CICRED'S SEMINAR

Age structural transition in Brazil – Demographic bonuses and emerging challenges

Laura Rodriguez-Wong, José Alberto M. de Carvalho

Age Structural Transition in Brazil – Demographic Bonuses and Emerging Challenges

Laura Rodriguez Wong

José Alberto M. de Carvalho

Contents

Age Structural Transition in Brazil – Demographic bonuses and emerging challenges[1]

Laura Rodríguez Wong [*]

José Alberto M. de Carvalho [**]

ABSTRACT

The paper describes the Brazilian Age Structural Transition (AST) produced primarily by fertility decline (about 56% in 25 years). Slightly ahead of most of the Latin America countries, Brazil entered into the stage in which some of the strongest, mostly positive, age structure effects are to be perceived. Some improvements related to health, nutrition and education among children and youngsters, for example, were achieved in part due to the AST. Among the working age population the mature population (aged 25 to 64) that usually has high activity rates and is constituted by important taxpayers, will increase in relative and absolute terms at least until 2045. The *junior* segment (aged 15 to 24) - a proxy of those entering for the first time into the labor force-, in contrast, will probably have negative growth rates (*r*). Thus, the ratio of the junior labor force to the mature labor force, an indicator of the pressure for generation of new employments, has a downwards trend in Brazil. Different growth rates inside the working age population are therefore another demographic window of opportunities. This bonus however, can only be claimed if full employment and higher productivity are pursued. As a necessary although not sufficient condition to achieve social, economic and intergenerational balance, labor force skills should be at their higher levels. For this reason, all opportunities to become skilled should be given to the workers-to-be.

On the other hand, due to the AST, new challenges emerge to the Brazilian society. Population aged 65 or more will necessarily expand, in relative and absolute numbers. If current per capita government transferences are kept constant, the difference between age-related government expenditures and revenues would increase considerably and cause an unbearable increment in the fiscal deficit. Prospectively, any simulation about age-related government expenditures will result in the already known scenario: the elderly will demand massive resources, due to social security plans and because it is just at older ages that health care is more necessary and costly. The foretold fiscal crises caused by the aging of the population combined with an unsound Brazilian Social Security System should be a matter of concern for the Brazilian society.

Most of the policy recommendations to developed countries made decades ago regarding the AST process are similar to those discussed in this paper; what is different, however, is the speed of present changes in several developing countries. It is extremely important in order to take advantage of the demographic bonuses and to prepare to society to face the new challenges to be aware of the short period to define, implement and accomplish plans, whichever they may be.

---

[1] **This paper follows much of the ideas written in a previous article on similar matters by Carvalho and Wong (1998)**

[*] Center of Development and Regional Planning (CEDEPLAR) UFMG/Brazil, and Pan American Health Organization.

[**] Center of Development and Regional Planning (CEDEPLAR) UFMG/Brazil

Introductory note

The term *Age Structural Transition* (AST) that has been promoted by Pool (2000), encompasses the changes produced primarily by fertility decline and thus in the sizes of birth cohorts. They are then mediated by shifts in patterns of survivorship, and in many populations by migration flows.

This paper focuses in the AST that Brazil is enduring and their consequences. The case of Brazil is particularly important, firstly, because the country itself may be considered a sub-continent. It is expected to hold more that 180 millions inhabitants by 2005, which will represent about a third of the total population of the Latin American and the Caribbean[2]. Secondly, because fertility transition is well advanced in all regions inside the country. This synchronization, along a territory that has the same history and culture –where the Portuguese language is almost universal– has taken place despite their remarkable inequality at the socio-economic and geographical inequalities[3]. Also, although Brazil is going through impressive age structural changes, most of the Latin American countries are experiencing similar fast changes, and it is probable that those delayed in the process, will pass through an even faster change as pointed out by Fígoli and Wong (2003). Thus, Brazil is a well illustrative example of de demographic changes operating in Latin America.

Data used to describe the AST in Brazil are basically from the Population Division of the United Nations. Population projections estimates for the next decades are, of course, subject to errors, , but at the same time, there is little room for significant changes in the hypotheses behind the projections. Ceteris paribus, fertility will not return to previous levels, besides, recent projection revisions have shown that fertility levels have been over-estimated frequently. Mortality despite the paucity of reliable data on adult mortality shall probably continue to decrease unless the upsurge of devastating diseases. Finally, international migration may lead to modify the forecasts, even in this case, it would not cause dramatic changes in the projections for the following one or two decades.

The paper describes, firstly, the demographic transition that Brazil is undergoing; secondly, using secondary data, some perspectives of the probable government expenditures given the future age pattern are presented. Lastly, social demands of the different age groups, the challenges that the AST poses and alternatives to face those challenges are considered.

1 - The age structure transition in Brazil

Between the 1940's and the 1960's, major part of the Latin American population experienced a significant decline in mortality with a relative constant fertility that resulted in a quasi-stable

---

[2] The Brazilian territory has more than 8,5 million Km^2 (equivalent to about 90% of the USA surface). While part of the North and Northeast areas are located above the Equator, important share of the Southern territory is located well below the Tropic of Capricorn. Besides, according to some international mass-media, the country "*sees itself as the United States of South America*" (New York Times: "Brazil's Moment" - Published: January 24, 2004) - *http://www.nytimes.com/2004/01/24/opinion/24SAT1.html*

population. Afterwards, the onset of the fertility decline initiated a deep change in the age distribution that will operate in the medium and long run similarly to several highly populated Asian developing countries that also have gone through impressive demographic changes.

This change in the case of Latin America and the Caribbean (LAC) may be seen through the age distributions presented in Figure 1 and through the variation of the median age (M) of the populations. M increased in LAC about 6 years between 1965 – when the demographic changes were not still reflected in the age structure– and 2000[4]. Brazil has experienced an even faster age structural change as shown by the evolution of the pyramids in Figure 1, and the difference with the rest of LAC will probably be wider over the next decades. In fact, the Brazilian median age (25.4 in 2000) increased by more than 7 years during the period 1965-2000; during the same 35-year period, European countries also aged, albeit at slower pace. Besides, by 2050, the Brazilian age pattern (with M=41.2) will be older than the current average in Europe (M=37.7 in 2000)[5] .

The Brazilian demographic change is caused by the particular combination of trends in fertility and mortality, where influence of the former is the most important.

Onset of the **Brazilian Fertility transition** took place by the end of the sixties Total Fertility Rate (TFR) dropped from 6.2 to 2,7 children per woman over the period 1965-1990. Figure 2 shows this fast decline, equivalent to 56% in 25 years. Although the astounding socio-economic and geographic inner difference delayed the onset in the less privileged regions of the country, estimates using the 2000 demographic census indicate that replacement level has been nearly reached in most of the territory. Fertility decline has been even faster in the less developed regions[6]. The national TFR was around 2.3 in 2000.

---

[3] Map 1 in annex shows the wealth distribution across the Brazilian territory in terms of GNP per capita; clearly, the Southern area concentrates the highest values, the poorest performance corresponds to the Northeast region and some areas of the extreme North region.

[4] Increase in the Median age (M) of the total population according to United Nation (2003) are as follows:

Region	Increases in M (in years)			M (2050)
	1965-2000	2000-2050	Total increment	
Europe	6.8	10.0	16.8	47.7
Latin America & the Caribbean	5.6	15.5	21.1	39.8
Brazil	7.2	15.8	23.1	41.2
Source: Raw data from United Nations, 2003				

[5] Notice in addition that none Western country has M above 41.0 in 2000.

[6] The Northeast Brazilian Region, that has around 50 million people, approximately 30% of the Brazilian population, and traditionally bears the less favorable socio-economic conditions, had a 50 % reduction in the TFR in a 15 year period (from 6.1 in 1980 to 3.0 in 1995). Similar fast decline was observed in the North Region. (Wong, 2000).

