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# Answers from demographic policy to the aging of the population: family, labor market and migration

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Answers from demographic policy to the aging of the population: family, labor market and migration – 3rd quarter 2015

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# Abstract

This paper analyses the main demographic policy responses governments of developed countries have at their disposal to compensate for an overall declining and ageing population and, in particular, a reduction in the working-age population and labour force. Policy responses are of two types: those addressing the determinants of expected population ageing and decline (such as by affecting migration, raising fertility, etc.), and those concerning the consequences of the demographic change (such as by increasing the age of retirement, altering pension systems, etc). We review the main explanations for the declining trends in fertility levels in developed countries and discuss the role and effectiveness of family policies in promoting a critically needed re-increase in fertility levels towards the replacement level. We consider how retirement age and labour market policies can contribute to remove obstacles to achieving longer working lives. We argue that the key necessary conditions for this to happen are that social protection programs need to be selected in support of such policies that keep individuals healthy, skilled, and motivated to work longer and be productive. We critically discuss the rationale, the purpose and the economic and political challenges of immigration policies to counteract population ageing. Against this background the key policy trade-offs between demographic policy responses measured in retirement years' differentials are estimated and discussed.

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# 1. Introduction: motivation, objectives and structure

Population ageing challenges the financial sustainability of pension schemes and other old-age intensive expenditure programs such as health care and long-term care[1]. These expenditures are set to continue to rise as people live longer and generally healthier lives. Pension benefits, whether financed on a pay-as-you-go basis or funded in advance, represent a transfer of resources from the working population to the retired population and, although in different ways, are critically affected by the current and future age-structure of the population, particularly by a shrinking labour force.

It is well known that there are roughly only two ways of seeking income security in old age. One is to store current production for future use, an option that is not feasible for most goods and especially services. The second approach is for individuals to exchange production when in their active-life period for a claim on future production. This can be done either (i) by asking workers to save part of his wages in order to accumulate a portfolio of (real or financial) assets which he would exchange for goods produced by younger workers after his retirement, or (ii) by getting a promise (from his government, employer, a social institution, or relatives) that he would be given goods and services produced by younger workers after his retirement.

Although PAYG and funded systems are different financial mechanisms for organising claims on future output - the former based on the accumulation of real/financial assets, the later based on promises, - for both future output is essential even in an open economy setting where one country could try to diversify demographic risks internationally, since what matters ultimately for pensioners is to fund consumption after they have stopped working. Changes in the size and the age-structure of the population influence expected macroeconomic outcomes since they affect savings and investment behaviours, labour market decisions, aggregate demand and supply responses, the level and volatility of asset prices, and financial markets and international capital flows[2]. Pension system reforms should, therefore, be designed and implemented in a manner that supports sustainable growth and development and diminishes possible distortions in capital and labour markets.

Population aging is the result of increasing life expectancy, falling fertility rates and, in some countries, negative net (international) migration flows. The cumulative effect of population aging, increasing median age in the population, a deteriorating old-age dependency ratio, and a shrinking labour force make the financing of old-age income support increasingly challenging[3]. In Ayuso, Bravo, and Holzmann (2015a,b) we critically reviewed the demographic assumptions used by international organizations in preparing population projections and explored the effects of differences in driver assumptions on demographic outcomes, in particular median age, old-age share and demographic old-age dependency ratio.

The reforms necessary to respond to the challenges of faster than expected ageing societies and to align systems with the ongoing socioeconomic changes must be a part of a wider economic, political and social debate that is needed to (i) make pension systems sustainable, adequate and fair, (ii) increase levels of employment of the working age population, (iii) improve working conditions in order to reconcile paid work with family life, (iv) reduce labour costs through a shift in taxation, (v) create conditions for healthy active ageing, (vi) reform healthcare services while guaranteeing access and quality of care, (vii) achieve gender equality.

In this final paper of this trilogy we assess the consequences of using more realistic demographic assumptions and outcomes on key policy areas (family policy, labour market policy and pension system reform) and analyse the policy implications that are needed to offset the negative effects of ageing. To this end the structure of the paper is a follows: Section 2 discusses the role of family policies in promoting an increase in fertility levels, particularly leave entitlements, cash transfers and the provision of services, including childcare; (b) Section 3 reflects on the effectiveness of immigration policies in compensating for the demographic imbalances in developed countries; Section 4 outlines the role of retirement and labour market policies in mitigating the effects of population aging, particularly the obstacles to achieving longer and more productive working lives and the policies that can help to uphold economic growth; Section 5 presents the policy trade-offs between family, immigration, labour market and pension reform policies, while Section 6 concludes.

[1] There are potential savings through lower expenditures for education and unemployment benefits, but the magnitudes are small (see Holzmann 1987, EUCOM Ageing Report 2015).

[2] In the short run, demographic changes are likely to affect aggregate demand via consumption and investment expenditures that depend critically on structural changes in the population's age-earnings profiles and consumption patterns. In the medium to long run, both changes in the labour supply and changes in productivity could significantly alter an economy's aggregate supply and thereby, probably leading to less production and therefore a slowdown in economic growth. Over the long term, per capita income will decline and living standards will be lower. Demographic changes not only reduce labour supply in headcount terms, even if this is mitigated by endogenous and policy-induced lengthening of working lives, by also affect the combination by which its factor inputs are utilized. It may become increasingly hard to find highly skilled workers. Innovation may fall off.

[3] Interestingly, population ageing and depopulation in the developed world contrasts with accelerated population growth in other regions of the globe, a context that represents considerable economic, social, cultural and environmental challenges and requires concerted action over the short, medium and long term.

