Beggar-Thy-Women: Foreign Brides and the Domestic Front – The Case of Taiwan *

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Abstract

In 2003, one in four marriages in Taiwan involved a bride from a foreign, and often substantially poorer, country. We examine the impact of foreign brides on native women using administrative data covering the period 1998 to 2006. Our identification strategy exploits a 2003 policy that tightened visa requirements combined with the observation that rural or poorly educated men were more prone to marry foreign brides. Our difference-in-differences estimates suggest a positive fertility response among domestic women from the presence of foreign brides. We also find divorce risk to decline, a perhaps counter-intuitive finding but one consistent with children stabilizing marriage.

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1 Introduction

In Taiwan, 29% of brides in 2003 were foreign born, a sharp increase from the mere 2% in 1990.[1] Over the past decade, developed East Asian countries have received more than half a million foreign brides, the vast majority from substantially poorer countries such as the People's Republic of China (henceforth, China), Vietnam, Indonesia and the Philippines.

The phenomenon is not isolated to East Asia. Poorer or less educated women marrying richer or better educated men is a part of a longstanding pattern in which women marry up. However, the magnitude and the scope of this dramatic rise in foreign brides are unprecedented and have been met with apprehension in the receiving countries. The existing literature has linked the phenomenon to notions of male superiority within the social context of the receiving countries. It has also chronicled the motives and (mis-)fortunes of the brides and grooms [Hsia, 1997, 2006, Luoh, 2006, Kim, 2009, 2012, Kawaguchi & Lee, 2012] and highlighted the benefits to the natal families of the foreign brides [Belanger et al. , 2011, Belanger & Linh, 2011]. However, little attention has been given to the impact on women in the receiving countries.[2]

A priori, it is plausible that domestic women would be negatively affected by the inflow of foreign brides. Foreign women constitute low-cost competition similar to the presence of immigrant workers in the labor market. However, there are two principal reasons to believe that the impact on domestic women in the marriage market is more severe than the impact that immigrant workers have on the native workers in the labor market. First, considering the core services provided by wives: sex and children [Edlund & Korn, 2002],

[1] During the same time period, the proportion of marriages involving foreign grooms remained stable around 3%.

[2] Weiss et al. [2012] is a recent exception.

the substitutability between foreign and domestic women as wives may be high, especially if they are of similar ethnicity.[3] Second, although the possibility of complementarities between the immigrant and domestic workers imply that the immigrant worker may not necessarily displace a domestic worker in the labor market, this scenario is less likely on the marriage market where complementarities are with the opposite, not the same, sex.

How domestic women fare in the face of low-cost competition in the form of foreign brides is a question of high policy relevance for a number of reasons. First, a large number of brides from poor countries likely undermine the status of women – directly through a compositional change and indirectly through the effect on native women's status – and as a consequence, children's outcomes may suffer.[4]

Second, the rapid growth of foreign brides in East Asian countries has been primarily driven by the rise of so called "mail-order brides" and the prevalence of this type of marriage should be highly responsive to policy changes such as visa requirements and regulations of matrimonial agencies. Marriages involving mail-order brides are concluded after only a few meetings, are brokered by a third party and involve a bride from a poor country who upon marriage settles in the groom's substantially richer country. Although marriages between bride and groom of different nationalities have been on the rise in recent years in part due to lower travel costs and increasing integration of social and economic networks across countries, the majority of cross-border marriages taking place in the developed countries of East Asia like Taiwan stand out because of their transactional characteristic.[5]

[3]The greater the emphasis on child quality and companionship the less interchangeable domestic and foreign women are likely to be. Although a foreign background could be a coveted feature in a wife and mother, newspaper testimony from foreign brides suggests otherwise. Foreign brides are expected to adapt to the host country and to not pass on the language or other aspects of their native country's culture.

[4]See Duflo [2011] for a review of the literature on women's status and their children's outcome.

[5]International marriages have also become more common in Europe, e.g. nearly half the marriages in

Third, the topic of mail-order brides is likely to emerge as a salient policy issue as the close to 15 million surplus males under the age 20 in China begin to look for wives. Importing foreign brides has been touted as a solution to the looming bride deficit [Sharygin et al. , 2012]. Feasibility notwithstanding, importing women for marriage would undo the advantage that son preference gave domestic women through relative scarcity in the marriage market.

In this paper, we study Taiwan. In the fall of 2003 the Taiwanese government reversed course and tightened visa requirements for brides coming from China.[6] The changes included the introduction of an interview designed to screen out mail-order brides (who were asked detailed questions about the husband and his family). As a result, it became much more difficult to marry Chinese brides and the number of Chinese brides halved between 2003 and 2004. In 2005, a similar policy was applied to Vietnamese brides and the flow of Vietnamese brides was similarly stemmed. By 2006, foreign brides were one-quarter of the number in 2003. This drastic change in policies governing the flow of foreign brides into Taiwan presents us with a unique opportunity to evaluate the social impact of foreign brides on the domestic population of women.

In particular, we focus on local women's fertility response to the inflow of foreign brides. Fertility is well below replacement level in East Asia's developed countries and Taiwan is no exception. Fertility is a prime example of a joint decision and therefore subject to intra-household bargaining.[7] Although it can be debated whether wives or husbands want children "more," low fertility in developed East Asian countries today is commonly attributed to

Switzerland are international. Yet in Europe the gender of foreign spouses is rather balanced; in East Asia, foreign spouses are predominantly women.

[6]For a number of reasons including concern that the foreign brides fed prostitution rings, led to the devaluing of women and threatened national security.

[7]For early contributions see Mancer & Brown [1980], Horney & McElroy [1988], McElroy [1990], Bourguignon et al. [1994], Lundberg & Pollak [1993].

modern women's reluctance to assume the traditional roles of subservience and domesticity expected in marriage and motherhood [Frejka et al. , 2010]. Therefore, in the context at hand, fertility can be seen as an inverse measure of women's bargaining power.[8] Assuming that the inflow of foreign brides undercuts domestic women's bargaining power we would therefore expect foreign brides to increase domestic women's fertility.

However, the predicted effect on divorce is less clear. On the one hand, foreign brides make divorce and remarriage for men more attractive. On the other hand, if fertility increases and the presence of young children stabilize marriages, then the net effect of foreign brides on divorce is ambiguous.

We analyze Taiwanese government administrative records covering the universe of marriage, divorce and birth registries for the period of 1998 to 2006. We limit our attention to couples who married in between 1998 and 2003 (before the tightening of visa requirements) and link to their subsequent fertility and divorce outcomes through 2006.[9] The merged dataset contains information on the bride's and groom's respective birth date and education level, the couple's marriage date, divorce date, marriage history, place of residence, and detailed birth records of children born between 1998 and 2006.

Our main identification strategy is a difference-in-differences approach where the first difference exploits the 2003 policy change that resulted in a drastic reduction in the entry of foreign brides. For the second difference we note that foreign brides affect "marginal"

[8]For evidence that women desire lower fertility than their spouses, see Ashraf et al. [2012]. Francis [2011] found that when Taiwanese women have more bargaining power, fertility declines. A government report based on a nationally representative survey in 2006 in Taiwan found that the ideal number of children is higher for married men (2.5) than for married women (2.4) and for single men (1.93) than for signal women (1.88).

[9]Our analysis is restricted to couples who married before the visa-tightening policy went into effect since the policy could have changed the type of natives that got married.

marriage markets more. Foreign brides have been much more prevalent in poor rural areas and among less educated men, so-called mail-order brides being all but absent among the better educated. We seek to classify localities according to their reliance on foreign brides. To that end, we use the adult sex ratio in the locality as a gauge of its standing in the national marriage market. The rationale for this proxy is that internal migration patterns mirror those of cross-border marriages: young women leave poor rural areas to seek a better life. This is a general pattern and one of the authors has argued elsewhere that more young women than young men are leaving economically depressed areas due to the marriage market [Edlund, 2005]. Young women may be viewed as a scarce resource, whose allocation is determined by demand. Since, by and large, rich areas have rich men, young women are disproportionately found there. Moreover, in Taiwan the eldest son is supposed to co-reside with his aging parents, further reducing male mobility. Therefore, adult sex ratios (male-to-female) may serve as a measure of the ability of men to marry domestic women and thus the demand for foreign brides.

We find that native couples in areas with high sex ratios are less likely to have children and are more likely to divorce after 2003 relative to couples in low sex-ratio townships. Moreover, we exploit the fact that few men with a college degree married foreign brides; especially mail-order brides. The incidence of foreign brides among college educated grooms was largely unaffected by the more strict visa requirements post-2003. Therefore, couples in which the husband is college educated may serve as another comparison group. Similarly, we find that native women with less educated husbands are less likely to have children and are more likely to divorce after 2003 relative to couples with college educated husbands.

Next, we present evidence on intra-household bargaining power from the Social Devel-

opment Trends Survey. The results are consistent with the fertility results. We find that wives are more likely to be the decision maker on household expenditure and child-rearing decisions in areas with high sex ratios after 2003 relative to those in low sex-ratio townships. A limitation of these data is a small sample size (albeit nationally representative) and only a two-year availability of questions on decision making in the household.

Other than the marriage market channel, it is possible that foreign women displace native women in the labor market. If local women have lower income as a result of foreign brides, that could also lower their bargaining power at home. However, examining native women's labor force participation, earnings, and hours worked, we find no evidence of labor market effects.

The remainder of this paper is structured as follows: Section 2 discusses background and existing literature on foreign brides, Section 3 describes the data, Section 4 presents the specification for regression analysis and discusses the results, and Section 5 concludes.

In the Appendix, we make a theoretical case for increased competition leading to higher fertility among domestic women and, possibly, changes to divorce rates.

2 Background and Literature Review

Women marrying up is a common and possibly long standing feature of human mating systems [Oota et al. , 2001]. The marrying-up often has a geographic component, with poorer areas losing their young women to richer areas [Fan & Huang, 1998, Edlund, 2005]. A modern-day version is the so-called mail-order brides phenomenon whereby a man in a rich country marries a woman from a poor country after very few preliminaries, casting marriage

in a venal and transactional light. Pejoratively termed, the phenomenon is generally looked down upon by the receiving country and was minimally pursued in the past.

Internet penetration and cheaper transportation has undoubtedly been important catalysts for the rise in cross-border marriages. However, the prevalence of cross-border marriages in the developed East Asian countries suggests additional factors.

First, East Asia shares a common culture defined by its Confucian heritage. While in the past century Confucianism has been superseded by other ideologies, notably nationalism and communism, it still has a grip on family values. One example is the persistence of a son preference culture. Confucianism also places great emphasis on filial behavior; "being disrespectful towards inlaws" remains grounds for divorce in Taiwan, echoing a similar precept in traditional Chinese family law.[10] Tellingly, a recent Korean survey found that 53.5 percent of Korean husbands answered "obedience to parents" as their foremost reason for marrying Vietnamese brides, followed by "similar appearance to Koreans" [Kim, 2012, p. 552].

Another reason mail-order brides have become prevalent in East Asian developed countries is that marriage in the Confucian tradition is very clearly a transaction through which a woman is purchased to deliver progeny, preferably sons. In most of East Asia until the 1950s marriages were arranged by the parents of the prospective spouses and companionship, as emphasized in the West [Glendon, 1996], was disdained. Thus, while Western culture has idealized and practiced companionate marriage, the Confucian marriage has the outright flavor of a purchase contract, whereby the wife is acquired to render reproductive and other services.

[10] "Disobedience towards husband's parents" was the first out of seven grounds for divorce in traditional Chinese family law.

While Western-inspired family law has been adhered to since the mid 1900s, male-oriented attitudes towards family formation remains in East Asia and may be one reason greater educational attainment and concomitant ability to be economically self-sufficient has led many women in richer East Asian countries to opt-out of marriage. With fewer women in the marriage market, men at the bottom of socioeconomic status have found it difficult to find a domestic wife and have turned to substantially poorer, but culturally and ethnically similar, women from China or Vietnam. Although the premise of male chauvinist values begs the question why attitudes have not changed, the gender structure in the host countries is often pointed to as an explanation for the appeal of foreign brides [Kim, 2012, Kawaguchi & Lee, 2012].

Additionally, the countries composing East Asia are economically heterogeneous; countries such as Singapore and Japan have per capita incomes above USD40,000 as compared to Vietnam which despite almost two decades of economic reforms remains relatively poor at a per capita GDP of around USD1,400. Taiwan (GDP per capita is about USD20,000), while not as rich as Singapore or even Korea, is clearly richer than China (USD4,000 per capita GDP) or Vietnam.

In the case of Taiwan, the cultural proximity to China contributed to the high levels of foreign brides. In 1987, Taiwan lifted martial law and in 1992 allowed entry of Chinese spouses [Liaw et al. , 2011]. Following the thawing of bi-lateral relationships, the number of Chinese brides steadily increased. In 2003, close to 29,000 Taiwanese men married Chinese brides. For comparison, in the same year about 110,000 Taiwanese men married a compatriot.

Vietnam has been the second largest source country of foreign brides. Greater Taiwanese business interests in Vietnam in the 1990s provided the impetus for the marriage of some

110,000 Vietnamese women to Taiwanese men in the following decade [Belanger & Linh, 2011].

