Premarital Pregnancy and Spouse Pairing Patterns in Japan:

Assessing How Novel Family Behaviors "Fit In" to the Family Formation Process

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Abstract

We examine patterns of age and educational intermarriage in an attempt to assess how the rapid increase in premarital pregnancy fits in to the family formation process in Japan. Using data on over 30,000 marriages between 1950 and 1997, we estimate logistic regression models with female hypogamy as the outcome of interest. We first estimate the average "effect" of premarital pregnancy on patterns of age and educational pairing. We then estimate cohort-interactive models to examine change in the relationship between premarital pregnancy and spouse pairing. Results show that, for women with a high school education and above and women who marry at relatively young ages, marrying while pregnant is associated with a significantly higher likelihood of a "less desirable" pairing. Furthermore the relative likelihood that pregnant women marry hypogamously has increased over time. This change was particularly dramatic in the 1990s and has been most pronounced among marriages at relatively young ages. We conclude that premarital pregnancy is not an increasingly conventional path to family formation in Japan. Rather, it appears that the family formation process is becoming increasingly heterogeneous. This pattern of change has potentially important implications for subsequent levels of divorce and social stratification.

Introduction

Demographic trends associated with the "second demographic transition" exhibit substantial regional variation (Lesthaeghe 1995). Japan is particularly interesting for having very low levels of cohabitation and non-marital childbearing while also having very low rates of marriage and fertility (Lesthaeghe and Moors 2000). In contrast with most other low-fertility societies, family formation in Japan thus remains closely tied to marriage (e.g., Raymo 1998, 2003). There is, however, evidence to suggest that important changes may be underway. Of particular interest is the recent increase in marriages preceded by pregnancy (Iwasawa and Raymo 2004). High levels of premarital pregnancy suggest that the primary reason for the very low rates of non-marital childbearing in Japan is the strong tendency to "legitimate" non-marital pregnancies by marrying (Iwasawa 2002). This may also be an important reason for the very low prevalence of cohabitation in Japan. Following related research on the interpretation of novel family behaviors such as cohabitation and non-marital childbearing in the U.S. (e.g., Bumpass 1990; Smock 2000), our goal in this paper is to evaluate how marriage preceded by pregnancy "fits in" to the Japanese family system. More specifically, we seek to assess whether marriage preceded by pregnancy has emerged as a conventional pathway to family formation in Japan or whether the increase in premarital pregnancy simply reflects increasing exposure to the risk of pregnancy and/or decreasing contraceptive effectiveness.

Our methodological approach is straightforward. Following earlier work on cohabitation in the U.S. (e.g., Axinn and Thornton 1992; Blackwell and Lichter 2000; Rindfuss and VandenHeuvel 1990; Schoen and Weinick 1993), we assess the extent to which outcomes associated with the more novel pattern of family formation resemble those associated with the more conventional pattern. More specifically, we contrast patterns of spouse pairing in

marriages preceded by pregnancy to those in marriages not preceded by pregnancy. We are particularly interested in assessing the degree to which spouse pairing patterns in marriages preceded by pregnancy have come to resemble those of other marriages. By examining change across marriage cohorts in observable differences between "deviant" and "conventional" pathways to marriage, we can shed light on the extent to which premarital pregnancy has become part of the conventional family formation process.

Background

Japan is unusual among industrialized countries in that some features of the "second demographic transition" are quite pronounced while others are essentially absent. For example, the Japanese TFR has been well below replacement level for the past twenty-five years, age at first marriage is among the latest in the world, and rates of divorce are similar to those in many Western European countries. In contrast, cohabitation and non-marital fertility remain at negligibly low levels. However, there is mounting evidence to suggest that Japan may be on the verge of experiencing significant increases in these and other innovative family behaviors associated with the second demographic transition. Several sources of attitudinal survey data show substantial declines in the disapproval of cohabitation, divorce, and never marrying (Atoh 2001, Retherford, Ogawa, and Matsukura 2001; National Institute for Population and Social Security Research 2003) and one recent survey indicates that a surprisingly large proportion of young men and women know someone who has either cohabited, had a non-marital birth, or intends to never marry (Rindfuss, Choe, Bumpass, and Tsuya 2004). This discrepancy between growing tolerance of innovative family behaviors and the limited prevalence of such behaviors is the central motivation for our research. Finding that that premarital pregnancy has evolved from a "deviant" behavior into a more conventional pathway to family formation would suggest that

Japan may be on the verge of increases in other novel family behaviors associated with the second demographic transition.

Despite the rarity of non-marital births in Japan, premarital pregnancy is now very common (Retherford, Ogawa, and Sakamoto 1996). While the proportion of all births occurring to unmarried mothers has remained at roughly 1% since the mid-1960s, the proportion of first births occurring to mothers who were unmarried at conception has increased from 5% in 1975 to nearly 20% in 2000 (Iwasawa and Raymo 2004).[1] Premarital pregnancy is particularly prevalent among young mothers. Roughly half of all first births to women age 15-24 in 2000 occurred to women who were unmarried at conception (Iwasawa and Raymo 2004). The proportion of first marriages preceded by pregnancy has doubled from 6% among women marrying in the 1950s to 13% among women marrying in the 1990s (Iwasawa and Raymo 2004).

While the trends in premarital pregnancy are clear, the mechanism underlying them are not. For example, concurrent trends toward later marriage (Raymo 1998, 2003; Retherford, Ogawa, and Matsukura 2001) and earlier initiation of sex (Retherford, Ogawa, and Matsukura 2001; Retherford, Ogawa, and Sakamoto 1996; National Institute for Population and Social Security Research 2003) suggest the increase in premarital pregnancy may simply reflect an increase in exposure to the risk of pregnancy. The potential relevance of this scenario is further suggested by the relatively low use of contraception at young ages and the high reliance upon relatively ineffective methods such as condoms and withdrawal (Sato and Iwasawa 2001).

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[1] Note that there has been a small increase in non-marital childbearing in very recent years. Currently 1.5-2.0% of first births are to unmarried mothers (Source: 2002 Vital Statistics of Japan).

