Migration, Retirement, and Aging in Stable Populations

Fernando Riosmena, Maria Winkler-Dworak, Alexia Prskawetz, and Gustav Feichtinger

Fernando Riosmena. Population Program, Institute of Behavioral Science and Department of Geography, University of Colorado at Boulder. 1440 15th St. 483 UCB. Boulder, CO. 80302. USA. Tel: +1-303-492-1476. Fax: +1- 303-492-215. Email: Fernando.Riosmena@colorado.edu.

Maria Winkler-Dworak, Vienna Institute of Demography (Austrian Academy of Sciences) and Wittgenstein Centre for Demography and Global Human Capital. Wohllebengasse 12-14/6th floor. 1040 Vienna, Austria.

Alexia Prskawetz, Institute of Mathematical Methods in Economics (Vienna University of Technology), Vienna Institute of Demography (Austrian Academy of Sciences), and Wittgenstein Centre for Demography and Global Human Capital. Wohllebengasse 12-14/6th floor. 1040 Vienna, Austria.

Gustav Feichtinger, Institute of Mathematical Methods in Economics (Vienna University of Technology), Vienna Institute of Demography (Austrian Academy of Sciences), and Wittgenstein Centre for Demography and Global Human Capital. Wohllebengasse 12-14/6th floor. 1040 Vienna, Austria.

ABSTRACT

Immigration has drawn attention as a potential contributor to solve some of the problems associated with population ageing. However, previous studies have deemed it as an inefficient way to rejuvenate the population, and one that would generate unrealistic growth levels in many ageing nations. While this literature as a whole highlights the trade-offs between the rejuvenating and growth effects of immigration, most studies look at either of these effects, rarely concentrating on the actual trade-off between them. Further, these studies have used a stable population model with fixed migrant inflows or, in one study, tying migrant flows to a share of the birth flow. We argue that a fixed inflow or a target tied to the number of births may not yield an optimal or realistic solution to the aforementioned trade-off and propose the use of an immigration regime in which the number of migrants is tied to labour market needs, approximated by the difference between retirees and new labour force entrants in a given year. Guided by prior work on the optimal age composition of intake into organizations, aimed to reduce ageing while curbing growth, we also propose the use of a bimodal age distribution of immigration that includes members both just entering the labour force in addition to older individuals close to leaving it. In addition to being optimal in terms of its rejuvenating/growth effects on the mean age, we study the implications of using such a schedule in terms of its effects on dependency ratios vis-à-vis more commonly-used age distributions of immigration. We illustrate these effects using the case of eleven European, East Asian, and North American nations with varying levels of below replacement fertility, with all also undergoing substantial ageing, and which have had sizable immigration in the recent past.

Keywords: Ageing; immigration; stable population models; dependency ratios

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INTRODUCTION

It is well known that many nations are undergoing substantial population ageing (e.g., Bongaarts 2009; Uhlenberg 2009). Under the prevailing social security systems, labour market policies, and institutional frameworks of most nations, ageing poses economic challenges and could endanger the sustainability of economic growth (see works in Prskawetz, Bloom and Lutz 2008). Immigration has drawn attention as a potential contributor to solve some of the problems associated with future population ageing. However, previous studies have deemed it as an inefficient rejuvenation strategy (Schmertmann 1992; Wu and Li 2003), and one that could further generate unrealistic growth levels for many countries if tied to anti-ageing objectives (Blanchet 1989; Coleman 2002; Espenshade 2001; United Nations 2001).

Although these studies as a whole highlight the trade-offs between the rejuvenating and growth effects of immigration, they have only looked at either side of the trade-off using a narrow set of migration scenarios. Most studies looking at the long-term ageing or the medium-run growth implications of immigration have used a stable population model (SPM) with fixed migrant inflows introduced by Espenshade, Bouvier, and Arthur (1982), in which a below-replacement population becomes stationary (i.e., attains zero-growth and a fixed age structure) by adding a constant number of immigrants (see also Arthur and Espenshade 1988; Bacaër 2003; Cerone 1987; Feichtinger and Steinmann 1992; Mitra and Cerone 1986; Schmertmann 1992; Schmidbauer and Rosch 1995; Wu and Li 2003).

