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Long Term Trends in Marital Age Homogamy Patterns: Spain, 1922-2006

Age-assortative mating patterns are the result of spousal preferences, but also depend on the relative numbers of marriageable men and women in the population. By reconstructing long data series of marriages and of the single population by sex and age, Albert Esteve, Clara Cortina *and* Anna Cabré *have examined this question for the case of Spain using data on marriages starting from 1922. The proportion of homogamous couples (both spouses have the same age) increased in the 1970s, at a time when marriage rates were falling. In recent years, age asymmetry has decreased and couples where the wife is older than the husband are less rare. Given the limits of using indicators by age for periods when age at marriage is changing, the authors use relative ages to reveal the increase in age homogamy and in age symmetry of the marriage market. Confirming the results obtained in other countries, notably those presented for England-Wales by Máire Ní Bhrolcháin in* Population *(*Population, An English Selection*, 13-2), the authors show that these patterns are not due to changes in the age-sex distribution of the population, but to a shift in spousal age preferences. The most recent results suggest a downward trend in age homogamy which remains to be confirmed.*

Compared with other dimensions of assortative mating (i.e. ethnicity, religion or socioeconomic status), age homogamy in western societies is so taken for granted that it is seldom studied. By age homogamy we refer to the degree of similarity/difference in age between spouses. In the developed world, married women are on average two to three years younger than their spouses,

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because women marry at younger ages than men. As previous research has shown, age differences between spouses vary by marriage order and age at marriage (Ní Brolcháin, 1992). Age differences between spouses are higher for second and later order marriages than for first order ones and, regardless of marriage order, absolute differences increase with age at marriage. In most developed countries, age at marriage went through two phases over the twentieth century. In the first phase, which basically corresponds to the first half of the century, age at marriage and permanent celibacy tended to decline as industrialization and urbanization increased. In the second phase, which began in the late 1960s, previous trends reversed, with an increase in delayed marriage and in celibacy (United Nations, 1990). Where age homogamy is concerned, evidence on time trends for some western countries does show a steady increase in age homogamy over the twentieth century (Bozon, 1991, 2006; Ní Bhrolcháin, 1992; van Poppel et al., 2001; Atkinsson and Glass, 1985; Vanderschelden, 2006). Recent findings from the Netherlands (van Poppel et al., 2001) and the United States (Qian, 1998) reveal, however, an increase in age heterogamy in the last years of the twentieth century that continued into the early twenty-first century.

Explanations for gender differences in age at marriage can be classified into two separate sets, placing emphasis either on the rational choice of individuals or on the demographic constraints of the marriage market, i.e. the age distributions of eligible men and women.

At the individual level, rational choice models of marriage timing have stressed the importance of the traits and qualities that an individual must possess to be a good candidate in the marriage market. Traits and qualities are basically determined by the way the gender division of labour in households is established. In the male breadwinner union model, women marry earlier than men because their biology, experiences and other investments in human capital are more specialized to the production of children and other commodities, requiring marriage or its equivalent (Becker, 1974, p. 77). In the dual-earner union model, time allocation to both market and household sectors is assumed to be gender symmetrical. Specialization does not occur, so investments in human capital are the same for both men and women. As a result, women tend to marry later (Oppenheimer, 1988). Women's increasing educational attainment and massive entrance into the labour force are the main driving forces towards greater gender symmetry in marriage timing. Irrespective of the model of union considered, men and women weigh and exchange each other's traits and characteristics to maximize their expected well-being through marriage and advance, delay or forego marriage depending on the prospects of finding a partner who meets expectations.

While economists place emphasis on the shadow prices that guide participants to maximize their expected well-being, demographers' main interests centre on the age-sex distribution of the marriage pool: the number of eligible men

and women. The concept of "marriage squeeze" refers to absolute or relative imbalances in the total numbers of men and women at the prime ages for marriage (Akers, 1967; Schoen, 1981). Sex differences in mortality or in migration patterns can easily create disruptions in local marriage markets by decreasing or increasing the population of men or women of certain ages. Along with mortality and migration, major fluctuations in births can also affect the age-sex composition of the marriage market two decades later, as larger or smaller cohorts reach marriageable age, due to the near universal tendency of women to marry earlier than men (Akers, 1967; Cabré, 1993, 1994). Accumulated evidence shows that various mechanisms have been used through history to cope with marriage market squeezes. It is generally observed that the level of marriages is rarely affected by a marriage squeeze, even in severe situations (Henry, 1969; Bartiaux, 1994). Rather than being constrained by the age distribution of eligible candidates, brides and grooms appear to adapt their behaviour. Flexibility in age preferences accommodates substantial disparities in the number of available partners (Ni Bhrolchain, 2000).

This paper uses marriage registration statistics to carry out a long-term descriptive analysis of age homogamy patterns in Spain, from 1922 to 2006. We first examine the relationships between age-assortative marriage patterns and trends in second order marriages and age at marriage of men and women. Second, we apply a standardization method to decompose the changes in age-assortative mating among first marriages into the effects produced by changes in age-sex composition and those produced by the underlying age preferences of spouses. The length of the period enables us to examine these relationships in a long-term perspective and under various scenarios with regard to the importance and nature of second order marriages, trends in age at marriage, and fluctuations in the number of eligible men and women in the marriage market due to the effects of the Spanish Civil War (1936-39).

I. Data and methods

We use yearly newlywed marriage data from Spanish vital registration statistics to examine age-assortative mating patterns in heterosexual marriages.[1] A cross-tabulation of marriages by spousal age is needed to compute various indicators of assortative mating: the percentage of homogamous couples; the asymmetry ratio, i.e. the ratio between hypergamous couples (man older than woman) and hypogamous couples (woman older than man); and forces of attraction between ages. The year 1922 is the first for which data are available. Prior to this year, records indicating age at marriage do not associate the two spouses, making accurate age spread computations extremely difficult. Data for the years 1922 to 1975 were obtained from the official publications of the

(1) Same-sex marriages were legalized in Spain in 2005.

Movimento Natural de la Población (MNP), which publishes data collected by the Spanish civil register. Due to disruptions caused by the Spanish Civil War, no data were issued from 1934 to 1940.(2) For the years 1976 to 2006, we use microdata files of marriage records covering all marriages commenced in Spain by age and marital status of the spouses, as well as other information.

From 1922 to 1975, spousal age is classified into age groups that change over time and have different interval lengths. From 1976 to 2006, spousal age is reported in single years. For reasons of data availability, and in order to have standard and comparable cross-tabulations of marriages by spousal age, we use five-year age groups to classify individuals aged 15-39 and a ten-year age group for those aged 40-49. Estimating homogamy indicators between spouses on the basis of five-year age groups can pose a risk of either over- or under-estimating the real levels. Previous research has faced similar problems (van Poppel et al., 2001), although our own tests for the period 1976-2006, comparing results using single age data with those using five-year age groups, show that there are no significant differences between the two approaches with regard to the trends and the conclusions suggested by the results. This question, however, will be further discussed as individual indicators are presented.

Regarding previous marital status, we aim at distinguishing between first and second or higher order marriages. We define first marriages as those where both spouses are single at the time of marriage. Second marriages apply to all couples where at least one spouse is either divorced or widowed at the time of marriage. Prior to 1934, and from 1976 to the present, marriages are classified according to the marital status of both spouses. This information was not reported from 1941 to 1975 so the distribution of marriages by spousal age and marital status is not known for this period. We used linear interpolation to estimate the proportion of first marriages for each spousal age combination, taking the known values of the five years before 1941 and after 1975 as reference points. The assumption of linearity is based on two previous assumptions. First, the proportion of second marriages decreased constantly, defining a linear trend over those periods preceding the divorce law when first marriages can be identified, i.e. 1922-1934. Second, between 1941 and 1975, mortality in Spain followed a constant downward trend. With this method we observe a gradual reduction in the proportion of second and higher order marriages for each spousal age combination over the period of study.

In the second part of the analysis, we decompose the changes in age-assortative mating among first marriages into the effects produced by changes in age-sex composition of the marriage pool and those produced by the underlying age preferences of spouses. To do so, we use Schoen's harmonic mean to obtain a single marriage rate for each spousal age combination, called

(2) Recaño and Muñoz (2001) have estimated the number of marriages by marital status for the period 1934-1940, but their estimates do not provide a combined account of the age of the spouses.

force of attraction (Schoen, 1981, 1988). The force of attraction has the advantage of including the population at risk, i.e. the marriageable population. Most research on assortative mating has excluded the population at risk and limited itself to existing marriages. Conclusions regarding union formation patterns based on existing marriages may often be misleading if the characteristics of the population at risk are not properly included in the models. The success of the force of attraction lies in its ability to connect the actual number of marriages between men and women at a given age to a harmonic mean of the male and female population at risk at that given age (Qian and Preston, 1993; Qian 1998). Schoen's model has been criticized for not considering spillover or competition effects (Choo and Siow, 2006). These two points remain tangential to the purposes of this paper, and our use of force of attraction as an indicator of the underlying age preferences for a given period of time remains pertinent.