Alternatively, declining social pressures and economic incentives to marry (National Institute for Population and Social Security Research 2003) suggest that premarital pregnancy may increasingly provide an impetus to marry among couples who would have married later or perhaps remained single but romantically involved. In this case, the increase in premarital pregnancy may be viewed as the emergence of new stage in the transition to marriage. Finally, Japan's prolonged economic downturn combined with evidence of increasing social stratification (Tachibanaki 1998) suggest the possibility that increasing premarital pregnancy may reflect increasing socioeconomic variation in family formation behavior. Evidence that the increase in premarital pregnancy has been particularly marked among those with less education (Iwasawa and Raymo 2004) is consistent with this view. Distinguishing between these three alternative scenarios will help to understand how premarital pregnancy fits into the family formation process while also providing insights into the likelihood that other innovative family behaviors may emerge in Japan.

The first scenario suggests that the growth in premarital pregnancy may simply be the result of increased exposure to the risk of pregnancy. However, the increasing prevalence of "mistakes" suggested by this scenario has potential implications for future levels of divorce to the extent that marriage is increasingly prompted by pregnancy rather than careful spouse search. The second scenario suggests that premarital pregnancy is increasingly part of the "conventional" pattern of family formation. Similar to observed trends in cohabitation in the U.S., a relatively uncommon behavior initially observed among marginalized groups may diffuse to become an important component of the family formation process. The third scenario suggests that fundamental changes in the family formation process may be confined to certain subgroups, with social and economic forces contributing to a dehomogenization of family formation

behavior. Premarital pregnancy may remain a "deviant" path to family formation while becoming increasingly common and increasingly concentrated among particular subgroups of the population. Analogous phenomena in the U.S. are the increasing black-white differences in marriage and non-marital childbearing (Raley 1996; Smith, Morgan, and Koropeckyj-Cox 1995).

To evaluate these three alternative scenarios, we examine change over time in the relationship between premarital pregnancy and spouse pairing behavior. The basic assumption underlying this approach is that differences in the outcomes associated with novel and conventional pathways to family formation should decline or disappear as the novel behavior becomes increasingly conventional. That is, the subsequent outcomes (i.e., spouse pairing patterns) of those who do and do not experience the novel behavior (i.e., premarital pregnancy) are expected to converge as experience of that behavior becomes less selective over time. The most relevant example of this process may be found in the large literature on premarital cohabitation and divorce in the U.S. (e.g. Axinn and Thornton 1992; DeMaris and McDonald 1993; Lillard, Brien, and Waite 1995). Evidence from recent studies indicating a decline in the relative likelihood of divorce for couples that cohabited prior to marriage suggests that the experience of cohabitation has become less selective and that the marriage-destabilizing influences of the cohabitation experience have declined (Schoen 1992). These findings can be interpreted as evidence that cohabitation has evolved into a component of the "mainstream" family formation process.

Our decision to examine patterns of spouse pairing is motivated by both the recency of the increase in marriages preceded by pregnancy and the relatively straightforward theoretical linkages between premarital pregnancy and spouse pairing. Because premarital pregnancy has increased notably in recent marriage cohorts, it is necessary to examine outcomes that are

temporally proximate to marriage. The fact that spouse pairing patterns have been documented extensively (e.g., Raymo 2000; Suzuki 1991) facilitates the distinction of "less desirable" (non-normative) outcomes and "more desirable" (normative) outcomes. Based on these studies of spouse pairing, we focus on age and educational attainment – the two strongest dimensions of assortative mating in Japan – and assume that status hypogamous marriages are less desirable outcomes for women than are status homogamous or status hypergamous marriages. We do not see this as a controversial assumption in the Japanese context (Raymo 2000).

Hypotheses

Our first step is to assess the extent to which premarital pregnancy can be thought of as a non-normative path to family formation in Japan. We do this by evaluating the following three mutually exclusive and exhaustive hypotheses regarding the general "effect" of premarital pregnancy:

> H1: On average, marriages preceded by pregnancy are more likely to be hypogamous than homogamous or hypergamous (i.e., the wife is more likely to be older/more highly educated than the husband).
>
> H2: On average, marriages preceded by pregnancy are no different than other marriages with respect to spouse pairing.
>
> H3: On average, marriages preceded by pregnancy are more likely to be homogamous or hypergamous than hypogamous.

The first hypothesis suggests the importance of "mistakes" (i.e., contraceptive failure or non-use), with social and economic pressures to marry if pregnant resulting in marriages that would not have happened otherwise. Assuming that the process of selecting a sex-partner is, on average, less selective than the process of selecting a spouse, less desirable pairings should be

more common among women who were pregnant at marriage. This corresponds to the first of the three scenarios described above and suggests that hypogamous marriage may be viewed as "penalty" associated with premarital pregnancy. The second hypothesis suggests that premarital pregnancy should not be thought of as a deviant behavior but rather as a component of the family formation process in Japan. This corresponds to the second scenario described above and suggests that pregnancy is important primarily as an immediate reason to marry among couples who would have ultimately married anyway. The third hypothesis may perhaps be viewed as a "good catch" effect. In a context characterized by limited incentives (other than legitimization) to marry, increasing sexual activity prior to marriage, and relatively low rates of contraception, it is possible that women desiring to marry may use pregnancy as a means to "marry well" (see Akerlof, Yellen, and Katz 1996 for a related discussion). In contrast to the first hypothesis, this third hypothesis suggests that the sex-partner search process may be more selective than the spouse selection process. We do not, however, have any strong theoretical or substantive reason to expect support for this hypothesis in Japan. We are thus primarily interested in determining the extent to which premarital pregnancies are associated with a higher likelihood of marrying hypogamously with respect to age and education (i.e., H1 vs. H2).

Because we are particularly interested in the extent to which this relationship has changed over time, we put forth three additional hypotheses:

H4: Marriages preceded by pregnancy are increasingly similar to other marriages with respect to spouse pairing.

H5: Marriages preceded by pregnancy are increasingly different from other marriages with respect to spouse pairing.

H6: Differences between marriages preceded by pregnancy and other marriages with respect to spouse pairing have not changed over time.

