On the Momentum of Marriage Decline

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Over the last several decades, first-marriage rates declined remarkably in the more developed regions, raising the proportion never-marrying at ages 45-49 to 8.5% on average. We analyze the future trends in the proportions never-marrying for 96 countries, of which 32 are in the more developed regions, 42 in the less developed regions, and 22 are the least developed countries. In a way similar to the approach of population momentum, we assume that first- marriage rates stop declining instantaneously and remain constant over the next 35 years. Even under such an optimistic assumption, however, we find that on average the proportion never-marrying at ages 45-49 would still increase by more than threefold for countries in the more developed regions. Few countries and areas in the less developed regions would follow the trends in the more developed regions. And there is yet no sign of marriage decline in the least developed countries.

[1] The views expressed are the authors' and do not necessarily reflect the position of the United Nations

Over the last several decades the more developed regions[2] (United Nations, 2005) have seen a decline in the prevalence of marriage. This trend has been widely noted and is a major part of what is called by some the ‘Second Demographic Transition’ (Lesthaeghe, 1995). Indeed, among a wide range of fundamental shifts that would occur under the prospect of low marriage prevalence (see Waite, 1995), demographers would expect low fertility (Manning, 1995) and hence rapid population aging. Whether or not the prevalence of marriage will continue to decline is, therefore, of substantive concern. Short term forecasts of the percentage single at the older ages have, up to now, been estimated using parameters of marriage models. The parameters themselves are estimated using actual data for ages younger than 30 or 35 years, and the percentages of single at older ages are then calculated by the estimated models. Two such approaches have been done by Bloom and Bennett (1990) and Goldstein and Kenney (2001). Based on the Coale-McNeil (1972) model and data on women born in 1940s and 1950s in the U.S., Bloom and Bennett (1990) forecasted a short-term, say less than ten years, declines in marriage prevalence. However, using the Hernes (1972) model and adding data for women born in the early 1960s, Goldstein and Kenney (2001) predicted a leveling off trend in marriage prevalence for women in the U.S. Goldstein and Kenney argued that period declines in marriage prevalence reflect, mostly, delays of marriage in cohort perspective, as is the view of Schoen and Canudas-Romo (2005). The inconsistency between the two short-term forecasts is understandable. In general, short-term forecasts are sensitive to the choice of historical data, because short-term changes are subtle and involve strong effect of random disturbance.

Long-term forecasts may be robust to the choice of historical data, but they depend more on the assumptions about future trend. Theories of marriage are not yet helpful for making such assumptions. For example, an economic theory (see Becker, 1981) explains marriage as a rational arrangement that raises economic utility. Accordingly, marriage prevalence should decline with the rising of women’s earning and labor force participation. In contrast, to institutional theories (e.g., Goode, 1982),

[2] Comprising of Europe, Northern America, Australia, New Zealand, and Japan.

marriage is by no means only an economic arrangement, but supported by values, laws and a wide range of social norms. Therefore, marriage prevalence may not decline even if the economic importance of marriage is reduced. Of course, without *consentaneous* guide from theories, one may still turn to empirically identify the long-term trend in marriage prevalence. To do this, however, one needs data on the annual numbers of first marriage and single population for long periods, which are, unfortunately, unavailable even for many developed countries. Given the state of the art, we propose a long-term perspective for the trend of marriage prevalence, along the line of population momentum that provides informative scenarios on the basis of succinct assumptions.

In practice, the proportion single at ages 45-49, which we denote as SP(45), is used to describe the preva lence of marriage. Although SP(45) is of direct interest, first marriage is the dominant force that changes the SP(45) in reality. And the fundamental measure of first marriage is the first-marriage rates, which we denote as n(x) for age group x. For an age group staring at age x, n(x) is defined as the number of first marriages divided by the number of singles, in a certain year. When the n(x) at ages 15-49 stopped changing, SP(45) will still change for 35 years. This is similar to the case of the population momentum in which the population size changes after the vital rates leveled off.

The momentum of population growth (Keyfitz, 1971) is defined as the ratio of a population's ultimate size after a fertility transition to its initial size. Similarly, we define the momentum of marriage decline as the ratio of a population's ultimate SP(45), which is reached by fixing the n(x) at the initial level, to its initial SP(45). Similar also to the approach of population momentum that assumes constant vital rates and calculates the final population size, we assume constant first-marriage rates and compute the ultimate SP(45).

