Demographic changes as factor of national development and international competitiveness

by
Antonio Golini and Cristiano Marini
antonio.golini@uniroma1.it; cristiano.marini@uniroma1.it

1. Preface

A first aim of this paper is to examine the demographic machinery of the first and second demographic transition and to try to evaluate when and how long a "demographic window"–recognized trough the "dependency ratio"–is opened in a population. A second aim is an attempt to evaluate the possible impact of spatial differences in timing and length of demographic windows on relations, both economic and migratory ones, among countries. In brief, we want to give "a domestic and an international view on population from a demographic window". In order to evaluate the whole process and possible costs and benefits of the first and second demographic transition (Lesthaeghe and Van de Kaa, 1986; Lesthaeghe, 1995; Chesnais, 2000), we preferred to make reference to actual populations rather than to theoretical ones, in particular to four countries placed along the road from the beginning of the first demographic transition to the heart of the second one: Nigeria, Egypt, China, and Italy.

2. Demographic windows

From a demographic point of view, the demographic window[1] represents the "bridge" between a young and less developed population - high fertility and low life expectancy which witness an old demographic regime (and often also socio-economic backwardness) - and an older and more developed population - widespread and successful birth control and long life expectancy. The same period can be perceived as a one-off opportunity from the point of view of economic growth and development in general: the absolute and relative number of potential income producers and savers should favour both wealth creation and accumulation (Birdsall and Sinding, 2001; Merrick, 2002). This would occur because greater resources would not be addressed to "unprofitable" investments, which are large and essential both in societies with a large number of elderly people and also in societies with a great number of youths. Hence, economic policies decisions are fundamental[2] in order

[1] In literature, the "demographic window" has been recently analysed and studied, due especially to the interest of international organizations (UNFPA, 1999, 2002, 2003; UN, 2002; UNESCWA 2004). Such organisations regard this demographic period as an actual possibility to decrease national and individual poverty in developing countries. This would occur as an effect of fertility decrease and of the following increase of the ratio between working age population and dependent population (young and old). However, investments are necessary in health, family planning, education and employment opportunities in order to make economy grow (that is the case of East Asian "tigers" and of some countries in Latin America, as Mexico and Brazil).

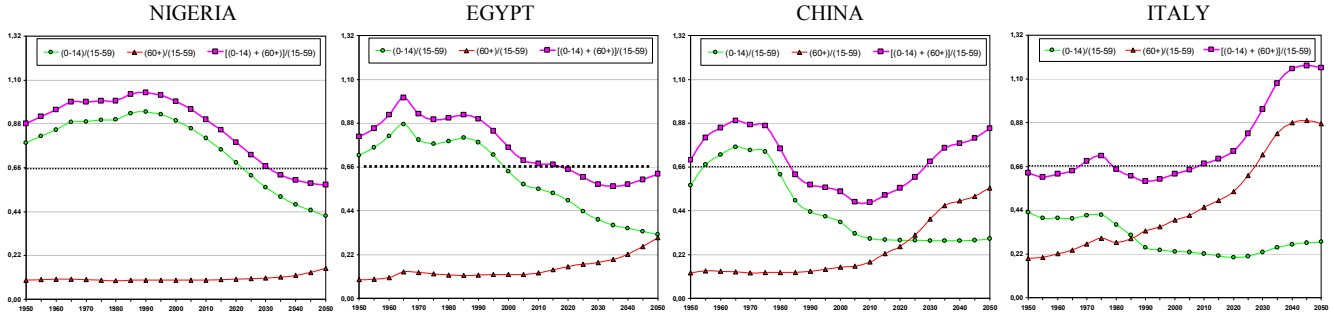
[2] According to the World Bank (2003, p. 36), with respect to this *demographic gift* and to the policies that could exploit it economically, "countries can take advantage of this one-time opportunity if they invest appropriately in their human and physical capital and create employment opportunities for youth and for those who have not been working for wages. Several countries in East Asia, such as the Republic of Korea and Thailand, and a few in Latin America, such as Brazil and Mexico, have done so. But South Asian countries that are now moving into the later stage of their transition to low fertility may not benefit from the demographic transition if they do not encourage growth, investment, and human capital development. The demographic window for these countries will close within a generation."

to exploit the opportunity given by a demographic condition that can be extended only in the medium-long term (about 50 years)[3].

