UNIVERSITY of HAWAI'I®
MĀNOA

University of Hawai`i at Mānoa Department of Economics Working Paper Series

Saunders Hall 542, 2424 Maile Way,
Honolulu, HI 96822
Phone: (808) 956 -8496
www.economics.hawaii.edu

Working Paper No. 13-18

Sons, Daughters, and Labor Supply in Early Twentieth-Century Hawaii

By

Timothy Halliday
Sumner La Croix

September 2013
(Revised March 2014)

Sons, Daughters, and Labor Supply in Early Twentieth-Century Hawaii.

Timothy Halliday and Sumner La Croix
Dept. of Economics, University of Hawai‘i-Mānoa

3 March 2014

Immigration to Hawaii between 1868 and 1924 transformed its ethnic structure and population size. We investigate whether high Chinese, Japanese, Korean, and White sex ratios allowed females to negotiate better marriage terms and to allocate more household resources to daughters. Using IPUMS samples from the 1900, 1910, 1920, and 1930 Territorial Censuses of Hawaii, regression analysis suggests that both daughters and sons reduced mother labor force participation (LFP), but LFP effects are larger for a daughter than a son at some age intervals. Daughters have no effect on father LFP, but for some age intervals a son has a positive effect.

JEL codes: J22, J61, N32,

Keywords: Hawaii, labor supply, married women, IPUMS

*Halliday is Associate Professor and La Croix (corresponding author) is Professor, Dept. of Economics, University of Hawaii, 2424 Maile Way, Rm 542, Honolulu, HI 96822. Halliday email: halliday@hawaii.edu. La Croix email: lacroix@hawaii.edu. La Croix tel.: (808) 956-7061. We thank Bishnupriya Gupta, James Mak, Mary Louise Nagata, Richard Steckel, John Wallis, and participants in the 2009 Social Science History Association Meetings, the April 2010 Conference of the All-University of California Group in Economic History, the 2013 Economic History Association Meetings and seminars at the University of Hawai‘i-Mānoa and Rutgers University for comments and discussions. Many thanks to Yukiko Abe for providing Japan census data on female employment rates by prefecture and to Noriko Tsuya for pointing us to data on age of marriage in Japan. Melinda Podor and Kai Yoshioka provided excellent research assistance. We are responsible for all errors and omissions.

Massive immigration to Hawaii between 1868 and 1924 transformed the ethnic structure and size of its population as well as the structure of the Hawaii economy. Most immigrants to Hawaii were Asian males, recruited to work on plantations in the rapidly expanding sugar and pineapple industries. Sex ratios of Chinese, Japanese, and Caucasian men and women of marriageable age were sometimes larger than two. High sex ratios imposed a constraint on the overall supply of female spouses that forced changes in the likelihood and timing of marriage in Hawaii. We hypothesize that increased competition among males for spouses tilted terms of the marriage contract towards features valued by females and changed resource allocation within the household. Given its extremely high sex ratios at the turn of the twentieth century, Hawaii provides an excellent setting to investigate these propositions.

Our analysis uses pooled IPUMS samples from the 1900, 1910, 1920, and 1930 Territorial Census of Hawaii to document how critical demographic and labor market variables evolved over three decades and to consider how different constraints on marital choice and the presence of children affected male and female labor force participation in Hawaii. The description of demographic and labor market variables focuses on the evolution of ethnic sex ratios, marriage rates and composition, number of children, and teenage and adult labor force participation across the four census samples. This sets the stage for us to consider whether high sex ratios are associated with changes in labor force participation due to increased female bargaining power. In particular, we investigate how the presence of children in a household affected the labor supply of married males and females and whether these effects vary with the age and gender composition of their children.

Our analysis of these questions is grounded in recent theoretical models of marriage that emphasize the central rule of sex ratios in generating endogenous sharing rules for allocation of consumption and time within the household (Chiappori, Fortin, and Lacroix, 2002; Iyigun and Walsh, 2007). Our econometric analysis draws from the framework utilized in Lundberg and Rose's (2002) study of the effect of child gender and age on parent's labor market choices and outcomes. Our results reveal that the age and gender composition of a couple's children are associated with substantial differences in parental labor force participation.

1. Immigration to Hawaii, 1872-1924

In the late 1840s, the Kingdom of Hawaii reorganized property rights to land and established a system of transferable private land rights (La Croix and Roumasset, 1990). This facilitated big investments by foreign residents and firms in large-scale plantations dedicated to growing sugar cane and pineapples. By 1900, the two industries employed more than half of Hawaii's labor force, and almost all of their employees were immigrants from Asia, Europe, and the United States.

In 1872 Hawaii's population amounted to just 56,897 people, with about 8 percent of residents foreign born (Table 1). Most of the foreign born were Chinese agricultural workers. Descendants of U.S. missionaries and other U.S. immigrants were prominent members of the government, managers with sugar plantations and allied firms, and major property owners. In 1876, a reciprocity treaty between the Kingdom of Hawaii and the United States allowed sugar produced in Hawaii to enter the United States duty free. The treaty induced a massive expansion of the sugar industry in Hawaii and created demand from sugar plantations for tens of thousands of new workers (La Croix and Grandy,

1997). Between 1868 and 1898, planters and the Hawaii government cooperated to facilitate immigration from China, Japan, and Portugal to work in sugar and pineapple fields and associated processing factories. This immigration transformed Hawaii's population, with the overall population increasing by 270 percent and the percent foreign-born from 8.0 to 61.7 percent between 1872 and 1900 (Table 1).

Conflicts between sugar planters, white settlers, and Hawaii's government led to the overthrow of the Hawaiian monarchy in 1893. Substantial opposition in the U.S. Senate to consecutive treaties of annexation between the new Republic of Hawaii and the United States scuttled them but fighting in the Philippines during the Spanish-American War raised the strategic value of Hawaii, and it was annexed by a joint resolution of Congress on 7 July 1898. Hawaii's population continued to soar after annexation, increasing by 240 percent from 1900 to 1930. First-generation immigrants comprised 61.7 percent of the population in 1900 and 41.8 percent in 1930. Most were young males from Japan and China, ages 18-25, recruited by sugar plantations to work in field and factory.[1] Migrants had also come from Portugal to work as plantation workers and foremen (*lunas*) and from the United States to work in skilled and management positions. After annexation in 1900, sugar plantations attempted to diversify their workforce by recruiting workers from newly annexed Puerto Rico and the Philippines as well as Korea, Canada, England, Germany, and Spain. The result was a sweeping transformation of both the size and ethnic composition of Hawaii's population during the first three decades of U.S. colonial rule (Table 2).

Because the overwhelming majority of the immigrants to Hawaii were young

[1] See La Croix and Fishback (2000) for an in-depth discussion of the ethnic composition of the plantation workforce.

males, the sex ratios of ethnic populations of marriageable age (18-35) reached extremely high levels (Table 3). The Chinese sex ratio was the highest, standing at 9.00 in 1900 before declining to 4.00 in 1910, 2.57 in 1920, and 1.22 in 1930. Strict application of the Chinese Exclusion Act to Hawaii after annexation meant that decreases in the Chinese sex ratio occurred as native-born Chinese became a larger part of the sample.

The HSPA recruited more than 120,000 Filipinos to Hawaii between 1906 and 1930, transforming the ethnic composition of the plantation workforce from more than 60 percent Japanese in 1900 to more than 70 percent Filipino in 1930. The high Filipino sex ratios for 1920 (6.14) and 1930 (9.00) were primarily due to the late start of mass Filipino migration in 1915 relative to other immigrant groups, restrictions on migration of other ethnic groups imposed by the Immigration Act of 1924, and the status of Filipinos as U.S. nationals until the passage of the Tydings-McDuffic Act in 1934.[2]

The sex ratio of Portuguese, considered by other ethnic groups in Hawaii as distinct from white, fell from 2.33 in 1900 to 1.22 in 1910, to 1.00 in 1920, and to 1.08 in 1930. Their relatively low initial sex ratio reflects the relatively early arrival of Portuguese immigrants relative to other immigrant groups and a more balanced gender composition of Portuguese immigrants to Hawaii.

Sex ratios for native Hawaiians of marriageable age did not exhibit the extreme values of immigrant groups, registering at 1.00 in 1900 and 1.04 in 1910.[3] Native

---

[2] 1924 Immigration Act. An act to limit the immigration of aliens into the United States, and for other purposes. H.R. 7995; Pub.L. 68-139; 43 Stat. The Tydings–McDuffie Act, also known as the Philippine Independence Act, Pub.L. 73–127, 48 Stat. 456, was enacted March 24, 1934 and ended Filipinos status as U.S. nationals.

[3] The IPUMS samples of Koreans in Hawaii are relatively small and we do not interpret them here. Using the full census sample (Nordyke, 1989), we find that sex ratios of

Hawaiian sex ratios subsequently fell to 0.75 in 1920 and 0.79 in 1930. The reasons for the decline are unclear, although emigration of Hawaiian men to the U.S. west coast played some part. The sharp increase in the white sex ratio—from 1.5 in 1900 to 4.26 in 1930—was due to a surge in immigration of white males from the mainland United States after World War I. The increase was partly due to the establishment of the federal and territorial governments in Hawaii as well as construction on U.S. military bases, in particular Pearl Harbor and Schofield Barracks.

The Japanese sex ratio for ages 18-35 was relatively high in both 1900 (3.55) and 1910 (2.70) before declining to 0.82 in 1920 and 0.96 in 1930. The two main factors behind the decline were the Gentlemen's Agreement of 1907-1908, which ended the immigration of male Japanese workers to Hawaii, and the *Yobiyose Jidai* ("Summoned Era") immigration, in which close relatives and "picture brides" (*shashin hanayome*) joined the roughly 50,000 Japanese males working in Hawaii in 1907. Over the entire *yobiyose* period (1908-1924), 26,506 men, 30,633 women, and 5,138 children came to Hawaii.

The U.S. Immigration Service categorized 14,276 of the *yobiyose* women as picture brides.[4] Typically, the immigrant's family would use a go-between to assist in

---

Koreans of marriageable age show the most dramatic change, falling from 13.53 in 1910 to 1.02 in 1920 to .49 in 1930. The fall between 1910 and 1920 is mostly due to almost all males from the first wave of Korean immigrants (1903-1905) becoming older than the upper bound of the marriageable age interval [18-35] by 1920 and to immigration of Korean picture brides.

[4] Adams, 1924, p. 16. Some of the *yobiyose* women were wives who joined their husbands in Hawaii. Others were women who married immigrant men who had made the journey back to Japan to find a bride. Few workers could afford the journey to Japan, the return travel for the couple, and expenses associated with a Japanese wedding. Another

finding a suitable bride. "An exchange of photographs" and information about "family genealogy, wealth, education, and health" were normal parts of the traditional marriage screening process that carried over to selection of immigrant picture brides (Ichioka, 1988, p. 164). The Japanese Consulate required that the name of the picture bride be entered into the immigrant's family registry six months before she applied for a passport to the United States. Prior to 1915, laborers were ineligible to summon brides, businessmen needed an annual gross income of $1,200 and savings of $1,000, and farmers had to show gross annual profits of $400-$500 and savings of $1,000. From 1 July 1915, all Japanese males with savings of at least $800 were eligible to summon picture brides or their wives (Ichioka, 1988, p. 165). After 1915, the Japanese government required that the groom be no more than 13 years older than the bride; occasional waivers were granted. Japanese brides were often motivated to migrate and marry by the opportunity to remit earnings to their families.

In 1924, the U.S. Congress passed the Asian Exclusion Act, bringing an end to Asian migration to Hawaii from all countries except the Philippines.[5] The immigration ban redirected Japanese and Korean workers to native-born brides from their own and other ethnic groups.[6]

2. Sex Ratios and Household Resource Allocation

Sex ratios have the potential to affect individual behavior relating to marriage and

---

barrier was that returnees were subject to the military draft if their stay exceeded 30 days (Ichioka 1988, p. 164).

[5] Paterson (2000, p. 80) estimated that between 600 and 1,000 picture brides came to Hawaii from Korea from November 1910 to 1924.