If female-hypogamous marriage is viewed as a "penalty" associated with premarital pregnancy, support for H4 would be consistent with a scenario in which premarital pregnancy has become an increasingly conventional part of the family formation process in Japan. Such evidence would have important implications for the likelihood of subsequent family change. Finding that premarital pregnancy is an increasingly conventional pathway to family formation would suggest that other forms of innovative family behavior such as cohabitation and non-marital fertility may also increase in the near future.

Support for H5 would suggest a dehomogenization of family formation behavior in Japan. As suggested in the third scenario described above, it may be that premarital pregnancy among recent marriage cohorts is fundamentally different from premarital pregnancy in earlier cohorts. If premarital pregnancies in earlier marriage cohorts were primarily the result of contraceptive failure among couples intending to marry at some point, subsequent outcomes should not differ greatly by pregnancy status at marriage for these women. In more recent marriage cohorts, however, premarital pregnancies may increasingly be the result of contraceptive failure (non-use) among couples without specific intentions to marry. The stigma and economic hardship associated with non-marital fertility and a desire not to abort may be the primary motivations for marriage among these couples. To the extent that sex-partner selection criteria and spouse selection criteria differ, this scenario would be consistent with a divergence in marital outcomes by pregnancy status at marriage.

Support for H6 would suggest that the increasing prevalence of premarital pregnancy primarily reflects the increasing exposure to the risk of pregnancy. If the concurrent trends

toward earlier sexual initiation and later marriage result in more premarital pregnancy, we can conclude that there has been little fundamental change in the family formation process. Premarital pregnancy was less common in the past because relatively few young men and women were sexually active and because marriage was relatively early. In contrast to support for H4, support for this hypothesis would provide less reason to anticipate the emergence of other novel behaviors such as cohabitation and non-marital fertility.

In formulating these hypotheses, we have intentionally avoided any discussion of abortion. Although many pregnancies to unmarried women do end in abortion (which is legal and readily available in Japan), this is not directly relevant to our questions. Because we are interested in assessing the extent to which pregnancy has become an increasingly conventional step in the transition to marriage, it does not make sense to consider those pregnancies that were aborted. The relationship between premarital pregnancy and the outcome of interest – spouse pairing – is inherently unobservable. Our focus on marriages preceded by pregnancy rather than premarital pregnancy per se does, however, necessitate the assumption that the relationship between the likelihood of aborting a premarital pregnancy and the relative age and educational attainment of the mother and father have not changed over time. Although the ratio of abortions to live births reported in the vital statistics declined during the 1990s (National Institute for Population and Social Security Research 2003), there is no way to evaluate the extent to which this trend may differ by characteristics of the mother and father.

Data and Methods

Data

Our analyses are based on pooled data from the National Fertility Surveys conducted in 1982, 1987, 1992, and 1997. Each of these surveys provides information on age, year and month of

first marriage, year and month of first birth, educational attainment, and husband's age and educational attainment for nationally representative samples of married women age 18-49. Pooling data from the four surveys generates a sample of 35,183 women who married between 1947 and 1997.[2] After deleting observations for which reported age at marriage is less than 16 and observations with missing data on any of the variables, the sample consists of 32,325 women.

Variables

Spouse Pairing: The dependent variables in the analyses we present below are dichotomous representations of spouses' relative age and relative educational attainment. For age pairing, we define "normative" (or "more desirable") pairings as those in which the wife is' at least one year younger than the husband. We code these age-hypergamous marriages as "0" and code all other (i.e., age-homogamous and female age-hypogamous) marriages as "1". Our decision to include age-homogamous pairings in the "non-normative" category reflects the rarity of female age-hypogamy in Japan. Only 11% of the marriages in our sample were female age-hypogamous while 12% were age-homogamous and the remaining 77% were female age-hypergamous. For educational pairing, marriages in which wife's educational attainment is the same or lower than the husband's are coded as "0" whereas marriages in which the wife's education is higher than the husband's are coded as "1". Here, educational attainment is measured as a categorical variable: junior high school; high school; junior college and vocational school; and university.

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[2] One limitation of these data is the absence of information on previous marriages. Our analyses are therefore based on data provided by women in their first marriages married to men who are also in their first marriages.

Because women in the lowest educational category cannot marry men with less education than themselves, we redefine the outcome variable for this group. Junior high school graduates married to men of similar educational attainment are coded as "less desirable" marriages (i.e., "1") while those married to men with higher education are coded as "0". The results for this group are therefore not directly comparable to the results for women with higher levels of educational attainment.

Premarital pregnancy: The independent variable of primary interest is premarital pregnancy. Because we wish to use a conservative criterion for distinguishing women who were pregnant prior to marriage and because we are ultimately interested in marriages preceded by a known pregnancy, we define those women whose first child was born within eight months of marriage as pregnant prior to marriage. Using this criterion, 11% of respondents in our sample were pregnant prior to marriage. As shown near the top of Table 1, the proportion pregnant prior to marriage increased from 6% in the 1950s and 1960s to roughly 14% in the 1980s and 1990s.

Marriage cohort: As indicated by hypotheses H4-H6, our primary focus is the extent to which the coefficient for premarital pregnancy has changed over time. We operationalize time as a categorical representation of marriage cohort with marriages classified according to the decade in which they occurred (1950-69; 1970-79; 1980-89; 1990-97).

Age at marriage: Age at marriage is measured as a continuous variable in the models for age pairing and as a linear spline in the models for educational pairing. These model-specific parameterizations of age at marriage are based on observed bivariate relationships between age at marriage and the outcomes of interest. Because patterns of age pairing are fundamentally related to age at marriage (Oppenheimer 1988), we estimate two separate models for age-pairing.

One model is based on the subsample of marriages to women less than 25 years old and the other is based on marriages occurring at age 25 and beyond.

Educational attainment: As noted above, educational attainment is operationalized as a four-category measure of completed education. Because the likelihood of marrying up or down with respect to education is determined to a large extent by the relative size of the pool of eligible mates with higher or lower levels of education, we estimate separate models for women at each level of educational attainment.

