

New Challenges for Risk

Management:

Is population ageing a systemic risk?

The ageing of world's population is a phenomenon clearly observable that will have in the near future multiple effects in work and business. The methodology of Risk Management can play an important role in addressing this contemporary risk.

RAFAEL PASCUAL CAMINO

MAPFRE Caución y Crédito.

CRISTINA LINARES CALPE

SegurCaixa Holding, VIDACAIXA, S.A.



The concept of life expectancy

PSYCHOLOGICAL-SOCIOLOGICAL APPROACH

One of mankind's overriding concerns has always been the preservation of life. Although we do not know exactly what happens once we lose this precious gift, day to day activities are all geared towards prolonging life to the utmost and also maximising its quality. Interest in life and ageing has been omnipresent throughout the history of mankind. Two aspirations that have existed in all cultures and at all times bear eloquent witness to this life-prolongation drive: the quest for longevity and immortality. Alchemist's chimera such as the «elixir of eternal youth» and the «fountain of life» have lingered on into today's society in vestigial form: vitamin pills, anti-ageing cosmetics, quirky diets, keep-fit programmes, plastic surgery...

Thinkers down the centuries have shown an unflagging interest in longevity and eternal youth; they have been equally keen to understand the ageing process and the problems of advanced age. The ancient civilisations of China, India and the Eastern Mediterranean area studied this subject in great depth. So did the Greeks and Romans somewhat later. Other philosophers like Plato and Aristotle provided telling insights into the subject, their thoughts playing an important role in European culture. By way of example, in the Middle Ages, old age was conceived as the age of emotional balance and as a release from the yoke of worldly pleasures; on the other hand, it was also seen

THINKERS DOWN THE CENTURIES HAVE SHOWN INTEREST IN LONGEVITY AND ETERNAL YOUTH; THEY HAVE BEEN EQUALLY KEEN TO UNDERSTAND THE AGEING PROCESS AND THE PROBLEMS OF ADVANCED AGE



as a stage of physical and mental decline.

Turning to the psychological aspects of life expectancy, mention could be made, on the one hand, of intellectual skills, such as memory, learning ability, adaptation and the relation thereof with the level of activity and satisfaction in life. But then there is also the question of the individuals' attitudes and reactions to their environment; their interactions with society tend to dwindle as they shrink from activities with a growing degree of dependence on their peers.

In recent centuries medical advances



ILLUSTRATION STOCK

have provided man with a quiverful of weapons to fight against diseases that once tumbled whole civilisations. This struggle is not over yet; there are still incurable diseases and a great part of the world's population cannot afford these new drugs and medicines.

BIOLOGICAL APPROACH

According to the laws of nature it is inevitable that all living things change over time, both in structure and in function. The

ageing process involves progressive alterations to the cells, tissues, organs and the whole organism. The upshot is that old age is the inevitable result of organic and mental deterioration. This deterioration is already visible in mid life. Research shows that ageing starts way before the age of 65. By the age of 40 there is already a decline in energy levels, with a corresponding increase in susceptibility to diseases and disabilities.

It therefore seems *de rigueur* to point out here that the human organism passes through a cycle comprising conception,

IN LAST CENTURIES LIFE EXPECTANCY HAS SOARED DUE TO AGRARIAN, TRANSPORT, SCIENTIFIC, INDUSTRIAL AND URBAN REVOLUTIONS

when life expectancy is maximum, through birth, childhood, adolescence, maturity, decline and death. The latter brings life expectancy down to zero.

DEMOGRAPHIC-MATHEMATICAL APPROACH

From the demographic-mathematical point of view the complete life expectancy at birth is defined as the mathematical expectancy of the random age-of-death variable, X , defining this within a set of real positive numbers ranging from zero to infinity, albeit with acceptance in practice of a threshold value, w . If the age-of-death variable is a discrete variable, life expectancy is then called reduced life expectancy (ex). This would be the complete number of years that a person who has reached the age x could expect to live.

FACTORS THAT HAVE INFLUENCED LIFE EXPECTANCY:

A. Agrarian revolution:

- Invention of new techniques allowing land to be worked with less effort.
- Application of techniques to obtain higher farming yields and more harvests per year, the introduction of new crop rotation schemes, etc.
- The appearance in Europe of new crops from elsewhere in the world (maize, potato), changing nutritive possibilities.
- New land is brought into cultivation, both in Europe and the new continents colonised by the Europeans.



B. Transport and communication revolution:

- Paths are upgraded from beaten tracks to paved roads.
- The 19th century sees a great leap forward with the use of steam locomotion on land (railways) and on the sea (steam ships).
- Communications become faster on the strength of continual technological innovation.

C. Scientific Revolution:

- Medical and pharmaceutical advances, impinging directly on the reduction in death rates.

D. Industrial Revolution

(18th to 19th century):

- Increased production of goods and services.

–Development of manufacturing industry, incorporating mechanical working systems to reduce production times and costs.

E. Urban Revolution:

–Cities, springing up around the mining and industrial hubs, grow rapidly and become authentic black holes sucking in people from the surrounding countryside.

–The cities' infrastructure is steadily improved throughout the 19th century (sewage systems, drinking water purification, street cleansing, road paving, public lighting, etc.), whereby the cities cease little by little to be «death traps» and become healthy, dynamic and modern areas driving social and economic change and also altering peoples' mindsets.