The mathematical expression of Schoen's force of attraction is the following:

$$\alpha_{ij} = \frac{m_{ij}}{\frac{H_i F_j}{(H_i n) + (F_j n)}} \qquad [1]$$

where m_{ij} identifies marriages between men aged i and women aged j; H_i is the number of eligible men at age i; F_j is the number of eligible women at age j; n is length of the male and female age intervals. As seen in the above expression, the number of marriages in the numerator is connected to the number of potential encounters between eligible men and women at ages i and j respectively. Quoting Qian and Preston (1993, p. 494), the force of attraction "reflects both the rate of encounters and the proportion of such encounters that lead to marriage".

To estimate force of attraction we require, for each year, the distribution of first marriages (i.e. both spouses single) by age of groom and bride, and single population counts by sex, age and year of marriage. In previous paragraphs, we have already presented how the distribution of first marriages was obtained. We now explain how the figures of single population by sex and age were estimated for the entire period 1922-2006.

Population counts by sex, age and marital status from all censuses between 1900-2001 and the population registers of 1975 and 1986[3] are taken as reference values for interpolation. We use Karup-King multipliers (Shryock and Siegel, 1976) to estimate the single age counts lacking in the 1900, 1910 and 1920 census data, and also because the age groups in these censuses are inconsistent with the intervals used in this analysis.

We examined several approaches to estimate the intercensal proportions of single populations aged 15-49. Interpolation based on counts of the single

(3) Data from the population register of 1996 were not used because they contain no information on marital status.

population was ruled out. Taking a cohort perspective did not yield a satisfactory fit. We used the Coale-McNeil nuptiality model to estimate proportions of the single population by sex, age and cohort. The fitted values did not offer reliable results due to the lack of sensitivity to exceptional historical episodes.(4) Finally, we decided to interpolate proportions of the single population by age and sex and apply them to the estimated intercensal total population counts.(5) We smoothly interpolated proportions of single population across ages. We used two known proportions of single population at age x for the years t and t+10 to interpolate the values falling between them. The estimated proportions were later used to obtain counts of the single population by sex and age.

There is no ideal method to validate the soundness of this approach. We have developed an indirect procedure that compares the number of marriages resulting from the estimated counts of marriages based on changes in single population to the number of marriages published in the official statistics. We arrive at the expected number of marriages by comparing the single population count at age x in year t to the count at age x+1 in year t+1, adjusting for mortality and migration. This figure is then compared with the official number provided by the Spanish civil register. Differences between expected and observed figures for first marriages at ages 15-49 are relatively small, and correlation coefficients between both series are relatively high (0.9 for men, and 0.83 for women). Larger discrepancies are observed at the higher end of the age range, while for younger ages, where most marriages occur, there is almost no difference.

II. Results

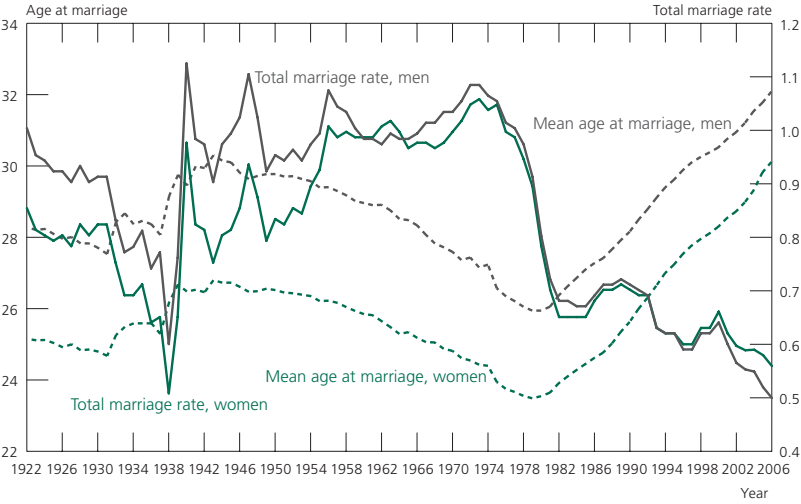
Nuptiality patterns in twentieth-century Spain

To explore age-assortative mating patterns in Spain during the twentieth century, we first examine trends over time in marriage intensity and marriage timing. Figure 1 shows the trends in the total marriage rate and the mean age at marriage by sex (obtained from the marriage rates for people aged 15-49) between 1922 and 2006. Trends in marriage timing, which appear to be the same for both men and women, can be divided into four different stages: i) mean age at marriage decreased from the 1920s until the mid 1930s, when interrupted

(4) Moreover, having insufficient known values made it difficult to apply the Coale-McNeil nuptiality model. As a result, the selection of parameters was often too arbitrary.

(5) For the total population, we use data estimates by age and sex produced by Amand Blanes in his doctoral dissertation (2007). Blanes' population estimates were subject to a double correction process affecting both the census figures and the intercensal estimates. First, a comprehensive array of measures was implemented to correct the census figures by: (i) adjusting the figures to a similar time reference, i.e. 1 January; (ii) correcting open age groups; (iii) correcting the issue of digit attraction and deficient age reporting; and (iv) correcting for under-registration of the infant and elderly population. Second, data series for births, deaths and migration were used to estimate intercensal population counts. For the years prior to 1975, no data on migration are available; the difference between the estimated count and the observed count at the time of the census was assumed to be due to migration and distributed retrospectively.

Figure 1. Total marriage rates and mean age at marriage by sex, Spain 1922-2006



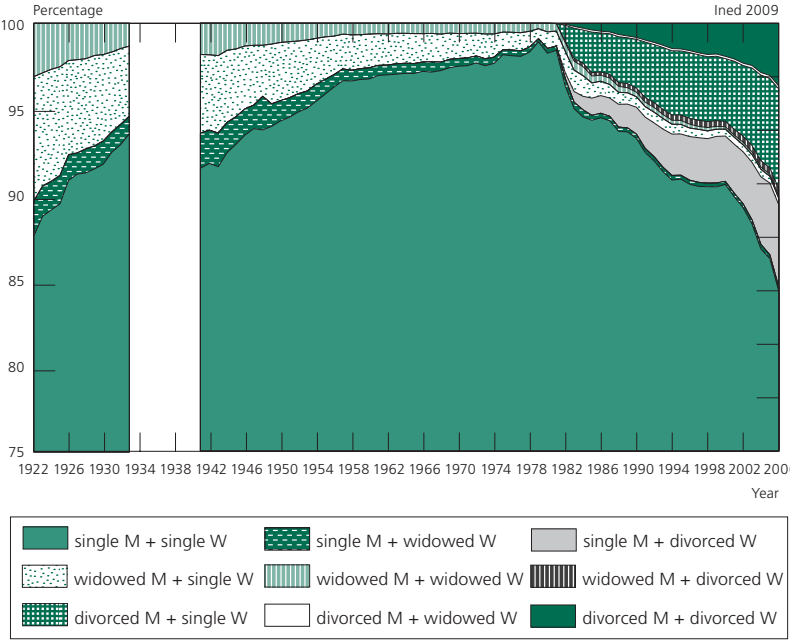
Source: Miret (2002) and authors own calculations based on vital statistics and population censuses.

by the economic crisis resulting from the 1929 crash in the USA (Miret 2002), and again by the consequences of the Spanish Civil War (1936-1939); ii) both the economic crisis and the war were responsible for the dramatic increase in male and female age at marriage that continued during the postwar years and occurred parallel to a substantial decline in total marriage rates (TMR); iii) mean marriage ages then decreased from the 1950s to the 1970s, passing from 30 years of age to 26 for men and from 27 years to 24 for women; iv) starting in the late 1970s, the figures on age at marriage show a significant and sustained postponement of marriage, which in 2006 reached a higher mean age than at any point in the whole previous century.

Trends in marriage timing are not fully correlated to changes in total marriage rates. Figure 1 clearly shows the sudden changes in TMR resulting from exceptional events such as the Spanish Civil War. A sharp decrease in TMR was recorded between 1937 and 1939, followed by a dramatic but brief recovery in 1940. Levels stayed low during the postwar years and started recovering through the 1960s to the mid 1970s, when the highest levels were reached. After that, total marriage rates rapidly decreased as a result of the economic crisis and stayed low in a context of expanding non-marital cohabitation in Spain (Domingo, 1997; Castro Martín, 2003; Nazio, 2008).