During the 1980s and 1990s, Taiwan's economy was growing rapidly, especially relative to some of its East Asian neighbors. By 1990, Taiwan's GDP per capita was 19 times higher than China's, 10 times higher than Indonesia's and 22 times higher than Vietnam's. As the Taiwanese government encouraged investment throughout Southeast Asia in the early 1990s, Taiwanese businessmen went to Vietnam and Indonesia to seek cheap labor but also saw the potential of marriage brokerage [Jiang & Huang, 2004].

These brokers charge the prospective groom a lump-sum of USD7,000-10,000 [Wang & Chang, 2002].[11] The brokers manage the entire process, including arranging the groom's trip abroad and his meeting with potential brides. Once a groom chooses his bride, the broker arranges a wedding banquet in the bride's hometown, prepares all the documents for the bride's visa application, and arranges the trip to Taiwan. The process takes less than a week for the groom, while the bride often has to wait for a couple months before she receives the proper visa to enter Taiwan.[12] According to the Survey Report of the *2002 Living Conditions of Foreign and Mainland Spouses* produced by the Taiwanese government containing data collected from 175,000 foreign spouses, 37.8% of all Southeast Asian brides were introduced to their spouses via commercial marriage brokers and 46% met through friends and relatives [Ministry of Interior, 2004].[13] Table 1 describes the composition of foreign brides by country

[11]The average wedding in Taiwan costs USD26,000, more than the annual per capita income, and expenses are usually paid by groom.

[12]For more in depth report on the process of bride selection see Wang & Chang [2002].

[13]The high share of foreign brides being introduced through friends and relatives have two implications. First is that a high share of foreign brides do prefer their foreign marriage arrangement over staying in their home countries, so that they would introduce their friends and families to marry a Taiwanese man. Second, this is parallel to the findings in the immigration literature where new immigrants could benefit from the existing network of immigrants in the host countries [Beaman, 2012].

of origin. China, Vietnam and Indonesia are among the largest bride exporting countries. Why would these foreign brides want to marry abroad? According to a survey done in 2004 in Vietnam of 650 households with one or more daughters married to Taiwanese men, the overwhelming reason is material gain. Nearly 80% of households cite "to help the family," "for a better life," or "to make parents happy" as the main reason.[14] The Vietnamese bride's family receive USD1,000-2,000 at the time of the wedding in addition to later remittances [Wang & Chang, 2002, Belanger et al. , 2011].[15] After the Taiwanese government lifted the restriction in 1992 on Chinese brides entering Taiwan the marriage brokerage business expanded to China.

The number of foreign brides starts to increase in the mid-1990s. By the time our dataset begins in 1998, every one in eight marriages involves a foreign bride and the percentage keeps rising through 2003 (see Figure 1). On September 1, 2003 the Taiwanese government implemented more stringent screening of newly married Chinese brides seeking entry. Prior to the policy, Chinese brides only needed to provide a valid marriage certificate in order to obtain a visa. After the policy, three interviews were required: prior to entry, at the port of entry, and finally at the place of residence. Brides could be refused entry or be repatriated immediately if the marriage was deemed illegitimate [Wu, 2004, Lu, 2008].[16] Thus, entry became arbitrary and solely dependent on the interviewers.[17] This new rule implicitly increased the cost of marrying Chinese brides.[18] Figure 2 separates Chinese and

[14]There was no case of parents having sold their daughter [Ngu, 2005].

[15]The UN/World Bank estimates nominal 2011 GDP per capita in Vietnam at around USD1,400.

[16]Announced on August 28, 2003 by the Immigration Office, Ministry of Interior, and published on the front page of the China Times, the Liberty Times and the United Daily Newspaper on August 29, 2003.

[17]According to Wu [2004], nearly 10% of Chinese brides were turned away in the first four months of the policy's implementation.

[18]Lu [2008] suggests that one of the main reasons why the policy was implemented is due to the negative media attention surrounding several crackdowns on prostitution rings that consisted mostly of Chinese brides.

Southeast Asian brides. It is clear that the policy was enforced since we observe a dramatic decline of Chinese brides starting in the winter of 2004. The decline in Southeast Asian brides starts in 2005 when the Taiwanese embassy in Vietnam switched to one-on-one interviews instead of bulk processing, reducing the number of visas from hundreds to 20-30 a day (Dajiyuan News, 2005).

2.1 Existing Literature

The foreign-bride phenomenon in Taiwan has been widely studied since early work by Hsia [1997]. However, most of the studies have been ethnographic in nature. In this section, we only discuss the studies that have drawn on large-scale data sets and thus are closest to our paper.

Tsay [2005] provided an overview of the trends of the foreign bride phenomenon from 1991 to 2003 in Taiwan. Drawing on aggregate-level datasets provided by the central government, he describes the rising trend, country-composition and settlement patterns of foreign brides. His paper is one of the first to identify the regional variation in the demand and supply of brides. Luoh [2006] furthered the analysis by combining the Labor Force Participation survey with the 2000 Census survey to examine the relationship between the groom's education level and the likelihood of marrying a foreign bride. He found that foreign brides had disproportionately married grooms with less extensive education. Among men with less than a middle-school education, foreign brides outnumbered Taiwanese brides. He also found that foreign brides are disproportionately located in the southern, less-developed, parts of

Chang [2002] estimated that a total of 1,800 Chinese brides have been convicted of prostitution. Yet, the scale of this problem does not seem large when one considers that there were more than 300,000 foreign brides in Taiwan during this time period.

the island (such as Ponghu, Chiayi and Nantou Counties) while the metropolitan areas (such as Taipei and Taichung City) had very few foreign brides. These differences will be used in our paper for the difference-in-differences analysis.

Liaw et al. [2011] analyzed the 2003 Survey of Foreign and Mainland Spouses' Life Status. The main focus of their paper was to examine determinants of fertility among foreign brides. They estimated the total fertility rate of foreign brides to be 1.58 children, substantially above the 2003 national average of 1.23 [Chen, 2005].

Kawaguchi & Lee [2012] asked why men in developed East Asian countries have turned to countries such as China and Vietnam for brides in such numbers. They pointed to reluctance of increasingly well-educated domestic women to enter wedlock. However, tension between women's education and willingness to marry can be resolved in a number of ways. In the West, there has been a radical shift in gender roles allowing women to combine marriage and work, reversing the once negative relationship between education and marriage.

The literature on society-wide effects is small. The study closest to ours, Tsai et al. [2010], examined the impact of foreign brides on out-of-wedlock fertility among Taiwanese women. Using the 1990 and 2000 censuses, they found a positive association with out-of-wedlock fertility by comparing areas that were major recipients of foreign brides to areas receiving fewer foreign brides. However, a challenge when interpreting this association as causal is that the factors that drove local men to turn to foreign wives are likely to be closely related to local women's decision to bear children outside of marriage. Weiss et al. [2012] studied the gender differential impact of the rise in marriages between a Hong Kong man and a Mainland woman after the 1997 re-unification. They argued that Hong Kong women (men) were less (more) likely to ever be married, currently married, or the household head;

and more (less) likely to be currently divorced or a single parent. In their analysis they use Taiwan as a control group, thus their findings are relative to Taiwanese men and women.

3 Data

For our main analysis, we link Taiwanese marriage, divorce and birth registries for the years 1998 through 2006. From each marriage record we obtain information on education, date of birth, country of origin, and marriage history of the bride and the groom. The birth registry contains information on sex, birth weight, gestation length, birth order, and birth place. Thus, for each couple married between 1998 and 2006 we have information on fertility and divorce outcomes through 2006.

The policy change we exploit took place in the fall of 2003. By making it more difficult to marry mail-order brides the policy likely changed the type of native couples who got married. Therefore, we limit our sample couples where both husband and wife are Taiwanese, non-aboriginal, nationals who married between 1998-2003.[19] Furthermore, we require the wife to be between the ages of 20 and 45 and the husband to be born between 1928 and 1987. That is, a couple would be observed until divorce or the wife turning 46. Since fertility has a 9-month lead-time, 2005 is the first year we expect the policy change to show in natality data. We omit year 2004, a transitional year, leaving us with six years of pre-treatment and two years of post-treatment data.

We exclude a couple of remote islands mainly used as military bases (less than 0.1% of total observations), leaving us with 356 townships in 23 counties.

[19]Couples in which the groom is foreign or the bride or groom is aboriginal constituted 5% of the total sample.

Thus, we arrive at an analysis sample of 691,216 couples on average observed over five years, or 3,563,957 couple-year observations.

3.1 Descriptive Statistics

Table 2 provides summary statistics of couples married between 1998 and 2003, broken down by the bride's origin: Taiwan, China, South East Asia or Other. Here, China includes Macao, Hong Kong and mainland China. Southeast Asia includes Vietnam, Indonesia, Malaysia, Thailand, Cambodia, Singapore, The Philippines and Laos. This table provides characteristics of our analysis sample (Column 1) as well as illustrates how the foreign brides and their grooms differ from native couples.

We see that the majority of foreign brides are from China, 61%, followed by Southeast Asian brides, 33% (an underestimate as the remaining 6% of brides include Chinese and Southeast Asian brides who entered in 1998 and 1999, see note to Table 2).

The spousal age gap is 11-13 years among couples where the bride is foreign. Among Taiwanese couples, the gap is three years. Not only are foreign brides younger than local brides but the Taiwanese men who marry them are also substantially older. As for education, grooms who marry Chinese or Southeast Asian brides are less educated than those who marry native women. Conditional on reporting, the education level of Chinese brides is higher than those of Southeast Asian brides. Perhaps unsurprisingly, the marriages involving foreign brides were also more unstable. While 10% of couples in which the bride (and the groom) were Taiwanese had divorced by 2006, the numbers for Chinese brides and Southeast Asian brides who had divorced were 28% and 17%, respectively. 6.21% of Chinese brides were

marrying to a divorcee, while this rate is much lower for domestic brides (less than 1%). It is quite common for (male) divorcees to remarry foreign brides. [20]

Figure 3 displays the share of foreign brides over time by groom's education level. There is a clear negative gradient, consistent with previous findings. The majority of men who marry foreign brides have at most a middle-school education. Grooms with a four-year college degree almost exclusively marry a fellow Taiwanese woman.

4 Empirical Analysis

In this section, we investigate the effect of foreign women on domestic women. To that end, we focus on the fertility and divorce outcomes of Taiwanese-born married women. Lastly, we utilize two rounds of the nationally representative Social Development Trends Survey and its information on household decision making.

4.1 Identification

For our analysis using administrative data, we pursue a difference-in-differences approach using the 2003 policy change combined with the assumption that less attractive men would be more affected by the more stringent visa requirement.

For the second difference, we use two features of the marriage market, the adult sex ratio in the township and the education level of the groom. The rationale for using the township sex ratio is that women of family-forming age migrate to better marriage markets, resulting

[20] These statistics likely overstate the stability of marriages with foreign brides since they are more likely than domestic brides to abscond without seeking a formal divorce. Foreign brides are only eligible for citizenship after three years of residence. On average it takes about eight years to receive citizenship.

in poor marriage markets also having a surplus of men. In fact, the township sex ratios (ages 20-50) range from 0.84 (men to women) to 1.67, where the richer, metropolitan areas generally have a surplus of women, and poorer rural areas have a surplus of men (see Figures 4 and 5). We classify townships according to their sex-ratio quartile (population based, 2000 census).[21]

Figure 6 presents the share of foreign brides by quartile for each year relative to the peak year 2003. As expected, townships in the fourth quartile have the sharpest increase in foreign brides leading up to the 2003 policy, as well as the sharpest decline. Figure 7 presents the geographic distribution of foreign brides from 1998 to 2006.

We separately analyze the seven administrative metropolitan areas (which contain about a quarter of the total population). These areas are less comparable to the rest of Taiwan for the following four reasons: (i) Our main analysis relies on the assumption that an individual's marriage market would mostly depend on the adult sex ratio in his/her township. The highly integrated transportation and labor market in these metropolitan areas renders the township distinction less meaningful. For example, Taipei City, which area-wise is smaller than Manhattan, has 12 townships. (ii) The 2003 SARS outbreak was known to hit big cities (more densely populated) in Taiwan the hardest. SARS, as an infectious disease, was known to be more prevalent in hospitals, possibly affecting fertility plans. Thus, SARS is an example of a factor affecting fertility in metropolitan areas for which neither year fixed effects nor linear time trends would account.[22] (iii) The higher housing costs and greater population density affect fertility levels. (iv) Townships in metropolitan areas would cluster mostly in

[21] Ideally, 2003 township sex ratio would best reflect a town's female deficit and marriage market competition at the onset of visa tightening policy. However, 2003 sex ratio at township level is not available.

[22] One reason SARS might have affected fertility is that people sought to avoid outpatient medical care during the epidemic [Bennett et al. , 2011].

the first sex ratio quartile. If we kept metropolitan areas in our analysis, the comparison we made between those in the second/third/fourth quartiles to first quartile would be not only about local sex ratio but also about the differences in urbanization of these areas.