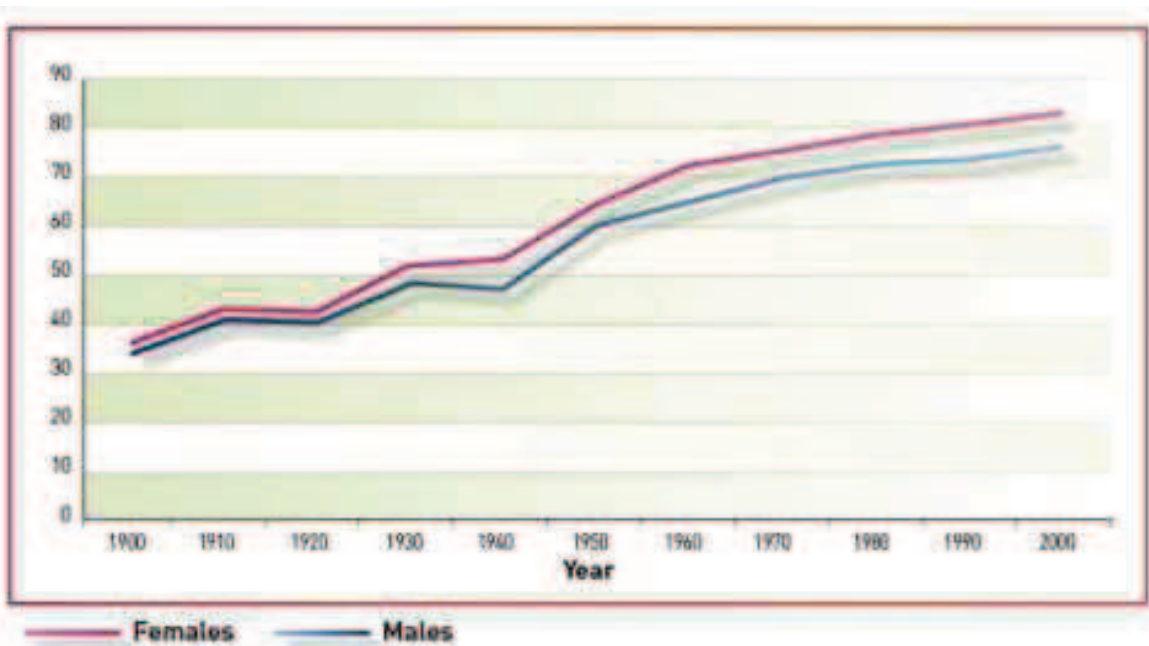
As a result of all these changes life

expectancy and the worldwide population both soared. The distribution worldwide is uneven, however, with glaring discrepancies in some developing and under-developed countries. The population increase would have been even steeper but for high infant mortality, famines and epidemics.

Life expectancy in twentieth-century Spain increased substantially, from 34.7 years in 1900 to 78.7 in 1998. The increase for males was from 33.8 to 75.2 and for females from 35.7 to 82.1. The biggest increase in life expectancy came in the first third of the century due to the improvement in living conditions. Other factors enhancing life expectancy in the last third of the century were improvements in healthcare techniques and increased access thereto, as well as the setting up of the social safety net that culminated in a fully-fledged welfare state.

**LIFE
EXPECTANCY IN
TWENTIETH
CENTURY SPAIN
INCREASED
SUBSTANTIALLY
FROM 34.7
YEARS IN 1900
TO 78.7 IN 1998**

Life expectancy in Spain in the twentieth century.



Source: INE (National Statistics Institute)

THE BABY-BOOM BEGAN IN SPAIN IN 1955, TEN YEARS LATER THAN IN THE REST OF EUROPE, DUE TO THE LINGERING AFTERMATH OF THE CIVIL WAR

This graph shows that this variable slipped back in the decades of 1910-1920 and 1930-1940, mainly due to the 1918 flu pandemic and the Spanish Civil War from 1936 to 1939, which affected males above all. As from 1950 growth has been steady with no setbacks. In fact the trend is one of continual but moderate growth. This implies a concomitant fall in the death rate, thanks to improvements in treating and preventing diseases. The reductions in the death rates did not occur until after World War I, i.e., nearly a century behind other European countries. Likewise, the fall in fertility came late in Spain, not occurring until a few years before the Spanish Civil War.

The main effect of all the abovementioned factors was a considerable population increase, thanks above all to the drop in infant mortality. In figures the population grew by about 10 million from 1900 to 1950, rising from 20 million to 30 million. By the end of this period, however, a slight ageing process had already become observable, with an increase in the proportion of over 65s.

The baby-boom, a totally left-field



event from a demographic point of view, began in Spain in 1955, ten years later than in the rest of Europe, due to the lingering aftermath of the Civil War. Logically, this increase in fertility acted as a break on the incipient ageing process. Spain's post-baby-boom fall in the fertility rate also lagged behind the rest of Europe. The fertility rate held steady at about 3.0 until the late seventies, plunging to below 1.5 by the mid nineties.

As for life expectancy in the twenty first century, the following table shows the same upward trend with no setbacks whatsoever. In 2002 male life expectancy stood at almost 77 while the figure for females was 83, representing an inter-sex gap of 6 years. Forecasts up to 2025 show that male life expectancy will top 80 and female life expectancy will reach 86. The male-female gap will not come down. Forecasts for 5 years later show little change.

Life expectancy in Spain in the twenty-first century by gender.

Year	Males	Females	Gap
2002	76,63	83,36	6,73
2010	78,34	84,79	6,45
2015	79,23	85,54	6,30
2020	79,84	86,04	6,20
2025	80,37	86,48	6,12
2030	80,89	86,92	6,03

Source: INE forecast on the basis of the 2001 census.



THE DEMOGRAPHIC TRANSITION THEORY.