Control variables: Models include controls for several other characteristics that are potentially related to both the likelihood of premarital pregnancy and spouse pairing. Premarital coresidence with parents is a dichotomous variable distinguishing those who lived with parents prior to marriage from those who did not. Assuming that women living away from home are subject to less parental influence, we expect that these women may be more likely to be pregnant at marriage and to marry hypogamously. A three-category measure of sibship position distinguishes only children and eldest daughters with no brothers from other women. The first two groups may be less likely to be pregnant at marriage and less likely to marry down to the extent that have greater responsibility for carrying on the family name or business. We also include father's occupation is included as a proxy for social background. The categories are: agriculture; self-employed; white-collar/professional; blue-collar; other; and missing. We expect that both premarital pregnancy and marrying down to be less likely among daughters of men in higher status occupations (i.e., white-collar/professional). We also include a variable indicating where the respondent met her spouse. The categories are: school; work; neighborhood; club or group; via friends or siblings; arranged marriage; marriage agency; random meeting; other. We expect those who met via arranged marriages or marriage agencies to be far less likely to be

pregnant at marriage or to marry down and those who met at parties or while traveling (the "random meeting" category) to be much more likely to do both. Finally, we include each measure of spouse pairing as an independent variable in the model for the other dimension of spouse pairing. The expected direction of these controls is not clear. On the one hand, it is possible that hypogamy on one dimension is associated with a higher likelihood of hypogamy on the other dimension. On the other hand, if exchange is taking place, it is possible that marriages hypogamous on one dimension are more likely to be homogamous/hypergamous on the other. Although we would like to control for other characteristics such as premarital region of residence and occupation prior to marriage, this information was not collected consistently across the four surveys.

Table 1 describes the characteristics of the sample by marriage cohort. The first two rows indicate that the wife is the same age or older than the husband in roughly one quarter of marriages and that the proportion of age homogamous/hypogamous marriages has doubled across marriage cohorts. The proportion of educationally hypogamous marriages is also roughly one-quarter. The decline across cohorts in educational hypogamy is due entirely to the declining proportion of junior high school graduates and the declining proportion of these women who marry men of similar education. Among women with at least a high school education, the proportion of educationally hypogamous marriages has remained constant across marriage cohorts at one-fifth. The fifth and sixth rows depict the aforementioned doubling in the proportion of marriages preceded by pregnancy. Cohort trends in other variables reflect rapid social change in Japan over the past several decades. The mean age at marriage has increased by nearly four years and marriages are increasingly distributed over a wider range of ages. The increase in educational attainment is particularly dramatic – nearly 90% of women in the earliest

marriage cohort had a high school education or less whereas nearly half of the most recent cohort completed a post-secondary degree. Rapid fertility decline is reflected in declining sibship size – the proportion of only children has doubled while the proportion of eldest daughters with no brothers has tripled. Fathers' occupation shows a major shift away from agriculture and other forms of self-employment to white-collar employment. There has been relatively little change in premarital living arrangements – roughly three-fourths of women in all cohorts coresided with parents prior to marriage. Finally, spouses in more recent cohorts are far less likely than their predecessors to meet their husband via arranged marriage (*miai*) and much more likely to meet at work.

Methods

To examine the relationship between premarital pregnancy and age pairing, we estimate the following three logistic regression models.

$$\text{Model 1a: } \ln[p^a_i/(1-p^a_i)] = \beta_1 MAGE_i + \beta_2 PMP_i + \beta_3 COHORT_i + \varepsilon_i \quad (1)$$

$$\text{Model 2a: } \ln[p^a_i/(1-p^a_i)] = \text{Model 1} + \beta_4 Z_i \quad (2)$$

$$\text{Model 3a: } \ln[p^a_i/(1-p^a_i)] = \text{Model 2} + \beta_5 (PMP_i \times COHORT_i) \quad (3)$$

Here p^a_i represents the probability that woman i marries a man who is the same age or younger than herself. MAGE is age at marriage, PMP is the dichotomous indicator of premarital pregnancy status, COHORT is the four-category measure of marriage cohort, and Z is a vector comprised of the other control variables. In these models for age pairing, Z includes both educational attainment and whether or not the marriage was educationally hypogamous. Model 1 allows us to assess the average "effect" of premarital pregnancy on the odds of age-homogamous/hypogamous marriage relative to age-hypergamous marriage. Model 2 allows us to assess the extent to which the relationship between premarital pregnancy and age pairing is

mediated by the control variables. In Model 3, we assess the extent to which marriages preceded by pregnancy have become more (or less) like other marriages by allowing the relationship between premarital pregnancy and age pairing patterns to vary by marriage cohort. We estimate a total of six models for age pairing, i.e., 3 models x 2 categories of wife's age at marriage.

We estimate similar models for educational pairing:

$$\text{Model 1b: } \ln[p^e_i/(1-p^e_i)] = \beta_1 MAGE_i + \beta_2 PMP_i + \beta_3 COHORT_i + \varepsilon_i \quad (3)$$

$$\text{Model 2b: } \ln[p^e_i/(1-p^e_i)] = \text{Model 1} + \beta_4 Z_i \quad (4)$$

$$\text{Model 3b: } \ln[p^e_i/(1-p^e_i)] = \text{Model 1} + \beta_5 (PMP_i \times COHORT_i) \quad (4)$$

Here, p^e_i represents the probability that woman i is married to a man in a lower educational category than herself (or in the same category for junior high school graduates) and the other variables are as defined above. We estimate a total of twelve models for educational pairing, i.e., 3 models x 4 levels of educational attainment.

Results

Before presenting the results of the multivariate models, we present the proportion of "less desirable" marriages by marriage cohort, age at marriage, education level, and pregnancy status at marriage in Table 2. The upper panel demonstrates a relatively large increase across marriage cohorts in the likelihood of age homogamy/hypogamy among women pregnant at marriage. This trend is particularly pronounced among marriages to younger women. The proportion of age hypogamous/homogamous pairings among early marriages preceded by pregnancy is twice as high in the 1990s (27%) as in 1950s/60s (13%). Cohort change in the proportion pregnant at marriage (italics) also indicates that the increase in marriages preceded by pregnancy has been concentrated at younger ages. The proportion of young brides pregnant at marriage has nearly

quadrupled from .06 to .22 whereas the proportion of older brides pregnant at marriage has increased by only a few percentage points.

