THE DECLINE IN MARRIAGE IN ISRAEL, 1960-2007: PERIOD OR COHORT EFFECT?

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Abstract: Two economic and one ideational explanation dominate the current debate over the decline in marriage. It has been difficult to test the hypothesis that the decline is the result of attitudinal change. The ideational hypothesis, however, predicts that the decline in marriage partly is a cohort effect. Thus, the ideational hypothesis can be falsified by the absence of cohort influences in the decline. Three major findings emerge from our analysis of the Israeli censuses of 1972, 1983, 1995 and 2008. First, until 1990-94 the decline in marriage was a period effect. Second, after 1990-94, the decline was a cohort effect, as predicted by the hypothesis that the decline is the result of attitudinal change. Third, we replicate the results of previous research which has shown that the decline in marriage is not the result of an increase in female education, as predicted by the economic independence hypothesis.

The Decline in Marriage in Israel, 1960-2007: Period or Cohort Effect?

1. Introduction

In the last four decades the developed countries have experienced great decline in the marriage rates of both men and women. Three explanations –two economic and one ideational– dominate the current debate over the decline in marriage (Billari, Liefbroer, and Philipov, 2006; Kalmijn, 2007). One economic explanation stresses the role of men and asserts that the decline in young men's labor-market position caused marriage to decline (Oppenheimer, 1988). A second economic explanation stresses the role of women and is based on the theory of gains to marriage that is closely associated with Becker (1991). It asserts that the increased economic power of women has diminished their economic reliance on men and has made marriage less desirable (Bachrach, Hindin, and Thomson, 2000; Sassler and Schoen, 1999). Much of the empirical work on the economic independence hypothesis has been generally negative (Oppenheimer et al., 1997).

Cultural innovation or ideational shifts in the ethical, religious and political realm are a commonly invoked third explanation for changes in marriage (Lesthaeghe and Van de Kaa, 1986). It has been difficult to test the third hypothesis formally. Cross-sectional studies have reported a relationship between marriage patterns and attitudes (e.g. Lesthaeghe and Neidert, 2006), but to the best of our knowledge there are no longitudinal studies of the relationship that determine the extent to which the decline in marriage is associated with attitudinal *change*.

Lesthaeghe and Surkyn (1988) argue that the major mechanism for attitudinal change is the demographic dynamic of cohort succession: when an older birth cohort

dies out, it is replaced by a new cohort that holds different values reflecting its unique historical experience. Of course attitudinal change may also be a period effect, but to the extent that attitudinal change is a cohort effect, then the hypothesis that the decline is due to attitudinal change can be falsified by the absence of cohort influences in the decline. Previous research has already tested the hypothesis that attitudinal change causes marital fertility to decline by searching for cohort effects (e.g. Raftery et al., 1995; Schellekens and van Poppel, 2012). To the best of our knowledge, however, this has not yet been done in the study of the decline of marriage.

Using the twenty per cent samples of the Israeli Censuses of 1972, 1983, 1995 and 2008 this study will try to determine to what extent the decline in marriage is a cohort effect. In most developed countries, the census does not ask or has stopped asking questions about age at first marriage. The Israeli census is one of the few that still does. Although family surveys in many developed countries continue to provide information on marriage patterns, early surveys did not interview single women. Thus, the Israeli data provide a rare opportunity to test the hypothesis that the decline in marriage is a cohort effect.

Our empirical results show that until 1990-94 the decline in marriage is a period effect, but that after 1990-94 it is a cohort effect. Thus, we cannot reject the hypothesis that the decline is partly the result of attitudinal change. In the last section we will discuss the extent to which economic explanations for the decline in marriage can accommodate the observed cohort effects. We also replicate the results of previous research which has shown that the decline in marriage is not the result of an increase in female education, as predicted by the economic independence hypothesis.

2. Cohort and period theories of marriage

Using Dixon's (1971) framework, we review cohort and period theories of marriage in terms of three mediating factors between social structure and marriage behavior: availability of mates, feasibility of marriage, and desirability of marriage. The availability of mates is determined primarily by the sex ratio of persons of marriageable age within endogamous groups. Feasibility is determined primarily by expectations regarding financial and residential independence of the newly married couple and by the availability of resources for meeting these obligations. The desirability of marriage, or the strength of the motivation to marry, is determined by the availability of social and institutional alternatives to marriage and by the extent to which these alternatives are considered rewarding.

2.1. AVAILABILITY OF MATES

The availability of mates is unlikely to be the major explanation for a phenomenon that has affected both men and women in much the same way. According to marriage squeeze theory, baby-boom women should have experienced a much less favorable market than those born earlier, because of their large numbers relative to non-baby-boom men a few years older. For men, the large cohorts of baby-boom women should give those born in the years right before the baby-boom a greater advantage in finding a mate, compared with men born earlier (Goldman, Westoff, and Hammerslough, 1984; Goldscheider and Waite, 1986). In Israel a marriage squeeze may have contributed to the early stages of the decline in marriage among women and to a rise in marriage among men in the late 1960s and early 1970s, when relatively large cohorts of women born in the late forties and early fifties entered the marriage market (Ben-Moshe, 1989).

2.2. FEASIBILITY OF MARRIAGE

The economic instability hypothesis asserts that marriage has become less feasible. It stresses the role of men and is based on the idea that marriage requires economic resources and stability. It has long been recognized that marriage increases in times of prosperity and declines in times of recession (Bracher and Santow, 1998: 275). Empirical studies generally support the view that unemployment and low earnings among men lead to delays in marriage (e.g. Ahn and Mira, 2001; Bracher and Santow, 1998; Kalmijn and Luijkx, 2005; Kravdal, 1999; Liefbroer and Corijn, 1999; Lloyd and South, 1996; Oppenheimer, 2003; Raz-Yurovich, 2010; Sassler and Goldscheider, 2004; Sassler and Schoen, 1999; Sweeney, 2002; Xie et al., 2003).

