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Fertility decline & ageing populations

HSBC and the Oxford Institute of Ageing have entered into a strategic alliance in order to build a cutting-edge research base on global ageing which will provide key information for policy and corporate decision makers. As part of the agreement, HSBC funds three research fellowships at the OIA, jointly runs the Future of Retirement research programme, and sponsors Ageing Horizons – a quarterly review bulletin which collates and integrates current research and analysis on the medium-term implications of population ageing.

This brief is a supplement to Ageing Horizons. The full review is available online, with regular updates reflecting new developments and ideas on the themes chosen for each issue.

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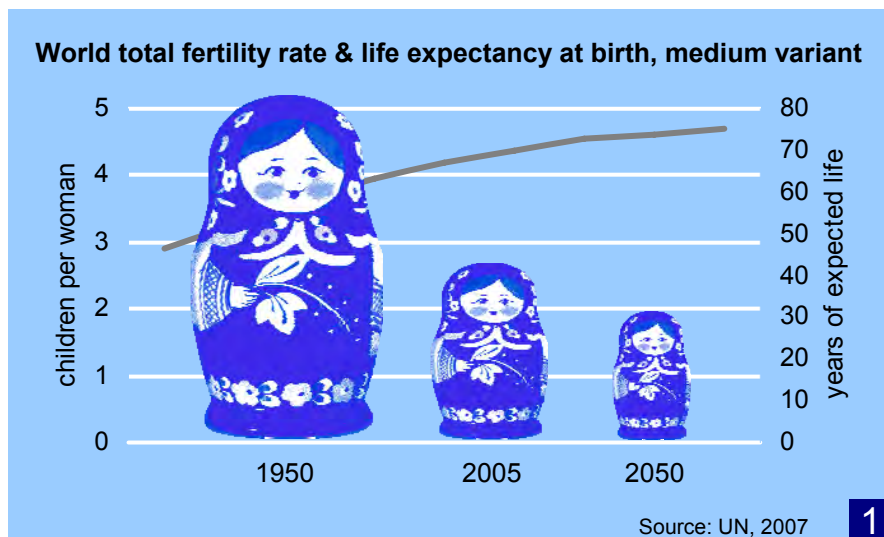
Clive Bannister

If life expectancy increases and fertility remains constant, the age structure of the population changes: a greater proportion of the population falls into the older age groups. The same would happen if life expectancy were to remain constant and fertility fell. The world population is now 'getting older', not only as a result of unprecedented improvements in life expectancy, but also as a result of very sharp declines in fertility. Both trends are likely to continue, and together will have a profound impact on the age structure of the world's population. 'While the 20th century was the century of population growth... the 21st century... is likely to become the century of population aging' (Lutz and Sanderson, 2004).

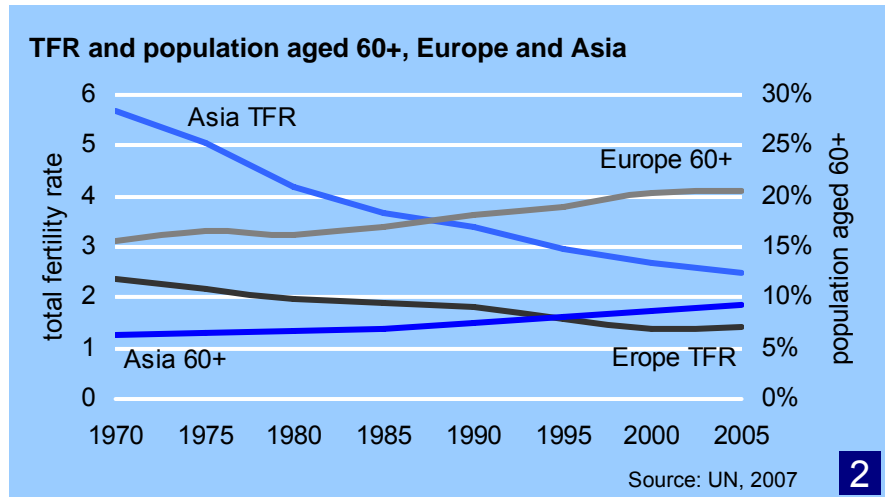
This briefing summarises recent global trends in fertility and looks at current forecasts for continuing decline in fertility levels across the world. In the more developed world, where fertility rates are almost everywhere below-replacement level, these trends are a source of considerable concern to policy-makers. They worry that reductions in fertility may go 'too far' – or may indeed have gone too far already. In the less developed world, where declining fertility levels are more likely to be seen as providing relief from the pressures of rapid population growth, the changing age structure of the population is arguably more of an opportunity than a problem. ■

► Ageing populations

One of the most common measures of fertility is the 'total fertility rate (TFR)' – the average number of children that would be born to each woman if current age-specific fertility rates stayed constant across her childbearing years. The TFR for the world as a whole stayed at the level of around 5 children per woman in the 1950s and 1960s but it has been declining dramatically ever since: from 5.02 in 1950 to 2.55 in 2005 and by 2050 it is expected to be around or below 2.0. At the same time, the life expectancy at birth has been rising: from 46.4 in 1950 to 67.2 in 2005 and in 2050 it is projected to increase above 75.



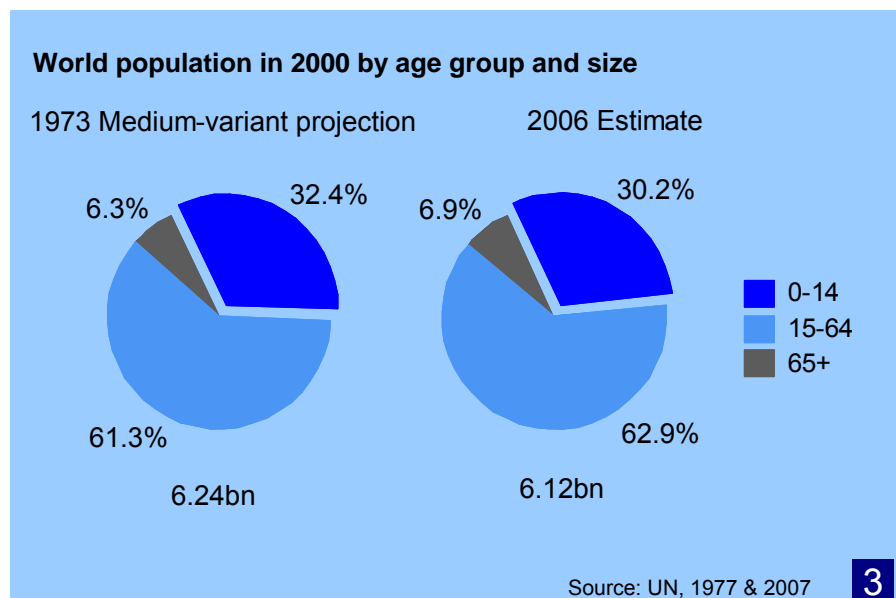
As fewer children are born populations are ageing rapidly



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It used to be thought by some experts that fertility decline depended on economic development and improved access to education for women, but today 'village women and slum families in some of the poorest countries are beginning to prove them wrong' (Crossette, 2002). In Cambodia, for example, between 1970 and 2005 TFR declined almost by half: from 6.2 to 3.2 children per woman (UN, 2007). Another common assumption was that culture and religion would keep fertility decline in check. Over the same period, however, fertility in Catholic Italy also declined by almost half: from 2.5 to 1.3 (UN, 2007). While in 1970 people aged 60+ comprised 15.5% of the population in Europe and 6.3% in Asia, by 2005 they had reached 20.6% and 9.2%, and in 2050 are projected to reach 23.7% and 34.5% respectively (UN, 2007).