The lower panel shows that, among those pregnant at marriage, the proportion of educationally hypogamous marriages has remained stable among high school graduates but increased sharply among more highly educated women. Change is particularly pronounced for marriages taking place in the 1990s. Among junior college/vocational school graduates marrying in the 1990s, over half (58%) of those who were pregnant at marriage married someone with less education than themselves. This is nearly twice as high as the proportion of hypogamous marriages among women who were not pregnant at marriage (.33). Among recently married university graduates, 39% of marriages preceded by pregnancy were educationally hypogamous. Educational hypogamy is only half as likely (16%) among those not pregnant at marriage. It is important to note, however, that the number of marriages preceded by pregnancy is very small among women with university degrees (e.g., n=23 in 1990s marriage cohort). Cohort change in the proportion pregnant at marriage (italics) also indicates that, at all levels of education, the proportion of marriages preceded by pregnancy is at least twice as high in the 1990s as in the 1950s/60s. The four-fold increase among women who did not complete high school is particularly striking.

Overall, Table 1 suggests that the "penalty" associated with premarital pregnancy has increased over time. This would not be consistent with a scenario in which premarital pregnancy is increasingly part of the conventional family formation process. To assess the statistical significance of the relationship between premarital pregnancy and spouse pairing, we now turn to the multivariate results.

Table 2 presents the results of Models 1a-3a separately for women marrying prior to and after age 25. Model 1a shows that both early and later marriages preceded by pregnancy are significantly more likely to be age homogamous/hypogamous than are other marriages. For women marrying prior to age 25, pregnancy is associated with a 61% higher odds of marrying a man of the same age or younger than themselves. For those who were at least 25 years old at marriage, the difference is 26%. Including the control variables in Model 2a reduces the magnitude of the coefficient for premarital pregnancy for both age groups. For women marrying at age 25 and beyond, the difference between those who were and were not pregnant at marriage is no longer significant. Educational attainment and place of meeting appear to mediate the relationship between pregnancy status at marriage and the odds of marrying a man of equal or younger age. Women with post-secondary education are significantly less likely than their less educated counterparts to marry homogamously/hypogamously with respect to age. Not surprisingly, marriages between men and women who meet at school are far more likely to be age homogamous or female age hypogamous whereas those who meet via arranged marriages or marriage agencies are far less likely be so. Among women who marry before age 25, however, those who are pregnant at marriage are still 47% more likely to marry someone of the same or younger age. The nature of marriages preceded by pregnancy thus appears to differ by age. At young ages, the results are consistent with hypothesis 1 and suggest the importance of contraceptive failure (or non-use) in prompting marriage that might not have happened otherwise. At older ages, however, the results are consistent with hypothesis 2 and suggest that pregnancy is one motivation for marriage among couples that may have married anyway.

The results of Model 3a further indicate that change over time in the relationship between premarital pregnancy and age pairing has been concentrated among those marrying relatively

young. Compared to marriages in the 1970s, marriages to pregnant women less than 25 years old were 38% more likely to be age homogamous/hypogamous in the 1980s and 65% more likely to be so in the 1990s. There are no significant differences across marriage cohorts for those marrying at age 25 or later. The results for earlier marriages are thus consistent with hypothesis 5 while the results for later marriages are consistent with hypothesis 6. Among those who marry early, there is growing differentiation between those who are pregnant at marriage and those who are not. Among those marrying at age 25 and beyond, there is little evidence that the role of pregnancy in the marriage formation process has changed over time.

Tables 3 and 4 present the results of Models 1b - 3b separately for women at each level of educational attainment. Among junior high school graduates, pregnancy status at marriage is unrelated do the odds of marrying a man with the same education rather than one with higher education. However, for women with a high school degree or higher, Model 1b shows that those who married while pregnant are significantly more likely to marry men with less education than themselves. Furthermore, the "penalty" associated with premarital pregnancy appears to be positively associated with educational attainment. Compared to similarly educated women who were not pregnant at marriage, the odds of marrying hypogamously if pregnant are 37% higher among high school graduates, 56% higher among junior college/vocational school graduates, and 61% higher among university graduates. Coefficients for marriage cohort indicate that women with a high school education or less are decreasingly likely to marry down whereas university graduates are increasingly likely to marry down. These cohort coefficients reflect changes in marriage market composition brought about by (a) a decline in the proportion of men and women who do not finish high school, (b) large relative improvements in women's educational

attainment (i.e., it is numerically more difficult for highly educated women to marry similarly educated men), and perhaps (c) changes in spouse pairing preferences.

The results of Model 2b indicate that the control variables mediate the relationship between premarital pregnancy and the odds of educational hypogamy for university graduates but not for women in the other educational categories. The odds ratio for pregnancy at marriage remains positive in the model for university graduates but is no longer significant ($p = 0.14$). The results for junior high school graduates are thus consistent with the hypothesis 2 and suggest that getting married when one becomes pregnant has been and continues to be part of the conventional family formation process among Japanese women with low levels of educational attainment. For high school graduates and women with two-year college degrees, results are consistent with hypothesis 1 and suggest that pregnancy results in marriages that might not have taken place otherwise. Given the very small numbers of university graduates who are pregnant at marriage it is tempting to interpret the large positive (but statistically insignificant) coefficient for these women in the same way.

Several of the control variables in Model 2b are statistically significant and generally in the hypothesized direction. For women with post-secondary education, age-hypogamous marriages are also more likely to be educationally hypogamous. University graduates who are eldest daughters with no brothers are less likely to marry down but sibship position is unrelated to the educational pairing of women in other educational categories. Father's occupation is strongly related to educational pairing with daughters of white-collar employees significantly less likely than others to marry down with respect to education. With the exception of university graduates, women living with parents are less likely to marry hypogamously. Interestingly, less educated women who met their spouse via *miai* (arranged meeting) were more likely to marry

down whereas university graduates were significantly less likely to marry down when meeting via *miai*. Meeting one's spouse via friends or siblings or randomly meeting (e.g., at a party, while traveling, etc.) is associated with substantially higher odds of educational hypogamy for all groups except university graduates. Not surprisingly, the odds of educational hypogamy are substantially lower among those who met their spouses at school.