Figure 2 presents the distribution of marriages by the marital status of spouses between 1922 and 2006. We find that when total marriage rates were high, marriages between singles (i.e. first marriages) represented more than

Figure 2. Distribution of marriages by marital status of spouses, Spain 1922-2006



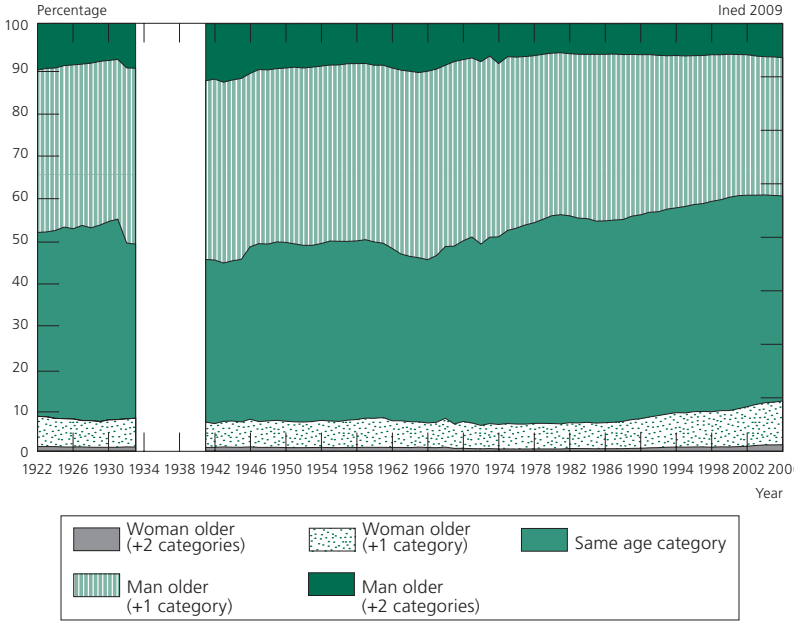
Source: Spanish vital statistics, 1922-2006

97% of all marriages. Conversely, the proportion of second or higher order marriages increased in the two periods of low nuptiality, i.e. during the 1920s and 1930s, and again over the last three decades. Nevertheless, second or higher order marriages in these two periods corresponded to different compositions in terms of the spouses' marriage status. Before the Civil War and in the postwar years, such marriages only involved widowed men and women, but from 1982, after the adoption of the Spanish Divorce Law of 1981, the majority of second or higher order marriages concerned divorcees. They accounted for more than 90% of second marriages between 1982 and 2006. The proportion of widow(er) remarriages decreased because both the proportion of widow(er)s and their propensity to remarry were lower than at the beginning of the twentieth century.

Age-assortative mating in Spain in the twentieth century

Figure 3 shows the distribution of marriages in Spain by spousal age differential. Since we group age at marriage into five- and ten-year age categories, homogamous couples are those in which both spouses belong to the same category, even if they are not exactly the same age. We classify as heterogamous

Figure 3. Distribution of all marriages by age difference between spouses, Spain 1922-2006



Note: The age categories are 5 years for ages 15-39, and 10 years for ages 40-49. For 2% of all marriages the age difference is unknown or is 3 categories or more. These marriages are not shown in Figure 3.
Source: Spanish vital statistics, 1922-2006

those couples where the spouses belong to different age categories. Undoubtedly, this procedure is liable to underestimate or overestimate homogamy levels, since differences between spouses cannot be estimated from single age data; rather they have to be computed from pre-defined age groups of five and ten years. If homogamy were defined as both spouses being exactly the same age, the proportion of homogamous couples would have been lower than that observed in Figure 3. For heterogamous couples, there are also some risks. First, couples where the spouses belong to different age groups are classified as heterogamous even when the age difference between husband and wife is just one year. At the same time, much larger age differences between spouses can occur within the same age group, yet the couple is nonetheless classified as homogamous. To test the reliability of this method, we compared the trend in homogamy using age groups of 5 and 10 years with that obtained using one-year age categories for those years where the information is available, i.e. 1976-2001. In keeping with other studies (van Poppel et al., 2001), the difference between both procedures is minimal. While a restricted definition of homogamy

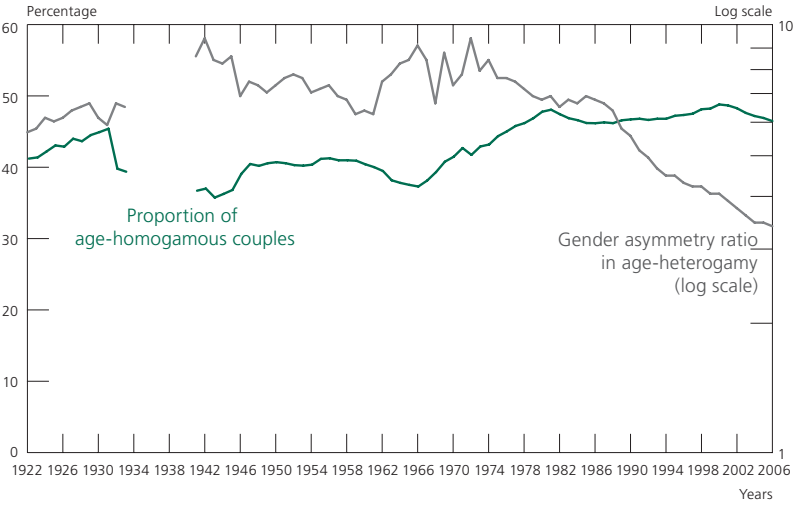
implies fewer homogamous couples, trends over time are equally informative regardless of the definition. This applies to other measures presented in this article. To maintain comparability, we use the same age group structure for the entire period.

As a constant throughout the period, Figure 3 shows the weight of homogamous couples as well as, among heterogamous couples, the considerable proportion of marriages where the husband is one age category older than the wife. Such marriages are up to five times more frequent than those where the wife is one age category older than the husband. Beyond these constant patterns, three interesting episodes arise from the analysis of the trends shown in Figure 3. First, there is a decrease in the proportion of homogamous marriages in the years before and after the Spanish Civil War (1936-1939). The proportion of marriages in which the husband and wife belonged to the same age category decreased from 47% in 1931 to 38% ten years later and did not recover to the 1931 level until 1977. Second, during the 1960s, the proportion of men marrying younger women (age hypergamy) grew in comparison with earlier and later decades, while the proportion of homogamous marriages fell. These changes coincided with the arrival in the marriage market of the small cohorts born during and after the Spanish Civil War.(6) Third, from the 1970s until the present day, the trend has been for an increase in the proportion of homogamous marriages parallel to a decrease in the proportion of hypergamous marriages and a slight increase in marriages where the wife is older than the husband (age hypogamy). Specifically, the proportion of hypogamous marriages in which the wife is one age category older than the husband rose from 6% in 1980 to 10% in 2006. This trend is a clear sign of increasing age symmetry among recent marriages. In recent decades, there has been a steady trend towards fewer hypergamous marriages, along with a progressive increase in male and female ages at marriage (see Figure 1).

Figure 4 shows two indicators summarizing the information from Figure 3 that will be referred to in following sections. These measures provide relevant information on crude patterns in age-assortative mating and are not entirely redundant with Figure 3. At this point, we aim to show how homogamy has changed over time regardless of the factors that have influenced such changes. For this reason, net measures of homogamy derived from log-linear models or, more accurately, from forces of attraction, are of less interest. Initially, our preference was to use mean age difference between spouses as a summary indicator of assortative mating. Results showed that from the 1940s, there has been a trend towards smaller age differences, from 3.5 years in 1940s to 2.1 years in 2006. This long-term trend in declining average age differences was only temporally interrupted during the 1960s, a decade in which the differences increased. Though these results were not significantly different from those

(6) The number of births in Spain decreased drastically between 1936 and 1939, falling from 613,691 births in 1936 to 419,848 in 1939.

Figure 4. Proportion of homogamous couples and gender asymmetry ratio in age heterogamy (hypergamy vs. hypogamy), Spain 1922-2006 (all types of marriage)



Scope: Marriages between persons aged 15-49.
Source: Spanish vital statistics, 1922-2006.

presented here, mean age difference may mask certain underlying trends that are better captured using the proportion of homogamous couples and the asymmetry ratio together as indicators.

As a summary indicator of age homogamy, we use the proportion of homogamous couples (where both spouses belong to the same age group). In a two-dimensional contingency table with two ordered variables, the age of the husband by the age of the wife, homogamous couples are found in the diagonal cells. The proportion of homogamous couples is equal to the sum of all marriages found in the diagonal cells divided by the total number of marriages in each year. As a summary indicator of gender asymmetry in heterogamous couples, we use the ratio between hypergamous marriages (husband one or more age categories older than wife) and hypogamous marriages (wife one or more age categories older than husband). To obtain this indicator, we calculate the ratio between the sums of the upper and lower sides of the diagonal of our two-dimensional contingency table.