Therefore, we separate these largest metropolitan areas – special municipalities (Taipei, Kaohsiung) and provincial cities (Keelung, Hsinchu, Taichung, Chiayi, Tainan cities) – and pursue slightly different approaches for the metropolitan and non-metropolitan sub-samples. For the non-metropolitan areas, we let township sex ratio provide the second difference, the idea being that high sex ratio townships will be more affected.

For the metropolitan areas, since townships are highly integrated, we let husband's education form the second difference, the assumption being that college educated men are unaffected by the availability of foreign brides, the mail-order variety in particular.

As can be seen in Figure 3 college educated men are the least likely to marry a foreign bride, and the sharp decline seen after the 2003 policy is barely noticeable suggesting that the mail-order brides are a rarity among college educated men. College educated men outrank lesser educated men in the marriage market and the most straightforward explanation for their affinity for fellow Taiwanese as spouses is positive assortative mating (e.g., from public goods in marriage) and foreign spouses ranking below Taiwanese women on the (Taiwanese) marriage market. However, this does not imply that the college educated are insulated from the influence of foreign brides and the difference is likely one of degrees rather than absolutes. Marriage provides men with sex and children and the ability of a woman to perform those tasks does not rely on a common language. However, marriage may also provide companionship, and for this, domestic brides have a distinct advantage. The greater the weight on personal compatibility, the lower the substitutability bias introduced is one of

attenuation. That is, if foreign brides also reduce the bargaining power of women married to educated men, the difference-in-differences would provide a lower bound estimate of the impact.

4.2 Regression Model

For the non-metropolitan areas, we estimate a regression model of the form:

$$\begin{aligned} Y_{ivt} = \beta_1 I(Post03)_t + \sum_{j=2}^{4} \beta_j I(SexRatioQ_j)_v \times I(Post03)_t \\ + \sum_{j=2}^{4} I(SexRatioQ_j)_v + X_{ivt} + t \times LOCALITY_v \\ + \tau_t + \pi_v + \epsilon_{ivt} \end{aligned} \tag{1}$$

where Y_{ivt} is an indicator variable, 1 if couple i in township v in year t had a child or divorced. $I(Post03)$ is an indicator variable, 1 if $t > 2003$. $I(SexRatioQ_j)_v$ indicates township v's sex-ratio quartile. X_{ivt} includes wife's age, age ^{2}, husband's education (9-15 years, 16 or more years), whether the couple has a son, and a set of dummies controlling for duration of marriages (in years). τ_t is a vector of year dummies, and $LOCALITY$ is a vector of county or township dummies. We cluster standard errors at the township level.

The main coefficients of interest are $\beta_2, \beta_3, \beta_4$ which capture the heterogeneous impact of the 2003 policy on the likelihood of fertility or divorce across sex-ratio quartiles.

We focus on the coefficients $\beta_2, \beta_3, and \beta_4$ rather than β_1. The coefficient on $I(Post03)_t$, β_1, captures not only changes in low sex-ratio townships driven by the policy but also any

changes in country-wide contemporaneous factors affecting the outcome in question. These coefficients are also sensitive to which year is excluded from the year fixed effects.[23]

As a preliminary, Figure 8 shows the probability of a birth in the years leading up to the 2003 policy, by sex-ratio quartile. This figure is restricted to only those who married before 2003. Before the policy, the higher sex-quartiles have higher fertility and we observe parallel decreasing trends across the four quartiles. After the policy, fertility drops more in the high sex-ratio areas.

For the metropolitan areas we let husband's education level provide the second difference and estimate a regression model of the form:

$$\begin{aligned} Y_{ivt} = {} & \beta_1 I(Post03)_t + \beta_2 I(Post03)_t \times MIDDLE_i \\ & + \beta_3 I(Post03)_t \times LOW_i + MIDDLE_i + LOW_i \\ & + X_{ivt} + \tau_t \times LOCALITY_{iv} + \pi_v + \epsilon_{ivt} \end{aligned} \tag{2}$$

where $MIDDLE$ is an indicator variable that takes on the value 1 if the husband has nine to fifteen years of education, and LOW is an indicator variable that is 1 if the husband has eight years or less of schooling. The reference category is four-year college degree or more. The coefficients of interests are β_2 and β_3 and in the case of fertility we expect $\beta_3 < \beta_2 < 0$.

[23]Between controlling for year of marriage, marriage duration, and year, we can choose two. We have opted for marriage duration and year, the reason being that we believe these two to have a stronger link to fertility (and divorce) than year of marriage. For instance, fertility is likely influenced by economy wide events like unemployment (2000 and 2001 were recession years) or auspicious years for the Chinese Zodiac. The presence of idiosyncratic factors also means that fertility trends are poorly captured by, say, a polynomial in year.

4.2.1 Fertility Outcomes – Non-Metropolitan Areas

We start by estimating Equation 1 without the county-specific time trends (only year effects) on couples in non-metropolitan areas (see Table 3 for results). In Column 1, all education groups are pooled, whereas Columns 2-4 present results by husband's education. We see that relative to couples in the first (township sex-ratio) quartile, fertility falls after the 2003 policy and, as hypothesized, the decline is greater in the townships with higher male sex ratios. For couples in the fourth sex-ratio quartile townships there is a 4 percentage point reduction in fertility. Coefficients on second quartiles $SexRatioQ2$ and third quartiles $SexRatioQ3$ are statistically different, as are the $SexRatioQ3$ and $SexRatioQ4$ coefficients

Turning to the effects by education (Columns 2-4), we see that within each education category, there is a greater reduction in fertility among couples in higher sex-ratio townships after the policy. Comparing across education groups, the ordering of the effect sizes are as hypothesized, larger among the less educated.

The coefficient on $I(Post03)$ is negative but is hard to interpret due to the inclusion of year dummies. Consequently, going forward, we will omit this coefficient from the tables to focus on the difference-in-differences results.

In Table 4 we present results allowing for county- and township-specific time trends respectively as well as county-year fixed effects, Panels A-C. In Panel A we allow for different fertility trends by county; the results are qualitatively similar. For the whole sample and within each education group, the effect is greater in higher sex-ratio areas. Quantitatively, the results are somewhat muted. Next, we turn to a more demanding specification by substituting township-specific for county-specific time trends (there are 308 townships and

16 counties in non-metropolitan areas), see Panel B. The qualitative pattern found earlier remains however reduced in magnitude. Finally, we control for county-year fixed effects (Panel C) and the results are similar to the specification including county-specific time trends. For ease of comparison, the coefficients across specifications are graphed in Figures 9 and 10.

4.2.2 Fertility Outcomes – Metropolitan Areas

We now turn to the results for the seven metropolitan areas, home to about a quarter of our sample. For the reasons outlined previously, the township sex ratios provide a less meaningful distinction here. Instead, we group couples according to husband's education level, the assumption being that the policy mainly impacted men with less education leaving college educated men largely unaffected.

Table 5 presents the results from estimating Equation 2 for the metropolitan areas. As hypothesized, relative to the college group (defined by husband's education), lower education groups reduced their fertility post-policy. In the basic specification, Column 1, relative to the most educated group, the middle and lowest education groups reduced their fertility by 0.062 and 0.074 respectively (the difference is statistically significant at the 1% level). While the effect size may appear small, the baseline fertility risk is only 0.19. Columns 2-4 allow for location specific time trends and city-year fixed effects, and the difference-in-differences results remain almost unchanged, consistent with metropolitan areas being geographically highly integrated and homogeneous.

4.3 Divorce Outcomes

Next we examine divorce outcome (Tables 6-8). While the results are not as clear as in the case of fertility, the picture that emerges is that foreign brides stabilized marriage – a seemingly counterintuitive finding. Theory suggests that more women would make remarriage more attractive for men, thereby having a destabilizing effect. While this might still be the case over the longer term, in the short term the higher fertility of Taiwanese wives, and thus the presence of young children (as documented above), suggests an alternative explanation.

We sketch the argument here (for a more detailed exposition, see the Appendix). Assume that in marriage men hire women to produce children (see Edlund [forthcoming]) and domestic and foreign women are substitutes. In return, in marriage, men provide resources to women. Furthermore, suppose that fertility is uncertain, depending on the woman's unverifiable effort and a stochastic term. If the production of children is costly to women, women have an incentive to shirk. Divorce may be a disciplining device, triggered by low fertility (failure to bear children was the second of the seven ground for divorce in Chinese family law).[24]

Foreign brides in this setting can have two effects. Faced with a better alternative, men's divorce threshold may shift, triggering divorce at a higher fertility level. Faced with heightened risk of marriage termination, women might increase effort, resulting in a rightward shift in the fertility distribution. Thus, the prediction is that fertility would increase whereas the net effect on divorce risk is ambiguous.

[24]Taiwan was part of China 1683-1895.

4.4 Robustness

To check robustness to functional form assumptions, we also estimate the policy impact on fertility and divorce using duration analysis with a Weibull hazard function. We find similar results for both fertility and divorce. As for fertility, those residing in the third and the fourth sex-ratio quartiles respectively were 3.6% and 5.8% less likely to give birth after the 2003 policy than couples in townships with lowest sex-ratio quartile (statistically significant at 1%). We also find that the likelihood of divorce increased for couples in the fourth quartile by 8% relative to the couples in the first quartile. Since the findings are in line with those of the OLS analysis, we do not include the tables in the interest of space (but they are available from the authors upon request).

We also estimate a triple-difference model, in which we are interested in whether fertility reduction by lower educated men is greater in higher adult sex ratio areas (and conversely for divorce). The results are largely supportive (see Appendix Table A.1).

4.5 Decision Making Within Households

While we interpret our findings so far as being consistent with domestic women losing bargaining power due to the greater availability of foreign brides, in this section we seek some direct evidence of lower bargaining power using the Social Trend Survey. The survey is nationally representative and in 2002 and 2006 it asked of both husbands and wives: "Within your household, who is making each of the following decision: expenditures, savings, and child rearing." Options are: self, spouse, both, others or not applicable. We employ the same difference-in-differences strategy as before, grouping respondents according to the lo-

cal (adult) sex ratio. Our outcome of interest is a dummy variable that takes the value 1 if the wife is reported as the main decision maker.[25] Columns 1 to 3 of Table 9 show results using the husband's responses and Columns 4 to 6 show results using the wife's responses. Both husbands and wives report that, after the policy, wives are more likely to decide how to manage savings and expenditure in areas with higher adult sex ratios. The pattern for child-rearing is less clear. Still, consistently, after the policy, women in the highest sex-ratio quartile gained on women in the lowest sex-ratio quartile.

4.6 Discussion

We have shown that as a consequence of the immigration policy change in 2003, native married women reduce fertility and increase divorce rates. Our findings in Section 4.5 suggest that these results may be due to a shift of bargaining power from husband to wife. However, there could be other channels through which the policy affects the welfare of native brides, namely the labor market competition. For example, foreign brides can become a low cost substitute for native women in the labor market. Consequently, the tightened immigration policy in 2003 could have affected native women labor market outcomes and indirectly affect native women's fertility and divorce outcomes.

To explore this alternative hypothesis, we use the Labor Force Participation Survey (1998 to 2006), a nationally representative survey collected annually by the Taiwanese government to examine employment status, wages and hours worked in the previous week for married women. Similar to the analysis on fertility and divorce, if there is an impact on the labor

[25] We decide to focus on the choice that wives as the main decision makers (rather than both as choice) since it is a more clear indicator of wife's status rising at home.

market due to the 2003 policy, we expect (i) the least educated native women to be more affected since they are closer substitutes to foreign women, and (ii) areas with higher foreign bride inflow to be more affected. Yet, neither of these patterns emerge in Table 10.[26] These results are not surprising for two reasons. First, foreign brides are prohibited from working until they receive permanent residence status which usually takes several years, so we do not expect an immediate impact on the labor market. If foreign brides work regardless of legality, we would expect them to work in the informal labor market, competing primarily with domestic low-skilled women if at all. Second, Angrist [2002] found high sex ratios to be associated with lower female labor force participation. Therefore, while there may be a higher demand for female labor after the 2003 policy, it is not clear whether married women prefer to work or not. In sum, the absence of a labor market effect suggests that the marriage market is the main channel through which foreign brides affected domestic women.

Hitherto, we have focused on native women. However, there is no reason to believe foreign wives to be insulated from the overseas competition and in Table 11 we present results estimating Equation 1. Panel A presents results for Chinese wives and Panel B results for Southeast Asian wives. For both groups, the changes in fertility are driven by couples where the groom is less educated. Among Chinese wives we find no affect among couples with a college educated husband. Among Southeast Asian wives, the effect is of the "wrong" sign – couples residing in the highest sex-ratio areas had relatively higher fertility post-policy. As already discussed, the foreign bride phenomenon decrease with the groom's education and college educated men were likely unaffected by the change in visa requirements. The

[26]The results presented in Panels B and C include the entire sample of married women regardless of employment status. We also tried various alternative specifications including restricting the sample to those who were employed and using log(income) as the dependent variable – the results are still statistically insignificant. These results are not presented in the interest of space but are available upon request.

impact is smaller among Southeast Asian brides than among Chinese brides. A couple of factors may have contributed to this differential effect. First, the announcement of the policy was publicized on the front page of major local newspapers in the fall of 2003. Since most Southeast Asian brides do not read Chinese, information dispersion was likely slower among this group. Second, the policy change in 2003 was designed to curtail the inflow of Chinese mail-order brides – the inflow of Southeast Asian brides was stemmed later.

