Assimilation and the ethnic marriage squeeze in early 20th Century America

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During the 19th and 20th Century, large waves of international immigrants – often with very different age and sex structures – arrived in the United States. Within a relatively short period many of these immigrants were assimilated. We examine the effect of variation in sex ratios of different ethnic groups on the marriage market, by looking at marriage patterns of first and second-generation immigrants from six of the largest immigrant groups. Using data from the 1930 census, we construct measures of ethnic sex ratios at the county level to test how ethnic sex ratios affected ethnic exogamy. Our results, using county-level fixed-effects models, show that the probability of marrying outside one's ethnic group is strongly tied to ethnic sex ratios. The effects of sex ratios play a stronger role on men's marital behavior and a weaker effect on women's. We also find that counties are preferable to states in terms of the appropriate geographic context to use in this analysis. Once we examine the empirical pattern of sex ratio effects more closely, we find that exogamy, particularly for women, is primarily driven by severe shortage of potential spouses from one's own ethnic group with little evidence that a large surplus of potential spouses much *reduces* exogamy. The robustness of our findings are strengthened by analyses that show qualitatively similar effects when we remove natives from the analysis – forcing exogamy to defined as marriage between two distinct immigrant ethnic groups. Our findings highlight the importance of ethnic sex ratios in local marriage markets at a critical era of American assimilation.

While the "Marriage Squeeze" is a modern expression, it is a very ancient concern (Guttentag and Secord 1983). The squeeze is typically driven by a real or perceived shortage of potential marital partners, where that shortage is caused by preferences for spouses possessing particular characteristics, such as age and education, but also a common background based on race, ethnicity, or religion (K. Davis 1941; Coombs 1961; Becker 1973; Goldman, Westoff, and Hammerslough 1984; Fossett and Kiecolt 1991; Kalmijn et al. 2006). In America, differential sex ratios were driven by unprecedented waves of European migration from the late 19th century through to the early 20th century (Warner and Srole 1945; Haines 2000; Hirschman 2005). These waves of immigrants not only helped to fuel American progress but, as we argue here, the heterogeneity in ethnic sex ratios generated by these migration flows helped to stimulate the great era of assimilation in the early 20th C.

Because the immigrants arrived in such different temporal, age and sex patterns, they created a new demographic opportunities and challenges both for natives and immigrants. Imbalanced sex ratios have been shown to affect the age of marriage (Schoen 1983) and to alter the age gap between spouses (Muhsam 1974; Schoen 1983; Bergstrom and Lam 1989; Stier and Shavit 1994). Also, imbalanced sex ratios may affect the percentages never-married, as well as divorce and remarriage rates (Guttentag and Secord 1983; Schoen 1983; South and Lloyd 1992; Perlmann 2000). Moreover, sex ratios may be made even more uneven if we distinguish populations by ethnicity and race and these imbalances may have even greater impacts on exogamy. Studies have identified how the ethnic and racial marriage squeeze can impact the odds of intermarriage between groups, particularly when the category that is in surplus increases their marital odds by expanding their spousal search to other groups (Guttentag and Secord 1983; McCaa 1993).

This paper aims to focus more specifically on the impact of the ethnic marriage squeeze for marital assimilation among immigrants by exploring spatial variation in age and ethnic composition of the population in the US. We use data from the 1930 IPUMS census files to compute ethnic sex ratios at the county level for the six largest immigrant groups at the beginning of the 20th century. We explore the effect of the ethnic marriage squeeze on ethnic exogamy as well as on how gender and exposure to American society affect the relationship between ethnic sex ratios and exogamy. Our study offers insight into how shortages in same-ethnic spouses may have affected marriage markets and ultimately helped to fuel patterns of immigrant assimilation during a critical period of American demographic change.

Background and Theory

Ethnicity at the beginning of the 20th C. was a central characteristic of individual and group identity - strongly tied to stratification and segregation (Hirschman 1983). Americans classified themselves along ethnic lines - their national origin or their nationality - and the social structure was described as a national society containing a series of sub-societies based on ethnic identity (Gordon 1964). In this context, the ethnic community was central for the daily life of immigrants: it was at this level that many newspapers were published; colleges established, theaters and orchestras performed; workers groups and churches organized; and was the frame within which people worked and lived next to each other (J. Davis 1969; Furer 1973; Renkiewicz 1973; Lopata 1976; Juliani 1981).

Alongside the centrality of ethnic identity, the early 20th C. also witnessed unprecedented waves of immigrants to America's shores. Two features of immigration during this era were particularly notable for helping to understand the changing context of ethnicity and marriage. One, immigrant flows from Southern and Eastern Europe were replacing the earlier North-Western European migration streams. The "new" immigrants differed in their culture, religion and language and were more segregated than the "old" immigrants and the natives (Duncan and Lieberson 1959; Lieberson 1963). Two, the various ethnic groups often arrived with dissimilar age and sex structures that contributed to a destabilization of sex ratios (Muhsam 1974; Guttentag and Secord 1983; Perlmann 2000).

The destabilization of sex ratios was not a new phenomenon and international migrant flows caused an excess of men in the United States during this period, especially in the foreign-born white population. For instance, in the 1910 census, a ratio of 129 males for every 100 females was observed among foreign born immigrants (Haines 2000). While in most cases migration consisted of young and single men who came to search for new economic opportunities (Haines 2000), there were also migration streams biased toward young and single women. For example, the Irish migration stream was very female-dominant, driven by difficult marriage market conditions back in Ireland (Dixon 1978; Jackson 1984; Daniels 2002).

Differential sex patterns of domestic migration across the United States also functioned in some cases to further exacerbate spatial variation in ethnic sex ratios. In particular, intensive urban growth – driven both by newly arrived international migrants as well as domestic migrants making their way to cities – generated new demographic dynamics. From a rural society, in which only 5 percent of the American citizens lived in urban areas in

1790, by 1920 more than a half of the population were urban (Daniels 2002). And women, especially young ones, were more likely to migrate to the growing cities, in some cases balancing sex ratios in cities but also creating a potential female deficit in many rural areas (Becker 1973).

Ethnic Sex Ratios and Marriage

These dynamics prepare a compelling stage on which to examine the process of marital assimilation. On the one hand the salience of ethnicity meant that marriage markets in this period were relatively closed with most marriages conducted within the boundaries of the ethnic group (Panunzio 1942; Wildsmith, Gutmann, and Gratton 2003). On the other hand, shifting demographic balances could create intense ethnic marriage squeezes putting pressure on individuals and families to show flexibility and to marry out. This combination of social constraints and demographic stimuli created a unique environment for studying the marriage squeeze and its impact on ethnic exogamy among immigrants.

Prior work has shed light on important consequences of the ethnic marriage squeeze although there has been a good deal of inconsistency in findings across studies. There is for example evidence that ethnic sex ratios raised women's but not men's probability of marrying in America (Angrist 2002). More specific analysis focusing in on New York City in the early 20th C. shows that the ethnic sex ratio had no effect on the probability of marriage but exerted a powerful influence on ethnic intermarriage (McCaa 1993). Another analysis, based on large multilevel models using data on over 140 ethnic groups in United States over a 130 years period, shows that exogamous marriage was positively associated with sex ratios at the metropolitan level for men and negatively associated for women (Spörlein, Schlueter, and van Tubergen 2014). Additional findings provide further support for the relation between ethnic sex ratios and exogamy in the United States during the early 20th C. and show that this relationship weakened after WWII for immigrant groups who had arrived just a few decades earlier (Wildsmith, Gutmann, and Gratton 2003).