The demographic transition theory defines some stages through which populations necessarily have to pass from the traditional demographic model to the current one. These stages are of variable

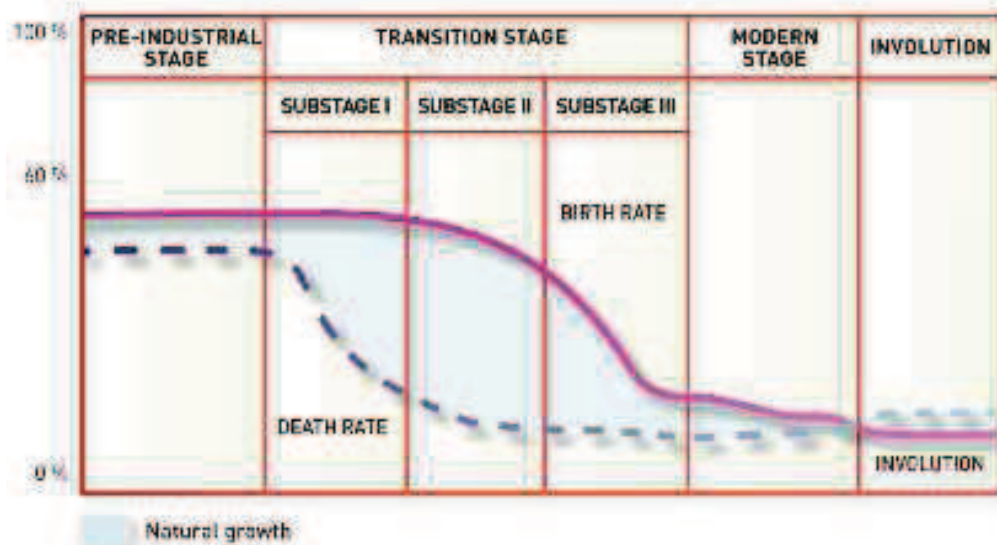


length depending on the population involved. This process began in the late eighteenth century or mid nineteenth century in industrialising countries and ended in the sixties or seventies of the twentieth century. The two variables considered in the model are birth rate and death rate, their difference being the population's natural growth.

The model starts from a stage in which a population has very high birth and death rates, more or less cancelling each other out and therefore with only weak population growth. This stage corresponds to the pre-industrial society. The transition ends with a final stage in which both rates are, on the contrary, very low, so the population growth rate is once again very weak or even negative.

**THE
DEMOGRAPHIC
TRANSITION
THEORY DEFINES
SOME STAGES
THROUGH
WHICH
POPULATIONS
NECESSARILY
HAVE TO PASS
FROM THE
TRADITIONAL
DEMOGRAPHIC
MODEL TO THE
CURRENT ONE**

Demographic Transition Model



FROM 1900 TO 1998 SPAIN'S POPULATION DOUBLED, RISING FROM 18.6 MILLION IN 1900 TO 39.5 IN 1998

The transition comprises two phenomena that are consecutive in time:

The first kicks off in the early twentieth century and consists of a sustained reduction of the death rates (especially the infant mortality rate) as result of the improvements in living conditions brought in by the industrial revolution (public hygiene, better nutrition, etc.). During this first stage of the transition individuals have not yet adapted their reproductive behaviour to the falling death rate. By inertia they continue to procreate massively to ensure the future continuity of their family, so the low death rate coexists at first with a high birth rate. The result of the interaction of these two factors is a growing, very young population.

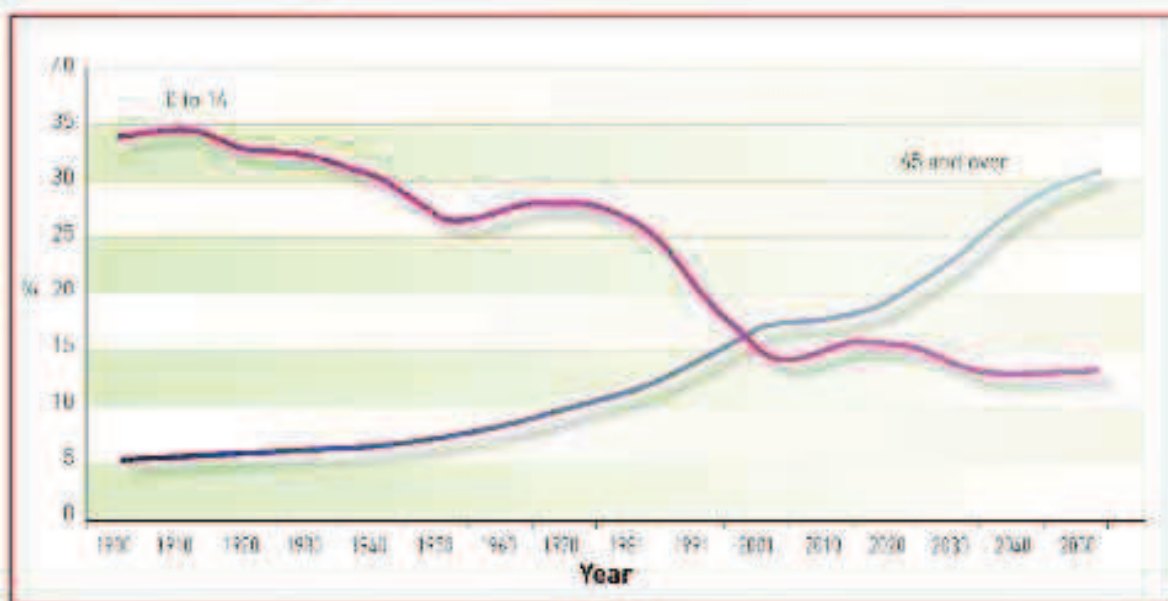
With time individuals adapt their behaviour to the new context of lower mortality, thus initiating the second phase of the demographic transition theory, a gradual



