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Long-term population decline, past and future

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Abstract

This paper contains some thoughts on the process of imminent population decline under way in much of the developed world and quite possibly in other world regions as well. We are witnessing the beginnings of a vast trend change which promises to bring to a close a period of population growth that has lasted for several centuries. It can be shown that this great change is a byproduct of the demographic transition which unleashed a number of the forces that have led to where we are today. A comparison will be made between the foreseeable characteristics of future population reduction and other periods of prolonged population decline. Examples of Europe after the appearance of the Black Death and of the indigenous populations of America in the wake of the European colonization will be used. This comparison will underscore the existence of important similarities and also of major disparities among the different processes. From our vantage point early in the twenty-first century, there is still much to be learned from the historical record, even though the decades ahead for much of the world will lead us into mostly uncharted territory. The purpose of this paper is to stimulate reflection and debate on a subject that looms as perhaps the key social issue of the coming century.

1. *Towards long-term population decline*

There are indications that a large part of the world is about to commence a prolonged period of population decline. This will bring to an end three centuries of unfettered population growth, itself a unique experience in human history. For a number of decades during the second half of the twentieth century, world population growth rates surpassed 1.75 percent per year, exceeding 2 percent between 1970 and 1975, and were considerably higher in many world regions. Not only are there indications that this period of growth is coming to an end; there are also real perspectives for prolonged population decline in many of the world's regions during the twenty-first century. There can be little doubt that this process is well under way in Europe and in other developed nations. It may just be getting underway in many of the lesser developed countries of the world as well. Only in the least developed regions of the world is it still a matter of serious doubt, though there too population growth rates have declined substantially in recent years.

The mechanics of decline can be traced to a prolonged reduction in fertility nearly everywhere in the world. In developed regions, fertility reached its maximum levels around a century ago. Since then, decline has been unchecked, with the brief interlude of the baby boom of the 1950s and 1960s. In other parts of the world, fertility decline started much later (1960s-1980s), though the pace of decline has been far faster than it was in the developed world. The result of this is that, with the exception of regions such as sub-Saharan Africa, inter-regional disparities in fertility at the beginning of the twenty-first century are far smaller than they were only 50 years ago. In large parts of the world, below-replacement fertility has been the norm for some time now, and in others there is a good chance that fertility, at present just above replacement levels, may be headed in the same direction.

Some demographers have been aware of this process for some time now. During the 1980s Jean Bourgeois-Pichat (1981, 1986, 1989) published a series of speculative and imaginative papers about the coming period of population decline in Europe and eventually throughout the world. Yet demographers tend to be ill-equipped to study prolonged periods of population decline because as a discipline demography was designed to explain population *growth*, not population *decline*. In fact, the very idea of decline and of population shortage is largely foreign to our society, mostly because for several centuries there has been no experience of shrinking population. In developed regions, where the process is well-advanced, the idea of population decline and its implications is having difficulty being assimilated by large sectors of

society. In most of the developing countries, the problems of population *abundance* continue to dominate scientific, social and political agendas.

The ideal of optimal population growth has always been an elusive one, both in theory and in fact. Once again it promises to be a blurry target. A world that has been dominated by excess population growth for so long is well be its way to becoming one in which growth will turn into decline. The challenges posed by population decline will be dramatically different from those posed by excess growth. Historically, a 'large and well-nourished population' has always been considered the sign of a successful society and a successful economy. Periods of decline have been equated to decadence and to societies that were somehow unable to function properly. Will the future of the world be one of *success* or one of *decadence*? At this juncture of human history, a juncture that gives every indication of being a turning point, looking into the past may help us understand future trends a bit more clearly.

2. *Tracking population decline in the recent past and the foreseeable future*

Patterns of potential decline cannot be uniformly predicted with existing data. In some regions, such as Europe, it seems a virtual certainty, while in others it is no more than a possibility. The evidence, however, adds up. At the very least, everywhere, even in the poorest regions, it is unquestionable that the extremely accelerated population growth of much of the second half of the twentieth century years is now a thing of the past.

In Europe it is difficult to dispute that we are initiating a prolonged period of population decline, not just one of population stagnation. Years of below-replacement fertility and declining numbers of births suggest that in Europe *negative population inertia* has set in. In other words, no matter what the changes in the foreseeable future fertility might be, it is unlikely that the process of decline will be halted, as cohorts of children born to shrinking cohorts of mothers continue to be ever-smaller.[1] Even when using the optimistic medium fertility estimate of the United Nations and with relatively generous estimates of in-migration, over the next 25 years the number of women of childbearing age in Europe is expected to decline by 21.2 percent, with their relative weight among all women shrinking from 48.5 percent at present to 39.8 percent in 2030. If the UN projection is extended further until 2050, with the same medium fertility variant, the number of women of childbearing age will have declined by one third with respect to the

[1] This negative inertia is far more visible in societies in which recent fertility change has been more abrupt than in others in which declines have been more gradual. A comparison of Northern and Southern European societies on this point is instructive.

present and they will represent 36.4 percent of the female population. Were lower estimates of fertility to be used, the decline of women of reproductive age would be considerably higher.