Our main hypothesis builds on these earlier studies to examine how sex ratios within ethnic groups affect ethnic exogamy. We hypothesize that a shortage of eligible spouses of one's own ethnic group will help to drive exogamy. Since the sex ratio is measured as the ratio of males to females, it's expected impact in this case will be in opposite directions, but conceptually similar: shortages from within one's own groups supply of potential partners will drive out-marriage. We primarily focus on models where only immigrants are included,

because the meaning of exogamy may be very different for natives. However, we also test models where natives are also included.

Whether sex ratios matter or not, we argue that their impact may be very different for men and women. So far, there is conflicting evidence, partly noted above, as to whether men or women's marital behavior may be affected more if at all by ethnic sex ratios. Part of the noted variation in the literature may be due to the diversity in how marriage markets are operationalized, where national, state, or metropolitan agglomerations have been used for capturing marriage markets. However, the inconsistent findings might also be due to other more fundamental differences in opportunity structures faced by men and women.

We believe that there are good reasons to expect differences in how men and women react to an ethnic marriage squeeze. Our second hypothesis is that men's marital outcomes will be more strongly affected by ethnic sex ratios than women's outcomes. The literature shows that men usually have a larger supply of benefits to offer in exchange of marriage in comparison to women (Becker 1973; Merton 1941). Men with status and proper salaries may help women to upgrade their lower status through marriage (Crowder and Tolnay 2000). Women will have faced a much more limited ability to exchange resources in the marriage market in an era when most women weren't financially independent. Moreover, men's greater reactivity is likely due to a combination of men being more exposed to a more diverse mix of society and because women's marital decisions are often more constrained by family preferences and their exposure to outside groups is more carefully managed. In this context of gender inequality, male probabilities of marrying out of their own group will be more strongly affected by shortages of potential spouses from their ethnic group.

While our study differs in several ways from earlier work, one particularly meaningful difference is our operationalization of ethnic sex ratios at the county level. We believe one source of variation in findings across earlier studies is due to how ethnic sex ratios have been measured. In some cases, sex ratios have been measured at the national level (Angrist 2002), state-level (Wildsmith, Gutmann, and Gratton 2003; Sassler 2005), or also the metropolitan level (Goldman, Westoff, and Hammerslough 1984; Crowder and Tolnay 2000; Spörlein, Schlueter, and van Tubergen 2014). These various choices are often driven by data limitations rather than theoretical arguments, and marriage markets – certainly in the early 1900s – are most likely better operationalized using smaller geographical units. The correct contextual unit of course is the one that best reflects the geographic space within which partners are chosen. Evidence indicates that most potential partners are found from nearby environments (Cox 1940; Ramsøy 1966; Akers 1967; Goldman, Westoff, and Hammerslough 1984). We

would expect sex ratios on a community level to exert a stronger effect on marriage patterns than those defined at the state or national levels. This is of course one appeal of studies that have focused on localized areas such as New York City (Pagnini and Morgan 1990; McCaa 1993) or small towns in Illinois (Schoenfeld 1969). Notwithstanding the appeal of examining the role of sex ratios within a single, clearly defined geographic location, there are also limitations to what can be learned and generalized from individual locations, and this localized approach doesn't enable us to answer certain broader questions about the overall impact of local sex ratios on assimilation across America.

Our analysis builds on the use of county-level data as the geographic unit for studying marriage markets in this period, but we also consider how this shift to a county level may impact our main findings. Our reasoning is consistent with earlier arguments stating that the county level together with the metropolitan level are the most attractive units to analyze the impact of sex ratios on the marriage pattern (Fossett and Kiecolt 1991). Our third hypothesis predicts that ethnic sex ratios measured at the county level will have a stronger influence on exogamy than those measured at the state level.

Lastly, despite substantial interest in how sex ratios may matter, very little attention has been paid so far to nonlinearity in the impact ethnic sex ratios. Most of the literature, as like our own earlier discussion, focuses on how shortages within one's own group induce marriage out, but less on whether surpluses of potential spouses from one's own group might also reduce the likelihood of out-marriage, and be a driving force behind the overall relationship. This relationship might also vary by sex. Our arguments are driven again mainly by evidence that women's marriage choices are more constrained. We would expect that surpluses in potential spouses will put more pressure on women to marry endogamously. We anticipate the impact will be weaker for men. Our fourth hypothesis is then that both men and women will be more affected by shortages of potential spouses and less affected by surpluses from within their own group. However, social constraints will likely put more pressure on women to marry endogamously when a surplus exists of potential spouses.

Method

Data

We analyze marriage patterns for more than a million individuals using the United States 1930 Integrated Public Use Microdata Series (IPUMS) Census (Ruggles et al. 2010). In this census year, the number of foreign born whites reached its peak, with almost fourteen

million white immigrants (Haines 2000). This, along with the fact that it marked the end of a massive wave of immigration from Europe, makes this census a compelling choice for studying sex ratios and the marital assimilation of immigrants. The 5 percent sample we use provides standard census information: sex, age, race, marital status, birthplace of both partners and their parents, household's location, literacy, as well as number of years in the United States for all immigrants.

We restricted our analysis to white first and second-generation immigrants from the six largest emigration countries during this period: England, Germany, Ireland, Italy, Poland and Russia. Non-whites are excluded for this analysis because inter-racial marriage remained both strongly sanctioned and in some cases legally restricted (Hollinger 2003). Natives are included in the calculation of sex ratios, but our primary focus is on the marital behavior of first and second generation immigrants. We also exclude first-generation immigrants married prior to arrival in the US because they did not have the opportunity to marry exogamously. In addition, in order to more accurately assess the impact of relevant ethnic sex ratios experienced by individuals, second generation immigrants claiming in the census a state of residence different from their place of birth were excluded from the sample as well.[i] These procedures led to a loss of 17.1% of women, 15.8% of men, but they substantially increase our confidence that the identified effects are really capturing the role of marriage markets on exogamy. The age range of male respondents is between 23 to 53 years old, and the females between 20 to 50. All told, the sample consists of 286,559 observations, including 140,152 females and 146,407 males.

Methodology

We take into account both the demographic and ethnic constraints that individuals face in the marriage market. Our dependent variable, exogamy, identifies whether an individual's spouse belongs to an ethnic group different from one's own. The ethnicity of individuals is defined either on their country of origin, if they are foreign-born, or based on place of birth of both of their parents.[ii] Of course, one debatable limitation of the census is that third-generation immigrants are all collectively categorized as natives – we return to this limitation later.