The proportion of homogamous couples ranged from a minimum of 36% in 1944 to a maximum of 49% in year 2000. From 1922 until the late 1960s, age homogamy hovered around 40%. It increased from 1922 to 1931, then decreased sharply in 1932. During the second half of the 1930s, although there are no data for that period, a decrease in homogamous couples probably occurred, coinciding with a fall in marriage rates (Figure 1). From the 1940s

until the late 1950s, age homogamy remained constant. This trend was interrupted by a downturn in the 1960s, followed by a rise in the 1970s. Through the 1980s and 1990s, however, the proportion of homogamous couples remained constant with a slight upward tendency, except in the last three years.

From 1922 to the late 1970s, the gender asymmetry ratio in age heterogamy oscillated between 7 and 8 hypergamous couples (man older than woman) to each hypogamous couple (woman older than man). In other words, men married younger women eight times more frequently than women married younger men. From the late 1970s to 2006, the gender asymmetry ratio decreased steadily, halving from 7 in 1979 to 3.4 in 2006. It thus increased gender symmetry, by which we mean the lack of effectual difference between men and women in the treatment of age when selecting a spouse. As seen in Figure 4, higher gender symmetry does not necessarily signify more homogamous couples, but rather that the number and distribution of hypogamous marriages is similar to the number and distribution of hypergamous marriages.

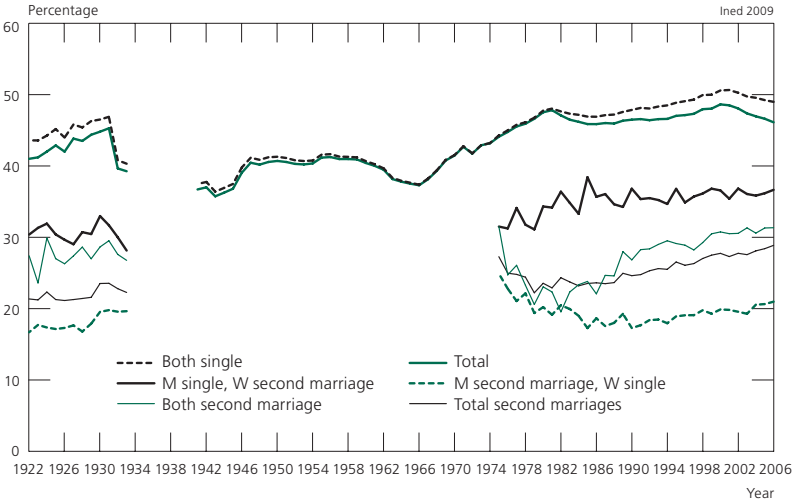
Bearing in mind the trends in both indicators, we next examine their relationships with marriage order and age at marriage.

There is no need to present in a single graph the trends in age at marriage (Figure 1), second order marriages (Figure 2), age homogamy and gender asymmetry (Figure 4) to demonstrate the lack of complete correlation between them. Neither the rise in second marriages nor the effect of marriage postponement has had the expected effect of decreasing age homogamy between spouses over the last two decades. For the central part of our period, however, the decrease in second marriages and age at marriage is consistent with the increase in age homogamy. Looking more closely at these relationships, we find some clues to understand the lack of correlation during the last two decades of the twentieth century.

Marriage order is a key factor affecting overall age homogamy patterns. The accumulated evidence shows that the average age difference between spouses is systematically larger for second marriages than for first marriages. They are thus less homogamous than first marriages, since they mostly occur at later ages and with greater age spreads between men and women. The greater the proportion of second or higher order marriages, the greater the impact on the cumulative proportion of homogamous marriages.

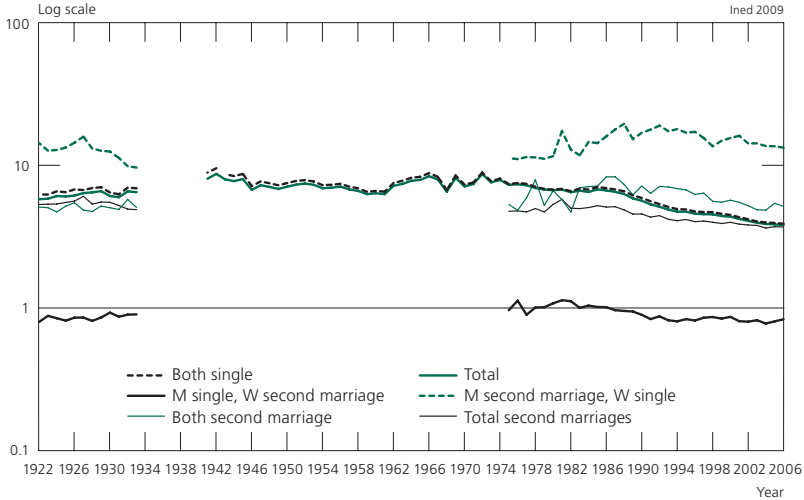
Figures 5 and 6 show trends in age homogamy and gender asymmetry in age heterogamy for all marriages, first marriages and, for those years where information is available, on second marriages. We split second marriages into three categories: single men marrying divorced or widowed women; single women marrying divorced or widowed men; and divorced or widowed women marrying divorced or widowed men. Second marriages present the lowest proportions of age homogamy but, as is also the case for the gender asymmetry ratio, their impact on the cumulative mean is weak. Even at the point of

Figure 5. Proportion of homogamous couples by type of marriage, Spain, 1922-2006



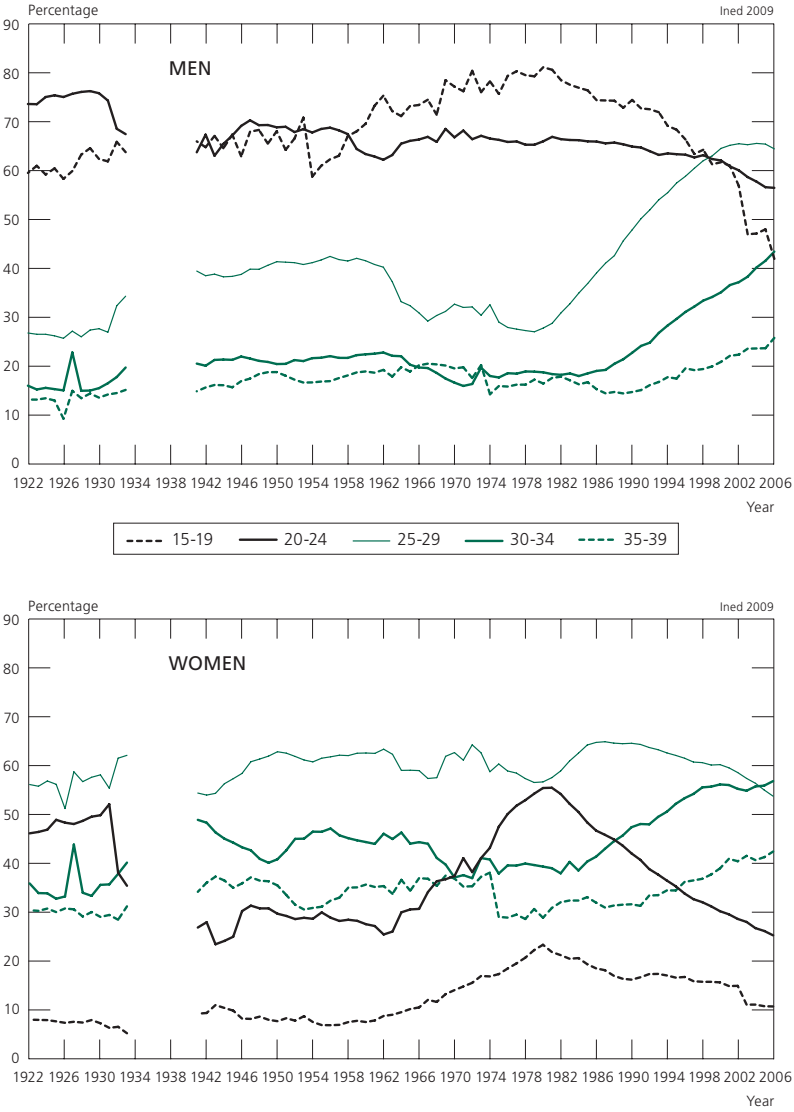
Scope: Marriages between persons aged 15-49.
Source: Spanish vital statistics, 1922-2006.

Figure 6. Gender asymmetry ratio in heterogamous couples by type of marriage, Spain 1922-2006



Scope: Marriages between persons aged 15-49.
Source: Spanish vital statistics, 1922-2006.

Figure 7. Proportion of age homogamy among first marriages, by age group and sex, Spain 1922-2006



Scope: Marriages between persons aged 15-49.
Note: The 40-49 age-group is excluded from this analysis as it cannot be compared with the five-year age groups. In a homogamy model based on ten-year age-groups, higher levels of homogamy would be observed. In any case, there are very few first marriages at these ages.
Source: Spanish vital statistics, 1922-2006.