# 2. Promoting fertility: from individual decisions to family policies

Population aging and the increase in the demographic dependency ratio in Europe in recent decades is roughly half due to the decrease in the fertility rate since the hay days of the baby boom of the 1950s. Thus re-increasing the total fertility rate toward replacement level (i.e. slightly more than 2 children born by every women) promises a major easing of population aging and contribution to sustainable pensions and other age-sensitive social programs. To engage in a policy of fertility promotion and support is best done on a shared understanding of why fertility rates decreased well below replacement level, yet simple explanations do not exist. On the flip side of such knowledge gaps, the public interventions in many mature OECD countries to promote fertility had mixed outcomes which allow for some moderate optimism. In this section we briefly review the main explanations for the declining trends in fertility levels in developed countries and address the policy options governments have at their disposal to invert them, and the experience of some countries.

## 2.1. How to explain long-term trends in fertility levels?

Fertility is a multifaceted phenomenon and there are no clear cut explanations for long-term changes in fertility levels. Fertility decline in the developing world is historically correlated with the decline in child mortality, modern contraceptive methods, increasing urbanization, better education levels and, more recently, with increased employment rates for women and higher income levels that lead parents to invest in 'child quality' rather than quantity (D'Addio & Mira d'Ercole, 2005; Ayuso, Bravo, and Holzmann 2015a). Changes in personal values that emphasised self-realisation and freedom and societal changes that enforced women's rights, namely more equality in access to education and employment, which progressively led to their economic independence and hence a diversified range of family patterns (increase in divorce, smaller family units, single parents, single households) also help to explain fertility levels.

In some countries, institutional factors such as the increase in the level of individual insecurity (more precarious types of employment, youth unemployment, reduction in social welfare, employment protection legislation, etc.) also helps to explain current fertility patterns, namely the timing of birth. In other, childbearing norms, particularly the tolerance to out-of-wedlock births seems to have some impact. In the developing world, the fall of fertility levels has been accompanied by postponement of first marriage and child-bearing. A longer education for women, increased participation in the labour market for younger women, more gender equality and a different social and cultural environment help to explain this later fertility. However, the experience of some developed countries with a strong welfare state, improved conditions for women and greater institutional support (e.g., France, Ireland, Scandinavian countries) suggest that it is possible to reconcile the desire to have children with women's family and working career aspirations. Surprisingly also the opposite approach of a market-based system with close to no public family support seems to be able sustain a high fertility rate (i.e. USA), assisted by high migration inflows.

Finally, in many countries surveys show that there seems to be a gap between the expected number of children at the end of the reproductive age span, which is in many cases close to the replacement level, and the number of children that cohorts are actually likely to have. This fertility gap highlights the existing obstacles to the fulfilment of expectations, and may indicate there is a latent demand for more family support.

## 2.2. Which family policies seem to be more effective in increasing fertility levels?

In democratic societies, having children is a personal decision, in which family policies provide the context (favourable, adverse) in which those decisions are taken. Public authorities have a key role to play in supporting families in general and parents in particular. This is normally done through the three core elements of family policy: public transfers and taxation, measures to balance work and family life, childcare provision and other related services. Although many family policies have purposes other than enhancing fertility, such as reducing child poverty and income maintenance, direct compensation for the economic cost of children, improving child education, improving gender equality, supporting early childhood development, guaranteeing equal opportunities for children irrespective of their gender, status, abilities or family situation, support parenting, improve the quality of family life or encouraging female participation in the labour market, it is know that they may also have a significant effect on fertility (Thévenon, 2011).

Given this background, which family policies seem to be more effective in increasing fertility levels among developed countries? To what extent institutional factors such as attitudes towards childbearing and public policies can

influence fertility trends? How to explain a moderate fertility re-increase in some countries and not the others and what can we learn from that? Should we expect an end of the process of childbearing postponement? Is the relationship between economic development and fertility a one-way route?

The three main types of family policies designed specifically to promote fertility are (a) leave entitlements, cash transfers, and provision of services, including childcare, (b) privileged access to public housing, and (c) free or subsidised provision of medical or education services to families with children (Sleebos, 2003)[4]. Los pagos financieros o en efectivo a las familias con hijos pretenden compensar parcialmente los costes directos de tener hijos y pueden proporcionarse de muchas maneras[5]. Cash payments have long existed in developed countries. The history of child-related transfers or income subsidies in these states has generally been to support child-rearing rather than to influence how it is carried out. Hence, the motivations for introducing cash benefits for families with children were not so much to affect child-rearing practices directly but instead to offer solidarity with parents and families, encourage fertility, or as anti-poverty measure (Daly, 2013). These objectives, especially the former two, favoured a universal approach, so in many countries, especially those in Western Europe, the cash benefits were paid to all families and had no conditions attached[6].

In addition to direct income transfers, most countries offer families tax reductions or credits on the basis of the number and/or age of children. Being less expensive to administer than income transfer programs, general tax reductions differentiate between families since they provide a greater financial incentive to those paying tax at higher marginal rates. If, for the contrary, reimbursable tax credits are provided, tax reductions are reduced as income rises or a given benefit ceiling is set at relatively low income levels, the effect on disposable income may have only impact on fertility decisions of lower earning families.

Maternity or paternity leave programs offer time off work to mothers and fathers at or around the time of birth. Leave policies determine the financial compensation parents will receive as well as the maximum duration of the leave, that in some cases may extend over a number of years[7]. The provision of services, particularly the availability and affordability of formal (public or private) childcare, especially for the youngest children, is normally seen as contributing to increase fertility levels, principally in those cases where both parents want (or need) to continue working.

Empirical evidence suggests that income transfers, tax measures and the coverage of childcare services for children under age 3 have a significant positive relation to fertility[8], while the number of paid weeks of leave at birth has a much smaller influence on fertility trends. However, empirical results also show that the relative importance of policy measures varies with the welfare state context. For instance, spending on income benefits apparently has a larger influence in Nordic countries, the effect of the coverage of childcare services for children under age is weaker in English-speaking countries, extending the duration of paid leave has opposite effects in different context (positive influence in Nordic countries, but negative in South European countries). This suggests that one-size-fits-all family policies do not seem to work out, and that country specific economic, social and cultural features must be taken into account.