Our main explanatory variable is the sex ratio, which in this case, refers to the ratio of males to females based on age range, ethnicity and county of residence. We have imposed a relatively strict interpretation of the age structure of the market of potential partners - both within one's own ethnicity (ESR) and outside (OSR). Figure 1 presents the age gap distribution of married couples for males by ethnicity including natives. It can be seen that the

median gap between spouses among most of the groups is three years in favor of the husband except the English and Irish, where the median is two years in favor of the husband and Italians with four years in favor of the husband. The median for Americans lies roughly in between that of the other groups, although the interquartile range is somewhat smaller. On average, men marry women that are younger by 3.35 years, and among the immigrants men marry women that are 3.47 years younger on average. Our calculations are similar to other studies in terms of age gap of spouses (Schoen 1983; Bergstrom and Lam 1989; Fossett and Kiecolt 1991). Despite a recognition that a narrow age range may ignore relevant competition between members in neighboring cohorts, our main analysis is based on calculation of the sex ratio variable as follows[iii]:

$$Sex\_Ratio_{i,e,c} = \frac{\sum_{j=i}^{i+6} M_{j,e,c}}{\sum_{k=i-3}^{i+3} F_{k,e,c}} \qquad (1)$$

where $M_{j,e,c}$ = males in the j age range from ethnicity group e and county c

$F_{k,e,c}$ = females in the k age range from ethnicity group e and county c

Our analysis is restricted to members of communities that contain at least 10% of both sexes. After this restriction, the data show that our equation is sufficiently broad to capture the real age gap between spouses for 86.02% of men and 82.4% of the women in our sample. Figure 2 displays the sex ratio densities by ethnicity in 1930. Whereas natives and Irish sex ratios are centered around 0.9, sex ratios for other ethnicities such as the Italian and Polish are distributed far more widely and a more substantial percentage of the distribution is concentrated in extreme values.

We also define an estimate for the sex ratio for other groups, OSR, using equation (1). We calculated the OSR as the percentage of men in groups other than ego's, in the target age groups, residing in ego's county. This proportion also includes natives. Finally, additional independent variables include indicators for age, age at marriage, literacy, urban residence, ethnicity immigration generation and the proportion of the ethnic group in the county. Table 1 contains a summary of the variables used in our analysis.

Our main analysis includes a sequences of three linear probability models, with heteroskedastic corrections for the standard errors, and a fourth model built on the same specification as the third but using county fixed-effects, also with robust standard errors. The use of county fixed effects models aimed to isolate the causal effect of the county level sex

ratios while controlling for differences across counties, including unobservable factors such as their labor market conditions, history of ethnic discrimination by natives, and more. The main models include both sexes, with interactions between gender and the sex ratio to obtain a separate estimate for how sex ratios affect men and women. We also present an additional LPM and fixed effects model – both at the state level – to determine how a more narrow geographic definition of marriage markets may matter.

Two additional sets of models extend our interest in the estimated effects of ethnic sex ratios on the probability of exogamy. The first set of models includes a set of dummy variables for ESR values within different ranges to test the pattern of the relationship between ESR and exogamy. The aim is to shed light on whether surplus and shortage of potential mates may have different effects on ethnic intermarriage and to what extent this might vary by sex. The second set of models includes only immigrants who married *non-natives*. Thus, in this case exogamous marriage is narrowly defined as marriages to someone from a recognizably different ethnic group. This separation enables us to isolate the potential bias of inter marriage to a third generation partner but from the same ethnic group of origin, which can't be distinguished in the census. The models presented can provide reassurance that the effects of ethnic sex ratios are being driven by true inter-marriage and not by marriage to natives that are in fact third generation immigrants form ego's ethnic group.

Results

Descriptive statistics on marriage patterns of first and second-generation immigrants from within the six largest immigrants groups in the United States in the early 20th century (Table 2) help to highlight the diversity and social differences during that period. For example, while the Italian, Polish and Russian immigrants reduce their volume of marriage as the seniority in their host society increases, the English, German and Irish increase it toward the rate of Americans. The rates of the exogamy are even more diverse. While 78 percent of the second-generation immigrants males from England married a partner without an English background, 1.1 percent of the first-generation immigrants females from Italy married males from a different ethnic group. In addition, the level of exogamy increased for the second-generation across all the ethnic groups. Gender differences are also prominent across groups: we find for example that among English the percentage of marriage is higher for men. On the other hand, in some groups such as Italians the female percentage married is much higher. In

terms of intermarriage, male rates are generally higher although females marry out more among the American, Irish and Polish.

Our ethnic indicators distinguish between first and second-generation immigrants from each group. The estimates show increases from first to second generation in the probability of marriage for older groups of immigrants including English, German and Irish. In contrast, the more recent waves of immigrants from Italy, Poland and Russia show declining probabilities of marriage from first to second generation. This distinction between "old" and "new" immigration groups is also reflected in rates of exogamy, with intermarriage more common among the older origin groups.

Our main analysis follows in Table 3, where we present linear probability and fixed effects models for both sexes combined. Our main variables of interest focus on the impact of ESR on exogamy, our dichotomous outcome variable. Appendix 1 presents models where men and women are examined separately to facilitate the interpretation and we refer to these over the course of the discussion where the differences across sex are meaningful. When we refer to tests of gender differences, they refer to models that are not shown but where we estimate an interaction between sex (male) and the relevant variable and report on the t-statistic. We also include in Appendix 2 a set of models that replicate those presented in Table 3 but where natives are also included in the analysis as a separate ethnic group (the reference category).

Our sequence of models begins with a baseline, County-LPM1, including all of our control variables but excluding the effect of sex ratios. Our second model, County-LPM2, introduces ESR and its interaction with a male dummy to show how ESR affects men and women differently. A third specification, County-LPM3, includes both ESR and OSR, to estimate the impact of sex ratios within one's ethnicity as well as outside one's ethnic group. Finally, both county and state fixed effects are shown in Table 3, allowing us to control for differences across counties in their underlying and unobserved differences. While we discuss in some instances the sequence of coefficients, most of our attention is focused on the County-FE model.

Beginning with County-LPM1, we find that age has a negative effect on exogamy, possibly a signal that patterns of marriage may be becoming more flexible for new cohorts in our data, but the coefficient is no longer significant in the Count-FE model. Interestingly, age of marriage is positively associated with exogamy, presumably because people who married young are more likely to have met their partners within their own community (Ramsøy 1966; Stier and Shavit 1994). We find no overall difference between male and female immigrants in

terms of exogamy – this is stark contrast to what we find if natives are included in the model. When natives are included then male levels of exogamy are found to be lower (see Appendix 2). Literacy, our proxy for education, is also positively associated with exogamous marriage and this effect appears significantly stronger for women than for men ($p<0.001$). Surprisingly, the probability of exogamous marriage is no different in urban and rural areas.

Estimates of the contextual or ethnicity variables show that group size is negatively and significantly associated with exogamy - every 10% increase (in absolute terms) in a group's size reduces the probability of exogamous marriage by over 6 percent. The effect is significantly stronger for women. Inclusion of the control for group size helps to ensure that our subsequent sex ratio variables are capturing dimensions of the population structure that are beyond the gross effect of group size, though our substantive findings below are similar when this group size is omitted. The ethnicity/generation indicators show that later streams of migrants, relative to first generation English, are less likely to be married exogamously, at least in the second generation. In contrast, more recent migration streams, such as the Italians, Polish and Russians, show lower probabilities of exogamous marriage when compared to first generation English. Furthermore, the estimates show an increase in the probability of marrying out of one's group when we compare second-generation immigrants to first-generation immigrants from within the same ethnic category (all contrasts are significant).