[6] There were few native-born Filipinas of marriageable age due to the short time between the immigration of Filipino workers and the ban on immigration from the Philippines.

household resource allocation via multiple channels. Pioneering analysis of marriage by Becker (1973, 1991) emphasized how a child raises the value of the mother's home production, thereby inducing both short-run and long-run declines in female labor force participation and hours. The sex ratio plays a central role in Becker's models, as a scarcity of women of marriageable age relative to men allows women to gain a larger share of the surplus generated by marriage. Undertaking empirical tests of Becker's framework on U.S. data, Grossbard-Schechtman (1993) and Grossbard-Schechtman and Neideffer (1997) found that higher sex ratios were associated with less female labor force participation.[7]

Several recent models provide a channel by which the scarce gender takes actions to make themselves more attractive in the marriage market by increasing family savings or investment in human capital prior to marriage. Iyigun and Walsh (2007) and Chiappori, Iyigun and Weiss (2009) have developed models in which pre-marital investment affects both spousal matching in the marriage market as well as endogenous sharing rules that determine how household resources are allocated among spouses during their marriage. In Iyigun and Walsh's model, a higher sex ratio reduces (increases) the consumption share of the male (female) during the marriage and tends to

[7] Angrist (2002) provided another test of Becker's marriage model by examining how changes in sex ratios affected the marriage prospects and labor force participation of second-generation Italians in the United States between 1910 and 1940. To account for left-out variables and reverse causality, Angrist instrumented for the sex ratio of Italians of marriageable age with the sex ratio of Italian migrants of marriageable age. His econometric estimates suggest "that high sex ratios in the early twentieth century improved female marriage prospects, reduced female labor force participation, and tilted the balance of household bargaining power toward women more generally. Estimates for families with children also suggest that higher sex ratios led to increased marital stability and higher income in families with children" (p. 999).

increase (decrease) male (female) pre-marital investment in human capital.[8] Lafortune (2013) provides empirical support for their approach, finding that shifts in sex ratios in U.S. states during the 1900-1930 period affected pre-marital human capital investment decisions of second-generation Americans.[9]

Another strand of this literature takes premarital investments in human capital as exogenous and develops a model of collective labor supply by a married couple, with the distribution of marital surplus dependent on each spouse's bargaining power. Chiappori's (1992) collective model of household resource allocation is founded on the assumption that choices by both spouses are Pareto-efficient and that changes in spousal bargaining power affect the total distribution of surplus within the marriage. Chiappori, Fortin, and Lacroix (2002) extended Chiappori's collective labor supply model to allow analysis of factors that affect spouses' bargaining positions but not their preferences or household resources. They specify a structural microeconomic model in which an increase in the sex ratio leads to a decrease in female labor supply and an increase in male labor supply. Using U.S. data from the Panel Study of Income Dynamics (PSID), Chiappori *et al.* (2002) found strong evidence for the model's results vis-à-vis female-male labor supplies as well as evidence showing that a higher sex ratio is associated with a larger share of

---

[8] Iyigun and Walsh (2007) note that the "impact of an unbalanced sex ratio is stronger in the lower assortative ranks, and it dissipates as the rank of a couple rises" (p. 526). In addition, the wife's share of the marital surplus increases monotonically as the couple's marital rank increases "the couples' outside prospects—be it their utility as singles or in another potential marriage—play an independent role in whether household allocations are made efficiently" and how endogenous sharing rules form (p. 510).

[9] Wei and Zhang (2011) find that high savings rates in China during the 2000s decade can be partly explained by China's high sex ratio for persons ages 18-35, as families with a son saved more to make him more attractive in the marriage market.

household income allocated to the wife (pp. 59-67).[10]

Lundberg and Rose (2002) focused on how the number and gender of children in a household affect parental labor force participation. They argued that that an additional child increases the value of home production to both parents rather than just the mother. Because the value of the mother's home production increases relative to the value of the father's home production, their model yields an unambiguous increase in mother's time devoted to home production with the addition of a child to the household. The impact of the child on the father's labor force participation is ambiguous, as the decline in the relative value of the father's home production vis-à-vis the mother could be more than offset by the decline in the father's value of work relative to home production.

The magnitude of a mother's increased specialization in home production due to the presence of an additional child is likely to be affected by both the child's parity and the mother's cohort (Lundberg and Rose, 2002, p. 252). Adjustments in specialization at higher parities should be smaller due to adjustments already undertaken at lower parities. Cohort effects could affect specialization due to peer attitudes regarding labor force participation by married women with young children and to innovations in home production technologies and new capital goods that, over time, have provided parents with access to an increasing variety of substitutes for parental time in household production.

Lundberg and Rose (2002) estimated the effect of an additional child on parents' wages and hours, with several regression specifications accounting for children's gender.

---

[10] A number of recent studies have investigated how low sex ratios affected marriage market outcomes in France (Abramitzky et al., 2011), Russia (Brainerd, 2007), and Germany (Bethmann and Kvasnicka, 2013) after World War II and how high sex ratios affected marriage market outcomes in China during the 2000s (Porter 2007).

Their econometric results reveal little evidence that child gender affects the labor market outcomes of mothers, yet show statistically significant and substantial effects of gender on labor market outcomes of fathers (p. 251). Fathers increased their hours and wages for both daughters and sons, but the magnitudes of the increases were bigger for sons than daughters. Lundberg and Rose (pp. 261-264) suggested a number of factors to explain the differential labor supply responses, including higher returns to educating sons than daughters, expectations of additional support from a daughter for elderly parents, or a preference by men for sons that raises their value of marriage when they have a son.

Recent studies have found that when women achieve more control over resources in marriage, they tend to devote more resources to girls. Well-known recent examples include Thomas (1994), who found that in Brazil, Ghana, and the United States, an increase in mother's education had more effect on girls' than boys' heights, and Duflo (2000), who found that when social pensions are controlled by female rather than male household members in South Africa, the weight for height and height for age ratios of girls increased. From the perspective of our study, which examines labor supply in the collective household, increased resources devoted to girls means that mothers work less and spend more time with their daughters.[11]

This article tests this proposition in a historical context by examining how the gender composition of a couple's children affected labor force participation by both

[11] From a slightly different perspective, Grossbard-Schechtman (1984) argued that an increase in sex ratios increases the demand for wives' spousal labor, thereby increasing the shadow wage for home production and reducing work outside the home. Because this decision decreases household income, a general equilibrium solution could involve the husband working more hours or participating in the labor force when he otherwise would not.

parents in the Territory of Hawaii during the early twentieth century. Our analysis begins with an extended discussion of Hawaii's demographic and labor market variables critical to the LFP analysis, including sex ratios and marriage rates and marriage composition; number of children; and teenage and adult labor force participation across the four census samples.

3. Sex Ratios in Hawaii and Marriage Rates, 1900-1930

Until 1898, most males of marriageable age in Hawaii were unmarried. Most were migrants who did not intend to marry and settle in Hawaii but rather were focused on accumulating wealth to enhance prospects when they returned to their home countries. The U.S. annexation of Hawaii in 1898 and the establishment of a territorial government in June 1900 changed their decision-making calculus. The Organic Act—the federal legislation establishing the constitution of the new territorial government—voided all existing and future indentured or penal labor contracts in Hawaii.[12] Beechert (1985) and Liou (2013) show that plantation wages in Hawaii increased after the Organic Act's ban on penal labor contracts became effective.[13] For single male workers, the combination of

---

[12] The Organic Act. An Act to Provide a Government for the Territory of Hawaii. Act of April 30, 1900, C 339, 31 Stat 141. Section 10 voided labor contracts that hold persons in "service for a definite term":

> That all contracts made since August twelfth, eighteen hundred and ninety-eight, by which persons are held for service for a definite term, are hereby declared null and void and terminated, and no law shall be passed to enforce said contracts in any way; and it shall be the duty of the United States marshal to at once notify such persons so held of the termination of their contracts.

[13] Naidu and Yuchtman (2013) specify a model of a labor market with penal sanctions for breach of contract and show that elimination of the penal sanction is associated with a higher wage. Their econometric analysis considers the impact of the 1875 repeal of

a more stable government and higher wages increased the benefits of settling permanently in Hawaii. Once the decision to stay was made, the next step was to form a family.

The very high Caucasian, Korean, Japanese, and Chinese sex ratios in Hawaii between 1900 and 1910 imply a heightened level of competition for brides of the same or a different ethnicity. To find a wife, immigrant workers would either have had to offer sufficiently good terms to a woman in Hawaii or paid passage and marriage broker fees to bring a bride from their home country to Hawaii. One aspect of the multi-margin marriage contract that could be affected by high sex ratios is resource allocated within the household to sons and daughters. In the context of a collective model of household resource allocation, Hawaii's overall high sex ratio would have allowed all women, *regardless of their ethnicity*, to enter marriages on more favorable terms. Even in ethnic groups with low sex ratios—Hawaiians and Portuguese, competition from white males—a high sex-ratio group—for Portuguese and Hawaiian brides set the stage for women in low sex-ratio groups to negotiate better marriage terms.[14]

Britain's Master and Servant law, and their results reveal positive and statistically significant effects of repeal on wages (pp. 135-141).

[14] Married couples in Korea, China, and, more weakly, Japan revealed a preference for a son rather than a daughter during the late nineteenth and early twentieth centuries. Historians and demographers have shown that in these countries, sons often received better nutrition early in life, more time inputs from parents, and a better, longer education than daughters (Cornell, 1996; Caldwell and Caldwell, 2005; Lee and Wang, 1999). Since both parents likely shared these preferences, this article does not rely on this line of argument to make the point that potential brides in Hawaii wanted to tilt family resource allocation towards daughters. Pabilonia and Ward-Batts (2007) use recent U.S. data to investigate whether differences in parental behavior towards boys and girls are due to fathers' preference for sons.

How did Hawaii's high sex ratios affect the marriage rate and the characteristics of married couples? Figure 1 plots sex ratios for ethnic populations ages 18-35 in Hawaii (Table 3) against male marriage rates (Table 4) in each of the four census samples and finds that they are inversely related. For example, in 1910, the three ethnic groups with the highest sex ratios for persons ages 18-35—White, Japanese and Chinese—also had the three lowest male marriage rates: Japanese (34 percent), Chinese (33 percent) and White (26 percent). Figure 2 plots female marriage rates against ethnic sex ratios. Not surprisingly, female marriage rate were much higher than male marriage rates and were positively correlated with sex ratios. For example, Japanese had the second highest sex ratio (ages 18-35) in 1910 and the highest female marriage rate, while Hawaiians had the lowest sex ratio (ages 18-35) and the second lowest female marriage rate.

One might conjecture that Hawaii's high ethnic sex ratios would result in high rates of exogamy due to the low odds faced by males of finding a spouse of the same ethnicity. Table 5 shows ethnic marriage matrices for the four census samples, with the number of endogamous marriages displayed on the diagonal. The vast majority of marriages observed in 1900—92 percent, in 1910—96 percent, and in 1920—93 percent, were endogamous, i.e., marriages to a person of the same ethnicity. One explanation for the high rates of endogamy in 1900 and 1910 is that with the exceptions of native Hawaiians, sex ratios for all ethnic groups were relatively high, with relatively fewer brides to go around; brides from scarce ethnic groups were easily matched with men from the same ethnic group. Native Hawaiians who had the lowest sex ratio and the highest relative supply of women, also had the highest rates of exogamy among females. If a

Caucasian, Portuguese, Japanese or Chinese male married a woman of another ethnicity, it was usually a Native Hawaiian woman.

Endogamous marriages declined sharply between 1910 and 1930, registering at just 82 percent of marriages in 1930.[15] Embedded in this decline are endogamy rates for Japanese men and women exceeding 99 percent in 1930. If we remove marriages involving Japanese men and women from the 1930 sample, the endogamy rate for marriages involving any other ethnic group falls to 67 percent. Portuguese, Chinese, and Hawaiian women and Chinese and White men had the highest rates of exogamy in 1930.[16]

The differences between the average ages of married females and married males are astonishingly high in each of our four sample years (Table 6). In 1920, the average age of husbands exceeded the average age of wives by 2.72 years for Filipinos, 5.08 years for Hawaiians, 6 years for Whites, 6.37 years for Koreans, 6.95 years for Japanese, 7.08 years for Portuguese, and 12.33 years for Chinese. These differences exceeded comparable measures observed in the United States (3.4 years difference in median age of first marriage in 1920), China (2.0-3.1 years difference in mean age of first marriage in 1929-1931), Japan (4.2 years difference in mean age of first marriage in 1920), and Korea (4.5 years difference in median age of first marriage in 1925), the home countries

[15] The decline in endogamy is very similar if we combine Portuguese and White into a single ethnic group: 97 percent in 1900, 97 percent in 1910, 95 percent in 1920, and 84 percent in 1930.

[16] See Fu and Heaton (1997) on inter-ethnic marriage in Hawaii; Furtado (2012) for a cross-country study of interethnic marriage; and Furtado and Theodoropoulos (2011) for a study of interethnic marriage and assortative matching by education using recent U.S. data.

from which most Hawaii migrants originated.[17] The large differences between the average ages of married males and females in Hawaii are particularly important for our analysis, as they reveal that the intense competition for brides among single males in high sex-ratio ethnic groups was not confined to potential brides from their ethnic group but spilled over to potential brides from other ethnic groups. The generalized competition provided single women of marriageable age in all ethnic groups with substantial bargaining power that should have allowed them to realize more favorable marital terms.

