

WHY ACTUARIES ARE INTERESTED IN POPULATION ISSUES AND WHY OTHER ORGANISATIONS INTERESTED IN POPULATION ISSUES SHOULD TALK TO ACTUARIES?

A PAPER PREPARED FOR THE IAA POPULATION ISSUES WORKING GROUP BY ASSIA BILLIG AND ADRIAN GALLOP

Executive Summary

Demography is at the heart of the overall economic development of countries around the world. The Population Issues Working Group (PIWG) was created in 2010 with the purpose of identifying population issues of particular interest to actuaries and in respect of which the actuarial profession, at an international or national level, could make a useful contribution in the public interest.

The present paper outlines how actuarial work is affected by demographic issues and suggests reasons why other organisations interested in population issues should talk to actuaries. It does not aim to provide an exhaustive description of the interrelation of actuarial work and demographic issues but rather offers a flavour of challenges and opportunities for actuaries related to evolving world demography. The paper discusses impacts of health and morbidity trends, urbanization, fertility, migration, mortality and population aging on work of actuaries.

Mandatory actuarial standards or actuarial guidelines may require that the actuary should consider demographic data when setting assumptions. For example, ISAP 2 on the Financial Analysis of Social Security Programs has a section on data which states that the actuary should consider what data are required in order to perform, review, advise on, or opine on the financial analysis of the Social Security Program (SSP). These data might include, amongst others:

- national or regional demographic statistics on variables such as fertility, mortality, morbidity, and migration;
- demographic status and experience of the SSP, as applicable; and
- censuses and population surveys covering, for example, family statistics.

While falling mortality rates and the resulting increases in longevity already draw significant attention of actuarial communities, actuaries should increase their awareness of the role actuaries can play in assessing impacts that other demographic changes have on programs and products. As the profile of the population changes, so do the required products. New products emerge and old ones evolve. This concerns not only social security programs, but also insurance products, pension plan designs, savings products, health insurance products, long term care products, etc. Actuaries working in these areas need to analyse current and future population trends in order to understand the potential needs of evolving populations and create programs and products that serve to protect people when they are most vulnerable: old, sick, disabled, suffer loss of family member, job loss, etc.

Going forward, the paper suggests that actuaries need to:

- Explore how future demographic developments may affect actuarial models and projections
- Provide better understanding of the economic, demographic and social processes that underlie actuarial models and projections (e.g., work-based population movements, health-based mortality / morbidity trends, etc.)
- Enable linkage of population and medical development trends, thus enhancing actuarial models and projections
- Engage in the assessment of the needs of various groups of the population and in the development of suitable products and services to help meet those needs and manage risks.

Actuaries are perceived sometimes as being extremely good at analysing particular trends in relation to programs and products, but not recognizing the overall fiscal and economic implications of these trends. This is a myth that actuaries should strive to disperse by actively interacting with national and supranational organizations.

Demographic risks in the modern world cannot be ignored. The actuarial profession possesses a profound understanding of demographic risks and their implications. Actuaries should take steps to engage with those outside the profession to recognize this expertise and to use it.

The Population Issues Working Group

Demography is at the heart of the overall economic development of countries around the world. Demographic trends such as the aging of populations, migration, fertility, mortality and urbanization change the characteristics of populations as well as of the labour force. Box 1 provides some key demographic facts that are quite dramatic. National and local demographic trends shape government policies with respect to programs affecting families, education, health, employment, old-age, etc. These are the areas where actuaries have been traditionally involved in assisting in policy formulation, evaluation and maintenance.

The Population Issues Working Group (PIWG) was created in 2010 with the purpose of identifying population issues of particular interest to actuaries and in respect of which the actuarial profession, at an international or national level, could make a useful contribution in the public interest.

As stated in the PIWG terms of reference, its role is

- To identify sources of information on population issues which could be of interest to actuaries and to facilitate access to this information through the IAA website or in other ways.
- To monitor published population studies and research in progress to identify emerging results of interest and relevance to actuaries.
- To create a network of actuaries engaged in demographic work or with particular interest in population issues.

- To scan the media for reports on population issues on which it might be appropriate for the IAA to respond and to propose public statements for the IAA to make.
- To promulgate to relevant IAA Committees and Sections information on up-to-date population studies and issues which might be relevant to them.
- To raise awareness of population issues in the wider actuarial community worldwide.
- To promote the role of actuaries in demographic work.
- To interface with supranational bodies which have a particular focus on population issues and to ensure that they are aware of the expertise and interests of actuaries in this field.

The present paper outlines how actuarial work is affected by demographic issues and suggests reasons why other organisations interested in population issues should talk to actuaries. It does not aim to provide an exhaustive description of the interrelation of actuarial work and demographic issues but rather offers a flavour of challenges and opportunities for actuaries related to evolving world demography.