In County-LPM2 we include ESR along with an interaction between the ESR and the male dummy to capture the separate effect of the ESR on men and women's probability of out-marriage. Our results show that the ethnic sex ratio has a negative effect on the probability of exogamous marriage for women. This effect points in the opposite direction for men, which makes sense given that the sex ratio is defined as the ratio of men to women. Both coefficients capturing the impact of ESR – the sex ratio variable as well as the interaction of sex ratio with male dummy – remain impressively stable across all models. They are unaffected when controls are included for the sex ratio of other ethnic groups (OSR) in County-LPM3. Likewise, when we control for county-fixed effects, the results remain almost indistinguishable except for a very slight decrease in the interaction coefficient. We use the coefficients from the County FE for further calculations.

It is clear from Table 3 that ethnic sex ratios matter overall in addition to mattering separately for men and women. At the same time, we can see that the impact of ESR is not of equivalent magnitude for both sexes. In quantitative terms, increasing ESR by 10 percent from a balanced level of ESR (1.0) to an ESR of 1.1 is associated with a decline in the probability for women of marrying out of their ethnic group by 0.22 percent. The direction of

living in a county with fewer potential spouses from within one's ethnic group has a qualitatively similar effect for men. However, the magnitude is larger: decreasing ESR by 10 percent (from 1 to 0.9) leads to a decrease in the probability of exogamous marriage by 0.48 percent. Thus, exogamy is affected by sex ratios for both sexes. However, men's out-marriage is more strongly determined by the prevailing ESR whereas women's is less dependent on whether there is a shortage or surplus of potential marriage partners from one's own ethnic group.

Another perspective on the quantitative difference between sexes is shown in Figure 3 where the predicted probability of exogamous marriage is plotted for a range of ethnic sex ratios for men and women (all other covariates at their averages and ethnicities at their mean proportions). Based on our model results, the turning point between men and women's probability to marry out of the ethnic group is an ESR of 0.67, meaning that women's probability of exogamy is higher than the probability of men when they exceed men by more than 49%. Figure 3 also shows that the male slope is sharper than the female slope, further illustrating men's higher sensitivity in the impact of ESR on the probability for exogamous marriage.

The last model in Table 3, State-FE, shows our comparison of ESR's impact when it is calculated using county level data versus where ESR is calculated at the state level. The estimates in Table 3 show that predicted effect of ESR is in the same direction for both sexes and still significant but the substantive impact is reduced by 45-65 percent. This is also shown in Figure 3, where the broken line shows that ESR has a much weaker impact for both sexes than what is obtained using counties. The state-based measurement would imply a diminished role of ethnic sex ratios on the probability of exogamy. Moreover, the state level FE models predict a similar impact of sex ratios for male and female exogamy as opposed to the stronger effect we identified when using county FE models. Overall, these results support our third hypothesis that the marriage squeeze at the county level identifies a much larger impact on the probability of exogamy relative to state level data.

Whereas our analysis has focused on measuring how ESR affects marriage markets, our county level analysis has treated ESR in a simpler linear specification. This approach ignores the possibility that the impact of ESR is non-linear and might be expected to weaken or strengthen as the sex ratios become very unbalanced. Moreover, the effect of a surplus of ethnically eligible spouses may differ from the impact of a deficit. It might also be that *highly* unbalanced sex ratios create or are a product of social dynamics that inhibit mixing and inter-marriage.

Our analysis in Table 4 provides four models that test the effect of a more flexible specification for ESR. In these models we consider the effect of ESR separately for men and women when ESR is divided into discrete categories with the middle category omitted. In the first two models (Men-1 and Women-1) the ESR is divided into three categories: < 0.9; 0.9 - 1.1; and >1.1. In the last two models (Men-2 and Women-2), ESR is divided into five distinct categories: < 0.8, 0.8 - 0.95, 0.95 - 1.05, 1.05 - 1.2 and > 1.2.

The first two models (Men-1 and Women-1) show that a shortage of potential partners affects both men and women and increases the probability of exogamy for both. As seen earlier, an ESR that implies a shortage of ethnic partners affects exogamy more strongly for men than women (0.042 versus 0.019). This is evident both in the three category specification, (Men-1 and Women-1) as well as in the five category specification (Men-2 and Women-2). Shortages of potential spouses drive exogamy for both sexes and the effect can also be seen to strengthen in the five category specification as the sex ratio becomes increasingly skewed. Interestingly, exogamy does not increase for women for small deviations from a balanced sex ratio (Women-2) and is apparently only affected once sex ratios because more strongly distorted. For men, on the other hand, even smaller deviations in sex ratios lead to exogamy, although the effect increases with the magnitude of the imbalance. As noted earlier, while both sexes are affected, the evidence implies that women are not affected as strongly.

Table 4 also enables us to separate the impact of a shortage of potential spouses from the impact that might be felt by a surplus. Assuming some degree of contact between groups, some level of exogamy might be expected. However, the data suggest that a surplus of potential spouses from own's ethnic group can also impact exogamy - likely by increasing pressure to marry within one's group. In this case, our results are more difficult to interpret. We find that men's probability of exogamy declines as the share of potential female spouses is greater than balanced. However, we find that women's probability of exogamy actually rises when there are a particularly large share of potential spouses. This last effect is difficult to reconcile with models of ethnic marriage or our other findings.

Robustness Checks

Our findings point to a clear and unambiguous impact of sex ratios on the probability of exogamy for male and female immigrants at the beginning of the 20th C. The analysis shows a very strong relationship between the tendency for individuals to marry-out when

there is a shortage of potential spouses. One limitation is that we are unable to exclude the possibility that immigrants are marrying natives who are actually third generation immigrants. Most marriages across different ethnicities in our data are in fact unions with American-born spouses. In our sample, 65.1% of the immigrants whose marriages are defined as exogamous marriage had an American spouse. It is very likely that in some share of cases, third generation natives may still retain cultural and ethnic markers that make them more ethnic than American. Thus, what to us appears as exogamous marriage may for all intents and purposes be endogamous marriage. This possibility is difficult to overcome directly given the limitation that these census data only report on birthplace of parents, not grandparents. However, we introduced a separate set of models to test for this possibility by excluding cases of immigrants who married natives. Thus, in this robustness check, marriage out of one's group (exogamy) is only counted if it occurs between two people from different immigrant groups (one of the six groups included in our analysis) and where both parents of these people are of the same background.

The results shown in Table 5 – both linear probability and county fixed effects models - show that the estimated impact of ESR remains very strong. In fact, the coefficient on sex ratio shows the effect is almost identical to what is shown in Table 3 while the coefficient on the male interaction with sex ratio indicates some decline in the effect for men, but the male effect still remains stronger than what is found for women. This strict interpretation of exogamy and the consistency in our estimates gives us increased confidence that the estimated impact of ESR is in fact identifying how ethnic sex ratios affect marital outcomes.

