Figure 4a. Estimated percent distribution of women with selected levels of education by marital status and experience of premarital sex, Taiwan 1989-93

In school until age 15



In school until age 18



In school until age 22

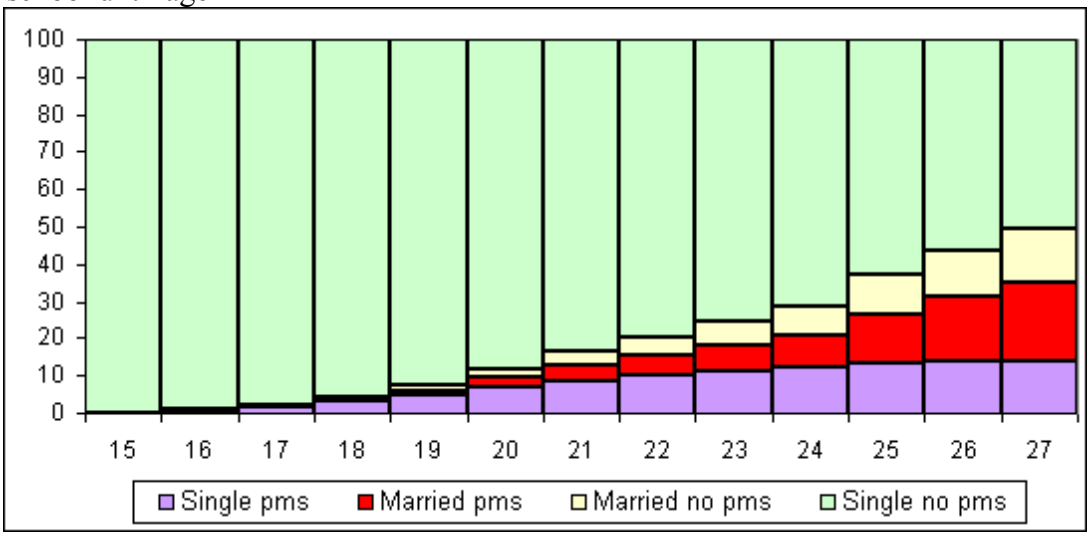
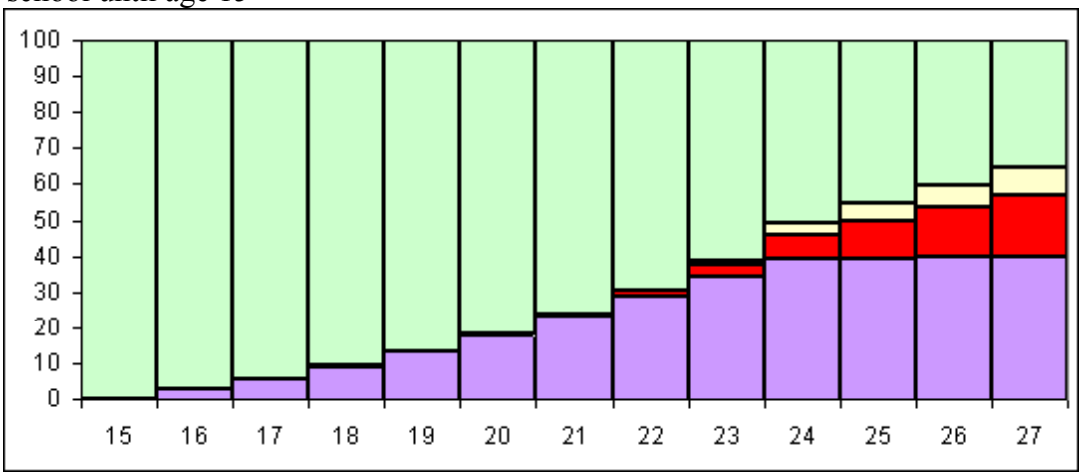
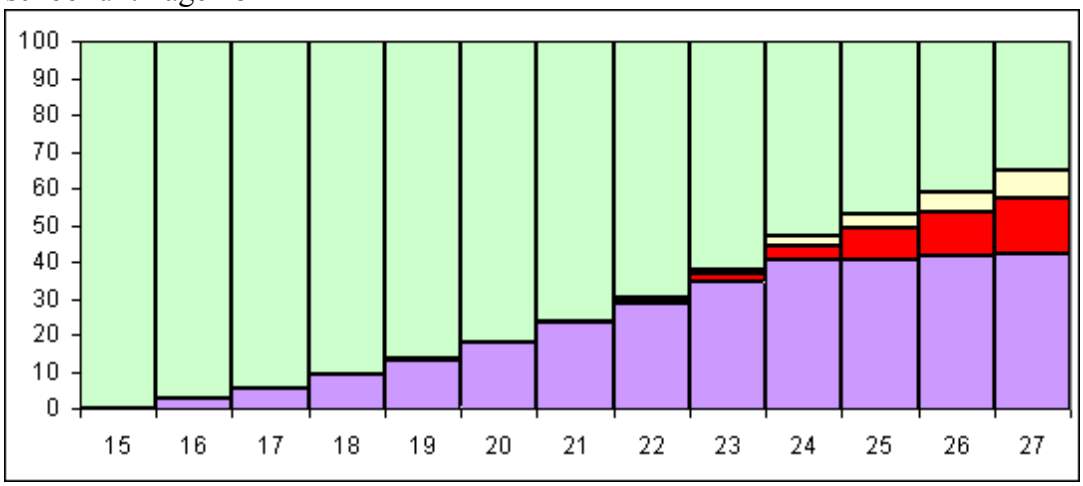


