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Descriptive Finding

Digit preferences in marriage formation in Sweden: Millennium marriages and birthday peaks

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Digit preferences in marriage formation in Sweden: Millennium marriages and birthday peaks

Sofi Ohlsson-Wijk¹

Abstract

BACKGROUND

Digit preferences are normally seen as potentially harmful biases in respondents' reports. Possibly such preferences might also be the cause of some patterns found in Swedish marriage formation, thus affecting actual demographic behavior.

OBJECTIVE

Digit preferences in marriage formation in Sweden are examined – more specifically, the additional propensity to marry for the first time during the year 2000 or at ages ending with 0 – and their demographic and socioeconomic correlates.

METHODS

Event-history analyses are applied to Swedish register data covering 3.5 million men and women in 1991–2007.

RESULTS

First-marriage risks clearly increase for both men and women at exact ages 30, 40, 50, and 60 and in the year 2000. These patterns exist across demographic and socioeconomic groups and are not due to measurement error or random variation.

CONCLUSIONS

The timing of marriage is not strictly determined by conventional demographic or socioeconomic factors. Whether the findings are idiosyncratic to contexts like the Swedish, where there are small differences between marriage and cohabitation, remains to be answered.

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1. Introduction

1.1 Digit preferences in data and in real life

In the study of demographic behavior, temporality can have important and unexpected influences. Demographic patterns found across various aspects of time, such as calendar time, age, or durations, can be an artifact of the data, methods, or methodology (see Mills 2000 for discussion). For example, digit preferences - preferences for certain types of numbers - normally appear as a form of measurement error found in some data. When respondents themselves report age and timing of demographic events there is a risk that they round off to an even number or a number ending with 5 or 0 (e.g., Budd and Guinnane 1991; Mills 2000). In the register data used in the present study, collected by authorities and agencies, this is not an issue.

Mills (2000) stresses that actual demographic behavior can also be influenced by temporality. Some examples are seasonal cycles in weather conditions or social norms about the proper timing of life events. She also states that everyday life is shaped by institutional calendars and even "something as arbitrary as the date on a calendar can influence life course behaviour" (p.105).

In the present study the effects of digit preferences on demographic behavior in Sweden are examined. More specifically, I study the propensity to marry for the first time in the year 2000 or when being of an age that ends with 0, and also if there are any differences across demographic or socioeconomic groups. Andersson (2004) has reported a peak in 2000 for first marriages among women of all parities as well as for second marriages in Sweden. It is not known, however, if the peak was equally pronounced across other demographic, or socio-economic, distinctions for women or for men. Marriage peaks among Swedish women are also visible at exact ages 30 and 40 when previous divorces, parity, and calendar years 1971-1993 are taken into account (Andersson 1998). It is not known whether this pattern also exists for later years when Swedish marriage trends have turned from declining to increasing (Ohlsson-Wijk 2011), or for higher ages when marriage formation generally is not as common. In addition, it would be interesting to know if such patterns exist across various demographic and socio-economic groups and if there are any gender differences.

In Sweden, turning an age that ends with 0 is generally associated with larger celebrations and might therefore be seen as specifically suitable to combine with other celebrations, such as weddings. These specific birthdays could also symbolize distinct transitions in life, and trigger considerations of statuses or other transitions in life, such as marriage formation.

The peak at the turn of the millennium indicates that this was viewed as a special time to marry. Similar phenomena have been observed at specific dates in Sweden

when an unusually large number of couples married. Some examples are July 7, 2007 and December 12, 2012, which could be written 070707 and 121212 respectively, and other dates of that kind (Statistics Sweden 2013a). Mills (2000) argues that the turn of the millennium was viewed as an important event in many cultures and could cause reflection about time itself and our own lives and even lead to temporary peaks in marriage formation or childbearing. The marriage peak in Sweden, however, seems to be the only example of such an impact on family-demographic behavior. Aggregate data on marriage and fertility rates for other countries do not seem to indicate any apparent peaks in 2000 that deviate from the normal fluctuations across years (see e.g., United Nations 2005; Council of Europe 2006).

1.2 Marriage formation in Sweden

Sweden has been a forerunner in declining marriage trends and increasing levels of cohabitation and extramarital childbearing (van de Kaa 2002), although marriage has in fact become increasingly popular in Sweden since the late 1990s (Ohlsson-Wijk 2011). From an international perspective there are quite weak institutional factors in Sweden that promote marriage over cohabitation in terms of, for example, social security, legal rights, and economic benefits (Agell and Brattström 2008; Perelli-Harris and Sánchez Gassen 2012). Although marriage is sometimes seen as a more committed type of union, cohabitation is widely accepted as an alternative to marriage, even when having children (Wiik, Bernhardt, and Noack 2010; Bernhardt 2001).