Oppenheimer (1988) asserted that a decline in young men's labor-market position is the major explanation for the decline in marriage. A major impediment to making a long-term commitment is the uncertain nature of future characteristics and a major source of uncertainty lies in the timing of the transition to a stable work career. Empirical studies support the view that instabilities in young men's careers lead to delays in marriage (e.g. Bukodi, 2012). Although Oppenheimer et al. (1997) found that long-term labor-market position had an impact on marriage formation among blacks and whites, Wood (1995) found that the shrinking pool of high-earning, young African-American men explains little of the decline in African-American marriage in the United States during the 1970s.

Easterlin (1978) presented a cohort version of the economic instability hypothesis. He argued that the sharp decline in the relative economic position of young males is because of the entry into the labor market of baby-boom cohorts that are large relative to older cohorts. According to Easterlin's relative cohort-size model,

the trend in marriage should reverse itself as baby-bust cohorts reach young adulthood. Trovato (1988) tested the model in Canada and found support for it, but his study stopped in 1985 and, hence, did not include baby-bust cohorts.

2.3. Desirability of marriage

Two explanations for the decline in marriage assert that marriage has become less desirable. The economic independence model stresses the role of women and asserts that the increased economic power of women has made marriage less desirable, whereas the second demographic transition theory asserts that ideational change has made cohabitation an acceptable alternative to formal marriage.

2.3.1. Economic independence model

The economic independence model asserts that increases in educational attainment, growth in employment opportunities, and a rise in rates of labor-force participation have diminished women's economic reliance on men and have made marriage less desirable (Sassler and Schoen, 1999). Much of the empirical work on the independence hypothesis has been generally negative. Under the independence argument, better educated women should be more economically independent of marriage. Micro-level regression analyses, however, have shown that once school enrollment is taken into account, better educated women do not have a lower probability to marry (Blossfeld and Jaenichen, 1992; Goldscheider et al., 2001; Oppenheimer et al., 1997; Raymo, 2003; Raz-Yurovich, 2010; Santow and Bracher, 1994). Neither are women with a greater degree of economic self-sufficiency less likely to marry (Bracher and Santow, 1998). Raz-Yurovich (2010), however, did find an "independence" effect among women with the highest earnings.

Educational increases have been attributed to cohort succession (Wilson, Zozula and Gove, 2011). Hence, if female educational attainment is the driving force in the economic independence model, then the decline in marriage should be a cohort effect. To prevent confusion between the economic independence model and other hypotheses that predict cohort effects, we estimate cohort effects net of educational attainment.

2.3.2. Second demographic transition theory

In many countries cohabitation has become an alternative to formal marriage, at least a temporary one (Kiernan and Eldridge, 1987). Thus, part of the decline in marriage has been offset by increased living together without being married (Bumpass and Sweet, 1989; Haskey, 2001; Leridon and Villeneuve-Gokalp, 1988). Cohabitation is usually associated with a change in attitudes and values (Clarkberg, Stolzenberg, and Waite, 1995; Thornton et al., 1995). Lesthaeghe has made a powerful case that ideational change is strongly implicated in the decline in marriage (Lesthaeghe and Neidert, 2006; Lesthaeghe and Surkyn, 1988). Ideational change as an explanation for the decline in marriage has received much less attention than the other two explanations, perhaps because the hypothesis that ideational change causes marriage to decline is much more difficult to falsify.

A central socio-psychological postulate is that cohorts tend to be marked for life by the ideas prevalent in their youth (Ryder, 1965: 851). Following Inglehart (1985), Lesthaeghe and Surkyn (1988: 17-23) asserted that a major mechanism for attitudinal change is the demographic dynamic of cohort succession: when an older generation dies out, it is replaced by a new cohort that holds different values reflecting its unique historical experience.

In the social sciences there is a continuing debate between those who describe people as making choices "rationally" on the basis of available information and those who emphasize a wide variety of distorting psychological influences. One area of continuing empirical clash between these perspectives focuses on the long-term stability of attitudes. At one extreme is the view that basic attitudes are always susceptible to change given compelling evidence. At the other extreme is the view that basic attitudes are acquired early and persist throughout life. Much of the evidence for value systems to have crystallized by early adulthood comes from the study of political socialization. Several studies of political socialization suggest that people are highly vulnerable to shifts in attitudes during early adulthood. Attitude stability increases with age. This increase appears to occur immediately following early adulthood, and attitude stability appears to remain at a constant, high level for the remainder of the life cycle (Alwin and Krosnick, 1991; Firebaugh and Chen, 1995; Inglehart, 1985; Inglehart and Abramson, 1994; Sears and Valentino, 1997; Tilley, 2002).

Of course, Inglehart (1985) does not argue that attitudinal influences operate entirely through cohort effects. Firebaugh and Davis (1988), as one example, find that cohort replacement and within-cohort change contribute equally to changes in anti-black prejudice in the US. Thus, the assertion that if there are no cohort effects, there are not ideational effects is probably wrong. To the extent that attitudinal influences do operate through cohort effects, however, the hypothesis that the decline in marriage is due to attitudinal change can be falsified by the absence of cohort influences in the decline.

Lesthaeghe and Surkyn (1988) associated attitudinal change with the process of secularization. Although many studies of trends in religiosity have reported cohort

influences, there is also evidence for period influences, especially in the U.S. (Argue, Johnson and White, 1999; Chaves, 1989; Crockett and Voas, 2006; Schwadel, 2011; Te Grotenhuis and Scheepers, 2001; Tilley, 2003; Voas and Crockett, 2005).

Of course, explanations based on attitudinal change raise the question whether attitudinal change is endogenous or not. Some think that attitudinal change is primarily an effect, rather than a cause, of changed behavior (e.g. Easterlin, 1978). The birth control pill, for example, may have enabled a change in attitudes toward cohabitation and premarital sex insofar as its availability reduced the risks of sex outside marriage (Goldin and Katz, 2000; Goldin and Katz, 2002; Kiernan and Eldridge, 1987: 61; Preston, 1986: 183). Lesthaeghe and Surkyn (1988: 39) argued that economic circumstances affect the value orientations of the socializing generation and open or close possibilities for cultural diffusion.