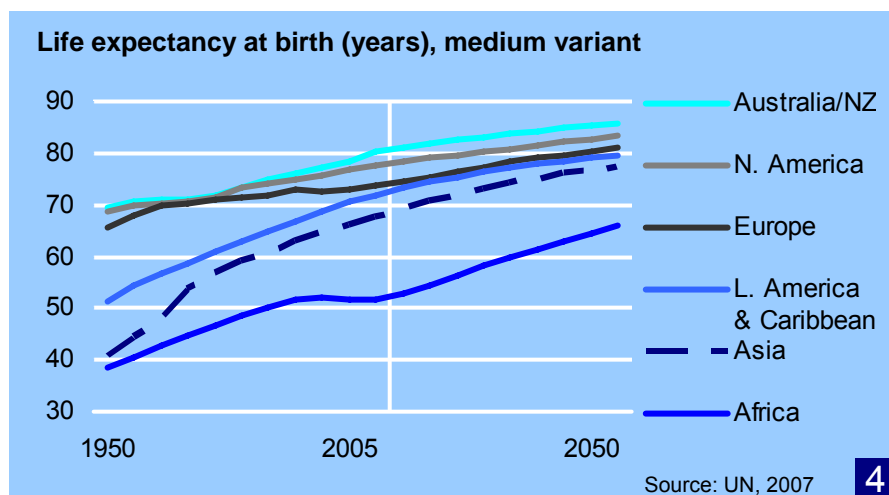
Ageing is likely to be larger than UN estimates



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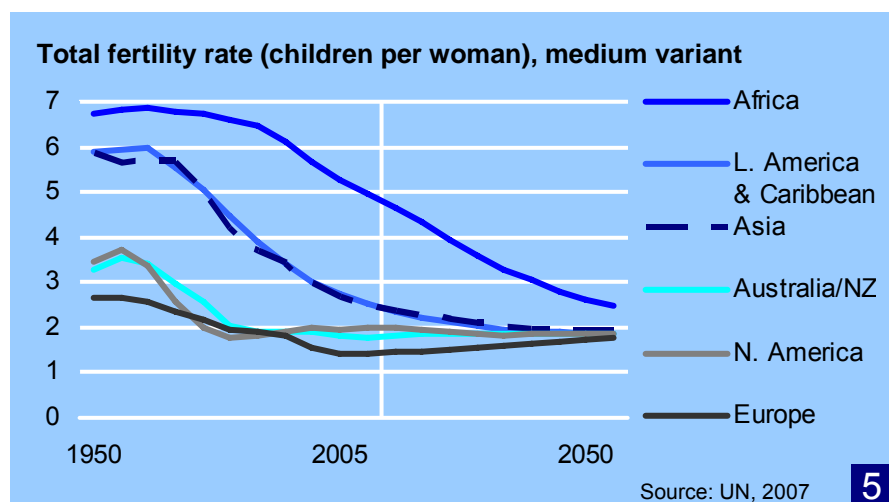
Population projections are based on assumptions about what will happen to fertility and mortality in the future; and these assumptions can be proved wrong. The UN has consistently underestimated fertility declines and longevity improvements (Keilman, 1998). These errors compensate each other when it comes to the population size, but when it comes to ageing they reinforce each other (Lutz, 1996).

Nobody knows whether a biological limit to human life exists



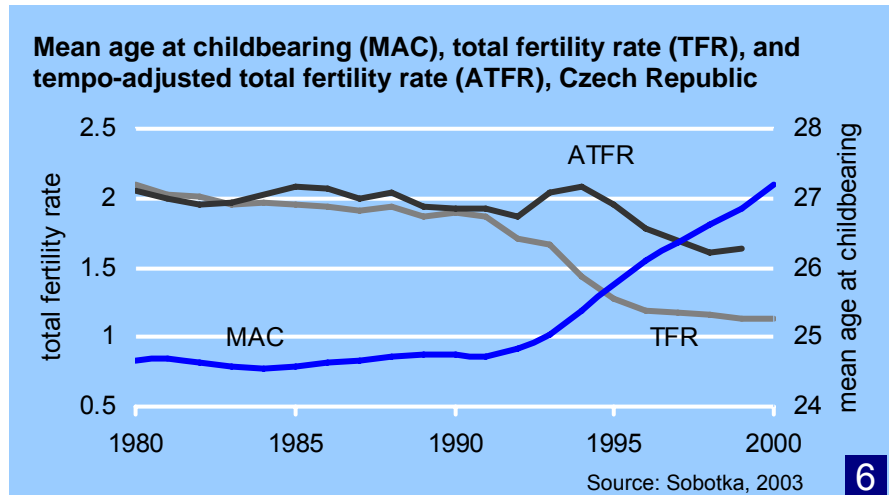
Until recently population forecasters have tended to assume that there was a biological limit to human longevity. In the late 1970s, for example, the UN assumed the upper limit of life expectancy for men 73.3 and 80.0 for women, but less than 10 years later Japan surpassed these limits (Lutz et al., 2004). While in more developed areas life expectancy may extend faster than projected, in less developed areas progress may be slower than expected. Life expectancy in Africa improved relatively fast until the late 1980s but then stalled. Current UN projections assume very substantial gains in life expectancy in Africa over the next 50 years.

There may be no escape from the 'low fertility trap'



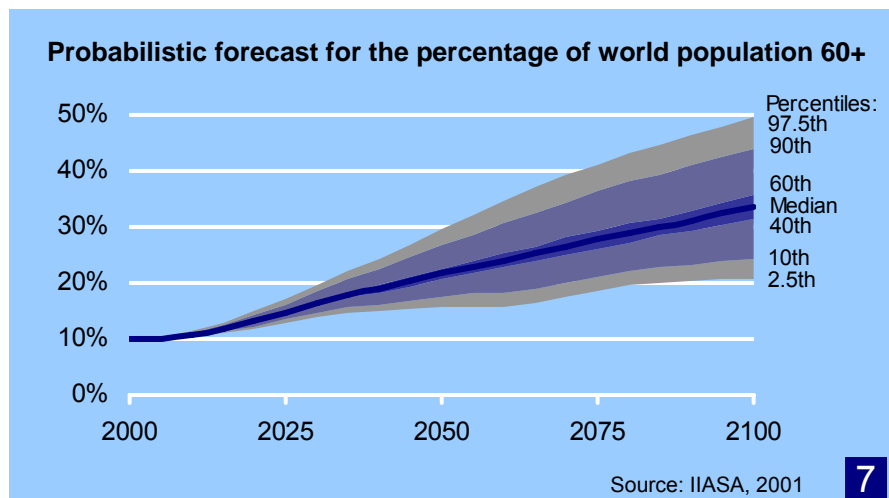
The UN population projections assume that fertility rates around the world will converge. In the 1990s it was thought that they would converge to natural replacement level (around 2.1). The figure now used for the medium variant projections is 1.85 children per woman (UN, 1995, 2004a). It has to be remembered, however, that 'through the introduction of modern contraception, the evolutionary link between the drive for sex and procreation has been broken' (Lutz et al., 2006); and it is not impossible that in some parts of the world – where fertility has already fallen much lower than 1.85 children per woman – it may not recover. There is some reason to think that countries might find themselves stuck in a low fertility trap from which it is very hard to escape. Much smaller families will become the norm (ibid.).