It has been claimed that in Sweden marriage and cohabitation have become virtually indistinguishable and that there is a general indifference to the choice between the union forms (e.g., Heuveline and Timberlake 2004; Hoem 1991). In such a scenario the choice is taken so lightly that any small factors that facilitate or obstruct marriage formation become influential. These arguments might be particularly relevant in relation to digit preferences in marriage formation. The upcoming of a specific birthday or point in time, such as the start of the new millennium, might then be the one little factor that is needed to push some cohabiting couples in the direction of marriage. This makes modern-day Sweden an interesting context for studying digit preferences in marriage formation.

The marriage boom in Sweden in 1989, caused by a reform of the widows' pension scheme, has been given as an example of how lightly the choice between cohabitation and marriage is taken (Hoem 1991; Ohlsson-Wijk 2011). There were, however, some non-negligible economic incentives for marrying in that specific year. Therefore, any digit preference patterns found in the present study would be an even

more convincing example of how arbitrary or small factors can affect the choice to marry.

Marriage formation patterns in Sweden vary across a number of demographic and socioeconomic distinctions. Digit preferences might, in the same way, affect some couples more than others in their choice of union form, depending on their characteristics or what stage of life they are in. Marriage is almost always preceded by cohabitation in Sweden (Andersson and Philipov 2002) and for young cohabiters marriage plans are in general more common among those in strongly committed relationships (Wiik, Bernhardt, and Noack 2010). First-marriage formation is also more common when there are plans to have children (Moors and Bernhardt 2009), when expecting a child, or when having young children (Baizan, Aassve, and Billari 2004). Furthermore, first-marriage risks are higher for the highly educated and those with good labor-market attachment (Bracher and Santow 1998) and vary across type of settlement and country of birth (Ohlsson-Wijk 2011). Digit preference patterns in marriage formation are examined across these factors and possible explanations for the findings are discussed at the end of this article.

2. Methods

2.1 Data and study population

The data are derived from administrative registers at Statistics Sweden, covering information on all residents in Sweden, all registered marriages at a monthly level, and numerous socioeconomic and demographic characteristics and life events. In order to obtain a uniform study population, marriage is restricted to first, opposite-sex, marriage. A first marriage for an individual is not necessarily the first marriage for their partner. Information about pre-marital partners is not included in the analyses because the registers do not contain complete cohabitation histories.

The study covers never-married men and women of ages 18–55 in the years 1991–2007. Age 18 is the minimum legal age for marriage. Only individuals born in Sweden and foreign-born who immigrated before age 15 are included to assure a low prevalence of (non-registered) marriages before immigration. In total, there are 1.9 million men and 1.6 million women in the data.

2.2 Variables

The demographic and socioeconomic factors included are those that are available in the data and that previously have been linked to Swedish marriage formation (see above). The data are longitudinal and at the individual level and all factors except for country of birth and sex are time-varying. Age, parity, age of youngest child, and expecting child are measured on a monthly basis. Educational attainment, type of settlement, and labor-market activity are measured annually because more detailed data were not available. For variable categories and summary statistics on the distribution of the study population across categories see Table A1 in the appendix.

2.3 Method of analysis

Event-history analysis is valuable for studying life course data (Blossfeld, Golsch, and Rohwer 2007; Hoem 1993) and is here used in the form of piece-wise constant baseline intensity models. The marriage risk is modeled as a function of an individual's characteristics in any given month. The independent variables are measured before the marriage risk to avoid reverse ordering of events, and as close in time to the risk as possible.

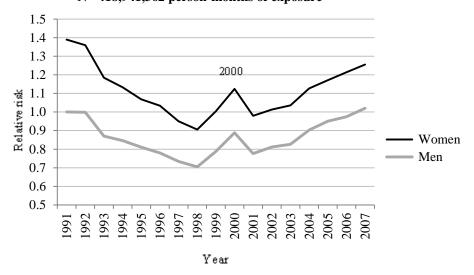
Individuals are observed from age 18 or January 1991, whichever comes last, and until first marriage, December 2007, first emigration, turning 56, or death, whichever comes first. Model test statistics are not presented because the data cover the whole defined population. Furthermore, the large, comprehensive dataset ensures that random variation does not conceal or otherwise distort any possible digit preference patterns in demographic behavior across age and calendar time.

3. Findings

3.1 Millennium marriages

Figure 1 displays first-marriage risks across calendar years and sex without additional factors in the model. The reversal from declining to increasing marriage trends can be seen as well as the 'millennium peak' in 2000. On average, men and women were 8% more likely to marry in 2000 than would be expected (the average of the values for 1999 and 2001). The millennium peak was primarily due to an increase of weddings in June, July, and August, which normally are the most popular months for weddings (Statistics Sweden 2013b).