Births are currently down by 40 percent with respect to their maximum achieved in 1955-60. Using the same optimistic fertility variant –it forecasts that TFRs in Europe will rise from their current levels of 1.4 to about 1.83 by 2050- the number of births will be 45 percent off peak by 2025-30 and 48 percent by 2045-50. If, however, fertility remains constant at about the 1.4-1.45 levels, the number of births in Europe will be 63 percent off their peak by mid century. It is not difficult to imagine the potential for very significant population decline with figures such as these.

In other developed countries, the situation is not quite the same. While population aging and eventual decline is the likely scenario for the future, the pace is not uniform. For the Asian tigers, the situation is in some ways even more advanced than it is in Europe. In Japan fertility has been below replacement since 1975-80 and in South Korea since 1985-90. Currently TFRs are near 1.3, the number of births is already more than 50 percent below peak levels, and the number of women of childbearing age is expected to decline even more than it is in Europe. In Taiwan, while fertility is a bit higher (TFR=1.6), the basic pattern is the same. In the rest of the developed world the situation is not quite so pronounced. In Canada (1.51) and Australia (1.75) fertility is now well-below replacement, while in the USA (2.04) and New Zealand (1.96) it is only just below replacement. Even in the United States, however, once the contribution of new immigrants to fertility is removed, native-born fertility has been below-replacement since 1972 and is currently near 1.85.

In less developed countries the signs are not as clear as they are in Europe, though indications of potential decline are everywhere to be seen. In China, the patterns of population replacement are not unlike what they are among developed East Asian countries. Current fertility is near 1.7 and is already 73 percent below its peak value in 1950-55 (TFR = 6.22). Perhaps more important, the yearly number of births is now 29 percent below its peak value reached in 1987. If we use a combination of the 'medium' and 'low' fertility variants in the United Nations forecasts, by 2025 the yearly numbers of births will be only be slightly above half peak levels and the number of women of childbearing age will have already declined by about 15 percent. Taken together, the population of China and that of the more developed regions represent almost 40 percent of the world total.

In other less-developed regions, everywhere there has been a precipitous fall of fertility (a decline of 46 percent since the late 1950s) (Table 1). Otherwise, important disparities exist with respect to whether –or when- population decline will set in. In most of the less developed regions, not only is fertility well-below its peak value but declining numbers of births (the tell-tale sign of extremely rapid aging) leading eventually to population decline has already begun. As for the least

developed regions of the world, despite continued falls in fertility, it is still too early to be sure of further trends in births and in population.

Table 1: ***Patterns of fertility decline in less developed regions***

	Current TFR	% off peak	Births (max)	% off peak
Latin America	2.38	59.9	1990-95	0.8
North Africa	3.18	55.1	1985-90	1.3
South Central Asia	3.20	47.4	1990-95	2.6
Southeast Asia	2.52	59.0	1985-90	6.5
West Asia	3.36	48.1	2000-05	
Least developed countries	5.02	25.3	2000-05	

3. *Periods of population decline in the past*

There have been numerous periods of population decline in the past, though our knowledge of most of them is severely limited by available data. History is filled with relatively brief periods decline, lasting from a few years to as long as one half century. The seventeenth century in much of southern and central Europe was one of these periods; parts of the twentieth century in, say, the Soviet Union, Germany or China is another. War often played an important role, either directly or indirectly, in these periods of population loss. In terms of long-term total population change, however, they were not altogether that important, with losses representing a relatively small percentage of the total population of a country or a region and lasting a relatively short amount of time. The likely scope of population loss and the duration of decline in store for much of the world in the coming years make these comparisons less than ideal. The two best historical examples of prolonged population decline to be found over the last thousand years would be the situation of Europe in the aftermath of the Black Death and that of the indigenous populations of the American continent in the wake of European colonization.

The Black Death appeared in Europe during the latter part of 1347 and in 1348, more than five centuries after its last previous appearance. Within two or three years it had affected the great majority of the continent. From that moment until its eradication in the late seventeenth and early eighteenth centuries successive epidemics of plague made their way through Europe. Plague mortality became a structural part of the pre-industrial European landscape. Jean Noel Biraben (1975) has estimated that for the century following its initial appearance, there was an epidemic of plague in Europe every 11.1

years. Subsequently the frequency of epidemics gradually decreased as did their intensity, though plague mortality continued to dominate the European landscape for centuries, with far more spectacular and dire consequences than typhus, the other main cause of epidemic mortality.[2] As late as the seventeenth century plague epidemics were capable of inflicting enormous mortality on rural and especially on urban populations.