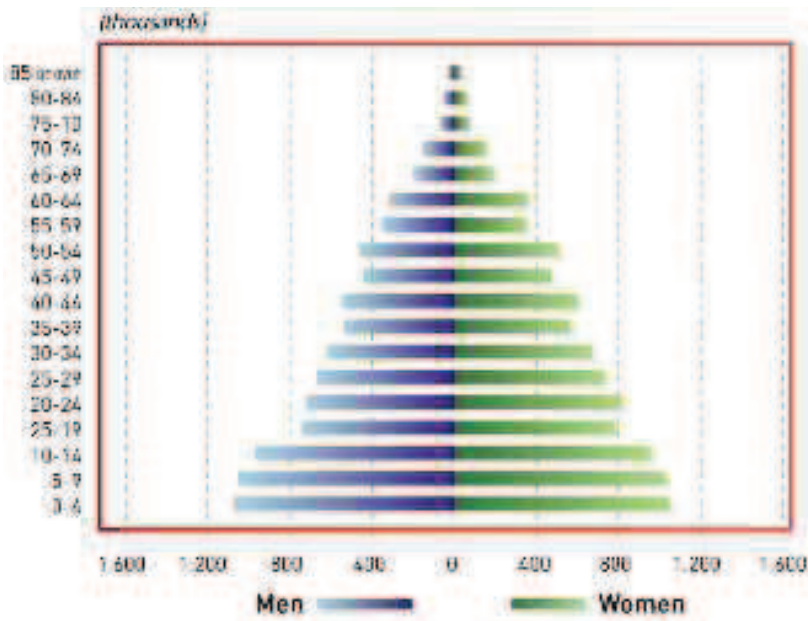
fall of the birth rate. The death rate also continues to come down, once more as a cumulative effect of the improved living conditions and also the significant healthcare advances.

By the end of the process the population strikes a new balance with low death and birth rates. This new balance brings with it an ageing population; it is in fact this new demographic regime that characterises all developed countries today. Hence the inversion of the demographic trend, as shown in the following graph, where the number of persons aged 0-14 is falling while the 65s and over are increasing:

Inversion of the demographic trend 1900 to 2050



Source: IAE (2004a). Population trends, 1900 to 2001. WC, 2004.
 IAE (2004b). Aspects of the Spanish population from the 2001 population census. WC, 2004.



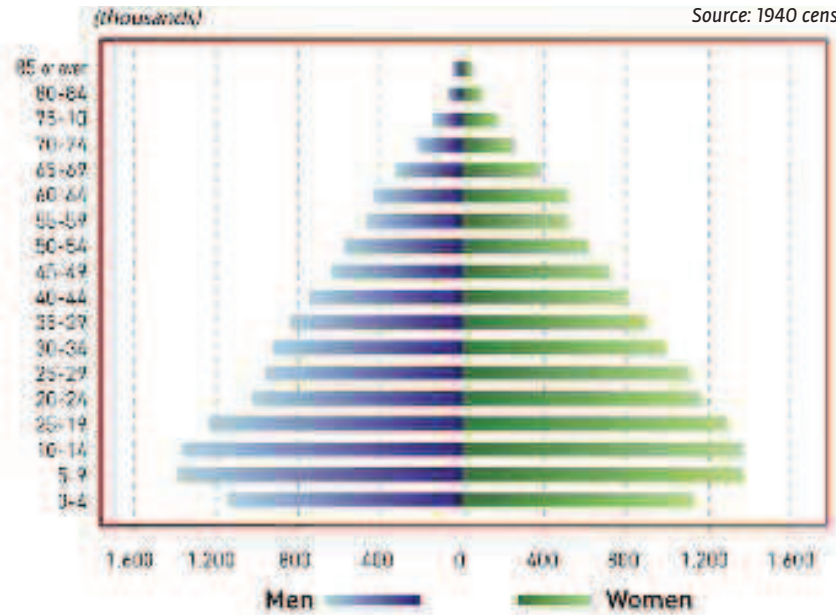
Spanish population pyramid. Year 1900.

Source: 1900 census.

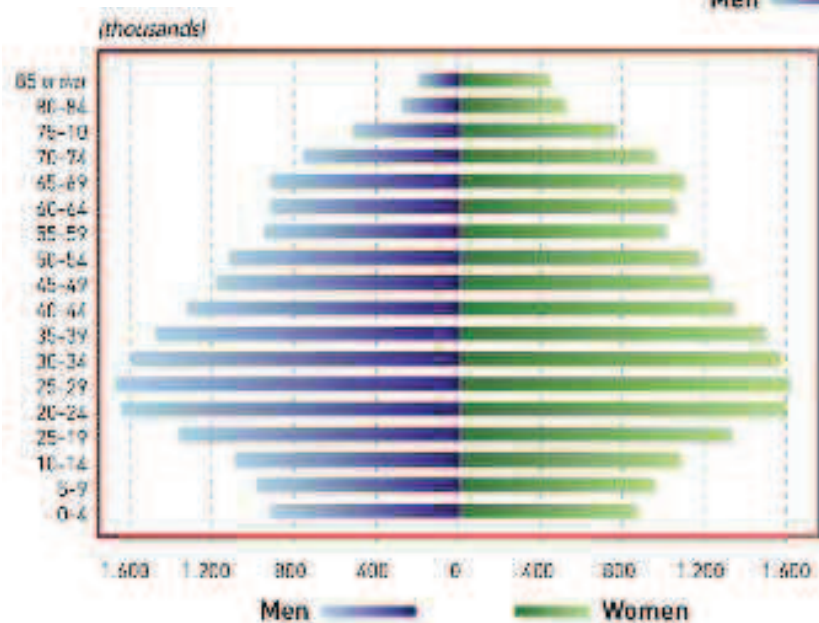
POPULATION PYRAMIDS IN SPAIN

From 1900 to 1998 Spain's population doubled, rising from 18.6 million in 1900 to 39.5 by 1998, representing an average cumulative yearly growth of 0.77%. Moreover, the crude death rate during the same period fell from 2.83% in 1900 to 0.92% in 1998.