Figure 1 clearly shows how demographic windows are different in timing and length among the four countries we took into consideration. Obviously, timing, duration and intensity of the window vary according to the arbitrary hypothesis that are put forward about: a) the extreme ages of dependent and independent age groups; b) the threshold of the dependency ratio.

As to the choice of dependent and independent age classes to establish the dependency ratio, we considered 15-59 age group, as this seems a fair compromise for a proper international comparison between those countries that are currently in different stages of demographic development. The better compromise seemed that of defining working-age classes of population in order to include five-year age class with significant activity rates. This is why people aged 60-64 have not been included[4]. Thus, in this work the working age population is aged 15-59.

Figure 1 – Dependency ratios, total (0-14 + 60+)/(15-59), young (0-14)/(15-59), and elderly (60+)/(15-59), in four countries at a different stage of demographic transitions, 1950-2000 and prospects up to 2050 (medium variant)



Source of basic data: UN, *World Population Prospects. The 2002 Revision,* New York, 2003

In order to individuate the threshold of dependency ratio (or its reciprocal), which defines the time interval of demographic windows, we tried to evaluate economic sustainability of age structure. As an arbitrary threshold of dependency ratio we choose the value of 0.66[5] because its reciprocal is equal to 1.5, i.e. 1.5 working age population per 1 people in dependent age. As in Western societies activity rate in the age group 15 to 59 is about 0.6-0.7, 1.5 working age population means 1 employed per 1.5 unemployed, a ratio which seems to be sustainable from an economic point of view, both at familiar level, and at macro level.

The demographic path which will be followed in future decades by a single country is not only the consequence of future trends in fertility, mortality (and migration, to some extent), but also a consequence of the accumulation in the past of a positive or a negative demographic momentum. But in turn, the path which will be followed becomes more and more important for the future growth of population, as the persistency of the trend implies a further accumulation of positive or negative momentum.

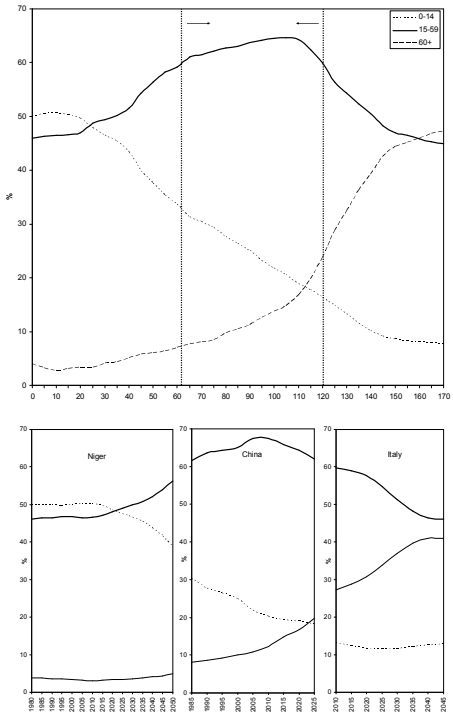
[3] For Williamson (2001), around two decades, depending on the speed of the transition.
[4] Only in the case of Nigeria most of these take part in economic activities (2/3 of total). Activity rate of the same age class varies from a minimum of 20% in Italy to a maximum of 44% in China, while in Egypt it is 38%.
[5] In other works (for example Cheung *et alia*., 2004), the universal threshold value of dependency ratio is 0.5; below it the demographic window opens.

3. Opening and closing of a demographic window and some related problems

Following the demographic experience of Niger (which currently experiments the highest fertility in the World), China and Italy, we tried to draw a general scheme of the evolution of age structure by broad age groups of a hypothetical population which follows the way of a complete first and second demographic transition, from a high fertility and mortality, as those observed in Niger, to a prolonged very low fertility and mortality, as those observed and forecasted for Italy (Figure 2).

Looking at the actual experience of the three countries taken as reference, it is evident that in order to cover the whole pathway, illustrated in the upper section of Figure 6, about 170 years would be necessary. Under these circumstances, the demographic window would remain open from time 61 to time 120, i.e. for about 60 years[6].