Because of the ‘tempo effect’ actual fertility may not be as low as TFR shows



TFR is a period measure calculated on the assumption that the timing (*tempo*) of childbearing over the life cycle does not change, but today women across the world postpone childbearing until older ages. Postponement leads to fewer births in a given period and hence a smaller period TFR even if women still have the same number of children over their life course (IIASA, 2006). For example, uncertainty after political change in the Czech Republic in 1989 prompted women to postpone childbearing (Sobotka, 2004), but they still eventually gave birth to their desired number of children later. In this case, if the TFR is adjusted to take account of postponement, fertility rates are revised upwards, though they still show a decline.

21st century is likely to be the century of massive population ageing

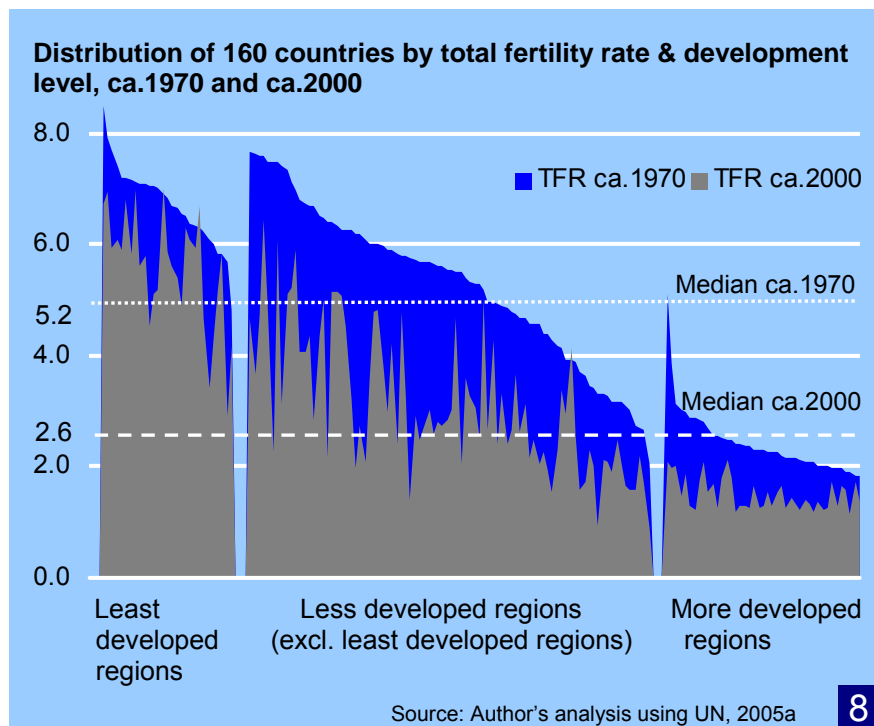


Unlike conventional population forecasts – which oversimplify the complexity of the current trends and do not specify future uncertainties – probabilistic forecasts provide us with a full range of future possibilities and their probabilities. This graphic representation of probabilistic forecasts from IIASA (2001) shows that in 2100, there is a 95% probability that the population 60+ will comprise between 20% and 50% of the total population (IIASA 2001); and an 80% probability that it will make up between 24% and 44% of the total. The median here approximates the ‘bestimate’ for the proportion of the world’s population that will be aged 60+ in 2100, i.e. 37%. ■

► Demographic transition

The *demographic transition* is the name given to the shift from high mortality and fertility rates characteristic of rural agrarian societies to the low mortality and fertility rates associated with more urban industrial societies. The prediction that sooner or later all countries experience a decline in mortality followed by a fall in fertility is one of the foundations of demographic theory. Furthermore, the demographic transition is irreversible – once started, it will carry on.

Fertility decline is global

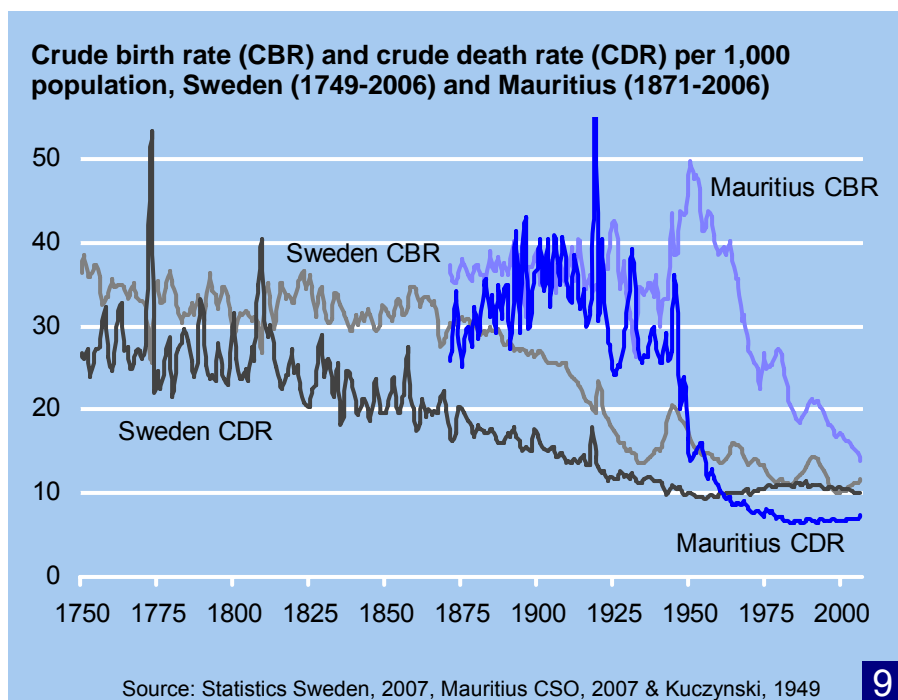


In 160 countries for which the UN has comparable data for the years 1970 and 2000, the median TFR has declined from 5.2 to 2.6 children per woman. Many countries in more developed regions completed their transition to low fertility rates as early as the beginning of the 20th century. In Figure 8, the outliers for the 1970s in the more developed regions are Albania (TFR=5.1) and Ireland (TFR=3.9). Nearly all these countries now have below replacement fertility (the exceptions being Albania, Iceland and the USA).

Over the same period, many countries in less developed regions experienced very rapid fertility decline. In Mongolia, for example, TFR dropped from 7.5 to 2.3, in Iran from 6.4 to 2.2, in Mexico from 6.2 to 2.7, and in China from 5.7 to 1.4. In other members of this groups of countries, the transition to low fertility has only just started to get underway: in Iraq TFR fell from 7.1 to 5.2, in Nigeria – from 6.3 to 5.1, and in Pakistan – from 6.0 to 4.8.