5 Conclusion

In 2003, 29% of marriages in Taiwan involved a foreign bride. Taiwan is not alone, in that the practice is on the rise throughout East Asia. Women marrying up, within or across countries, is a long standing practice. What is new is the larger scale on which this practice is now occurring, fueled by lower transaction costs (the internet, cheaper air travel, etc.), stark economic disparities and in the case of East Asia, a shared cultural heritage.

We examine the impact of the foreign bride on Taiwanese married women exploiting a policy change initiated in 2003 which increased the difficulty of marrying foreign brides. Using administrative data, we estimate that foreign brides increased fertility of domestic women and reduced divorce rates. Our findings are likely to generalize to South Korea and Japan, also countries where men have turned to foreign brides in large numbers.

East Asian developed countries struggle with fertility levels well below replacement level, a phenomenon commonly linked to domestic women's reluctance to marry, especially if educated. In 2010, Taiwan recorded a total fertility rate of 0.90 children per woman and the numbers for Korea and Japan were similarly low at 1.21 and 1.39 respectively. The

popularity of foreign brides from substantially poorer countries offers additional evidence of womens roles in marriage trailing the progress made in other domains such as education and the workplace.

References

2005. Proc. Marriage Migration between Vietnam and Taiwan: A View from Vietnam (Singapore, 5-7 December 2005).

Angrist, Joshua. 2002. How do sex ratios affect marriage and labor markets? Evidence from America's second generation. Quarterly Journal of Economics, **117**(3), 997–1038.

Ashraf, Nava, Field, Erica, & Lee, Jean. 2012. Household Bargaining and Excess Fertility: An Experimental Study in Zambia. Duke and Harvard University.

Beaman, Lori A. 2012. Social Networks and the Dynamics of Labour Market Outcomes: Evidence from Refugees Resettled in the U.S. The Review of Economic Studies, **79**(1), 128–161.

Belanger, Daniele, & Linh, Tran Giang. 2011. The impact of transnational migration on gender and marriage in sending communities of Vietnam. Current Sociology, **59**(1), 59–77.

Belanger, Daniele, Linh, Tran Giang, & Duong, Le Bach. 2011. Marriage Migrants as Emigrants. Asian Population Studies, **7**(2), 89–105.

Bennett, Daniel, Chiang, Chun-Fang, & Malani, Anup. 2011 (April). Learning During a Crisis: the SARS Epidemic in Taiwan. Working Paper 16955. National Bureau of Economic Research.

Bourguignon, Francois, Browning, Martin, Chiappori, Pierre-Andre, & Lechene, Valerie. 1994. Incomes and Outcomes: a Structural Model of Intra-Household Allocation. Journal of Political Economy, **102**(6), 1067–1096.

Chang, Shu-Ming. 2002 (May). Marketing International Marriages: Cross-Border Marriage Business in Vietnam and Taiwan. M.Phil. thesis, Tamkang University, Taiwan. in Chinese.

Chen, Chaonan. 2005. Perspectives of Taiwan's Population and Potency of Alternative Policies. The Japanese Journal of Population, **3**(1), 58–75.

Duflo, Esther. 2011 (December). Womens Empowerment and Economic Development. Working Paper 17702. National Bureau of Economic Research.

Edlund, Lena. 2005. Sex and the City. Scandinavian Journal of Economics, **107**, 25–44.

Edlund, Lena. 2006. Marriage: Past, Present, Future? CESifo Economics Studies, **52**(4), 621–639.

Edlund, Lena. forthcoming. The Role of Paternity Presumption and Custodial Rights for Understanding Marriage Patterns. Economica.

Edlund, Lena, & Korn, Evelyn. 2002. A Theory of Prostitution. Journal of Political Economy, **110**(1), 181–214.

Fan, Cindy F., & Huang, Youqin. 1998. Waves of rural brides: Female marriage migration

in China. Annals of the Association of American Geographers, **88**(June), 227–251.

Francis, AndrewM. 2011. Sex ratios and the red dragon: using the Chinese Communist Revolution to explore the effect of the sex ratio on women and children in Taiwan. Journal of Population Economics, **24**(3), 813–837.

Frejka, Tomas, Jones, Gavin W, & Sardon, Jean-Paul. 2010. East Asian childbearing patterns and policy developments. Population and Development Review, **36**(3), 579–606.

Glendon, Mary Ann. 1996. The Transformation of Family Law: State, Law and Family in the United States and Western Europe. Chicago: University of Chicago Press.

Horney, M. J., & McElroy, Marjorie B. 1988. The Household Allocation Problem: Results from a Bargaining Model. Pages 15–38 of: Schultz, T. Paul (ed), Research in Population Economics, vol. 6. Greenwich: JAI Press.

Hsia, Hsiao-Chuan. 1997. Selfing and Othering in the "Foreign Bride" Phenomenon -A Study of Class, Gender and Ethnicity in the Transnational Marriages between Taiwanese Men and Indonesian Women. Ph.D. thesis, University of Florida.

Hsia, Hsiao-Chuan. 2006. Empowering "Foreign Brides" and Community through Praxis-Oriented Research. Societies Without Borders, **115**(1), 93–111.

Jiang, YL; Chen YJ, & Huang, YT. 2004. A Study of Life Adjustment of the Mainland China Spouses and Foreign Spouses. Community Development Quarterly, **105**(1), 66–89.

Kawaguchi, Daiji, & Lee, Soohyung. 2012 (March). Brides for Sale: Cross-Border Marriages and Female Immigration.

Kim, Andrew Enungi. 2009. Global Migration and South Korea: Foreign Workers, Foreign Brides and the Making of a Multicultural Society. Ethnic and Racial Studies, **32**(1), 70–92.

Kim, Hee-Kang. 2012. Marriage Migration Between South Korea and Vietnam: A Gender Perspective. Asian perspective, **36**(3), 531–563.

Liaw, Kao-Lee, Lin, Ji-Ping, & Liu, Chien-Chia. 2011. Reproductive contributions of Taiwan's foreign wives from the top five source countries. Demographic Research, **24-26**(April 27, 2011).

Lu, Melody Chia-Wen. 2008. Gender, Marriage and Migration: Contemporary Marriages Between Mainland China and Taiwan. Ph.D. thesis, Proefschrift Universiteit Leiden, Leiden, The Netherlands.

Lundberg, Shelly, & Pollak, Robert A. 1993. Separate spheres bargaining and the marriage market. Journal of Political Economy, 988–1010.

Luoh, Ming-Ching. 2006. Gender Differences in Educational Attainment and International Marriages. Taiwan Economic Review, **34**(1), 79–115. in Chinese.

Mancer, Marilyn, & Brown, Murray. 1980. Marriage and Household Decision-Making: A Bargaining Analysis. International Economic Review, **21**(1), 31–44.

McElroy, Marjorie. 1990. The Emperical Content of Nash-Bargained Household Behavior. Journal of Human Resources, **25**(4), 559–583.

Ministry of Interior, ROC. 2004. Survey Report of the Living Conditions of Foreign and Mainland Spouses. Tech. rept. in Chinese.

Oota, Hioki, Settheetham-Ishida, Wannapa, Tiwawech, Danai, Ishida, Takafumi, & Stoneking, Mark. 2001. Human mtDNA and Y-Chromosome Variation is Correlated with Matrilocal versus Patrilocal Residence. Nature Genetics, **29**.

Shapiro, Carl, & Stiglitz, Joseph E. 1984. Equilibrium Unemployment as a Worker Discipline Device. The American Economic Review, **74**(3), pp. 433–444.

Sharygin, Ethan, Ebenstein, Avraham, & Das Gupta, Monica. 2012. Implications of China's future bride shortage for the geographical distribution and social protection needs of never-married men. Population studies, 1–21.

Tsai, Wehn-jyuan, Liu, J.T., & Hockenberry, J. 2010. Do Foreign Brides Crowd Out Domestic Unwed Women? A Study of Nonmarital Fertility in Taiwan.

Tsay, Ching-lung. 2005. Marriage migration of women from China and Southeast Asia to Taiwan. In: Jones, Gavin W., & Ramdas, Kamalini (eds), (Un)tying the Knot: Ideal and Reality in Asian Marriage. Singapore: Asia Research Institute. National University of Singapore.

Wang, Hong-zen, & Chang, Shu-ming. 2002. The commodification of international marriages: Cross-border marriage business in Taiwan and Viet Nam. International Migration, **40**(6), 93–114.

Weiss, Yoram, Yi, Junjian, & Zhang, Junsen. 2012. Hypergamy, Cross-boundary Marriages, and Family Behavior. Mimeo.

Wu, Shen. 2004. Study of Chinese Female Spouses Life Adaptation in Taiwan A case study of the Chinese Female Spouses in Taipei County. M.Phil. thesis, National Sun Yat-Sen University, Taiwan. in Chinese.

Table 1: Composition of Foreign Brides by Country of Origin

Country of Origin	Number	Percent
China	170,883	55.6
Vietnam	72,715	23.7
Indonesia	19,045	6.2
Thailand	6,157	2.0
Cambodia	4,187	1.4
Other/Missing	34,125	11.1
Total	307,112	

Note: Data Source 1998-2006 Marriage Registry. In 1998 and 1999, the rule for reporting the bride's country of origin was less strict. Therefore, some brides from China or Southeast Asia may be included in Other/Missing. From 2000 onwards, almost all foreign brides reported country of origin.

Table 2: Summary Statistics

	(1)	(2)	(3)	(4)
	Bride Origin			
	Taiwan	China	SE Asia	Other
Bride's age	26.8	28.6	22.9	26.1
	(4.9)	(7.2)	(5.1)	(6.9)
Groom's age	29.7	40.3	36.0	36.9
	(5.5)	(11.9)	(7.7)	(9.8)
n daughters, 2006	0.588	0.200	0.464	0.364
	(0.681)	(0.472)	(0.639)	(0.593)
n sons, 2006	0.636	0.217	0.497	0.406
	(0.684)	(0.481)	(0.632)	(0.601)
Divorced by 2006	0.101	0.278	0.174	0.118
Year married	2000	2001	2001	2000
Groom remarried, %	0.87	6.21	4.85	2.59
Bride's education:				
<9 years	0.207	0.277	0.427	0.131
9 yrs/some college	0.506	0.117	0.126	0.069
college +	0.283	0.028	0.023	0.066
missing	0.003	0.577	0.424	0.734
Groom's education:				
<9 years	0.230	0.49	0.524	0.48
9 yrs/some college	0.484	0.425	0.42	0.382
college+	0.285	0.076	0.052	0.124
Observations	691,216	128,332	69,688	11,981

Note: Data pertain to the time of marriage, unless otherwise noted. Restricted to couples who married between 1998 and 2003. Standard deviations are in brackets. China includes Macao, Hong Kong and mainland China. Southeast Asia includes Vietnam, Indonesia, Malaysia, Thailand, Cambodia, Singapore, The Philippines and Laos. Other includes all other foreign countries or missing values. In 1998 and 1999, the rule for reporting the bride's country of origins was less strict. Therefore, some brides from China or Southeast Asia are included in Other. From 2000 onwards, almost all foreign brides reported country of origin.

Table 3: Fertility Impact by Township Sex-Ratio Quartile– Non-Metropolitan Areas

	(1)	(2)	(3)	(4)
		Husband's Education:		
	All	0-8yrs	9-15yrs	16+
Mean Dep. Var.	0.219	0.219	0.226	0.206
$I(Post03)$	-0.0224***	-0.00461	-0.00431	-0.0175***
	(0.00305)	(0.00405)	(0.00366)	(0.00447)
$\underline{I(Post03)\times}$				
$SexRatioQ2$	-0.0171***	-0.0202***	-0.0139***	-0.0106***
	(0.00333)	(0.00379)	(0.00324)	(0.00345)
$SexRatioQ3$	-0.0284***	-0.0296***	-0.0231***	-0.0191***
	(0.00354)	(0.00369)	(0.00332)	(0.00395)
$SexRatioQ4$	-0.0397***	-0.0353***	-0.0294***	-0.0240***
	(0.00323)	(0.00350)	(0.00305)	(0.00411)
Observations	2506918	665016	1238914	602988
Adjusted R^2	0.085	0.103	0.091	0.069

Standard errors clustered at the township level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Sample excludes special municipalities (Taipei City, Kaohsiung City) and provincial cities (Keelung City, Hsinchu City, Taichung City, Chiayi City, Tainan City). See Table 5 for results for the metropolitan areas.

All regressions include township dummies, year fixed effects, a dummy for lack of a son, dummies for marriage duration in years, and wife's age (years). Location specific time trends are not included.

All regressions exclude year 2004. Restricted to native couples married 1998-2003. Column 1 includes husband's education dummies. Column 2 restricts sample to couples in which the husband's education is less than 9 years. Column 3 restricts sample to couples in which the husband's education is 9 years to some-college. Column 4 restricts sample to couples in which the husband's education is four-year college or more.