Figure 1: Relative first-marriage risks in Sweden across years 1991–2007, for men and women aged 18–55. Interaction between year and sex, standardized for age. Men 1991 as reference category. N= 418,941,362 person-months of exposure



Analyses of the other variables (not displayed here) show some differentials across groups in the degree to which marriage risks are elevated in the year 2000. The millennium peak is most evident among those in their late 20s to early 40s which are the typical marrying ages (see Figure 2) and a few years above.

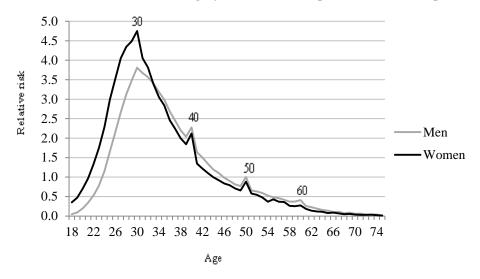
Those in metropolitan or other big cities display slightly less clear peaks in 2000 than others. For men the peak is more pronounced the better their labor-market attachment. It increases with income level and is weakest among the unemployed and students, but especially among non-participants in the labor market. For women the pattern is less clear: peaks are least evident among students and non-participants but clearest among women with low or medium income or the unemployed. Regarding family situation, there is a somewhat stronger peak among parents, and perhaps especially those with two or more children.

For the other factors the patterns are either too fluctuating to reveal any clear picture (country of birth) or there is no clear difference in the millennium marriage pattern across groups (age of youngest child, expecting child, and educational attainment).

3.2 Birthday peaks

Figure 2 displays first-marriage risks across age and sex in the years 1991–2007 without any additional factors included. In this particular figure only, men and women of ages 56–75 are also included to reveal any possible digit preferences beyond age 55. Marriage risks peak at age 30, but there are also visible peaks at exact ages 40, 50, and 60 (hereafter referred to as "birthday peaks"). They represent a preference for marrying during the 12 months when at an age ending with a 0, rather than at any adjacent age. The peaks are equally large among men and women, on average 8% higher than expected (the average of those a year younger and a year older) for age 30 and 20%–30% higher for ages 40, 50, and 60.

Figure 2: Relative first-marriage risks in Sweden across ages 18–75, for men and women 1991–2007. Interaction between age and sex. Men aged 50 as reference category. N= 449,079,786 person-months of exposure



Analyses of the other factors (not displayed here) reveal birthday peaks across all groups, although there are a few differences. Birthday peaks are stronger among parents than others, and especially among those with two or more children. The peaks are less pronounced among those with tertiary education.

For remaining factors the patterns are either too fluctuating to reveal any clear picture (country of birth and expecting child) or show no clear difference across groups (age of youngest child, labor-market activity, and type of settlement). Birthday peaks seem to be quite equally pronounced over the years 1991–2007.

4. Conclusions and discussion

Digit preferences found in demographic data might not only be an artifact of the data, methods, or methodology. In the present study they reflect actual marriage formation patterns across calendar time and age. Digit preferences clearly affect first-marriage formation patterns in Sweden among all demographic and socioeconomic groups studied (unclear for country of birth however), although this is more pronounced among some groups than others.

Larger effects of digit preferences are displayed among those who have children, and especially if they have two or more. Those of typical marrying age or slightly older were also extra likely to marry in 2000. These individuals are in or past a stage of life where marriage formation is most common and possibly has been up for discussion. They are also likely to be in a committed relationship where the difference between continuing cohabitation or marrying might seem especially small, but for various reasons have not married (yet). They might therefore need a weaker push than others to tip over towards marriage in the case where a specific birthday or point in time is approaching, such as the turn of the millennium. The peaks at exact ages 50 and 60, well beyond typical marrying ages, also point in this direction. It is not known from the data, however, how long the couples cohabited before marriage.

Holland (2013) argues that the meaning of marriage may vary depending on when it occurs in relation to childbearing. Marriages occurring before or soon after the first birth are more conventional regarding timing and may be seen as a prerequisite for, or legitimizing of, childbearing (ibid). Possibly the larger effect of digit preferences among those with children, and especially those with two or more, could be related to a less traditional view of marriage.

The lower popularity of millennium marriages in big cities and the weaker birthday peaks among the highly educated could possibly be explained by variations in culture, taste, or how cohabitation and marriage are perceived. The finding among men that the peak in 2000 was higher the better their labor-market attachment or income could perhaps be due to any of these explanations, or to differential economic possibilities of hosting a wedding party.