It is nearly impossible to know just how many people died in the original epidemic (1347-1351) though estimates of between one quarter and one third of the population of Europe have been used.[3] Successive epidemics diminished in intensity but continued to be extremely lethal. The first epidemic affected people of all ages, while subsequent ones, at least during the first century of repeated epidemics, tended to be selective of younger people. A century after the Black Death appeared in Europe, total population had decreased by between 30 and 40 percent.[4] This global decrease was achieved not so much by the die-off occurring during the first wave of plague, as terrible as it was, but by the repeated onslaughts that gave the population little time to recover between one epidemic and the next.[5]

For more than three centuries, plague mortality dominated the demographic system existing in Europe, but only for the first century or less was it able to reverse any possibility of growth. Population decline ceased in most of Europe by 1450 and pre-plague population levels were reached less than a century later. Ultimately, the depopulation in Europe caused by the plague created abundant available land and a labor shortage. This facilitated high real wages, early family formation, and high levels of fertility. Once the overwhelming immediacy of plague mortality receded, these factors led to strong population growth

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[2] Livi Bacci estimated that in Tuscany during the second half of he fourteenth century there was a serious mortality crisis (normally plague) once every 11 years, with an average sevenfold increase in deaths. Between 1400-1450, these crises occurred every 13 years and deaths increased by 5, and between 1450 and 1500 there was a crisis every 37 yeares and normal deaths were increased by 4. See Livi Bacci (1978: 41). See also Del Panta (1980: 132)

[3] On this point, see, for example, Russell (1972:55-56); McNeill (1976: 149).

[4] For Italy, Pinto (1996: 60) estimates a total population decline between the early fourteenth century and the central decades of the fifteenth century of 40 percent. See also Del Panta (1980: 132-137). Other contries yield roughly similar levels of decline. For France, see Biraben (1975); for England, Russell (1958: 40-45) or Ziegler (1969: 224-31); and for Spain, Pérez Moreda (1988: 365-368).

[5] The curve of deaths from the town of Siena (Italy) during the century after the plague is an eloquent example of this process (Del Panta, 1980: 109) It can be shown that population loss of 30-40% over the course of a century can be readily explained by repeated epidemics, with periods of population growth between each epidemic. Exercises of this nature regarding the plague can be seen, for example, in Livi Bacci (1999, chp. 4) or in Pérez Moreda and Reher (1985: 315-316).

throughout the second half of the fifteenth and much of the sixteenth centuries, as well as between successive plague epidemics.

The other historical example of prolonged population decline is offered by the indigenous populations of America in the wake of the European conquest. During the first century and a half of European colonization and occupation a population decline took place that in many ways appears to have been a unique experience in relatively recent human history, especially for a population of that size. The extent of population loss is subject to many very heated debates, due mostly to the difficulties inherent in estimating the size of the population at the time of contact with European powers.[6] There is no dispute about the horrendous nature of the disaster, simply about the extent of population loss over that fateful 150 year period.[7] By all accounts, population decline was far greater than it ever was in Europe following the Black Death.[8]

Population loss was not everywhere the same. In some areas the indigenous populations practically disappeared (low-lying areas, especially the Caribbean), while in others (the Jesuit Missions in Paraguay, for example) they fared reasonably well, at least until the eighteenth century (Livi Bacci: 2003, 2004). The mining highlands appear to mark a middle path in this tale of disaster. These disparities, however, should not mask the immensity of the disaster, which may have reduced total population size by as much as 80-90 percent. There are indications that population decline ceased some time towards the middle of the seventeenth century.

Three basic causes have been cited as reasons for this population disaster. The first one was the cruelty of the conquering powers towards the native populations. This was material for the Black Legend of the Spaniards and had its first and foremost proponent in the Spanish reformist priest Bartolomé de las Casas[9]. In more recent years, the idea that Europeans brought infectious diseases into heretofore virgin populations has gained considerable credibility. From this perspective,

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[6] Estimating these populations is by no means a simple task. Some of the highest estimates were given by the 'Berkeley School' of Simpson, Cook and Borah and other much lower ones were suggested by authors such as Rosenblat, Henige or even Livi Bacci. Middle-range estimates are gatherd by Denevan. On this issue, see, for example, Cook and Simpson (1948), Cook and Borah (1971-79), Livi Bacci (2003), Henige (1992), Rosenblat (1954), and Denevan (1992), Sánchez Albornoz (1974: 39-51).

[7] For central Mexico estimates of the extent of the disaster ranges from 60 to 95 percent (McCaa, 2000: 253).

[8] For a summary of these debates, see the special issue of the *Revista de Indias* (2003, n 227), edited by Nicolás Sánchez Albornoz, which contains a total of 10 papers on the original debates inspired by the work of Woodrow Borah.

[9] The allegations of Las Casas are contained in his *Brevísima relación de la destrucción de las Indias*.

diseases unknown in the New World but well-known in Eurasia, such as smallpox, are seen as the major agents of population decline.[10] The alternate explanation, itself related at least indirectly to the cruelty theory, is that indigenous populations suffered from considerable levels of infertility, due not only to the way they were treated (forced labor in the mines, forced migration, spousal separation) but also to the fact that their entire way of life had been destroyed by the occupying Spanish forces. Examples of this infertility can be found in sterilization, suicide and, more significant, in the evidence that has emerged of extremely small family size, often with averages of 2 or fewer children per family.[11]

It is unquestionable that all of these factors intervened to provoke population loss in the Americas, though the debate centers on how much weight to assign to each of them. It is our opinion that it is almost impossible to explain such levels of long-term population loss for such vast populations by means of mortality crises alone. With the population of the continent declining by as much as 90 percent over the course of 150 years, mortality crises alone cannot be considered sufficient cause. In the case of the Black Death, for example, when mortality was probably as bad as or perhaps even worse than it was in America, population only diminished by approximately one third over the course of a century. In Latin American, the rate of decline was between 2 and 3 times higher.