Table 4: Fertility Impact by Township Sex-Ratio Quartile – Non-Metropolitan Areas

	(1)	(2)	(3)	(4)
		Husband's Education:		
	All	0-8yrs	9-15yrs	16+
	A. County-Specific Time Trends			
$\underline{I(Post03)\times}$				
$SexRatioQ2$	-0.0134***	-0.0163***	-0.0105***	-0.00646**
	(0.00255)	(0.00343)	(0.00265)	(0.00301)
$SexRatioQ3$	-0.0228***	-0.0226***	-0.0183***	-0.0138***
	(0.00289)	(0.00332)	(0.00310)	(0.00358)
$SexRatioQ4$	-0.0324***	-0.0260***	-0.0230***	-0.0193***
	(0.00253)	(0.00322)	(0.00286)	(0.00401)
Adjusted R^2	0.085	0.103	0.091	0.069
	B. Township-Specific Time Trends			
$\underline{I(Post03)\times}$				
$SexRatioQ2$	-0.00943***	-0.0127**	-0.0116***	0.00101
	(0.00287)	(0.00595)	(0.00416)	(0.00587)
$SexRatioQ3$	-0.0128***	-0.00262	-0.0159***	-0.0134**
	(0.00297)	(0.00531)	(0.00425)	(0.00609)
$SexRatioQ4$	-0.0159***	-0.0147***	-0.0193***	-0.00339
	(0.00281)	(0.00481)	(0.00424)	(0.00675)
Adjusted R^2	0.085	0.103	0.091	0.069
	C. County-Year Fixed Effects			
$\underline{I(Post03)\times}$				
$SexRatioQ2$	-0.0144***	-0.0183***	-0.00985***	-0.00650**
	(0.00282)	(0.00343)	(0.00294)	(0.00327)
$SexRatioQ3$	-0.0249***	-0.0273***	-0.0179***	-0.0147***
	(0.00360)	(0.00345)	(0.00366)	(0.00397)
$SexRatioQ4$	-0.0354***	-0.0317***	-0.0216***	-0.0221***
	(0.00314)	(0.00355)	(0.00342)	(0.00431)
Adjusted R^2	0.085	0.104	0.091	0.069
Observations	2506918	665016	1238914	602988

Panels A, B and C augment the specification in Table 3 with county-specific time trends, township-specific time trends, and county-year fixed effects respectively. Other notes as for Table 3. There are 308 townships and 16 counties.
Standard errors clustered at the township level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 5: Fertility Impact by Husband's Education – Metropolitan Areas

	(1)	(2)	(3)	(4)
		Time trend		
	Basic	City	Township	City-Year FE
$I(Post03)\times$				
9-15yrs Edu.[a]	-0.0620***	-0.0594***	-0.0598***	-0.0580***
	(0.00125)	(0.00127)	(0.00127)	(0.00127)
0-8yrs Edu.	-0.0743***	-0.0714***	-0.0716***	-0.0687***
	(0.00242)	(0.00240)	(0.00245)	(0.00240)
Observations	1057039	1057039	1057039	1057039
Adjusted R^2	0.067	0.067	0.067	0.067

Sample restricted to couples in special municipalities (Taipei City, Kaohsiung City) and provincial cities (Keelung City, Hsinchu City, Taichung City, Chiayi City, Tainan City).
[a] – Husband's education.
Mean of the dependent variable is 0.189.
Column 1 is the basic model.
Column 2 includes county-time trends. There are seven counties, each corresponding to a metropolitan area.
Column 3 includes township-time trends. There are 48 townships.
Column 4 includes county-year fixed effects.
Standard errors in parentheses.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 6: Impact of Policy on Divorce by Township Sex-Ratio Quartile

	(1)	(2)	(3)	(4)
		Husband's Education:		
	All	0-8yrs	9-15yrs	16+
Mean Dep. Var.	0.019	0.027	0.020	0.009
$I(Post03)$	0.0321***	0.0385***	0.0278***	0.0139***
	(0.000774)	(0.00191)	(0.000928)	(0.000895)
$\underline{I(Post03)\times}$				
$SexRatioQ2$	0.000926	0.00360**	0.000118	-0.000689
	(0.000654)	(0.00158)	(0.000918)	(0.000671)
$SexRatioQ3$	0.000982	0.00376***	-0.000593	-0.000130
	(0.000620)	(0.00139)	(0.000842)	(0.000667)
$SexRatioQ4$	0.00127**	0.00312**	-0.000706	-0.000407
	(0.000592)	(0.00129)	(0.000800)	(0.000713)
Observations	2506918	665016	1238914	602988
Adjusted R^2	0.006	0.005	0.005	0.002

Notes as for Table 3.
Standard errors clustered at the township level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 7: Impact of Policy on Divorce by Township Sex-Ratio quartile

	(1)	(2)	(3)	(4)
		Husband's Education:		
	All	0-8yrs	9-15yrs	16+
	A. County-Specific Time Trends			
$I(Post03)\times$				
$SexRatioQ2$	0.00132*	0.00248*	0.000872	0.000694
	(0.000673)	(0.00145)	(0.00102)	(0.000678)
$SexRatioQ3$	0.00160**	0.00267**	0.000536	0.00163**
	(0.000741)	(0.00135)	(0.00109)	(0.000760)
$SexRatioQ4$	0.00174**	0.00181	0.000293	0.00152*
	(0.000729)	(0.00140)	(0.00102)	(0.000862)
Adjusted R^2	0.006	0.005	0.005	0.002
	B. Township-Specific Time Trends			
$I(Post03)\times$				
$SexRatioQ2$	-0.0000347	0.00280	-0.000885	-0.000169
	(0.00112)	(0.00261)	(0.00160)	(0.00134)
$SexRatioQ3$	0.00220**	0.00492**	0.00223	0.000811
	(0.00110)	(0.00237)	(0.00150)	(0.00130)
$SexRatioQ4$	0.000941	0.00391*	0.00180	-0.000582
	(0.00106)	(0.00210)	(0.00142)	(0.00133)
Adjusted R^2	0.006	0.005	0.005	0.002
	C. County-Year Fixed Effects			
$I(Post03)\times$				
	0.00152**	0.00255*	0.000872	0.000841
$SexRatioQ2$	(0.000652)	(0.00145)	(0.00106)	(0.000616)
	0.00183**	0.00242*	0.000461	0.00198**
$SexRatioQ3$	(0.000771)	(0.00144)	(0.00117)	(0.000766)
	0.00193**	0.00113	-0.0000518	0.00222**
$SexRatioQ4$	(0.000773)	(0.00155)	(0.00115)	(0.000893)
Adjusted R^2	0.006	0.005	0.005	0.002
Observations	2506918	665016	1238914	602988

Panels A, B and C augment the specification in Table 3 with county-specific time trends, township-specific time trends, and county-year fixed effects respectively. Other notes as for Table 3. There are 308 townships and 16 counties.
Standard errors clustered at the township level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 8: Divorce Impact, Large Metropolitan Areas, by Husband's Education with Education Interaction Term

	(1)	(2)	(3)	(4)
		Time trend		
	Basic	City	Township	City-Year FE
$I(Post03)\times$				
9-15yrs Edu.[a]	0.00571***	0.00575***	0.00566***	0.00555***
	(0.000558)	(0.000568)	(0.000561)	(0.000552)
0-8yrs Edu.	0.00458***	0.00472***	0.00464***	0.00440***
	(0.000902)	(0.000903)	(0.000915)	(0.000911)
Observations	1057039	1057039	1057039	1057039
Adjusted R^2	0.007	0.007	0.007	0.007

Sample is restricted to couples in special municipalities (Taipei City, Kaohsiung City) and provincial cities (Keelung City, Hsinchu City, Taichung City, Chiayi City, Tainan City).
[a] – Husband's education.
Mean of the dependent variable is 0.02, i.e., there is an annual 2-percent chance of divorce conditional on not having divorced yet.
Column 1 is the basic model.
Column 2 includes county-time trends. There are seven counties, each corresponding to a metropolitan area.
Column 3 includes township-time trends. There are 48 townships.
Column 4 includes county-year fixed effects.
Standard errors in parentheses.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 9: Impact of Policy on Intra-Household Decision Making by Sex-Ratio Quartile

	Wife Decides:					
	He Says			She Says		
	Spending	Savings	Children	Spending	Savings	Children
Mean Dep. Var.	0.228	0.189	0.130	0.279	0.258	0.137
$I(Post03)\times$						
$SexRatioQ2$	0.0293	0.0530***	0.00296	-0.0219	0.0624**	-0.00178
	(0.0322)	(0.0107)	(0.0209)	(0.0385)	(0.0288)	(0.0161)
$SexRatioQ3$	0.0308	0.0196	0.0238	-0.0176	0.0245	0.0182*
	(0.0307)	(0.0129)	(0.0178)	(0.0174)	(0.0221)	(0.00989)
$SexRatioQ4$	0.0741*	0.0678***	0.0565**	0.0549*	0.0729**	0.0255
	(0.0405)	(0.0172)	(0.0221)	(0.0281)	(0.0263)	(0.0174)
Observations	12162	12162	11472	13835	13835	13147
Adjusted R^2	0.027	0.014	0.015	0.016	0.011	0.005

Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Outcomes are only surveyed in 2002 and 2006. All regressions include county dummies, a set of age dummies, education dummies, a dummy for employment status, a dummy indicating whether the interviewee is the main earner. All regressions are weighted using sample weight. Sex ratios and the quartiles are defined at the county level since township of residence is not available in the dataset. Restrict to couples who got married before 2004. Columns 1 to 3 restricted to husband's response. Column 4 to 6 restricted to wife's response. Columns 1 and 4 present whether wife is the main decision-maker for expenditure decisions. Columns 2 and 5 present whether wife is the main decision-maker for saving and asset investment decisions. Columns 3 and 6 present whether wife is the main decision-maker for child-rearing decisions.

Table 10: Employment Impact on Married Women by Sex Ratio Quartile

	(1)	(2)	(3)	(4)
		Woman's Education:		
	All	0-8yrs	9-15yrs	16+
	A. Employment (mean=0.477)			
$\underline{I(Post03)\times}$				
$SexRatioQ2$	0.0138	-0.0405	0.0294	-0.0169
	(0.0225)	(0.0310)	(0.0232)	(0.0452)
$SexRatioQ3$	0.0286	0.00266	0.0439	-0.116*
	(0.0230)	(0.0347)	(0.0247)	(0.0565)
$SexRatioQ4$	0.0290	-0.0150	0.0378	0.0116
	(0.0245)	(0.0334)	(0.0273)	(0.0798)
Adjusted R^2	0.071	0.048	0.043	0.024
	B. Income (mean=14,117)			
$\underline{I(Post03)\times}$				
$SexRatioQ2$	694.9	-494.2	1057.5	98.30
	(798.2)	(856.6)	(909.7)	(2358.4)
$SexRatioQ3$	631.4	394.2	1444.2	-5811.1
	(787.7)	(938.7)	(945.3)	(3003.8)
$SexRatioQ4$	-50.95	-828.0	557.6	-2321.5
	(762.8)	(877.5)	(940.0)	(3659.6)
Adjusted R^2	0.171	0.041	0.053	0.024
	C. Hours (mean=26.0)			
$\underline{I(Post03)\times}$				
$SexRatioQ2$	0.615	-2.405	1.517	0.646
	(0.899)	(1.264)	(1.037)	(2.351)
$SexRatioQ3$	1.900	1.811	1.928	-2.478
	(0.996)	(1.318)	(1.211)	(2.906)
$SexRatioQ4$	1.805	0.359	2.052	1.266
	(1.087)	(1.290)	(1.290)	(3.294)
Adjusted R^2	0.049	0.059	0.039	0.016
Observations	61505	21153	34750	5602

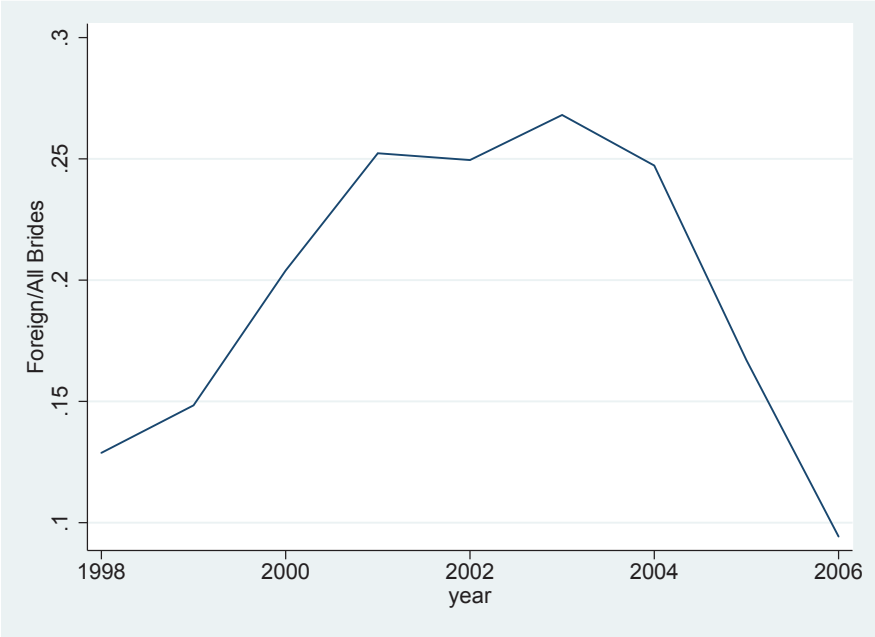
The dataset is from the Taiwan Labor Force Survey, a nationally representative sample, for years 1998-2006. Panels A, B and C present results from estimating Equation 1 for employment, income and hours respectively. Income is measured in TWD/month (1 USD $\approx$ 30 TWD). Hours pertain to hours worked last week. Age dummies, year fixed effects, township fixed effects, county specific time trends, and a set of variables for the number of children in different age groups (ages: <3, 3-6, 7-15, 15-18 and 18+ years) are included. The data set is limited to married women ages 20-45. All regressions are weighted using sample weight. Sex-ratio quartiles are defined at the township-level. Column 1 includes education dummies (woman's education). Column 2 restricts sample to women with middle school education or less. Column 3 restricts sample to women with high school education to some college. Column 4 restricts sample to women who have a four-year college degree or more. Standard errors clustered at the township level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 11: Fertility Impact, Chinese and Southeast Asian Wives, by sex-ratio quartile – Non-Metropolitan Areas