Figure 2 – A scheme of evolution of age structure of a hypothetical population, by broad age groups, according to a complete first and second demographic transition from high fertility and mortality to a prolonged very low fertility and mortality. References are made to three actual populations in different phases of demographic transitions



For actual populations the source of basic data is: UN, *World Population Prospects. The 2002 Revision* (estimates and medium variant), New York, 2003

Our hypothetical population helps us to better understand some of the problems associated with: a) the left side before the window; b) the window; c) the right side after the window. In discussing these problems we mainly refer to a demographic point of view, neglecting in large extent other aspects – economic, social, environmental – related to the demographic ones.

[6] Here we refer to the age group 15-59 and to the threshold of 1.5 person in working age per 1 person in non working age. This threshold, obviously, is obtained when the percentage of people aged 15-59 out of the total population is equal to or more than 60%.

a) The left side before the window. The major problem in this phase is the very rapid growth of population and the "excessive" burden of young people. For instance, in a country like Niger where fertility is equal to 8 children per woman in 2000-05 (the highest value in the world, as mentioned above), from 1980 to 2015 population aged 0-14 should arrive to count for about 50% out of the total population and to exceed total working age population, aged 15 to 59. In the period from 1965 to 2025 total population is expected to pass from 3.6 to 25.7 millions, growing at an average rate of 3.32% a year, with a multiplier factor equal to 7.1.

A so rapid population growth can be put under control only with a targeted and efficient population policy, specially if it is sustained by aids and interventions from the international community.

b) The window. The major problem in this phase is a multifaceted and intricate question of governance.

First of all, policy makers should have the capability and the operational possibility to adapt in a dynamic way the social and economic structure of a country according to the dramatic change in demographic structure: a huge increase, slow in a first phase and rapid in a second one, of old population which at a given point in time overcomes a largely declining young population. Both from a cultural and an operational point of view, individuals, families, people, and society as a whole should have the capability to move gradually from a child-oriented society to elderly-oriented one. But also in this phase, the presence and the importance of children should not be left aside. In general, the opening of window implies a declining ratio of students that would turn to workers for a couple of decades, a trend that could allow countries to finance better school systems and boost savings in pensions systems[7].

A second problem is, other things being equal, the capability of creating enough jobs for a possible "excess" of working age population, when its growth is very rapid and intense, both for demographic reasons and for social and economic reasons, particularly linked to the modernization of agriculture and a new condition of women. In many cases there is the necessity to relieve the possible surplus of labour force trough emigration. This means that people must have the real possibility to emigrate from a country and the real possibility to immigrate in many others.

A third problem comes later from the reduction of working age population, especially for its young fraction, and aging, after the peak registered in the window. These trends can create some beginning problems in maintaining efficiency of the production system and competitiveness in the international arena.

An further problem is trying to maintain, in the long run, fertility at a sustainable level – we say between 1.75-1.85 and 2.25-2.35 (10-15% under or above replacement rate) – which guarantees a gradual decline (or growth) of population and its aging, so that after the demographic window a rapid and intense population implosion and involution can be avoided.

c) The right side after the window. In the case of a *prolonged extremely low fertility* one can observe a real, progressive demographic implosion, which very unlikely could be put under control, particularly because in the first and the late part of the second demographic transition the interest, attitude and behaviour of individuals and couples (directed to have just one or zero children) are very often in contrast with the interest of the community (to have more or less 2 children per woman). The major problem which arises in this case is the very rapid decline of total population and working age population and the "excessive" burden of old people. One possible solution - but challenging and problematical under several aspects, including the psychological one – could be a very intense and prolonged immigration flows (UN, 2000).

[7] This is the position, among others, of Enrique V. Iglesias, of the Inter-American Development Bank (1999), as can be seen in a press release (http://www.iadb.org/NEWS/Display/PRView.cfm?PR_Num=70_99&Language=English).

The deaths/births ratio could reach 3.25 and the percentage of women aged 15-49 could decline from a "normal" value of about 50% to a value of 30% in 2050. This means that such a population could not have more endogenous resources for a recovery of births, and therefore for a less heavy unbalance between births and deaths, even with a recovery in fertility.

From an economic point of view, one of the major problems is related to a very rapid and intense decline of working age population and its aging, which poses a serious problem of survivorship for the production system, also in relation with the international competitiveness.