Figure 1. Latin America and Brazil, 1950-2050: Population by age and sex (relative distributions)

a) Latin America and the Caribbean   *b) Brazil*
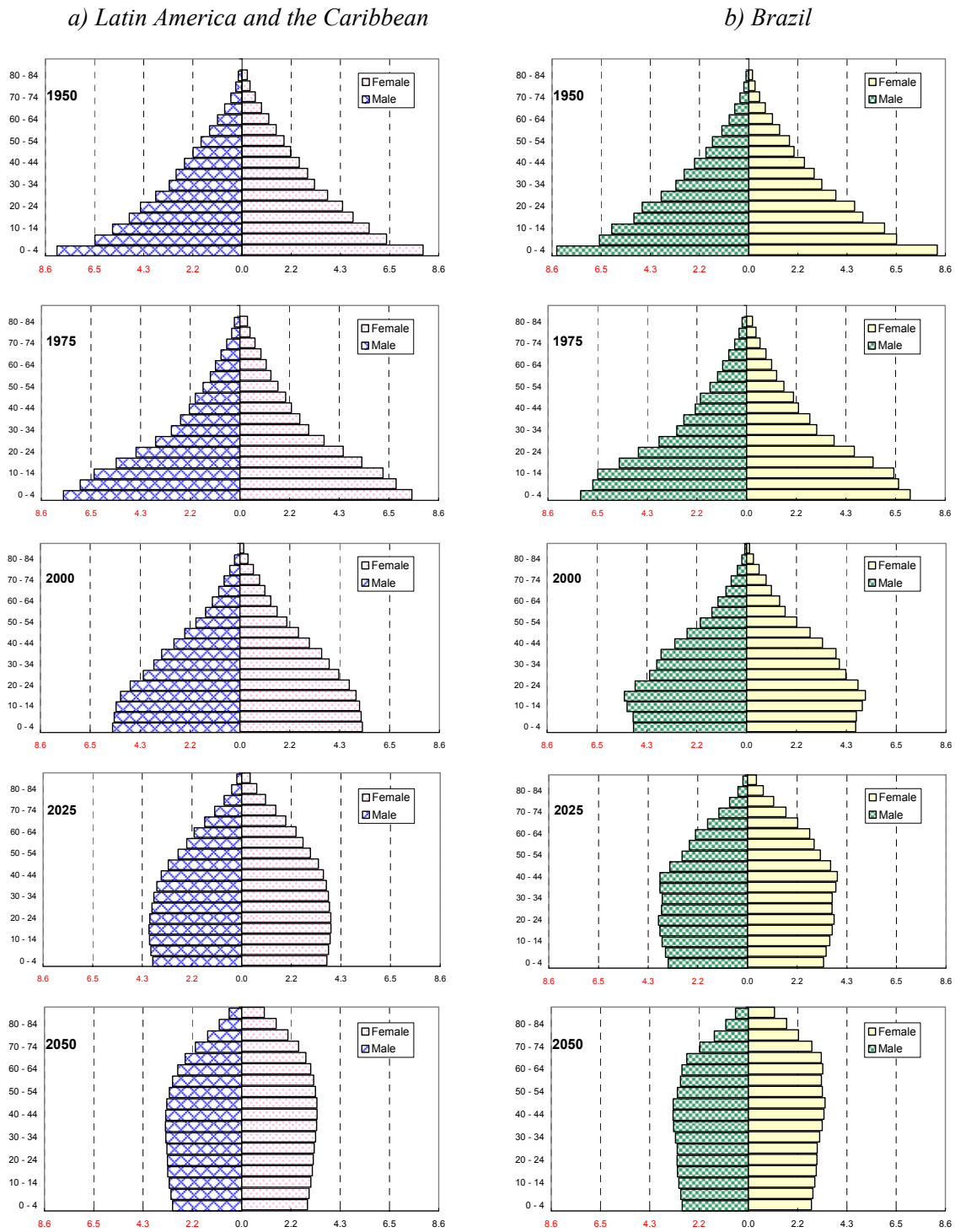
Source: Raw data from United Nations, 2003.

The magnitude of the general decline of fertility in Brazil in such a short period of time, on the one side, is surprising when compared with the experience of developed nations. It is known than most European countries took about a century to complete their fertility transition, and countries like Sweden and England, for instance, took about six decades (approximately from 1870 to 1930) for

diminishing their levels by about 50%. Brazil, instead, experienced similar decline in just a quarter of century. On the other side, this fast decline is by no means unique to Brazil. Countries with different culture and socio-political organizations and, above all, with different population policies and family planning programs (ranking from compulsory regulation to no policy at all, which was the Brazilian case) experienced similar changes in their fertility levels in approximately the same period[7]. Some of these countries are Thailand, South Korea, Iran, China and Mexico. (See Figure 2)

Figure2. Sweden, England, Brazil and selected developing countries: Total Fertility Rate for selected periods.
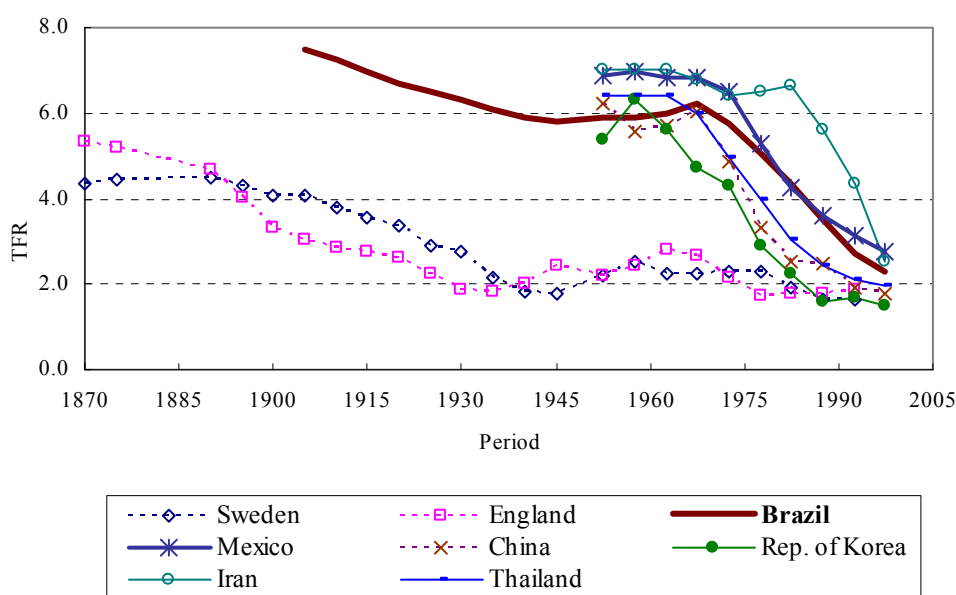
Source: Carvalho and Wong, (1998) and United Nations, 2003.

Prospectively, there are no signals of recovery trends for Brazil[8] and according to the United Nation's estimates, it will correspond to Brazil the lowest South American level for the period 2000-2025 (United Nation, 2003). Furthermore, cohort-estimates suggest that by 2005, the TFR might be definitively at replacement level and there are no indications that fertility would stabilize around 2.0 children per woman Thus fertility might continue decreasing well below replacement level (Perpetuo and Wong, 2003).

Mortality showed also a sustainable downward trend that started in the better off regions during the late thirties but speeded up during the sixties (Camargo and Frias, 2001) and caused changes in the age structure. Children born during the fifties were expected to have less than 80% chance of surviving up to age 15, while the cohorts born at the beginning of the current century have rose this probability up to 95%. Impressive changes are noticed for adult ages; only half of the cohorts born

---

[7] It is worth noting that over the second half of the last century, Brazil did not have either official or unofficial population or family planning policies or programs.

[8] High prevalence of contraception due to sterilization (BENFAM, 1997) will not allow, at least in the short run, any recovery of the fertility level.

8

during the fifties would survive up to retirement ages. In contrast, according to the more recent life tables (Sawyer et al. 1999), about 80% of those born after year 2000 are expected to reach those ages.