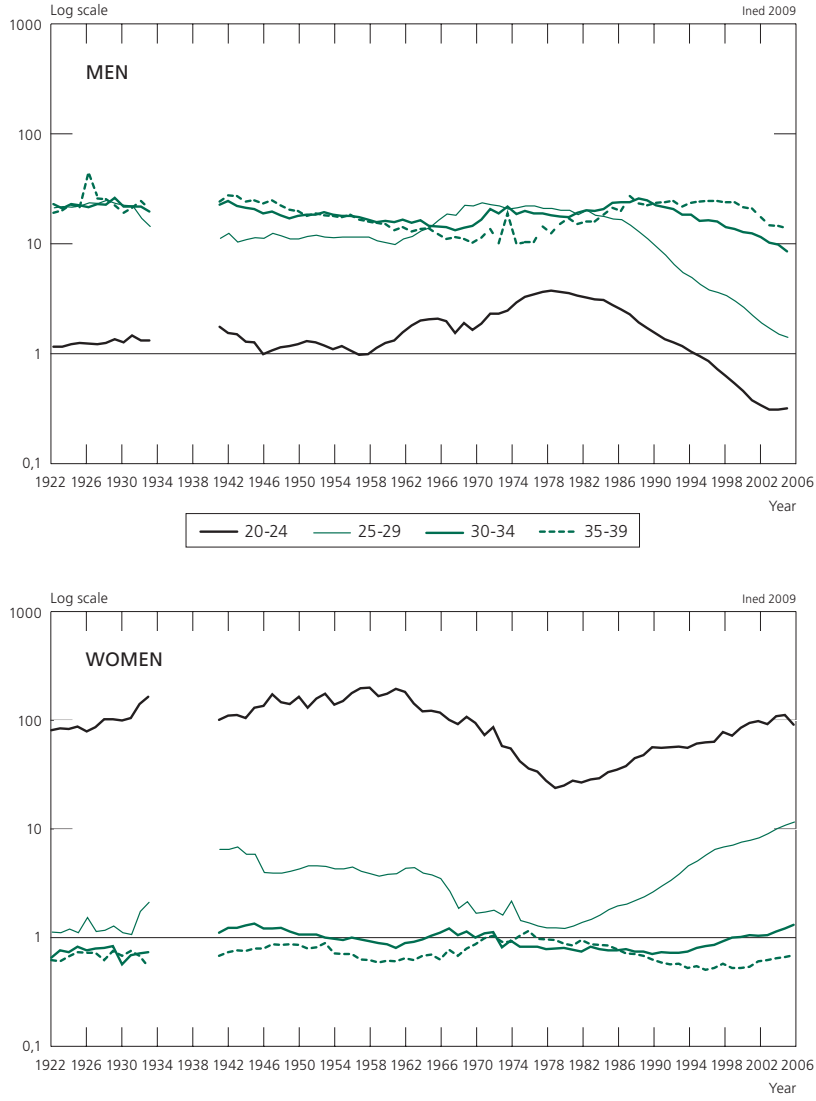
maximum difference between first and second order means, the cumulative proportion of homogamous marriages never diverges by more than 3 percentage points from that observed for first order marriages. For both indicators, overall marriage trends are driven by trends in first marriages which, between 1922 and 2006, always represented more than 85% of marriages celebrated each year (Figure 2). As second marriages become more widespread, the age homogamy levels between first and second marriages are tending to converge. Homogamy is systematically higher for marriages between single men and divorced or widowed women than for divorced or widowed men marrying single women, but the highest proportions are found among first marriages. For the last three decades, the proportion of homogamous first marriages has grown steadily, except in the last three years over which we note a slight decrease.

Second marriages show quite different gender asymmetry ratios depending on the combination of marital statuses of the spouses. Divorced/widowed men marrying single women consistently show the highest levels of gender asymmetry over time. The asymmetry ratio of divorced/widowed men marrying single women is on average three times higher than that of single men marrying single women (first marriages). On the other hand, single men marrying divorced/widowed women show the most balanced asymmetry ratio, consistently hovering around a ratio of one to one. In other words, as many single men marry younger divorced/widowed women as marry older ones. When both spouses are divorced or widowed, the ratio is similar to that of first marriages.

We now examine age homogamy and gender asymmetry by age at first marriage for both men and women, (Figures 7 and 8). Here we only select first marriages, in order to work with a dataset free of interference, as these indicators tend to skew heavily at older ages if we include second and higher order marriages. We observe significant differences between men and women in both indicators. Homogamy decreases when men marry later and increases when women marry later. For instance, an average of 60% of men marrying before age 20 marry women of the same age group (Figure 7). For women of this age group, the percentage is just 10% to 20% (depending on the year). By contrast, for later ages at marriage, at ages 35-39 for example, around 13% to 26% of men and 30% to 42% of women, on average, marry a person of the same age group. In other words, there is a positive relationship between age at marriage and average age difference for men, while this relationship is negative for women (Esteve and Cortina, 2007; Ní Bhrolcháin, 1992) for the first three age groups, where most marriages occur. Thus, if men increasingly marry later, age homogamy decreases, whereas if women marry later, it increases, barring changes in the distribution of age homogamy patterns by age at marriage.

The gender asymmetry ratio in age heterogamy offers insights into the trends in age-assortative mating over time (Figure 8). As is the case for age

Figure 8. Gender asymmetry ratio in age heterogamy among first marriages, by age group and sex, Spain 1922-2006



Scope: Marriages between persons aged 15-49.
Note: The asymmetry ratio is defined as the ratio of hypergamous couples (husband in higher age group than wife) to hypogamous couples (wife in higher age group than husband). Since couples at each end of the age distribution can only present one type of characteristic, this indicator cannot be calculated. For example, women who marry below age 20 will marry either a man in the same age group (homogamy) or in an older age group (heterogamy). Women in this age group cannot form hypogamous couples.
Source: Spanish vital statistics, 1922-2006.

homogamy, significant differences between men and women are found. The asymmetry ratio increases with men's age at marriage and decreases with women's age at marriage. In other words, as men's age at marriage increases, the likelihood of choosing a younger spouse increases, while as women's age at marriage increases, the opposite is true. The highest asymmetry ratio is found in women aged 20-24 at the time of marriage. These women predominantly marry men from higher age groups.

For both men and women, the asymmetry ratio stayed the same between 1922 and the early 1960s, although there was a deviation during the second half of the 1930s and the early 1940s, with an increase in the asymmetry ratio for women marrying at ages 25-29, the range in which the vast majority of women married. This variation explains the decrease in age homogamy and the increase in the asymmetry ratio observed for total marriages during the same years (Figure 4). Simultaneously, the age at marriage for both men and women also rose (Figure 1). It can thus be concluded that the statistics referring to these years reflect marriages that would have occurred some years earlier, but, due to exceptional historical circumstances, were postponed. When these women married, they showed the patterns that would have been observed had they married at younger ages without postponement.

At the beginning of the 1960s, however, the asymmetry ratio by age at marriage started increasing for men and decreasing for women. This trend continued until the late 1970s, when a complete reversal occurred for both sexes. These trends correlate perfectly with trends in age at marriage (Figure 1). Major decreases in age at marriage occurred for both sexes between the early 1960s and late 1970s, but they have been increasing ever since. The mechanisms behind this correlation can perhaps be attributed to the increasing pressure placed on younger women by a lower male age at marriage. When more men start to marry at younger ages, they tend to marry women of similar ages who would otherwise marry older men. As a result, older men are forced to adapt to the high pressure on women in the age ranges that they traditionally draw from by marrying even younger women, thus increasing the gender asymmetry ratio. Conversely, given the high number of men marrying at younger ages, women tend to marry men of similar ages, thus decreasing the gender asymmetry ratio and increasing the proportion of age homogamy (as seen in Figures 7 and 8, specially among women aged 20-29).