Box 1: Key global statistics

- By 2020, there will be 1 billion people aged 60 or older; by 2050, more than 2 billion. In 2015, around 125 million people will be aged 80 or older; by 2050, there will be almost 400 million.
- In 2010, over a quarter of the world population was younger than age 15; by 2050 it will be around one fifth. This trend affects mostly the less and least developed regions of the world.
- In 1950, less than 30 per cent of the world population lived in cities; today it is more than 50 per cent.
- In 2013, international migrants represented over 3 per cent of the global population.

Source: Various United Nations Population Division publications

How actuarial work can be influenced by population issues

To perform their work, actuaries need to develop assumptions and models. Often some of the assumptions required are directly demographic in nature (for example assumptions on future mortality rates). Others may be indirectly influenced by demographic trends. It is a professional duty of an actuary to examine all available information in order to develop best-estimate assumptions, including demographic ones. In many jurisdictions actuaries have legal as well as professional responsibilities in this respect. Actuaries are often required to carry out their work under a set of mandatory actuarial standards (such as the Technical Actuarial Standards for work carried out in the UK, or Canadian Institute of Actuaries standards for work carried out in Canada) or non-mandatory guidelines. An example of the latter are the International Standards of Actuarial Practice (ISAPs). ISAP 2 on the Financial Analysis of Social Security Programs has a section on data which states that the actuary should consider what data are required in order to perform, review, advise on, or opine on the financial analysis of the Social Security Program (SSP). These data might include, amongst others:

- national or regional demographic statistics on variables such as fertility, mortality (life expectancy), morbidity, and migration (if such data are not available on a national or regional basis, the actuary might consider information from a wider geographical area that might apply, or it may be necessary to rely on relevant and reliable statistics of international organizations);
- demographic status and experience of the SSP, as applicable; and
- censuses and population surveys covering, for example, family statistics.

In some cases actuaries are responsible for assumptions under legislation. For example, in the UK the Social Security Administration Act 1992 requires the UK Government Actuary to review the operation of the National Insurance Fund of Great Britain at least every five years, taking into account the current rates of contributions, the yield to be expected from contributions in the longer term; and such other matters as he considers to be relevant as affecting the present and future level of the Fund.

Social security programs by their nature cover wide segments of a country's population and, therefore, are strongly affected by demographic developments. Social security actuaries rely on sophisticated demographic projections both in assessing the sustainability of social security systems and in developing systems' designs.

Performing population projections implies making assumptions on longevity, fertility and migration. In developing demographic assumptions, actuaries often actively collaborate with multiple agencies (see Box 2) including demographers. However, at the end of the day, actuaries are professionally responsible for assumptions they use. Thus, for instances, instead of relying on national agencies projections, actuaries may develop their own demographic assumptions. In addition, in order to identify trends that impact particular programs actuaries need to recognize the finer characteristics of projected populations under consideration (which may not comprise the total national population). Some of key questions that may be asked are:

- How healthy people are at different ages and at different socio-economic levels?
- What are the characteristics of immigrants and emigrants with respect to age, gender, education, health, family composition, etc.?
- Does immigration/emigration impact the fertility and longevity profiles of countries?
- How family structure is evolving?
- How demographic developments impact the labour market?

Box 2 Involvement of actuaries in development of demographic assumptions

By their nature, social security programmes often cover a wide segment of the population. Thus, economy-wide and nation-wide economic and demographic assumptions are often needed for the purpose of assessing social security systems' sustainability. The development of the assumptions for social security valuations is often a joint exercise that involves inputs from organizations responsible for preparation of actuarial reports (and therefore actuaries) as well as various governmental organizations and independent bodies of experts.

A recent survey on actuarial and financial reporting for social security schemes found that in 40% of cases, organizations responsible for preparation of actuarial reports were solely responsible for assumptions, and, in another 30% of cases, they shared responsibility with other organizations.

Source: Survey on actuarial and financial reporting for social security schemes and its legal implications: Summary of findings and conclusions, Ménard, Billig, Léger (May 2012)

As the profile of the population changes, so do the required products. New products emerge and old ones evolve. This concerns not only social security programs, but also insurance products, pension plan designs, savings products, health insurance products, long term care products, etc. Actuaries working in these areas need to analyse current and future population trends in order to understand the potential needs of evolving populations and create programs and products that serve to protect people when they are most vulnerable: old, sick, disabled, suffer loss of family member, job loss, etc.

Actuaries are working more and more in non-traditional areas which can be influenced by demographic trends such as micro-insurance (e.g. India, South Africa), pure demography (e.g. Mexico), agricultural crop insurance and weather insurance (e.g. India).