	(1)	(2)	(3)	(4)
		Husband's Education:		
	All	0-8yrs	9-15yrs	16+
		A. Chinese Wives		
$\underline{I(Post03)\times}$				
$SexRatioQ2$	-0.0122***	-0.0129***	-0.0139***	0.00378
	(0.00315)	(0.00405)	(0.00428)	(0.0104)
$SexRatioQ3$	-0.0138***	-0.0114**	-0.0225***	0.0182
	(0.00386)	(0.00445)	(0.00548)	(0.0138)
$SexRatioQ4$	-0.0240***	-0.0255***	-0.0242***	0.00209
	(0.00500)	(0.00652)	(0.00706)	(0.0188)
Observations	347427	178432	146050	22945
Adjusted R^2	0.091	0.092	0.091	0.078
		B. Southeast Asian Wives		
$\underline{I(Post03)\times}$				
$SexRatioQ2$	-0.0119**	-0.00950*	-0.0115*	-0.0180
	(0.00469)	(0.00526)	(0.00691)	(0.0166)
$SexRatioQ3$	-0.0145***	-0.0166***	-0.00493	-0.0228
	(0.00507)	(0.00557)	(0.00701)	(0.0259)
$SexRatioQ4$	-0.0124**	-0.0129**	-0.00716	0.0724**
	(0.00533)	(0.00584)	(0.00909)	(0.0334)
Observations	227801	128235	89628	9938
Adjusted R^2	0.150	0.161	0.141	0.090

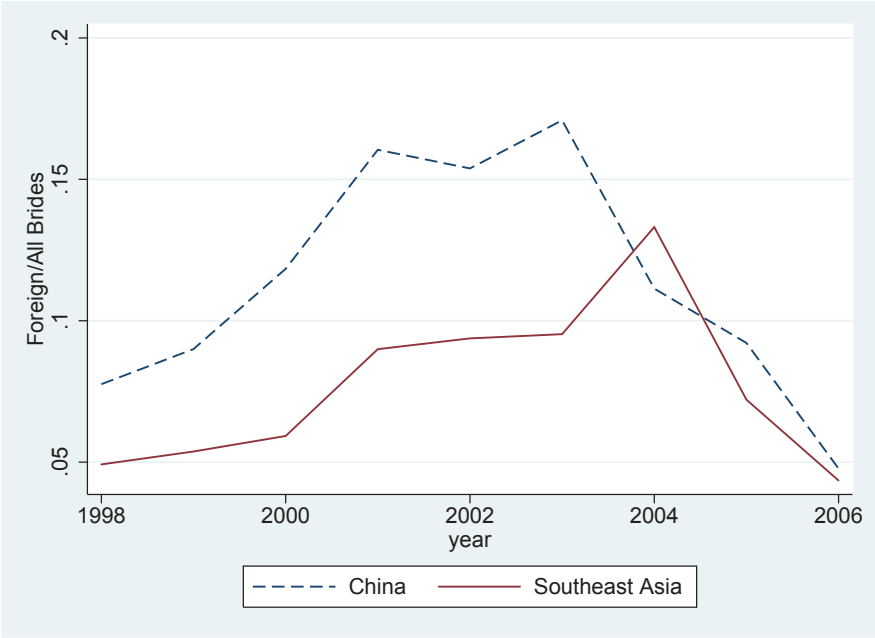
All regressions include township dummies, year fixed effects, county specific time trends, a dummy for lack of a son, wife's age (years), and marriage duration dummies. Other notes as for Table 3. Standard errors clustered at the township level in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Figure 1: Foreign Brides by Year, Share of Newlyweds



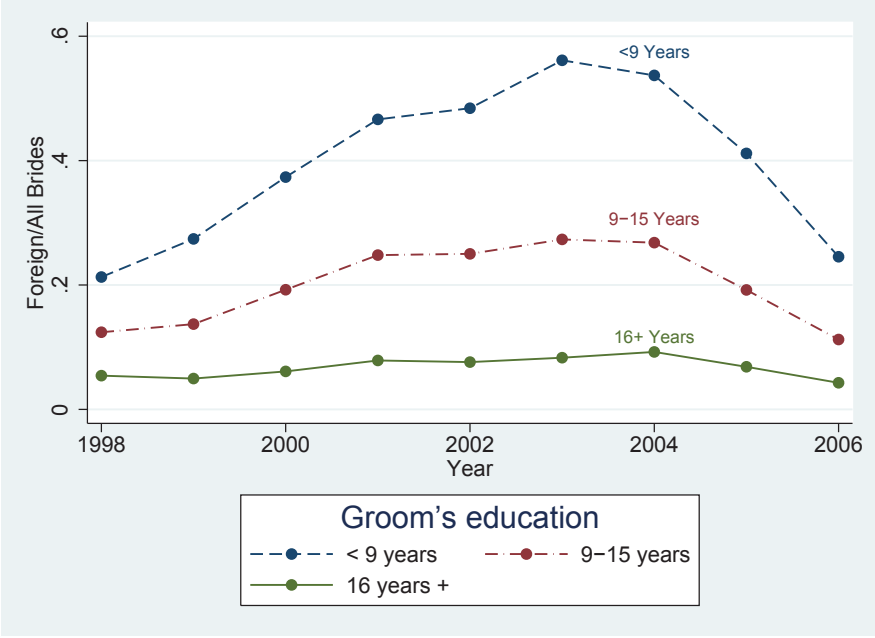
Data compiled from government marriage registry, various years.

Figure 2: Foreign Brides by Origin



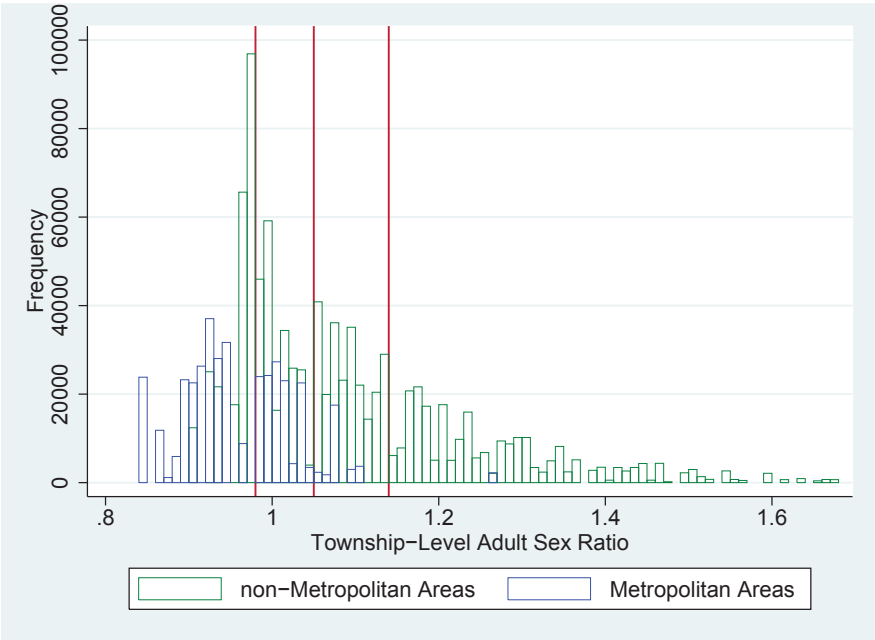
Data compiled from government marriage registry, various years.

Figure 3: Foreign Brides by Groom's Education



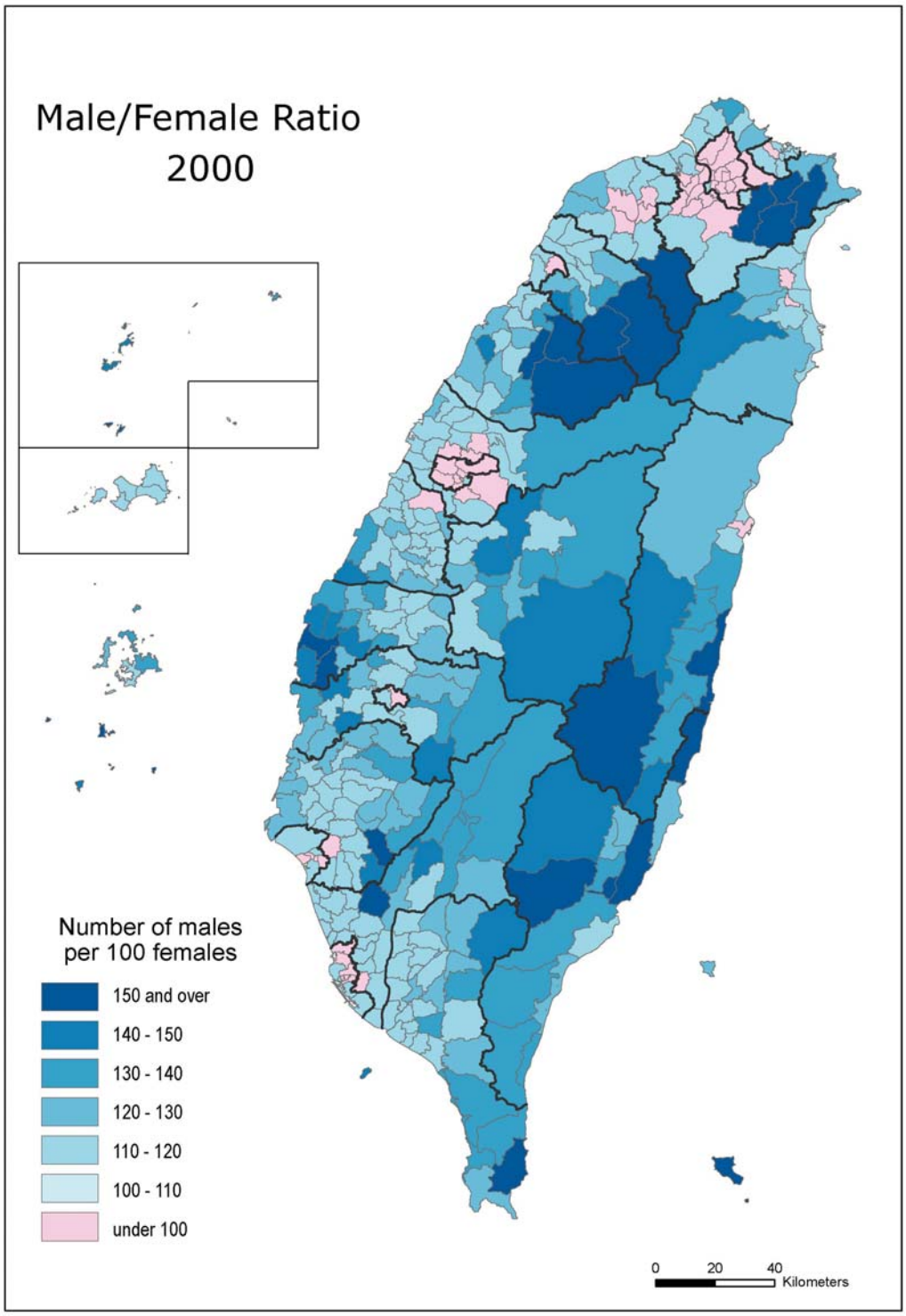
Data compiled from government marriage registry, various years.