The results of model 3b are consistent with hypothesis 5 for high school graduates and junior college/vocational school graduates. Relative to pregnant high school graduates marrying in the 1970s, those marrying in the 1990s were more than twice as likely marry a man with less education than themselves. The corresponding difference is 77% for junior college/vocational school graduates. For university graduates, the pattern is similar but the coefficient associated with the odds ratio of 2.16 for marriages preceded by pregnancy in the 1990s is not statistically significant. For junior high school graduates, it appears that the likelihood that marriages preceded by pregnancy are educationally homogamous has actually declined over time. In general, however, the results of our analyses provide no evidence that the increasing prevalence of premarital pregnancy indicates that this experience has become part of the conventional pattern of family formation in Japan. Rather it appears that the increase in premarital pregnancy has been concentrated among young women in the lowest educational category and that for most groups of women, premarital pregnancy is increasingly associated with less desirable spousal characteristics. This support for our fifth hypothesis suggests increasing heterogeneity in the family formation process – with those who marry while pregnant significantly less likely to marry "well."

Summary and discussion

The goal of this research is to better understand how premarital pregnancy fits into the family formation process in Japan. We approach this question by comparing the nature of marriages preceded by pregnancy to those of marriages not preceded by pregnancy. The basic argument is that increasing similarity between the two types of marriage would indicate that premarital pregnancy is becoming a more conventional feature of the family formation process in Japan. The results of our models are very clear. We find no evidence that premarital pregnancy is becoming a more conventional path to family formation in Japan. Rather, age and educational pairing patterns in marriages preceded by pregnancy have become increasingly dissimilar to other marriages. This pattern is particularly pronounced for marriages taking place in the 1990s.

A central motivation of this study was to shed light on the potential for increase in currently uncommon family behaviors such as cohabitation and non-marital fertility. The fact that premarital pregnancy does not appear to be part of the conventional path to family formation suggests does not provide us with any reason to expect rapid spread of cohabitation and non-marital fertility. Our results do, however, suggest that increasing heterogeneity in the family formation process may lead to growth in other non-normative patterns to family formation among subgroups of the population – especially the less educated and those who begin sexual relations at young ages. This is a marked departure from the very homogenous family life course that characterized Japan until recently (Brinton 1992). This increasing heterogeneity in patterns of family formation has potentially important implications for subsequent family outcomes such as divorce and for social stratification.

The proportion of marriages ending in divorce is increasing rapidly. For example, roughly 12% of the 1995 marriage cohort had divorced within five years. While lower than the

corresponding figure of 19% in the U.S., Japan is not a country in which divorce is uncommon. Unfortunately, there is very little data with which to examine the correlates and consequences of divorce. When such data do become available, we will be able to directly examine the relationship between premarital pregnancy and subsequent marital stability.

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Table 1: Sample Characteristics, by Marriage Cohort

	Marriage Cohort				
Variable	**1950-69**	**1970-79**	**1980-89**	**1990-97**	**Total**
Age Pairing					
Homogamous/Hypergamous	84.41	77.77	74.01	69.06	77.42
Hypogamous	15.59	22.23	25.99	30.94	22.58
Educational Pairing					
Homogamous/Hypergamous	60.36	74.17	79.20	79.10	72.90
Hypogamous	39.64	25.83	20.80	20.90	27.10
Pregnancy Status at Marriage					
Not pregnant	93.78	89.62	85.26	86.32	89.05
Pregnant	6.22	10.38	14.74	13.68	10.95
Age at Marriage					
Mean	22.69	23.82	25.18	26.14	24.16
s.d.	2.55	2.88	3.84	4.37	3.45
Educational Attainnment					
Junior High School	40.26	15.84	6.36	4.60	17.69
High School	47.40	57.39	50.41	46.54	52.17
Junior College/Vocational School	9.76	20.64	32.63	35.81	22.92
University	2.58	6.14	10.60	13.05	7.22
Sibship Position					
Only Child	3.46	3.90	5.68	6.16	4.51
Eldest daughter - no brothers	5.02	7.85	12.95	14.91	9.28
Other	91.52	88.25	81.37	78.93	86.21
Father's Occupation					
Agriculture/primary sector	30.85	22.86	15.66	6.59	21.15
Self-Employed	23.37	19.79	17.87	13.51	19.48
White-collar	23.37	31.64	39.73	53.59	34.06
Blue-collar	11.80	15.21	17.38	16.89	15.20
Other	4.94	6.19	5.96	5.10	5.74
Missing	5.67	4.32	3.39	4.31	4.37
Premarital Living Arrangements					
Coresiding with parents	72.59	69.94	73.34	73.40	71.81
Not coresiding with parents	27.41	30.06	26.66	26.60	28.19
Place of Meeting					
School	2.10	4.55	7.33	8.38	5.13
Work	25.53	33.28	33.48	40.97	32.29
Neighborhood	6.37	3.07	2.08	1.79	3.42
Club/group	3.37	4.48	5.46	4.94	4.54
Via friends or siblings	12.74	16.71	21.13	23.85	17.70
Arranged marriage	44.37	31.36	22.26	11.49	29.92
Marriage agency	0.10	0.22	0.53	0.83	0.33
Random meeting	4.76	5.11	6.21	6.03	5.42
Other	0.67	1.22	1.52	1.72	1.23
N	7,743	8,114	9,469	6,999	32,325

Table 2: Proportion of "Less Desirable" Pairings, by Marriage Cohort, Pregnancy Status at Marriage, Age at Marriage, and Educational Attainment