International migration, on one side, has been of little impact on the age structure in the recent decades; **internal migration**, on the other side, plays important roll to explain the regional age structural changes. Intense internal flows of labor force (which means sex and age selectivity) to the richer Brazilian southern areas contribute to exacerbate the aging process in the sending areas. Areas where the onset of fertility transition took longer, were, at the same time, the most important providers of working–age population towards areas where the transition was already ongoing. As a consequence, a number of relatively poor States, in spite of more recent fertility decline ended up with the oldest age structures. In addition, there were new internal migration flows oriented towards medium size cities before entering the new century. The new flows will probably increase because of the exhausted absorption capacity of the traditional receivers that are now megalopolis. This paper does not consider AST inside the different Brazilian regions, however it is important to note that this emerging patterns will probably have different impact on age structure of the sending and receiving regions. It will also have important consequences on the changes of the socio-economic demands to be meet by national policies.

1.2   The age structure

Combination of the changing trends in fertility and mortality affected the quasi-stable population that Brazil had until the seventies.

The drop in the proportion of children in the Brazilian population, mainly as a consequence of fertility decline decreased the share of children under age five from 15% to 11% between 1970 and 1990. Similarly, the age group 5-9 dropped its share from 14% to 12%, respectively. Proportions continued to drop in 2000, when, besides the decrease, the sizes of both age groups became very similar (each of them sharing about 9 % of the total population). Thus the age structure started to get rid of the pyramidal look-alike and a rectangular shape is emerging as additional indication of the aging process. (Figure 1) Complementarily, older age groups increased their share. Population aged 60 or more, for example, increased from 5.1% in 1970, to 8.6% in 2000.

The inter-age relationships

The analysis of simple indicators as the share of the three large age groups (less than 15, 15 to 64 and 65 or more), the Dependence Ratio (DR) and the Aging Index constitute the first approach of the inter-age relationships while the country is undergoing AST. Figure 3 shows that population distribution is changing mainly due to the changing shares of the extreme age groups.

At the beginning of the period, in 1950, the share of population aged 65 or more was negligible, on the other extreme, however, more than 4 out of 10 individuals were under age 15. By 2050 population over 65 years old will probably have a higher share (20%) than the young population (17%). The intermediate group, those at the economically active age, due to the same demographic dynamics - high fertility levels in the past and continuous improvements in survivorship - is still increasing. It will probably maintain a slow but continuous upward trend; after 2025 the share would

be about 68%, when it would start to decrease. Their absolute numbers, though, would continue to increase until Brazilian population become nearly stationary, i.e., perhaps by 2050. In other words, despite the increase of the elder population, a long period of time is coming, in which population at productive age would be numerically and proportionally growing and so their role in the economy. The difference between population at productive age and the dependents started to enlarge during the 70's in relative terms. In addition the 21rst century entered undergoing the exceptional and continue upward trend of the working age population share that would remain substantial after reaching stability with no population growth (over 60%).

Figure 3. Brazil, 1950-2050: Age distribution of the population (three large groups)
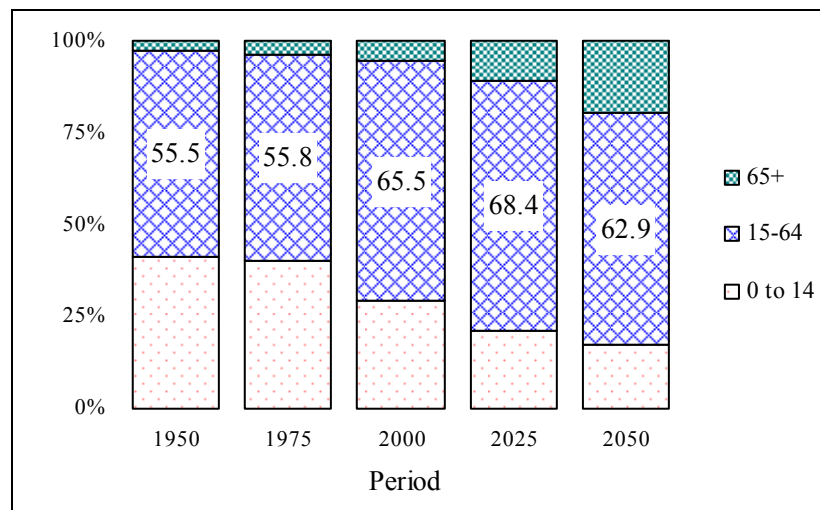
Source: Raw data from Unites Nations, 2003.

Table 2 emphasizes the findings mentioned above. The dependency ratio (DR) and its components (Children and Elderly) clarify the relationship between the different age groups mentioned. The burden on the productive population was constant –and at extremely high values– until about the seventies when dependent population (under age 15 and over 65) in Brazil, were nearly half of the total population and more than 90% of them were children below age 15 (Carvalho and Wong, 1998). The DR has been decreasing since then and, consequently with the population trends perspectives, it will continue to decrease until 2025; this downward tendency is a blend of two opposed trends: the increase of the absolute size of older adult population and the decrease followed by stabilization of the population below age 15. It is worth noting on one side, that the total DR will not recover the high levels it had at the beginning of the 20th century, although the EDR will increase twofold over 2000-2025 (or fourfold if the period 2000-2050 is considered). On the other side, the Potential Support Ratio (an index of the potentially able to support the elderly people) and calculated as the inverse of the EDR will experience a sharp decrease after 2000, which is explained by the increase of the population aged 65 or more that surpasses the growth of the economically active age population.

Finally the Aging Index, more sensible to variations in the age distribution since only considers the two age groups that respond for the aging process, also shows the velocity of the aging process. Comparisons made by Moreira (1997) locate Brazil among the countries with the more acute increase

of this Index in the near future. In 25-years period the Aging Index would be threefold the 2000's ratio, when there would be more than 50 adults aged 65 or more per 100 children below age 15. Before the end of the period, by 2045, number of elder people would surpass the number of children.

Table 1
Brazil, 1950-2050: Dependency Ratios and their relative distribution and Aging Index

| Period | Dependency | | | | | | Potential support Ratio[4] | Aging Index (per cent)[5] |
| | Ratio (per cent) | | | Relative distribution | | | | |
	Total[1]	Children[2]	Elderly[3]	Total	Young	Elderly		
1950	80.3	74.9	5.4	100.0	93.3	6.7	18.6	7.2
1975	79.2	72.2	7.0	100.0	91.2	8.8	14.4	9.6
2000	52.7	44.8	7.9	100.0	85.0	15.0	12.7	17.6
2005	49.2	40.5	8.7	100.0	82.3	17.7	11.5	21.5
2010	47.1	37.6	9.6	100.0	79.7	20.3	10.5	25.4
2015	46.2	35.2	11.0	100.0	76.2	23.8	9.1	31.3
2020	45.7	32.7	13.1	100.0	71.4	28.6	7.6	40.0
2025	46.2	30.6	15.6	100.0	66.2	33.8	6.4	51.0
2030	48.0	29.3	18.7	100.0	61.0	39.0	5.4	63.8
2035	49.9	28.5	21.5	100.0	57.0	43.0	4.7	75.4
2040	52.3	28.0	24.2	100.0	53.7	46.3	4.1	86.4
2045	55.4	27.7	27.7	100.0	50.1	49.9	3.6	99.8
2050	59.1	27.6	31.5	100.0	46.7	53.3	3.2	114.3

(1) Dependency Ratio (TDR) = CDR + EDR.
(2) Children Dependency Ratio (CDR) = Pop. less than15/population aged 15-64.
(3) Elderly Dependency Ratio (EDR) =Pop. aged 65 or more/population aged 15-64.
(4) Number of persons aged 15-64 per persons aged 65 or more.
(5) Aging Index= (Pop. aged 65 years or more/ Pop. less than 15)
Source: Raw data from United Nations, 2003.

Brazil has the benefit of a demographic bonus considering the combination of these three age groups. The country is achieving its lowest DR with the expansion of the population at working age (in absolute and relative terms), the fast decrease of the young people share, and the -still-relatively low growth rate of the elderly population. According to Carvalho and Wong (1998), this is a double encouraging structural situation.