Long leave programs have a negative impact on female employment as women find it harder to return to work (Thevenon & Solaz, 2013). Extending paid leave beyond some level has counterproductive effects on female employment rates and, by the same token, on the gender employment gap. On the other hand, a high level of benefits, even if for a shorter leave period, seems to be more important in influencing women to have more children.

Academic studies suggest a strong correlation between fertility rates and the provision of formal childcare and/or childcare enrolment rates. Long opening hours for childcare facilities aligned with working parents schedules make the conciliation of family and work responsibilities easier. Affordability of childcare is, for most families, also very important since in many countries (e.g., Portugal) this can represent a significant fraction of a family's monthly disposable income. Countries that have high levels of public spending on childcare as a percentage of GDP (France, Denmark, Sweden, UK, Finland), making it more affordable for parents, are also among the ones with the highest fertility rates in the developed world.

Other policies seem to be important when it comes to reproductive decisions. For instance, in most countries and families women assume the greater part of household and

[4] Other policies influence reproductive decisions indirectly by changing the environment in which decisions by families about the number of children they wish to have or their timing (e.g., policies designed to reconcile family and work responsibilities of individuals, regulations affecting working hours, gender equity policies, reshaping the tax system, accounting for out of work periods in pension systems, policies favouring a broad societal support of children and parenting).

[5] In some cases a *child bonus* is paid out to parents once at the time of birth. In others, a *child or family allowance* is paid on a continuing (regular) basis until the child reaches a given age (16-18 years or later if the child is still in education). The cash amounts paid per child may be flat for all children or rise for second or subsequent children or, in some cases, with the age of the child. In most countries, basic child allowances are universal, whereas some set an income ceiling above which the allowance is not payable. Others gradually phase out income transfers as family income rises.

[6] This contrasts, for instance, with conditional income transfers policies, very popular in the Latin American region, more instrumental in orientation and targeted to change aspects of familial functioning around child-rearing. The conditions imposed normally relate to school attendance and/or health-related progress on the part of the child, or indeed the parents' attendance at a parenting programme, but can also extend to general familial behaviour. Empirical evidence suggests that if payments are made directly to the mother it is more likely that the money will be spent directly on the child (Daly, 2015).

[7] Programs normally allow for a fraction of this leave to be transferable between parents. Specific leave policies have been introduced in some cases to shorten the timing between births. Introduced in Sweden in 1980s, the so-called "speed premium" policy allows mothers to keep the same level of leave benefit they received for an earlier child if they have an additional child within 30 months.

[8] See, for instance, Sleebos (2003) for a detailed review of the literature or, for a more recent approach, Luci & Thévenon (2013).

childcare work and this is often presented as a possible reason for women deciding not to have (more) children. Some authors (e.g., Thévenon and Gauthier, 2011) consider achieving gender equality within family a significant policy goal to promote fertility. In this context, measures to involve fathers in childcare might have an effect on fertility.

Policies that help reconcile working and family life and provide public support for working parents seem to be crucial in encouraging fertility decisions. More flexible employment patterns (e.g., part-time work, flexible working hours and the ability to take short leave, e.g., to care for a sick child or attend a school meeting) are considered very important for parents. The availability of part-time work can help parents (particularly women) to avoid choosing between having children and accepting a full-time job. Overall, in an aging society it may be important to decompress work life around fertility decisions and child raising, also to allow for extended working life later in the life cycle (Bovenberg, 2009).

The experience of the Nordic countries shows that adopting coordinated and consistent family policies throughout time pays off. Family policies must be placed in their relevant economic and political context, and be aligned with other components of the welfare state. In a broader context, family policies promoting fertility could be expanded to include all public and private policies that may potentially affect the well-being of families, including policies and services related to employment, education, health, housing, public transport, immigration, etc. Benefits provided by regional and local governments, benefits and social responsibility programs provided by employers should not be neglected. Parenting support focusing primarily on imparting information, education, skills and support to parents through health-related interventions for parents and young children and education and/or general support for parents is also important.

Spain's recent governments have engaged in intense debates about the most effective family policies for increasing the country's low birth rates. One of the most popular measures (recently relaunched, although with some restrictions) has been the cheque bebé (baby-cheque) which rewards the birth of a child with cash payments. However, the efficiency of this measure has been widely questioned, given its limited impact on increasing birth rates (Gauthier (2007) reveals that the effects tend to be more significant in the second child).

Different studies have proved the need to rethink the public policies used. Esping-Andersen et al. (2013) show that increasing public investment in pre-schools (0-3 years) is the most effective measure for combating low birth rates. This conclusion is also supported by Baizan (2009), who reveals that in Spain this policy has had a significant impact not only on the decision to have the first child but also on the second and successive births. However, although investment in this area has been increased since 2000, and there are significant differences around the country, the supply still lags far behind the demand.

Other elements that have been widely questioned are gender inequality and the duration of maternity and paternity leaves. Men rarely take the opportunity of taking paternity leave in Spain, and almost never to its full extent. Myrskylä et al. (2011) show that gender equality is a necessary condition for birth rates to increase, but there is still a long way to go in this regard. Although we could say that in Spain there has been an increase in the role of men in childcare, this situation can still be considered marginal.

Last but not least it will be less easy to find immediate prescriptions for other factors of fertility decline, such as economic and labour market uncertainty, late transition to adulthood, hedonism and post-materialism as a value-system relating to the desire for fulfilment of material needs (such as security, sustenance and shelter), with their new philosophy of life, lack of points of reference or the incapacity to take risks. In spite of this, in these cases it is essential to proactively take actions to change attitudes towards motherhood.