	Marriage Cohort				
	1950-69	**1970-79**	**1980-89**	**1990-97**	**Total**
Age at Marriage and Pregnancy Status at Marriage	*Proportion of Marriages in which Wife's Age ≥ Husband's Age*				
Less than 25 years old					
Not Pregnant	0.11	0.16	0.17	0.19	0.15
Pregnant	0.13	0.19	0.24	0.27	0.21
(*% pregnant at marriage)*	*(0.06)*	*(0.11)*	*(0.18)*	*(0.22)*	*(0.12)*
25 years old and above					
Not Pregnant	0.32	0.34	0.32	0.36	0.34
Pregnant	0.34	0.41	0.38	0.41	0.39
(*% pregnant at marriage)*	*(0.07)*	*(0.10)*	*(0.11)*	*(0.09)*	*(0.10)*
Total - all ages					
Not Pregnant	0.15	0.22	0.25	0.31	0.22
Pregnant	0.18	0.26	0.30	0.33	0.27
(*% pregnant at marriage)*	*(0.06)*	*(0.10)*	*(0.15)*	*(0.14)*	*(0.11)*
Educational Attainment and Pregnancy Status at Marriage	*Proportion of Marriages in which Wife's Education> Husband's Education*				
Junior High School[a]					
Not Pregnant	0.70	0.60	0.47	0.41	0.64
Pregnant	0.75	0.56	0.44	0.43	0.59
(*% pregnant at marriage)*	*(0.08)*	*(0.15)*	*(0.22)*	*(0.35)*	*(0.12)*
High School					
Not Pregnant	0.17	0.14	0.09	0.07	0.13
Pregnant	0.19	0.18	0.13	0.19	0.16
(*% pregnant at marriage)*	*(0.05)*	*(0.10)*	*(0.11)*	*(0.10)*	*(0.09)*
Junior College/Vocational					
Not Pregnant	0.32	0.35	0.34	0.33	0.34
Pregnant	0.43	0.45	0.43	0.58	0.46
(*% pregnant at marriage)*	*(0.04)*	*(0.09)*	*(0.11)*	*(0.10)*	*(0.09)*
University					
Not Pregnant	0.12	0.11	0.13	0.16	0.13
Pregnant	0.00[b]	0.16	0.19	0.36	0.20
(*% pregnant at marriage)*	*(0.02)*	*(0.06)*	*(0.07)*	*(0.06)*	*(0.06)*
Total - all education levels					
Not Pregnant	0.39	0.25	0.20	0.19	0.27
Pregnant	0.48	0.31	0.23	0.33	0.31
(*% pregnant at marriage)*	*(0.06)*	*(0.10)*	*(0.15)*	*(0.14)*	*(0.11)*

a: Outcome for Junior High School graduates is marrying homogamously

b: None of the four pregnant university graduates in the 1960s marriage cohort married hypogamously

Table 3: Odds Ratios from Logistic Regression Models for Age Homogamous/Hypogamous Marriage

	Age at Marriage < 25			Age at Marriage ≥ 25		
Variable	Model 1a	Model 2a	Model 3a	Model 1a	Model 2a	Model 3a
Age at Marriage	1.24**	1.36**	1.37**	1.08**	1.10**	1.10**
Pregnancy Status at Marriage						
Not pregnant (omitted)	1.00	1.00	1.00	1.00	1.00	1.00
Pregnant	1.61**	1.47**	1.28**	1.26**	1.08	1.09
Marriage Cohort						
1950-69	0.74**	0.85**	0.86**	0.95	1.04	1.04
1970-79 (omitted)	1.00	1.00	1.00	1.00	1.00	1.00
1980-89	1.13*	0.96	0.90#	0.86**	0.73**	0.74**
1990-97	1.31**	1.01	0.90	0.99	0.70**	0.69**
Pregnancy Status x Marriage Cohort						
1950-69 x Pregnant			0.84			1.02
1970-79 x Pregnant (omitted)			1.00			1.00
1980-89 x Pregnant			1.38*			0.96
1990-97 x Pregnant			1.65*			1.04
Educational Attainnment						
Junior High School		1.08	1.09		1.05	1.05
High School (omitted)		1.00	1.00		1.00	1.00
Junior College/Vocational School		0.69**	0.69**		0.89*	0.89*
University		0.47**	0.47**		0.72**	0.72**
Educational Pairing						
Homogamous/Hypergamous (omitted)		1.00	1.00		1.00	1.00
Hypogamous		1.36**	1.36**		1.04	1.04
Sibship Position						
Only Child		1.07	1.07		1.07	1.07
Eldest daughter - no brothers		1.11	1.11		1.05	1.05
Other (omitted)		1.00	1.00		1.00	1.00
Father's Occupation						
Agriculture/primary sector		1.01	1.01		1.03	1.03
Self-Employed		0.93	0.93		1.00	1.00
White-collar (omitted)		1.00	1.00		1.00	1.00
Blue-collar		1.07	1.07		1.07	1.07
Other		1.05	1.05		1.15	1.15
Missing		1.05	1.06		0.97	0.97
Premarital Living Arrangements						
Coresiding with parents (omitted)		1.00	1.00		1.00	1.00
Not coresiding with parents		1.10#	1.09#		1.06	1.06

Place of Meeting						
School		6.62**	6.65**		2.68**	2.68**
Work (omitted)		1.00	1.00		1.00	1.00
Neighborhood		1.74**	1.73**		1.02	1.02
Club/group		1.35**	1.35**		0.93	0.93
Via friends or siblings		1.15*	1.14*		0.60**	0.60**
Arranged marriage		0.25**	0.25**		0.18**	0.18**
Marriage agency		0.18#	0.19#		0.07**	0.07**
Random meeting		1.49**	1.49**		0.92	0.92
Other		1.21	1.21		0.75#	0.75#
N	19,801	19,801	19,801	12,524	12,524	12,524
chi-square	441.25	1937.77	1950.95	179.55	1702.98	1703.20
df	5	25	28	5	25	28
LR test (p value)		0.00	0.00		0.00	0.97

Notes: ** p<.01, * p<.05, # p<.10

Table 4: Odds Ratios from Logistic Regression Models for Educationally Hypogamous Marriage, Junior High School and High School Graduates