The model

We consider a cohort of males or females that subjects the first marriage rates observed at a given year, suffers no mortality and is closed to migration, and denote the proportion single at age x, which is the number of singles aged x divided by the number of the total population aged x, as s(x)[3]. In this model, the only force that changes s(x) is the force of first marriage, which can be defined in the way similar to the force of mortality as

$$m(x) = -\frac{1}{s(x)}\frac{ds(x)}{dx}. \qquad (1)$$

The model is then obtained by solving (1) as

$$s(x) = s(a)\exp[-\int_a^x m(y)dy], \qquad (2)$$

where a is the starting age.

In practice, we do not have μ(x) but the first-marriage rate n(x). Assuming constant μ(x) over age group x, n(x) can be used to substitute μ(x) (see Preston, Heuveline and Guillot, 2001; p59). This substitution applies to the values of n(x) that are often obtained in 5-year age groups starting from age 15. In order to distinguish the model proportion single from the observed SP(45), we denote the model proportion of singles at ages 45-49 as SSP(45), and compute it as the average of s(x) at ages 45-49 according to (2) as

$$SSP(45) \approx s(15)\exp[-5\sum_{y=15}^{40} n(y)]\frac{\exp[-n(45)] + \exp[-2n(45)] + ... + \exp[-5n(45)]}{5}. \qquad (3)$$

[3] In s(x) the x represents an exact age, while in SP(x) the x stands for the starting age of an age group.

At the initial time, the observed SP(45) may not be the SSP(45). Nevertheless, the observed SP(45) will be the SSP(45) after 35 years. To illustrate this, recall that after the initial time the first-marriage rates are assumed to be constant. Thus, for a cohort aged 15 at the initial time, its proportion single at age x should follow (2) to change. Because after 35 years this cohort will reach age 50, its proportion single at age x will be the s(x) in (2) for all ages younger than 50, and therefore its observed SP(45) shall be the SSP(45). For cohorts aged 15 at times later than the initial time, their observed SP(45) will be the SSP(45) when they reach age 50 for the same reason. Thus, at times 35 years later than the initial time, the observed SP(45) will be stationary at the SSP(45). We therefore call the model proportion of singles the stationary single proportion. And this is way we denote the model proportion of singles at ages 45-49 as SSP(45), of which the first S stands for stationary.

In (3), s(15) can be taken as 1 for countries in the more developed regions, assuming no one marries before age 15. This assumption, however, could not satisfactorily reflect the reality of many developing countries. In general, we may assume that the initial average single proportion at ages 15-19, which is the observed SP(15) at the initial time and we denote as ISP(15), is already stationary. Then the s(15) can be estimated according to (2) as

$$s(15) = \frac{\text{ISP}(15)}{\exp[-n(15)] + \exp[-2n(15)] + \ldots + \exp[-5n(15)]}. \qquad (4)$$

It is possible for the s(15) given by (4) to be larger than 1, indicating that the ISP(15) is too large to be a stationary value for the observed n(15) to reach from an s(15) that is not larger than 1. This could happen for countries in the more developed regions, when marriages at ages younger than 15 are rare and the n(15) changes notably over time. When this situation occurs, we take the s(15) as 1.

Application

We collected data on the age-specific numbers of first marriage, single population, and total population, which produce the values of n(x) and ISP(x), from three sources: The Statistics Division of United Nations (UNSD), the Demographic and Health Surveys (DHS), and the Eurostat. The data cover female populations for 96 countries, of which 32 are in the more developed regions, 42 are in the less developed regions (thereafter excluding the least developed countries), and 22 are the least developed countries (United Nations, 2005). For each of these countries, the source and the reference year, later than 1989, are listed in Table 1. In order to show historical trends in first-marriage rates, we also collected the data for the G7 countries (Canada, France, Former West Germany, Italy, Japan, the U.K., and the U.S.) for periods earlier than 1990, from the UNSD.