Bargaining advantages prior to entering in marriage might not have necessarily translated into gains in wives' surplus during marriage due to difficulties in enforcing informal marriage contracts. One enforcement mechanism was the threat of divorce. The Kingdom of Hawaii allowed divorce on a wide number of grounds in the late nineteenth century, and its divorce law was assumed by the Territory of Hawaii at annexation.[18] In 1900, the crude divorce rate in Hawaii was relatively low, just 0.3, compared to a U.S. rate of 0.6.[19] The Hawaii rate rose to a peak of 2.2 in 1918, before decreasing to an average rate of 1.9 over the 1919-1930 period. Hawaii rates exceeded the U.S. crude divorce rate for 1920 (1.6) and 1930 (1.6). A careful interpretation of the big increase in Hawaii's crude divorce rate would require additional theoretical and

---

[17] China: Lee and Wang (1999), Tables 5.1 and 5.4; U.S.: Carter et al. (2005), vol. 1, Series Ae481-482; Kwon et al. (1975), Table III.3; Japan: National Institute of Population and Social Security Research, Selected Demographic Indicators of Japan, Table 6. At http://www.ipss.go.jp/p-info/e/S_D_I/Indip.asp#t_6. Last access on 9 December 2013.

[18] See Hawaii Government (1884), Title V, Article LIII, and Territory of Hawaii (1915), ch. 145.

[19] Crude Divorce Rate = (Divorces/Population) x1000. U.S. data: Carter et al. (2005), vol. 1, Series Ae509. Hawaii data: Schmitt (1977), pp. 62-63.

empirical modeling but on its face suggests that it provided at least a weak mechanism for enforcement of marriage contracts.

4. Gainful Employment in the Hawaii Territorial Censuses

Our paper uses samples drawn by the Integrated Public Use Microdata (IPUMS) project from the first four Territorial Censuses of Hawaii: 1900, 1910, 1920, and 1930 (Ruggles *et al.*, 2010). The samples vary in size due to increases in the Hawaii population over the four census samples and variations in the percent of observations drawn from each census: 20 percent in 1900, five percent in 1910, one percent in 1920, and five percent in 1930. We estimate all regressions using a subset of observations (i.e., married couples both with and without children) for each census sample and this further reduces the sample size. For some regressions, observations from each sample year are weighted by the percentage of households drawn by IPUMS from the census for a particular year. We report both weighted and unweighted regression results.

We use the binary (yes/no) response to the following territorial census question as the dependent variable for our labor force participation regressions: Do you have an occupation? After consulting with a somewhat detailed set of rules concerning the response, the census taker could accept the response and classify the person as a "gainful worker," ask clarifying questions to place the person's response into a more specific category, or not accept the worker's response as an occupation under census rules, e.g., homemaker and student were not accepted as an occupation nor was any occupation given by a long retired person.

It is, however, far from clear that the answer to the "occupation" question would be the same as the answer elicited from the three modern questions that determine

whether you are classified as in the labor force. The Current Population Survey asks a sample of the non-institutional population over the age of 16: Were you employed at all in the current survey week; if no, have you looked for work in the last 4 weeks; and are you currently available for work?[20]

Goldin (1986) argued that the gainful worker question systematically omitted women working in three sectors: family agriculture, manufacturing, and boardinghouse keepers. After accounting for these omissions, Goldin estimated that the labor force participation rate for married women in 1890 would increase from 4.6 percent to between 12.3 and 14 percent. Abel and Folbre (1990) examined manuscript census returns for two small Massachusetts towns and calculated that adjustments to the data to reflect Goldin's concerns would raise married women's labor force participation rates from 10.1 to 47.3 percent in one town and from 9.9 to 68.2 percent in the other.[21] Carter's (2006) survey of the literature on the correspondence of these two concepts concluded that scholars "have achieved widespread agreement on three points. First, the gainful worker and the labor force concepts would have yielded similar statistics for prime-age males had both questions been asked at the same time. Second, the gainful worker and labor force concepts produce different estimates for youthful and older males and for females of all ages. This is because when the census asked about occupations, it did not indicate the period of time for which the question of occupation pertained" (p. 2-14). Third,

---

[20] See http://www.bls.gov/bls/empsitquickguide.htm for 2013 questions. Last access on 2 March 2014.

[21] See also Folbre and Abel (1989). Carter and Sutch (1996) examined the original enumerations of the 1880 Census and found that census takers frequently did not categorize women who had reported that they were housekeepers (defined as keeping house for pay) as gainfully employed.

"instructions to enumerators … were generally consistent from one census to the next, except in the case of the 1910 Census. In that year, the census included special instructions to enumerators that substantially raised the gainful worker rates of children and women—especially black women—relative to reports for the previous and following censuses. … The special entreaties to enumerators also reduced the recorded labor force participation rates of older men" (p. 2-15).

How important are these considerations for the Hawaii territorial census samples? First, family farms are less important in Hawaii than on the U.S. mainland as most agricultural output was produced on plantations. There is, however, considerable evidence that a substantial percentage of Japanese field workers at sugar plantations were accompanied on most days by their unpaid wives who specialized in particular types of field tasks. If a wife worked more than 15 unpaid hours, the rationale for including her in the labor force is the same as for a family farm.[22]

Second, social historians have reported that married women often took boarders into their households and provided them and other single male plantation workers with a variety of household services, such as shirt making, meals, and hot baths. In part, this was due to the lack of opportunities for married women living on plantations located in isolated rural areas. Thus we expect that omission of this category will bias measures of married female labor force participation downwards in all three Hawaii censuses.

---

[22] After the 1909 sugar strike, the sugar plantation owners reorganized production to provide greater incentives to individual workers. Many were assigned particular plots of land. Some tasks, e.g., planting, burning, and harvesting, were done by company teams, while others, e.g., weeding, were done by the worker and his family. Worker compensation was primarily based on the output of sugar on the assigned plot and the price realized from sale of the sugar to California and east coast refiners.

Third, were Hawaii enumerators also supplied with the special 1910 instructions regarding gainful employment? Unfortunately, we do not know. We note, however, that the Hawaii data on gainful employment of married women exhibit the same spike in 1910 as the mainland data. The spike could be due to Hawaii-specific factors affecting labor force participation but it is suggestive.

This study is possible because the first four territorial censuses used a relatively detailed ethnicity variable that placed individuals into specific ethnic categories based on country of origin.[23] For our purposes, this is particularly important, because immigrants (or their descendants) from five countries—the Philippines, Korea, China, Japan, and Portugal—accounted for over 75 percent of the population in each of the three census years.

Our counts of daughters and sons only account for a couple's children (ages 0-18) who are living in the household. If some reside elsewhere on a semi-permanent basis, either because the parents cannot take care of them or other families have adopted them, then the number of sons and daughters in residence is probably the desired variable for our regression analysis of labor force participation. On the other hand, if the child is living at another residence temporarily (e.g., with a relative in Honolulu who lives close to the child's private or public school), then the measure of daughters and sons in residence does not adequately reflect the ongoing influence on the household of children living elsewhere on parental decisions.

[23] Beginning with the 1940 census of population, the U.S. Census Bureau offered only one classification ("Asian") for a person from Asia. IPUMS samples for the 1940 and 1950 censuses do not contain any data from Hawaii or Alaska.

Table 7 breaks down LFP in Hawaii by gender and age across the four census years. The opposing trends for male and female teenagers are notable. Male teenager (16-18) LFP has a negative trend, falling from 78 percent in 1900 to 73 percent in 1910, 60 percent in 1920, and 46 percent in 1930. At the same time female teenager LFP increased from 15 percent in 1900 to 23 percent in 1910, 47 percent in 1920, and 26 percent in 1930. The falling male teenage participation rates could be partly due to increases in school enrollment. Enrollment of 16-17 ages (male and female) increased from 35.9 percent in 1910 to 40.1 percent in 1920 and 51.4 percent in 1930, while enrollment of 18-19 ages (male and female) increased from 13.9 percent in 1910 to 16.4 percent in 1920 and 21.3 percent in 1930 (Schmitt, 1977, Table 9.8).

Younger male (19-34) LFP was very high in 1900 and 1910 (97 percent) and fell slightly in 1920 and 1930 to 95 percent. Younger female LFP did not change much over the four census years, increasing from 23 percent in 1900 to 24 percent in 1920 and 1930.[24] Mirroring U.S. trends in female LFP for this period (Goldin, 2006), older female (35-60) LFP rose from 12 percent in 1900 to 17 percent in 1920 and 18 percent in 1930.[25]

[24] We omit discussion of 1910 LFP given our earlier discussion of the 1910 question on gainful employment.

[25] In 1900, the majority of Hawaii's population was employed on large sugar and pineapple plantations in rural areas or on small privately owned farms producing traditional native products. Female labor force participation in 1900 largely reflected the opportunities available to rural women married to Hawaii plantation workers. While blue collar jobs in the sugar processing factories on Hawaii's plantations were largely closed to women, a change in the contracting system used by most Hawaii plantations after the 1909 sugar plantation strike provided more opportunities for wives to work alongside their husbands in the fields. See more at fn. 22.

6. Children and Picture Brides in the Hawaii Census Samples

Table 8 presents a breakdown of the average number of children ages 0-18 living with married women ages 18 to 40. For two groups—White and Portuguese, the average number of children declined between 1910 and 1930, while for Puerto Ricans, the average number declined between 1910 and 1920, the only two years in which Puerto Ricans are identified in the census.[26] By contrast the average number of children living with Hawaiian mothers rose from 1.82-2.02 children in the 1900-1920 censuses to 2.65 in the 1930 census. Even more striking is the growth in the number of children per married Japanese woman over the 1900-1930 period, from 0.60 children in 1900 to 3.08 in 1930. The number of children per married Chinese woman rises from 2.56 children in 1900 to 3.66 in 1910 and 4.12 in 1920, before falling back to 3.34 children in 1930. While there are some positive and some negative trends for individual ethnic groups, there is a strong positive trend for the full sample, with the number of children per married couple rising from 1.54 in 1900 to 2.76 in 1930.

We develop ten variables to count the number of sons and number of daughters in five discrete age intervals—0-1, 2-5, 6-10, 11-16, and 17-18—who resided with both parents. This enables us to analyze how parental LFP decisions may be related to the presence of sons and daughters in the household and to specific phases in their development.

Table 9 provides estimates of the percent of Japanese and Korean wives who were picture brides in the 1920 and 1930 census samples. Since the IPUMS census samples

[26] For Puerto Ricans, this may be due to arrival in Hawaii within a limited time period (1901-1902) as well as grown-up children leaving the household prior to the 1910 and 1920 censuses.

for Hawaii do not contain a direct measure identifying a woman as a picture bride, we develop three alternative algorithms to identify a picture bride, each of which is based on a combination of individual variables available in the IPUMs samples. The first defines a Japanese picture bride as a married Japanese women who migrated to Hawaii between 1908 and 1924 and was between 18 and 25 years of age at migration (Definition 1). The second (Definition 2) follows the first while expanding the age range to between 18 and 35 years. The third (Definition 3) follows the second while also requiring that the woman had no children when they migrated. The three algorithms used to identify Korean picture brides are identical except the immigration period is set from 1910 to 1924.

7. Sons, Daughters, Sex Ratios, and Parental Labor Force Participation

We use the linear probability model to estimate several specifications of labor force participation (LFP) regressions for married women and, separately, for married men. Results from probit specifications for LFP regressions for married women are reported in the Appendix and are broadly similar to those estimated with the linear probability model. Census samples of married women are restricted to women below the age of 40 and census samples of married men are restricted to men below the age of 40. Both census samples include married men and women without children. We confine the census samples to married couples as our focus is on estimating the effects of sons and daughters on LFP in the context of a collective model of household resource allocation in which choices by two spouses are assumed to be Pareto-efficient. Households without two marriage partners did not face this coordination problem, and other variables not considered in our econometric model surely affected LFP choices of an unmarried household head.

We estimate separate regressions for LFP of married men and married women for each of the four census samples and a pooled census sample. All regressions using a pooled census sample include a census year binary variable. They are run with and without two binary variables for the wife's ethnicity and the husband's ethnicity and two binary variables identifying a Japanese or Korean married woman as a picture bride.