Spanish population pyramid. Year 1940.



Source: 1940 census.



Spanish population pyramid. Year 1998.

Source: Spanish population mortality tables. Years 1998-1999.

The Spanish population pyramid in 1900 shows the typical triangular shape of a young population in expansion. By 1940 the population pyramid had begun to change shape as a result of the falling birth rate during the Spanish Civil War. By 1998 the birth rate had shrunk dramatically, with the concomitant population ageing.

Spain's twenty-first century population pyramids show a small base, reflecting very low birth and death rates, with deaths

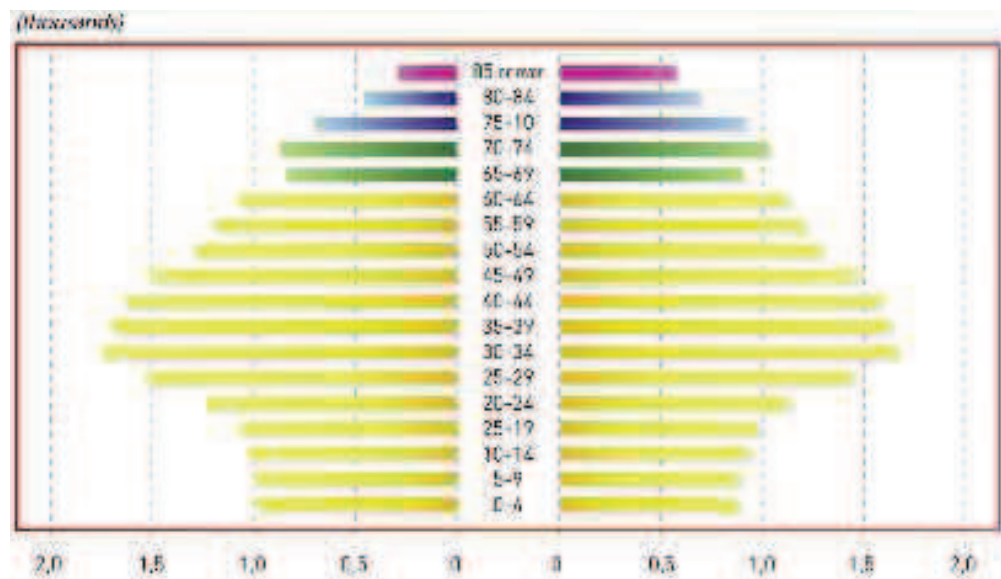
sometimes outnumbering births. This spells a nil or even regressive growth. By 2004 the population is ageing with a low proportion of young people and an increase in the elderly. As a result of all the abovementioned factors the graph now has a beehive shape.

Forecasts for 2050 point to a T-shaped «pyramid» with a narrowing base and upward slew, as a result of the falling birth rate. In other words the over 65s are growing while the lower age brackets shrink, due to the drastic fall in the death rate.

Spanish population pyramid

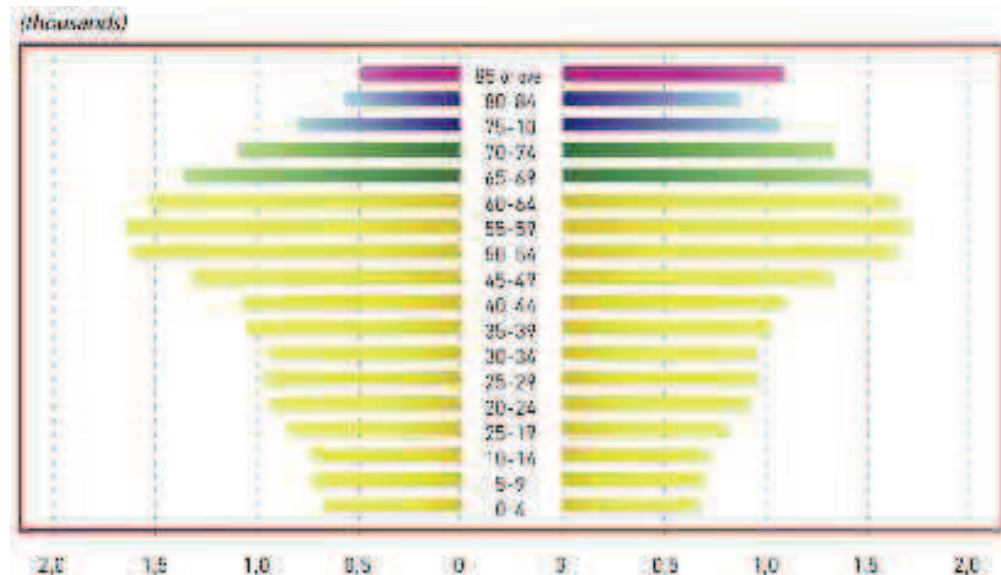
Year 2004

Source: ICEA – Drawn up from INE figures and forecasts.