The key assumption in the momentum approach is constant first-marriage rates. Would this assumption underestimate or overestimate the future level of marriage prevalence? Recent historical changes in first-marriage rates could be summarized by that in the SSP(45), which we show in Figure 1 for the G7 countries. It can be seen that the values of SSP(45) had increased, or the first-marriage rates had declined, remarkably in the G7 countries after 1970. Since first-marriage rates declined in recent history, we may anticipate that they are more likely to do so in the near future, and that assuming constant first-marriage rates would underestimate the proportions single in the future, at least for the developed countries. For developing countries, the first-marriage rates are high and do not have much room to rise, so the constant assumption could also underestimate the proportions single.

On the other hand, in developed countries the values of n(x) are usually measured when the cohorts are postponing first marriage. Since such postponement cannot continue forever, the values of n(x) may subject to change when the postponement stops. Although constant n(x) is not a forecast but an assumption in this paper, we may still discuss whether such an assumption could be improved, and whether it could stand, when taking the postponement into account. The possible change in the n(x), apparently, depends on how the cohorts stop the postponement. If, for example, the postponement were stopped in the way that cohorts' lifetime marriage prevalence are kept constant, then, the n(x) would increase in the future, because the postponed marriage would appear at older ages later. And this increase could be estimated using the Bongaarts-Feeney format (Bongaarts and Feeney, 1998), albeit which is designed for fertility. Assuming constant (or any certain change of) cohort prevalence to estimate the underlying n(x), however, could not improve the specific approach of this paper, which aims to show the potential changes in cohort prevalence. Nonetheless, that all cohorts follow the current n(x) in the future is also a way to stop the postponement. Thus, it is possible for the assumption of constant n(x) to stand, given that there are transient postponements.

Using the observed n(x) and ISP(15), values of SSP(45) are obtained by (3) and (4). Results are shown in Figure 2 for the 96 countries listed in Table 1.

Discussion

We now discuss the marriage-decline momentum in Figure 2, of which the initial times are listed in Table 1, and the times at which the SSP(45) would be reached are 35 years later, respectively. The momentum of marriage decline is defined as the ratio of SSP(45) to ISP(45). Accordingly, it can be seen that for all the 32 countries in the more developed region, the values of momentum are larger than or close to 2, implying that the proportions single at ages 45-49 would be more than doubled after 35 years of the initial time. Further, only few countries or areas in the less developed regions have a momentum that is remarkably bigger than 1 and an SSP(45) that is larger than 10%. These countries or areas are Bahrain, Hong Kong SAR and Macao SAR of China, Israel, Jordan, Morocco, and Singapore. Furthermore, for each of the least developed country, either the momentum is close to 1, or the SSP(45) is close to 0. Thus, significant marriage decline may be expected in the more developed regions; a few countries or areas in the less developed regions would follow the trend of the more developed regions; and there is yet no sign of marriage decline in the least developed countries.

We now focus on countries in the more developed regions, as are shown in Figures 3 to 5. It can be seen that countries in Northern and Western Europe have higher SSP(45), which is due mainly to their higher ISP(45). The values of the SSP(45) and ISP(45) for countries in Southern and Eastern Europe are in between while the developed countries outside Europe have lower SSP(45) and ISP(45). Averaging the momentum for each category, the values are similar: 3.32 for North and West European countries, 3.98 for South and East European nations, and 3.22 for the five developed countries outside Europe.

These values of momentum imply that, on average and after 35 years of the initial time, the proportions single at ages 45-49 would increase by more than threefold. This may not be an issue if the values of ISP(45) were small. But on average the ISP(45) was already 8.5%. Yet this surprising prediction is conservative, because it assumes that the recent significant declines in first-marriage rates stop instantaneously. Should the first-marriage rates continue to decline in the future, the SSP(45)s would be even higher.

It is possible that in the future first-marriage rates may stop declining and might even rise to some higher level, because feedback could be stimulated by the negative effects of marriage decline, of which we cite a few. Married couples have more children than those in cohabitation do (Manning, 1995); and children in a marriage are less likely to be out of school and work (McLanahan and Bumpass, 1988). Further, marriage matters not only for children, married couples save more (Rindfuss and VandenHeuvel, 1990), suffer less stress (Robbins and Martin, 1993), and live healthier and longer lives (Zick and Smith, 1991). Nonetheless, unless strong feedback could be stimulated soon, on average countries in the more developed regions will face the prospect that more than 27% women never marry, and for some nations this never-marrying proportion could be as high as half.