How would a wife's status as a picture bride have affected her LFP decisions? Starting from the central assumption of the collective model—that decisions made within the household are Pareto optimal, we argue that various aspects of the marriage contract would have been tilted towards picture brides, with adjustments including less LFP. Considerations on both sides of the market support this hypothesis. Japanese and Korean males in Hawaii who turned to the expensive overseas market for brides most likely had been unable to match with potential brides in Hawaii, and their decision to participate in the overseas market provided a signal that they were unlikely to be ideal marriage matches. From the perspectives of the bride and her family, a decision to marry an unknown male working as a common laborer on a sugar plantation many thousands of miles from home was very risky. While picture brides were typically from poor families living in rural Southern Japan, they still could have demanded that marriage margins be tilted more to the bride to compensate them for the low expected quality of the marriage and for the risk.[27]

---

[27] The discussion in the text emphasizes *ex ante* competition in the marriage market. Once they had arrived in Hawaii, brides were also vulnerable to *ex post* opportunistic behavior by their spouses. Most did not have the resources to return to Japan if they were unhappy with their husbands; they did not have close or distant relatives in Hawaii; and they were more isolated than other wives in Hawaii due to the concentration of Japanese workers in rural Hawaii sugar plantations at the turn of the century. See Mitsunaga (1984) for a discussion of violence against Japanese brides during the 1895-1905 period.

Table 10 reports results from OLS regressions on LFP of married women using each of the four census samples and a pooled census sample. Our first four specifications (Table 10, columns 1-4) provide separate estimates for each of the four IPUMS census samples. The estimated coefficient on *Age* is positive in each of the regressions but is statistically significant only in the 1910 and 1930 samples. All but two of the estimated twenty coefficients on the *Number of Sons* variables are negative, thirteen of the twenty estimated coefficients are statistically significant at the five percent level, and one is statistically significant at the ten percent level. Three of the four statistically insignificant estimated coefficients are from the 1920 sample, which is much smaller (N_{1920}=309) than the other three samples (N_{1900}=3651, N_{1910}=4390, N_{1930}=1689). Estimated coefficients for each of the *Number of Sons* variables are largest (except in 1930) for the 0-1 age interval, reflecting a -4.66 to -12.85 percent decline in mother's LFP, are smaller in magnitude (except in 1930) for the 2-5 age interval (-5.23 to -7.52 percentage points), and are even smaller for the 6-10 age interval (-3.88 to 1.12 percentage points). The 17-18 age interval brings a reversal for 1900 and 1910, with estimated coefficients increasing in magnitude (-6.04 in 1900 and -12.94 in 1910).

The signs, magnitudes, and statistical significance of estimated coefficients on the *Number of Daughters* variables are very similar to those on the *Number of Sons* variables. All estimated coefficients on the *Number of Daughters* variables are negative and thirteen of the twenty estimated coefficients are statistically significant at the five percent level. Magnitudes of the estimated coefficients again tend to decline from the 1900 to the 1930 census, are largest for the 0-1 age interval, reflecting a -6.74 to -11.58 percentage point decline in mother's LFP; are smaller but still substantial for the 2-5 age interval (-5.12 to

-7.45 percentage points); and are even smaller for the 6-10 age interval (-2.79 to -3.62 percentage points). The 17-18 age interval brings a reversal for 1900 and 1910, with estimated coefficients increasing in magnitude (-7.10 in 1900 and -14.14 in 1910).

F-tests cannot reject at the ten percent level of statistical significance the null hypothesis that the estimated coefficients on corresponding sons and daughters variables within each census are equal. We note, however, that the hypothesis that the estimated coefficients on the *Number of Sons* (-4.66) and *Number of Daughters* (-7.84) variables for the 0-1 age interval in 1930 are equal has a *p*-value of 0.11.

The next four specifications (Table 10, columns 5-8) are estimated with the pooled sample. The first specification (column 5) is the same used in earlier regressions for single census years. The estimated coefficient on *Age* is positive and statistically significant at the one percent level. All estimated coefficients on *Number of Daughters* and *Number of Sons* variables are negative and statistically significant at the one percent level. The same general patterns found in signs and magnitudes of estimated coefficients for individual census years also appear in results from the pooled sample: Declines in the magnitude of estimated coefficients from the 0-1 age interval to the 6-10 age interval and increases in magnitude for the 11-16 and 17-18 age intervals.

The general pattern of estimated coefficients on *Numbers of Daughters* and *Number of Sons* persists in the next three specifications (columns 6-8) when we add variables to control for the married woman's ethnicity, her husband's ethnicity (columns 6-8), and picture bride status (columns 7-8).[28] *F*-tests cannot reject at the ten percent

[28] All estimated coefficients on *Number of Sons* and *Number of Daughters* variables are negative, with 10 of 15 estimated coefficients on *Number of Sons* statistically significant

level of statistical significance the null hypothesis that the estimated coefficients on the corresponding sons and daughters variables within each specification are equal.

Estimated coefficients for *Wife Ethnicity* and *Husband Ethnicity* vary little across the three pooled specifications, so we focus primarily on the specification reported in column 7 which uses "Definition 1" versions of *Korean Picture Bride* and *Japanese Picture Bride* variables. Results from endogamous marriages—over 94 percent of the marriages in the pooled sample—show that relative to white wives, the LFP rate is 1.12 percent less for Portuguese wives, 5.09 percent less for Hawaiian wives, 15.75 percent more for Korean wives, and 27.04 percent more for Japanese wives.[29]

The high LFP of Japanese wives might have its roots in labor practices brought from rural Southern Japan, where husbands and wives often worked together in the field. Figure 3 presents LFP rates from the 1920 Japan Census of Population for married women in eight different five-year age groups from five provinces that supplied over 87 percent of Hawaii migrants: Fukuoka, Hiroshima, Kumamoto, Okinawa, and Yamaguchi. LFP rates in Okinawa and Kumamoto vary by age between 58 and 76 percent and in Fukuoka, Hiroshima, and Yamaguchi between 41 and 57 percent. All are substantially higher than were observed in Western Europe or the United States during the early twentieth century.

---

at the five percent level and 12 of 15 estimated coefficients on *Number of Daughters* statistically significant at the five percent level and one at the ten percent level.

[29] Our results are the sum of the estimated coefficient for *Ethnic Husband* and *Ethnic Wife* from the same ethnic group. Since estimated coefficients on *Chinese Wife* and *Chinese Husband* are statistically insignificant at the 10 percent level, we conclude that Chinese wives had the same LFP rates as white wives.

Japanese wives who were also picture brides participated in the labor force much less than native-born Japanese wives or Japanese wives who immigrated to Hawaii before the picture bride era (1908-1924). The estimated coefficient on *Japanese Picture Bride* (Definition 1) is -12.83 and statistically significant at the one percent level (column 7) while the estimated coefficient on *Japanese Picture Bride* (Definition 2) is -15.17 and statistically significant at the one percent level (column 8). These results are consistent with our earlier analysis of picture brides' LFP (p. 23) which suggests that marriage terms for a picture bride would need to be tilted toward her in order to take the risky decision to migrate to a distant land and marry unknown men working in sugar plantation fields. The same arguments also apply to similar results found for Korean picture brides.

Table 11 reports results from weighted regressions for the same specifications reported in Table 10, columns 6-8. The weight on observation *i* from census *j* is equal to the inverse probability of sampling observation *i* from census *j*. The broad pattern of results for the *Number of Sons* and *Number of Daughters* variables is similar to the pattern reported for the unweighted regressions: All estimated coefficients are negative for both *Number of Sons* and *Number of Dau*ghters in the 0-1, 2-5, 6-10, and 11-16 age intervals; all estimated coefficients for *Number of Daughters* exceed those for *Number of Sons* for the 0-1, 2-5, and 6-10 age groups; the largest estimated coefficients are for the 0-1 and 2-5 age intervals; and for the 0-1, 2-5, and 6-10 age intervals, 16 of 18 estimated coefficients are statistically significant at the five percent level. F-tests cannot reject the hypothesis that estimated coefficients on sons and daughters variables within the 0-1 age

interval and the 2-5 age interval are equal.[30] For the 6-10 age interval, the LFP response by married women to a daughter is larger than their response to a son, and F-tests reject the hypothesis that the estimated coefficients are equal.[31]

Estimated coefficients for wife and husband ethnicity are similar to those in the pooled unweighted regressions (Table 10, columns 6-8), although none of the estimated coefficients on *Husband Ethnicity* are statistically significant at the 10 percent level. Estimated coefficients on *Japanese Picture Bride* and *Korean Picture Bride* (Table 11, columns 2 and 3) have the same signs but are slightly smaller than their counterparts in the unweighted pooled regressions, with three of the four estimates registering as statistically significant at least at the ten percent level.

Table 12 reports results from OLS regressions on LFP of married men using each of the four census samples (columns 1-4), a pooled census sample (columns 5-6), and a weighted pooled census sample (columns 7-8). The estimated coefficient on *Age* is negative and statistically significant in the 1900 sample, but varies in sign and is not statistically significant in the 1910, 1920, and 1930 samples (columns 2-4). It is negative in the pooled regressions (columns 5-8) and becomes statistically significant at the five percent level when ethnicity variables are added to the pooled unweighted (column 6) and pooled weighted specifications (column 8).

Only one of the 40 estimated coefficients on *Number of Daughters* is statistically significant. For the four regressions on individual census years, the signs for estimated coefficients on *Number of Sons* gradually change from a mixture of positive and negative

---

[30] For the three specifications, *p*-values for the 0-1 age interval range from 0.25 to 0.28 and for the 2-5 age interval from 0.87 to 0.94.

[31] For the three specifications, *p*-values for the 6-10 age interval range from 0.05 to 0.08.

in 1900 to all positive in 1930. The four estimated coefficients on *Number of Sons* that are statistically significant at least at the ten percent level have positive signs. *F*-tests cannot reject at the ten percent level the null hypothesis that estimated coefficients on *Number of Sons* and *Number of Daughters* are equal for all age intervals in the four census years with the two exceptions of the 0-1 and 11-16 age intervals in the 1900 sample.[32] Estimated coefficients for sons and daughters variables in a regression using a pooled census sample (column 5) are all statistically insignificant, but an *F*-test cannot reject at the one percent level that estimated coefficients for the 11-16 age interval are different.

Regression results change somewhat when wife ethnicity and husband ethnicity are added to weighted and unweighted pooled regressions (columns 6 and 8). In the unweighted specification (column 6), the estimated coefficient on *Number of Sons* for the 11-16 age interval is positive, substantial—a 1.15 percentage point increase in LFP, and statistically significant at the one percent level. An *F*-test rejects at the five percent level that estimated coefficients for the 11-16 age interval are equal and at the 10 ten percent level that estimated coefficients for the 0-1 age interval are equal. In the weighted pooled specification with ethnic controls (column 8), estimated coefficients on *Number of Sons* for the 2-5 age interval (0.66), for the 6-10 age interval (0.51), and 11-16 age interval (1.02) are all positive and statistically significant at least at the ten percent level. An *F*-test rejects at the ten percent level of statistical significance the null hypothesis that the

[32] For the 0-1 age interval for 1900, we note that the estimated coefficients on *Number of Sons* and *Number of Daughters* were both statistically insignificant at the ten percent level.

estimated coefficients on *Number of Sons* and *Number of Daughters* for the 2-5 age interval are equal.

In the weighted pooled specification (column 8), wife and husband ethnicity variables are generally statistically insignificant, with exceptions noted for *Japanese Wife* (-26.15), *Japanese Husband* (27.19), and *Hawaiian Wife* (-5.12). For an endogamous Japanese marriage, the sum of the two Japanese ethnicity variables (1.02) is consistent with the collective household model, as it predicts that males from a high sex-ratio group would work more to attract a bride from the same ethnic group.[33] The result for *Hawaiian Wife* is more of an anomaly, as we would expect that competition for Hawaiian wives would lead all men in high sex-ratio Hawaii to offer to work more.

7. Conclusion

Our econometric analysis was conducted on an LFP measure that is somewhat crude, particularly for married women. This is, however, necessarily the case for studies of labor force participation in the 1900-1930 period that analyze U.S. or Hawaii census data, as it is the best measure of LFP for this period. Despite the noisy dependent variable, our regression results on LFP of married men and women in Hawaii during the 1900-1930 are broadly in accord with the predictions of the collective model of household resource allocation. Our analysis of the 1900-1930 Hawaii territorial censuses showed that mothers' LFP declined as the household added both sons and daughters and that mothers' LFP responses were larger for daughters than sons for the 6-10 age interval in weighted specifications (Table 11). Regression results for both weighted and unweighted pooled census samples show that women from two low sex-ratio ethnic

[33] Japanese sex-ratios are very high in 1900 and 1910 but are much closer to one in 1920 and 1930 (Table 3).

groups—Portuguese and Hawaiian—tended, as predicted by the collective household model, to participate less in the labor force. In addition, we found that Japanese and Korean picture brides had much lower LFP rates than other Japanese and Korean wives.