As such, these studies have only looked at a special case of a more general family of SPMs open to migration (Alho 2008; Liao 2001; Pollard 1973; Preston and Coale 1982; Rogers 1990; Sivamurthy 1982). For instance, Alho (2008) has recently used a similar

model in which the number of immigrants is not fixed (before a steady state is reached), but in which immigration is tied to (a proportion of) the birth flow. This is an interesting extension as it provides a more flexible immigration policy that could adapt to labour market conditions. Note that this regime is very similar to that of some European academies of sciences, in which the number of academicians to be elected in a given year is tied to the number of people reaching a given (retirement) age (Dawid et al. 2009; Feichtinger et al. 2011; Feichtinger et al. 2007; Riosmena et al. 2011). As such, we find the results of those studies to be informative in this context, as we discuss below.

We propose an alternative immigration regime, similar to that proposed by Alho (2008), but in which the number of immigrants is more closely tied to "net" labour demand, approximated by the difference between the number of retirees and the number of people entering the labour force.[1] As Alho (2008) notes, tying the number of immigrants to the ebbs and flows of any age group (p. 641) would still ensure long-term population stability. Furthermore, if fertility is below-replacement, the population will still become stationary in the long run under this regime (for an analogous case, see Dawid et al. 2009), as the birth (and thus immigrant) flow stabilizes into a fixed number (Feichtinger et al. 2007; Riosmena et al. 2011). It then follows that tying the number of immigrants to (a share of) the difference of the number of people at two specific ages will also lead to a stationary population.

[1] This assumes that labour demand will at least be as large as the size of the labour force at baseline and will continue to be so in the future in this fixed number. As such, we deem this assumption as mildly conservative under most technological regimes. Using this number also implicitly assumes that the net reduction in native labour supply due to ageing can be met with foreign labour supply. Although this does not mean we are assuming foreign labourers are a perfect substitute for *all* native labourers, we are indeed assuming that foreign workers can take over the jobs opened up by the retired labour force, or by native workers moving into jobs opened by the retirement of these workers. Note that some of the retired workers may be immigrants as well, so this assumption could potentially work even with segmented labour markets in which a nontrivial share of immigrants works in "secondary" (i.e., labor-intensive, capital-low) labour markets (see discussion of Segmented Labour Market Theory in Massey et al. 1993).