If, on the other hand, infertility is brought into the picture, it is much easier to meet our goal for population decline. Fertility is a far more effective way of reducing population over the long run than mortality. Take present-day Europe as an example: despite the continued -albeit gradual- improvement in mortality, should fertility remain more or less at current levels throughout the twentieth century, by the end of the century population decline will be close to 40 percent or more. The total destruction of the world as they knew it may well have been reason enough for indigenous populations to drastically reduce their reproductive patterns.

The scenarios of past and present population decline briefly discussed here present sharply different demographic characteristics

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[10] Among the many proponents of this perspective, see N.D. Cook (1998), McNeill (1976: chp. 5), and, at least indirectly, Crosby (1972: chps 1 and 2). For a summary of this perspective, see Sánchez Albornoz (1974: 60-66).

[11] For a number of these testimonies, see Sánchez Albornoz (1974: 53-56). The Governor of the Viceroyalty of Peru, the Marquis of Castifuerte, said in 1736 "The loss of political control, esteem, wealth, abundance, and strength to the conquering power naturally affects the will of the conquered to beget and bring up children they are unable to support" (Sánchez Albornoz, 1974: 54). Other authors have pointed to the extremely small family size (average of 2 children with high levels of sterility among married couples), the existence of infanticide and other means of limiting reproduction. For different perspectives on these points, see González and Mellafe (1965: 69), Gumilla (1741: chp. XXVII), or the detailed accounts of Jaramillo (1964: 275-283). See, also, Sánchez Albornoz (1998).

and have dramatically different social and economic profiles. In post-plague Europe, extremely high mortality appears to have been accompanied by extremely high fertility. Information regarding fertility during this period is sparse, but there are instances in Italy during the late fourteenth and early fifteenth centuries in which women's age at marriage has been estimated at between 16 and 19 years of age (Herlihy and Klapisch-Zuber, 1978).[12] This suggests that fertility at the time was very high, with birth rates well in excess of 45 or even 50 per thousand.

Post plague populations, then, would invariably have been very young, with high dependency rates despite the relative lack of elderly people in society. This type of dependency was not necessarily an economic disadvantage because societies in fourteenth and fifteenth Europe were based on very early entry into the labor force and with little or no investment in children's education. Classic dependency rates might be a strongly misleading indicator on this point, especially insofar as the economic implications of these rates are concerned. The first 150 years following the arrival of the Black Death was a time of considerable economic prosperity in Europe, as shown by the high real wages existing at the time (Phelps Brown and Hopkins, 1956: 303). The same factor leading to population decline –epidemic mortality- proved to be an important stimulus, especially in the medium run, for economic growth and for the well-being of these populations.[13]

In America very high mortality was accompanied by very low fertility. It was the worst possible combination. Historical examples of high mortality / low fertility populations over prolonged periods of time are quite infrequent. This appears to have been one of them. The resulting age structure was certainly much older than in post-plague Europe because there were relatively few young children in society. Contrary to what happened in Europe, there is no indication that this period of decline gave way to economic growth or to improving living standards, at least not before the second half of the seventeenth century, and even then it is quite doubtful that living standards improved much at all.

The third scenario will affect Europe and much of the developed world in the near future. This group of countries includes most of those who participated in the historic demographic transition (the *forerunners*), plus some of the Asian tigers (Reher, 2004a). These are all extremely low-mortality societies and in few of them is fertility at or even near replacement levels, with current average TFRs approximately 25 percent below levels required for replacement. This leads to extremely old age distributions. In these countries 25-29 is currently

[12] On this subject, see also Pérez Moreda and Reher (1986: 315-317).

[13] In some areas, as late as the first half of the sixteenth century, real wages continued to be high in comparison to seventeenth and even eighteenth century standards. This was the case of the Kingdom of Castile. See Reher and Ballesteros (1993: 122-126); Hamilton (1934).

the largest age group in society, and by mid-century it will be 55-59. This process is taking place amid populations with unprecedented levels of material well-being, educational attainment and almost any other indicator of living standards we might want to use. The economic implications of declining populations and extremely old age structures may be enormous.

In sum, these three examples point to deeply contrasting population scenarios. In post-plague Europe, extremely high mortality and fertility led to great economic growth. Population decline lasted for the greater part of a century, but by 1550 European population was considerably higher than it was in 1348. Thus, depending on how population decline is defined, its duration in post-plague Europe was between 75 and 200 years. In America, high mortality together with low fertility led to prolonged population decline lasting for well-over one century, with relative levels of decline far exceeding that which occurred in post-plague Europe. This process was accompanied by declining living standards as well and lasted much longer than it did in Europe, between 125 and 450 years depending on the perspective.[14]

In the developed world of the twenty-first century, population decline will be marked by extremely low mortality, extremely low fertility, and will take place despite remarkably high living standards. It promises to be a period of population decline with uncertain but likely very negative economic implications for these societies. How long this period of decline will last is, of course, not at all clear. There are reasons, however, to expect that recovery will not come any time soon. Any population decline achieved through low fertility tends to be far more long-lasting and difficult to reverse than one brought on solely by mortality. Its economic implications may also be more negative.