Our LFP regression results are similar to those obtained by Lundberg and Rose (2002) who compared the labor supply responses of two cohorts of U.S. men and women (born before or in 1950 and born after 1950) to additional male and female children. They found that "men work more and/or harder after having sons relative to daughters" and "no evidence that children's gender affects women's hourly wages and no evidence of an effect on labor supply" (p. 261). We found positive changes in fathers' LFP in response to sons and evidence that a child's gender affects mothers' LFP in just one of five age intervals. Comparability of the studies is limited, as our study examines the extensive margin of labor force participation whereas Lundberg and Rose's econometric analysis focused on intensive margins of wages and hours.

In this article, we have emphasized how variations in sex ratios could lead to adjustment of various features of marriage contracts, thereby allowing female preferences for additional resource allocation to children, and female children in particular, to be realized. Lundberg (2005) rightly emphasized the difficulty of separating the effects of son-daughter preferences from other possible explanations for behavioral adjustments that stem from high sex ratios, e.g., fathers may have a "technological" comparative advantage in raising boys; fathers may provide better role models for boys; boys are harder to raise than girls, prompting fathers to behave altruistically; and there may be

differential time costs associated with raising boys.[34] In the context of plantation Hawaii in the early twentieth century, there may well be other explanations lurking behind our regression results. We leave such investigations for future research.

[34] See Lundberg (2005) for a survey of the effects of sons and daughters on parental behavior in the United States and Dahl and Moretti (2008) for an analysis of the demand for sons.

References

Abel, M., Folbre, N., 1990. A Methodology for Revising Estimates: Female Market Participation in the United States, Historical Methods 23, 167-76.

Abramitzky, R., Delavande, A., Vasconcelos, L., 2011. Marrying Up: The Role of Sex Ratio in Assortive Matching. American Economic Journal: Applied Economics 3, 124-57.

Adams, R., 1924. The Japanese in Hawaii: A Statistical Study Bearing on the Future Number and Voting Strength and on the Economic and Social Character of the Hawaiian Japanese. National Committee on American Japanese Relations, New York.

Angrist, J., 2002. How Do Sex Ratios Affect Marriage and Labor Markets? Evidence from America's Second Generation. Quarterly Journal of Economics 117, 997-1038.

Becker, G.S., 1973. A Theory of Marriage: Part I. Journal of Political Economy 81, 813-46.

Becker, G.S., 1991. A Treatise on the Family. Harvard University Press, Cambridge.

Beechert, E., 1985. Working in Hawaii, A Labor History. University of Hawaii Press, Honolulu.

Bethmann, D., Kvasnicka, M., 2013. World War II, Missing Men, and Out-of-Wedlock Childbearing. Economic Journal 123, 162-194.

Brainerd, E., 2007. Uncounted Costs of World War II: The Effect of Changing Sex Ratios on Marriage and Fertility of Russian Women. National Council for Eurasian and East European Research, Seattle.

Caldwell, J.C., Caldwell, B.K., 2005. Family Size Control by Infanticide in the Great Agrarian Societies of Asia. Journal of Comparative Family Studies 36, 205-226.

Carter, S.B., Garner, S.S., Haines, M.R., Olmstead, A.L., Sutch, R., Wright, G., eds, 2006. Historical Statistics of the United States: Earliest Times to the Present, Millennial Edition, Vol. II. New York: Cambridge University Press.

Carter, S.B., 2006. Labor Force. In Carter, S.B. et al., eds, Historical Statistics of the United States: Earliest Times to the Present, Millennial Edition, Vol. II. Cambridge University Press, New York.

Carter, S.B., Sutch, R., 1996. Fixing the Facts: Editing of the 1880 U.S. Census of Occupations with Implications for Long-Term Trends and the Sociology of Official Statistics. Historical Methods 28, 5-24.

Chiappori, P-A., 1992. Collective Labor Supply and Welfare. Journal of Political Economy 100, 437-67.

Chiappori, P-A., Fortin, B., Lacroix, G., 2002. Marriage Market, Divorce Legislation, and Household Labor Supply. Journal of Political Economy 110, 37-72.

Chiappori, P-A., Iyigun, M., Weiss, Y., 2009. Investment in Schooling and the Marriage Market. American Economic Review 99, 1689–1713.

Cornell, L.L., 1996. Infanticide in Early Modern Japan? Demography, Culture, and Population Growth. Journal of Asian Studies 55, 22-50.

Dahl, G.B., Moretti, E., 2008. The Demand for Sons. Review of Economic Studies 75, 1085-1120.

Duflo, E., 2000. Child Health and Household Resources: Evidence from the South African Old-Age Pension Program. American Economic Review: Papers and Proceedings 90, 393-398.

Folbre, N., Abel, M., 1989. Women's Work and Women's Households: Gender Bias in the U.S. Census. Social Research 56, 545-70.

Fu, X., Heaton, T.B., 1997. Interracial Marriage in Hawaii: 1983-1994. Edwin Mellen Press, Lewiston, New York.

Furtado, D., 2012, Human Capital and Interethnic Marriage Decisions. Economic Inquiry 50, 82–93.

Furtado, D., Theodoropoulos, N., 2011. Interethnic Marriage: A Choice between Ethnic and Educational Similarities. Journal of Population Economics 24, 1257–79.

Goldin, C., 1986. The Female Labor Force and American Economic Growth, 1890-1980. In S.L. Engerman and R.E. Gallman, eds, Long-Term Factors in American Economic Growth. University of Chicago Press, Chicago.

Goldin, C., 2006. The Quiet Revolution that Transformed Women's Employment, Education, and Family, American Economic Review 96, 1-21.

Grossbard-Shechtman, A., 1984. A Theory of Allocation of Time in Markets for Labour and Marriage. Economic Journal 94, 863-882.

Grossbard-Shechtman, S., 1993. On the Economics of Marriage: A Theory of Marriage, Labor, and Divorce. Westview Press, Boulder, Colorado.

Grossbard-Shechtman, S., Neideffer, M., 1997. Women's Hours of Work and Marriage Market Imbalances. In I. Persson and C. Jonung, eds, Economics of the Family

and Family Policies. Routledge, New York.

Hawaii Government,1884. Compiled Laws of the Hawaiian Kingdom. Honolulu: Hawaiian Gazette Office.

Ichioka, Y., 1988. The Issei: The World of the First Generation Japanese Immigrant, 1885-1924. Free Press, New York.

Iyigun, M., Walsh, R.P., 2007. Building the Family Nest: Pre-Marital Investments, Marriage Markets, and Spousal Allocations. Review of Economic Studies 74, 507-35.

Kwon, T.H., Lee, H.Y., Chang, Y., Yu, E-Y., 1975. The Population of Korea. C.C.R.E.D. Series. Population and Development Studies Center, Seoul National University, Seoul.

La Croix, S.J., Grandy, C., 1997. The Political Instability of Reciprocal Trade and the Overthrow of the Hawaiian Kingdom. Journal of Economic History 57,161-89.

La Croix, S.J., Fishback, P., 2000. Migration, Labor Market Dynamics, and Wage Differentials in Hawaii's Sugar Industry. Advances in Agricultural Economic History 1, 31-72.

La Croix, S.J., Roumasset, J., 1990. The evolution of private property in nineteenth-century Hawaii". Journal of Economic History 50(4), 829-52.

Lafortune, J., 2013. Making Yourself Attractive: Pre-Marital Investments and the Returns to Education in the Marriage Market, American Economic Journal: Applied Economics 5, 151-178.

Lee, J.Z., Wang, F., 1999. One Quarter of Humanity: Malthusian Mythology and Chinese Realities, 1700-2000. Harvard University Press, Cambridge.

Liou, W., 2013. Effects of Annexation on Labor in Hawaii. Paper presented at the 2013 World Congress of Cliometrics, Honolulu, Hawaii.

Lundberg, S., Rose E., 2002. The Effect of Sons and Daughters on Men's Labor Supply and Wages. Review of Economics and Statistics 84, 251–268.

Lundberg, S., 2005. Sons, Daughters, and Parental Behavior. Oxford Review of Economic Policy 21, 340–356.

Mitsunaga, E.A., 1984, Yeiko Mizobe So. In B.B. Peterson, ed., Notable Women of Hawaii. Honolulu: University of Hawaii Press.

Naidu, S., Yuchtman, N., 2013. Coercive Contract Enforcement: Law and the Labor Market in Nineteenth Century Industrial Britain. American Economic Review

103, 107–144.

Nordyke, E.C., 1989. The Peopling of Hawaii, 2nd ed. University of Hawaii Press, Honolulu.

Patterson, W., 2000. The Ilse: First-generation Korean Immigrants in Hawai‘i, 1903-1973. University of Hawaii Press, Honolulu.

Porter, M., 2007. Imbalance in China’s Marriage Market and Its Effect on Household Bargaining. Unpublished manuscript.

Pabilonia, S.W., Ward-Batts, J., 2007. The Effect of Child Gender on Parents' Labor Supply: An Examination of Natives, Immigrants, and their Children. American Economic Review 97, 402-406.

Ruggles, S.J., Alexander, T., Genadek, K., Goeken, R., Schroeder, M.B., Sobek, M., 2010. Integrated Public Use Microdata Series: Version 5.0 [Machine-readable database]. University of Minnesota, Minneapolis.

Schmitt, R.C., 1977. Historical Statistics of Hawaii. University Press of Hawaii, Honolulu.

Territory of Hawaii, 1915. Revised Laws of Hawaii 1915. Honolulu Star-Bulletin, Ltd.

Thomas, D., 1994. Like Father, Like Son; Like Mother, Like Daughter. Journal of Human Resources 29, 950-86.

Wei, S-J., Zhang, X., 2011. The Competitive Saving Motive: Evidence from Rising Sex Ratios and Savings Rates in China. Journal of Political Economy 119, 511-64.

Table 1: Hawaii's Population Count in Kingdom and Territorial Censuses

Census Date	Hawaii Population	Percent Foreign Born	Percent Children with Foreign-Born Parent
1872 Dec. 27	56,897	8.0	7.9
1896 Sept. 27	109,020	52.2	na
1900 June 1	154,001	61.7	16.3
1910 April 15	191,874	54.9	26.5
1920 Jan. 1	255,881	46.7	35.0
1930 April 1	368,300	41.8	37.5

Sources: Hawaii Population from Schmitt (1977), Table 1.2; Percent Foreign Born from Schmitt (1977), Table 3.1; Percent Children of a Foreign-Born Parent from Schmitt (1977), Tables 1.2, 3.1, and 3.2.

Table 2: Ethnic Composition (Percent) of Hawaii's Population, 1872-1930

Ethnicity	1872	1900	1910	1920	1930
Hawaiian	86.2	19.3	13.6	9.3	6.1
Part-Hawaiian	4.4	6.4	6.5	7.0	7.7
Japanese	0.0	39.7	41.5	42.7	37.9
Chinese	3.6	16.7	11.3	9.2	7.4
Caucasian	4.4	5.5	7.7	7.7	12.2
Portuguese	0.7	11.9	11.6	10.6	7.5
Korean	0.0	0.0	2.4	1.9	1.8
Filipino	0.0	0.0	1.2	8.2	17.1
Puerto-Rican	0.0	0.0	2.5	2.2	1.8
Spanish	0.0	0.0	1.0	0.9	0.3
Other	0.7	0.4	0.6	0.3	0.2
Total Population	56,897	154,001	191,909	255,912	368,336

Source: Schmitt (1977), Table 1.12.

Table 3: Sex Ratios By Ethnicity and Age, 1900-1930

All ages	1900	1910	1920	1930
White	1.33	1.70	1.86	2.23
Portuguese	1.56	1.13	1.04	1.00
Puerto Rican	-	1.50	1.44	-
Chinese	6.14	3.76	3.00	1.38
Japanese	3.35	2.33	1.27	1.13
Filipino	-	-	3.55	4.56
Korean	-	-	1.86	1.63
Hawaiian	1.13	1.13	1.27	0.92

Over 18	1900	1910	1920	1930
White	1.24	2.13	2.03	2.85
Portuguese	2.33	1.22	1.00	1.08
Puerto Rican	-	2.03	1.00	-
Chinese	11.50	8.10	5.25	1.86
Japanese	4.00	3.17	1.50	1.33
Filipino	-	-	6.14	9.00
Korean	-	-	2.85	2.45
Hawaiian	1.17	1.13	1.13	0.89

Between 18 & 35	1900	1910	1920	1930
White	1.50	2.13	2.23	4.26
Portuguese	2.03	1.22	0.85	0.96
Puerto Rican	-	2.23	0.49	-
Chinese	9.00	4.00	2.57	1.22
Japanese	3.55	2.70	0.82	0.96
Filipino	-	-	6.14	9.00
Korean	-	-	0.33	0.56
Hawaiian	1.00	1.04	0.75	0.79

Source: IPUMS samples for 1900, 1910, 1920 and 1930 Territorial Censuses of Hawaii.
Note: In 1930, the U.S. Census coded Puerto Ricans as "White" rather than a separate ethnic category.