Our exclusion of natives from the analysis is non-trivial issue and studies have varied in their approach to this. Some studies of intermarriage have included natives, at times using controls. Our reasoning is primarily based on three factors. One, natives will carry a very large weight and have a strong impact on our findings. Two, including natives means we will have a very large number of counties weighing in that have few or no immigrants whatsoever. This might be less of an issue if we focused exclusively on cities, but our intention was to look more broadly. Three, and more importantly, our study is focused on assimilation. While marriage to Americans might be seen as assimilation, including natives would mean making assumptions about the meaning of marriage of Americans to immigrants. While this is certainly a necessary dimension to assimilation, it also raises concerns about whether these two forms of exogamy are equivalent. Ultimately, our approach has been to estimate our analysis in both ways, with the results available in Appendix 2. The results show that our

basic finding are unchanged. Sex ratios continue to matter and the effect for men is stronger than for women.

One important methodological concern is the uncertainty about the true age window for potential spouses and to what extent it varies across ethnic groups. In any case, all we are able to measure is the marriage gap between realized marriages. However, we replicated our main analysis using a window of ages that is twice as large as the one shown in Equation 1. Whereas the original calculation is based on number of men age x to x+6 divided by women ages x-3 to x+3, this additional sex ratio is calculated as the number of men age x-3 to x+9 divided by the number of women ages x-6 to x+6. Use of this alternative window for the sex ratio, which is twice as wide as the one in our main analyses, shows that our findings are basically unchanged using a broader window for the ESR variable to capture ethnic market of eligible spouses. In a similar vein, we replicated our analyses using the number of males in the relevant age window over the combined number of women and men to create a proportion of male statistic for each ethnic group.

We should note that we are limited to current marriage, despite the importance in accounting for changes in exogamy for second or later marriages. Whereas divorce may have been limited in this era (0.46% from our sample were divorced), widowhood was more common, and second marriages were not infrequent. Nonetheless, we can assume that our results aren't biased by this matter since exogamy is found to be associated only with divorce and as mentioned the volume of it is minor.

Conclusion

Scholars looking at assimilation have often focused on intermarriage as one of the last stages of assimilation. From this perspective, the increasing exogamy seen in America in this period is crucial to a unique period of American history. Our study aims to shed light on whether part of the driving force behind this shift in exogamy was the uneven distribution of immigrants across America. Migration driving assimilation is not the typical storyline, it is hard to not see this in our findings. Driven by both international migration distributions as well as flows of domestic migrants, sex ratios became skewed and created the need for individuals to shift their marital expectations.

We find that men living in counties facing a shortage of potential spouses from within their own ethnic group were relatively “quick” to marry out of their group. Women during this period also responded to a shortage of eligible partners from their own group, but not as

strongly as men. The gendered nature of the growth in exogamy and in how sex ratios help to drive this process cannot be surprising. Women were probably tied to more conventional marriage patterns, as they played a central role in transmitting ethnic identity to the next generation through food, holidays and religious practice (Sassler 2005). Moreover, marriage can be seen as an exchange: men because of their income and occupation were able to offer advantages to women from other ethnicities in return for marriage. Women, on the other hand, were limited in the sorts of exchanges they could offer potential spouses. Nonetheless, these processes did occur even if not as fast as for men. The end result was a far more diverse and mixed society. We see that by 1930, some 27% of men and 25% of women among immigrants were marrying out of their ethnic group, at least as defined in our study.

This is an alternative perspective on the driving forces for assimilation. While many influences may have contributed, the finding that demographic supply played such a substantial role in marital assimilation adds fuel to the debate on assimilation. Thus, even if education, social capital and segregation all were important processes in pushing assimilation forward, brute demography was also a force to be reckoned with. This was not equally true for both sexes and it seems like men were more affected than women in this initial stages in this period.

How exceptional is this era? This is a question that is worth asking in future work. There may be several factors that make this period unique. One is that ethnicity was so critical making it particularly difficult for individuals in some settings to marry out. Two is that sex ratios may have been more unbalanced than in later periods. Finally, the gender differences may not be as large in later migration streams if women were less constrained in their marital choices in comparison to men.