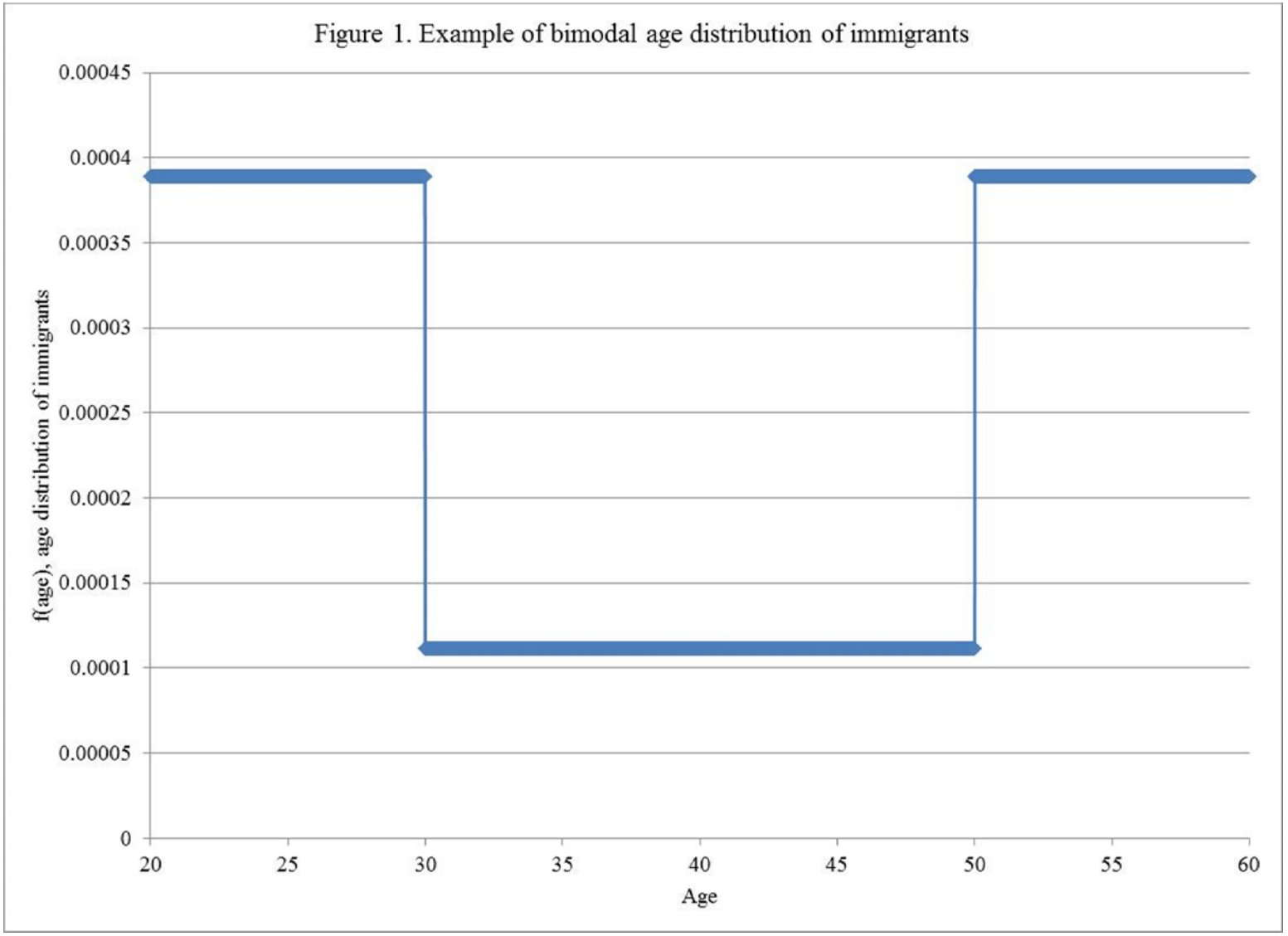
Further, studies have paid little attention to different age structures of immigration, despite the fact that the age structure (Wu and Li 2003) and ultimate size (Arthur and Espenshade 1988) of the population in these models is somewhat sensitive to the age structure of immigrants. Prior work on the optimal age composition of members elected into academies of science with a similar policy of tying the number of elections to the number of retirements has shown that the optimal intake policy for these academies is to elect new members from a bimodal age structure (Dawid et al. 2009). We use such a bimodal distribution, drawing members disproportionately from ages close to entry into and exit out of the labour force.

We illustrate these effects on the pre-transitional growth and steady-state age structure of eleven European, East Asian, and North American nations (see Table 1). All of these countries have at or (well) below replacement fertility {Billari, 2004 #102;Ediev, 2007 #94;Preston, 2007 #95}; are undergoing sizable ageing {Preston, 1989 #75;Uhlenberg, 2009 #64}; and are immigrant-receiving nations {Massey, 1998 #106}. Our baseline will be then the actual age distributions of each of these populations. We fix fertility and mortality to the average of the previous 10 years and use set immigration in a given year to the number of people reaching age 65 minus the number of people reaching age 20 and use a bimodal age distribution of immigration similar to Figure 1. We illustrate the effect of this immigration regime on the pre-transitional growth and the steady state age structure of the population of these countries.

Table 1. Countries Used in the Analysis, by Level of Recent Fertility

Level	Countries
Lowest-low (1.0 < TFR ≤ 1.3)	Spain, Italy, South Korea
Lower-low (1.3 < TFR ≤ 1.6)	Germany, Japan
Medium-low (1.6 < TFR ≤ 1.8)	Netherlands, Canada
Moderate (1.8 < TFR ≤ 2.1)	United Kingdom, United States, Sweden, France

Figure 1. Example of bimodal age distribution of immigrants



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