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Figure 1. Historical changes in Stationary Single Proportion at ages 45-49 (SSP(45))

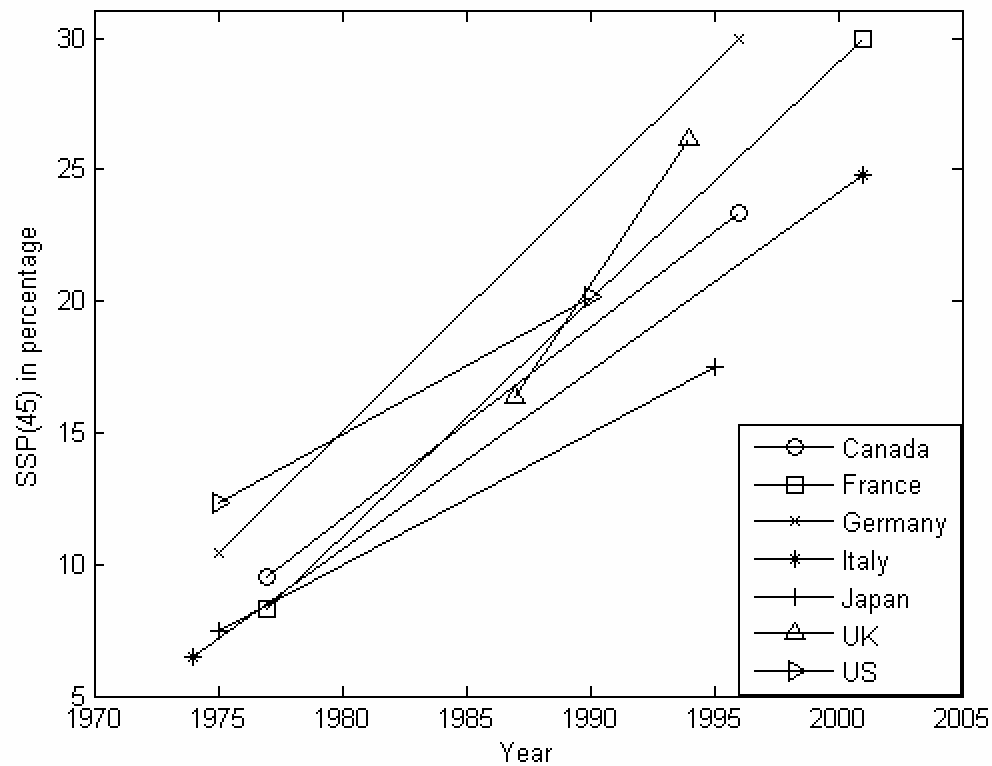

Figure 2. Single proportions at ages 45-49; SSP(45) versus ISP(45)