More in general Europe will face major demographic changes in the years to come, which will put increasing pressure on public finances. To avoid leaving an unsustainable burden for future generations, most EU member states need, on top of further consolidating their public finances and raising employment rates, to engage in structural reforms. The demographic window of opportunity for the phasing-in of effective reform is closing rapidly[8].

Of course all these problems are much more less severe and therefore much more easily faced if low fertility is not extremely low and if it does not last since many decades. Indeed, in this case all trends are much slower and more gradual.

Indeed the previous considerations refer mainly to the speed of change in total population and in its major age groups. With an annual change rate of 1.5-2% or more, a population should have the capability to change at least at the same rate financial, physical, and human resources to face a change of this magnitude. Last but not least, it should have the necessary flexibility in social and economic structure for a timely and complete adaptation to the changed demographic structure. The situation is much more severe when in the medium run a broad age group has a not negligible positive annual growth rate, while in the same time a different broad age group has a not negligible negative annual growth rate. This is the case of all countries which move along the two transitions.

4. Looking ahead: the importance of population strategies and policies

Looking at Table 1 one can consider the impact of alternative demographic trends on the future of population.

If in China the future fertility path will be that projected by the UN low variant (TFR equal to 1.35 in 2045-2050 from current 1.70), then to face the 86 millions increase of population aged 80 or over, we find a decrease of 230 millions in population aged less than 80. The population structure will be largely compromised and very likely it will not be able to assure a sustainable future, both from a demographic and economic point of view. On the other hand, it seems to be unsustainable also a recovery of fertility as projected in the high variant (TFR equal to 2.35 in 2045-2050), which implies a very huge increase (331 millions inhabitants) in total population. To face the 86 millions increase of population aged 80 or over, the best way to be followed seems to be that of the medium variant (TFR equal to 1.85 in 2045-2050), which implies a *gradual* decrease of total population and a less intense unbalance both in age structure and between births and deaths. We should consider that a huge unbalance between deaths and births affects not only the future demographic situation, but also the psychological perception of life vs. death and therefore population vitality vs. population malaise.

Looking at the Italian situation, the only way to be followed in the attempt to *reduce the accumulation of a negative momentum* and avoid an *irreversible* deterioration of the demographic situation, up to a point of no-return, is the high variant of fertility (TFR equal to 2.35 in 2045-2050

[8] This is the position of the ECOFIN (2003) as reported to the European Council on the broad guidelines of the economic policies.

from current 1.28, which seems an impossible target if one looks at present attitude and behaviour of Italian women and couples) and a much more massive foreign immigration.

For Nigeria and Egypt the most convenient way seems to be the low variant and the medium variant respectively if they intend to *reduce the accumulation of a positive momentum*.

Table 1 – Some demographic consequences of alternative paths of future fertility in some Countries in different phases of the two demographic transitions between 2000 and 2050

Country	Fertility variant (on the left the 2000-05 value; on the right the 2045-50 values)	Annual average 2045-50			2005-50 population change (thousands)		
		Births (thousands)	Deaths (thousands)	Ratio D/B	Less than 80	80 or over	Total
Nigeria	High 2.90	6 817	2 675	0.39	+163 837		+165 318
	5.85 Medium 2.40	5 010	2 407	0.48	+125 098	+ 1 480	+126 579
	Low 1.90	3 470	2 260	0.65	+89 434		+90 914
Egypt	High 2.44	2 584	905	0.35	+71 951		+74 616
	3.29 Medium 1.94	1 707	891	0.52	+49 218	+ 2 665	+51 883
	Low 1.44	1 013	880	0.87	+29 981		+31 646
China	High 2.35	23 097	19 089	0.83	+245 560		+331 345
	1.70 Medium 1.85	14 279	18 883	1.32	-9 322	+ 85 785	+76 463
	Low 1.35	7 615	18 710	2.46	-230 370		-144 585
Italy	High 2.35	689	820	1.19	-4 481		+0.281
	1.28 Medium 1.85	429	818	1.91	-11 951	+ 4 770	-7 181
	Low 1.35	234	816	3.49	-18 518		-13 748

Source of basic data: UN, *World Population Prospects. The 2004 Revision*, New York, 2005

Therefore the population policy - in particular fertility policy - adopted by central and local authorities, and its perception and practice by women and couples, will be crucial in the future, even more than in the past, because of accumulation of momentum during the first and the possible second demographic transition. Naturally the policy action could not be only a demographic one, but a global one taking into consideration all the aspects and components of society (Demeny, 2000; Golini, 2000).