# 3. Working more, longer, and more productively: retirement and labour market polices to address population ageing

Although the problems of pension systems can be solved in many ways, this section focuses on the role of retirement age and labour market policies to mitigate the effects of population aging. More specifically, we outline the obstacles to achieving longer and more productive working lives and the policies that can help to uphold economic growth in an aging population through contribution base growth generated by extended working life, higher labour force participation, high employment levels, reduced share of people working in informal sector jobs, and productivity growth by keeping individuals skilled, innovative and entrepreneurial.

To make it clear and concise, the discussion encompassed in this section will briefly analyse the following topics: (i) Why is it an increase in effective retirement age so crucial? (ii) How to achieve it? (iii) How to keep elderly workers on the labour market? (iv) How to achieve greater work attachment and higher productivity of older workers? In setting up the arguments, this section summarizes a more exhaustive discussion presented in Holzmann (2014).

## 3.1. Why is it an increase in effective retirement age so important?

In response to population ageing, exacerbated by long-term budget deficits in many countries, the options for adjusting to the financial imbalance in pension systems are the same across earnings-related pension schemes (whether funded or unfunded, DB or DC) and include: (i) an increase in the contribution/saving rate; (ii) expanding the contribution basis; (iii) Reducing the benefit level; (iv) Reduce the benefit payment period by requiring individuals to work longer/retire later from the labour market. Pension reforms seeking to appropriately raise effective retirement ages can be justified on the basis of both a macroeconomic setting and individual welfare enhancing perspective.

**A macroeconomic explanation:** With population aging under constant activity spans, a smaller share of the active population has to take care of a rising number of non-active elderly, i.e., an intergenerational redistribution of the economic pie in favour of the latter has to take place. When ageing is a result of life expectancy increases, the distribution occurs only from the active to the old-age population. When ageing is essentially a consequence of declining fertility rates, some redistribution from the shrinking share of youth to the expanding share of elderly may take place. In this static setting, increasing the retirement age in line with population aging is an approach justified by the desire to keep the distribution of the economic pie broadly unchanged across cohorts and generations.

When we take into consideration the impact of population aging on productivity, saving, consumption, investment and economic growth, the question is whether a change in the work force composition as a result of a decrease in the inflow of youngsters into the labour market in relative and absolute terms, compensated by extending the work lifes of older workers, will ultimately lead to a productivity and economic growth slow-down. This fear of population aging reducing productivity and economic growth is the result of a linking the cross-section hump-shaped productivity-age profile with an aging population structure that is bound to lead to a productivity slow-down. Although there is cross-country evidence of a strong and significant negative link between a change in the work force composition and total factor productivity (IMF, 2004; Feyrer, 2007), recent empirical studies assuming a dynamic approach in which the age-profiles (in terms of knowledge, skills, and entrepreneurial drive) move outward with each new age cohort, show that the results of population aging on macro-productivity can substantially be reduced or even fully compensated (Holzmann, 2013b)[9]. An aged labour force may potentially be a less dynamic and productive one, but, at the same time, the scarcity of workforce is expected to accelerate human capital formation with potentially favourable long run effects on economic growth rates. To sum up, to counter the impact of population aging on economic growth the productivity of an older workforce must continue to increase.

Finally, both funded and pay-as-you-go (PAYG) social programs, i.e., unfunded pension schemes have an underlying (explicit or implicit) rate of return that is impacted by population aging (Holzmann, 2009). In unfunded social programs (such as for pensions or health), the implicit rate of return is, in the steady state, the rate of economic growth (work force growth plus productivity growth), and both are directly affected by population aging. In funded social programs, the rate of return is the market interest rate, which may also be negatively affected by population aging as it shifts the population share from saving to dissaving cohorts (at least under life cycle considerations) and changes households' savings behaviour and portfolio composition. Generally speaking, lower rates of return mean that workers have to save more during their working lives to achieve the same target benefit level. Whether labour market, health and education policies directed to extended working lives, increase labour market participation, foster productivity growth, keeping individuals healthy, motivated, skilled, innovative and entrepreneurial will be able to sustain the rates of return for

[9] See also Bloom and Souza-Poza (2013) for an overview of recent and innovative papers on the topic of "Ageing and Productivity".

both funded and unfunded schemes is still an open question, but a promising one governments should pursue.

**An individual welfare enhancing perspective**: A different question is whether the decision to delay retirement, as one of the possible options to respond to the financial strains of pension systems in an ageing society, is optimal from the individual point of view. The answer to this question requires the application of inter-temporal choice models, such as the life cycle approach, which stipulates that individuals make savings and labour supply decisions that smooth their consumption of goods and leisure across their entire individual lifetime. For most workers, the decision of when to retire is at least as important as the decisions about work hours while employed. Throughout life both of these decisions are affected by both the income taxes and social insurance and pension systems.

In Holzmann (2014) the author summarizes the findings of a large body of theoretical, simulation, and empirical literature on inter-temporal choice models that have impact on the pension system selection, and concludes that: (i) If individuals have to bear the full burden of life expectancy increases, the "natural" response for both funded and unfunded schemes is essentially to expand labour market participation and to delay retirement, with limited appetite for more pre-saving/higher contributions or reduced benefit levels; (ii) In the case of aging from below, the subsequent reduction in the (implicit or explicit) rate of return for pension schemes changes the remuneration of contributions and the price of leisure/labour. This induces income and substitution effects on the choice between work and leisure with an undetermined net result on labour supply, savings, and retirement decisions, but does not questions the dominance of an extended activity span as a key reaction to an increase in life expectancy.

## 3.2. How to keep elderly workers on the labour market?

There is considerable potential to at least slow down the consequences of an ageing labour force by reducing the current high unemployment levels, increasing the labour participation rate and prolonging working careers. Policies to remove impediments that keep older workers from staying longer in the workforce are crucial to efforts to stop labour force decline. Many of these impediments come from pension systems themselves, which discourage people from lengthening their work lives and participating in the labour force at older ages.