Year 2025

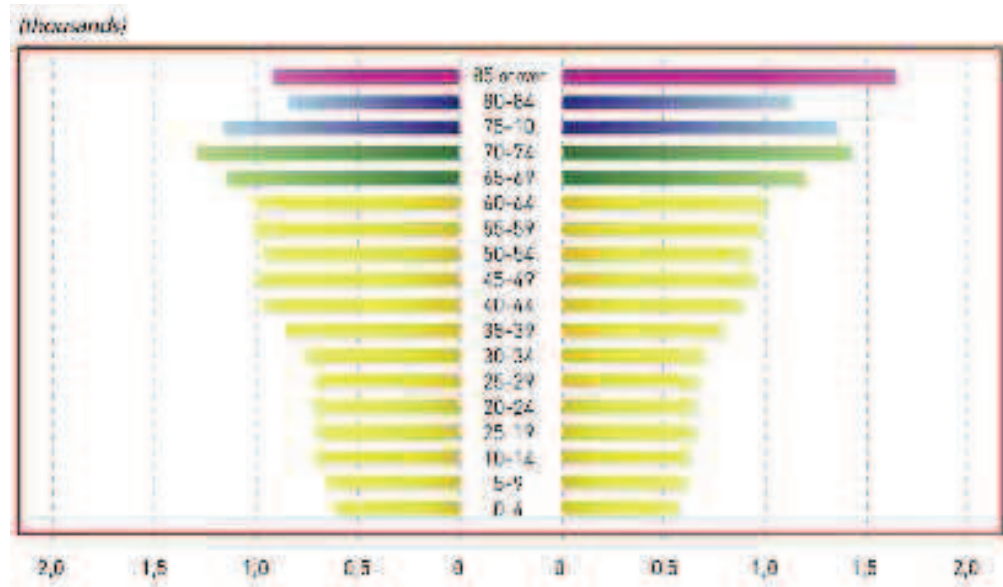
Source: ICEA – Drawn up from INE figures and forecasts.



Spanish population pyramid

Year 2050

Source: ICEA – Drawn up from INE figures and forecasts.



The above pyramids refer to the Spanish population trend throughout the twenty first century. As for the world as a whole, current estimates point to a 50% increase from here to 2050, with the highest growth rates being recorded in Africa, Asia and Latin America. Warning voices have been raised about this situation and the possible effects.

EFFECTS OF POPULATION AGEING

While the world's population as a whole will be growing, Spain's will be going through an ageing process. *Prima facie* this should not be much of a problem since improvements in medicine and pharmacy will ensure a better quality of life. There is no room for complacency, however, and a blind eye cannot be turned to certain effects:

● Dependent Population

The existence of people needing a higher degree of attention than the rest,

even becoming totally dependent for carrying out their vital functions, is not a new problem. Whether a newborn baby, a sick person or an elderly person, there are many cases in which people have to spend part of their time looking after others. This is known as *protección a la dependencia* (dependency protection) in Spain or long-term care in Europe.

As Professor Rodríguez Cabrero points out, this task, invariably the responsibility of women, is unremunerated and barely acknowledged in society. The European social model is characterised by the recognition of a subjective right to protection in situations of functional dependency in daily activities, by means of allowances or services, as the case may be. These protection arrangements are then managed in a decentralised way

**WITH
POPULATION
AGEING, THERE
IS A GROWING
NEED FOR LONG-
TERM-CARE
WORKERS; THIS
WILL TURN
GRADUALLY
INTO A SOURCE
OF
EMPLOYMENT**

THE OVER-80 SHARE OF THE POPULATION WILL TRIPLE BY 2050, RISING FROM 4% OF THE POPULATION TO 11-12% IN THE OECD COUNTRIES

under a system of state regulation and mixed public-private funding. Changes in woman's social role, her incorporation into the job market and the reduction in size of the family unit are all depriving this traditional model of the manpower to sustain it. There is now therefore a growing need for long-term-care workers; this will gradually turn into a source of employment, both national and international, with different skill grades to suit the attention needed. These workers could be drawn from currently inactive or underemployed groups.

Recommendation 98 of the Committee of Ministers to the Member States of the European Union included a definition of dependency, which has been duly incorporated into Spanish law in Act 39/2006 on the promotion of personal autonomy and attention for persons in a situation of dependency (*Ley de promoción de la autonomía personal y atención a las personas en situación de dependencia*). This has facilitated the creation of the National Dependency System (*Sistema Nacional de Dependencia*). This public initiative had



been rounded out by the development of insurance products including these new coverage arrangements, in an attempt to meet this growing demand in the broadest way possible.

● **Non-dependent Population**

The over-80 share of the population will triple by 2050, rising from 4% of the population to 11-12% in the OECD countries. Although many of these people will be dependent on others to a lesser or greater degree, many others will be hale enough to cater perfectly for themselves.

This increase of life expectancy means that people will have a longer post-retirement lifespan, thereby generating a demand for leisure to fill this time.

But this increase in free time will not be matched by an equivalent increase in spending power, since the public retirement pension is less than most working salaries. The pension rates in Spain, as a percentage of gross salary, are among the highest in Europe at 81%, well above the 60% figure of Finland and dwarfing the 38% of Ireland and the 30% of the United Kingdom.

The current economic crisis has a twofold and simultaneous effect of increasing the state's burden of unemployment benefits while reducing its solvency for paying out social subsidies. This does not mean that the model is about to collapse but this situation has sparked off a social debate about the ongoing viability of this model, which would now seem to be unsustainable in view of the current top-heavy shape of the population

pyramid. Delaying of the retirement age is mooted as a possible solution to this problem in the media and on social networking sites, something that is in fact already being tried in countries like Germany.

There are many effects of this situation.

We can sum them up as follows:

–Sociological effects

Today's society is obsessed with competitiveness. Young people are fast-tracked into positions of responsibility that their callowness has hardly prepared them for. The future increase in the average age of the population will probably lead to a slackening of this trend. We will have to get used to the fact that population ageing will be more of a demographic than a biological phenomenon, as the downsides of ageing are offset by medical advances and healthier living habits.

–Consumer effects

Whether or not world production can feed a growing population is currently a burning issue. Furthermore, the diet is changing. Leisure is changing too, with a greater presence of technological gadgets both in the home and outside.

–Economic effects

Public pension systems will have to look for formulae that strike the right balance between a dwindling paying-in population and a swelling taking-out population.

Private saving systems will play a key role in filling the gaping holes likely to open up in the public systems. Current consuming and saving patterns will therefore have to be revised on both an individual and collective basis. If saving has to increase, spending has



to fall. Another solution might be to seek an increase in productivity to fuel a sharp rise in salaries.