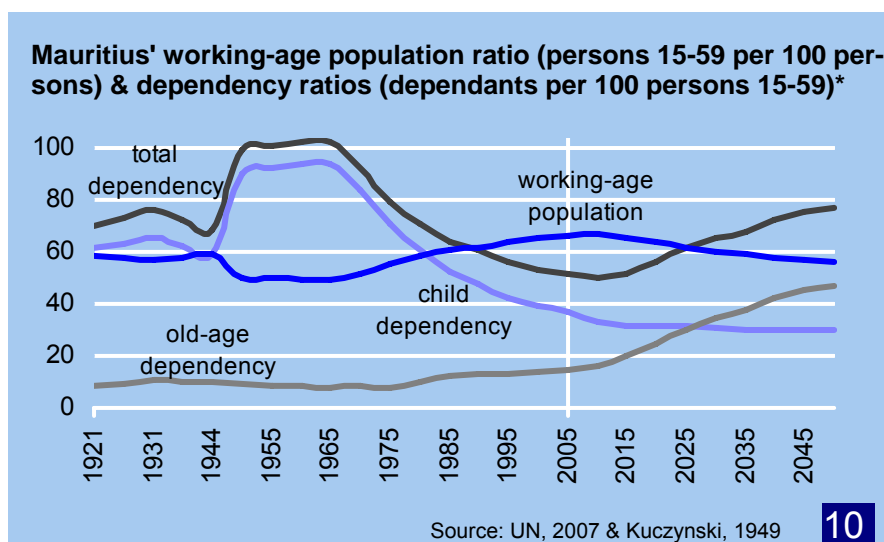
Although fertility has declined in most of the least developed countries, it still remains relatively high (i.e. is a cause of rapid population growth). The median TFR for the countries in this group (which includes nearly all of Africa) fell from 6.8 to 5.8.

Demographic transition in less developed countries occurs later but faster than in more developed countries



These series of birth and mortality statistics from Sweden and Mauritius (which has unusually data good reaching back into the nineteenth century) show that the demographic transition follows the same pattern in less developed countries as in more developed countries, even though it is delayed. Birth and death rates in Mauritius show a lot of fluctuation – with only a negligible natural increase in the population – before the demographic transition gets going in the mid-1940s. Although mortality plummeted, fertility remained high causing the population to grow very rapidly. Mauritius' population is still growing because of population momentum (Lutz and Sanderson, 2004), despite the drop in the fertility rate after 1950s, now below replacement level. The comparison between Sweden and Mauritius serves to illustrate one very important difference between more developed and less developed countries: the pace of the demographic transition is much more rapid in less developed countries. The fall in Mauritius birth and death rates over two decades parallels what happened in Sweden over almost two centuries. The time lag between the beginnings of mortality decline and fertility decline was more than 50 years in Sweden; in Mauritius no more than 15-20 years.

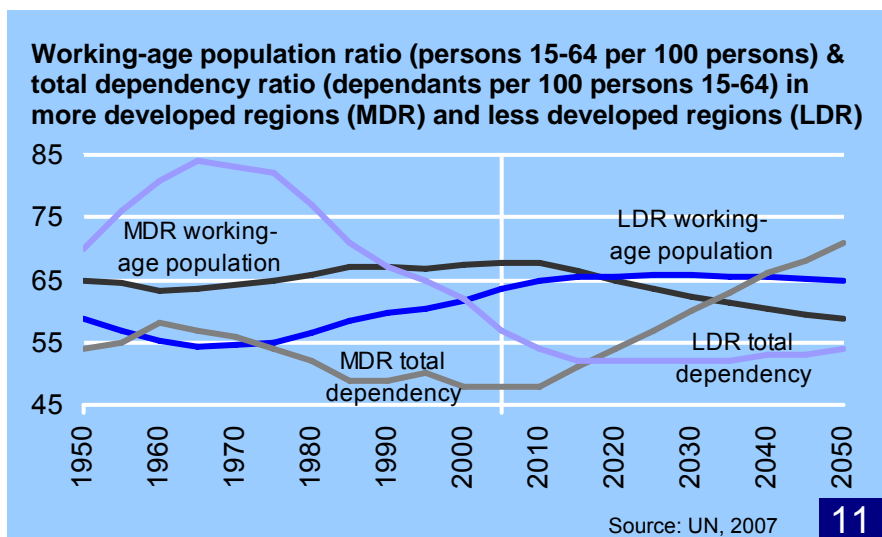
Transition to low fertility brings the demographic dividend – a chance to increase economic growth and per capita income



* we consider the working-age population being aged 14-59 because the statutory retirement age in Mauritius is 60 (AARP, 2007).

Early in Mauritius demographic transition, the total dependency ratio jumped from 0.6 to over 1 dependant per each working-age person, but in the mid 1960s continuing fertility decline coincided with growth in the working age population to drive down both the child and total dependency ratios. At this juncture, Mauritius economic development accelerated and per capita income rose: there were more people in the labour force and fewer mouths to feed. Such demography-induced acceleration of economic development and prosperity is known as the *demographic dividend* (Lee and Mason, 2006). Both the East Asian 'tiger' economies and Ireland owe much of their growth to this dividend. It is of course transitory – eventually the working-age population ceases to grow and the older population starts to increase in size.

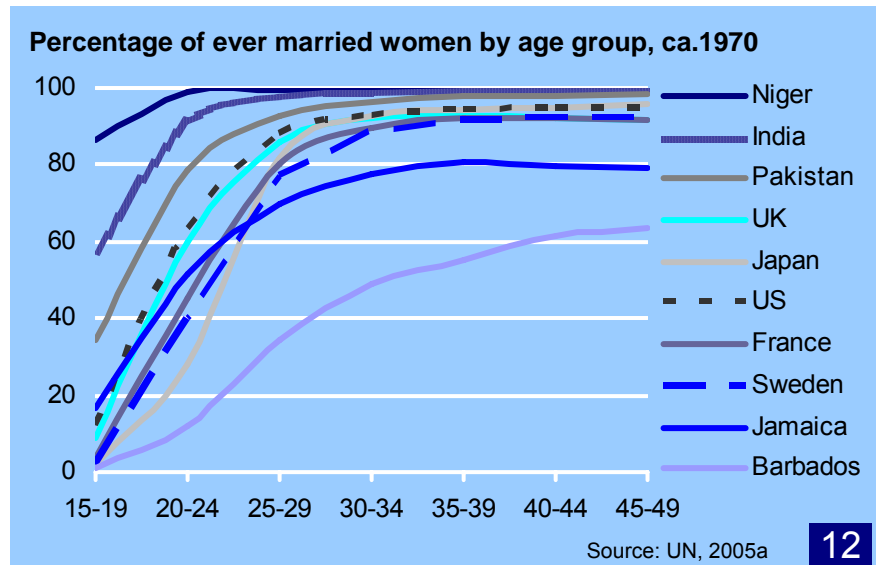
Demographic fortunes of more and less developed countries are about to reverse



Like Mauritius, other less developed countries started their demographic transition later than more developed countries. Rapid declines in fertility and expanding labour forces have caused their total dependency ratios to fall; and it is reasonable to expect these trends to continue in the near future. In more developed countries, the growth of the working-age population has been slowing down – and in some countries the working age population may start to shrink in the future. Continuing reductions in fertility in more developed countries are unlikely to have much impact on overall dependency ratios in the near future as fertility is already at very low levels; and when the baby boomers start retiring overall dependency ratios will increase steeply. ■