In Holzmann (2014) the author claims that the key necessary conditions for this to happen are that social protection programs need to be selected in support of such policies that keep individuals healthy, skilled, and motivated to work longer and be productive. This requires (i) having a tax and pension system that creates incentives to stay in a formal job during working life and at higher ages, (ii) strengthening incentives for individuals to move out of inactivity or unemployment to take on a formal job; (iii) creating incentives for employers to hire and/or keep the elderly employed, (iv) the adoption of lifelong learning approaches for individuals, (v) rethinking the wage bargaining process between workers and employers, by shifting from demanding reduced working hours and higher wages to introducing requests for more training and skill acquisition into the negotiations, (vi) challenging the most common myths and misperceptions about older workers, namely that they prefer retirement over work, that they are less productive and not employable, and that they take away jobs from the young; (vii) redefining the role of the elderly in the job market, by reassignment within the unit or changing to a new employer/self-employment in order to accommodate for changes in the mix of skills as individuals get old.

Overall, pursuing an active ageing approach to policy in the fields of pension, health, employment, education and social affairs could in principle help tackling the problems posed by population ageing. This would be achieved by (i) ensuring that fewer adults die prematurely in the highly productive stages of life; (ii) reducing the number of older workers (and retired) develop disabilities and pain associated with chronic diseases; (iii) increasing the number of older people that remain independent and enjoy a better quality of life and require less social assistance; (iv) increasing the number of older people that continue to make a productive contribution to the economy and to important social, cultural and political aspects of society; (v) reducing the number of those in need of costly medical treatment and care services. Health care policies addresses to promote healthier life styles in terms of nutrition, physical exercise or drug addictions (smoking, drinking) should be pursued through either tax or financial incentives and/or through education, regulation and enforcement policies.

The development of public policies related to what might be called exogenous variables of aging is becoming more important. While age is the key variable when analysing the survival of individuals at different times (endogenous variable), there are some circumstances that may alter the expected results based on this variable. Such is the case of accidental death and disability, factors that can affect people in their most productive ages.

In this regard, the World Health Organization (WHO, 2011) predicts that road traffic injuries (RTIs) will be one of the main causes of disability-adjusted life expectancy in 2030 (Peden et al., 2004). Björnstig and Larsson (1994) and Haukeland (1996) identified the following impacts of an accident on a person's life: Early retirement, long-term sick leave, job changes as a result of illness, and in general, reduction in welfare and quality of life. Lund and Bjerkedal (2001) reported that in Norway, between 1992 and 1997, traffic accidents were one of the main factors that increased the number of people receiving disability pensions between 16 and 66 years (the ratio of people with disabilities and deaths in this age group, associated with workforce, was approximately 2.5:1). In Spain, Alemany et al. (2013) demonstrate the high impact of such accidents in the prevalence of dependency in the most productive age of individuals.

In parallel, preventive measures aimed at increasing the quality of life and independence of older people are gaining more

weight in advanced societies (Lizana, 2013; Vlachantoni, 2013, Donald, 2009). For example, the development of policies reducing the likelihood of falls in people aged 65 and over (this being one of the most important causes of disability in the older population) can improve the welfare of the elderly, retarding the effects of aging, with further remarkable effects on reducing healthcare costs (Heywood and Turner, 2007).

## 3.3. Which pension system works better for an aging population?

Pension systems have multiple objectives, both at the individual/family level and in terms of public policy. At the individual/family level, the major ones are to provide a *consumption smoothing mechanism*, i.e. a device for intrapersonal redistribution throughout the life cycle from one"s when young to one"s when old, and an *insurance mechanism*, that in a world of uncertainty addresses individual longevity risk (but also disability risk and/or survivors income protection), i.e., the risk of outliving one's asset before dying trough annuity contracts.

When it comes to public policy, pension systems have several objectives, including poverty relief for those with little or no earnings record, redistributing from high to low earners (or from singles to married couples) in a least distortionary way possible, ensuring intergenerational equity, adjusting (preferably automatic) to demographic and economic shocks, creating incentives for working longer/retiring later, for increasing overall saving in the economy or for sustainable economic growth. Pension system should provide adequate, affordable, sustainable, and robust retirement income, while seeking to generate welfare-improving externalities.

Given these objectives, which pension system works better for an aging population and is consistent with the vision of working longer/retiring later? The discussion of this topic is well beyond the scope of this paper (for a thorough discussion see, for instance, Holzmann, 2014), so we briefly summarize some of the points of this debate. First, there are strong conceptual considerations and empirical evidence that defined contribution plans dominate defined benefit plans in their capacity to address population aging well. Second, within the class of defined contribution plans, the selection between funded (FDC) and unfunded (NDC) schemes is much less evident, even without population aging. Third, to address population aging properly, a broader pension system that includes other pillars as well as social benefit programs covering a diverse set of objectives needs to be considered, particularly a zero pillar that addresses old-age poverty, a voluntary third pillar that addresses the coverage gap for informal sector workers, a residual fourth pillar that offers income and service support to the elderly and other social insurance programs that have a close link with old-age insurance, in particular for disability and survivorship (see Holzmann and Hinz, 2005).

Pension system reforms should remove financial incentives to early retirement and give individuals more flexibility over their retirement decision, be consistent with fiscal consolidation and a reduction in public debt burdens, promote risk diversification by ensuring that retirement income is provided by a mix of tax-and-transfer systems, funded systems, private savings and earnings, maintaining a basic level of social insurance beyond a minimum social safety net, seek a better burden-sharing between generations, include automatic adjustment mechanisms, enforcing transparency and accountability, enhancing the ability of pension systems to respond to the changing needs of society and individuals.