Figure 4: Township Sex Ratio Distribution



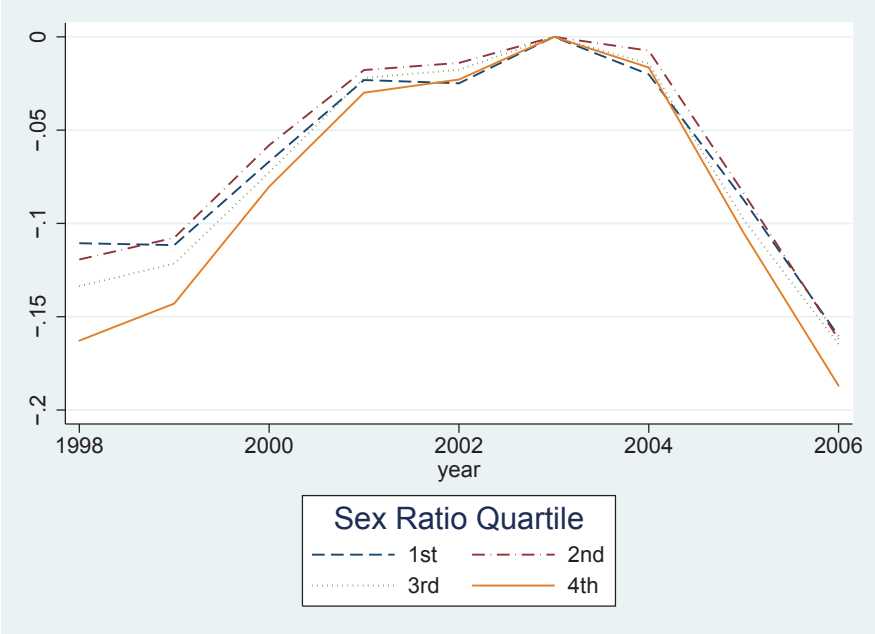
The graph shows the number of individuals in our sample by township sex ratio (ages 20-50, year 2000). The vertical lines at 0.98, 1.05 and 1.14 show the quartile cut-offs for the non-metropolitan areas. The corresponding numbers for the entire sample are 0.96, 1.00 and 1.11 respectively. Metropolitan areas are the special municipalities (Taipei City, Kaohsiung City) and provincial cities (Keelung City, Hsinchu City, Taichung City, Chiayi City, Tainan City) referred to in the text.

Figure 5: Geographic Distribution of Township Sex Ratios



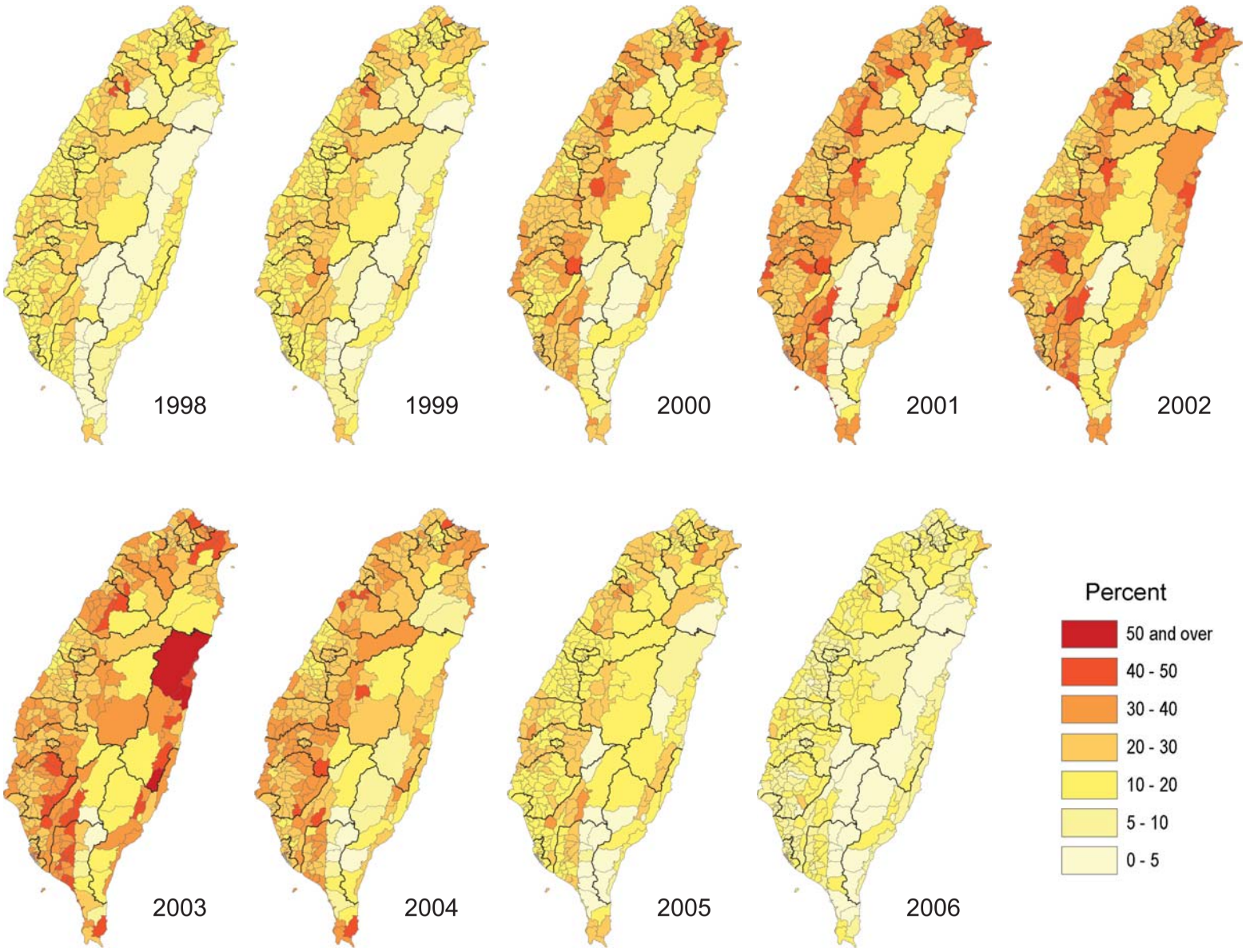
Thin lines demarcates townships, thick lines counties.

Figure 6: Foreign Bride Share by Sex-Ratio Quartile



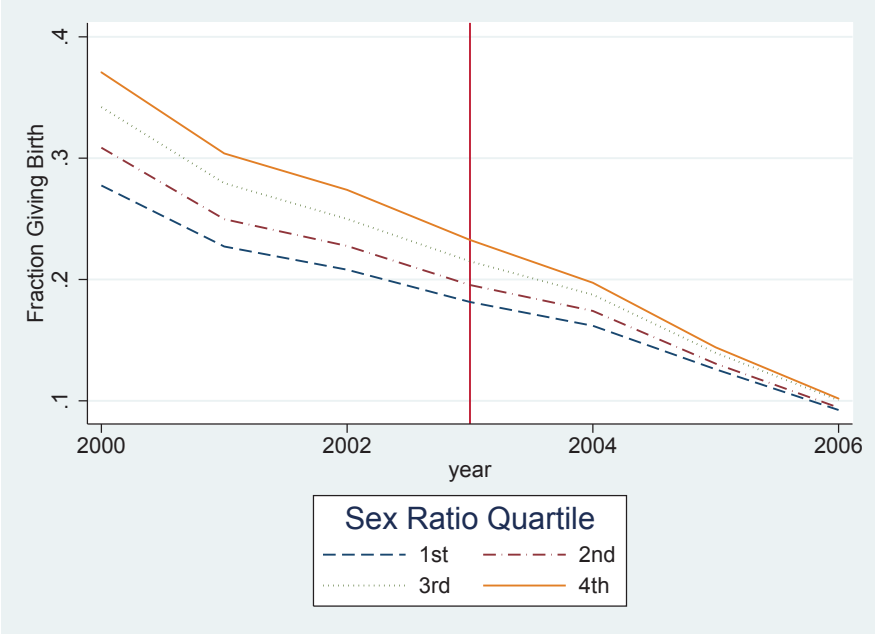
Share of foreign brides (relative to 2003) by township sex-ratio quartile (ages 20-50), cf. Figure 4.

Figure 7: Geographic Distribution of Foreign Bride Share 1998-2006 – Fmap



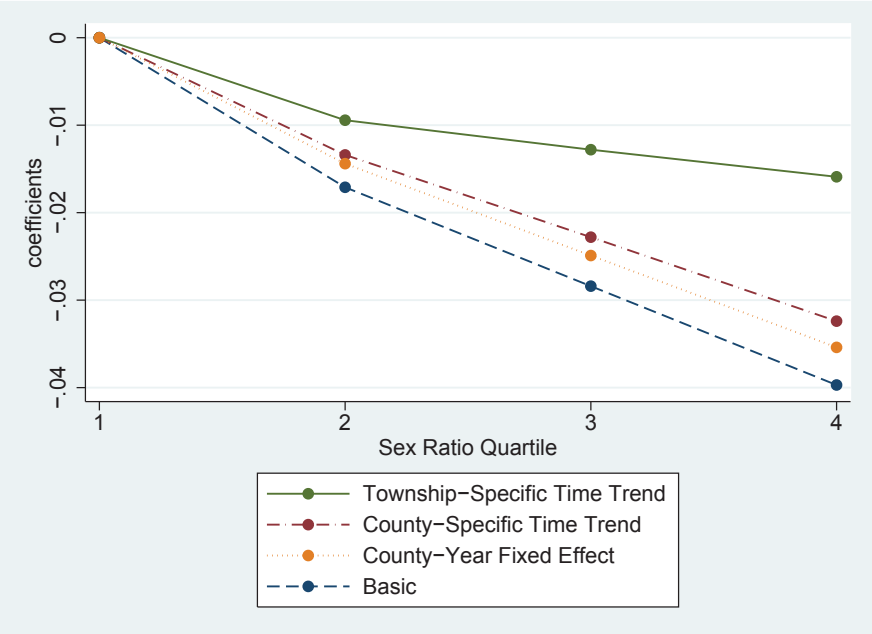
Thin lines demarcates townships, thick lines counties.

Figure 8: Fertility by sex-ratio quartile



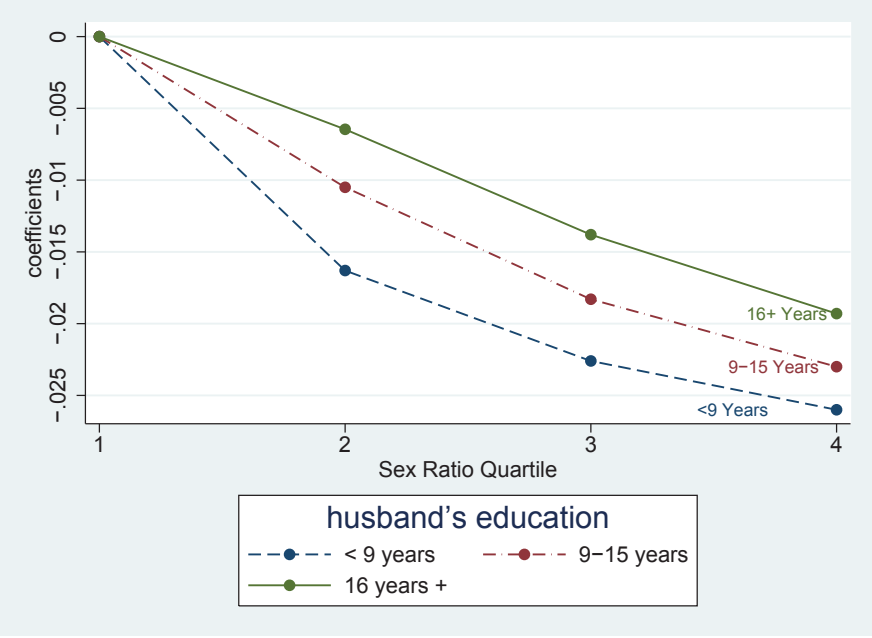
Fertility by township sex-ratio quartile (ages 20-50), cf. Figure 4.

Figure 9: Estimated Policy Effect Across Sex-Ratio Quartiles



Basic – corresponds to Table 3, Column 1. County-specific time trends – corresponds to Table 4, Column 1, Panel A. Township-Specific time trends – corresponds to Table 4, Column 1, Panel B. County-Year fixed effects – corresponds to Table 4, Column 1, Panel C. Sex-ratio quartiles refers to township sex-ratio quartiles (ages 20-50), cf. Figure 4.

Figure 10: Policy Impact on Fertility by Sex-Ratio Quartile



Estimated policy impact on fertility by township sex-ratio quartile and husband's education, see Table 4, Columns 2-4, Panel A.

Appendices

For Online Publication

In this section we sketch a Principal-Agent framework to help interpret our results for divorce. Consider a world where, in marriage, men employ women to produce children. As in Shapiro & Stiglitz [1984], women can shirk (not deliver children). Men do not know whether the outcome was due to shirking or chance and act on observed fertility. Fertility below a cut-off level triggers divorce.[1]

Assume that each marriage lasts two periods and women can produce children, but fertility is uncertain and depends positively on the woman's unverifiable effort $e = \{0, 1\}$, as well as a stochastic term. We let the density distribution of fertility ϕ, given e be denoted by $f(\phi|e)$, where $f(\phi|1)$ stochastically dominates $f(\phi|0)$. We let $F(\phi|e)$ denote the cumulative distribution of fertility, and let $\alpha_x^e = F(\phi_x|e)$. This is illustrated in Figure A.1.

For simplicity we will let women's cost of effort be captured by a positive marginal cost of children – higher effort, in expectation, leading to more children and higher cost.