► Postponement of childbearing

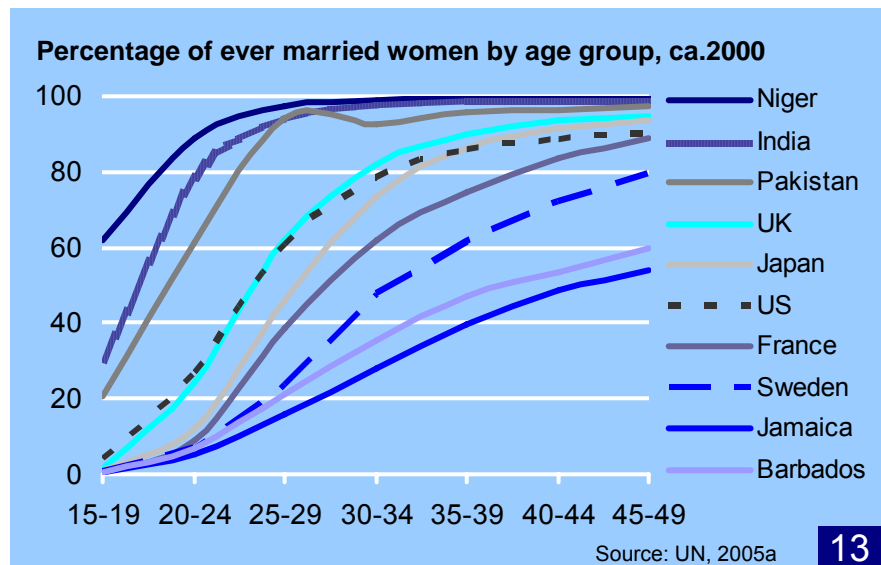
Economists tend to explain fertility declines by modelling the impact of changing social conditions on the choices of self-interested agents. Sociologists, on the other hand, tend to emphasise the part played by prevailing values and norms. In Europe in recent decades, marriage has become a less popular institution. Fewer people are marrying; there is more divorce, more co-habitation, more extra-marital fertility, and childbearing is being postponed. These changes have been described as a *second demographic transition* (Van de Kaa, 1987). They are, however, by no means universal.



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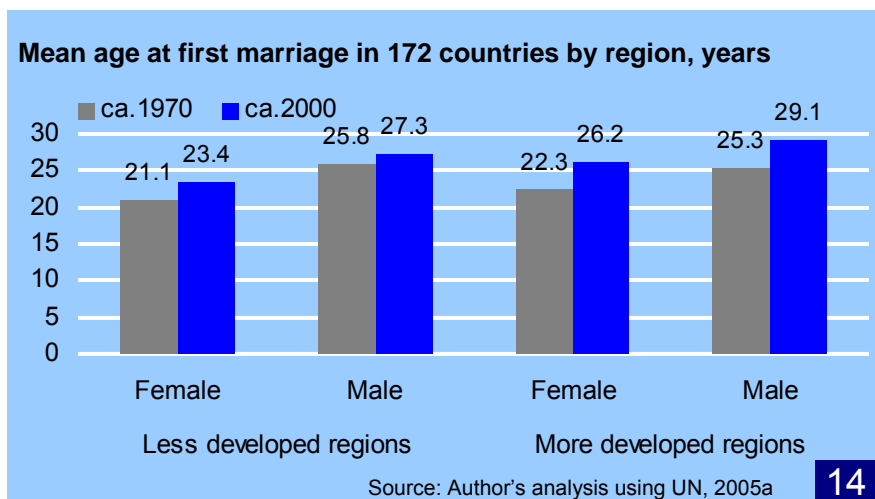
Between the 1970s and 2000s, marriage markedly shifted towards later ages. Also, there are now fewer marriages in some countries. In spite of this, the institution of marriage is still strong globally. In the 1970s, in three out of every four countries, at least 89% of all men and women 45-49 had been married at least once. The figure in the 1990s was still close to 89% (UN, 2004b).

Despite delayed marriages in some countries the institution of marriage is still strong globally



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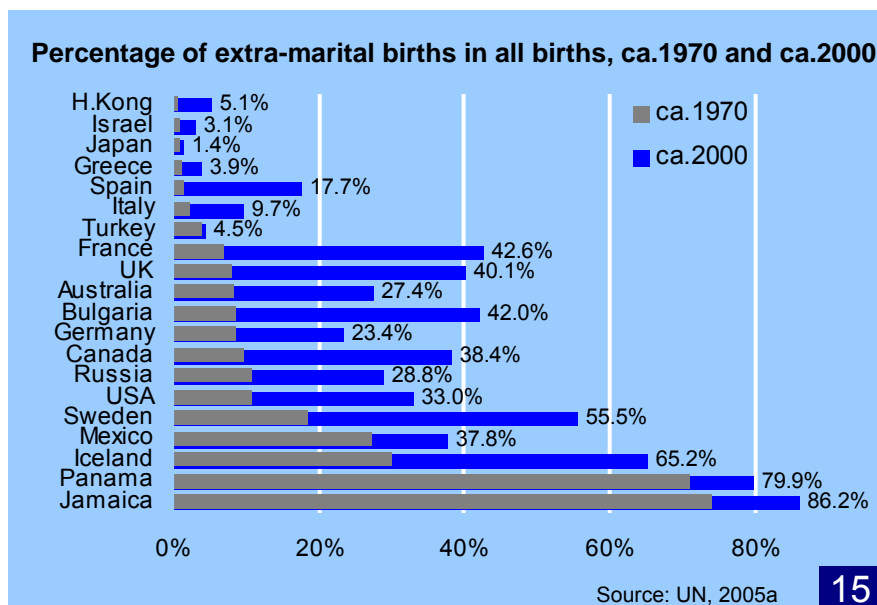
Both men and women spend a longer period in 'singlehood'



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The average length of life spent as a 'single' has risen over the last few decades, both for men and women. Thirty years ago women in developing countries married on average only a year earlier than women in developed countries. The gap now has widened to almost 3 years. Men in more developed countries in the 1970s were marrying on average half of a year younger than men in less developed countries; now they are almost two years later. These averages conceal huge variation between different countries in the age of first marriage, much greater in less developed regions than in more developed regions.

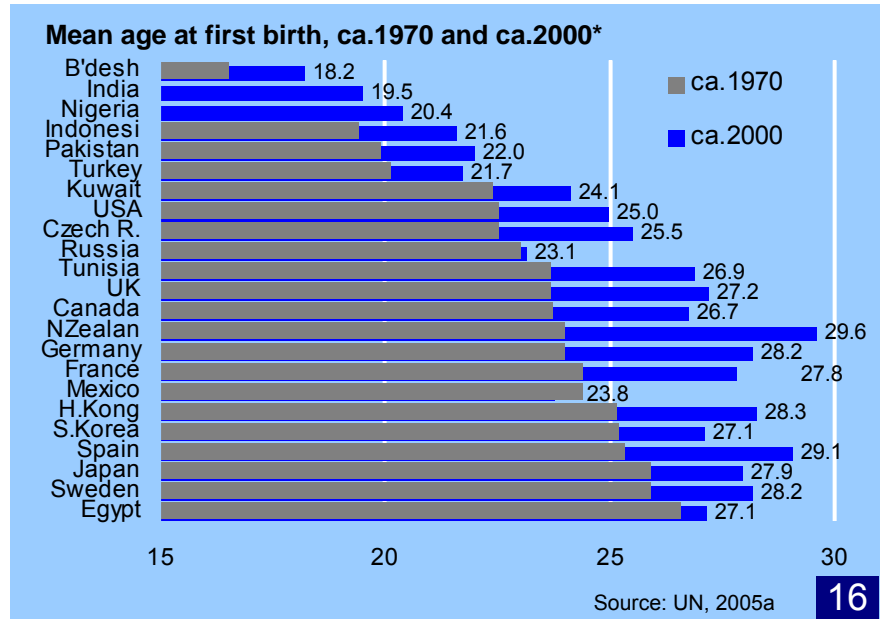
Transition to a high number of extra-marital births is not universal



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Delayed marriage and its increasing instability have probably contributed, especially in more developed regions, to a rapid increase in the number of extra-marital births. The increase in extra-marital births has not been universal, however, even in the more developed countries. Religion may explain part of the variation in out-of-wedlock births in some parts of the world, but it is only part. In Orthodox Greece, for example, the percentage of extra-marital births has stayed low; in her Orthodox neighbour Bulgaria there has been a fourfold increase. Mexico, a more Catholic country than Spain, still has much higher rates of out-of-wedlock births. What the explanation for these variations, it seems clear that European countries with relatively high TFR (by European standards) have a lot of extra-marital births.