Figure 1: Age gap distribution of married couples for males by ethnicity

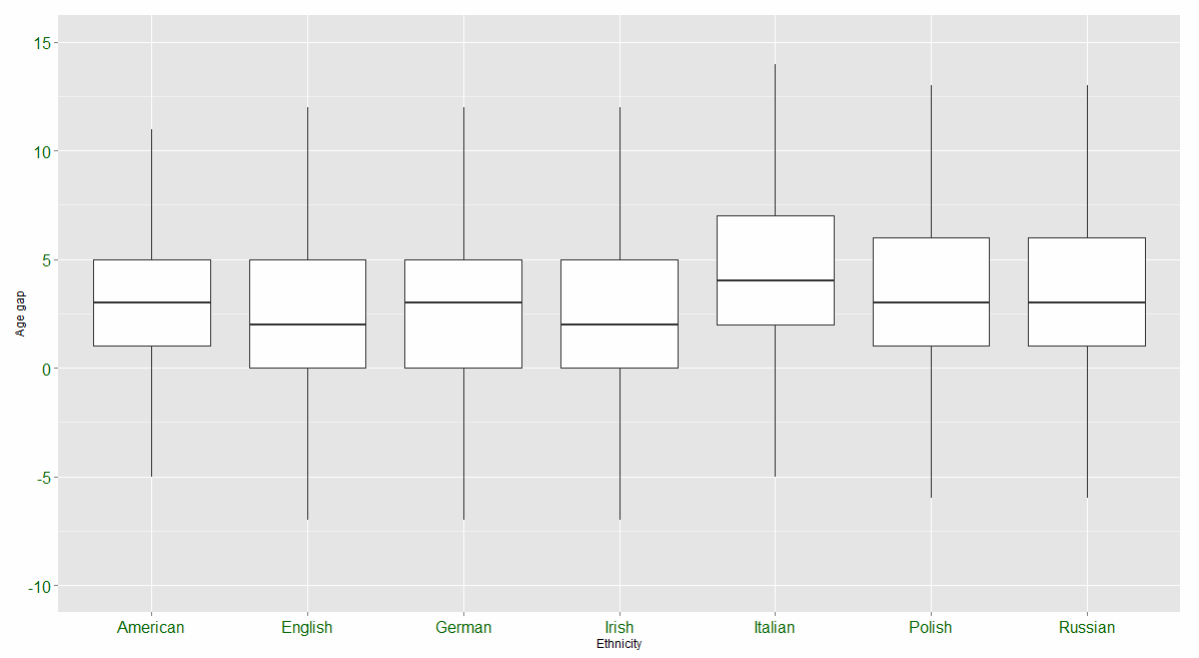

Figure 2- Density of the sex ratios by ethnicity

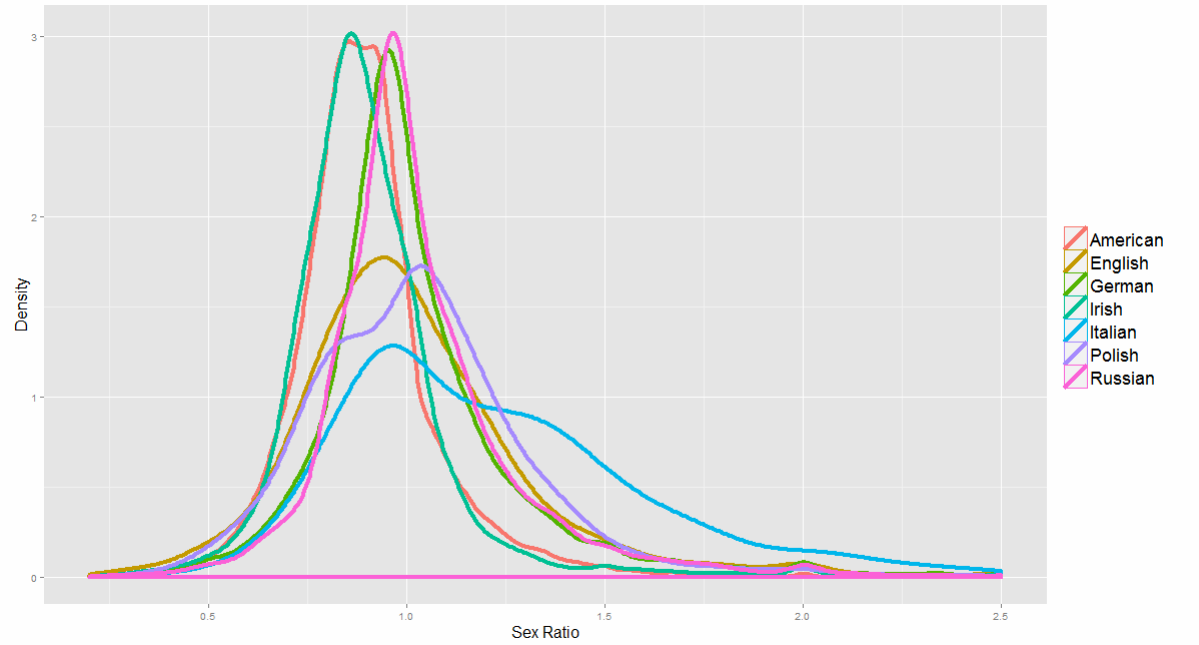

Figure 3- Prediction of exogamy by sex ratio and sex, holding constant the other dependent variables

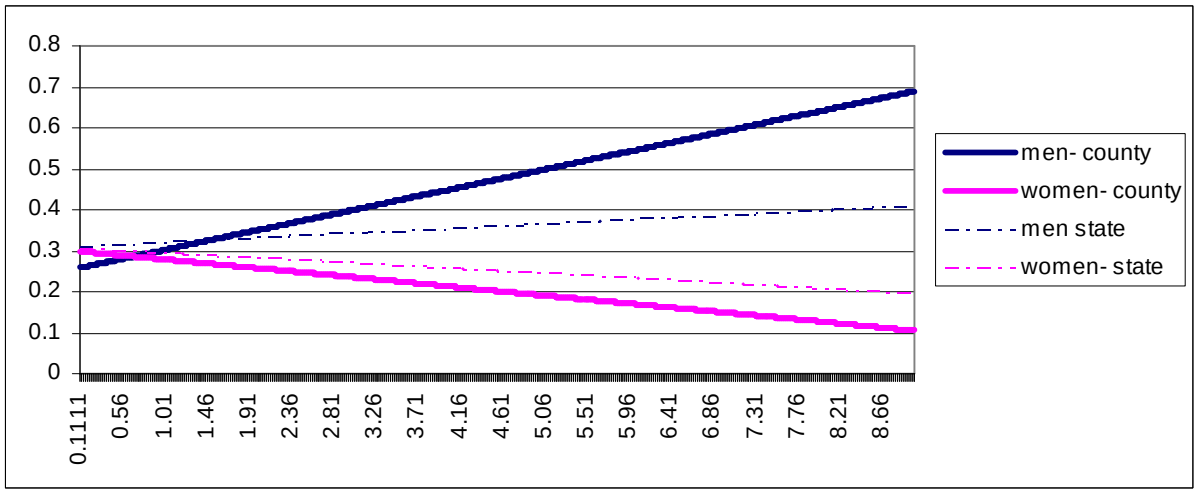

Table 1: Descriptive statistics for the IPUMS 1930 United States Census Sample

	mean	std	min	max
dependent variable:				
exogamy	0.264			
independent variable				
Ethnic sex ratio	1.059	0.377	0.111	9
Others sex ratio	0.485	0.066	0	1
Group size	0.168	0.108	0.002	0.962
Age	35.956	8.828	20	53
Age^2	1370.747	639.924	400	2809
Age at marriage	23.819	4.827	12	53
Urban	0.871			
Literate	0.956			
Ethnicity:				
English= 18,142				
German= 82,348				
Irish= 48,154				
Italian= 54,052				
Polish= 44,239				
Russian= 39,624				
Male	0.511			

Table 2: Probabilities for marriage and exogamous marriage, by ethnicity and immigration generation

	Ever-married		Exogamy	
	1st generation	2nd generation	1st generation	2nd generation
American		**0.779**		**0.095**
males		0.781		0.087
females		0.777		0.103
English	**0.731**	**0.786**	**0.486**	**0.766**
males	0.740	0.807	0.501	0.778
females	0.719	0.767	0.466	0.754
German	**0.704**	**0.891**	**0.230**	**0.490**
males	0.678	0.775	0.236	0.510
females	0.738	0.807	0.222	0.471
Irish	**0.563**	**0.591**	**0.207**	**0.562**
males	0.553	0.604	0.159	0.561
females	0.571	0.580	0.248	0.562
Italian	**0.798**	**0.609**	**0.037**	**0.172**
males	0.749	0.567	0.057	0.309
females	0.881	0.640	0.011	0.091
Polish	**0.826**	**0.626**	**0.082**	**0.226**
males	0.783	0.597	0.079	0.217
Females	0.879	0.647	0.086	0.231
Russian	**0.770**	**0.613**	**0.098**	**0.185**
males	0.750	0.623	0.107	0.203
females	0.793	0.605	0.088	0.171

Table 3: Linear probability models and fixed effects models (county and state levels) for the effect of sex ratio on exogamy