Below we discuss several population trends that influence actuarial work.

Health and morbidity trends

Health and morbidity trends are strongly related to and, in turn, influence demographic factors such as aging, fertility, migration and urbanization. For example, as stated in the ILO report "Employment and social protection in the new demographic context", aging has had the inherent effect of increasing the demand for more disability benefits as the average age of the workforce is increasing and older workers have a higher propensity to become disabled. This coupled with increases in the statutory retirement age could cause disability programs to effectively take on the role of unemployment benefits. Actuaries should be able to isolate this type of impact on programs and provide policymakers with timely and appropriate advice.

Health Care Programs

The financing and sustainability of health care systems is an important topic for both aging societies and rapidly developing and growing countries. The functioning of the health care system has a significant impact on society and its general well-being, and is reflected in the economic growth of the country. The

health status of the population affects the available workforce, which in turn has implications for labour productivity, one of the main determinants of economic growth.

Health care expenditures are characterized by a high level of uncertainty. Health care systems around the world have various designs as well as different balances between public and private health care. The designs and financing of health care systems are affected by demographic trends such as fertility, aging, urbanisation, internal and external migration, levels of socio-economic disparity between a country's regions, etc.

Actuaries are traditionally involved in assessing the financial status of both private and public health care systems. For example, as stated on the web page of US Centers for Medicare and Medicaid Services, the assumptions underlying the long-term projections for Medicare and Medicaid programs developed by the Office of the Actuary (OACT) "have evolved over several decades through internal deliberations, the reports of three independent technical panels, ongoing discussions with the Medicare Trustees and their staffs, and the input of various external researchers". On the same website multiple references to research and actuarial studies are provided (<https://www.cms.gov/Research-Statistics-Data-and-Systems/Research/ActuarialStudies/index.html>).

More and more actuaries are positioning themselves as think tank resources for policymakers. One example is the report jointly sponsored by Society of Actuaries (US) and Canadian Institute of Actuaries entitled "Sustainability of the Canadian Health Care System and Impact of the 2014 Revision to the Canada Health Transfer". This report states in particular: "Unlike studies that have attempted to forecast and discuss the future costs of the Canadian health care system using a macroeconomic approach, this report uses a demographic approach and the application of actuarial techniques to directly capture the increase in health care costs associated with the aging of the population." All Canadian provincial, territorial, and federal ministers of health and finance have been sent a draft copy of the report, as have the provincial premiers and the Prime Minister.

Another example is the project on "Sustainability of health care financing" conducted over the 2011-2013 triennium by the Technical Commission on Statistical, Actuarial and Financial Studies (TC ACT) of the International Social Security Association (ISSA). Health care systems were discussed at several international events: the 17th International Conference of Social Security Actuaries Statisticians in Berlin, Germany, that hosted more than 200 delegates from about 75 countries around the world, the ISSA Technical Seminar in Muscat, Oman (attended by more than 180 delegates from 40 countries), and at the World Social Security Forum in Doha, Qatar. Delegates at these events included actuaries, government representatives working in social security area as well as policymakers. Presenters from OECD, China, Germany, Japan, Lebanon and Mali shared their ideas. The importance of demographic trends was repeatedly emphasized at these meetings. The findings of this project were presented at the World Social Security Forum in Doha in November 2013.

Micro-insurance

Micro-insurance includes any form of protection against risks that is designed for and accessed by low-income people, provided by different categories of carriers but operating on basic principles of insurance and funded by premiums.

The IAA is making a consistent effort to promote the importance of actuarial expertise in the area of health care. In 2013, the IAA met with the World Health Organization to discuss the topic “The role of actuaries in the healthcare system”. In particular, this presentation addressed emerging health micro-insurance programs as an efficient way to finance and deliver health care to population, especially in rural areas. Health micro-insurance could be either a part of the public system (Rwanda), totally private (Bangladesh), or can be delivered jointly by government and insurers (India).

Disability programs

Health and morbidity trends drive the design and financial status of disability programs. Actuaries working on disability plans need to develop complex assumptions regarding disability incidence rates, recovery rates, durations of disability etc. As such, analysis of disabilities by medical cause, age, gender and by other population characteristics is required. For example, according to the Institute for Health Metrics and Evaluation (University of Washington), the main causes of disability in the world are musculoskeletal disorders as well as mental disorders. At the same time, other causes such as communicable diseases like HIV/AIDS and malaria accounted for a larger proportion of disability in sub-Saharan Africa than the world as a whole. The same analysis concludes that in sub-Saharan Africa the greatest disability was experienced among younger age groups (1 to 4 years and 10 to 14 years), in contrast to the world as a whole where those aged 35 to 44 had the largest number of years lost due to disability.