4. *Population decline and the demographic transition*

It is our contention here that the persistent extremely low fertility in developed countries cannot be satisfactorily attributed to economic stress, unemployment, public policies or lack thereof, or to passing trends. Fertility has remained well below replacement now in Europe and in much of East Asia for nearly 25-30 years, with no indication of a reversal in that pattern. Extremely low fertility has been around for too long for it to portend anything other than major long-term social

[14] Pre-Columbian population levels were not reached on the continent –despite the massive arrival of Africans, Europeans and Asians - before the second half of the nineteenth century. If indigenous populations are considered alone (even including persons of mixed race [*mestizos*]), they may have never reached their former levels or at least not before the central decades of the twentieth century.

change. It gives every indication of having become a structural aspect of the developed world.

There is reason to believe that the persistent low fertility in European populations is the outcome of the demographic transition that started in Europe well over a century ago. This hallmark event of human history unleashed powerful forces of social change, leading to the modernization first in much of European and American societies, and somewhat later in parts of East Asia and the Pacific. The links between the demographic transition and social change can be seen in age structures, migration patterns, the distribution of family labor, education and the quality of children, and adult health. All of these were powerful agents of change and have done much to accelerate patterns of economic growth during the twentieth century in Europe and in areas of East Asia.[15]

The demographic transition everywhere leads to certain changes in population age structure, at first a slow process of aging and later a very rapid one. It is a process of aging that is inherent in the demographic mechanisms that govern this change. In order to understand this process more thoroughly, it is helpful to look briefly at how the demographic transition contributed to the social change generally, and especially to how it contributed to the transformation in the role of women in society. This is the key issue, one that is present in all of the historic demographic transitions and probably in the more recent ones as well. Women were the central figures for the initial demographic transition in historic Europe. They were the ones who initiated fertility control within marriage. They also held the key to the health improvements of their children, especially before the aftermath of the Second World War when medicine and public health assumed greater relative importance. The demographic transition was, in its very origins, a key event in the empowerment of women. It also initiated a series of social, political and cultural changes in their role that mark social change during the twentieth century.

By implication, the demographic transition led to greater reproductive efficiency among women: reaching the desired family size took less time and less individual effort than ever before, though it may well have cost considerably more. Ronald Lee has estimated that women went from spending 70 percent of their adult lives bearing and rearing children before the demographic transition, to spending only about 14 percent of it in more recent times (Lee, 2003: 167). It meant a massive liberation of women's time, minimizing their 'wasted investments' on children who eventually died (Reher, 1995).

At first mortality declined faster than fertility and, despite diminishing numbers of children ever-born, completed family size tended to increase, thus creating additional economic burdens for

[15] For more on this subject, see Bloom, Canning and Sevilla (2003), Dyson (2001) and Reher (2004b).

families. Eventually, however, completed family size also decreased. This process only commenced several years after the start of the demographic transition. It implied important ideational changes because it meant that people –women- were aiming at –and achieving- smaller families. Ideational change did not characterize the first phase of the demographic transition, but rather a subsequent one.[16] It led to an emphasis on children of 'quality': surviving children began to receive more parental attention. This led to increasing investments in education, for boys as well as for girls, in both public and private spheres. By implication, economic costs related to childbearing and childrearing also increased.

Ultimately, this process of increasing reproductive efficiency with its ideational and economic implications can be seen as a prerequisite for the entry of women into the labor force. The increases in the labor force participation rates of woman have their own set of economic, social, and cultural causes. One of them, however, was the revolution in reproductive efficiency and the way it affected women and families: it made labor force participation possible in terms of time, helped create the economic need to do so and also paved the way for the increases in education necessary to make this sort of activity a part of the life expectations for women (Reher, 2004b). Taking a job and keeping a job after marriage became standard fare for the great majority of women in these countries. It is a process that began in earnest after the Second World War and has accelerated in the past three or four decades.

All of this has led to a massive rearrangement of women's position in society. This is one of the most important social changes of the entire twentieth century, one whose implications should not be underestimated. Women are now as highly educated as men, have activity rates that are every bit as high, and make an important contribution to family economies. This change has also coincided with what has been called the "second demographic transition" characterized by sharply declining fertility coupled with profound changes in certain dimensions of family forms, the meaning of the family, and family life (van de Kaa, 1987).

Having children no longer has the type of overriding importance that it once did for women (and for men) only half a century ago. Historically, by implication a successful life for a young woman meant having children and a family. With some exceptions, if you didn't have a family you were not successful in life, either in the eyes of society or in your own. In situations such as these, sacrifices were made to be successful, no matter what the cost. Today, having a family is still an

[16] Considering ideational change to be at the very origin of the demographic transition, many authors have overlooked the fact that during its initial stages the principle motivation for fertility control was an attempt of families to compensate for declining mortality (Caldwell, 1976; Lesthaeghe, 1983; Kirk, 1996). The point was to maintain traditional family size in the face of improved health, not to change it. The historic demographic transition was a two-step process, with significant ideational change only prevailing at a second stage.

important part of success for most women, but it has a much lower priority than it did before. In a somewhat arbitrary way, we might say that in the past having children and a family was 80 percent of what could be considered success in life, and now it is closer to 30 percent. As this happens, the opportunity costs for reproductive success necessarily become higher and people are more willing to negotiate, especially when circumstances are not ideal.