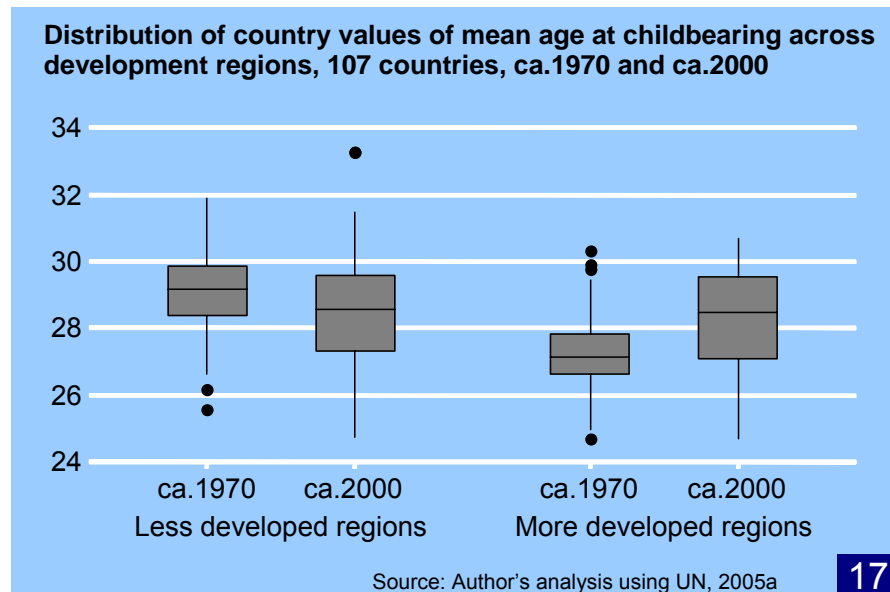
A major worldwide shift in the timing of first births towards later ages has occurred



* No data for India and Nigeria around 1970

Together with a shift towards later marriages there has been a major world-wide change in the timing of first birth. In most countries, the timing of first marriage shifted towards later ages too. Generally, the timing of first birth in developed countries is markedly delayed than in developing countries.

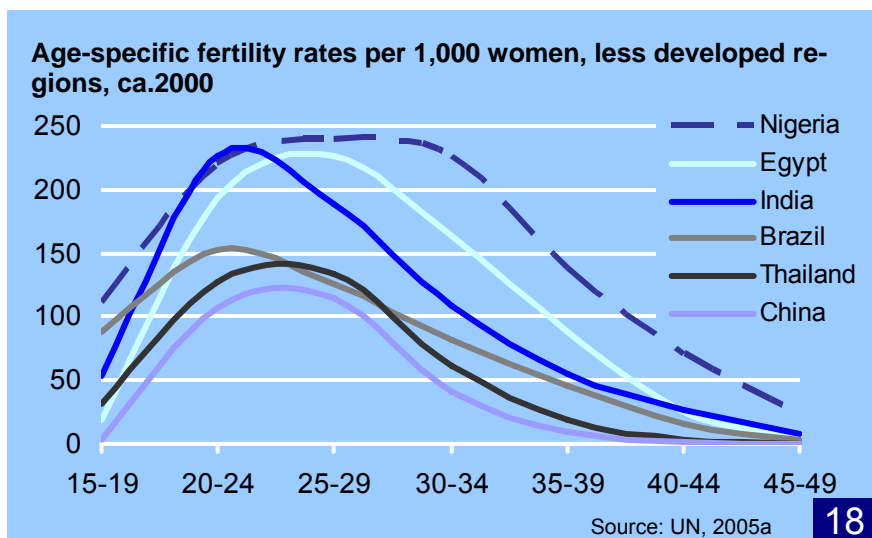
There has been diametrically opposite dynamics of the timing of childbearing across development regions



Rectangular boxes represent the middle 50% of the country values for each region and date. The horizontal line inside the box indicates the median value. 'Whiskers' extending from the box represent the upper and lower 25% of the distribution. Outliers are indicated by dots.

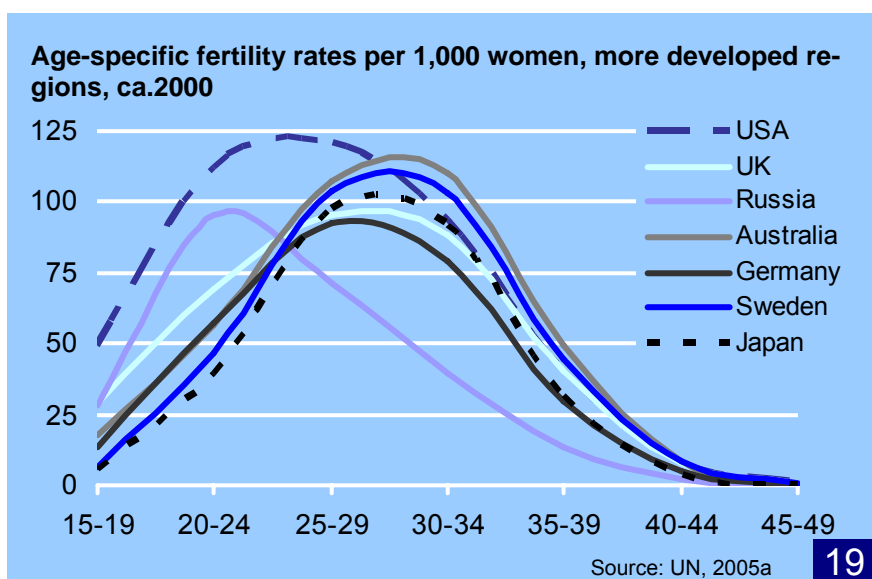
In more developed countries, women have been postponing the beginning of childbearing. In less developed countries, there has been a decline in the mean age at childbearing because when fertility declines women have fewer higher order births, which of course come at an older age.