In performing such analyses actuaries have several advantages such as access to high quality detailed databases and strong analytical abilities. The reference list to this paper includes disability studies performed in Canada for the Canada Pension Plan and in Argentina for several social security programs there. In the Canadian case, disability studies prepared by the Office of the Chief Actuary serve as an important policy tool for Employment and Social Development Canada. For example, analysis of recovery from disability by cause and age allowed this government department to fine-tune its rehabilitation programs by concentrating on cases that have a higher probability of recovery.

Long-term care

Aging of the population causes increases in long-term care expenditures at the social security level and in liability claims for long-term care insurance providers. As stated in OECD Health at a Glance 2013, total public spending for OECD countries on long-term care accounted for 1.6% of GDP in 2011, and projection scenarios suggest that this number may double by 2060. The same publication states that in OECD countries, around 60% of long-term care recipients are women “because of their higher life expectancy combined with a higher prevalence of disabilities and functional limitations in old age”.

Actuarial bodies are engaging in work identifying long-term care trends including those related to demography. For example, in 2011 the Institute and Faculty of Actuaries (UK) began a thought leadership research project on funding for long-term care. The Society of Actuaries (US) Long Term Care Insurance Section publishes regularly “Long-Term Care News” that addresses issues pertinent to the long-term care insurance industry with the emphasis on actuarial topics.

Mortality

The current levels of mortality and possible factors that will influence future trends in mortality rates are of great importance to much actuarial work. Actuaries need to be aware of the wide range of factors that can affect future mortality rates such as medical and bio-technological advances, whether society is willing and able to afford new research and treatments, changes in lifestyle such as diet, exercise and smoking, the impact of obesity, the evolving rates of improvement in mortality for different causes of death, the possible increasing resistance to treatment by antibiotics and the re-emergence of old diseases. There are also varying patterns of mortality improvement in historical data. For example, in the UK those born between 1925 and 1938 have consistently exhibited higher rates of mortality improvement than those born on either side; in projecting aggregate future mortality one of the questions is then whether and for how long these differentials will persist in the future.

Mortality also varies between different groups within a population e.g. by socio-economic class, by area, by level of deprivation, etc. In the UK, valuations of defined benefit pension scheme liabilities are sometimes carried out using annuity values which vary by postcode (which is effectively used as a proxy for lifestyle). The UK has historically had a large market in providing annuities, particularly for people in defined contribution pension schemes who purchase an annuity on reaching retirement. Several annuity providers provide ‘enhanced annuities’ where those who are in ill-health or have certain medical conditions such as diabetes or have a ‘poor’ lifestyle history (for example because of heavy smoking or drinking) can obtain higher annuity payments than those in better health.

Assumptions about current and future mortality rates of the oldest old will become more important as the proportion of the population at these ages grows over time. Currently relatively little is known for certain since the data at ages 90 and over are relatively sparse and not always of good quality, even for national populations as a whole.

Migration

The workforce in modern world is becoming increasingly mobile. International migration is driven by a wide range of factors such as urbanization, climate change, armed conflicts, political instability, as well as by the globalization of world economies.

Permanent international migration is an important driver of the population growth in countries like Australia, Canada, UK and the US. At the same time other countries are experiencing continuing high emigration. Projecting future migration is a challenge for social security actuaries. It is a volatile population component since it is affected significantly by a country’s immigration policies, the ability to attract immigrants with required professional skills, the economic and political environment as well as many other factors. As such, recent trends are not necessary representative of future ones. Performing

projections over extended periods such as 50 or 75 years require actuaries to use their judgement on how to balance recent experience and long-term trends in developing migration assumptions. In addition, when incorporating migration in social security projections, actuaries pay attention to age, gender, and family composition of immigrants, and the ability to find work (and thus pay taxes and social security contributions). In this area, actuaries can prove to be a valuable resource for policy makers and demography oriented institution due to the ability to perform detailed analysis based on administrative data.

Temporary international migration raises questions of the social protection of migrant workers. The social protection challenges confronting migrants are well summarized in the ISSA report “Social Policy Highlight 17: Social Security and migrants: Policy challenges and responses”. In particular, this publication discusses the financing of providing protection for migrants, whether allowing migrants to pay social security contribution and eventually have access to benefits result results in a net gain or loss for the system and if migrants do not have access to host countries social security, the cost for the country of origin when they return. In many countries (e.g. Canada, US) social security actuaries address these issues when assessing the financial status of social security programs.