It is not difficult to see how difficulties can abound in these sorts of situations. These can include problems with a person's career expectations, with finding the right partner, with the housing or the job market, with the willingness of men to share fully in home and family responsibilities, or with the reality of having to lower one's expected living standards in order to have a child. Having a family is an expensive, long-term investment. Since it is no longer an overwhelming priority for women (or for men), as it once was, they are much more willing to negotiate these expectations.

For men, being successful in life tended to be based mainly on professional success, more than on having a family. It was women who made families function and held them together, not men. This is why these changes we have described in women's values and expectations have had such a profound effect on reproduction and the family. The persistently low fertility over the past half century in much of the world is impossible to explain without this sort of ideational change. Should the current levels of fertility in developed societies continue to be linked to the role of women in society, by implication, then, below-replacement fertility will be with us for a long time to come.

It is our opinion that these forces at work can be traced directly and indirectly to the demographic transition. They are a logical outcome of that historic process. What Dirk van de Kaa has called the *second demographic transition* is merely a more advanced stage of that historic transition, one that was interrupted briefly and partially by the baby boom of the 1950s and 1960s.[17]

Contrary to what had been expected in classical demographic transition literature, however, fertility did not decline to replacement levels. Replacement fertility proved to be only a road sign along the route to significantly lower levels of fertility. Eventually, declining fertility turned into falling numbers of births. This occurred in different parts of Europe some time between the mid 1960s and the early 1980s. The demographic result of this is very clear as the process of population aging and eventually of population decline accelerated and became common fare for most of these societies.

[17] For different perspectives on the concept of the *second demographic transition*, see the 2004 issue of the *Vienna Yearbook of Population Research* containing articles by Billari and Liefbroer, van de Kaa, Coleman, Bernhardt, and Micheli.

5. *Future perspectives for world population*

The path for population in Europe and probably for most developed societies in the coming years is fairly clear. What about the rest of the world? There continues to be a general feeling that for the most part fertility will remain above replacement and so the prospects for the coming years point to a slow down in growth, but not to a reversal of growth. Is this supposition reasonable? The existence of a hypothetical 'floor' to fertility decline was a widespread belief in Europe during much of the twentieth century, and the upturn in fertility in the postwar years seemed to confirm this belief. Yet historical reality showed how unrealistic that expectation was.

Is it realistic for much of the developing world? The relative lack of economic development, relatively low levels of education and strong family cultures suggest that it may well be. Yet there are also signs to the contrary. At present, fertility is already below replacement in nearly 60 of the world's nations, and many of them are not developed countries. We can understand the processes at work better if we look at the demographic transition in these nations. Very generally, its specifically demographic characteristics can be summed up in the following points (Reher, 2004a):

1) Fertility decline began for most of the world's populations some time between 1955 and 1980.

2) Mortality decline in these societies began much earlier. The long lag between mortality decline and fertility decline led to accelerating rates of population growth that have only recently begun to slow dramatically in much of the world.

3) The pace of decline, both of fertility and of mortality has been far faster than in the historic demographic transitions; possibly twice as fast or more.

4) Due to the breakneck rates of fertility decline, population aging in these countries is also proceeding at a far more rapid pace than it ever did in the historic transitions. This process is especially clear during the past 20-30 years as the pace of fertility decline all over the world has far exceeded that of mortality. In many countries, the number of births has already begun to shrink and promises to continue to do so in the future.

6) Completed family size is now declining rapidly as the reduction in fertility outpaces improvements in mortality. This is exactly the opposite of the process taking place during the central decades of the twentieth century when over the course of a generation completed family size nearly doubled with respect to pre-transitional levels due to rapid mortality decline coupled with persistently high levels of fertility.

Will fertility stay above replacement and will the number of births continue to increase or at least remain at levels near where they are at present? Should current trends continue, many developing countries will have below replacement fertility in the very near future. Over the past 10 years among the less developed regions of the world (excluding China), TFRs have declined by 18 percent, and over the past 20 years decline has surpassed 30 percent. At this pace, in these regions, fertility will be below replacement within 10-15 years. There are subregions in which the pace of decline is considerably faster. Northern Africa is a good example because over the past 10 years fertility has declined by 23 percent and over the past 20 years by 45 percent (Mencarini and Salvini, 2003).

This pace of reduction of fertility seems unstoppable, unless a baby boom takes hold in these regions, as it did for historic transitions during the 1950s and 1960s. The baby boom delayed the onset of below-replacement fertility by nearly 20 years in the developed world, though it did not stop it. Fertility decline became a two stage process: an original decline, followed by a pause or even an increase in fertility during the baby boom, and once again followed by a period of intense decline. During the first period, the total amount of fertility reduction was far greater though the relative pace of reduction was greater than in the second phase of decline.

Will there be a second baby boom in the developing world? Our guess is that there will not, mostly because the conditions of the baby boom were world-wide at the time and appear unlikely to be repeated. For this reason, there is a chance that many developing regions of the world will pass straight from the first period of fertility decline into the second one with little or no pause. The present levels of fertility in these countries are only slightly above those holding in Europe at the mid-twentieth century.