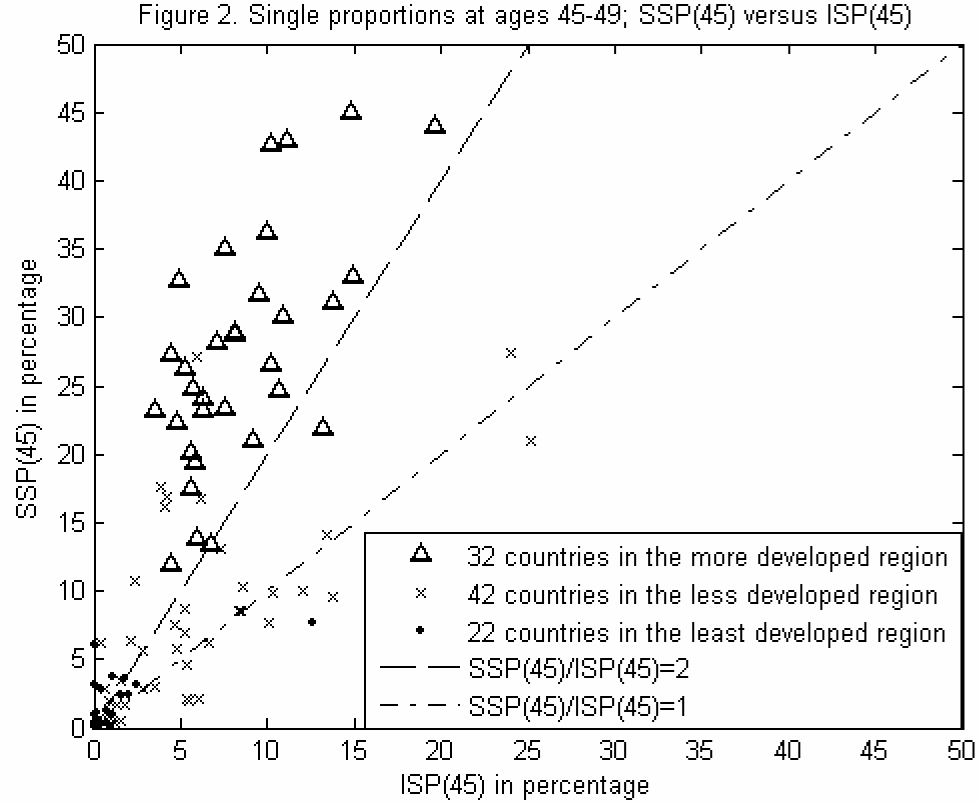

Figure 3. Single proportions at ages 45-49; SSP(45) versus ISP(45) for countries in Northern and Western Europe

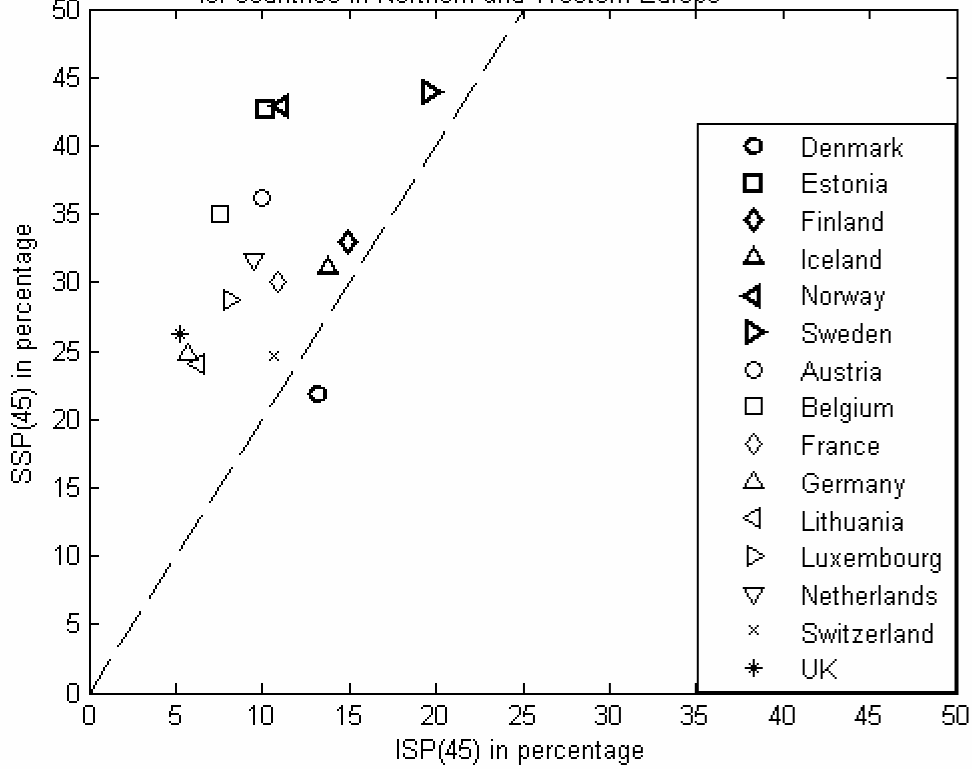

Figure 4. Single proportions at ages 45-49; SSP(45) versus ISP(45) for countries in Southern and Eastern Europe