Firstly, in the short and medium term the small size of current children generations pushes down the DR, which makes it possible the re-orientation of available resources from quantity to quality. In addition, one might expect an increase in the per capita government expenditure on primary education when the negative growth in the number of youngsters stays for a long while. At the same time, the large proportion of the working age population causes low dependency ratios either from children or the elderly and would relieve the current social welfare system, at least until the EDR enters the phase of fast growth. Slightly ahead of most of the Latin America countries, Brazil entered into the stage in which, according to Behrman et al, (2001), some of the strongest (mostly positive) age structure

effects are to be perceived[9]. This situation, certainly gives favorable conditions to the society for re-formulating the social security scheme and find out the ideal retirement strategy.

Secondly, the elder dependency ratio will be significantly high from 2020 only. Given the fact that the children of today -who belong to smaller generations than before- will be the labor force of tomorrow, who in turn, will have to face those increasing elder dependency ratios, a logical conclusion emerges: society vitally needs to invest in current children, particularly in the areas of health and education; this is not only a matter of quality of life, but also because they (again, a part of smaller generations) will sustain the economy and a highly increasing proportion of elderly.

The growth rates

The picture of the AST given by considering three large age groups can be better understood through the trend of the annual average growth rate (r) at different narrower age groups (See Table 2 and Figure 4). Population in the age groups 0-14 and 15-24, born after 1975 and therefore, during the period of fertility decline, will grow during the first half of this century at rates well under the average value for the total population, and -except for the age group 15-24 between 2000/05- the growth rates will be negative until stabilization is probably reached.

Table 2 - Brazil, 2000/2050: Annual average growth rate: Total population and selected age groups

Period	Total	0-14	15-24	25-64	65-74	75 +
2000-2005	1.2	-0.32	0.38	2.26	3.04	4.84
2010-2015	0.9	-0.26	-0.65	1.60	3.68	4.27
2020-2025	0.6	-0.75	-0.06	0.73	3.86	4.50
2030-2035	0.4	-0.41	-0.73	0.38	1.90	4.46
2045-2050	0.1	-0.52	-0.22	-0.42	2.14	2.27

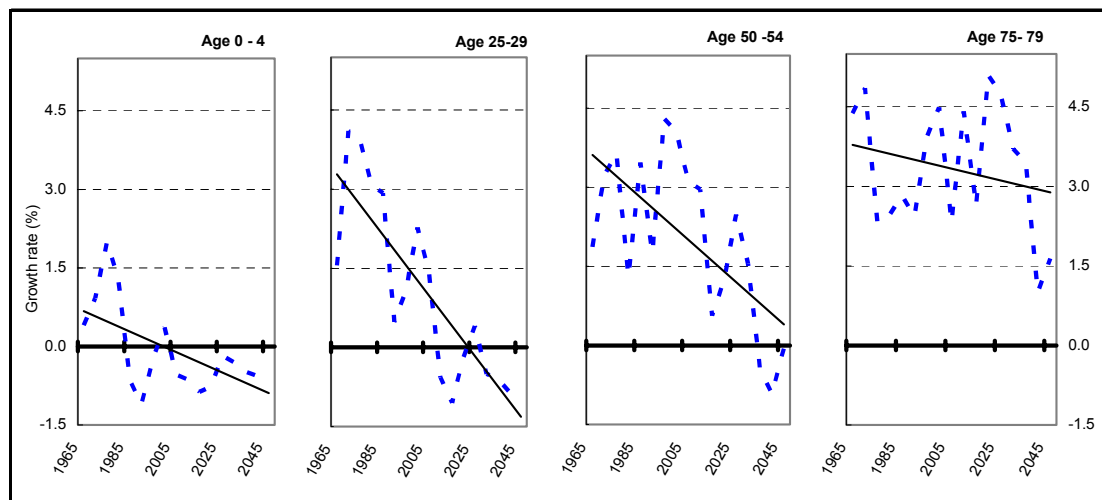Source: Raw data from United Nations, 2003.

At the beginning of this century, population below age 15, who should spend most of their daily time playing around or at the school is experiencing negative growth. Those capable of receiving further education and/or entering into the labor force (at ages, say, 15-24), although still increasing, have growth rates below 0.5% and will hold negative growth during the next four decades. Those with the usually larger participation in the labor force (ages 25 to 64) are now expanding at growth rates over 2% and will continue to expand but at rapidly declining rates. The volume of population aged 25-65 (the bulk of the employed labor force) would stop increasing only by 2045. Finally, groups over age 65 grow at positive and high rates during the whole period.

It is this pattern of differentiated values of r (lower for the young population, higher for the working age population until 2025, higher for the elder population) that necessarily produces a change in the age structure.

---

[9] In that sense, countries that have working age population relatively large and a low DR due to the AST, are expected to have relatively high productivity and save more (Behrman et al. (2001).

Figure 4 complements the above argument by showing the trend in r for selected 5-year age groups. Although in all cases there is a downward trend, the older the age group, the higher the growth rate; between 2000 and 2050; below age 55, the younger the age group the sooner it will reach negative growth rates; extreme old ages (75-79, for instance) will maintain their positive and high growth rates.

Figure 4. Brazil, 1965-2050: Annual Average Growth Population Rate for selected age groups (per cent)

Source: Row data from: United Nations, 2003.

1.2. The size of the Brazilian population

The consequence of different growth rates on the absolute size of the different age groups, is also an important issue to consider because, undoubtedly, Brazilian population will continue to grow, despite the current fertility changes toward, as said, below replacement level and the negative growth rates of younger age groups during the transitional period.

The volume of the total population until 2050, and the age groups contributions are presented in Figure 5. Between 2000 and 2020, 38 million people will probably be added to the total population, however, youngsters, and even part of adult population will grow at negative rates. During this period, the size of the population under age 30 and born after the onset of fertility decline, would shrink by 3.4 million. Because of the waves, some younger age groups will show higher losses. For example, population under age 25 would shrink by 5 million[10]. Furthermore, the age group 15-35 (that includes women responsible for more than 90 % of the current births), would reach negative growth during the whole 2010-2050 period; accordingly, the number of births would decline, even at constant fertility rates.

Finally, among the economically active age population (15 to 64), it is important to consider two groups, firstly, the *mature* working age population (ages 25 to 64 years: 75.5 million people in 2000). Its high growth rate implies an annual increment between 2 and 1.5 million people over the first

---

[10] Between 2020 and 2040, for instance, population size will have 20 million more people, notwithstanding the positive contribution will correspond only to the population aged 60 or more. Below that age, population is reducing in size.

decade of this century. This important sub-group, representing nearly half of the total population, would continue to increase at least until 2045. Secondly, there is the *junior* segment of the economically active age population (ages 15 to 24: 34.3 million people in 2000). They are a proxy of those entering for the first time into the labor force, and after 2005, will probably have negative growth rate. An important fraction (those aged 15-19) will usually be in the qualification phase, and the other also important fraction (20-24), although *economically active* will probably be on the unemployed side, looking for their first job. The mature age group (25-64), in contrast, usually has the higher activity rates and is constituted by the most important taxpayers in the whole 'active age'.