Another face of migration is the workforce of multinational corporations who move between different countries and continents. Pension actuaries are actively involved in the design and administration of international pension plans (IPP). The 2013 Towers Watson International Plan Survey states that the main objective of an IPP is to provide expatriates with a retirement benefit (as a replacement for not being able to remain in a retirement plan of a home country or host country). A continuing trend is to extend participation to include local workforces where local retirement or savings solutions are either not available or not adequate due to poor market conditions.

Fertility and evolving family structure

Fertility is one of the main demographic components underlying the evolution of populations. According to the Population Reference Bureau 2013 World Population Data Sheet, worldwide the total fertility rate (TFR, or average number of children per woman) is 2.5, and it is 4.4 in the poorest countries. TFRs currently range from a low of 1.2 in Bosnia-Herzegovina to a high of 7.6 in Niger. The wide range of TFRs across the world, with the poorest countries showing the highest TFRs, illustrates the different challenges faced by different countries. At the same time the family structures are also evolving, affected by factors such as increasing numbers of single parent families, the changing role of women in society, urbanization, the high percentages of orphaned children as a result of HIV/AIDS (e.g. in 2012 almost 18% of South African children had lost at least one parent), etc.

The projection of future fertility rates is a task performed by social security actuaries as a part of overall population projections. In developing these assumptions an actuary may look at population characteristics such as fertility by age of mother, by socio-economic level, by geographical region, by residency, etc. Models for developing fertility assumption can become very elaborate and depend on the contribution and benefit structure of the underlying programs.

Actuaries could be involved in the evaluation of specific family programs such as maternity programs, children pension programs such as the South African Child Support Grant, conditional cash transfer programs such as Brazilian Bolsa Família, etc. An example of good practice is the actuarial report produced for provincial Québec Parental Insurance Plan (Canada). These actuarial reports not only project fertility rate in Québec, but also project the distribution of families by type: single parent versus couples, and one earner versus two earners. This is an area where actuaries should strive to increase their visibility, since actuarial expertise is invaluable in designing and evaluating such programs.

Aging of the population

The aging of the population stemming from falling fertility rates and/or increasing longevity creates challenges for developed countries, including

- how society spending should be apportioned between younger and older populations, in other words, how intergenerational equity should be addressed
- whether aging will create labour shortages
- what impact aging could have on social programs and how social security programs could help alleviate this
- what impact aging could have on private savings and income provision after retirement
- how health systems and old-age retirement systems should adapt to changing realities
- what are the demographic characteristics of the oldest old, who until relatively recently have formed only a small proportion of the population and what their requirements might be in terms of savings, income and risk management
- what new lines of products are or might emerge, for example related to the expansion of long-term care?

Intergenerational equity

Discussions on intergenerational equity and sustainability are becoming increasingly relevant with increasing longevity and overall aging of the population. During 2011-2013, the ISSA Technical Commission on Statistical, Actuarial and Financial Studies participated in a project “Promoting a fair intergenerational balance”. Country case studies prepared by social security institutions in Canada, Denmark, France, Saudi Arabia and Uruguay, as well as the International Actuarial Association contribution from Japan, served as a foundation for this work. Teams working on this project included actuaries, economists, as well as people involved in making policies. The findings of this project were presented in the paper “Intergenerational equity: a condition for sustainable Social security?”. The paper discussed possible measures of the intergenerational equity, most of them being actuarial ones. Further, it summarized existing and potential policy responses stemming from these actuarial measures. This project demonstrates how actuarial expertise could be integrated into policy developments.

Automatic balancing mechanisms for old-age social security programs

It is a desirable feature of social security systems to automatically adjust to changing economic and demographic conditions. Several old-age social security programs around the world incorporate in their designs automatic balancing mechanisms (ABMs) that become activated by certain economic and

demographic triggers. The most wide spread demographic trigger is the increase in longevity. Japan and Germany use variations of dependency ratio to activate adjustment. Actuaries performing actuarial valuations of a scheme with an ABM should have an in depth understanding how future demographic development impact application of such mechanisms.

The design of ABMs often relies on the work of actuaries. For example, the UK government is currently legislating for a review of State pension age to take place once in every parliament. This will be based on the principle that individuals should spend a given proportion of their adult life in receipt of a state pension. The UK Government Actuary would report on longevity and a person independent of government would be commissioned to lead a report on other factors relevant to setting State Pension age. The government anticipates that these other factors will include, for example, healthy life expectancy and differences in life expectancy between socio-economic groups. The department for Work and Pensions will work with the Government Actuary's Department to develop proposals for the methodology which will inform the review.

It is not easy to design a mechanism that is able to stabilize financial status of the scheme while allocating future financial burdens fairly among contributors and beneficiaries. The next step is to monitor the appropriateness of existing designs and educate policymakers on their advantages and disadvantages. Actuaries can play a very important role in this. An example of this involvement is the work of Mr Sakamoto with respect to Japanese ABM as well as his analyses of the Canadian, German, Japanese and Swedish ABMs.