THE ROLE OF RISK MANAGEMENT IN POPULATION AGEING

The situation outlined above begs certain questions:

- I. Is population ageing a systemic risk or will it become one in the future?**
- II. What risks lie ahead for companies and organisations?**
- III. What could Risk Management bring to the equation?**

- I. Is population ageing a systemic risk or will it become one in the future?**

Systemic risk means a risk affecting the whole market, from which no one agent can single-handedly shield itself. The financial upheavals of recent years have brought this concept to the fore, as far as the financial markets are concerned. It has by now become accepted that this risk may arise from variables outside the models actually under study.

As far as companies and organisations are concerned, just as a grave economic crisis may change a company or institution or even

THERE IS A SOCIAL DEBATE ABOUT THE ONGOING VIABILITY OF NOWADAYS MODEL, WHICH WOULD NOW SEEM TO BE UNSUSTAINABLE IN VIEW OF THE CURRENT TOP-HEAVY SHAPE OF THE POPULATION PYRAMID

A SUBSTANTIAL CHANGE IN THE FACTOR OF PRODUCTION «LABOUR» ANALYSED FROM THE VARIABLE «AGE» COULD THROW OUT OF KILTER THE CURRENT RELATIONSHIP BETWEEN EMPLOYER AND EMPLOYEE

drive it to the wall, then a substantial change in the factor of production «labour», analysed from the variable «age», could, on our understanding, throw out of kilter the current relationship between employer and employee.

The report *Global Risks 2010 of the World Economic Forum* breaks down global risks into five main groups:

1. **Economic risks:** Food price volatility, oil price spikes, fiscal crises, asset price collapse, etc.
2. **Geopolitical risks:** International terrorism, nuclear proliferation, transnational crime and corruption, conflicts with certain countries, etc.
3. **Environmental risks:** Extreme rainfall, droughts and desertification, water scarcity, air pollution, etc.
4. **Societal risks:** Pandemic, infectious disease, chronic diseases, migration, etc.
5. **Technological risks:** Nanoparticle toxicity, data fraud/loss, critical information infrastructure (CII) breakdown.

Up to 35 concepts are itemised and vetted as global risks. Societal risks concentrate on health and the affects thereon of diseases, on the assumption that their eradication would reduce this risk and thereby boost life expectancy.

But population ageing does not feature there as a global risk. Might it be possible for a new fit to be found solely through migratory movements?

II. What risks lie ahead for companies and organisations?

In the current crisis situation, tackling a problem that lies 40 years down the line might seem like a profligate waste of resources in a period of scarcity. But 40 years

ago there were other problems that seemed far off in the future and now hog the headlines: oil shortages and problems of pollution. Could action have been taken earlier to ward off the expected effects?

Current research into population ageing has thrown up certain immediate risks for companies and organisations:

–Misfit between jobs, workers and working hours

Advancing age entails falling physical capacity. The older they get, *ceteris paribus*, the less productive workers will be in their jobs. On the other hand, they will be more experienced in carrying out their tasks.

Tasks may need to be distributed differently. As the ageing worker's physical capacities decline, a new balance has to be struck between what this person can contribute and the needs of the firm.

As regards working hours, the current trend is towards a gradual reduction of working time for the whole set of workers, so the special case of an older workers has to be factored in.

–Knowledge transfer

Working skills are acquired and honed with experience; the correct performance of working tasks calls for a worker to be given the right training. Older workers are a treasure trove of this experience and it would be a grave fault for any firm not to draw up knowledge management plans.

–Reduced worker motivation

If the new generations joining the job market are faced with the prospect of having to work longer or increase their contributions to public pension and private schemes, especially current generations, this will reduce their motivation and make them less productive.



III. What could Risk Management bring to the equation?

The idea of ERM involves a management of the risks that might affect the firm. The Risk Management methodology might therefore spark off a higher awareness of the problem. This does not entail a revolution in the processes but it would mean a first step towards ascertaining the current structure of human resources and their likely development in the future. Further down the line, a detailed analysis would have to be made of the various concepts characterising each group and the way they might affect each firm or organisation.

Risk Management is a sequential scheme for identifying, assessing, controlling and reducing risks. Company management would have a new concept in its Risk Management armoury, affecting the whole firm across the board and certain areas in particular, depending on the average age of the section concerned. Consideration could also be given to risk transfer by subcontracting personnel; this would call for an additional analysis.

In the short term the population-ageing

risk has a very low likelihood of occurring but this probability will increase with the years. The severity of its affect will depend on the concentration of workers from the same age bracket in a given department or in the firm as a whole. This should prompt proper management of human resources under the particular spectrum and methodology of risk management.

After this first stage in managing the ageing risk, the proposals for starting to reduce the risk could begin with:

-Drawing up a retirement plan by activities

It stands to reason that intellectual activities entail less bodily wear and tear than physical activities, even though the former activities also pose their own risks, such as an overly sedentary lifestyle. Clear and explicit legislation would enable working life to be arranged to suit, choosing from among the various alternatives on the basis of an additional variable, the age of the worker concerned.

Workers in Spain can currently opt for early retirement, with a corresponding reduction in their social security benefit entitlement. In the case of a hypothetical increase in the legal retirement age, workers could be allowed to continue working in some activities only, with a reduction in their working hours and wage. This would guarantee them some income-generating continuity.

-Reengineering of processes

Companies and organisations need to take on board the fact that productive structures are bound to change in the medium term, driven either by the demand for goods and services or by the job market. One possible solution might be shift working.

**THE RISK
MANAGEMENT
METHODOLOGY
MIGHT SPARK
OFF A HIGHER
AWARENESS OF
THE PROBLEM OF
POPULATION
AGEING**

There are many groups of workers who might be interested in shift working: elderly people, students, housewives, men and women with children, unemployed persons, etc., who need to work part time.