Both men and women have positive but decreasing marginal utility from children. Through marriage, men obtain the children borne by their wives.[2] We assume that men's cost of children is a per-period cost, and that it is smaller than women's cost. These cost asymmetries can be motivated by the structure of reproduction and marriage. For now, however, suffice it to note that the different cost structures may introduce gender differences in the desired number of children born in marriage, with men preferring more children than women. Furthermore, we assume that the utility (net of the cost of children) from children is not enough to make women self motivated.

We let the marriage contract stipulate a per period payment from the man to the woman against children produced in the marriage. If period 1 fertility is below a certain level ϕ_0, the marriage is dissolved and the second period payment is forfeited. The level of ϕ_0 is dictated by man's utility level outside of marriages.

The second period decision is trivial: women will exert zero effort. We focus on women's first period decision. Moreover, we assume that women face increasing marginal cost of fertility, resulting in the standard upward sloping supply curve.

Thus, shirking $e = 0$ could affect women negatively in two ways: it reduces her expected

[1] A sufficiently high wage can rule out shirking in equilibrium. Here we assume that such a wage is not optimal.

[2] For an overview of the legal and biological aspect of reproduction underpinning the basic setup of our model, see Edlund [2006, forthcoming].

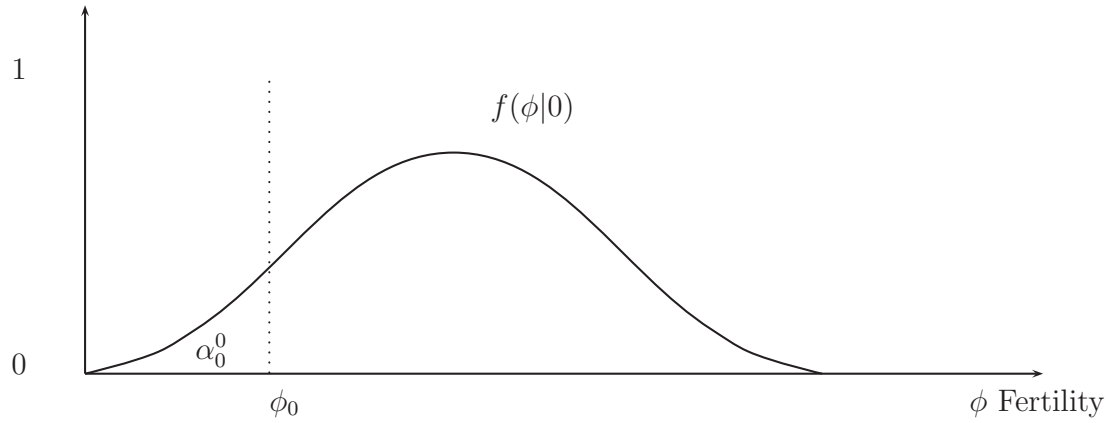
fertility and it increases the probability of being divorced. On the other hand, shirking increases her period 1 surplus (marriage payment minus cost of realized children). Therefore, women's effort level would be determined by the marriage payment, the cost of children, utility if divorced and the probability of being divorced. Let us denote by α^* the probability of divorce beyond which low effort yields lower expected-utility than high effort (for the woman).

Foreign brides are assumed low-cost providers of children and thus their presence makes divorce more attractive for men.[3] In our model, this amounts to a rightward shift of the fertility threshold that triggers divorce: $\phi_0 \to \phi_1, \phi_0 < \phi_1$, (illustrated in Figure A.2) and thus an increase in divorce risk at $e = 0$ from α_0^0 to α_1^0. In case $\alpha_1^0 > \alpha^*$, the influx of foreign brides would induce domestic women to exert more effort and, as a result, a shift in the fertility density function from $f(\phi|e = 0)$ to $f(\phi|e = 1)$ (illustrated in Figure A.3). The presence of foreign brides changes the divorce risk to $\alpha_1^1 < \alpha_1^0$, and it is possible that $\alpha_1^1 < \alpha_0^0$ (illustrated in Figure A.4).

One extension of the model is that some men may experience a larger shift in fertility threshold as a result of an influx of foreign brides than others. In particular, those men who would have a difficult time in the marriage market would have most to gain with the foreign brides inflow. Therefore, we expect the fertility of those who are least educated to be affected more than those who are better educated. We also expect those who live in the areas with higher sex ratio (male-to-female) to be affected more than those who live in areas with a lower sex ratio.

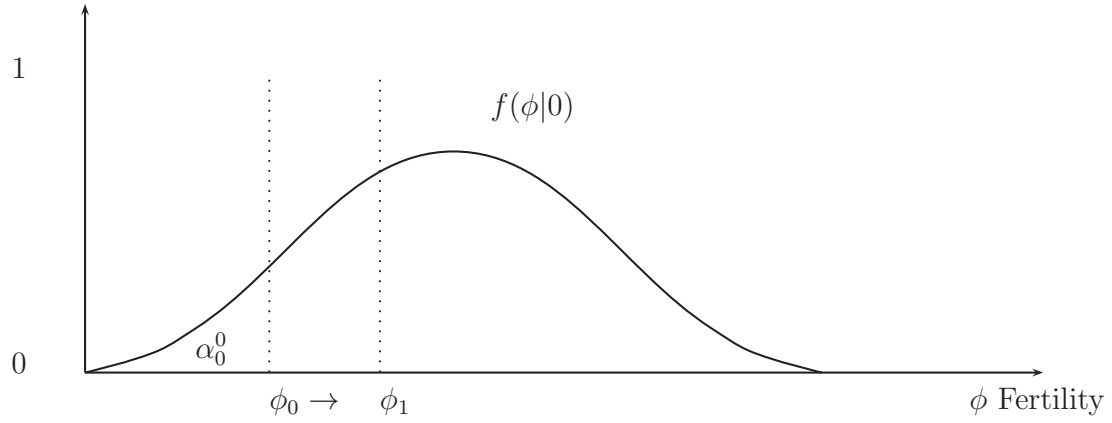
[3]Their presence could also make divorce less attractive for women since women would have a lower chance to be hired after divorce, and it should arrive at the same prediction. For the simplicity of our model we would leave out this point.

Figure A.1: Probability Density Function of Fertility Outcome, Domestic Women Exert No Effort



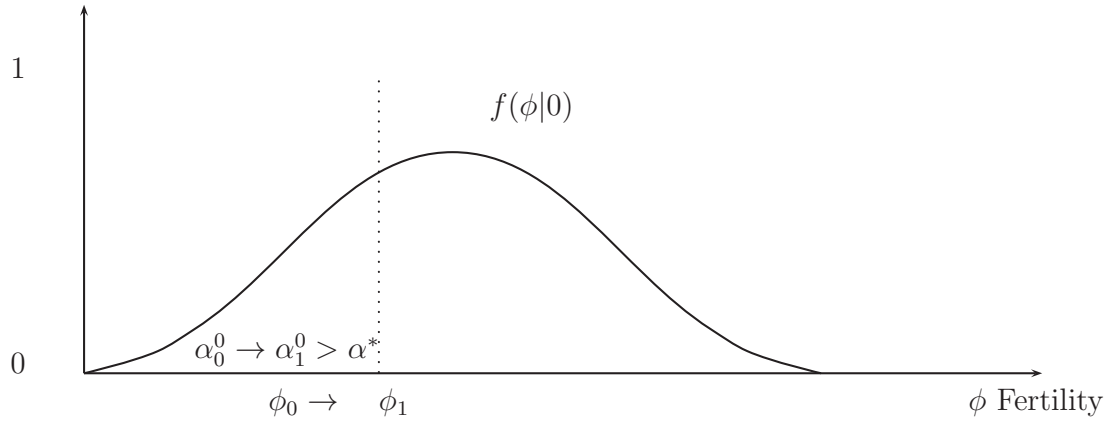
Notes: We let the density distribution of fertility ϕ given e be denoted by $f(\phi|e)$. We let $F(\phi|e)$ denote the cumulative distribution of fertility and let $\alpha_x^e = F(\phi_x|e)$. ϕ_0 indicates the fertility level below which men trigger divorce, thus α_0^0 is the probability of divorce.

Figure A.2: Shift of Divorce Threshold Due to Foreign Brides



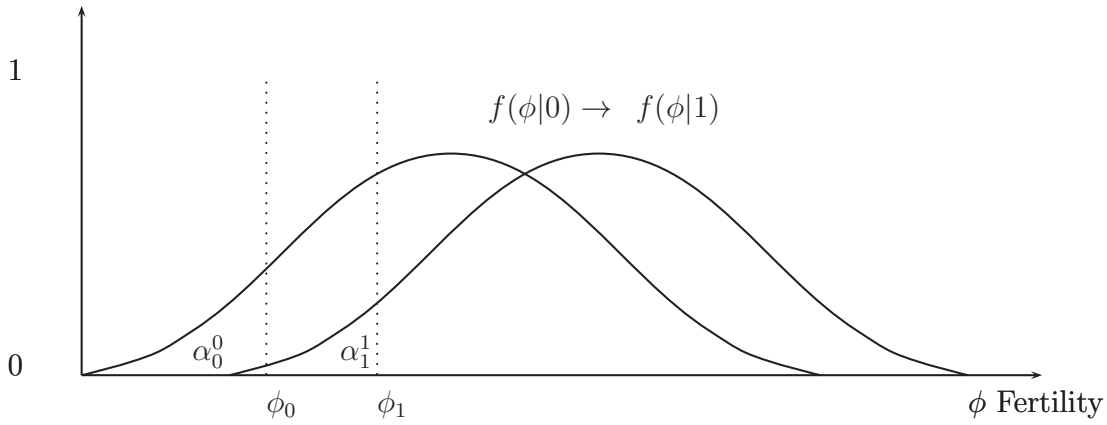
Notes: Availability of foreign brides moves the fertility threshold under which men divorce their wives from ϕ_0 to ϕ_1. Other notes as for Figure A.1.

Figure A.3: Raised Fertility Effort by Domestic Brides in Response to Higher Divorce Risk



Notes: Once foreign brides are available and the fertility level triggering divorce has been raised, the probability of divorce at no effort is $\alpha_0^1 > \alpha_0^0$. α^* is the probability of divorce beyond which low effort yields lower expected-utility for the woman than high effort. If $\alpha_0^1 > \alpha^*$, domestic women increase effort in response to foreign brides.
Other notes as for Figure A.1.

Figure A.4: Overall Fertility and Divorce Impact of Foreign Bride



Notes: The figure illustrates the case when the higher divorce risk has been high enough to make domestic women increase their fertility $f(\phi|0) \rightarrow (\phi|1)$. As a result, the new divorce risk, α_1^1 may be higher or lower than the divorce risk prior to the introduction of foreign brides.
Other notes as for Figure A.1.

Appendix Table-For Online Publication

Table A.1: Impact of Policy on Fertility and Divorce, Triple Difference, Excluding 7 Large Cities

	(1) Fertility	(2) Divorce	(3) Fertility	(4) Divorce
I(Post03)×				
$SexRatioQ2$	-0.00696*	-0.000140	-0.00221	-0.00000961
	(0.00311)	(0.000702)	(0.00272)	(0.000747)
$SexRatioQ3$	-0.0143***	0.000624	-0.00785*	0.000927
	(0.00361)	(0.000670)	(0.00310)	(0.000754)
$SexRatioQ4$	-0.0179***	0.000400	-0.00928**	0.000589
	(0.00347)	(0.000720)	(0.00323)	(0.000806)
I(Post03)×				
Groom Edu: 0-8 years	-0.0656***	0.00493***	-0.0661***	0.00496***
	(0.00235)	(0.00104)	(0.00234)	(0.00104)
Groom Edu: 9-15 years	-0.0565***	0.00608***	-0.0565***	0.00613***
	(0.00161)	(0.000687)	(0.00166)	(0.000693)
I(Post03)×$SexRatioQ2$×				
Groom Edu: 0-8 years	-0.0121**	0.00438**	-0.0127**	0.00433**
	(0.00379)	(0.00146)	(0.00395)	(0.00148)
Groom Edu: 9-15 years	-0.00339	0.000630	-0.00375	0.000641
	(0.00243)	(0.000935)	(0.00249)	(0.000928)
I(Post03)×$SexRatioQ3$×				
Groom Edu: 0-8 years	-0.0150***	0.00438**	-0.0141***	0.00435**
	(0.00350)	(0.00135)	(0.00351)	(0.00134)
Groom Edu: 9-15 years	-0.00533	0.0000228	-0.00518	-0.0000103
	(0.00275)	(0.000952)	(0.00272)	(0.000963)
I(Post03)×$SexRatioQ4$×				
Groom Edu: 0-8 years	-0.0140***	0.00383**	-0.0133***	0.00376**
	(0.00351)	(0.00130)	(0.00350)	(0.00130)
Groom Edu: 9-15 years	-0.00645*	0.000330	-0.00646*	0.000263
	(0.00297)	(0.000957)	(0.00300)	(0.000962)
County specific time trends	No	No	Yes	Yes
Observations	2959925	2959925	2959925	2959925
Adjusted R^2	0.085	0.008	0.085	0.008

Standard errors in parentheses.
All regressions include sex ratio quartile dummies, groom's education level dummies, interaction terms between sex ratio quartile and groom's education level, township dummies, a dummy for never had a son, wife's age, age^2, dummies controlling for duration of marriage.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$