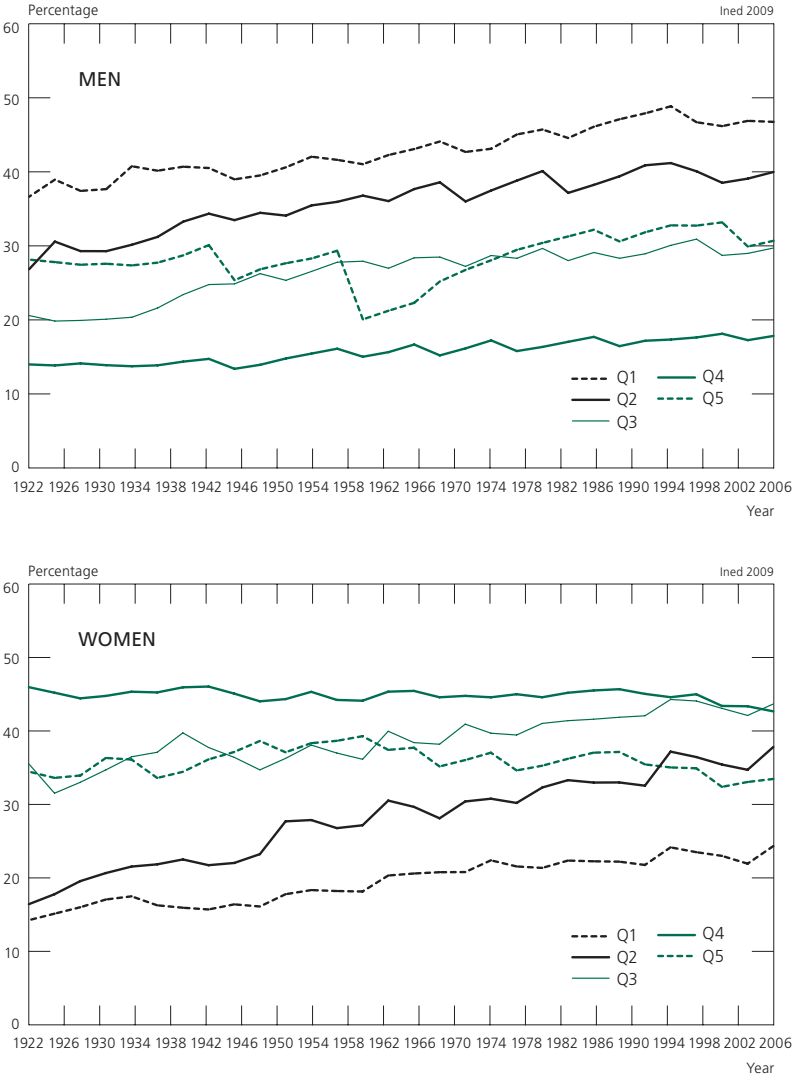
If age at marriage increases for both men and women, the few women that marry at early ages will tend to marry men whose ages are higher than in contexts of early marriage. Among women, differences in the gender asymmetry ratio at ages 20-24 and 25-29 have thus been increasing significantly since the late 1970s. The same increase is observed for the other age groups but is less pronounced. Among men, the asymmetry ratio starts decreasing because there are fewer women marrying at younger ages. For instance, although in 1980 men aged 25-29 were still able to marry younger women, this was no longer the case in 2006.

In summary, the overall trend in age homogamy and gender asymmetry (Figure 4) is the result of a combination of patterns in both of these indicators by age at marriage (Figures 7 and 8) and the distribution of spouses by age at marriage, i.e. marriage timing (summarized as the mean age at marriage in Figure 1). The decrease in the gender symmetry ratio over the last 40 years is explained by the combination of both changes in marriage timing and changes in age-assortative mating patterns by age at marriage. For instance, over the last 20 years, age at marriage has risen for both men and women, while age homogamy for first marriages has increased. An increase in the mean age at marriage implies that the homogamy and asymmetry levels observed at higher ages have more influence on the cumulative values than in earlier years. All other things being equal, this ought to produce the opposite effect, i.e. lower age homogamy and higher gender asymmetry. However, changes in age homogamy and gender asymmetry by age at marriage have been significant. In other words, men now marry later, but the age difference with respect to their wives is decreasing (lower gender asymmetry), and women also now marry later, at ages where we observe the smallest differences in age between men and women (lowest gender asymmetry).

To control for the spurious effect that changes in age at marriage may have on the observed distribution of homogamy and gender asymmetry by age at marriage, we re-examine this relationship based on a classification of men's and women's age at marriage, taking into consideration the relative position of each age within each year. In particular, we classify age at marriage into five groups comprising approximately 20% of cases (quintiles). In other words, the first male quintile, for example, includes marriages of the youngest 20% of men (irrespective of the wife's age) and so on. The same applies for women. Groups do not include exactly 20% of the cases because we do not have sufficiently detailed age data. This analysis is restricted to the 1976-2006 period for which single age data are available, and uses a slightly modified definition of homogamy. We consider homogamous couples as those for whom the absolute age difference between spouses ranges from 0 to 2 years. Higher differences correspond to heterogamous couples.

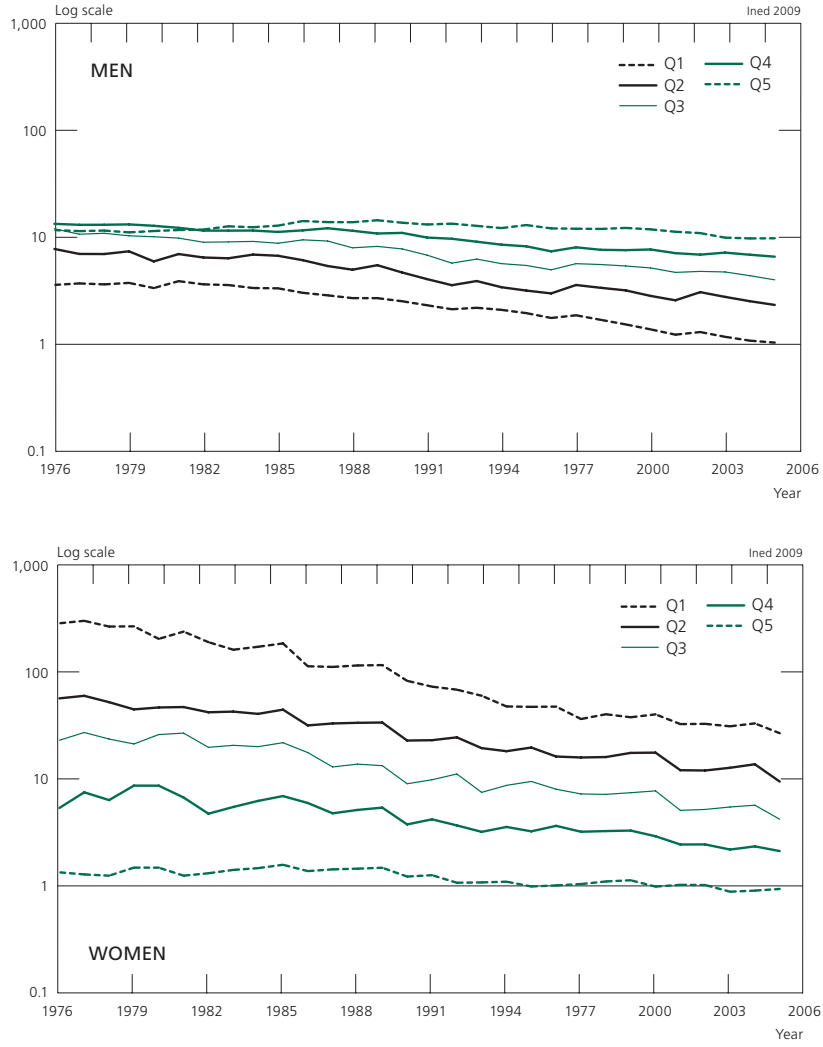
Figures 9 and 10 show age homogamy and gender asymmetry by each quintile for both men and women. Except for the oldest 20% of men and women, there is a stable relationship between age homogamy and relative age at marriage. The younger men marry, the more homogamous they tend to be, and the younger women marry, the less homogamous they tend to be. For both men and women, trends in age homogamy over time indicate an increase in the proportion of homogamous marriages, no matter how young or old they marry. Similar results, but in the opposite direction, are found for the gender asymmetry ratio. First, the gender asymmetry ratio decreases by age at marriage among men, and increases among women. Second, trends over time show a steady decrease in gender asymmetry at all ages, both for men and women. In summary,

Figure 9. Proportion of age homogamy among first marriages, by age (quintiles) and sex, Spain, 1976-2006



Scope: Marriages between persons aged 15-49.
Note: The quintiles represent the study population classified by age at first marriage and divided into 5 groups. For example, the first female quintile (Q1) comprises first marriages of the youngest 20% of women and the last male quintile (Q5) comprises first marriages of the oldest 20% of men.
Source: Spanish vital statistics, 1976-2006.

Figure 10. Gender asymmetry ratio in age heterogamy among first marriages, by age (quintiles) and sex, Spain 1976-2006.



Scope: Marriages between persons aged 15-49.
Source: Spanish vital statistics, 1976-2006.

after controlling for differences in age at marriage over time and between men and women, age homogamy and the gender asymmetry ratio indeed depict similar trends over time.