	County-LPM1	County-LPM2	County-LPM3	County- FE	State-LPM	State-FE
Age	-0.005***	-0.004***	-0.004***	-0.003	-0.006***	-0.005*
	0.001	0.001	0.001	0.002	0.001	0.003
Age^2	0.000	0.000	-0.000	-0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000
Age at marriage	0.003***	0.003***	0.003***	0.003***	0.003***	0.003***
	0.000	0.000	0.000	0.000	0.000	0.001
Male	0.029***	-0.049***	-0.006	0.005	0.185***	0.185***
	0.002	0.006	0.015	0.015	0.019	0.025
Literate	0.036***	0.035***	0.035***	0.033***	0.037***	0.035***
	0.002	0.002	0.002	0.003	0.002	0.003
Urban	-0.005	-0.003	-0.003	0.007	-0.018***	-0.010
	0.003	0.003	0.003	0.005	0.003	0.013
Group size	-0.618***	-0.611***	-0.610***	-0.594***	-0.750***	-0.819***
	0.010	0.010	0.010	0.074	0.015	0.085
English 1st-G	0.000	0.000	0.000	0.000	0.000	0.000
	.	.	.	.	.	.
English 2nd-G	0.272***	0.271***	0.271***	0.283***	0.260***	0.274***
	0.009	0.009	0.009	0.014	0.008	0.014
German 1st-G	-0.173***	-0.173***	-0.174***	-0.177***	-0.183***	-0.174***
	0.007	0.007	0.007	0.025	0.007	0.042
German 2nd-G	0.099***	0.098***	0.098***	0.100***	0.082***	0.099***
	0.007	0.007	0.007	0.019	0.007	0.024
Irish 1st-G	-0.225***	-0.224***	-0.223***	-0.217***	-0.233***	-0.219***
	0.008	0.008	0.008	0.025	0.007	0.034
Irish 2nd-G	0.113***	0.114***	0.114***	0.120***	0.109***	0.125***
	0.008	0.008	0.008	0.020	0.007	0.021
Italian 1st-G	-0.417***	-0.427***	-0.428***	-0.426***	-0.439***	-0.428***
	0.006	0.007	0.007	0.015	0.006	0.019
Italian 2nd-G	-0.313***	-0.315***	-0.315***	-0.317***	-0.333***	-0.324***
	0.008	0.008	0.008	0.016	0.007	0.020
Polish 1st-G	-0.377***	-0.380***	-0.380***	-0.366***	-0.411***	-0.396***
	0.007	0.007	0.007	0.018	0.006	0.022
Polish 2nd-G	-0.257***	-0.258***	-0.258***	-0.240***	-0.294***	-0.280***
	0.008	0.008	0.008	0.021	0.007	0.026
Russian 1st-G	-0.341***	-0.344***	-0.344***	-0.349***	-0.391***	-0.385***
	0.007	0.007	0.007	0.017	0.006	0.021
Russian 2nd-G	-0.260***	-0.262***	-0.262***	-0.281***	-0.325***	-0.321***
	0.008	0.008	0.008	0.020	0.007	0.022
ESR		-0.022***	-0.022***	-0.022***	-0.006**	-0.012**
		0.003	0.003	0.004	0.002	0.004
ESR*Male		0.072***	0.072***	0.070***	0.024***	0.024***
		0.004	0.004	0.005	0.003	0.004
OSR			-0.024	0.009	0.080**	0.154**
			0.020	0.022	0.031	0.050
OSR*Male			-0.089**	-0.109***	-0.354***	-0.352***
			0.029	0.029	0.042	0.054
_cons	0.602***	0.616***	0.622***	0.579***	0.600***	0.554***
	0.022	0.022	0.024	0.040	0.024	0.054
R-squared	0.233	0.234	0.234	0.208	0.234	0.219
No. of cases	171578	171578	171578	171578	187859	187859

* p<0.05, ** p<0.01, *** p<0.001

Table 4: County fixed effects models to test shape of ethnic sex ratio effects on exogamy, control variables included but not shown[1]

	Men-1	Women-1	Men-2	Women-2
ESR<0.9	-0.017***	0.019***		
	0.004	0.005		
ESR>1.1	0.042***	0.004		
	0.004	0.004		
ESR<0.8			-0.016**	0.042***
			0.006	0.007
0.8<ESR<0.95			-0.021***	0.002
			0.005	0.005
1.05<ESR<1.2			0.028***	0.008
			0.004	0.004
ESR>1.2			0.048***	0.012**
			0.005	0.004
R-squared	0.220	0.217	0.221	0.217
No. of cases	96731	85219	96731	85219

* p<0.05, ** p<0.01, *** p<0.001

[1]Controls include age, age squared, age at marriage, literate, urban, group size, ethnicity and OSR.

Table 5: Exogamy models after limiting the sample to couples that both partners are first or second-generation immigrants, control variables included but not shown[1]

	County LPM-3	County-FE
Male	-0.031**	-0.029**
	0.010	0.010
ESR	-0.024***	-0.019***
	0.003	0.003
ESR*Male	0.048***	0.047***
	0.004	0.005
OSR	0.032*	-0.011
	0.014	0.014
OSR*Male	-0.033	-0.033
	0.019	0.019
R-squared	0.083	0.089
No. of cases	142185	142185

* p<0.05, ** p<0.01, *** p<0.001

[1]Controls include age, age squared, age at marriage, literate, urban, group size and ethnicity.

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Appendix 1

A- PLM and county level fixed effects models for the effect of sex-ratio on exogamy, men

	County-LPM1	County-LPM2	County-LPM3	County- FE
Age	-0.005**	-0.006***	-0.005**	-0.004
	0.002	0.002	0.002	0.003
Age^2	0.000	0.000	0.000	-0.000
	0.000	0.000	0.000	0.000
Age at marriage	0.003***	0.003***	0.003***	0.003***
	0.000	0.000	0.000	0.000
Literate	0.047***	0.049***	0.050***	0.047***
	0.003	0.003	0.003	0.004
Urban	-0.022***	-0.015***	-0.015***	-0.003
	0.004	0.004	0.004	0.006
Group size	-0.649***	-0.631***	-0.629***	-0.631***
	0.014	0.014	0.014	0.072
English 1st-G	0.000	0.000	0.000	0.000
	.	.	.	.
English 2nd-G	0.266***	0.265***	0.265***	0.280***
	0.012	0.012	0.012	0.014
German 1st-G	-0.179***	-0.179***	-0.179***	-0.186***
	0.010	0.010	0.010	0.024
German 2nd-G	0.104***	0.102***	0.101***	0.098***
	0.009	0.009	0.009	0.018
Irish 1st-G	-0.290***	-0.284***	-0.283***	-0.274***
	0.010	0.010	0.010	0.024
Irish 2nd-G	0.099***	0.104***	0.104***	0.113***
	0.010	0.010	0.010	0.017
Italian 1st-G	-0.410***	-0.432***	-0.432***	-0.426***
	0.009	0.009	0.009	0.014
Italian 2nd-G	-0.189***	-0.196***	-0.196***	-0.195***
	0.011	0.011	0.011	0.019
Polish 1st-G	-0.393***	-0.399***	-0.398***	-0.382***
	0.009	0.009	0.009	0.017
Polish 2nd-G	-0.279***	-0.280***	-0.280***	-0.264***
	0.011	0.011	0.011	0.022
Russian 1st-G	-0.343***	-0.349***	-0.349***	-0.352***
	0.009	0.009	0.009	0.016
Russian 2nd-G	-0.252***	-0.255***	-0.255***	-0.271***
	0.012	0.012	0.012	0.021
ESR		0.048***	0.048***	0.042***
		0.004	0.004	0.005
OSR			-0.091***	-0.083***
			0.021	0.025
_cons	0.624***	0.588***	0.622***	0.590***
	0.036	0.036	0.037	0.061
R-squared	0.237	0.238	0.239	0.209
No. of cases	86359	86359	86359	86359