These observations need to consider the impossibility to describe an optimum of population on one hand, and the importance of dynamic sustainability of the relationship between population, resources, and territory on the other. Sustainability has to be regarded as a complex matter, also with reference to the speed in population variations (and also to the deaths- births ratio), and in broad age groups; it is also necessary to look at international demographic and economic stages of various populations in order to estimate a single population's ability to compete.

Demographic windows, and all that lays behind them, can have a great explicative importance in order to manage not only economic opportunities but also the demographic challenges of XXI century.

References

Birdsall N. and Sinding S. W., (2001), "How and why population matters: new finding, new issues", in: Birdsall N., Kelley A. C. and Sinding S. W. (eds), *Population Matters, Demographic Change, Economic Growth, and Poverty in the Developing World*, New York, Oxford University Press

Chesnais J. C., (2000), "The future of French fertility: back to the past, or a new implosion?", *Below Replacement Fertility*, *Population Bulletin of the United Nations*, Special Issue Nos. 40/41, 1999, New York

Cheung S. L. K., Yip P., Golini A. and Robine J. M., (2004), *Change in Demographic Window in Low Fertility Countries*, International Conference on the Demographic Window and Healty Ageing: Socioeconomic Challenges and Opportunities, Beijing, May 10-11

Demeny P., (2000), "Policy interventions in response to below-replacement fertility", *Below Replacement Fertility*, *Population Bulletin of the United Nations*, Special Issue Nos. 40/41, 1999, New York

ECOFIN statement, (2003), *Report from the Council (ECOFIN) to the European Council on the Broad Guidelines of the Economic Policies*, June 9
http://www.hm-treaury.gov.uk/documents/the_euro/assessment/report/euro_assess03_ecofin.cfm

Golini A., (2000), "Levels and trends of fertility in Italy: are they desirable or sustainable?", *Below Replacement Fertility*, *Population Bulletin of the United Nations*, Special Issue Nos. 40/41, 1999, New York

Lesthaeghe R., (1995), *Second Demographic Transition*
http://www.ssc.uwo.ca/sociology/ftsc/Family%20Transformation%20and%20Social%20Inclusion3/ tsld004.htm

Lesthaeghe R. and Van de Kaa D. J., (1986), *Family Transformation and Social Cohesion*
http://www.ssc.uwo.ca/sociology/ftsc/proposal.htm

Merrick T. W., (2002), "Population and Poverty: New Views on an Old Controversy", *International Family Planning Perspectives*, Comment, Volume 28, Number 1, March

UN Economic and Social Commission for Western Asia, (2004), *UNESCWA Publishes Demographic Profile of the Arab Countries*, UNESCWA Press Releases, Beirut, February 17
http://www.escwa.org.lb/information/press/escwa/2004/feb17.html

UNFPA, (1999), *State of World Population 1999: "6 Billion: A Time for Choices"*, New York
http://www.unfpa.org/swp/1999/chapter2.htm

UNFPA, (2002), *State of World Population 2002: People, Poverty and Possibilities*, New York
http://www.unfpa.org/swp/2002/english/ch1/

UNFPA, (2003), *State of World Population 2003: Making 1 Billion Count: Investing in Adolescents' Health and Rights*, New York
http://www.unfpa.org/swp/2003/english/ch1/page3.htm

UN Population Division, (2000), *Replacement Migration*, New York, March 21
http://www.un.org/esa/population/publications/migration/migration.htm

UN Population Division, (2002), *Falling Fertility Opens a 'Demographic Window' of Opportunity*, New York, December 3
http://www.arha.org.au/mediacentre/window.pdf

UN Population Division, (2003), *World Population Prospects. The 2002 Revision*, New York

UN Population Division, (2005), *World Population Prospects. The 2002 Revision*, New York

Williamson J. G., (2001), "Demographic Changes, economic growth, and inequality", in: Birdsall N., Kelley A. C. and Sinding S. W. (eds), *Population Matters, Demographic Change, Economic Growth, and Poverty in the Developing World*, New York, Oxford University Press

World Bank, (2003), *2003 World Development Indicators*, Washington DC
http://www.worldbank.org/data/wdi2003/people.pdf