The digit preference patterns are very similar for men and women. Furthermore, men's age is as influential in these patterns as women's. This could possibly mean that

men initiate marriage as often as women do, as opposed to findings in some Swedish studies indicating that women more often are initiators of union status change (e.g., Andersson and Noack 2010; Andersson et al. 2006; Duvander 1999).

Digit preference patterns might also reflect an emphasis on weddings and celebrations rather than on actual married life. Of course, it is not possible to tell here if digit preferences simply affect the timing of marriage or if they trigger some couples to marry who might not otherwise have done so.

Clearly, the timing of marriage in Sweden is not only determined by conventional demographic or socioeconomic factors. The Swedish context might be one where something as arbitrary as digit preferences are expressed in marriage formation due to the relatively small differences between cohabitation and marriage, and, as argued by some scholars (Heuveline and Timberlake 2004; Hoem 1991), the choice between the union forms is taken quite lightly.

Influences of other institutional calendars on demographic behavior have been found in some Asian countries. The numbers of births or marriages increase in certain years that are perceived as auspicious in the Chinese and Vietnamese astrological calendars (e.g., Goodkind 1996, 1993; Thang and Swenson 1996). In these contexts, however, the beliefs about the meaning of these specific years are strong (Goodkind 1996). This differentiates them from the patterns investigated in the present study where the time points do not carry any inherent meaning.

It would be interesting to know if digit preferences, or other equally arbitrary factors, affect marriage formation patterns in other countries also. In order to understand if digit preference patterns are related to the meaning of cohabitation and marriage it would be especially informative to know if the existence of such patterns depends on how much marriage differs from cohabitation in different contexts.

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Appendix

Table A1:	Distribution of months under risk of first marriage for variable
	categories. Men and women in the study population separately.
	Percent in each category

Variable	Men (%)	Women (%)	Variable (continued)	Men (%)	Women (%)
Calendar year			Expecting child ²		
1991	5.2	5.0	Not expecting	97.7	97.0
1992	5.3	5.2	Expecting	2.3	3.0
1993	5.4	5.3			
1994	5.5	5.4	Country of birth		
1995	5.6	5.5	Sweden	95.9	95.7
1996	5.7	5.6	Other Nordic country	1.1	1.0
1997	5.8	5.8	Other European, Australia,		
1998	5.9	5.9	or North America	1.1	1.1
1999	6.0	6.0	Other country	2.0	2.2
2000	6.0	6.0			
2001	6.1	6.1	Type of settlement ³		
2002	6.1	6.2	Metropolitan area	17.7	19.9
2003	6.2	6.3	Suburb	12.9	13.3
2004	6.2	6.3	Big city	28.6	29.4
2005	6.3	6.4	Middle-sized city	14.5	13.8
2006	6.3	6.5	Industrial municipality	8.3	7.3
2007	6.4	6.6	Rural municipality	4.1	3.7
			Sparsely populated municipality	2.7	2.3
Age ¹			Other large municipality	7.0	6.5
18-23	27.5	31.6	Other small municipality	4.3	3.9
24-28	21.4	22.4			
29-34	19.6	18.5	Educational attainment 4		
35-40	13.4	12.1	Low	54.4	46.5
41-55	18.1	15.3	Medium	36.4	41.6
			High	8.3	11.2
			Missing data	0.9	0.7

Variable	Men (%)	Women (%)	Variable (continued)	Men (%)	Women (%)
Parity			Labor-market activity ⁵		
No children	73.9	65.2	Low income	15.9	9.7
1 child	12.0	15.3	Medium income	22.1	21.1
2 children	10.6	14.8	High income	18.6	20.9
3 or more children	3.4	4.8	Student	21.5	28.3
			Unemployed	13.9	12.7
Age of youngest child			Non-participant	8.0	7.4
No children	73.9	65.2			
0-1 years	7.2	9.2	Months under risk in	224 044 270	187,027,083
2-3 years	4.5	5.8	total	231,914,279	
4-5 years	3.0	3.9	To fall moments and aff		
6 years or older	11.4	15.9	Total number of marriages	436,908	442,043

Table A1: (Continued)

Source: Swedish population registers maintained by Statistics Sweden; author's own calculations.

Notes: 1 In the analyses of patterns across age, age is measured in single years.

2 Expecting: during the seven months prior to a registered live birth, when a pregnancy likely is known.

3 Based on classification by the Swedish Association of Local Authorities and Regions (2011).

4 Low: up to two years of secondary, medium: three years of secondary to less than three years of tertiary, high: three years of tertiary or more.

5 Main economic activity in the previous year. See Ohlsson-Wijk (2011) for detailed description, although in the present study income groups are sex-specific. Non-participants in the labor market either lack any noteworthy income, are retired, or are provided for by social welfare benefits.