The real question, however, is whether the role of women in society is also being dramatically altered. Increasing reproductive efficiency, so vital for Europe's social and economic transformation, is unquestionably affecting women the world over. Will this lead to increasing investments in the quality of children? We believe it will, especially as completed family size continues to decrease. It is unquestionable that the role of women in society is changing, though there continue to be enormous disparities. Women's education has been increasing. According to recent UNESCO estimates, in developing countries by the end of the twentieth century female illiteracy had declined to almost half what it was in 1970 (64.2→34.2 percent), and secondary school enrollment ratios increased nearly threefold between 1970 and 1997 (16.0→46.4 percent). Despite problems in estimating female labor force participation in different societies over time, it too appears to be on the increase. In a selection of developing countries, female labor force participation rates (>15) increased substantially

between 1980-84 and 2000-3 (from 25 to about 36 percent).[18] Here, however, trends are not as clear as they are with education, and dramatic disparities continue to exist.

One of the characteristics of historic transition processes is that they commenced in a wide variety of social, educational and cultural contexts. In the end, however, the effects tended to converge everywhere. This also appears to be true in much of the developing world: social, economic and cultural disparities amid demographic similarities. Everywhere the value of children and the costs of raising them will increase, and so will the pressures on women to take advantage of new-found time available to them to generate further income for their families. There may be disparities in timing, but the process appears to be widespread.

The implications of the demographic transition in much of the developing world are becoming clear. The process of aging will be far more rapid and more intense than it was in historic populations. In this way, similar changes will take place in as little as half the time that it took in European nations. Throughout the developing world, aging and its attendant economic and social implications challenges will become an acute reality relatively soon after these issues become a central concern for societies in the developed world.

Labor shortages will be one aspect of the issue of aging. In some countries, this shortage of working age population is easy to predict because numbers of births have already been declining for several years. We believe that it is only a matter of time (perhaps 2-3 decades) before labor shortages begin to affect many or most societies in developing world. The availability of surplus labor (potential migrants) to compensate the labor strictures in the developed world will eventually be called into question, as the sending countries begin to suffer strictures of their own.

Should present trends continue, ultimately these will lead to significant decreases in the population of reproductive age. At that stage, the negative population inertia so visible in developed regions of the world will make itself felt elsewhere as well. Long-term population decline will set in, only three to four decades after it commenced in the developed regions of the world. The gap between the onset of fertility decline and the onset of population decline, that was more than a century in historic Europe, promises to far shorter in the developing world.

[18] The countries are: Morocco (16.9→27.3), Egypt (17.1→20.4), Syria (13.4→23.5), Pakistan (7.1→16.2), Indonesia (45.3→52.0), Philippines (50.1→52.8), Ecuador (19.5→53.9) and Mexico (30.1→38.6). These figures are based on International Labor Office estimates.

6. *Some conjecture regarding the future*

The reality of population decline is the likely course of events for many world regions, and could possibly affect the entire world within a few decades. It is a trend that has been building for many years now. In some areas where this process is further advanced population will decline by as much as 20 percent in the next 50 years and, should present trends in fertility continue, decline by the end of the century will be much greater. Since this upcoming period of decline will hinge on low fertility, populations will tend to be loaded with elderly citizens and children and working age populations will be shrinking.

From the standpoint of natural resources and the environment, over the long run this will be good news indeed. Eventually the twenty-first century will be seen as one in which the excesses of the nineteenth and twentieth centuries were corrected. This is not to say that over the coming decades there may not be vast struggles for control of certain shrinking natural resources. In the long run, human demand has had a dramatic effect on the environmental balance throughout the world, and the upcoming period first of slow growth and then of decline, will be a powerful correction for this process.

As for the society of the future, expectations are not nearly so optimistic. It is not easy to imagine this situation from our own vantage point in which cities and societies in the developed world are full and in the developing world they are teeming with people. Yet many of the structural characteristics of future society can be predicted with certain confidence. Severely skewed age structures, an unavoidable by-product of the process underway, will have important consequences for all aspects of social welfare that depend on the redistribution of resources. Should fertility remain below replacement for some time, these age effects will become a structural rather than a passing characteristic of society.

It is important to remember here that the present state of affairs in the developed word with numbers of births declining every year has been reached despite ever-greater numbers of women of childbearing age. In most of the developed world in the very near future (5-10 years), the number of women of childbearing age will begin a process of reduction that even in optimistic circumstances is likely to last for several decades. In other words, we are entering into a world of below-replacement fertility and shrinking numbers of women of childbearing age. This means that unless fertility increases dramatically to what are, from our vantage point, unimaginable levels (TFRs well above replacement), the pace of reduction of births should begin to accelerate, even in the face of moderately rising fertility. This leads us to expect intense aging to continue for some time to come.

Economists are well-acquainted with the issue of aging and grapple with potential solutions ranging from later retirement to increasing

women's labor force participation, large-scale immigration or reducing pensions and dismantling what is left of the welfare state. Over the long run, however, none of them may prove to be more than partial remedies. Economic growth may also be adversely affected, as the shortage of labor and abundance of tax revenues it must generate are increasingly diverted from productive assets towards more pressing social needs.

