Can Grandma help with the Kids, or does Mom Need to Care for Grandma, or is Grandma Herself Busy Taking Care of Great-Grandma?

A Demographic Analysis of the Sandwich Generation

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Abstract

Demographic change is characterized by longer life, later childbearing and fewer children. This paper looks at the implications of demographic change for the availability and care needs of multigenerational families using stable population and microsimulation models. Our methods allow us to answer questions such as: Are new mothers more or less likely than in the past to be sandwiched between caring for both their own parents and their own children? Is the availability of healthy grandmothers who could help with childcare increasing, or is grandma too busy taking care of her own parents? What is the frequency of only children who are responsible for both their sick parents and their newborn children? Our preliminary findings suggest that we are currently in a kind of "Golden Age" of grandmotherhood availability, better than both the past and the likely future.

EXTENDED ABSTRACT

Introduction

Demographers, it seems, cannot leave their grandmothers alone. If grandma is healthy and working, we ask how in the world natural selection could have let this happen (e.g., Cant and Johnstone 2008; Hawkes et al. 1998). If she is not, then we ponder the implications of inter-generational transfers flowing "upward" (e.g., Lee and Mason 2010).

At the root of each of these important branches of research is a straightforward empirical question: "How much and under what conditions do human generations overlap"? Or, in other words, how much of the human life cycle is spent in presence of multiple generations.

Demographic trends in developed countries have resulted in population aging and changes in the structure and size of kin networks. There has been an increasing interest for the consequences of the changing demography on mid-life adults, who may experience the simultaneous responsibility of caring for children and elderly parents. The concept of parents raising dependent children, while also having frail parents, has been popularized with the name of "sandwich generation". In this paper, we evaluate the demographic constraints on the overlap of generations in developed countries. In particular, we test whether the existence of a "sandwich generation" is consistent with observed vital rates.

At first glance, it would seem that as the Demographic Transition progresses, generational overlap would increase. Mortality decline implies longer life spans, which, in turn, are associated with higher probabilities for children to have living grandparents. On the other hand, fertility decline and postponement work in the opposite direction. As women have fewer children, and later in their lifecourse, the probability and likely duration of grandparenthood declines, ceteris paribus. The relative importance of changing patterns in mortality and fertility is not obvious, especially because of their cumulative nature with generations. How long one spends as a grandmother is affected by not only one's own (delayed) fertility and (reduced) mortality but also by ones' daughter's as well.

In this paper, we first present a simple model for the case of stable population with Gompertz-like mortality rates. The model provides some intuitive results on the relative impact of changes in mortality and fertility on the extent of overlapping generations. We then use a more detailed microsimulation model, which is calibrated on data for the United States, to estimate and project the evolution of kinship structure over time, and to evaluate which generations are more adversely impacted by the demographic change.

A simple model

The extent to which generations overlap is a function of the evolution of mortality and fertility rates over time. If the generation length (i.e., the mean age at childbearing) is fairly constant, then increases in longevity are associated with a higher number of overlapping generations. If the life expectancy is fairly constant, then increases in the mean age at childbearing will reduce the expected number of overlapping generations. The relative importance of fertility and mortality change can be analyzed using the stable population theory. Goodman, Keyfitz and Pullum (1974) proposed classic approximations for the probabilities of having a living mother ($M_1(a)$), grandmother ($M_2(a)$) and great-grandmother ($M_3(a)$), at age a, in the context of a stable population:

$$M_1(a) \approx \frac{l(\mu+a)}{l(\mu)}\,; M_2(a) \approx \frac{l(2\mu+a)}{l(\mu)}\,; M_3(a) \approx \frac{l(3\mu+a)}{l(\mu)}$$

μ is the mean age at childbearing and $l(\mu)$ is the survival probability to age μ. $M_1(a)$ says that the probability of having a living mother at age a is approximately equal to the probability of surviving a years past the mean age at childbearing. $M_2(a)$ says that the probability of having a living grandmother at age a is approximately equal to the probability of surviving a years past two times the mean age at childbearing, etc.

The probability of having both a living grandmother and a living great-grandmother at age a is the product $M_2(a) \times M_3(a)$. Figure 1 shows some results from stable population analysis. Panel (a) shows the relationship between life expectancy and generational length on the expected probability of having a living grandmother and great-grandmother at age 5.[1] In the US, from the late 1960s to the ealry 1990s, increases in life expectancy more than compensated fertility postponement. That led to a path of increasing overlapping generations. Starting from the 1990s, the average age at childbearing has been rising at a rate that more than counteracted the improvements in life expectancy. That has resulted in a reduction of the expected number of overlapping generations. Panels (b) through (d) show some stable population approximations based on life table and mean age at childbearing for the US (data sources: Human Mortality Database and the Human Fertility Database). The values can be interpreted as limit probabilities (i.e., the probabilities that would be experienced if the vital rates for the year considered would persist unchanged for a long time). For a girl of age 5, the limit probability of having a living grandmother has been over 0.9 since the early seventies and has been fairly constant. The limit probability of having a living grandmother has been decreasing during the last couple of decades, as a consequence of fertility postponement. As a result of these two facts, the probability of having a living grandmother, but not a living great-grandmother has been increasing during the last couple of decades. The probability for grandmothers to be sandwiched between great-grandmothers and grandchildren is smaller under the current demographic regime than under the one of the early 1990s.