# 4. Is immigration a useful strategy for dealing with ageing societies?

To counteract population ageing immigration is seemingly a policy approach that requires close attention in order to alleviate the effect on social programs but more broadly on economic development. In purely mechanical terms filling demographic gaps in the domestic age cohorts through targeted immigration of this age group should be very easy. And there should be little supply problems of immigrants given the population dynamics in Africa and much of Asia. In Africa alone the domestic population is projected to more than double from 2015 to 2050 from 1.2 million to 2.5 billion and to increase to to 4.8 billion by 2100 (UN, 2015). Only a fraction of this African population increase would be sufficient to cover the European population gap resulting from the projected decline. Yet such mechanical considerations need to be augmented by deeper demographic, economic, social and political considerations to inform a viable migration strategy. In this section we will focus on the following policy questions: (i) What should be the objective of such immigration: Stabilizing the demographic dependency ratio, the population size, or?; (ii) Economic challenges of immigration; and (iii) The Political challlenges of immigration.

## 4.1. The Demographic Objectives of Immigration

Immigration can, in principle, help to fulfil most or all demographic objectives, from stabilizing the demographic dependency ratio down to compensating gender gaps in a specific age cohort. For pension and other social program considerations, two objectives stand out: stabilizing the demographic dependency ratio and stabilizing the population size.

Stabilizing the demographic dependency ratio would do away with the effect of domestic population aging on the pension scheme: In a mature and balanced pension scheme also the system dependency ratio should stabilized and no need for adjustments in contribution rate, benefit level and retirement age would emerge. One would just need to supplement the domestic population at younger ages with the right number of migrants with the right gender to "correct" the shifting age structure. This should be easy as immigrants tend to arrive during their childbearing years and generally have more children per family than native citizens.

Yet, such optimistic assumptions have a number of empirical catches[10]. First, while fertility patterns do vary widely among women of different national origin, there is evidence to suggest that even women originating from cultures with high fertility rates adapt quickly to the fertility profiles of destination countries. Second, as immigrants also get older and acquire pension entitlements, to maintain appropriate demographic dependency ratio immigration must increase at an increasing rate ad inifinitum if it is to compensate for population ageing. Clearly such an approach is not sustainable in demographic terms and is likely to hit political and economic resistance well before.

This unsustainability of ever increasing immigration suggests that the other policy approaches – moving the fertility rate toward replacement rate and a later retirement in line with increasing life expectancy should come first. To the extent they are not able to deliver, immigration may have to set in. Yet, with a dynamic definition of the dependency ratio in which the age definition moves upward with life expectancy, a different demographic goal is needed. For this the stabilization of the population size may be useful for economic and social program reasons.

A stable population size should be able to stabilize also the size of the active population and labour force which should minimize adjustment costs on infrastructure, education programs, etc that shrinking population otherwise may have. Equally important for social programs is the effect of a stable population/labour force on the financing of public programs and for individuals on the rate of return an unfunded pension scheme is able to provide. This rate of return is the sum of labour force growth and productivity growth. If labour force growth is negative – as projected for a number of European countries – productivity growth that is also under pressure will have difficulties to compensate. A negative labour force growth of 1 percent p.a. over the life cycle means a 20 percent lower pension level.

## 4.2. The Economic Challenges of Immigration

To support the financing of pensions and other social programs and thus the quantitative expectations of immigration, the profile of the immigrants to Europe should be not too different from the local population with regard to family composition, education and skill levels, and culture. Else adjustment costs will emerge and theses externalities that need to be taken into account.

To be effective in the financial support of social programs immigrants should financial contribute to the schemes and not excessively burden these or other schemes (e.g. social assistance), and they should not put pressure on wages or increase unemployment of the indigenous population. On these and other concerns the available and limited empirical evidence is mixed with neither clear predominantly negative

[10] For estimations on the required migration magnitudes under different demographic and scenario assumptions, see UN (2001).

nor positive effects (Liebig and Mo, 2013). Hence, we are missing better and more comprehensive empirical results to guide policy decisions. To support this point a few examples should be sufficient:

(i) Only a small share of immigrants coming into Europe are labour migrants the type the mechanical analysis envisages. Most of the immigrants into Europe emerge from a generous family reunification that goes well beyond the core family, humanitarian access, and others. Labour migration is only a very small share (OCDE 2014, Figure 1.4).

(ii) The labour migrants from outside Europe have, on average, a lower level of education and less directly usable skills than the domestic population. This applies not only for countries further away and more recent immigration. This applies also for immigrants from older migration waves into to Europe (such as Morocco and Turkey) that keep a distinctly lower education and skill level than the non-migrant population and have typically also a lower labour force participation and high unemployment rate.

(iii) Labour immigration shocks on labour market outcomes, in particular wage levels and employment of the non-migrant population are not strong and universally negative, and in any case quite likely only transitory. Given the typically lower skill level of immigrants it is domestic counterpart that is typically negatively affected with regard to wage growth and employment prospects while the higher skill levels profit from complementarity effects. The economy as a whole, however, may be negatively impacted as the availability of low-skilled is likely to affect the choice of the production technology and thus future productivity growth.

(iv) As regards the overall fiscal effects of immigration on the migrant receiving country the final word is still out. A recent OECD study (OECD, 2013, p. 125) that for the first time provides a comparison across countries comes to the following conclusion: "Immigrants tend to have a less favourable net fiscal position than the native-born, but this is almost exclusively driven by the fact that immigrant households contribute on average less in terms of taxes and social security contributions than the native-born and not by a higher dependence on benefits." And "Depending on the assumptions made and the methodology used, estimates of the fiscal impact of immigration vary, although in most countries it tends to be small in terms of GDP and is around zero on average across OECD countries." Yet these conclusions are based a cross-section and not on life-cycle assessments that are relevant for the large long-term benefits such as pensions, health and long-term care.