	Junior High School			High School		
Variable	Model 1b	Model 2b	Model 3b	Model 1b	Model 2b	Model 3b
Age at Marriage (linear spline)						
Segment 1	0.72*	0.72*	0.71*	1.35	1.42	1.41
Segment 2	0.97*	0.95**	0.95**	0.82**	0.80**	0.81**
Segment 3	1.04*	1.04*	1.04*	1.07**	1.06**	1.06**
Pregnancy Status at Marriage						
Not pregnant (omitted)	1.00	1.00	1.00	1.00	1.00	1.00
Pregnant	0.99	1.06	0.95	1.37**	1.40**	1.27*
Marriage Cohort						
1950-69	1.58**	1.48**	1.43**	1.16*	1.10#	1.10
1970-79 (omitted)	1.00	1.00	1.00	1.00	1.00	1.00
1980-89	0.56**	0.58**	0.59**	0.58**	0.61**	0.60**
1990-97	0.44**	0.51**	0.50**	0.50**	0.58**	0.46**
Pregnancy Status x Marriage Cohort						
1950-69 x Pregnant			1.45#			0.93
1970-79 x Pregnant (omitted)			1.00			1.00
1980-89 x Pregnant			0.94			1.07
1990-97 x Pregnant			1.12			2.42**
Age Pairing						
Homogamous/Hypergamous (omitted)		1.00	1.00		1.00	1.00
Hypogamous		1.06	1.06		1.00	0.99
Sibship Position						
Only Child		1.01	1.01		0.94	0.95
Eldest daughter - no brothers		0.99	0.99		1.05	1.05
Other (omitted)		1.00	1.00		1.00	1.00
Father's Occupation						
Agriculture/primary sector		1.05	1.05		1.45**	1.46**
Self-Employed		1.08	1.08		1.26**	1.26**
White-collar (omitted)		1.00	1.00		1.00	1.00
Blue-collar		1.21#	1.21#		1.56**	1.56**
Other		1.08	1.08		1.46**	1.46**
Missing		1.46**	1.45**		1.42**	1.42**
Premarital Living Arrangements						
Coresiding with parents (omitted)		1.00	1.00		1.00	1.00
Not coresiding with parents		1.21**	1.21**		1.29**	1.29**
Place of Meeting						
School		1.31	1.30		0.40**	0.41**

Work (omitted)		1.00	1.00		1.00	1.00
Neighborhood		1.93**	1.93**		1.85**	1.84**
Club/group		1.04	1.05		1.09	1.08
Via friends or siblings		1.71**	1.71**		1.47**	1.47**
Arranged marriage		2.43**	2.43**		1.81**	1.80**
Marriage agency		3.21#	3.17#		2.06#	2.09#
Random meeting		1.37**	1.37**		1.67**	1.68**
Other		0.95	0.97		2.29**	2.27**
N	5,719	5,719	5,719	16,863	16,863	16,863
chi-square	190.52	366.18	370.30	272.48	538.06	553.56
df	7	24	27	7	24	27
LR test (p value)		0.00	0.25		0.00	0.00

Notes: ** p<.01, * p<.05, # p<.10

Table 5: Odds Ratios from Logistic Regression Models for Educationally Hypogamous Marriage, Junior College and University Graduates

	Jr. College/Vocational School			University		
Variable	**Model 1b**	**Model 2b**	**Model 3b**	**Model 1b**	**Model 2b**	**Model 3b**
Age at Marriage (linear spline)						
Segment 1	1.75	1.72	1.72	0.80	0.87	0.86
Segment 2	0.91**	0.90**	0.90**	0.92	0.87*	0.87#
Segment 3	1.04**	1.03	1.03	1.10**	1.08*	1.08*
Pregnancy Status at Marriage						
Not pregnant (omitted)	1.00	1.00	1.00	1.00	1.00	1.00
Pregnant	1.56**	1.44**	1.36*	1.61*	1.41	1.15
Marriage Cohort						
1950-69	0.83*	0.82*	0.82*	0.99	0.96	0.95
1970-79 (omitted)	1.00	1.00	1.00	1.00	1.00	1.00
1980-89	1.04	1.04	1.05	1.19	1.19	1.18
1990-97	1.09	1.14	1.07	1.47*	1.37#	1.29
Pregnancy Status x Marriage Cohort						
1950-69 x Pregnant			1.08			1.00[a]
1970-79 x Pregnant (omitted)			1.00			1.00
1980-89 x Pregnant			0.91			1.09
1990-97 x Pregnant			1.77*			2.16
Age Pairing						
Homogamous/Hypergamous (omit)		1.00	1.00		1.00	1.00
Hypogamous		1.44**	1.44**		1.32#	1.33#
Sibship Position						
Only Child		1.13	1.12		0.82	0.82
Eldest daughter - no brothers		1.02	1.02		0.69*	0.69*
Other (omitted)		1.00	1.00		1.00	1.00
Father's Occupation						
Agriculture/primary sector		1.79**	1.80**		1.31	1.31
Self-Employed		1.12#	1.12#		1.24	1.24
White-collar (omitted)		1.00	1.00		1.00	1.00
Blue-collar		1.88**	1.87**		2.33**	2.32**
Other		1.32*	1.32*		1.77#	1.73#
Missing		1.52**	1.53**		2.12*	2.16*
Premarital Living Arrangements						
Coresiding with parents (omitted)		1.00	1.00		1.00	1.00
Not coresiding with parents		1.22**	1.22**		1.21	1.21
Place of Meeting						

School		0.51**	0.51**		0.18**	0.18**
Work (omitted)		1.00	1.00		1.00	1.00
Neighborhood		1.16	1.16		0.91	0.93
Club/group		0.89	0.89		0.95	0.95
Via friends or siblings		1.31**	1.31**		1.00	1.00
Arranged marriage		1.05	1.05		0.53**	0.53**
Marriage agency		1.14	1.14		0.39	0.40
Random meeting		1.46**	1.46**		1.48	1.47
Other		1.22	1.23		0.69	0.71
N	7,410	7,410	7,410	2,333	2,333	2,333
chi-square	93.11	330.90	338.72	25.37	131.99	133.66
df	7	24	27	7	24	26
LR test (p value)		0.00	0.05		0.00	0.43

Notes: ** p<.01, * p<.05, # p<.10

a: Because there were no premarital pregnancies among university graduates in the earliest cohort, this coefficient is constrained to equal zero.