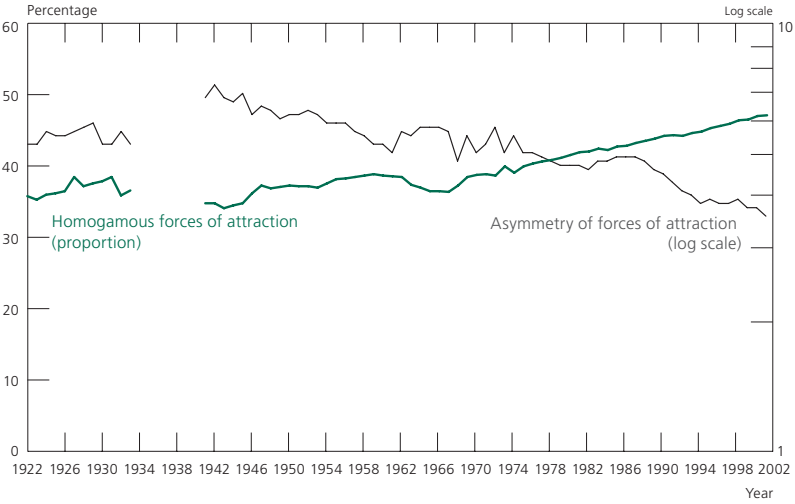
Using two-sex nuptiality models to estimate age-assortative mating patterns under three distinct age preference standards

Up to this point, we have closely examined trends in age-assortative mating patterns of marriages commenced in Spain over the twentieth century, but we have not discussed the factors associated with such patterns. We have merely indicated some historical circumstances to locate in time some of the shifts in overall age homogamy trends and examined the variations in these trends by marriage order and male and female age at marriage. We now aim to decompose the observed age homogamy behaviour into 1) the effects produced by the age-sex composition of the population at risk; and 2) those produced by underlying preferences, as measured by the force of attraction. For instance, controlling for marriage market conditions would enable us to assess the extent to which variations in age homogamy and gender asymmetry in age heterogamy trends in the 1960s were the result of a broken equilibrium in the age-sex composition of the population at risk due to the arrival on the marriage market of the small cohorts born during and after the Spanish Civil War. Along with mortality and migration, variations over time in the number of live births, depending on intensity and duration, can also affect the age-sex structure of the marriage market a couple of decades later, as larger or smaller cohorts enter the marriage market. Given that men almost universally marry younger women, decreases in births lead to a scenario where the size of a marriageable male cohort is larger than subsequent female birth cohorts.

We use Schoen's harmonic mean model, (also known as "force of attraction"; Schoen, 1981 and 1988) to estimate the number of marriages that would have occurred had underlying age preferences remained the same throughout the period.

We calculate the forces of attraction for each set of male and female ages at marriage. The complete set of forces of attraction for a given year is assumed to reflect the underlying age mating preferences for that year. For every year we construct two summary indicators of these preferences, which are the degree of homogamy and the level of asymmetry in hypergamous marriages versus hypogamous marriages. The indicator of homogamy is the sum of the forces of attraction (α_{ij} as defined in equation 1) where i equals j, divided by the sum of all forces of attraction. This is the weight or strength of diagonal cells (homogamous couples) over the complete distribution of couples. This indicator ranges from 0 to 1. The gender asymmetry indicator comes from the ratio between the sum of forces of attraction where $i > j$ (husband at least one age category older than wife) and the sum of forces of attraction where $i < j$ (husband at least one age category younger than wife).

Figure 11. Homogamy and asymmetry indicators of forces of attraction, Spain, 1922-2001

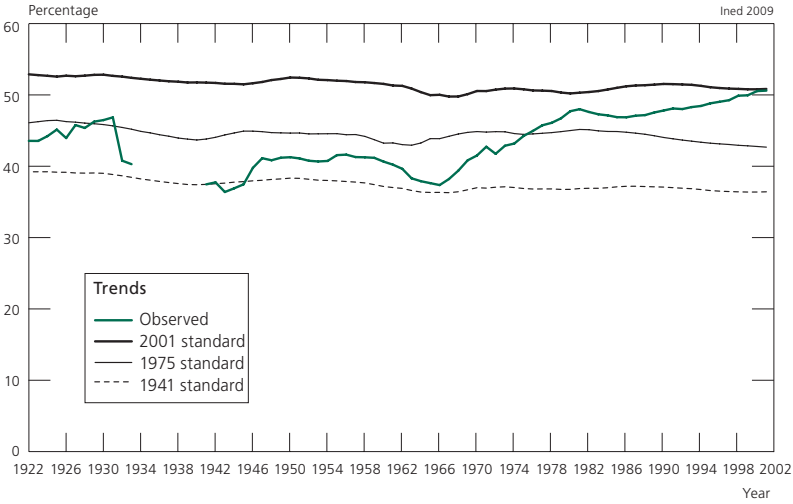


Scope: Marriages between persons aged 15-49.
Sources: Author's calculations based on Spanish vital statistics (1922-2001) and population censuses.

The indicators are displayed in Figure 11. Both are used to select the years that will serve as the constant age preference standards to estimate the expected average age difference. The 1941 standard represents the lowest level of homogamy and the highest level of asymmetry of the whole period. At the opposite extreme, 2001 represents the highest level of homogamy combined with the lowest level of asymmetry. Finally, the standard for 1975 falls roughly between 1941 and 2001 in terms of age homogamy and age asymmetry, but maintains the distinctiveness of being the year when marriage rates peaked to their maximum level for the whole period.

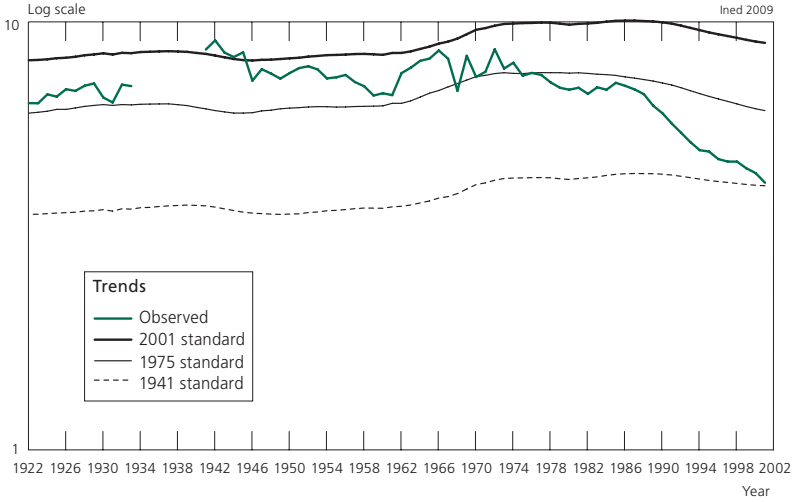
Figures 12 and 13 show homogamy and gender asymmetry in age heterogamy observed for first marriages in Spain between 1922 and 2001 and the expected values according to three distinct standards of age preferences. We use first marriages because they represent the vast majority of marriages and because forces of attraction for second marriages cannot be accurately ascertained. To obtain the expected trends in age homogamy and gender asymmetry, we take into the account the force of attraction for each year and the spousal age combination. The whole matrix of forces of attraction is taken to be the standard set of underlying age preferences. Each standard is then applied to the population at risk for every year in order to estimate the number of expected marriages for each spousal age combination. Finally, from these marriages, we compute both indicators following the same procedure as that described for Figure 4. The observed and the expected trends can be compared to determine the effect

Figure 12. Observed trends in age homogamy for first marriages and expected trends according to three standards of underlying age preferences, Spain 1922-2001



Scope: Marriages between persons aged 15-49.
Sources: Author's calculations based on Spanish vital statistics (1922-2001) and population censuses.

Figure 13. Observed trends in gender asymmetry in heterogamous first marriages and expected trends according to three standards of underlying age preferences, Spain 1922-2001



Scope: Marriages between persons aged 15-49.
Sources: Author's calculations based on Spanish vital statistics (1922-2001) and population censuses.

of changes in the age-sex composition of the population at risk on the mean spousal age difference.

Specifically, Figures 12 and 13 present the expected trends in age homogamy and gender asymmetry using the 1941, 1975 and 2001 age preference standards. Both measures are sensitive to the standard of age preferences taken as reference. The 1941 standard therefore produced lower age homogamy and higher asymmetry than that for 1975 and 2001. The differences between standards are due to a double factor: the strength of age homogamy and the degree of gender symmetry in age preferences. The 1941 standard presents the strongest trend of men marrying younger women and weakest trend of marrying at similar ages in comparison with the 1975 and 2001 standards. As asymmetry declines and homogamy increases, average age differences decrease.

From the variations in the expected trends, we conclude that changes in the age-sex composition of the marriage market have had little effect on changes in age homogamy and gender asymmetry over time. These changes must be due to other kinds of factors, mostly related to individual behaviour. With regard to age homogamy, the observed trend shows a spread of 15 percentage points between the minimum and maximum values, while the spread for the estimated trends is less than 4 points. The same applies for the gender asymmetry ratio: 4.5 points of internal variation between the observed values, and less than 1 point between the expected trends. The spread between the minimum and maximum values in the expected measures for each of the three standards proves to be relatively small, and all three standards show the same basic change over time. Taking into account only the age structure of unmarried men and women, we would expect age homogamy to have decreased slightly and gender asymmetry to have increased slightly from 1922 to 2001.