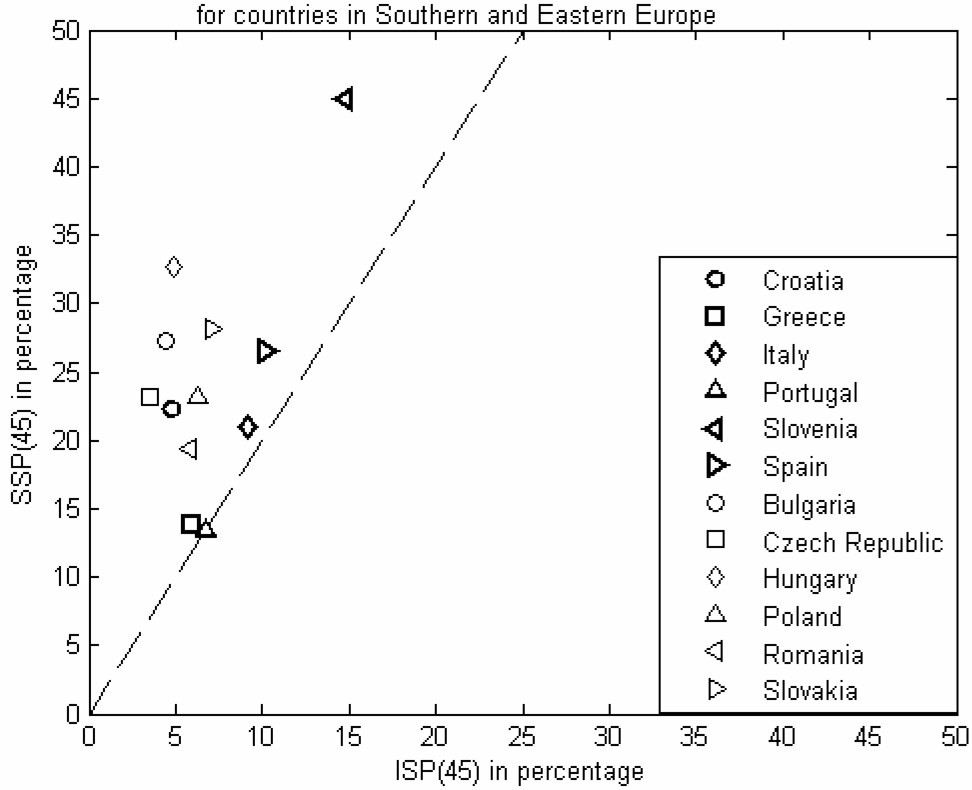

Figure 5. Single proportions at ages 45-49; SSP(45) versus ISP(45) for developed countries outside Europe