Figure 4b. Estimated percent distribution of men with selected levels of education by marital status and experience of premarital sex, Taiwan 1989-93

In school until age 15



In school until age 18



In school until age 22

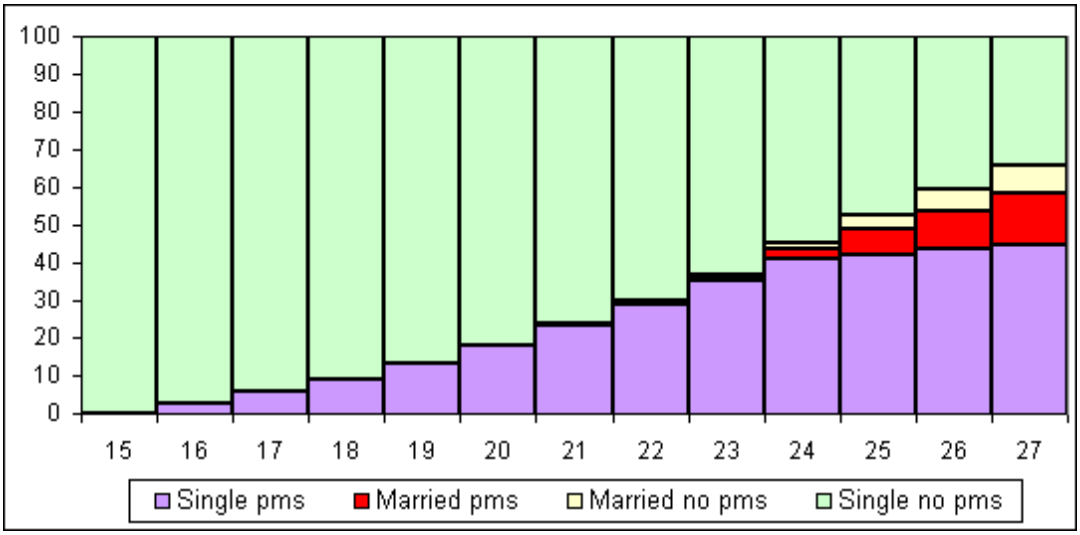


Table 1. Descriptive statistics of basic characteristics of respondents, 1994 Taiwan Youth Survey

	Men	Women
Number of respondents	884	2765
Age distribution (percent)		
15-19	34	36
20-24	30	31
25-29	37	33
Percent married		
Age 15-19	0	2
Age 20-24	8	29
Age 25-29	42	69
Lived in urban area continuously since age 12	55	55
Percent with more than 12 years of education, age 25-29	34	26
Percent whose father has more than jr. high education	28	26
Percent who talk to mother when in trouble	45	55
Percent who talk to father when in trouble	27	21

Table 2. Percent who had premarital sex by age, sex, marital status and relationship with the partner, 1994 Taiwan Youth Survey

	Age 15-19 % (N)	Age 20-24 % (N)	Age 25-29 % (N)	Total % (N)
Men				
All marital status	7% (297)	44% (263)	65% (324)	39% (884)
Single	7% (297)	40% (242)	52% (189)	30% (728)
Married: any premarital sex	-- (0)	60% (21)	65% (135)	65% (156)
Married: premarital sex with non-spouse	-- (0)	29% (21)	44% (135)	42% (156)
Women				
All marital status	6% (986)	36% (864)	52% (915)	31% (2765)
Single	5% (967)	17% (617)	17% (284)	11% (1868)
Married: any premarital sex	63% (19)	54% (247)	34% (631)	40% (897)
Married: premarital sex with non-spouse	16% (19)	15% (247)	10% (631)	12% (897)

Table 3. Selected characteristics associated with premarital sex by educational attainment: Men and women age 25-29 with premarital sexual experience, 1994 Taiwan Youth Survey

	Men, senior high or less education	Men, more than senior high education	Women, senior high or less education	Women, more than senior high education
Among single, percent who had premarital sex with more than one partner	64%	61%	58%	53%
Among married, percent who had premarital sex with someone other than spouse	75%	75%	27%	18%
Among single percent who used of contraceptives with at premarital sex				
Always	29%	31%	24%	47%
Most of the time	25%	31%	28%	20%
Among married, percent who a contraceptive method at first premarital sex	24%	38%	25%	32%
Among married, percent distribution of place of first sexual intercourse				
Own or partner's home	37%	38%	47%	36%
School dorm	1%	13%	0%	7%
Company dorm	6%	6%	8%	11%
Hotel/hostel	44%	31%	32%	29%
Brothel	6%	0%	0%	0%
Others	6%	12%	13%	17%