This being said, however, the expected trends are not entirely smooth, either for age homogamy or for gender asymmetry. There are short fluctuations for some periods, more or less pronounced depending on the standard of reference. For instance, the 1975 standard for age homogamy presents two short-term decreases in age homogamy in the late 1930s and the mid-60s, of a lower magnitude than those seen in the observed figures but proximate in time. Observed shifts in age homogamy for these two periods are considerably higher than the shifts expected by any of the standards. The magnitude and timing of these fluctuations varies by the standard chosen. This example suffices to conclude that shifts in the age-sex structure of the population at risk exert friction on marriage dynamics that varies according to the degree of homogamy and symmetry implicit in age preferences. According to our method, this means that the change in age homogamy for those years was due not only to changes in the age-sex composition of the population at risk, but mainly to changes in underlying preferences. In addition, changes in age homogamy or gender asymmetry due to changes in the age-sex composition of the population at risk occur sooner or later depending on the marriage

timing embedded in each preference standard. The 1975 standard, for example, is the first of the three to anticipate the rise in the average age difference observed in the 1960s. Of course, these last results are basically the consequence of using different standards of age preferences. They are, however, legitimate to illustrate that marriage market equilibrium cannot be defined solely on the basis of the age-sex distribution of the population, but must be based on the marriageable population as defined by age preferences.

III. Summary and Discussion

Our analysis of age-assortative mating patterns in Spain between 1922 and 2006 confirms that marriages occur mostly between spouses of similar ages, with the husband more frequently the older of the two. The results show that age homogamy increased during the twentieth century, particularly in the last 30 years, while traditional marriages, in which the husband is older than the wife, are becoming less common. The analysis finds modest evidence that under exceptional historical circumstances, changes in the age-sex composition of eligible partners modified age-assortative mating patterns. Major responsibility for such patterns is to be found in behavioural factors. The standardization method applied to decompose the changes in age-assortative mating into the effects produced by age-sex composition and those produced by the underlying age preferences of the spouses indicates that the latter are clearly more decisive. Irrespective of the preference standard used, changes in the expected age homogamy patterns are smaller than those observed. This discrepancy implies that the age-sex composition of eligible candidates is not sufficient, in itself, to explain trends in age-assortative mating.

The analysis of age-assortative marriage patterns by components has revealed important differences in terms of spousal marital status and age at marriage. Age homogamy for second and higher order marriages is lower than for first marriages, but there is little difference in the cumulative average age difference for all marriages. The proportion of second marriages has increased dramatically during the last three decades, but its impact on the total average age difference has remained fairly low, despite the fact that second or higher order marriages are on average less homogamous than first marriages.

Age at marriage is also related to age homogamy: the relation is negative with the age of the groom and positive with the age of the bride, meaning that average age differences increase when men marry later and decrease when women marry later. Within the current context of marriage postponement, we would expect this opposite relation to have had counterbalancing effects, with age homogamy patterns remaining untouched. Nevertheless, the delay in the age at marriage has entailed a shifting in age-assortative mating patterns, and, basically, higher gender symmetry at all ages.

From our observations, we conclude that neither the changes in the age-sex composition of the marriage market nor the rise in second marriages are

responsible for the increase in age homogamy or the decrease in gender asymmetry in age heterogamy observed over the last three decades. Ultimately most changes have been driven by behavioural factors.

Spanish patterns appear to be similar to those of other European countries, such as France, the Netherlands and the United States where age homogamy also increased from the beginning of the twentieth century (Bozon 1991, 2006; Ní Brolcháin, 1992; van Poppel et al., 2001; Atkinsson and Glass, 1985; Vanderschelden, 2006). As mentioned in the introduction, however, evidence from the Netherlands and the United States shows that age heterogamy has risen in recent years. The effect of cohabitation on age-assortative mating emerges as a factor favouring higher age heterogamy. As cohabitation is also increasing rapidly in Spain (Nazio, 2008; Castro Martín, 2003), the Dutch and US pattern could be seen as a particularly informative precedent for future years. Indeed, a small – though barely noticeable – increase in age homogamy has already been observed in Spain since 2000. It would be premature in our part to draw any conclusion on the causes of this tiny change. In addition to the increase in cohabitation, age at marriage is still on the rise, as is the frequency of divorce and remarriage (Solsona and Simó, 2007). Will these trends bring age homogamy levels down? We do not know as yet, although we do know that age homogamy has not been reduced by the dramatic increase in age at marriage during the last decades.

More importantly, will gender asymmetry in age heterogamy continue to decrease? Contrary to age homogamy, trends in gender asymmetry have shown a steady decline over the last three decades with no signs of reversal. Before making any prediction for future years, we should consider other aspects. Perhaps, the most important is the role of international migration. During the last decade, Spain has experienced rapid and accelerating growth in its population of foreign nationals. The immigrant population is starting to have a major impact on demographic dynamics, with the proportion of marriages involving at least one foreign national rising from 4.7% in 1996 to 15.6% in 2006 (Cortina et al., 2008). More than 60% of these marriages are between a Spanish man and a foreign woman (including first and second marriages). Mean age differences between spouses are systematically higher than any other combination of spouses and they have grown in the last ten years. Future research should address the impact of intermarriage on the overall patterns of age homogamy and decompose this into the changes in the age-sex composition of the marriage market that are due to immigration and those produced by the underlying age preferences of spouses who are international migrants.

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Albert Esteve, Clara Cortina, Anna Cabré • **Long Term Trends in Marital Age Homogamy Patterns: Spain, 1922-2006**

This paper uses marriage registration statistics to carry out a long-term descriptive analysis of age homogamy patterns in Spain, from 1922 to 2006. We first examine the relationships between marital age homogamy patterns, trends in second order marriages and age at marriage of men and women. Second, we apply a standardization method to decompose the changes of age homogamy among first marriages into the effects produced by changes in age-sex composition and those produced by the underlying age preferences of spouses. Results show that age homogamy increased during the twentieth century, particularly in the last 30 years, while traditional marriages, in which the husband is older than the wife, are becoming less common. Although the analysis proves that under dramatic historical circumstances, changes in the age-sex composition of eligible partners modified age-assortative mating patterns, major responsibility for such patterns is to be found in behavioural factors.

Albert Esteve, Clara Cortina, Anna Cabré • **L'écart d'âge entre époux en Espagne : tendances de long terme, 1922-2006**

Cette étude s'appuie sur les statistiques des registres de mariages pour proposer une analyse descriptive à long terme de l'écart d'âge entre époux en Espagne, de 1922 à 2006. Nous examinons tout d'abord les relations entre l'écart d'âge des conjoints, les tendances des mariages de second rang et l'âge au mariage des hommes et des femmes. Ensuite, par une méthode de standardisation, nous décomposons l'évolution de l'écart d'âge au premier mariage en deux types d'effets : ceux résultant des changements dans la structure par sexe et âge et ceux découlant des préférences individuelles en matière d'âge du conjoint. Les résultats font apparaître un accroissement de l'homogamie d'âge au cours du XX^{e} siècle, principalement dans les trente dernières années, et un recul du mariage traditionnel, dans lequel le mari est plus âgé que sa femme. Même si l'analyse démontre que, dans des circonstances historiques exceptionnelles, les changements dans la composition par sexe et âge des populations de conjoints potentiels ont modifié les schémas d'écart d'âge entre époux, l'explication principale se trouve dans les facteurs liés aux préférence et aux comportements.

Albert Esteve, Clara Cortina, Anna Cabré • **La diferencia de edades entre esposos en España : tendencias de largo plazo, 1922-2006**

Este estudio se utilizan las estadísticas de los registros de matrimonios para proponer un análisis descriptivo a largo plazo de la diferencia de edades entre los esposos en España, de 1922 a 2006. En primer lugar examinamos las relaciones entre la diferencia de edades de los consortes, las tendencias de los matrimonios de segundo rango y la edad al casarse de los hombres y de las mujeres. Luego, por medio de un método de estandarización, desglosamos la evolución de la diferencia de edades en el primer matrimonio en dos tipos de efectos : los que resultan de los cambios en la estructura por sexo y edad y los que se desprenden de las preferencias individuales en materia de edad del consorte. Los resultados hacen aparecer un incremento de la homogamia de edad en el transcurso del siglo XX, principalmente en los últimos treinta años y un retroceso del matrimonio tradicional, en el cual el marido es mayor que su mujer. Aún si el análisis demuestra que, en circunstancias históricas excepcionales, los cambios en la composición por sexo y edad de las poblaciones de consortes potenciales han modificado los esquemas de diferencia de edades entre esposos, la explicación principal se encuentra en los factores de comportamiento.