Preliminary results from microsimulation using SOCSIM

Life table models and survey data[2] can provide many useful insights, but they rely on strong assumptions and they also leave many questions unanswered.

- How long do "sandwich" periods last?
- What combinations of dependencies coexist and with what frequencies? How likely is it to have two, three or more elderly parents or inlaws alive while raising young children?
- How likely is it to have a sibling to share the responsibilities of helping elderly parents?
- How might all these trends evolve over time? Will today's "sandwich generation" be seen as "lucky" by its children?

[1] The isoprobability plot is generated by combining stable population approximations with Gompertz-like survival rates, so that $M_2(a) \times M_3(a) \approx e^{-\frac{\alpha}{\beta}[e^{\beta(3\mu+a)}+e^{\beta(2\mu+a)}-2e^{\beta\mu}]}$. α is kept constant, whereas β, the parameter related to senescent mortality, varies to match values of life expectancy in the range considered.

[2] A widely quoted Pew Research Center report on the US,"Baby Boomers Approach 60: From the Age of Aquarius to the Age of Responsibility" (2005) reported that 13 percent of "boomers" (aged 41-59) "are providing some financial support to an elderly parent at the same time [as] they are also either raising a minor child or supporting an adult child."

We pursue these questions with microsimulation using SOCSIM (e.g., Hammel et al. 1976; Hammel et al. 1990; Wachter et al. 1978; Wachter 1997; Wachter et al. 1997). We generate entire notional populations which behave according to demographic rates observed over the course of centuries. This technique allows us to see entire kinship networks with complete vital events dates. The model is calibrated using data from the Human Mortality Database, the Human Fertility Database, and estimates and forecasts from the United Nations World Population Prospects 2006.

Preliminary simulation runs produced the results shown in Figure 2, which shows the age patterns of the "sandwich" period across US birth cohorts. These results indicate that, relative to those born in 1930, women born in 1980 have significantly lower chances of being "sandwiched" at ages under 40. While this pattern is reversed at higher ages, overall, the graph shows that the demands on the sandwich generation seem to be diminishing.

There are some assumptions which underlie the result shown in Figure 2. Chief among them is that all grandparents are in need of care for the five year period preceding death. Our definition of "sandwich" in Figure 2 is "having at least one child under 10 and at least one parent within 5 years of death". Clearly, aging parents are not necessarily a burden. Even during the last five years of life, it is quite possible that grandparents might provide considerable benefits. Nonetheless our results suggest that it is relatively rare to bear the burden of support for both young children and old parents simultaneously, and that in the future it will be rarer still. It is however likely that, as fertility postponement reaches its limits, gains in life expectancy will continue on their path. As a result, more and more healthy grandmothers will find themselves "sandwiched" between caring for young grandchildren and frail great-grandparents.