Companies could design a shift-working system with two persons working five hours instead of a single person working 8 hours, allowing an extension of the customer attention time, for example.

Possible consequences: total productivity would be boosted due to the increase in performance hours. This solution would also be favourable to the much vaunted need of harmonising working and personal lives. It is obvious that wages would have to be reduced in line with the reduced hours.

But this way of working requires

companies to design jobs and shifts to suit the workers involved; this would in turn call for the firms to allow for long term changes in the organisational and functional structure.

–Guarantee the transfer of knowledge

The reengineering of processes calls for the creation of induction training handbooks and top-up training thereafter. The workers' input would then be twofold: not only the added value in carrying out the designed tasks but also the generation of knowledge on the basis of those tasks. All this would be conducive to an improvement of products and services and the production process itself.

The company has to ensure that older workers pass on their knowledge to the newcomers, even in shift systems such as the one described above.

BIBLIOGRAPHY

Alonso Meseguer, Javier (2007). «La política y las pensiones vs. la política de pensiones en España»; *Papeles de Economía Española*, n° 113, Madrid.

Anderson Robert, J., (1999). «New development in Europe for employment at end-of-career»; *The Geneva Papers on Risk and Insurance: Issues and Practice*, Vol. 24, n° 4 October, Genève.

Carabaña Morales, Julio (2003). «Los cambios demográficos y sus consecuencias sociales»; *Información Comercial Española*, n° 811, Madrid.

Casado Marín, David (2001). «Vejez, dependencia y cuidados de larga duración: situación actual y perspectivas de futuro»; Fundación La Caixa, Barcelona.

Flórez Lozano, José Antonio (1996). «El trabajador ante la jubilación: el estrés y el envejecimiento»; *Revista Seguridad*, n° 134, Avilés.

Gall, Brent (2004). «Changes in physical capacity as a function of age in heavy manual work»; *Ergonomics*, n° 6, London and Washington.

García Díaz, Miguel Ángel (2004). «Envejecimiento de la población, crecimiento económico y pensiones públicas en España»; *Información Comercial Española*, n° 815, mayo-junio 2004 ; p. 175-183, Madrid.

Gómez Redondo, Rosa (2005). «La mortalidad en España durante la segunda mitad del siglo XX: evolución y cambios»; *Papeles de Economía Española*, número 104, Madrid.

Guillén Estany, Montserrat y Albarrán, Irene (2006). «Longevidad y dependencia en España: consecuencias sociales y económicas»; Fundación BBVA, Bilbao.

Hallet, Mark (1997). «Aproveche la experiencia de los trabajadores antiguos»; *Noticias de Seguridad*, n° 12, Englewood, New Jersey.

Monteverde, Laura Malena (2005). «Medición de la esperanza de vida residual según niveles de dependencia en España y costes de cuidados de larga duración»; FUNDACIÓN MAPFRE Estudios, n° 92, Madrid.

Pampillón Olmedo, Rafael (2005). «Envejecimiento demográfico: ¿Es necesaria una reforma en el sistema

–Review of the productive structures

Firms may mistakenly believe that they will automatically cut costs if they replace more expert workers by younger workers earning a lower wage, or even a token amount in the case of interns and other similar work-experience arrangements. There is no guarantee of this, however.

What will really enable firms to outperform their competitors is suitable strategic planning, research, development, innovation, for all of which the input of expert workers is paramount. Structures have to be altered in search of increased productivity, doing so by redesigning the business models and the approach to suit variable market circumstances, including the job market.

These are some of the examples that could serve as starting points for the task in hand. We understand that the sheer heterogeneity of firms, organisations and activities means that a detailed study would be necessary of each particular case. Any attempt to apply a single-fit solution would be of little avail or might even prove counterproductive.

The above account gives us an idea of the scope and implication of population ageing in terms of the many complex risks it might entail for the system as a whole. Could we then claim that population ageing is a systemic risk? And, if so, are we up for the challenge? ■

de pensiones español?»; *Papeles de Economía Española*, n° 104, Madrid.

Paz Cobo, Sonia de; López Zafra, Juan Manuel; y Sánchez Delgado, Eduardo (2005). «El envejecimiento de la población: nuevo reto para la industria aseguradora»; *Gerencia de Riesgos y Seguros*. FUNDACIÓN MAPFRE Estudios, n° 91, Madrid.

Pérez Díaz, Julio (2005). «Consecuencias sociales del envejecimiento demográfico»; *Papeles de Economía Española*, n° 104, Madrid.

Pérez Ortiz, Lourdes (2005). «La ocupabilidad de los mayores y los programas de jubilación flexible»; *Papeles de Economía Española*, n° 104, Madrid.

Trinidad Requena, Antonio (2005). «La realidad económica y social de las

personas mayores: los jubilados tradicionales y los nuevos jubilados»; Instituto de Estudios Económicos, D.L., Madrid.

Whitehouse, Edward (2007). «Life-expectancy risk and pensions»; *OECD Social, Employment and Migration Working Papers*, 60. París.

Ernst & Young (2009). Strategic business risk 2008: the top10 risks for business; London: Ernst & Young, 2008.

Pérez, Jesús (1995). «Hacia una nueva estructura de edades de la población laboral»; *Salud y Trabajo*, n° 107-108, Madrid.

Ley 39/2006, de 14 de diciembre, de Promoción de la Autonomía Personal y Atención a las Personas en Situación de Dependencia; *Boletín Oficial del Estado*, núm. 299, de 15 de diciembre 2006.

www.ine.es
www.worldlifeexpectancy.com
www.epp.eurostat.eu
www.ced.uab.es
www.imsersomayores.cesic.es

World Economic Forum (2010):
Global Risks 2010 report