## 4.3. The Political Challenges of Immigration

Even if immigration would be able to deliver on the expected economic and financial gains there would be major political resistance against large scale migration quite likely needed to importantly affect the financial situation of pension schemes and other social programs. Some of these resistances may be overcome or at least softened with a better integration policy (such as language and cultural integration), other are likely to remain. If correct, immigration will remain in Europe but to enhance its economic effects and acceptability for the local population will require a more targeted and labour market oriented approach. Large scale immigration, even if targeted and better managed may not deliver, as expected, and may find increasing political opposition.

# 5. Key policy trade-offs

Tackling the demographics of a declining and ageing population is a difficult task. The availability of three main demographic drivers offers multiple policy options for which, however, the application is often not straight forward and the outcome not ensured. They offer also combinations for which trade-offs exists that need to be investigated and detailed. In this Section we do not aspire to give clear and definitive answers but to offer a road map for discussion and future analyses. Four points come to our mind that need attention both at the level of scientific foundations as well as societal discussions.

First, how effective in a simple mechanical sense are actually each of these demographic instruments – fertility, later retirement, migration - to address the aging and decline of population? What would happen if fertility were to return in one stroke to replacement rate? If retirement age could be increased in a wimp to the level needed to re-establish prior old-age demographic dependency ratios? If migration could be engineered that keeps labour force or even dependency ratios constant? Would this work in a mechanical sense to arrest population aging or decline? Even if mechanically effective, what would be the implications of such policies on public goods and services, on required capital stock and on labour market outcomes?[11] Very first estimations suggest that none of such individual policies alone would be able to address population aging, only some combination of all (Holzmann, 2006).

Second, as a next step it will be important establish a ranking of the main demographic policy options by at least three measures: By the technical feasibility, by the costs they involve, and by the welfare effects they create. As some of the discussion in the prior sections has indicated, for only very few of these questions we actually may have good answers. We have a number of conjectures but we have very limited factual knowledge.

Third, as the information for each of the above elements will be difficult to obtain, we may have to think about lighter approaches to establish some measurable trade-offs between demographic options that offer some first and broad policy information. One approach may be to express demographic options in terms pair-wise comparison of additional years in work/later retirement. The following examples and quantitative trade-offs are indicative only.

Last but not least at the EU level, previous studies at EU level have indicated the required increase in effective retirement age to compensate for the population aging over the next 50 years or so: The threshold for the old-age dependency ratio (OADR) would need to increase from 60+/(20-59) to 70+/(20-69) to keep the ratio broadly constant at 39 percent in the period 2004 to 2050, i.e. the effective retirement would need to increase by 10 years; the legal perhaps by even more (EU, 2005). This increase is due to all three demographic drivers. The effect of increasing life expectancy is perhaps the most important but not the only reason.

Against these considerations we should be able to calculate the equivalent retirement years of demographic options quite precisely. Taking the Spanish case as an illustrative example, we apply the forecasted path of life-expectancy derived in Ayuso, Bravo and Holzmann (2015b) and calculate how many years would the effective retirement age need to increase by 2050 to keep the old-age dependency ratio (65+/15-64) at the 2013 level (27.24%) for the following demographic scenarios:

**Table 1: Tentative demographic scenarios**

| Scenario | Fertility | Net Migration |
|---|---|---|
| 1 | TFR constant to its 2012 value (1.32) | Zero |
| 2 | TFR jumps-off immediately to 1.8 and remains constant thereafter | Zero |
| 3 | TFR jumps-off immediately to 2.1 and remains constant thereafter | Zero |
| 4 | TFR jumps-off immediately to 1.8 and remains constant thereafter | Positive and equal to 0.1% of total population |
| 5 | TFR jumps-off immediately to 1.8 and remains constant thereafter | Positive and equal to 0.2% of total population |
| 6 | TFR jumps-off immediately to 1.8 and remains constant thereafter | Positive and equal to 0.5% of total population |
| 7 | TFR jumps-off immediately to 1.8 and remains constant thereafter | Positive and equal to 1% of total population |
| 8 | TFR constant to its 2012 value | Positive and equal to 0.2% of total population |
| 9 | TFR constant to its 2012 value | Positive and equal to 0.5% of total population |

**Note**: We assume net migration flows are equally split between genders and have an age-pattern similar to the observed in the period 2008-2013.

Table 2 exhibits the estimated values for the old-age dependency ratio by 2050 (under alternative specifications) and the years the effective retirement age would need to increase to keep the ratio constant at its 2013 value. We can observe that in a scenario of no change in the total fertility rate (TFR) and zero net migration the retirement age would need to increase by 12.39 years. Bringing the TFR immediately to 1.8 or 2.1 but maintaining zero net migration (scenarios 2 and 3, respectively) slightly alleviates the increases in the retirement age needed to 11.54 and 11.02 years, respectively, but it is clearly not enough to cope with the ageing of the population.

[11] For instance, bringing the fertility levels back to its replacement-level would increase the need for more and better pre and postnatal care services, require more schools and teachers at the various levels, more social security services and innovative family-work reconciliation policies. Large-scale immigration flows over a long period of time requires an appropriate public and private management and, depending on the skill composition of migrants, significant investment on education and skills.

These results show that an instant move to higher fertility levels has a time-lagged effect on population growth. In effect, bringing fertility to its (stable population) replacement level does not produce results in the short to medium run and takes long to impact the total population since in the meanwhile the number of childbearing women will continue to age and decline as a consequence of decades of low fertility levels. The time lag until higher fertility impacts on population growth and OADR is longer the more distant to replacement level fertility levels were in the prior 20 years.