Figure 5
Brazil, 1950-2050: Population cumulated up to the indicated age (absolute values – in thousands)
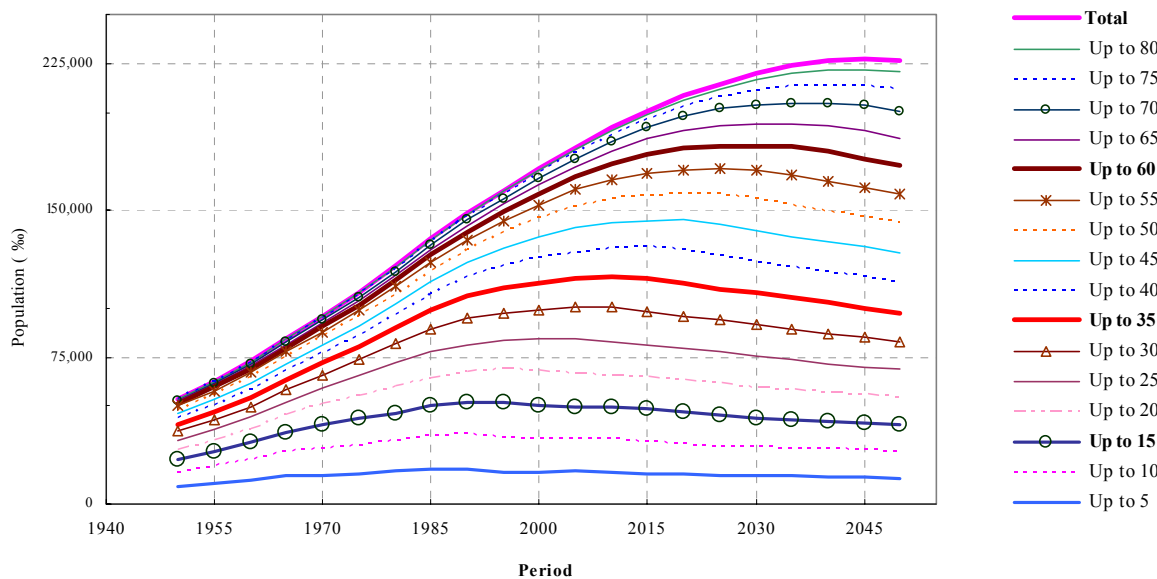
Source: Raw data from United Nations, 2003.

When the working age population is relatively young, unemployment tend to be higher. Very often, unemployment lessens as the age structure shift towards older ages (Behrman et al. 2001). The *junior* group increased in absolute numbers very rapidly until recently in Brazil (See Figure 6, left axis), thus, demographically speaking, by entering into the labor force they pressured the economy towards creation of enough employment that otherwise would promote social or economic instability by increasing unemployment and/or replacing older population still at working ages.[11]

The ratio of the *junior* to the *mature* labor force is an indicator of the pressure for generation of employments. In the case of Brazil the ratio goes downwards since the mid seventies (Figure 6). After 2000, there will be an acceleration of the trend due to the negative r of the young population.

Although the demographic transition from a young to an older population initially can boost the prospects for economic growth due to the reduction in the young dependency ratio, the shift to larger

---

[11] Muniz (2003) has found this relationship, particularly among young men (15-19) in the Brazilian metropolitan areas, where even higher growth rates for this age groups are caused by internal migration. This demographic trend is probably one of the factors that made harder to solve unemployment problem in the nineties.

proportions of the population in working ages can also constitute a potential threat if the right policies are not in place (Behrman et al.; 2001). However, as during that process the economic active population growth rates are differentiated by age, as in the Brazilian case, there might be another window of opportunities, this time, inside the labor force, where positive r corresponds to the age group that include the *mature* workers, that, on turn, usually bear higher employment rates than the junior workers[12].

Figure 6. Brazil, 1950-2050: Population aged 15-19 and 20-24 and three intra working age ratios (15-19/25-65; 20-24/25-65 and 15-24/24-65).
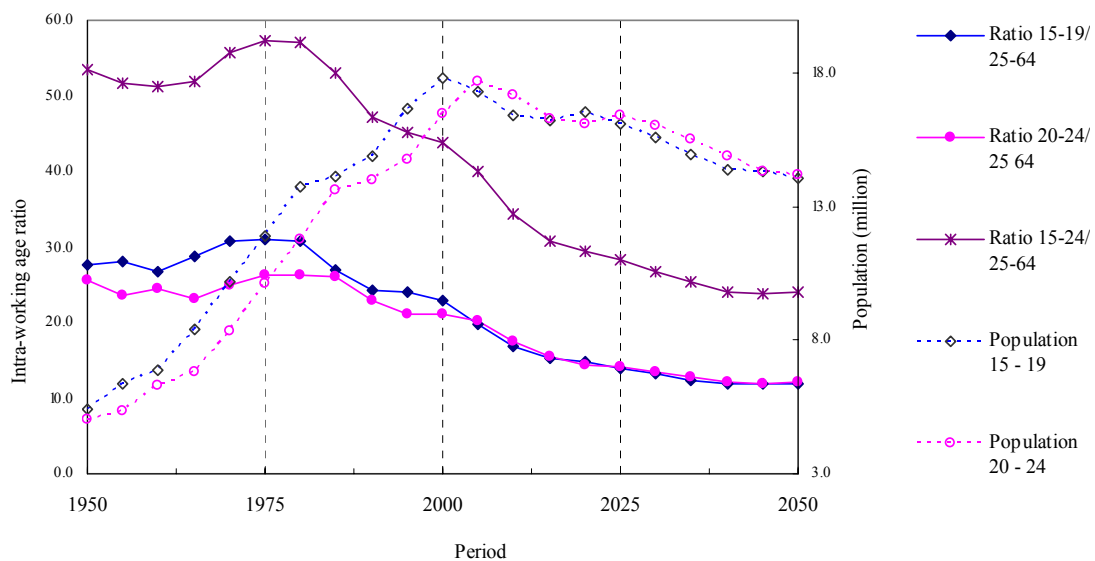
Source: Raw data from United Nations, 2003.

2 - Some economic consequences of the AST in Brazil.

Despite the demographic bonus brought about by AST in Latin America, being Brazil the typical example, economy is going through hard times. The current social and economic programs supported by the Government face chronic domestic and international debts, and most of the funding relies on the perspectives of the international investors about the national economy.

In spite of its relatively good economic performance during most of the second half of last century Brazil is still a developing country and presents one of the world's worse profile in terms of income distribution as illustrated in the Map showed in Annex. Public social policies have to play a significant role to overcome this context. Most of the social policies are age-related and should take into account the ongoing AST. On the one hand, programs dedicated to children or reproductive health, for example, could be qualitatively improved because the number of beneficiaries is lessening (relative and very often in absolute terms). On the other hand, more pressure will come from new

---

[12] Findings by Behrman et al. (2001) shows that if the age structure of the population is relatively young, the growth rate of the working age population would tend to outpace the growth rate of the capital accumulation. Afterwards, when younger

needs. Elderly-oriented demands, for instance, might become so unbearable that resources from other programs might be re-allocated to this population segment.

To evaluate magnitude of the forthcoming changes, it follows a view of the age-related expenditures made by the government. Also, based on the perspective of the AST, some inferences are made.

2.1 About the government age-related revenues and expenditures

Accounting of the government tax transfers (revenues and expenditures) by age, made by Turra (2001) for the nineties, reveals as expected, that flows for funding public expenses are more important at the central ages of the economically active population. The tax age profile estimated by the author shows that transferences from population aged 30-49 was about US$ 2,000 per capita per annum in 1996, being the age 40-49 the modal point (See Figure 7)[13].

Figure 7. Government transfers by age groups - Annual values per capital- US$ (circa 1995).
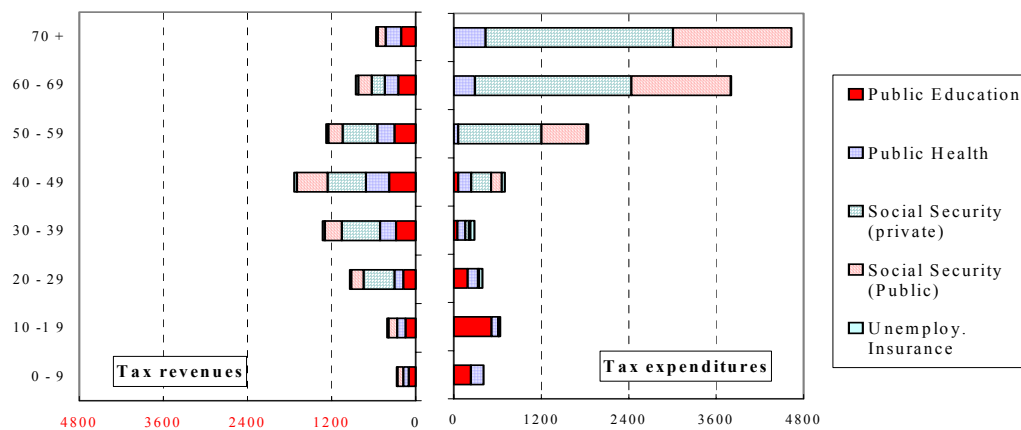
Source: Elaborated from data by Turra (2001).