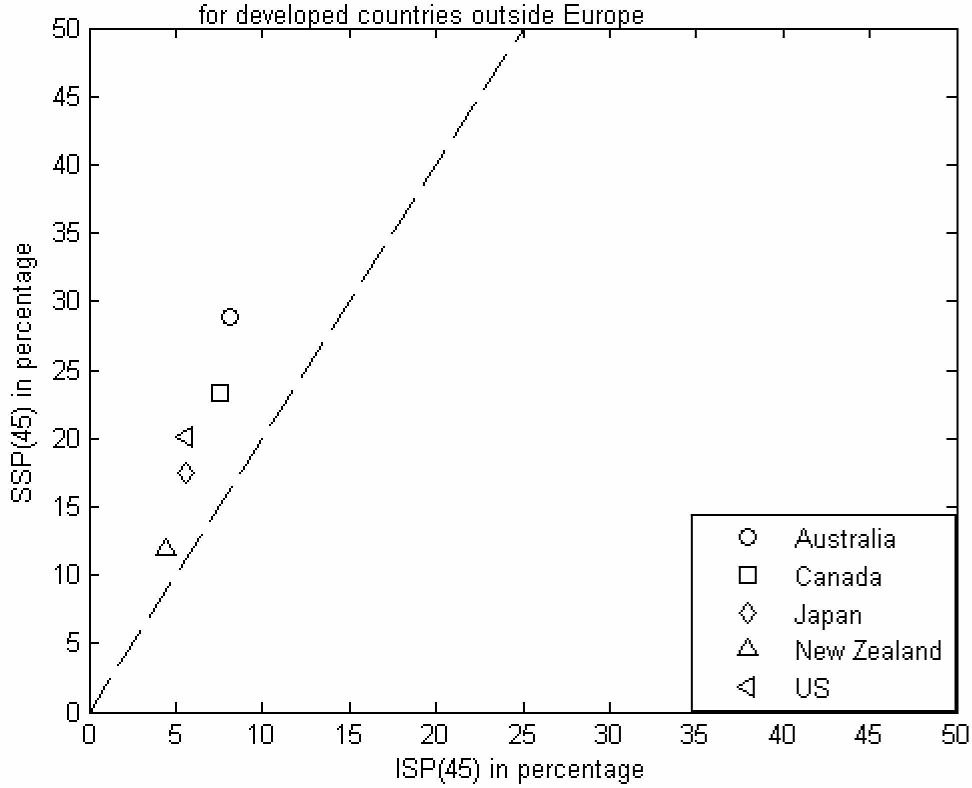

Table 1. Sources and referring years of data on first marriage and population by marital status

Country	Source	Year
More developed regions		
Australia	UNSD	2001
Austria	Eurostat	2001
Belgium	Eurostat	2001
Bulgaria	Eurostat	2001
Canada	UNSD	1996
Croatia	UNSD	1991
Czech Republic	Eurostat	2001
Denmark	Eurostat	2001
Estonia	Eurostat	2001
Finland	Eurostat	2001
France	Eurostat	2001
Germany	UNSD	1996
Greece	Eurostat	2001
Hungary	Eurostat	2001
Iceland	Eurostat	2001
Italy	Eurostat	2001
Japan	UNSD	1995
Lithuania	Eurostat	2001
Luxembourg	Eurostat	2001
Netherlands	Eurostat	2001
New Zealand	UNSD	1996
Norway	Eurostat	2001
Poland	Eurostat	2001
Portugal	Eurostat	2001
Romania	Eurostat	2001
Slovakia	Eurostat	2001
Slovenia	UNSD	2002
Spain	Eurostat	2001
Sweden	Eurostat	2001
Switzerland	Eurostat	2001
United Kingdom	UNSD	1994
United States of America	UNSD	1990
Less developed regions		
Armenia	DHS	2000
Bahrain	UNSD	1991
Belize	UNSD	1991
Bermuda	UNSD	1991
Bolivia	DHS	2003
Brazil	DHS	1996
Cameroon	DHS	2004
Chile	UNSD	1992
China: Hong Kong SAR	UNSD	1996
China: Macao SAR	UNSD	1991
Colombia	DHS	2005
Cote d'Ivoire	DHS	1998
Cyprus	UNSD	1992
Dominican	DHS	2002
Ecuador	UNSD	1990

Egypt	DHS	2003
El Salvador	UNSD	1992
Gabon	DHS	2000
Ghana	DHS	2003
Guatemala	DHS	1998
India	DHS	1998
Indonesia	DHS	2002
Israel	UNSD	2002
Jordan	UNSD	1993
Kazakhstan	DHS	1999
Kenya	DHS	2003
Kyrgyz	DHS	1997
Mauritius	UNSD	1990
Morocco	DHS	2003
Nicaragua	DHS	2001
Nigeria	DHS	2003
Peru	DHS	2003
Philippines	DHS	2003
Saint Lucia	UNSD	2001
Singapore	UNSD	1990
South Africa	DHS	1998
Tunisia	DHS	1998
Turkey	UNSD	2000
Uruguay	UNSD	1996
Uzbekistan	DHS	1996
Vietnam	DHS	2002
Zimbabwe	DHS	1999
Least developed countries		
Bangladesh	DHS	2004
Benin	DHS	2001
Burkina Faso	DHS	2003
CAR	DHS	1994
Chad	DHS	2004
Comoros	DHS	1996
Ethiopia	DHS	2000
Guinea	DHS	1999
Haiti	DHS	2000
Madagascar	DHS	2003
Malawi	DHS	2000
Mali	DHS	2001
Mozambique	DHS	2003
Namibia	DHS	2000
Nepal	DHS	2001
Niger	DHS	1998
Rwanda	DHS	2000
Senegal	DHS	1997
United Republic of Tanzania	DHS	1999
Togo	DHS	1998
Uganda	DHS	2000
Zambia	DHS	2001