* p<0.05, ** p<0.01, *** p<0.001

B- PLM and county level fixed effects models for the effect of sex-ratio on exogamy, women

	County-LPM1	County-LPM2	County-LPM3	County- FE
Age	-0.009***	-0.008***	-0.008***	-0.007***
	0.002	0.002	0.002	0.002
Age^2	0.000**	0.000**	0.000*	0.000
	0.000	0.000	0.000	0.000
Age at marriage	0.002***	0.002***	0.002***	0.002***
	0.000	0.000	0.000	0.001
Literate	0.026***	0.026***	0.026***	0.024***
	0.003	0.003	0.003	0.004
Urban	0.013**	0.011*	0.011*	0.017*
	0.004	0.004	0.004	0.007
Group size	-0.589***	-0.593***	-0.593***	-0.560***
	0.014	0.015	0.015	0.079
English 1st-G	0.000	0.000	0.000	0.000
	.	.	.	.
English 2nd-G	0.279***	0.279***	0.279***	0.292***
	0.014	0.014	0.014	0.020
German 1st-G	-0.166***	-0.166***	-0.166***	-0.167***
	0.011	0.011	0.011	0.028
German 2nd-G	0.096***	0.096***	0.096***	0.107***
	0.010	0.010	0.010	0.023
Irish 1st-G	-0.169***	-0.171***	-0.171***	-0.166***
	0.011	0.011	0.011	0.029
Irish 2nd-G	0.127***	0.125***	0.126***	0.131***
	0.011	0.011	0.011	0.025
Italian 1st-G	-0.427***	-0.420***	-0.420***	-0.422***
	0.010	0.010	0.010	0.020
Italian 2nd-G	-0.389***	-0.386***	-0.386***	-0.389***
	0.010	0.010	0.010	0.019
Polish 1st-G	-0.360***	-0.358***	-0.358***	-0.344***
	0.010	0.010	0.010	0.021
Polish 2nd-G	-0.243***	-0.242***	-0.242***	-0.219***
	0.011	0.011	0.011	0.023
Russian 1st-G	-0.338***	-0.336***	-0.336***	-0.343***
	0.010	0.010	0.010	0.020
Russian 2nd-G	-0.267***	-0.266***	-0.266***	-0.284***
	0.012	0.012	0.012	0.022
ESR		-0.018***	-0.017***	-0.013**
		0.004	0.004	0.004
OSR			-0.041*	-0.021
			0.020	0.023
_cons	0.671***	0.680***	0.697***	0.658***
	0.030	0.030	0.031	0.038
R-squared	0.237	0.237	0.237	0.216
No. of cases	85219	85219	85219	85219

* p<0.05, ** p<0.01, *** p<0.001

Appendix 2:

Linear probability models and fixed effects models (county and state levels) for the effect of sex ratio on exogamy, including Americans

	County-LPM1	County-LPM2	County-LPM3	County- FE	State-LPM	State-FE
Age	0.004***	0.005***	0.005***	0.005***	0.004***	0.005***
	0.000	0.000	0.000	0.000	0.000	0.001
Age^2	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***
	0.000	0.000	0.000	0.000	0.000	0.000
Age at marriage	0.001***	0.001***	0.001***	0.001***	0.002***	0.002***
	0.000	0.000	0.000	0.000	0.000	0.000
Male	-0.010***	-0.081***	-0.064***	-0.063***	0.013***	0.012
	0.001	0.003	0.003	0.003	0.003	0.006
Literate	0.024***	0.023***	0.023***	0.022***	0.023***	0.024***
	0.001	0.001	0.001	0.002	0.001	0.004
Urban	0.005***	0.006***	0.006***	0.015***	0.039***	0.044***
	0.001	0.001	0.001	0.001	0.001	0.006
Group size	-0.467***	-0.467***	-0.467***	-0.597***	-0.379***	-0.531***
	0.002	0.002	0.002	0.024	0.002	0.050
English 1st-G	0.047***	0.046***	0.046***	0.015	0.132***	0.069
	0.007	0.007	0.007	0.019	0.006	0.036
English 2nd-G	0.329***	0.328***	0.328***	0.288***	0.406***	0.337***
	0.007	0.007	0.007	0.021	0.006	0.040
German 1st-G	-0.145***	-0.145***	-0.145***	-0.179***	-0.091***	-0.149***
	0.004	0.004	0.004	0.014	0.004	0.024
German 2nd-G	0.129***	0.129***	0.129***	0.087***	0.179***	0.113**
	0.003	0.003	0.003	0.013	0.003	0.039
Irish 1st-G	-0.196***	-0.196***	-0.196***	-0.219***	-0.138***	-0.184***
	0.005	0.005	0.005	0.015	0.005	0.025
Irish 2nd-G	0.157***	0.158***	0.158***	0.128***	0.220***	0.170***
	0.005	0.005	0.005	0.012	0.004	0.025
Italian 1st-G	-0.374***	-0.378***	-0.378***	-0.409***	-0.320***	-0.373***
	0.002	0.002	0.002	0.014	0.002	0.026
Italian 2nd-G	-0.233***	-0.231***	-0.231***	-0.266***	-0.180***	-0.235***
	0.004	0.004	0.004	0.010	0.004	0.026
American	0.000	0.000	0.000	0.000	0.000	0.000
	.	.	.	.	.	.
Polish 1st-G	-0.337***	-0.338***	-0.338***	-0.365***	-0.287***	-0.347***
	0.003	0.003	0.003	0.020	0.003	0.032
Polish 2nd-G	-0.183***	-0.183***	-0.183***	-0.213***	-0.134***	-0.203***
	0.005	0.005	0.005	0.023	0.005	0.031
Russian 1st-G	-0.304***	-0.304***	-0.304***	-0.335***	-0.268***	-0.327***
	0.003	0.003	0.003	0.020	0.003	0.028
Russian 2nd-G	-0.192***	-0.192***	-0.192***	-0.234***	-0.167***	-0.232***
	0.005	0.005	0.005	0.019	0.005	0.030
ESR		-0.037***	-0.037***	-0.040***	-0.009***	-0.011***
		0.002	0.002	0.004	0.001	0.002
ESR*Male		0.075***	0.074***	0.073***	0.016***	0.016***
		0.003	0.003	0.003	0.001	0.002
OSR			0.011***	0.012***	0.035***	0.038***
			0.002	0.002	0.004	0.010
OSR*Male			-0.031***	-0.031***	-0.077***	-0.075***
			0.003	0.003	0.006	0.014
_cons	0.333***	0.360***	0.355***	0.449***	0.215***	0.313***
	0.007	0.007	0.007	0.020	0.007	0.044
R-squared	0.197	0.198	0.198	0.113	0.185	0.128
No. of cases	759540	759540	759540	759540	796197	796197

* p<0.05, ** p<0.01, *** p<0.001

[i] Census data do not enable us to determine whether individuals are living in the same counties in which they were born.

[ii] We excluded persons with parents from two different immigrant groups. This amounted to 6.23% of the sample of immigrants.

[iii] we also replicate our analysis with a window which is *twice* as wide (12 years of width rather than 6 as above) with no substantive change in our main findings (see below).