Age-specific female fertility in developing countries is spread across the natural female fertility cycle more evenly than in developed countries



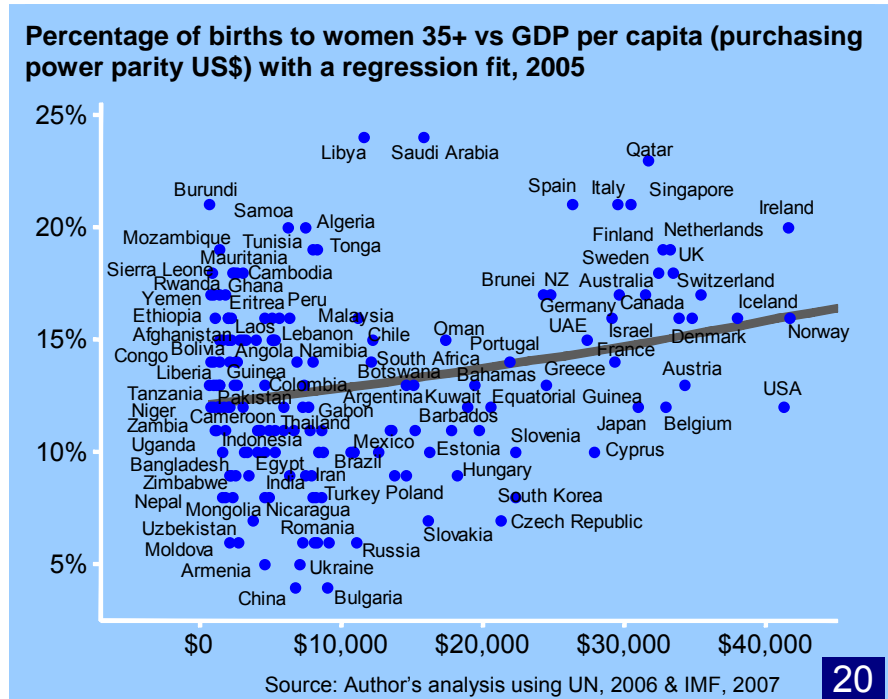
Age-specific fertility rates are the function of the age-related decline of female fertility. Fecundity starts to decline after 30-31. At 38 it is one fourth of that of women <30, with the birth of the last child in natural fertility populations occurring at the median age of 40-41, and sterility about ten years later (te Velde and Pearson, 2002). While Nigeria exemplifies the age-related decline of female fertility in a population with a low use of contraceptives, the pattern of births in China is illustrative of a population with tight fertility control. In less developed countries, age-specific fertility is spread more evenly across the female fertility cycle than in developed countries.

Women in developed countries postpone child-bearing until later ages



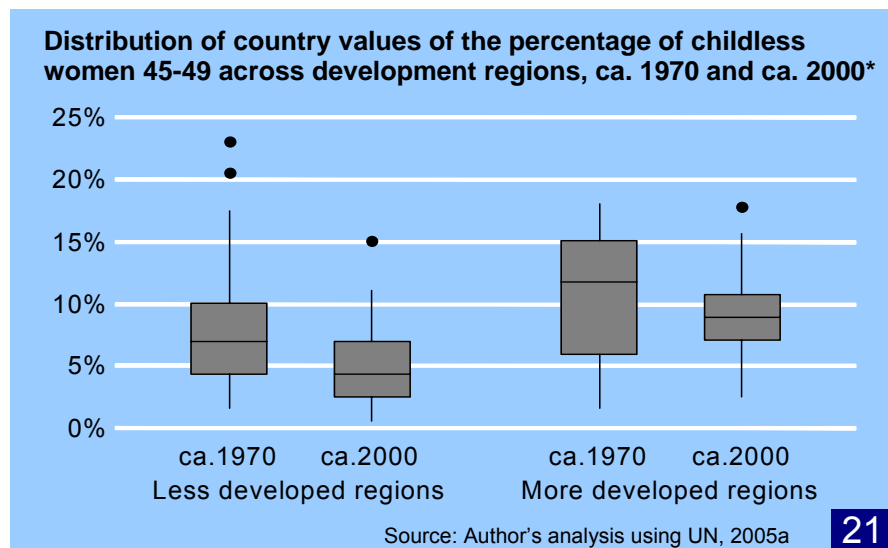
In most developed countries female fertility peaks in the late twenties and early thirties. This has a definite negative effect on fertility rates because of the tempo effect (see figure 6), and age-related decline in female fecundity. Also, shortened fertility careers make it more difficult for women to have more children than they had originally planned.

Fertility in women 35+ rises with the GDP per capita



It is perhaps surprising to see that in such culturally and economically different nations as Niger, Cameroon, Gabon, Colombia, Kuwait, Japan, Belgium, and the US, mothers aged 35 yrs+ contribute to the total number of births in their countries on the same level (12%). The list of countries in which women aged 35+ account for 18% of all births is similarly diverse, and includes Cambodia, Ghana, Mauritania, Sierra Leone, Sweden, and the UK.

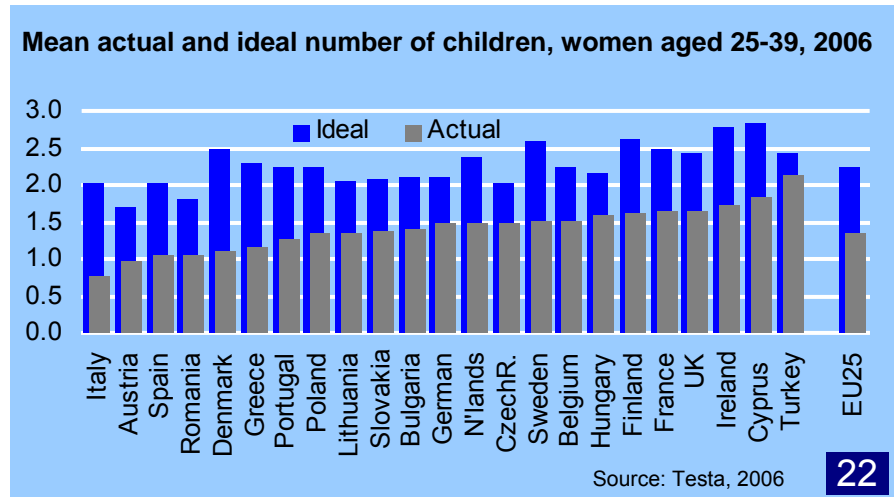
Childlessness has been on decline globally but remains higher in developed countries



* The sample of countries for which information was available for around 1970 (91 countries) is not identical to the sample of countries for around 2000 (121 countries).

The levels and variability of childlessness have been declining globally. In developing countries, this is attributed to the decrease in sterility caused by sexually-transmitted diseases (UN, 2004b). In developed countries, the decrease in childlessness reflects the increase in rates of marriage and early marriages in cohorts born in the middle decades of the last century (UN, 2005b). In the short run, childlessness will probably continue decline in both developed and developing countries. In the long run, it is set to rise in developed countries as the proportion of women born after 1960 who choose to remain childless is likely to be larger than among their mothers (UN, 2003).

The two-child family is most desired in Europe



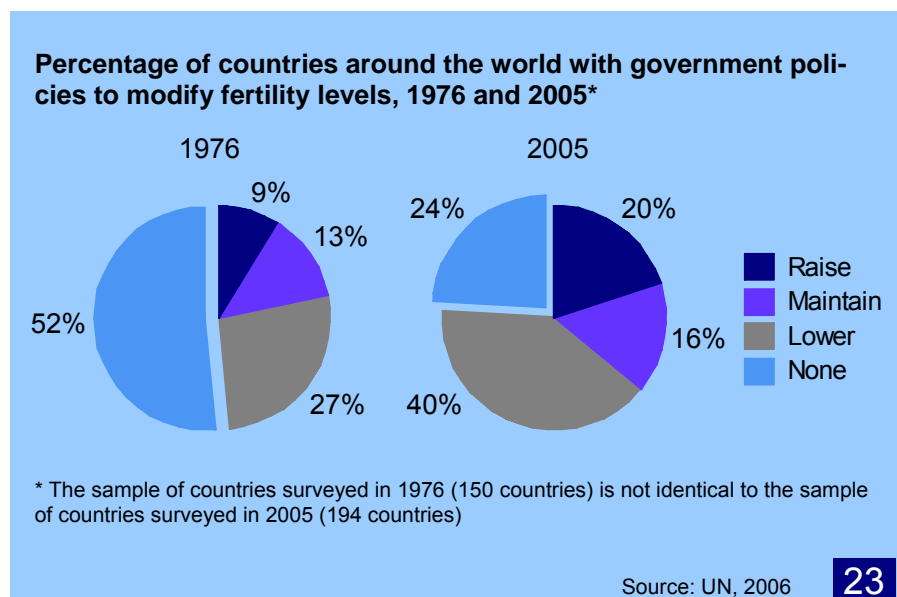
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Despite the prevalence of small families and childlessness in many developed countries, Europeans are still interested in having children. A Eurobarometer survey revealed that the ideal number of children perceived by women aged 25-39 for their own family is about two (Testa 2006). The fact that they do not yet have as many children as they would like to have suggests that besides intentional value and behaviour shift there should be powerful economic reasons preventing women from having a desired number of children. ■