Increase in retirement age

As mentioned earlier, one of the widespread changes in pension systems design is the increase in retirement age. Such increases are often not automatically linked to increases in longevity, but follow a predetermined schedule.

The decision to increase retirement age could be driven not only by increasing longevity, but by other factors such as shrinking tax and contribution bases due to falling fertility and a desire to keep people longer in work force in order to address labour shortages. By pooling actuarial expertise from private and public sectors as well as from academics, actuarial organizations could provide advice to policymakers for making efficient decisions in this area. An example of such collaboration of actuaries from different areas of expertise is the report of the CIA on "Issues Related to Increasing the Retirement Age". In this report demographic developments in Canada were analysed in relation to the labour force participation rates, labour productivity, as well as provisions of the three pillars of Canadian retirement income system.

Urbanization

Urbanization not only increases the number of persons living in cities (who will constitute the majority on the planet in the future), but it is also transforming lifestyle, family structures, traditional ways of caring for young and old, the labour force, etc. It also implies the concentration of wealth, industrialization, as well as possibly greater chronic health risks. All these factors affect many areas

where actuaries are traditionally or may be involved: old-age programs, health programs, unemployment programs, family programs, etc.

One of the examples is how the urbanization affects insurers business. Urbanization in emerging markets present new opportunities for insurers in both life and non-life lines of business, for example in product innovation, risk management, planning, asset allocation. At the same time, the changing risk landscape with concentration of wealth and population in relatively compact urban areas amplifies the risk of big loss scenarios.

Why other organizations should talk to actuaries

Some of the reasons why various national and supranational organizations should talk to actuaries are listed below:

- Actuaries have the expertise, experience and training to combine statistical, mathematical, demographic, economic and financial information into models, analysis, and projections. Actuaries are trained to determine and find trends and underlying features in data and information, thus enabling them to identify the major issues that may affect population growth, trends, and projections over time.
- Actuaries already produce models, projections, and policies that affect whole populations (e.g., via Social Security or pension funds) or segments of populations. These can be beneficially combined with work performed by other organizations.
- Actuaries can make a useful contribution to the debate on sustainability and adequacy of pension and social security systems as well as to the technical aspects of demographic and economic projections.
- Actuaries have access to high quality administrative data. This allows for identification of trends at a very detailed level.
- Actuaries may be able to provide commentary or advice on proposed policy changes based on past behaviour of clients and customers or commercial data which are not publicly available
- The results of actuarial work are used to define major national policies by legislators (see Box 3). Since this work is used on the national basis, it should be consistent with national organizations' projections. Discussions between these organisations and actuaries are necessary.

Box 3 – Reliance on work of actuaries

An ISSA survey covering 46 social security institutions in 32 countries reports that, in most cases, an actuarial valuation must be produced at least every three years. In turn, 80 per cent of reports were tabled in Parliament or submitted to government, in around one third of cases legislation requires specific action to be taken based on the findings of the report, and 80 per cent of reports are made public.

Source: Source: Survey on actuarial and financial reporting for social security schemes and its legal implications: Summary of findings and conclusions, Ménard, Billig, Léger (May 2012)

- In countries and regions when data are scarce (and these countries are often facing serious demographic challenges), actuaries can help national and supranational bodies to develop credible approximations.
- As well as producing models actuaries can review and provide quality assurance of models and assumptions used within government departments and elsewhere.
- Actuaries are expert in risk management and can provide useful input on ways of assessing and presenting information on risks involved related to demographic, economic and other areas.
- Actuaries can help provide education for model providers and users as well as the general public.
- Actuaries can also help with assessing the needs of various sectors of the population and developing suitable products for meeting these needs and managing risks
- Actuaries recognise the importance of providing measures of uncertainty to results. Since policymakers are often interested in a single figure or single variant result it is important to engage policymakers in considering a range of possible outcomes.
- As professionals actuaries operate under various standards which aim to provide that their work is objective and transparent and can command the confidence of clients and the general public. At the international level the International Social Security Association developed standards of practice for social security actuaries which are supported by the International Labour Office.

Projects in progress

Members of the PIWG and other actuaries are currently engaging others outside the profession to raise awareness of what actuaries can offer. Some examples are given below.

In Africa, several countries already employ actuaries to assist in valuing and advising on their social security program, worker's compensation schemes, life and general insurance activities. In other areas, actuaries have been in contact with government officials and academics to discuss the impact of demographic trends on such areas as agriculture, education, productivity and youth unemployment and how actuaries can work together with agronomists, demographers and national statistical bureau to settle a sound basis for collecting appropriate statistics. It is intended to set up a workshop to build up

sub regional networks in Africa to provide information on what actuaries can offer and their potential role, to share experience and to organize knowledge management and documentation.