To the extent that another shift in attitudes toward cohabitation and premarital sex is unlikely to occur, second demographic transition theory does not predict that the trend in marriage will reverse itself in the near future. The economic instability hypothesis, on the other hand, predicts a reversal in case of an improvement in young men's labor-market position. In particular, Easterlin's version of the economic instability hypothesis predicts an improvement in young men's labor-market position as relatively small cohorts reach young adulthood. Like Lesthaeghe and Surkyn (1988), Easterlin's relative cohort-size model predicts cohort effects. Unlike second demographic transition theory, however, his model predicts that the trend in marriage will reverse itself as relatively small cohorts will reach young adulthood.

3. Data and variables

Our data come from the twenty percent samples of the Israeli censuses of 1972, 1983, 1995 and 2008. The Palestinian Arab minority group has been omitted from the analysis. Most of these are Muslims who were still in the first demographic transition when the Jewish majority started to enter the second demographic transition. Thus, major trends in marriage are different for the two groups. Further justification for a separate analysis of the two ethnic groups in Israel is the very low rate of intermarriage.

Like all other developed countries, Israel has undergone changes in reproductive behavior in the last four decades, although not all of these are as dramatic as those that have occurred in other developed countries (Friedlander and Feldmann, 1993). Cohabitation in Israel is mainly a child-free prelude to marriage (Baloush-Kleinman and Sharlin, 2004). No official statistics are available. Evidence from the Israeli sample of the 2008 European Social Survey, however, indicates a steep rise in the proportion of ever having cohabitated among those born in the mid 1960s (Bystrov, 2012: 277).

We used the questions on year of only and first marriage in each census to reconstruct trends in nuptiality among cohorts born in 1926-1987 and model marriage between ages 20 and 35. Each census was only used for nuptiality in the period starting in the year of the previous census and ending before the year of the census, except for males in the 1995 Census. In the 1983 Census, males aged 18-24 were listed as being 21 years old. Hence, we used the 1995 Census to reconstruct trends in male nuptiality in 1979-1994 instead of 1983-1994.

Lesthaeghe and Surkyn (1988) argued that the major mechanism for attitudinal change is the demographic dynamic of cohort succession. Hence, we used a set of

dummy variables to model the effects of cohorts. We divided the sample into thirteen five-year birth cohorts, the reference category being 1960-64. In order to estimate net cohort effects we need to control for (age and) period effects. We divided the years 1960-2007 into ten five-year periods, the reference period being 1960-64.

The economic independence model asserts that increases in educational attainment indirectly have diminished women's economic reliance on men and have made marriage less desirable (Sassler and Schoen, 1999). Two distinct education vectors were constructed for each person from information on the number of years of schooling. The first –educational status– charts yearly participation in education. The second vector –educational level– reflects actual attainment (Hoem and Kreyenfeld, 2006; Santow and Bracher, 1994: 478). Our assumption that all respondents followed a model educational trajectory without interruptions, except for a few years of military or national service, may not be unreasonable (e.g. Raymo, 2003; Zabel, 2009). Whereas education may affect marriage, there may also be a reverse effect of marriage on education, because women who marry may drop out of school. To minimize this problem of endogeneity, we used educational status and level in year *t*-1 to model marriage in year *t*. We converted educational level into two dummy variables indicating 0-8 and 13+ years of education, senior high school (9-12 years) being the reference category.

Most Jewish men serve in the army for three years at age 18-20. Hence, a dummy variable was added to indicate military service. Our analysis starts at age 20. Therefore there is no need to add a dummy variable for military or national service among women at age 18-19.

Israel is a country of immigration. Therefore, it is important to control for immigration and countries of origin where marriage tended to be at younger ages than

Israel at the time of migration, such as North Africa, the Near East and the former Soviet Union (Scherbov and van Vianen, 2001). Hence, we added a variable indicating Oriental origin and one indicating birth in the former Soviet Union. Finally, immigrants may have spent most of their formative years abroad. Hence, we only included immigrants who arrived before they were ten years old.

4. Analytic approach

The census only lists the calendar year of marriage. Hence, a discrete-time hazard model is used to assess the effects of the independent variables on the probability of marrying. We have assumed that the hazard for a marriage is constant within annual intervals. We estimate discrete-time event-history models using logistic regression. This kind of analysis can accommodate two common features of event histories: censored data and time-varying variables, such as age and educational status and attainment (Allison, 2010).

The logistic regression model assumes that the observations are independent, but since observations from the same subject are likely to be correlated, this is not usually a reasonable assumption. We do not model the probability that an individual will marry in year *t*, however, but the *conditional* probability that an individual will marry in year *t* given that the individual is single in year *t*-1. In such a case there is no need to correct standard errors for clustering in individuals (Singer and Willett, 2003: 384).

The dependent variable in the statistical model is the annual log odds of marrying in Israel. The unit of analysis is the "person-year"; that is, each person contributes as many units to the analysis as the number for which he/she is observed. Person-years below age 20 were omitted from the analysis, thus excluding most of the

years spent in military and national service. Records were right-censored at age 35 or at the beginning of the year of the census, whichever came first. After left-truncation at immigration to Israel and the beginning of 1960, whichever came last, Jewish men and women contributed 1,384,559 and 1,008,008 person-years to the analysis, respectively.

Our review of the literature identified two hypotheses –Easterlin's relative cohort-size model and Lesthaeghe's second demographic transition– that predict cohort influences. Age-period-cohort models are particularly useful to detect the distinct impacts of age, period, and cohort on some outcome of interest. Disentangling the distinct effects of age, period and cohort, however, involves a methodological problem, because the three are perfectly correlated. There are at least three conventional strategies for dealing with this identification problem: (1) constraining two or more of the age, period, or cohort coefficients to be equal; (2) transforming at least one of the age, period or cohort variables so that its relationship is nonlinear; and (3) assuming that the cohort or period effects are proportional to certain measured variables (Yang and Land, 2006).