Table 4: Hawaii Marriage Rates by Ethnicity and Age, 1900-1930

Ages [16-18)	1900		1910		1920		1930	
	Males	Females	Males	Females	Males	Females	Males	Females
White	0.00	0.21	0.00	0.12	0.00	0.00	0.00	0.14
Portuguese	0.00	0.22	0.00	0.14	0.00	0.33	0.02	0.08
Puerto Rican	-	-	0.00	0.75	0.00	-	-	-
Chinese	0.01	0.20	0.00	0.20	0.00	0.00	0.00	0.00
Japanese	0.01	0.47	0.01	0.20	0.00	0.13	0.00	0.02
Filipino	-	-	-	-	0.00	1.00	0.00	0.67
Korean	-	-	-	-	0.00	0.00	0.00	0.00
Hawaiian	0.05	0.24	0.01	0.15	0.00	0.25	0.05	0.15

Ages [18-35]	1900		1910		1920		1930	
	Males	Females	Males	Females	Males	Females	Males	Females
White	0.30	0.74	0.26	0.63	0.27	0.54	0.16	0.71
Portuguese	0.64	0.86	0.54	0.82	0.32	0.72	0.47	0.68
Puerto Rican	-	-	0.46	0.89	0.50	1.00	-	-
Chinese	0.20	0.95	0.33	0.84	0.29	0.75	0.35	0.57
Japanese	0.30	0.97	0.34	0.96	0.59	0.85	0.41	0.71
Filipino	-	-	-	-	0.28	1.00	0.32	0.93
Korean	-	-	-	-	1.00	1.00	0.56	0.93
Hawaiian	0.51	0.74	0.50	0.78	0.63	0.88	0.56	0.73

Ages (35-65]	1900		1910		1920		1930	
	Males	Females	Males	Females	Males	Females	Males	Females
White	0.65	0.81	0.65	0.60	0.85	0.96	0.67	0.65
Portuguese	0.89	0.89	0.86	0.84	0.78	0.77	0.78	0.80
Puerto Rican	-	-	0.56	0.71	0.88	0.75	-	-
Chinese	0.36	0.83	0.43	0.88	0.49	0.92	0.56	0.82
Japanese	0.56	0.92	0.63	0.95	0.71	0.96	0.76	0.87
Filipino	-	-	-	-	0.33	1.00	0.53	0.91
Korean	-	-	-	-	0.42	1.00	0.41	0.72
Hawaiian	0.63	0.72	0.67	0.72	0.66	0.91	0.67	0.74

Source: IPUMS samples for 1900, 1910, 1920 and 1930 Territorial Censuses of Hawaii.

Table 5: Hawaii Marriage Matrices: 1900, 1910, 1920, and 1930

1900

Wife\Husband	White	Portuguese	Chinese	Japanese	Hawaiian
White	464	207	4	2	6
Portuguese	1	235	0	0	0
Chinese	0	0	267	1	0
Japanese	0	0	1	1964	2
Hawaiian	48	6	38	8	862

1910

Wife\Husband	White	Portuguese	P-R	Chinese	Japanese	Hawaiian
White	424	4	2	0	0	1
Portuguese	38	735	4	3	3	2
Puerto Rican	4	0	155	3	1	0
Chinese	1	0	0	294	0	0
Japanese	3	1	0	2	2572	1
Hawaiian	41	12	1	75	10	735

1920

Wife\Husband	White	Portuguese	P- R	Chinese	Japanese	Filipino	Korean	Hawaiian
White	33	0	0	0	0	0	0	0
Portuguese	7	35	1	1	0	2	0	1
Puerto Rican	0	0	8	1	0	1	0	0
Chinese	0	0	0	17	0	0	0	0
Japanese	2	0	0	0	208	0	0	0
Filipino	0	0	0	0	0	19	0	0
Korean	0	0	0	0	0	0	7	0
Hawaiian	2	1	0	7	0	0	1	45

1930

Wife\Husband	White	Portuguese	Chinese	Japanese	Filipino	Korean	Hawaiian
White	273	8	3	1	0	0	1
Portuguese	30	263	5	6	11	1	1
Chinese	4	12	112	1	2	0	2
Japanese	2	1	2	1069	0	0	3
Filipino	2	0	0	0	217	0	0
Korean	0	0	0	0	0	39	0
Hawaiian	15	6	11	0	10	3	119

Source: IPUMS samples of Territorial Censuses of Hawaii, 1900, 1910, 1920 and 1930.

Table 6: Average Ages of Husbands and Wives by Ethnic Group, 1900-1930

	1900		1910		1920		1930	
	Wife	Husband	Wife	Husband	Wife	Husband	Wife	Husband
White	34.44	41.35	36.21	42.73	35.91	41.91	37.16	41.60
Portuguese	35.21	41.71	34.54	40.01	39.67	46.75	38.19	42.96
Chinese	30.11	41.03	33.09	44.13	37.41	49.74	38.07	46.53
Japanese	27.97	32.65	31.66	36.52	33.5	40.45	37.75	44.27
Filipino	-	-	-	-	26.14	28.86	30.16	34.32
Hawaiian	37.68	42.21	38.44	42.40	40.10	45.18	39.36	43.34
Korean	-	-	-	-	36.13	42.5	34.47	43.91

Source: IPUMS samples of Territorial Censuses of Hawaii, 1900, 1910, 1920 and 1930.

Table 7: Labor Force Participation by Gender and Age, 1900-1930

Age	**1900**		**1910**		**1920**		**1930**	
	Males	Females	Males	Females	Males	Females	Males	Females
16-18	0.78	0.15	0.73	0.23	0.60	0.47	0.46	0.26
19-34	0.97	0.23	0.97	0.31	0.95	0.24	0.95	0.24
35-60	0.94	0.12	0.97	0.23	0.96	0.17	0.95	0.18
61+	0.76	0.08	0.73	0.07	0.84	0.11	0.60	0.07

Source: IPUMS samples of Territorial Censuses of Hawaii, 1900, 1910, 1920 and 1930.

Table 8: Average Number of Children Ages 0-18 in Household by Mother's Ethnicity, 1900-1930

Mother's Ethnicity	1900	1910	1920	1930
White	2.59	1.67	1.45	1.27
Portuguese	3.07	3.07	3.17	3.01
Puerto Rican	-	2.17	1.00	-
Chinese	2.56	3.66	4.12	3.34
Japanese	0.60	1.47	2.20	3.08
Filipino	-	-	3.00	2.22
Korean	-	-	3.00	3.51
Hawaiian	1.82	2.02	1.92	2.65
Full Sample	1.54	1.99	2.24	2.76

Source: IPUMS samples of Territorial Censuses of Hawaii, 1900, 1910, 1920 and 1930.

Table 9: Japanese and Korean Picture Brides, 1900-1930

	Percentage of Japanese Wives Who Were Picture Brides	Percentage of Korean Wives Who Were Picture Brides
	1920	
Definition 1	29.38	28.57
Definition 2	42.18	28.57
Definition 3	28.44	28.57
	1930	
Definition 1	31.57	17.95
Definition 2	39.37	19.95
Definition 3	32.22	17.95

Notes: Definition 1 includes women who migrated between 1908 and 1924 (1910 and 1924 for Koreans), were between 18 and 25 at the time of migration and are married in the census. Definition 2 is the same except that we include women between 18 and 35 at the time of migration. Definition 3 is the same as definition 2 except that we further restrict the definition to women without children when they migrated.

Table 10: Unweighted Regressions: Married Female Labor Force Participation

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Age	0.0001	0.0047***	0.0004	0.0056***	0.0031***	0.0008	0.0009	0.0010
	(0.0011)	(0.0012)	(0.0044)	(0.0017)	(0.0007)	(0.0007)	(0.0007)	(0.0007)
Number of Sons								
0-1	-0.1018***	-0.1285***	-0.0651*	-0.0466***	-0.1028***	-0.0854***	-0.0844***	-0.0831***
	(0.0143)	(0.0142)	(0.0389)	(0.0171)	(0.0087)	(0.0086)	(0.0085)	(0.0085)
2-5	-0.0752***	-0.0572***	-0.0523	-0.0532***	-0.0627***	-0.0528***	-0.0521***	-0.0512***
	(0.0092)	(0.0106)	(0.0326)	(0.0115)	(0.0061)	(0.0060)	(0.0060)	(0.0060)
6-10	-0.0388***	-0.0264**	0.0112	-0.0119	-0.0235***	-0.0122**	-0.0097	-0.0087
	(0.0084)	(0.0111)	(0.0330)	(0.0124)	(0.0064)	(0.0063)	(0.0063)	(0.0063)
11-16	-0.0416***	-0.0792***	-0.0376	-0.0362***	-0.0554***	-0.0190***	-0.0184***	-0.0187***
	(0.0092)	(0.0111)	(0.0341)	(0.0125)	(0.0065)	(0.0063)	(0.0062)	(0.0062)
17-18	-0.0604**	-0.1294***	0.1230	-0.0080	-0.0752***	-0.0229	-0.0258	-0.0257
	(0.0253)	(0.0221)	(0.1148)	(0.0393)	(0.0163)	(0.0160)	(0.0158)	(0.0158)
Number of Daughters								
0-1	-0.1102***	-0.1158***	-0.0674	-0.0784***	-0.1079***	-0.0993***	-0.0984***	-0.0971***
	(0.0142)	(0.0146)	(0.0427)	(0.0172)	(0.0088)	(0.0086)	(0.0086)	(0.0086)
2-5	-0.0745***	-0.0577***	-0.0624**	-0.0512***	-0.0630***	-0.0516***	-0.0494***	-0.0485***
	(0.0095)	(0.0104)	(0.0300)	(0.0120)	(0.0061)	(0.0061)	(0.0061)	(0.0061)
6-10	-0.0362***	-0.0279**	-0.0288	-0.0300	-0.0316***	-0.0157**	-0.0142**	-0.0141**
	(0.0087)	(0.0111)	(0.0264)	(0.0112)	(0.0062)	(0.0063)	(0.0061)	(0.0061)
11-16	-0.0501***	-0.0663***	-0.0258	-0.0099	-0.0427***	-0.01101*	-0.0081	-0.0087**
	(0.0094)	(0.0117)	(0.0442)	(0.0139)	(0.0070)	(0.0067)	(0.0067)	(0.0067)
17-18	-0.0710***	-0.1414***	-0.0421	-0.0193	-0.0872***	-0.0312	-0.0304**	-0.0300**
	(0.0263)	(0.0210)	(0.0917)	(0.0290)	(0.0143)	(0.0131)	(0.0130)	(0.0130)
Wife Ethnicity								
Other	-	-	-	-	-	-0.0009	-0.0040	-0.0041
						(0.0179)	(0.0178)	(0.0178)
Portuguese	-	-	-	-	-	-0.0360**	-0.0400**	-0.0403***
						(0.0159)	(0.0157)	(0.0157)
Chinese	-	-	-	-	-	0.0180	0.0147	0.0148
						(0.0322)	(0.0319)	(0.0318)
Japanese	-	-	-	-	-	0.1968***	0.2057***	0.2017***
						(0.0523)	(0.0518)	(0.0519)

Hawaiian	-	-	-	-	-	-0.0630***	-0.0612***	-0.0607***
						(0.0179)	(0.0177)	(0.0177)
Korean	-	-	-	-	-	-0.0154	0.0328	0.0352
						(0.0672)	(0.0831)	(0.0833)
Husband Ethnicity								
Other	-	-	-	-	-	0.0323*	0.0288*	0.0281*
						(0.0170)	(0.0169)	(0.0169)
Portuguese	-	-	-	-	-	0.0250*	0.0273*	0.0274**
						(0.0153)	(0.0151)	(0.0150)
Chinese	-	-	-	-	-	0.0164	0.0195	0.0191
						(0.0290)	(0.0287)	(0.0286)
Japanese	-	-	-	-	-	0.0623	0.0647	0.0703
						(0.0515)	(0.0509)	(0.0511)
Hawaiian	-	-	-	-	-	0.0083	0.0103	0.0104
						(0.0173)	(0.0172)	(0.0171)
Korean	-	-	-	-	-	0.1500***	0.1247***	0.1197***
						(0.0316)	(0.0318)	(0.0322)
Japanese Picture Bride – Def 1	-	-	-	-	-	-	-0.1283***	-
							(0.0225)	
Korean Picture Bride – Def 1	-	-	-	-	-	-	-0.1750**	-
							(0.0813)	
Japanese Picture Bride – Def 3	-	-	-	-	-	-	-	-0.1591***
								(0.0220)
Korean Picture Bride – Def 3	-	-	-	-	-	-	-	-0.1755**
								(0.0811)
p-value on difference in Number of Sons – Number of Daughters estimated coefficients								
0-1	0.6305	0.4615	0.9635	0.1134	0.6317	0.1860	0.1792	0.1780
2-5	0.9562	0.9703	0.7977	0.8976	0.9682	0.8878	0.7315	0.7285
6-10	0.8246	0.9217	0.2534	0.2418	0.3485	0.6842	0.5954	0.5274
11-16	0.5188	0.4210	0.8389	0.1283	0.1804	0.3260	0.2553	0.2137
17-18	0.7758	0.6949	0.2270	0.8319	0.5847	0.6920	0.8267	0.9237
Years	1900	1910	1920	1930	All	All	All	All
R^2	0.08	0.08	0.05	0.06	0.08	0.18	0.18	0.18
N	3651	4390	309	1698	10048	10048	10048	10048

Note: The table reports OLS regression coefficients. The dependent variable is a dummy variable indicating that the husband is in the labor force. Each observation is a family. We only employ households in which the husband is 40 years or younger. The omitted race category is "White". Census year dummies are included in all pooled estimates. Robust standard errors are reported in parentheses.