Government age-related expenditures as estimated by Turra (2001) for the mid nineties, were higher than age related revenues and had different age patterns[14]. Lower quantities are assigned to the young people, and most of the revenues are allocated to education, which is the case of the age group 10–19. The lowest per capita expenditure goes to the age group 30-39. After that age, government transferences increase exponentially. Transfers at older ages go almost exclusively to public health, pensions and retirement. After age 60, expenditure is higher than US$ 4,000 per annum/ per capita which is about tenfold the equivalent transferred to a child below age 10. Resources allocated to the elderly Brazilian population are relatively high, and according to Turra (2001) the proportions are similar to those found in developed settings. Most of the resources go to social security due to a quite generous policy for retirees in general, and for civil servants retirees in particular. A relatively small

---

cohorts reaching working age are smaller, capital per worker would tend to increase.

[14] Accounting by Turra (2000) shows that total aged and non-aged-related governmental taxes revenues summed US$ 218 billion, equivalent to 28% of the GNP for 1996. Figures presented here do not consider non-age related items, such as public safety, transportation, research, and defense

16

fraction goes to public health. Brazil certainly differs significantly from the majority of developed countries on this aspect.

Given the age-structure of the per capita government transfers, there has been according to Turra significant economic gains due to demographic bonuses (the relatively high growth rate of the labor force being one of them). However the demographic windows of opportunities will not last forever while the emerging challenges refer to social phenomena that are intrinsically embedded in the new demographic pattern.

2.2 Perspectives of the age-related government revenues and expenditures

The future government transfers (expenditures) will probably increase proportionally more than the revenues (from the taxpayers) due to the advance of the AST. A simple simulation of the transfers was made using data produced by Turra (2001).

Table 3
Brazil, 2000-2050: Simulation of government age-related revenues and age-related expenditures (million US$)

Age Group	2000		2025		2050	
	Age-related revenues	Age-related expenditures	Age-related revenues	Age-related expenditures	Age-related revenues	Age-related expenditures
0 – 9	8,904.2	13,521.2	8,328.02	12,646.3	7,178.9	10,901.2
10 -1 9	14,313.1	22,421.5	13,293.4	20,824.2	11,333.5	17,754.0
20 – 29	29,172.8	12,258.8	30,311.4	12,737.3	26,773.6	11,250.6
30 – 39	35,095.0	7,469.3	44,653.3	9,503.6	39,453.2	8,396.8
40 – 49	34,683.6	14,033.8	49,777.2	20,141.1	53,302.5	21,567.5
50 – 59	16,021.5	23,184.1	29,975.2	43,375.9	37,073.1	53,646.9
60 – 69	6,770.6	30,131.0	13,913.2	61,917.7	23,941.6	106,547.2
70 +	3,112.6	25,534.7	6,612.7	54,247.7	18,355.9	150,583.7
Total	**148,074.0**	**148,554.5**	**196,864.5**	**235,393.6**	**217,412.3**	**380,648.0**
% of age-related expenditures allocated to pop. 60 +	37.47		49.35		67.55	
TR/TE (*)	0.99		0.84		0.57	

Relative variation	2000-2025		2025-2050		2000-2050	
	Tax revenue	Tax expend.	Tax revenue	Tax expend.	Tax revenue	Tax expend.
	32.9%	58.5%	10.44%	61.71%	46.8%	156.2%
Annual Increment (%)	1.14	1.84	0.40	1.92	0.77	1.88

(*) Ratio of tax revenue to tax expenditure.
Source: Estimated from data produced by Turra (2001)

The exercise is done for the years 2000, 2025 and 2050 under the assumption that the per capita transfers (revenues and expenditures) remain constant by age. In a broad sense, this implies constant individual tax transference to the government and constant value of the per capita supply of basic public services as health, education and social insurance. It would be possible to use more complex hypothesis for forecasting public revenues and expenditures that are age-related. However the

constant per capita value is assumed, because the emphasis is on the consequences of changing age patterns over the government fiscal equilibrium.

Table 3 shows that the ratio of age-related tax revenues and age-related tax expenditures (TR/TE) was near to 1.0 in 2000. Expenditures, in absolute values, were allocated primarily to groups aged 50 or more, with extreme concentration among those aged 60 or more, with non resemblance of the age-related tax revenues distribution. Among the youngsters, the higher amount was allocated to the age group 10-19 (see Figure 8).

The 2025's scenario, however, is quite different. The TR/TE would be smaller than in the 2000 scenario (0.84). While between 2000 and 2025 age-related tax revenue would increase 33%, due to the high growth rate of the working age population, as said before, tax expenditures would increase much more: near 60%, due to the higher proportional growth of the elder population. As a consequence, age pattern of the government expenditures would vary drastically. Those aged 60 or more, would receive half of the government funding expenses. This is expected because of the advanced aging process (more population at older ages surviving more time). The revenue age pattern would remain similar with the main contributors being the population aged 30 to 49.

Figure 8. Brazil, 2000-2050: Government tax revenues and tax expenditure by age (million US$)
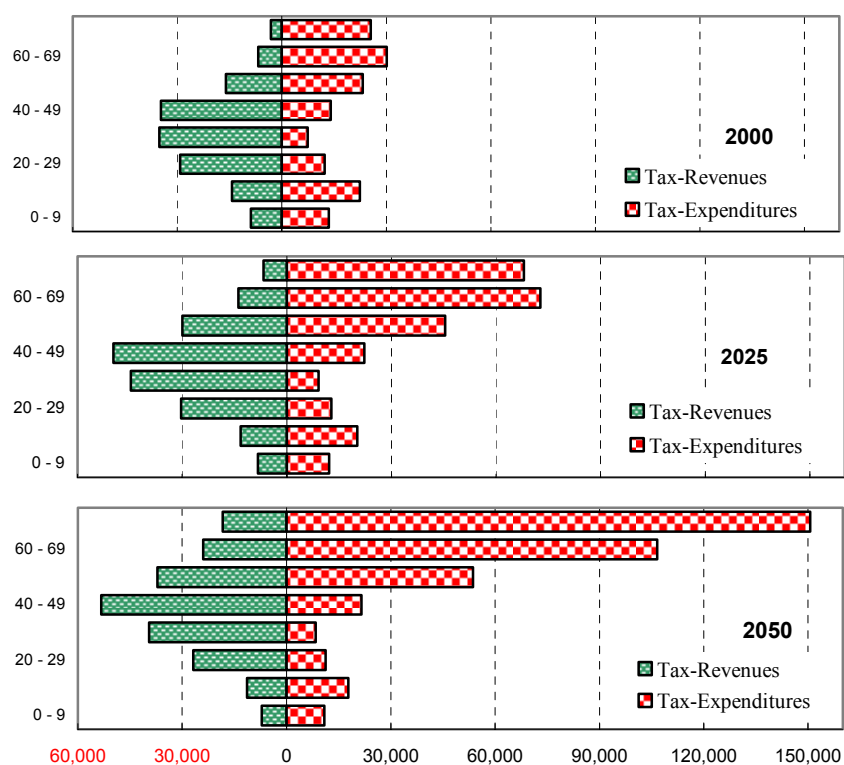
Source: Table 4

The 2050's scenario follows the trend initiated around 2025 according to this simulation. The TR/TE would be nearly 0.5. Between 2025 and 2050 tax revenues would increase only slightly (10%), since working age population (main tax-payers) would experience small growth rates. The opposite would

happen to the government age-related expenses that would grow more than 60%, due to the rapid increase of the elder population, surely affecting public debt. Finally, while age patterns of tax revenues would remain about the same, age pattern of public funding would exacerbate the trend described for the previous period. In absolute terms, less government financial resources would be allocated to the young people once they are expected to remain at negative growth rates until the end of the first half of the century. Nearly 70% of the age-related tax expenditure would be allocated to the population aged 60 or more.