Mason et al. (1973) point out that the identification problem can be solved by imposing equality constraints on categories of age, period and/or cohort. One criticism of this method is that estimates of model effect coefficients are sensitive to the arbitrary choice of the identifying constraint. Mason et al. (1973) designed their strategy for aggregate data, such as mortality rates. The identification problem for aggregate population data, however, does not necessarily transfer directly to individual-level data. We can use different temporal groupings for the age, period, and cohort variables, for example single years of age, and five-year intervals for time periods and birth cohorts, to break the linear dependency (Yang, 2008: 210).

A second strategy is to apply a parametric nonlinear transformation, such as a polynomial, to at least one of the age, period, or cohort variables so that its relationship to the others is nonlinear. Following Raftery, Lewis, and Aghajanian (1995) and Yang (2008) we chose to use a polynomial to model the effect of age. Whereas the use of a polynomial solves the problem of the arbitrary choice of the identifying constraint, this approach still is not very informative about the mechanisms by which period-related changes and cohort-related processes act on the dependent variable of interest.

"Period" is a poor proxy for some set of contemporaneous influences, and "cohort" is an equally poor proxy for influences in the past. When these influences can themselves be directly measured, there is no reason to probe for period or cohort effects (Hobcraft, Menken, and Preston, 1982). Hence, a third strategy is to constrain the effects of period and/or cohort to be proportional to some other substantive variable. Heckman and Robb (1985) term this the "proxy" variable approach because period and cohort are represented by some other variable. The "proxy" variable approach, however, also has its drawbacks. Although replacing an accounting dimension with measured variables solves an identification problem, it makes room for specification errors (Smith, Mason and Fienberg, 1982). Thus, replacing the period dummy variables by proxy variables may lessen the rigorousness of the control for the period effects on cohort differences (O'Brien, 2000: 125).

We performed several preliminary analyses using GNP per capita, the unemployment rate and the inflation rate as proxies for period effects. Although trends in cohort effects are similar in models that use proxy variables for period effects and those that do not use proxies, cohort effects in models that use proxies tend to be smaller than those in models without proxies for period effects. Hence, we

only present models that solve the identification problem by using a polynomial to model the effect of age. Our substantive conclusions, however, would not change, if we were to replace period dummy variables by proxy variables (results not shown).

5. Results

Non-marriage in Israel is still limited. In 2005, only 5.5 percent of Jewish women and seven percent of Jewish men aged 50-54 had never married (State of Israel, 2007: 146). Hence as far as the cohorts born before 1960 are concerned, the analysis presented below is mostly one of delayed marriage.

Figures 1 and 2 present first marriage rates per 1000 person-years for Jewish women and men at ages 20-24, 25-29, and 30-34 for every single year between 1960 and 2007 as estimated from the 1972, 1983, 1995 and 2008 censuses. Whereas the largest decline in marriage rates among women occurred at age 20-24, among men the largest decline occurred at age 25-29. In the analysis, we pool age groups and model the odds of marriage at ages 20-34. Table 1 presents descriptive statistics of the variables used in the analyses.

[Table 1 and Figures 1 and 2 about here]

5.1. Logistic regression model: Women

Table 2 presents two logistic regression models of the odds of marriage among women. Coefficients are presented as odds ratios or exponents of the raw logistic coefficients. The odds ratios are multiplicative effects on the odds of marrying in any one-year interval. A coefficient of 1.00 represents no effect, a coefficient greater than 1.00 represents a positive effect, and a coefficient less than 1.00 represents a negative effect on the odds.

[Table 2 about here]

The first model is an age-period model. It shows that marriage among women has been declining since 1960-1964. The second model adds cohort dummy variables to determine the extent to which the decline in marriage is a cohort effect. All cohort dummy variables have a very significant effect on the probability of marriage. Thus, there are cohort influences, but this does not necessarily imply that the decline is a cohort effect. To determine the extent to which the decline in marriage is a cohort effect we need to compare the coefficients of the period dummy variables in the two models.

Figure 3 presents period trends in marriage in terms of odds ratios in the two models. In the age-period model, marriage in terms of odds ratios (solid line) declines almost continuously. When cohort dummies are added to the model, however, marriage in terms of odds ratios (dashed line) declines until 1990-94, after which it increases. Thus, until 1990-94, the decline is a period effect, whereas after 1990-94 the decline is a cohort effect. If not for cohort influences, after 1990-94 marriage would not have continued to decline and by 2005-07 marriage would have returned to the level of 1970-74. Hence, to the extent that attitudinal change is a cohort effect, we cannot reject the hypothesis that attitudinal change explains the decline in marriage among Jewish women after 1990-94. Of course, other hypotheses predicting that the decline is a cohort effect may also be consistent with this finding.

[Figure 3 about here]

To determine which cohorts contributed to the decline in marriage, we now take a closer look at the coefficients of the cohort dummy variables. Women born in 1960-64 had the highest odds of marriage. The odds of marriage started to decline among women born in 1965-69. Compared with previous cohorts, this cohort

experienced a large increase in the proportion of ever having cohabitated (Bystrov, 2012: 277).

Under the independence argument educational attainment will lower the odds of marriage, through a decline in women's economic reliance on men. Our results indicate, however, that educational attainment increases the odds of marriage. Thus, the independence argument does not seem to be consistent with the Israeli data, as has already been observed by Raz-Yurovich (2010). Perhaps, higher education provides greater access to more attractive marriage markets (Oppenheimer and Lew, 1995: 118).

Our results indicate that educational attainment increases the odds of marriage net of enrollment. This does not necessarily imply, however, that more educated women marry at an earlier age than less educated ones, because our results also show that enrollment lowers the odds of marriage (see also Raz-Yurovich, 2010).

As predicted, women of oriental origin and immigrants from the former Soviet Union have higher odds of marriage.