In the European Union the Social Security sub-committee of the Actuarial Association of Europe engages with European institutions to make public interest interventions on matters of social security and pension policy. The sub-committee issued a position paper on the Sustainability of pension systems – the demographic challenge which made use of demographic projection information. The sub-committee has also been working with the Ageing Working Party of the European Council to make suggestions for enhancing the publication of projections of pension costs in the Ageing Report 2015 (a triennial publication of the European Commission). As part of the process, actuaries have been talking to statisticians in Eurostat (the body which collates, produces and publishes statistics for the countries of the European Union) and suggestions have been made concerning the official European Union population projections for all member states and their appropriateness for supporting the pension cost projections. The group also intends to carry out work on defining measures of sustainability of pension systems.

Conclusion

While falling mortality rates and the resulting increases in longevity already draw significant attention of actuarial communities, actuaries should increase their awareness on the role actuaries can play in assessing impacts that other demographic changes have on programs and products. Among other things, actuaries need to:

- Establish demographic baseline and explore trends that are required for actuarial evaluations, pricing, modeling, and similar activities
- Support comparisons between different societies / countries / socio-economic strata
- Explore how future demographic developments may affect actuarial models and projections
- Provide better understanding of the economic, demographic and social processes that underlie actuarial models and projections (e.g., work-based population movements, health-based mortality / morbidity trends, etc.)
- Support the establishment of more comprehensive actuarial models and projections (e.g., population-based models, country-wide models – rather than models and projections limited to a particular segment of interest)
- Enable linkage of population and medical development trends, thus enhancing actuarial models and projections
- Engage in the assessment of the needs of various groups of the population and in the development of suitable products and services to help meet those needs and manage risks.

Actuaries are perceived sometimes as being extremely good at analysing particular trends in relation to programs and products, but not recognizing the overall fiscal and economic implications of these trends. This is a myth that actuaries should strive to disperse by actively interacting with national and supranational organizations.

Actuarial organizations brand actuaries as risk management specialists using slogans like “Risk is opportunity” (SOA) and “Seeing beyond risk” (CIA). Demographic risks in the modern world cannot be ignored. The actuarial profession possesses a profound understanding of demographic risks and their implications. Actuaries should take steps to engage with those outside the profession to recognize this expertise and to use it.

Acknowledgements

We would like to thank all members of the Population Issues Working Group for their valuable input and support. In particular, we would like to acknowledge contributions of Yair Babad, Robert Brown, Chris Daykin, Lambert Gbossa, Dermot Grenham, Carlos Grushka, John Martin, and Arpan Thanawala.

Bibliography

Andrews, Doug et al. (2011, November). *Final report: Responding to the Dilnot Commission: Information gathering regarding long-term care in ten countries*. Retrieved from: <http://www.actuaries.org.uk/research-and-resources/documents/final-report-responding-dilnot-commission-information-gathering-reg>

Buffin, Ken, Stipp, Emile, Garand, Denis (2013). *The role of actuaries in the healthcare system*. Presentation of IAA to World Health Organization.

Ottawa. Canadian Institute of Actuaries. CIA Task Force on Retirement Age (2013, May) *Issues related to increase in “Retirement Age”*. Retrieved from: <http://www.cia-ica.ca/docs/default-source/2013/213038e.pdf?sfvrsn=0>

Geneva. International Labour Office (2013) *Employment and social protection in the new demographic context*. Retrieved from: http://www.ilo.org/wcmsp5/groups/public/---ed_norm/---relconf/documents/meetingdocument/wcms_209717.pdf

Groupe Consultatif Actuariel Européen Position Paper (2012, July). *Sustainability of pension systems in Europe – the demographic challenge*. Retrieved from http://actuary.eu/documents/Sustainability_pension_system_%20final_020712%20270612_web.pdf

Grushka, C., Bellinard, M., & De Biase, M. (2012). *Disability insurance risks: The Argentinian case*. International Social Security Review 65 (3), 49-75

Institute for Health Metrics and Evaluation (2013) *The Global Burden of Disease: Generating Evidence, Guiding Policy—Sub-Saharan Africa Regional Edition*. Retrieved from: <http://www.healthmetricsandevaluation.org/gbd/publications/policy-report/global-burden-disease-sub-saharan-africa>

International Social Security Association (2011, April). *Social Policy Highlight 17 Social security and migrants: Policy challenges and responses*. Retrieved from: <http://www.issa.int/details?uuid=f2cec605-aa86-472c-ba54-1ba4d492b900>