In short, if current per capita government expenses and revenues by age are kept constant the difference between age-related government expenditures and revenues would experience a considerable expansion and cause an unbearable increment in the fiscal deficit.

3 - About the social and economic policies that are age related

The AST creates opportunities and poses different challenges to different age groups. Following sections consider consequences of the age transition on the social demands of selected groups. Alternatives for sustainable development are discussed.

3.1 Infant Population

Infant population, although presenting small oscillations thus causing variations in the new cohorts' size, is experiencing, basically, below zero growth rate. Childhood public policies, as those concerning health, food and support for the youngest would greatly contribute for a qualitative difference in favor of the new generations which holds demographic favorable conditions on the demand side. Complementary, current young population, i.e., children under 15, have, ceteris paribus, greater chances to receive better assistance at family level as for health and food at least in view of its lower share vis-à-vis the adult population that supports them. Three aspects are considered here: Nutrition, Education and Health service.

3.1.1. Children's Nutrition

Conditions to allow improvements in nutritional standards are produced during the AST: for instance, decline of fertility in Brazil had as consequence not only a smaller family size but also a wider birth interval (Benfam, 1997) thus, chances of improving children feeding increased. Indeed, nutrition levels improved during the eighties, when fertility decline were long established (Peliano, 1990). However, society will only take all the advantages of the demographic bonuses to solve or reduce social difficulties if the right planning is done at the right place and at the right time. There are, still, vulnerable populations at these ages. Silva and Giuglian (2001), for instance, found out high prevalence of anemia among children below 36 months of age in public day care centers in Porto Alegre/Brazil a city with relatively high living standards, for the late nineties. Although there is no evidence of previous nutritional status for assessing whether before the fertility decline the situation was the same, this finding indicates that there is an urgent need for interventions to overcome this situation. Sure, this may be easier (or less difficult) with small cohorts.

Together with demographic transition, factors that outpace the bonus may come. Modernization, for example, very often encourages Western nutritional habits. Brazil is now in a nutrition transitional

stage because of recent increases in the prevalence of obesity and related chronic diseases with overweight conditions already prevalent among middle-income populations. Evidences exist for a variety of Brazilian populations: teenagers in big cities of the North Brazilian Region as well as in the Southeast tend to choose processed and chunk foods regardless of price and household socio-economic level[15]. Doyleand and Feldman (1997) point to the need of involving adolescents and parents in nutrition education campaigns to improve nutritional preferences and avoid risk of chronic diseases. It is a quite obvious recommendation that is far from a general implementation. Another example: due to the Brazilian age pattern of the fertility decline, there is a larger share of teenager pregnancies and it is known that they are prone to deliver low birth weight. Socio-cultural factors such as poverty and social deprivation, as well as biological and nutritional factors during pregnancy may be important determinants (Gama et.al. (2001). Low-cost programs may be planned for successful interventions.

3.1.2 The school age population

Albeit population below age 15 in general, will probably decline at almost constant negative rates at least until 2050, the various age subgroups implicated will experience oscillating growth rates. Obviously as it was the case of South and Southeast Asian countries, this is the clear demographic opportunity to reach the universal primary education and quality of education. To reach this objective a new educational model is needed with the necessary flexibility in order to anticipate the oscillating population flows to be attended by the educational system.

The unusual and favorable opportunity that Brazil has to implement a policy in this area is obvious. The country has excellent circumstances to overcome the shortcomings in the elementary school such as unsatisfactory coverage, very high rates of repetition and drop outs, low wage and poor qualification of educational staff.

The first elementary goal of eliminating illiteracy is on the right way: illiteracy proportion among population aged 10-14 halved during the nineties and is it now around 4% according the 2000 census. Coverage also increased during the nineties. School assistance for children aged 10-14 years grew from 79% for 95% and for the young people with age between 15 and 19 years, the proportion grew from of 46% for 66%. (Silva Leme and Wajnman, 2000)

Infrastructure for improving coverage of primary education is available, although, it faces misallocation of both, human resources and physical premises . New arrangements are needed, on one side, in the rural areas, where onset of fertility decline took longer and it is now that –in addition to out-migration– the number of school-aged children is drastically lessening. On the other side, re-organization is also needed because of the upsurge of new migration flows from big metropolis towards small and medium size cities. It is known that educational infrastructure usually concentrates in the big urban agglomerates that now may exceed the demand[16]

---

[15] See for instance: Doyleand and Feldman, 1997; Aquino and Philippi, 2003; Barrreto and Cyrillo, 2001.

[16] It has not been unusual among misinformed local politicians and community leaders to ascribe decreases in the enrolment or sub–utilized school capacity to the lack of planning or the absence of federal government support, instead of crediting it to the reduction of school-aged population.

At regional level, therefore, a continuous follow up of demand would be even more important, since migration will play an important role in its evolution, being able to intensify or attenuate oscillations in the short run. As the pressure for young children entering school lessens, or even disappears, more attention can be given to those already enrolled, raising, for instance, the teaching quality and attainment levels. Riani (2001) using indicators of educational performance shows that decrease in the school-age cohort for the nineties made possible an increase in both coverage and quality as well as improvement in the efficiency of the educational system. As a consequence, the annual failure rates in the primary school, which are extremely high - particularly among the poor - and leads to high drop out rates, might, indeed, experience cut backs. In this way, more financial resources will be spared and could be oriented to elementary school itself and high school, which coverage, as seen before, is lower than that of the elementary school.

The simulation presented in section 2.2 showed that if current per capita age-related government expenditures are kept constant it might result in fewer resources allocated to education in the near future, due to the decline of school age population in relative and even in absolute terms. On the other hand, the foreseen rapidly growing fiscal deficit caused by the difference between age-related government expenditures and revenues will provide a strong argument for not raising public expenditure in the educational system. However Brazil's current AST represent an opportunity to overcome one of its major problems, a reason why a case should be made for expansion of investment in the area, instead of reducing it due to decreasing demand or any governments' fiscal crisis. The same demand trend occurs as far as secondary education is concerned. The demographic bonus will only result in a large supply of human capital if appropriate investments are made (Birsall and Sinding, 1998)[17]. In spite of the important advancements observed in Brazil by the educational system during the last decade, mainly in relation to the primary education coverage, there is still an enormous deficit in terms of the secondary and university education , let alone their quality.

Regarding adolescents' skills, Brazilian economy will have a better performance if policies of technical training are further reinforced. According to Bowman (1987), where there is already at least some diversity in economic activity and organization - as is the Brazilian case - there are more room for progress in formal schooling, in learning at work, and in the transmission of new ways of doing things. It was not fortuitous that educational agreements involving the government and the industrial and technological sector were developed in countries – as South Korea, China and Malaysia, for instance– that are now on the forefront of the economic challenges (Bowman, pp 88-89). Thus, continuous learning through the post-school years, but not necessarily at the University must be of increasing importance as the 21st century is entering. In that sense, Brazil should mirror the East Asian countries' transition, where the young population, with high skills attained trough technical education, contributed to the progress in those countries (Bowman, 1987). The quality and levels of schooling attained were such, that a succession of smaller cohorts of youth did not pose problems for quality of the forthcoming labor force.

Finally considering human resources for education, it is worth to remind what Potter (1990) calls 'perverse consequences' on the educational levels of the rapid fertility decline in developed countries.

---

[17] Birdsall, N & S. Sinding. (1998). Report on Symposium on Population and Economic Development, November 2-6, Bellagio, Italy. (Mentioned by Navaneetham, 2001).