5.2. Logistic regression model: Men

Table 3 presents two logistic regression models of the odds of marriage among men. The first model is an age-period model. It shows that marriage increased until 1965-69, after which it started to decline. The second model adds cohort dummy variables to determine the extent to which the decline in marriage is a cohort effect. Figure 4 presents period trends in marriage in terms of odds ratios in the two models. It shows that among men the decline is a period effect until 1990-94 and a cohort effect after 1990-94. Thus, as far as the timing of the cohort influences is concerned, the results for men and women are identical. If not for cohort influences, after 1990-94 marriage

would not have declined and by 2005-07 marriage would have returned to the level of 1975-79. Hence, to the extent that attitudinal change is a cohort effect, we cannot reject the hypothesis that attitudinal change explains the decline in marriage among Jewish men after 1990-94.

[Table 3 and Figure 4 about here]

Figure 4 also shows that marriage among men increased in the 1960s. After controlling for cohort influences, however, little remains of the increase, suggesting that the increase in marriage among men in the 1960s was mostly a cohort effect. Perhaps this cohort effect is the result of a marriage squeeze (Ben-Moshe, 1989).

To determine which cohorts contributed to the decline in marriage, we now take a closer look at the coefficients of the cohort dummy variables. Men born in 1955-59 have the highest odds of marriage. Figure 5 compares cohort trends in marriage in terms of odds ratios among men and women. Initially, trends among men and women are very similar. Marriage started to decline among men born in 1960-64, that is one cohort before women. Among the youngest cohort of men, born in 1985-87, the decline seems to have come to a halt, whereas among women it seems to have slowed down. Results for the youngest cohort need to be treated with caution, however, because it is only observed for a short period.

[Figure 5 about here]

As among women, our results show that enrollment lowers the odds of marriage among men. Men who did not go to senior high school have the lowest odds of marriage. Unlike women, however, post-secondary education does not increase the odds of marriage. Army service has a negative effect on the odds of marriage. Unlike women, men of oriental origin do not have higher odds of marriage. As predicted, those born in the Soviet Union have higher odds of marriage.

6. Conclusion and discussion

In the last four decades more developed countries, including Israel, have experienced great decline in the marriage rates of both men and women. Three explanations –two economic and one ideational– dominate the current debate over the decline in marriage. The economic instability hypothesis stresses the role of men and asserts that the decline in young men's labor-market position caused marriage to decline. The economic independence hypothesis, on the other hand, stresses the role of women and asserts that the increased economic power of women has diminished their economic reliance on men and has made marriage less desirable. Finally, the second demographic transition theory asserts that ideational change has made cohabitation an acceptable alternative to formal marriage. It has been difficult to test the second demographic transition theory formally. Lesthaeghe and Surkyn (1988), however, argue that the major mechanism for attitudinal change is the demographic dynamic of cohort succession. Hence, it should be possible to falsify the ideational hypothesis by the absence of cohort influences in the decline of marriage.

Three major findings emerge from our analysis. First, until 1990-94 the decline in marriage is a period effect. Second, after 1990-94, the decline is a cohort effect, as predicted by the second demographic transition theory. Third, the decline is not the result of an increase in female education, as predicted by the economic independence hypothesis.

The economic instability hypothesis stresses the role of men and is based on the idea that marriage requires economic resources and security. Virtually all micro-level studies find that low earnings and unemployment decrease marriage among men (Kalmijn, 2007). Unfortunately, we were unable to test the economic instability

hypothesis. To the extent that it does not predict cohort effects, however, the economic instability hypothesis cannot explain the decline after 1990-94. Of course, it may explain the decline until 1990-94.

Richard Easterlin presented a cohort version of the economic instability hypothesis. His relative cohort-size model predicts that the decline in the relative economic position of young males is a cohort effect. Marriage decline did not start until the male cohort of 1960-64 and the female cohort of 1965-69 entered the marriage market. The male cohort of 1960-64 is not exceptionally large compared with the previous cohort, whereas the female cohort of 1965-69 is only slightly larger than the previous cohort as the result of a small baby boom that started in 1968 and lasted until 1975 (Friedlander, 1975). Easterlin's relative cohort-size model does not explain why marriage continued to decline among cohorts born in 1975-84. Hence, his model does not appear to fit the Israeli data very well.

The economic independence model asserts that increases in educational attainment, a rise in rates of labor-force participation, and increased earnings have diminished women's economic reliance on men and have made marriage less desirable (Sassler and Schoen, 1999). "Much of the empirical work on the independence hypothesis has been generally negative. At any given time, indicators of women's economic independence have not generally had a negative effect on marriage formation" (Oppenheimer et al., 1997: 311). Like Raz-Yurovich (2010) we also found no evidence for the decline in marriage in Israel being the result of increases in female educational attainment.

Educational increases have been attributed to cohort succession (Wilson, Zozula and Gove, 2011). After controlling for educational enrollment and attainment,

however, cohort influences remain. Apparently, we need to look elsewhere for an explanation of these cohort influences.

Second demographic transition theory attributes a major role to attitudinal change, possibly associated with an increase in cohabitation. According to Lesthaeghe and Surkyn (1988), education is of major importance in the dissemination process of new attitudes. This part of their hypothesis, however, is not supported by our data.

Lesthaeghe and Surkyn (1988) argued that the major mechanism for attitudinal change is cohort replacement. We do not argue that attitudinal change is a cohort effect, but to the extent that attitudinal change *partly* is a cohort effect, it should be possible to falsify the hypothesis that attitudinal change plays a major role. We used age-period-cohort models to estimate the contribution of cohort replacement. Our results seem to indicate that after 1990-94 cohort replacement was the major factor in the decline in marriage among Jewish women and men in Israel. Thus, we cannot reject the hypothesis that attitudinal change is a major explanation of the decline in marriage. To the extent that the economic instability and economic independence hypotheses do not account for the observed cohort effects and provided that no cohort theories of marriage decline have been omitted from our analysis, attitudinal change would appear to provide the best explanation for the decline after 1990-94.

If attitudinal change explains the decline after 1990-94, then cohorts born in the 1960s may have been the first to have a different attitude to cohabitation. Evidence from the Israeli sample of the 2008 European Social Survey appears to confirm this. The survey indicates a steep rise in the proportion of ever having cohabitated among those born in the mid 1960s (Bystrov, 2012: 277).