- International Social Security Association (2012, May) *Social Policy Highlight 24. Actuaries: Key players for sustainable social security systems*. Retrieved from: <http://www.issa.int/details?uuid=f9e581af-f791-4fb8-a46b-8909beeb2d44>
- Karl, Kurt (2014). *The Risk and Rewards of Urbanisation*. *Actuarial Post*. Retrieved from: <http://www.actuarialpost.co.uk/article/the-risk-and-rewards-of-urbanisation-5745.htm>
- Levert, Stéphane (2013, September). *Sustainability of the Canadian Health Care System and Impact of the 2014 Revision to the Canada Health Transfer*. Retrieved from: <http://www.cia-ica.ca/docs/default-source/2013/213075e.pdf>
- Ménard, Jean-Claude, Billig, Assia & Léger, Florian (2012, June). *Actuarial and financial reporting for social security schemes and its legal implications*. Paper presented at the 17th ISSA International Conference of Social Security Actuaries and Statisticians. Berlin, Germany. Retrieved from: <http://www.issa.int/web/event-17th-issa-international-conference-of-social-security-actuaries-and-statisticians/documents>
- Ménard, Jean-Claude & Billig, Assia (2013, November). *Proactive and preventive approaches in social security – Summary report of the sub project on "Supporting sustainability"* Paper presented at the World Social Security Forum. Doha. Qatar. Retrieved from: <http://www.issa.int/details?uuid=2b8e9143-cec5-4d5a-9a11-c7127f872412>
- Ménard, Jean-Claude, Billig, Assia, Sørensen, Ole Beier & Léger, Florian (2013, November). *Proactive and preventive approaches in social security – Supporting Sustainability Intergenerational equity: a condition for sustainable social security?*. Retrieved from: http://www.osfi-bsif.gc.ca/Eng/oca-bac/sp-Pages/issa14_rpt2.aspx
- Organization for Economic Co-operation and Development (2013) *Health at a Glance 2013 OECD indicators*. Retrieved from: <http://www.oecd.org/els/health-systems/Health-at-a-Glance-2013.pdf>
- Ottawa. Office of the Superintendent of Financial Institutions. Office of the Chief Actuary (2013). *Twenty-Sixth Actuarial Report on the Canada Pension Plan as at 31 December 2013*. Retrieved from: <http://www.osfi-bsif.gc.ca/Eng/oca-bac/ar-ra/cpp-rpc/Pages/cpp26.aspx>
- Ottawa. Office of the Superintendent of Financial Institutions. Office of the Chief Actuary (2011). *Actuarial Report (9th) on the Old Age Security Program as at 31 December 2009*. Retrieved from: <http://www.osfi-bsif.gc.ca/Eng/Docs/OAS9.pdf>
- Ottawa. Office of the Chief Actuary. (2011, September). *Canada Pension Plan Experience Study of Disability Beneficiaries Actuarial study No9*. Retrieved from: <http://www.osfi-bsif.gc.ca/Eng/Docs/cppas9.pdf>
- Pretoria. Statistics South Africa (2013). *Social Profile of South Africa, 2002-2012*. Retrieved from: <http://beta2.statssa.gov.za/publications/Report-03-19-00/Report-03-19-002012.pdf>
- Québec. Conseil de gestion de l'assurance parentale (2013). *Rapport actuariel du Régime québécois d'assurance parentale au 31 décembre 2012*. Retrieved from: <http://www.cgap.gouv.qc.ca/publications/index-publications.asp?categorie=0401201#liste>

Sakamoto, Junichi. (2008, February). *Roles of the Social Security Pension Schemes and the Minimum Benefit Level under the Automatic Balancing Mechanism*. Retrieved from:
http://www.actuaries.org/Boston2008/Papers/IPM4_Sakamoto.pdf

Sakamoto, Junichi. (2013). *Automatic Balancing Mechanisms*. Retrieved from:
http://www.actuaries.org/lyon2013/papers/PBSS_Sakamoto.pdf

Towers Watson. (2013) *International Pension Plan survey report 2013*. Retrieved from:
<http://www.towerswatson.com/en-CA/Insights/IC-Types/Survey-Research-Results/2013/12/International-Pension-Plan-survey-report-2013>

Washington. D.C. Board of trustees of the Federal Old-Age and Survivors Insurance and Disability Insurance Trust Fund. (2013, May) *The 2013 Annual Report of the Board of Trustees of the Federal Old-Age and Survivors Insurance and Federal Disability Insurance Trust Funds*. Retrieved from:
<http://www.ssa.gov/oact/tr/2013/tr2013.pdf>

Washington. Population Reference Bureau (2013). 2013 World Population Data Sheet. Retrieved from:
http://www.prb.org/pdf13/2013-population-data-sheet_eng.pdf