► **Population policies**

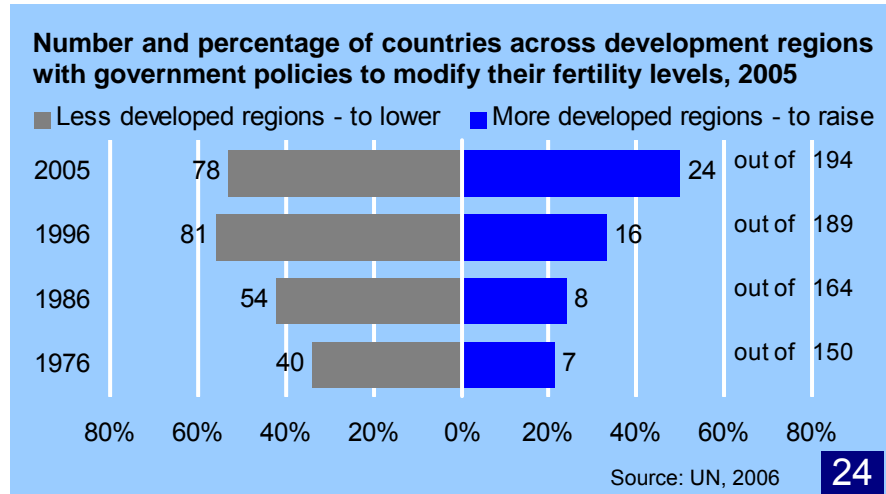
Over the last three decades, a major shift in the views and actions of governments around the world on fertility levels has occurred. In 1976, more than half of all countries had no intention to intervene to modify their fertility levels, but in 2005, more than three quarters of all countries wanted to do so in one way or another. Between 1976 and 2005, the proportion of the European governments who viewed their fertility levels as too low increased from one quarter to two thirds, and the proportion of the African governments who viewed their countries' fertility levels as too high increased from one third to three quarters (UN, 2006).

Today more than ever before governments round the world want to influence the fertility of their populations



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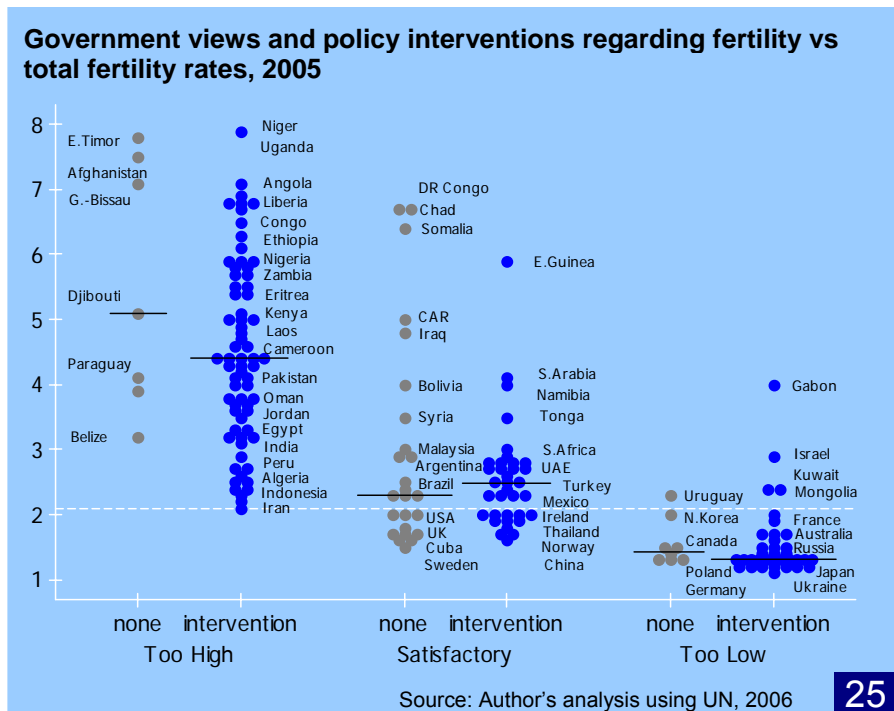
Whereas less developed countries want to lower their fertility, more developed countries want to raise it



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Despite the fact that enacting fertility policies depends on resources and political support which are not always present, most governments have managed to translate their policy preferences into policies. Between 1976 and 2005, the number of more developed countries with policies to raise their fertility increased more than three times, and the number of less developed countries with policies to lower their fertility levels almost doubled.

The relationship between fertility levels and government preferences is complex, however



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Most governments which intervene in fertility think that their population's fertility is too high. These governments have provided family planning, safe motherhood, and reproductive health services, enhanced the role of men in sexual and reproductive health, raised the minimum legal age at marriage, improved female education and employment opportunities, discouraged son preference, and providing low cost, safe and effective contraception (UN, 2006). Governments that want to raise fertility have offered baby bonuses, family allowances, maternal and paternal leave, subsidised child care and housing, tax breaks, flexible work schedules, and promoted the sharing of parenting and household work among spouses (UN, 2006). Although most of these governments have below-replacement level fertility, there are exceptions (e.g. Israel).

Notes

More developed regions comprise all regions of Europe plus Northern America, Australia/New Zealand and Japan (see definition of regions). *Less developed regions* comprise all regions of Africa, Asia (excluding Japan), Latin America and the Caribbean plus Melanesia, Micronesia and Polynesia (see definition of regions).

Least developed countries include 50 countries - Afghanistan, Angola, Bangladesh, Benin, Bhutan, Burkina Faso, Burundi, Cambodia, Cape Verde, Central African Republic, Chad, Comoros, Democratic Republic of the Congo, Djibouti, Equatorial Guinea, Eritrea, Ethiopia, Gambia, Guinea, Guinea-Bissau, Haiti, Kiribati, Lao People's Democratic Republic, Lesotho, Liberia, Madagascar, Malawi, Maldives, Mali, Mauritania, Mozambique, Myanmar, Nepal, Niger, Rwanda, Samoa, São Tomé and Príncipe, Senegal, Sierra Leone, Solomon Islands, Somalia, Sudan, Timor-Leste, Togo, Tuvalu, Uganda, United Republic of Tanzania, Vanuatu, Yemen and Zambia. These countries are also included in the less developed regions. Full definitions of major areas and regions are available online at: <http://esa.un.org/unpp/>.

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