Even though other developed countries witnessed similar declines in marriage at about the same time, it is not clear to what extent it will be possible to replicate the

results from Israel in other countries. There is also a technical problem. In most developed countries, the census has stopped asking questions about age at first marriage. And although family surveys in many developed countries continue to provide information on marriage patterns, early surveys did not interview single women. But perhaps, future research will be able to replicate our results in other more developed countries by pooling census and survey data.

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Table 1 Descriptive statistics (percentages).

Variable	**Women**	**Men**
Oriental origin	46.86	49.09
Born in the USSR	1.36	1.68
Enrollment	42.03	19.75
Years of education:		
0-8 years	4.67	7.26
9-12 years	46.09	51.25
13+ years	49.24	41.49
Army service (=age 20)	-	14.58
Birth cohort:		
1926-29	0.02	0.06
1930-34	0.17	0.35
1935-39	0.75	1.45
1940-44	3.31	4.37
1945-49	7.38	7.97
1950-54	9.81	10.25
1955-59	9.64	10.37
1960-64	9.94	10.72
1965-69	12.08	12.54
1970-74	15.87	15.17
1975-79	15.66	13.95
1980-84	12.19	10.20
1985-87	3.19	2.60
Period:		
1960-64	1.86	3.01
1965-69	4.60	5.72
1970-74	7.66	8.46
1975-79	9.24	9.56
1980-84	9.90	9.28
1985-89	10.18	10.69
1990-94	13.02	13.14
1995-99	14.60	13.71
2000-04	16.96	15.57
2005-07	11.98	10.86
Person years	1,008,008	1,384,559

Note: percentages of person-years.

Table 2. Logistic regression models of the odds of marriage: Women 1960-2007.

	Age-Period Model		**Age-Period-Cohort Model**	
Variables	**e^b**	**p-value**	**e^b**	**p-value**
Age	2.002	0.000	2.169	0.000
Age squared	0.986	0.000	0.984	0.000
Oriental origin	1.076	0.000	1.051	0.000
Born in USSR	1.084	0.001	1.135	0.000
Enrollment	0.598	0.000	0.639	0.000
Years of education:				
≤ 8	0.651	0.000	0.684	0.000
9-12	1.000	-	1.000	-
13+	1.087	0.000	1.041	0.000
Period:				
1960-64	1.000	-	1.000	-
1965-69	0.854	0.000	0.636	0.000
1970-74	0.753	0.000	0.427	0.000
1975-79	0.646	0.000	0.286	0.000
1980-84	0.536	0.000	0.198	0.000
1985-89	0.560	0.000	0.197	0.000
1990-94	0.449	0.000	0.182	0.000
1995-99	0.436	0.000	0.224	0.000
2000-04	0.390	0.000	0.279	0.000
2005-07	0.331	0.000	0.328	0.000
Birth cohort:				
1926-29			0.403	0.000
1930-34			0.222	0.000
1935-39			0.264	0.000
1940-44			0.357	0.000
1945-49			0.486	0.000
1950-54			0.682	0.000
1955-59			0.908	0.000
1960-64			1.000	-
1965-69			0.910	0.000
1970-74			0.676	0.000
1975-79			0.503	0.000
1980-84			0.297	0.000
1985-87			0.241	0.000
Constant	0.000	0.000	0.000	0.000

Table 3. Logistic regression models of the odds of marriage: Men 1960-2007.

	Age-Period Model		**Age-Period-Cohort Model**	
Variables	**e^b**	**p-value**	**e^b**	**p-value**
Age	4.065	0.000	4.312	0.000
Age squared	0.976	0.000	0.975	0.000
Oriental origin	1.016	0.010	1.002	0.809
Born in USSR	1.094	0.000	1.135	0.000
Enrollment	0.783	0.000	0.807	0.000
Years of education:				
≤ 8	0.732	0.000	0.746	0.000
9-12	1.000	-	1.000	-
13+	0.983	0.021	0.972	0.000
Army service	0.508	0.000	0.506	0.000
Period:				
1960-64	1.000	-	1.000	-
1965-69	1.208	0.000	0.975	0.299
1970-74	1.158	0.000	0.816	0.000
1975-79	0.934	0.000	0.611	0.000
1980-84	0.745	0.000	0.480	0.000
1985-89	0.626	0.000	0.430	0.000
1990-94	0.536	0.000	0.426	0.000
1995-99	0.487	0.000	0.471	0.000
2000-04	0.444	0.000	0.546	0.000
2005-07	0.387	0.000	0.576	0.000
Birth cohort:				
1926-29			0.494	0.000
1930-34			0.488	0.000
1935-39			0.661	0.000
1940-44			0.779	0.000
1945-49			0.926	0.000
1950-54			1.043	0.000
1955-59			1.083	0.000
1960-64			1.000	-
1965-69			0.853	0.000
1970-74			0.675	0.000
1975-79			0.520	0.000
1980-84			0.388	0.000
1985-87			0.459	0.000
Constant	0.000	0.000	0.000	0.000

Figure 1. Female first marriage rates per 1000 person-years by age, 1960-2007.