* Significance at the 10% level, ** Significance at the 5% level, *** Significance at the 1% level.

Table 11: Weighted Regressions: Married Female Labor Force Participation

	(1)	(2)	(3)
Age	0.0020	0.0019	0.0023
	(0.0013)	(0.0013)	(0.0013)
Number of Sons			
0-1	-0.0710***	-0.0711***	-0.0675***
	(0.0140)	(0.0140)	(0.0138)
2-5	-0.0600***	-0.0588***	-0.0563***
	(0.0101)	(0.0102)	(0.0101)
6-10	-0.0100	-0.0089	-0.0076
	(0.0116)	(0.0116)	(0.0116)
11-16	-0.0251**	-0.0252**	-0.0272**
	(0.0120)	(0.0120)	(0.0121)
17-18	0.0387	0.0360	0.0337
	(0.0444)	(0.0443)	(0.0444)
Number of Daughters			
0-1	-0.0912***	-0.0918***	-0.0870***
	(0.0148)	(0.0148)	(0.0146)
2-5	-0.0621***	-0.0604***	-0.0573***
	(0.0104)	(0.0104)	(0.0103)
6-10	-0.0325***	-0.0322***	-0.0331***
	(0.0091)	(0.0091)	(0.0091)
11-16	-0.0140	-0.0137	-0.0154
	(0.0131)	(0.0131)	(0.0130)
17-18	-0.0202	-0.0217	-0.0210
	(0.0269)	(0.0268)	(0.0268)
Wife Ethnicity			
Other	-0.0214	-0.0238	-0.0242
	(0.0297)	(0.0296)	(0.0295)
Portuguese	-0.0432	-0.0459*	-0.0476*
	(0.0272)	(0.0272)	(0.0271)
Chinese	0.0214	0.0197	0.0200
	(0.0510)	(0.0508)	(0.0508)
Japanese	0.2249*	0.2341**	0.2296**
	(0.1181)	(0.1159)	(0.1178)
Hawaiian	-0.0687**	-0.0689**	-0.0677**
	(0.0335)	(0.0331)	(0.0330)
Korean	-0.0207	0.0214	0.0256
	(0.0700)	(0.0804)	(0.0813)
Husband Ethnicity			
Other	0.0138	0.0140	0.0127
	(0.0265)	(0.0262)	(0.0262)
Portuguese	0.0257	0.0278	0.0290
	(0.0253)	(0.0251)	(0.0251)
Chinese	0.0188	0.0204	0.0199
	(0.0436)	(0.0435)	(0.0435)
Japanese	-0.0415	-0.0401	-0.0262
	(0.1181)	(0.1154)	(0.1180)
Hawaiian	0.0142	0.0163	0.0168
	(0.0345)	(0.0343)	(0.0342)
Korean	0.0742	0.0700	0.0600
	(0.0531)	(0.0531)	(0.0543)

Japanese Picture Bride – Def 1	-	-0.0445 (0.0350)	-
Korean Picture Bride – Def 1	-	-0.1423** (0.0631)	-
Japanese Picture Bride – Def 3	-	-	-0.0924*** (0.0343)
Korean Picture Bride – Def 3	-	-	-0.1402** (0.0627)
p-value on difference in Number of Sons – Number of Daughters estimated coefficients			
0-1	0.2580	0.2488	0.2758
2-5	0.8716	0.9030	0.9433
6-10	0.0833	0.0757	0.0503
11-16	0.5683	0.5550	0.5429
17-18	0.2842	0.2951	0.3203
Years	All	All	All
R^2	0.14	0.14	0.14
N	10048	10048	10048

Note: The table reports OLS regression coefficients. * Significance at the 10% level, **Significance at the 5% level, ***Significance at the 1% level.

Table 12: Male Labor Force Participation Regressions

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Age	-0.0014**	0.0003	-0.0031	0.0000	-0.0005	-0.0010***	-0.0009	-0.0013**
	(0.0007)	(0.0004)	(0.0027)	(0.0008)	(0.0003)	(0.0004)	(0.0008)	(0.0005)
Number of Sons								
0-1	0.0082	0.0044	-0.0105	0.0024	0.0040	0.0051	0.0014	0.0018
	(0.0079)	(0.0033)	(0.0205)	(0.0071)	(0.0032)	(0.0033)	(0.0062)	(0.0058)
2-5	-0.0045	0.0013	0.0172*	0.0083*	0.0013	0.0026	0.0066**	0.0066**
	(0.0062)	(0.0026)	(0.0107)	(0.0046)	(0.0026)	(0.0026)	(0.0032)	(0.0031)
6-10	-0.0053	-0.0007	0.0196*	0.0033	-0.0000	0.0019	0.0052	0.0051*
	(0.0094)	(0.0030)	(0.0114)	(0.0032)	(0.0031)	(0.0031)	(0.0029)	(0.0027)
11-16	0.0200**	-0.0029	0.0211	0.0053	0.0059	0.0115***	0.0080**	0.0102***
	(0.0096)	(0.0041)	(0.0131)	(0.0040)	(0.0033)	(0.0035)	(0.0032)	(0.0031)
17-18	-0.0429	0.0014	0.0380	0.0079	-0.0071	0.0001	0.0030	0.0091
	(0.0477)	(0.0147)	(0.0231)	(0.0042)	(0.0133)	(0.0130)	(0.0067)	(0.0073)
Number of Daughters								
0-1	-0.0160	0.0010	0.0249	0.0061	-0.0033	-0.0033	0.0061	0.0054
	(0.0102)	(0.0047)	(0.0132)	(0.0063)	(0.0041)	(0.0041)	(0.0044)	(0.0042)
2-5	0.0022	-0.0005	-0.0015	-0.0012	-0.006	-0.0000	-0.0024	-0.0027
	(0.0072)	(0.0032)	(0.0127)	(0.0062)	(0.0029)	(0.0028)	(0.0043)	(0.0038)
6-10	0.0025	-0.0010	-0.0067	-0.0001	0.0003	0.0022	-0.0012	-0.0010
	(0.0082)	(0.0037)	(0.0193)	(0.0047)	(0.0031)	(0.0030)	(0.0051)	(0.0052)
11-16	-0.0348**	-0.0145	-0.0077	0.0055	-0.0152	-0.0090	-0.0004	-0.0034
	(0.0176)	(0.0091)	(0.0155)	(0.0052)	(0.0071)	(0.0072)	(0.0046)	(0.0047)
17-18	0.0046	-0.0126	-0.0659	-0.0020	-0.0067	-0.0010	-0.0215	-0.0181
	(0.0130)	(0.0139)	(0.0744)	(0.0164)	(0.0086)	(0.0087)	(0.0067)	(0.0245)
Wife Ethnicity								
Other	-	-	-	-	-	-0.0038	-	-0.0324
						(0.0120)		(0.0280)
Portuguese	-	-	-	-	-	-0.0073	-	-0.0480
						(0.0133)		(0.0432)
Chinese	-	-	-	-	-	0.0020	-	-0.0275
						(0.0187)		(0.0354)
Japanese	-	-	-	-	-	-0.0792**	-	-0.2615*
						(0.0423)		(0.1561)

Hawaiian	-	-	-	-	-	-0.0284**	-	-0.0512*
						(0.0144)		(0.0280)
Korean	-	-	-	-	-	0.0120**	-	-
						(0.0061)		
Husband Ethnicity								
Other	-	-	-	-	-	-0.0116	-	0.0188
						(0.0126)		(0.0317)
Portuguese	-	-	-	-	-	-0.0022	-	0.0402
						(0.0132)		(0.0414)
Chinese	-	-	-	-	-	0.0055	-	0.0306
						(0.0184)		(0.0378)
Japanese	-	-	-	-	-	0.0907**	-	0.2719*
						(0.0423)		(0.1576)
Hawaiian	-	-	-	-	-	-0.0071	-	0.0123
						(0.0151)		(0.0082)
Korean	-	-	-	-	-	-	-	0.0123
								(0.0082)
p-value on difference in Number of Sons – Number of Daughters estimated coefficients								
0-1	0.0533	0.5141	0.1618	0.5755	0.1210	0.0706	0.4958	0.6060
2-5	0.5028	0.5767	0.3062	0.2401	0.6183	0.4860	0.1255	0.0975
6-10	0.5438	0.9478	0.3081	0.5218	0.9339	0.9334	0.2887	0.3182
11-16	0.0158	0.1661	0.6297	0.9712	0.0082	0.0108	0.0763	0.1817
17-18	0.3087	0.4979	0.1996	0.5889	0.9818	0.9426	0.3374	0.3029
Years	1900	1910	1920	1930	All	All	All	All
Weights	No	No	No	No	No	No	Yes	Yes
R^2	0.01	0.01	0.04	0.01	0.01	0.02	0.01	0.04
N	3107	3467	216	1199	7989	7989	7989	7989

Note: The table reports OLS regression coefficients in columns 1-6 and WLS coefficients in columns 7-8. The dependent variable is a dummy variable indicating that the husband is in the labor force. Each observation is a family. We only employ households in which the husband is 40 years or younger. The omitted race category is "White." Census year dummies are included in all pooled estimates. Robust standard errors are reported in parentheses.
* Significance at the 10% level, ** Significance at the 5% level, *** Significance at the 1% level.

Table A1: Unweighted Regressions: Married Female Labor Force Participation – Probit Marginal Effects

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Age	0.0005	0.0046***	0.0003	0.0047***	0.0030***	0.0012	0.0013*	0.0014**
	(0.0011)	(0.0012)	(0.0038)	(0.0015)	(0.0007)	(0.0007)	(0.0007)	(0.0007)
Number of Sons								
0-1	-0.1162***	-0.1440***	-0.0750	-0.0457**	-0.1174***	-0.0992***	-0.0991***	-0.0978***
	(0.0230)	(0.0181)	(0.0470)	(0.0200)	(0.0117)	(0.0119)	(0.0116)	(0.0116)
2-5	-0.0949***	-0.0609***	-0.0522	-0.0581***	-0.0732***	-0.0699***	-0.0688***	-0.0677***
	(0.0162)	(0.0127)	(0.0381)	(0.0150)	(0.0082)	(0.0081)	(0.0081)	(0.0081)
6-10	-0.0606***	-0.0251**	0.0136	-0.0055	-0.0224***	-0.0081	-0.0063	-0.0052
	(0.0200)	(0.0138)	(0.0327)	(0.0129)	(0.0087)	(0.0088)	(0.0088)	(0.0088)
11-16	-0.0940***	-0.1076***	-0.0470	-0.0381**	-0.0783***	-0.0352***	-0.0344***	-0.0345***
	(0.0308)	(0.0195)	(0.0462)	(0.0151)	(0.0118)	(0.0111)	(0.0111)	(0.0111)
17-18	-0.1492*	-0.2232***	0.1589	-0.0084	-0.1066***	-0.0315	-0.0360	-0.0358
	(0.0888)	(0.0579)	(0.1232)	(0.0387)	(0.0313)	(0.0295)	(0.0294)	(0.0300)
Number of Daughters								
0-1	-0.1323***	-0.1315***	-0.0640	-0.0824***	-0.1244***	-0.1208***	-0.1210***	-0.1197***
	(0.0223)	(0.0183)	(0.0460)	(0.0241)	(0.0123)	(0.0119)	(0.0119)	(0.0119)
2-5	-0.1000***	-0.0642***	-0.0667**	-0.0493***	-0.0719***	-0.0642***	-0.0626***	-0.0617***
	(0.0166)	(0.0129)	(0.0368)	(0.0150)	(0.0084)	(0.0083)	(0.0083)	(0.0083)
6-10	-0.0602***	-0.0291**	-0.0516	-0.0311**	-0.0378***	-0.0189**	-0.0176**	-0.0176**
	(0.0200)	(0.0139)	(0.0384)	(0.0140)	(0.0089)	(0.0089)	(0.0089)	(0.0089)
11-16	-0.1121***	-0.0935***	-0.0375	-0.0084	-0.0614***	-0.0186*	-0.0158	-0.0161
	(0.0317)	(0.0197)	(0.0549)	(0.0139)	(0.0117)	(0.0112)	(0.0111)	(0.0111)
17-18	-0.0715**	-0.2077***	-0.0421	-0.0224	-0.1127***	-0.0433**	-0.0430**	-0.0425**
	(0.0329)	(0.0389)	(0.0767)	(0.0317)	(0.0218)	(0.0205)	(0.0204)	(0.0204)
Wife Ethnicity								
Other	-	-	-	-	-	-0.0007	-0.0075	-0.0072
						(0.0306)	(0.0305)	(0.0305)
Portuguese	-	-	-	-	-	-0.0524**	-0.0541*	-0.0542*
						(0.0271)	(0.0266)	(0.0265)
Chinese	-	-	-	-	-	0.0069	0.0056	0.0056
						(0.0544)	(0.0533)	(0.05333)
Japanese	-	-	-	-	-	0.1566***	0.1615***	0.1600***
						(0.0613)	(0.0602)	(0.0600)