Table 4. Estimated multinomial logit and binary logit regression coefficients of "years since completion of education" on transition probabilities by gender and age group

	Transition from Single with no premarital sex			Transition from single with premarital sex
	Premarital sex vs. none	Marriage vs. none	Premarital sex and marriage vs. none	Marriage
Women				
Age 15-18	.3120*	.2629*	.3663*	.0595
Age 19-23	.1779*	.2214*	.2978*	-.0056
Age 24-28	-.0210	.1841*	.1604*	-.2041*
Men				
Age 15-23	.0001	.1161	.2076*	.1148
Age 24-28	-.0376	-.0426	-.0170	.0025

Notes: * indicates p<0.05.

Table 5. Estimated adjusted percentages of women who have experienced premarital sex by age 27 by level of education and marital status

Marital Status	Junior high school	Senior high school	Four-year college
All	53%	43%	35%
Single	58%	35%	22%
Married	50%	52%	59%

Note: See text for the computational procedure.

Table A1. Estimated multinomial logit regression coefficients for transition from being single without sexual experience, women

	Ages 15-18	Ages 19-23	Ages 24-28
Premarital sex vs. none			
Age	.3560*	-.0912	-.2210†
Years since completion of education	.3120*	.1779*	-.0210
Urban residence	.1270	.1071	.1548
Father had more than jr. high education	.0087	.1545	.3113
Talk to mother when in trouble	-.2829	-.2066	.1399
Talk to father when in trouble	-.5911	.0809	.3802
Marriage vs. none			
Age	.6119*	.1160*	-.2784*
Years since completion of education	.2628*	.2214*	.1841*
Urban residence	-1.066*	-.4132*	-.1346
Father had more than jr. high education	-.8578	-.4302†	-.3528
Talk to mother when in trouble	-.0249	.4588*	.4705*
Talk to father when in trouble	-.0272	-.0805	.4123†
Premarital sex and marriage vs. none			
Age	.5343†	.1117	-.1219
Years since completion of education	.3663*	.2978*	.1604*
Urban residence	.0463	-.3438	-.0697
Father had more than jr. high education	-.6486	-.6751†	-.0437
Talk to mother when in trouble	-.0397	.4565†	.2262
Talk to father when in trouble	-1.267	-.4969	.5048†
Number of observations	4407	4007	1466

Notes: † indicates p<0.10 and * indicates p<0.05.

Table A2. Estimated multinomial logit regression coefficients for transition from being single without sexual experience, men

	Ages 15-23	Ages 24-28
Premarital sex vs. none		
Age	.1964*	.0799
Years since completion of education	.0001	-.0376
Urban residence	.2946	-.3827
Father had more than jr. high education	(a)	.3418
Talk to mother when in trouble	-.4497*	.3304
Talk to father when in trouble	.2634	(a)
Marriage vs. none		
Age	1.1949*	.2623†
Years since completion of education	.1161	-.0426
Urban residence	-.3016	.3387
Father had more than jr. high education	(a)	-.8560
Talk to mother when in trouble	-1.1269	.4150
Talk to father when in trouble	.8250*	(a)
Premarital sex and marriage vs. none		
Age	.4820*	.1104
Years since completion of education	.2076*	-.0170
Urban residence	.0739	-.6806
Father had more than jr. high education	(a)	.8188
Talk to mother when in trouble	-.1438	-.4928
Talk to father when in trouble	-.5614	(a)
Number of observations	2350	550

Notes: † indicates p<0.10 and * indicates p<0.05.

(a) The covariate is not included in the model due to convergence problem.

Table A3. Estimated binomial logit regression coefficients for marriage among single men with sexual experience, women

	Ages 15-18	Age 19-23	Ages 24-28
Age	.2874	-.2252*	-.1288
Years since completion of education	.0595	-.0056	-.2041*
Urban residence	.5046	.1891	.1743
Father had more than jr. high education	-.8515	.3257	.1343
Talk to mother when in trouble	-.2084	.1921	-.0936
Talk to father when in trouble	-.3789	-.0140	.2588
Number of observations	85	927	1573

Notes: † indicates p<0.10 and * indicates p<0.05.

n.a. indicates that the variable was dropped from the model due to lack of variation.

Table A4. Estimated binomial logit regression coefficients for marriage among single men with sexual experience, men

	Ages 15-23	Ages 24-28
Age	.7518*	-.2082†
Years since completion of education	.1148	.0025
Urban residence	.1909	-.0398
Father had more than jr. high education	-1.274	-.2652
Talk to mother when in trouble	-.5108	.6773*
Talk to father when in trouble	-.1535	.1054
Number of observations	603	758

Notes: † indicates p<0.10 and * indicates p<0.05.