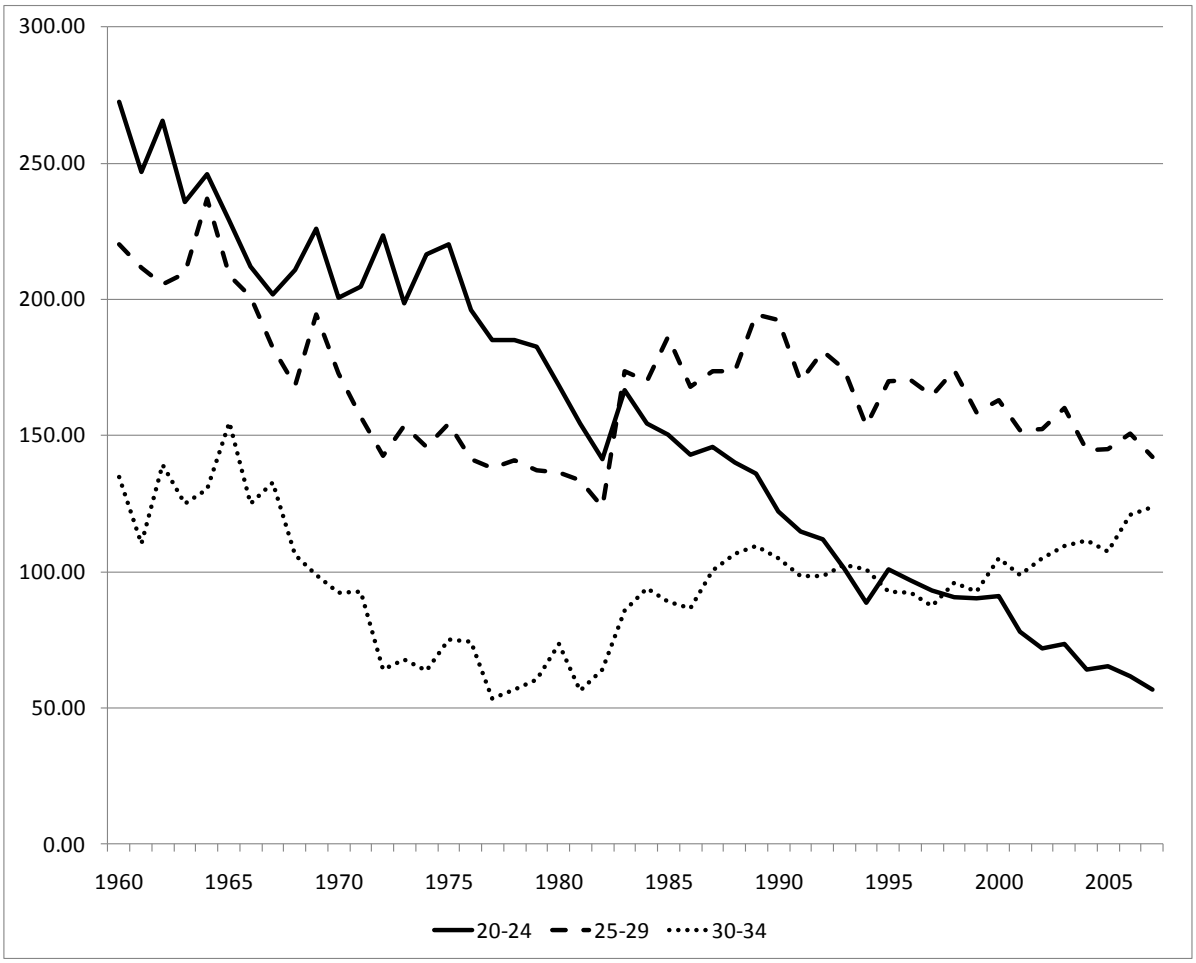

Figure 2. Male first marriage rates per 1000 person-years by age, 1960-2007.

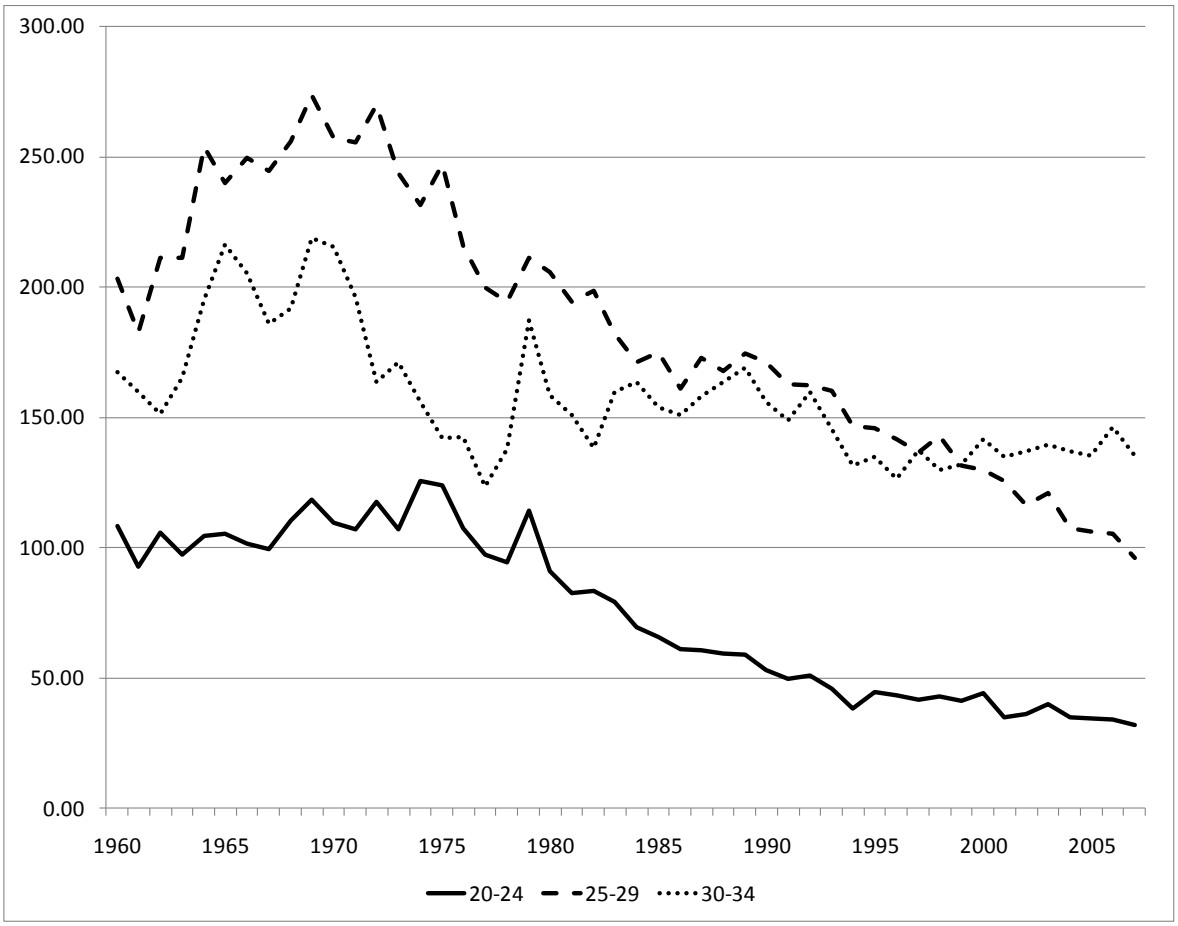

Figure 3. Period trends in marriage in terms of odds ratios: women, 1960-2007.