Hawaiian	-	-	-	-	-	-0.0974***	-0.0951***	-0.0947***
						(0.0243)	(0.0245)	(0.0245)
Korean	-	-	-	-	-	0.8467***	0.8461***	0.8461
						(0.0046)	(0.0046)	(0.0046)
Husband Ethnicity								
Other	-	-	-	-	-	0.0440	0.0402	0.0395
						(0.0363)	(0.0358)	(0.0357)
Portuguese	-	-	-	-	-	0.0143	0.0171	0.0169
						(0.0337)	(0.0337)	(0.0336)
Chinese	-	-	-	-	-	0.0529	0.0554	0.0547
						(0.0576)	(0.0571)	(0.0570)
Japanese	-	-	-	-	-	0.0858	0.0886	0.0908
						(0.0605)	(0.0594)	(0.0588)
Hawaiian	-	-	-	-	-	0.0210	0.0225	0.0223
						(0.0380)	(0.0379)	(0.0379)
Korean	-	-	-	-	-	-0.1603***	-0.1595***	-0.1596***
						(0.0047)	(0.0047)	(0.0378)
Japanese Picture Bride – Def 1	-	-	-	-	-	-	-0.0774***	-
							(0.0148)	
Korean Picture Bride – Def 1	-	-	-	-	-	-	-	-
Japanese Picture Bride – Def 3	-	-	-	-	-	-	-	-0.0913***
								(0.0143)
Korean Picture Bride – Def 3	-	-	-	-	-	-	-	-
p-value on difference in Number of Sons – Number of Daughters estimated coefficients								
0-1	0.6068	0.5917	0.8606	0.2123	0.6569	0.1661	0.1587	0.1605
2-5	0.9742	0.8486	0.7789	0.6791	0.9112	0.6738	0.5870	0.5984
6-10	0.9903	0.8367	0.1464	0.1678	0.2247	0.3817	0.3594	0.3206
11-16	0.6929	0.6095	0.9046	0.1637	0.3229	0.2933	0.2387	0.2450
17-18	0.4303	0.8289	0.1967	0.7936	0.8786	0.7478	0.8475	0.8570
Years	1900	1910	1920	1930	All	All	All	All
R^2	0.11	0.08	0.07	0.08	0.09	0.20	0.20	0.20
N	3651	4390	309	1698	10048	10048	10039	10039

Note: The table reports OLS regression coefficients. The dependent variable is a dummy variable indicating that the husband is in the labor force. Each observation is a family. We only employ households in which the husband is 40 years or younger. The omitted race category is "White". Census year dummies are included in all pooled estimates. Robust standard errors are reported in parentheses.

* Significance at the 10% level, ** Significance at the 5% level, *** Significance at the 1% level.

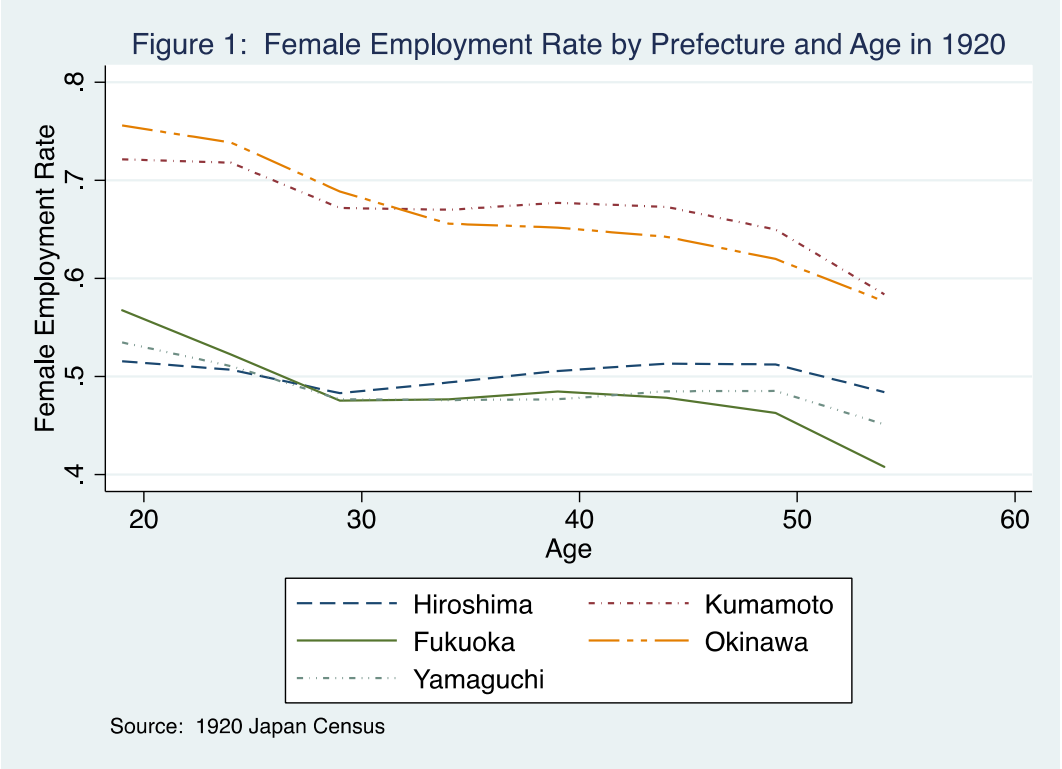


Figure 1: Female Employment Rate by Prefecture and Age in 1920
Female Employment Rate
.4
.5
.6
.7
.8
20
30
40
50
60
Age
Hiroshima
Kumamoto
Fukuoka
Okinawa
Yamaguchi
Source: 1920 Japan Census

Figure 2

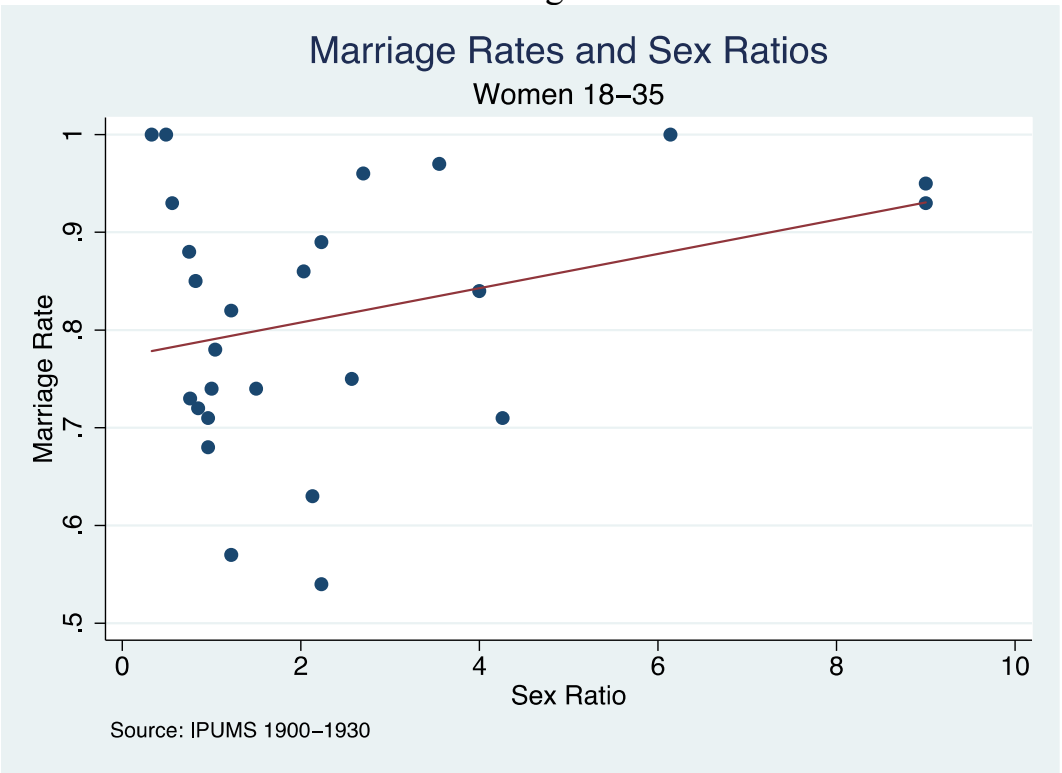
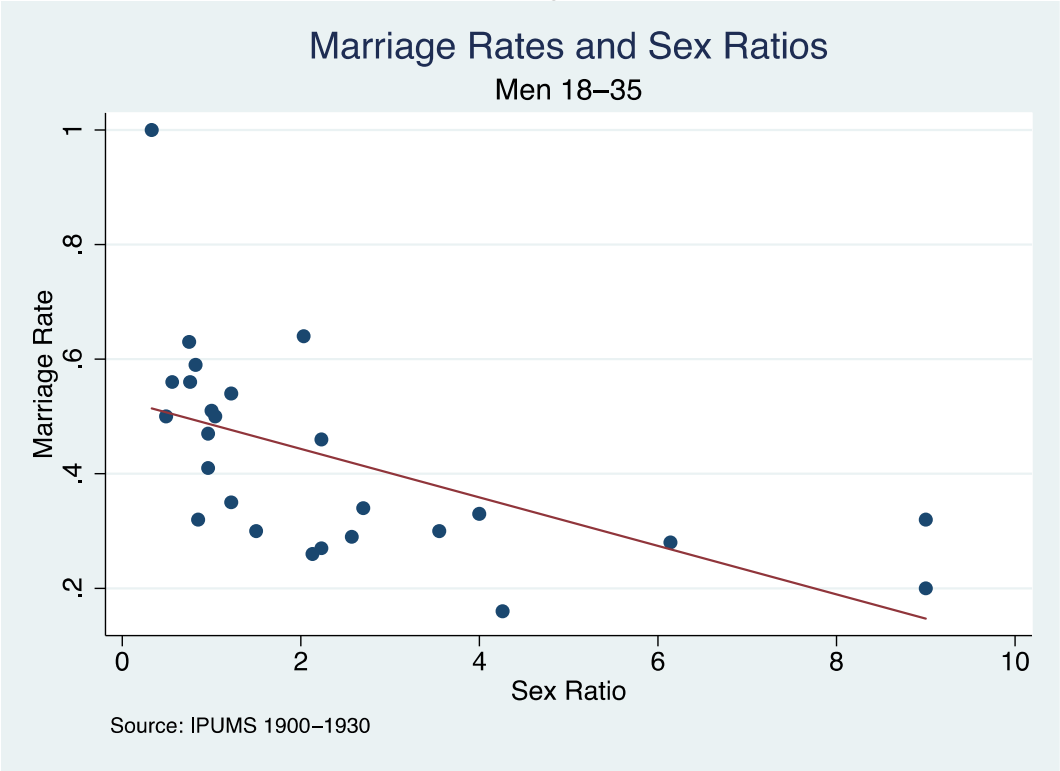

Marriage Rates and Sex Ratios
Women 18–35
Marriage Rate
.5
.6
.7
.8
.9
1
0
2
4
6
8
10
Sex Ratio
Source: IPUMS 1900–1930

Figure 3


Marriage Rates and Sex Ratios
Men 18–35
Marriage Rate
.2
.4
.6
.8
1
0
2
4
6
8
10
Sex Ratio
Source: IPUMS 1900–1930