If population declines by as much as 25 percent or more –as UN projections suggest it might-, urban areas in regions like Europe could well be filled with empty buildings and crumbling infrastructures as population and tax revenues decline. It is not difficult to imagine enclaves of rich fiercely-guarded pockets of well-being surrounded by large areas which look more like what we might see in some science fiction movies.

More than any other, the key issue here is the number of children born into society. With a moderately balanced age structure, all the challenges posed by increasing longevity can be met successfully, at least at a societal level. If age structures are severely skewed, however, it is much more difficult to be optimistic about the future. As Massimo Livi Bacci (2001) said, children are not just a matter of personal consumption and preference, but also one of social investment. Recently Ronald Lee has pointed out that childbearing in contemporary developed society has massive positive fiscal externalities (Lee, 2001; 2003: 186). It is difficult to argue with this sort of reasoning.

The key issue however is just how this bottom line –having children- can be met. Livi Bacci (2001), Longman (2004) and others suggest that public policy can make a difference. Indeed it can, but just how much of a difference can it make? In Northern European societies, where aggressive pronatal public policies are in effect, fertility is also considerably below replacement and has been so for more than three decades now. While higher than in Southern or Eastern Europe, levels in Northern Europe are still far from sufficient (TFR = 1.66). Can policy convince women (couples) to have children? Recent experience in Europe suggests that policy alone cannot be successful.

This leads us to the pivotal issue of how to reconcile the commonweal and self-interest, at least in terms of reproduction. Self-interest, as Adam Smith reminded us, has always been a key part of human life, past and present. How were the two of them brought into line in the past? The historical record is filled with examples of how slow population growth was guaranteed by means of economic limitations to population growth within a context of fairly close-knit cultural structures. While the fit between population growth and economic capacity was never perfect, over the medium term growth tended to stay within the limits fixed by the economy. This adjustment was helped by the fact that: a) living standards for much of the population were never far from subsistence, and b) reproduction tended to take place in high pressure regimes, with fertility adjusting to high and fluctuating levels of mortality. From different angles, the work of

Malthus, Hajnal (1965), Lesthaeghe (1980) and many others have emphasized these points.

All of this changed with the demographic transition. Living standards rose and compensating for high mortality ceased to be an important part of people's reproductive strategies. More important, perhaps, from a cultural standpoint, self-interest was no longer bound by such strict norms. Fertility decisions became conscious and individual, far more than they were socially determined. Unexpected by all, the great historical achievement of increasing reproductive efficiency –the centerpiece of the demographic transition- turned into dangerously low fertility.

Has the genie really been let inadvertently out of the bottle? Having children is ultimately an expression of confidence in the future; in the security of the life you can expect your children to be able to lead. At one level, this sort of confidence is subject to economic and political constraints. At another, deeper one, it is related to social and cultural stability. There is an immense cultural change under way in much of the West and it is related, at least indirectly, to the role of women in society. It is also related, of course, to the triumph of secularization, individualism and consumer society, long considered hallmarks of modernization processes. Despite what can be very legitimately viewed as achievements of recent history, it is also true that this is a time of insecurity for both men and women as to their roles in society and as to the future. It is also a time of deepening concern about the sustainability of society as we know it. We are witnessing the demise of the ideological foundations upon which society has been built for the past two centuries. Times of flux are not times that are conducive to optimism about the future.

This brings us all the way back to the historical examples discussed earlier. Of the three periods of demographic decline discussed here, two of them are based on prolonged periods of relative infertility. These are the periods in which population decline was and will be deepest and longest lasting. In both of them a breakdown of the world as people knew it takes place and a return to normalcy is long in coming. Contrary to what we might have expected, the fact that the economic and political contexts of these two examples are starkly different may not really matter much at all. In the Americas, the process of decline did not bottom out for well-over a century.

In Europe and perhaps in other world regions, we do not know the ending date of the process underway, but it may well not be soon in coming. Some years ago, Jean Bouregois-Pichat envisioned a scenario in which *"…l'humanité part de zéro, il y a quelque 600 000 ans, et y retourne vers l'an 2400"* (1989: 32). While it is difficult to share his exaggerated pessimism or to overlook the fact that great population swings have always generated compensational mechanisms tending to limit their duration and their importance, it is unlikely that an adjustment will come any time soon or that when population decline comes to a halt it will be at significantly lower levels than those existing

today or perhaps at any time during the twentieth century. It is unclear just how these adjustment mechanisms will come about or how effective they might be.

From our vantage point at the turn of the millennium, we can envisage a great trend change with potentially enormous consequences. In that respect, we are fortunate indeed, at least from a scientific and historical standpoint. For our children, and especially our grandchildren, persistent population decline –and possibly lower living standards- will likely be the only reality they will ever experience and the times of runaway population growth so prevalent in the nineteenth and twentieth centuries will be but a distant memory of the past.

Are other scenarios possible? Yes they are, but, at least at this stage, they are less likely than the one I have described. Some of these scenarios may be more benign (a return to replacement fertility everywhere aided by policies and changes in values), but others may be much less benign, implying aggressive public policies, social and political conflict, and the progressive abandonment of the achievements of the past two centuries. Even though the future is not really ours to know, population historians and demographers have an important role to play in bringing such crucial issues to the front and stimulating much-needed debate.

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