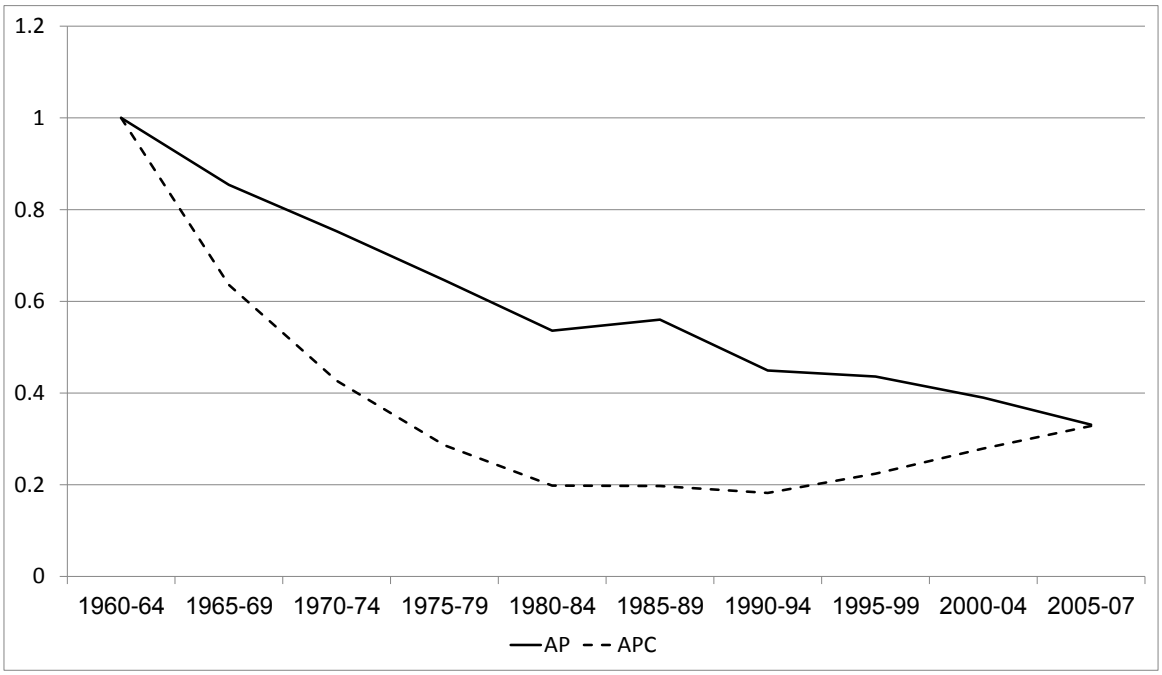

Figure 4. Period trends in marriage in terms of odds ratios: men, 1960-2007.

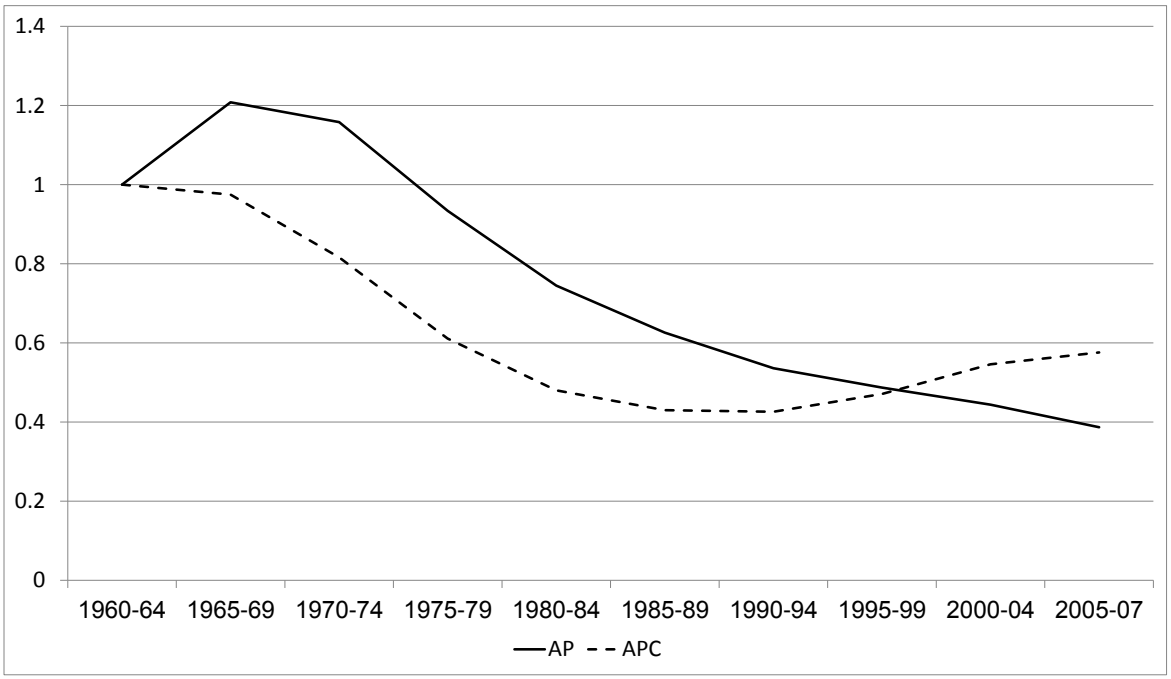

Figure 5. Cohort trends in marriage by sex in terms of odds ratios: 1926-1987.