**Table 2: Forecasted OADR and Increase in the Retirement Age needed to keep the ratio constant, under alternative demographic scenarios**

| | SCENARIOS | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **OADR 2050** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** |
| **65+ / 15-64** | 77,89 | 68,77 | 64,07 | 63,88 | 59,52 | 48,96 | 36,89 | 67,21 | 55,10 |
| **66+ / 15-65** | 73,31 | 64,92 | 60,58 | 60,37 | 56,31 | 46,41 | 35,02 | 63,42 | 52,13 |
| **67+ / 15-66** | 68,77 | 61,09 | 57,09 | 56,88 | 53,10 | 43,86 | 33,15 | 59,66 | 49,18 |
| **68+ / 15-67** | 64,33 | 57,32 | 53,65 | 53,43 | 49,94 | 41,34 | 31,30 | 55,96 | 46,26 |
| **69+ / 15-68** | 59,88 | 53,50 | 50,16 | 49,94 | 46,72 | 38,77 | 29,42 | 52,23 | 43,30 |
| **70+ / 15-69** | 55,48 | 49,72 | 46,69 | 46,47 | 43,52 | 36,21 | 27,53 | 48,53 | 40,35 |
| **71+ / 15-70** | 51,14 | 45,96 | 43,22 | 43,01 | 40,33 | 33,63 | 25,62 | 44,86 | 37,41 |
| **72+ / 15-71** | 46,93 | 42,30 | 39,84 | 39,63 | 37,20 | 31,10 | 23,75 | 41,28 | 34,52 |
| **73+ / 15-72** | 42,80 | 38,69 | 36,49 | 36,29 | 34,10 | 28,58 | 21,88 | 37,74 | 31,66 |
| **74+ / 15-73** | 38,87 | 35,23 | 33,27 | 33,08 | 31,12 | 26,15 | 20,06 | 34,37 | 28,91 |
| **75+ / 15-74** | 35,13 | 31,91 | 30,18 | 30,00 | 28,25 | 23,80 | 18,30 | 31,13 | 26,26 |
| **76+ / 15-75** | 31,64 | 28,82 | 27,29 | 27,12 | 25,56 | 21,58 | 16,63 | 28,11 | 23,77 |
| **77+ / 15-76** | 28,40 | 25,92 | 24,57 | 24,42 | 23,04 | 19,49 | 15,06 | 25,28 | 21,43 |
| **78+ / 15-77** | 25,43 | 23,26 | 22,07 | 21,93 | 20,71 | 17,55 | 13,59 | 22,68 | 19,28 |
| **79+ / 15-78** | 22,66 | 20,76 | 19,73 | 19,60 | 18,52 | 15,73 | 12,19 | 20,25 | 17,24 |
| **80+ / 15-79** | 20,11 | 18,46 | 17,55 | 17,44 | 16,49 | 14,03 | 10,90 | 18,00 | 15,36 |
| **81+ / 15-80** | 17,75 | 16,32 | 15,53 | 15,43 | 14,60 | 12,44 | 9,68 | 15,91 | 13,60 |
| **Increase in Retirement Age** | **12,39** | **11,54** | **11,02** | **10,96** | **10,38** | **8,55** | **5,15** | **11,31** | **9,63** |

Increasing and maintaining TFR rate at 1.8 and attracting, on a permanent basis, moderate migration flows corresponding to 0.1% (0.2%) of total population reduces by 1.43 (2.01) years the increase in retirement age when compared to scenario 1. When net migration flows assume a higher annual expression, as it is the case of scenarios 6 and 7 (0.5% and 1% of total population, respectively), the increase in the retirement age needed to maintain the OADR constant at 27.24% is much lower and of 8.55 and 5.15 years, respectively. In a scenario of no change in the TFR and moderate to high positive net migration flows (scenarios 8 and 9), the effective retirement age would still need to increase by 11.31 and 9.63 years, respectively.

Last but not least, the demographic policy options should be enhanced by information and considerations of alternative pension schemes' adjustments – as substitutes or as complements. The following example gives a gist of possible trade-off considerations:

The welfare-optimal reaction to an increase in life-expectancy is for a large set of circumstances quite likely a delay in retirement from the labour market, compared to the alternatives of a lower consumption level in retirement (i.e. keeping the contribution rate constant while reducing retirement consumption) or a lower consumption level across the full life cycle (i.e. smoother life cycle consumption through more pre-saving). The conclusions are less clear for the part of population aging introduced by below replacement fertility: From a welfare economic point of view, how much should this be addressed by delayed retirement, by more pre-saving, or by a higher fertility rate if the external effects of children are internalized within the pension system?.

# 6. Conclusions

Population ageing due to both continued increase in life expectancy and below-reproduction fertility rates is bound to deteriorate the financial balance of any pension scheme or other age-related program, be it unfunded or funded. To address this challenge to welfare state and society and potentially to turn it into some opportunity requires determined action at the level of countries' systems – i.e. all retirement income schemes – as well as the demographic drivers of population aging – i.e. fertility, mortality/retirement and migration. Pension system reform(s) alone, however innovative and strong will not be sufficient.

While each of the demographic actions – policies to increase the fertility rate toward replacement level, to move the retirement age in parallel to life expectancy, and the use migration to compensate for labour force gaps – is important and needed, they will to act together in some society' determined portion as none of the demographic options alone is likely to be sufficient in Portugal, Spain or elsewhere in the EU to arrest a population aging, however measured.

While pension reforms alone will not be able to address population aging, the type and structure of the reforms of pension schemes is conjectured to be crucial for the effectiveness of demographic policies. New or reformed pension schemes need strengthen the incentives for families of any kind to have and raise children, to stay on the labor market at advanced age and remain healthy skilled and motivated, and to accommodate the special needs of migrants and an internationally mobile labor force. Demographic actions with the right retirement and labor market policies are the key for a successful tackling of this biggest challenge to mankind in reported history.

In order to be more successful than most current demographic policies, new policies will need to move outside the current box and shake the incentives and thinking across all areas. Examples of such thinking include reducing the bias against children in the current mandated pension system by offering compensation for raising children; getting across to policy makers and society that for the time being the increase in life expectancy is a process with no end in sight which requires a revision of all societal institutions – from the oldest (marriage) to the youngest (public pension programs); and finding true win-win solutions to the admission of migrants for sending and receiving countries.

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