References

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Figures

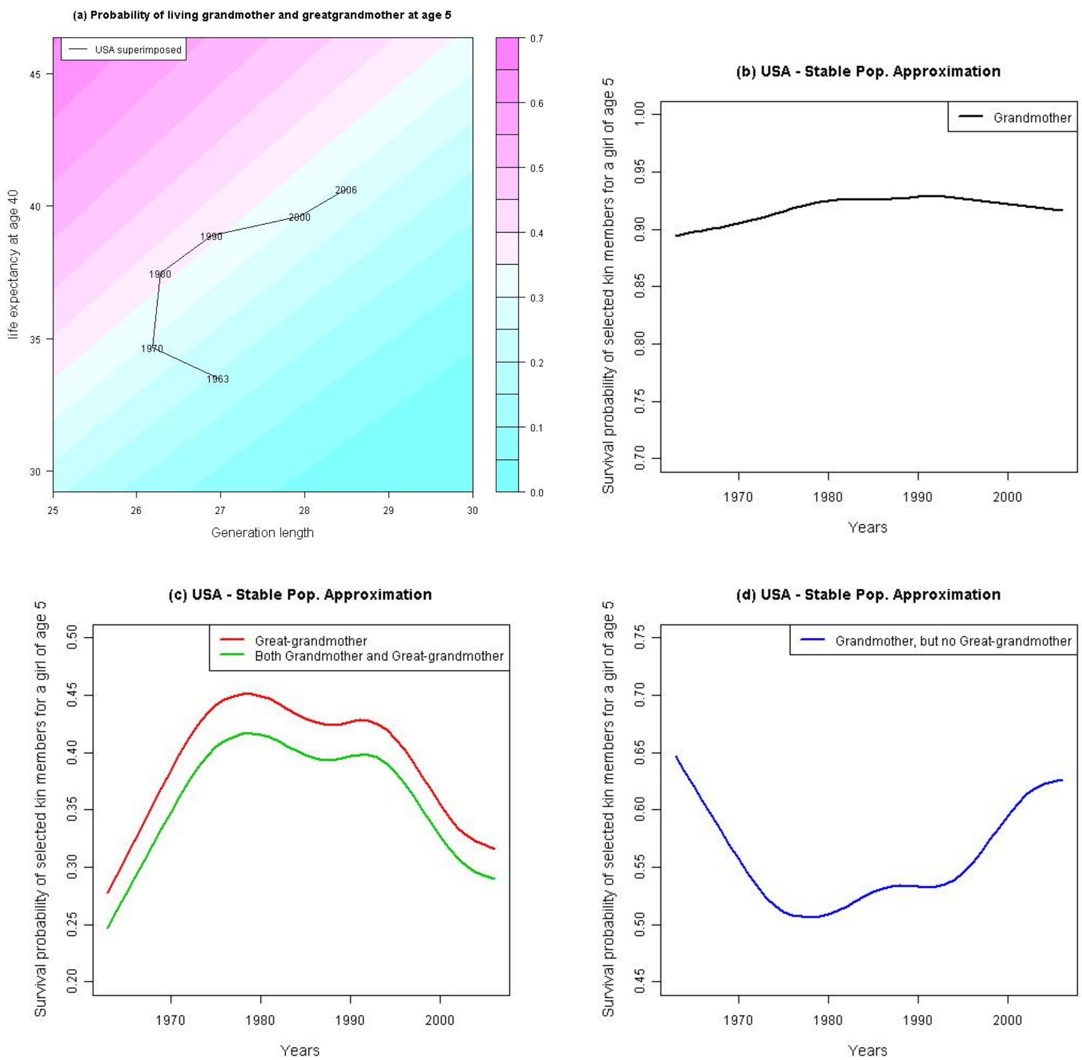

Figure 1: Limit survival probabilities of selected kin members for a girl of age 5 in the US. The calculations are based on stable population approximations. Data sources: Human Mortality Database and Human Fertility Database.

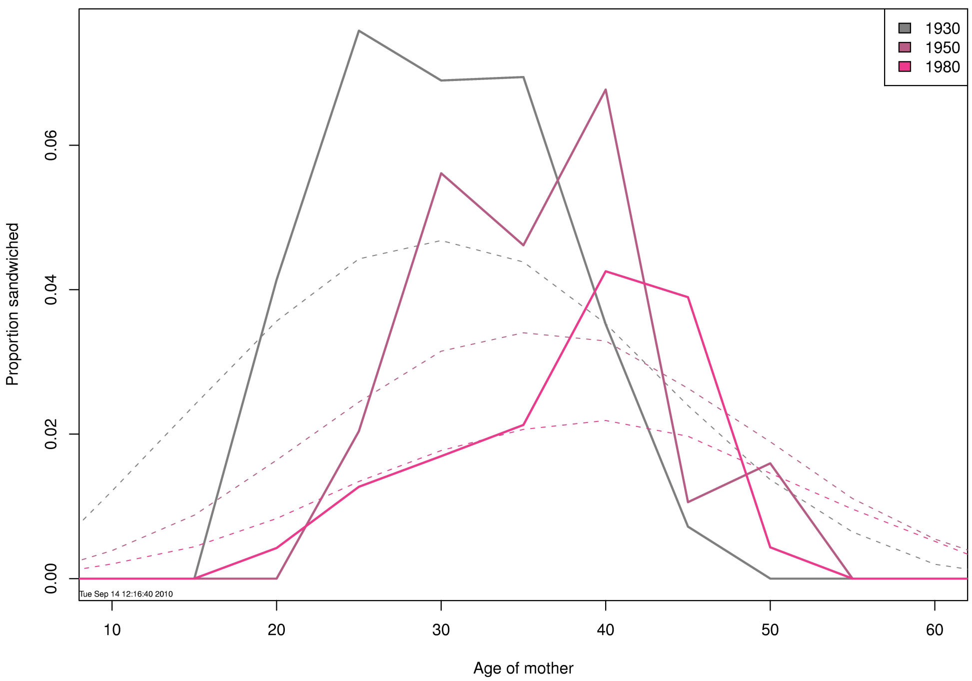

Figure 2: Age pattern of sandwich period for mothers, by birth cohort of mothers. The results are obtained from microsimulation using SOCSIM.