United States is a good example: Preston (1984) argues that the fast fertility change experienced by that country contributed to deteriorate children's welfare. Worse education results were attributed to downwards demand for teachers because of the declining school aged population. "This shift led to a lower wage for teachers, which induced a disproportionate number of the better teachers to leave the field or to avoid it altogether" (Preston, 1984, pp. 449).   Ultimately if quantitative demand of human resources for education is stable, there is no doubt that efforts should address the quality issue.

Similarly to the case of new nutrition attitudes, simultaneously to the window of opportunities, the Brazilian population undergoes its own developing process and modernization, which also means new emergent needs and demands to be attended. A typical example is the increase in female labor force participation either as a cause or a consequence of the fertility decline. This process may offset the effect of a smaller cohort in the demand for public services as pre-schools, nurseries or day-care centers. Demand for these services could in principle be better attended at the current required levels due to the reduction of the population size. However, besides the extra demand caused by significant increase of female participation in labor force, the sole wide spreading of modern ideas stimulating children to interact among them, in places other than their private homes may, disproportionably increase such demands. Rosemberg (1995) forecasts a substantial larger demand for preschool education. Since those demands will have to be satisfied at any rate, she points out the need of huge investments in getting skilled staff. Otherwise the actual young generations will be at risk of confinements, thus, developing or perpetuating adverse psychological and professional conditions.

3.1.3 Health care services for the children

  There has been, in general, less pressure from the demand side and more opportunities for improvement since current cohorts are indeed, smaller[18]. Registered births attended by skilled health personnel were around 80% in the nineties whereas the figure available for 2002 is around 95%. (FIBGE). Coincidentally this variation follows the decrease in the number of births.

There have been, also, real possibilities of eradication of infant preventable diseases by implementation of low cost vaccination programs and, as the fertility decline trend persisted, total coverage of preventive care for some important infectious diseases has been reached. Polio and tuberculosis vaccinations have already 100% coverage (DATASUS 2002). Measles and hepatitis-B did not reach 100% coverage in the public vaccination campaigns, only because these services are provided also by the private sector in richer areas.

Children-oriented prevention programs are expected to undergo a further growing following modernization and diffusion. In that sense, education spreading through mass media will expand demand for preventing illness instead of curing them. Consequently it would be necessary to re-address and improve skills on health prevention care to take advantage of the higher possibility of raising healthier children.

Physical activity, drug consumption and sexual behavior, together with Nutrition, previously mentioned are important examples of issues to be addressed.

3.2 The working age population

The Brazilian AST for the working age population implies, as said, positive r for the most part of the 2000 – 2050 period and an important and increasing share of the total population, reaching its peak by 2025 (around 69%). Thus the first an obvious challenge is for the generation of new employments to catch up with the growth of the working age population. Inside this large age group, however, the *junior* fragment, i.e., population aged 15-24, is now entering to a period of negative growth, while the *mature* labor force is increasing. From the demographic point of view, this composition represents a bonus if the labor force is productively employed. The positive growth of the *mature* labor force would lead to higher savings, higher government tax-revenues and consequently higher capacity for funding social programs. Thus, it turns out that during the AST in countries where the labor force is still an important component of the productive system, it is just the working age population who plays the most important role. On a priority basis, they should be given all opportunities to be skilled.

In Brazil, an important part of the young working age population is still at school, having or not an employment. At ages 15-19, two thirds attend school with or without job; only one third, very often the poorest, are full time workers. Silva Leme and Wajnman (2000) find out that among those simultaneously employed and attending school a significant portion re-enters school after becoming economically active, which may be signaling a pressure for further training to attain better productivity. Thus, again, policy makers should take advantage of the AST and focus on human resources in general, and in the younger generation in particular.

There are additional reasons to focus in the working age population group 15-24. On the one side, the intra-working age ratio, that indicates less pressure in the economy –and in the generation of new jobs- in the near future, can be interpreted as another window of opportunities. On the other side, it also might pose a threat. Chesnais (2004) argues that this group is also a proxy of new consumption demands[19] They are at the stage of family formation when demands on new households rise and so the purchases of furniture, cars, and similar goods. The negative growth rate of this group might affect negatively the economy if they are not consumers.

Related to the mature working age population, specifically those aged 50 or more years, usually, their increasing share in the total population is associated with economic growth due to their high probabilities of saving[20]; as mentioned before, their r would be high and almost constant during the next decades.

As in the case of Singapore, analyzed by Navaneetham (2001) Brazil can use the demographic bonus of larger population size in the age group 50-64 during 2005-2045 to increase saving rates and make use of this opportunity for economic growth. In this particular case, it must be said, the demographic bonus is a mere accessory. Benefit will only become true if policies encouraging savings are

---

[18] The annual number of registered births dropped from 4.2 million to 3.8 between the biennia 1999/2000 and 2001/2002 respectively. (FIBGE).

[19] Chesnais J.C. (2004): Communication at the Seminar on "Age-Structural Transitions: Demographic Bonuses, but Emerging Challenges for Population and Sustainable Development" - Paris, February 23rd-26th, 2004 - Sponsored by the Committee for International Cooperation in National Research in Demography (CICRED)

[20] Lindh, T and Malmberg, B. (1999). Age Structure Effects and Growth in the OECD, 1950-1990, Journal of Population Economics, Vol.12. (Mentioned by Navaneetham, 2001)

implemented, and, on top of this, full employment is achieved and equilibrated national budgets are established. This is, clearly a big challenge for the Brazilian policy makers. Behrman et al, explain that in Latin America, the aging process did not match with increase in savings as it happened in Asian countries undergoing similar AST, One possibility, they said, it is that "*right when the region was provided with the demographic boost, it was hit by the negative shock of the debt crisis*". In short, policies encouraging savings should be necessarily implemented.

Obviously, as the elderly dependency ratio is sharply increasing, echoing Navaneetham, it is important to take advantage of the demographic bonus given by the working age composition, present from now till at least, 2045 to increase the saving rate to meet the future old age burden.

3.3   The elderly population

The size and share of the age group 65 or more, has been said, would continually increase throughout the AST. Brazilian population aged 60 years or more would pass from 8,9 millions in 2000 to 23.0 millions in 2025 and to 46,2 millions by 2050. By then, their share would represent 20% of the total population, a proportion higher than current proportions in any European country[21].Thus, by 2050, Brazil will probably undergo the complexity of an aged society, older than that of today's Europe, where a much slower aging process with concomitant social and economic development has not been able to reach a society for all ages. The challenge in Brazil and Latin America is to know whether in a shorter period, the Region – that has a noticeable unfair income and social services distribution - will be able to do it. There is the threat of increasing inequality in the absence of permanent and coherent public policies embedded in sound social and economic planning in which the AST should be not only be taken into account but should play a fundamental role. Bahrmen et al. show, particularly for Latin America, that, when the population weight of older (and more unequal) age groups increases, inequality tend to rise.

The challenge placed by the AST to the population aged 65 and over is to provide resources and social infrastructure to allow them an active aging which in terms of policy programs should have three foundations: social security, health and participation (PAHO, 2002). The simulation made for predicting government expenditure makes it clear that, without structural changes there is serious risk of not satisfying the demands for an active aging. The changes will not be reached through the sole forces of the market. Some comments will be made about the three foundations necessary to secure an active aging.

3.3.1The Social Security

The time spent in retirement has increased in Brazil due to improvements in mortality, and will continue to increase because, as seen, those improvements will benefit older ages particularly. Thus, in a fully funded system, ceteris paribus, average benefit should decrease if the minimum age of retirement is kept constant.

The social security in Brazil, as in most Latin American countries, however is a pay-as-you-go system that worked out relatively well amid a relative young and quasi-stable population, but has,

---

[21] The highest proportion for the population aged 65 or more in Europe, corresponds to Italy (18.1) for the quinquenium 2000/2005. (United Nations, 2003)

now, chronic and structural non–demographic related crises. The increase in longevity along with the AST surely will contribute to aggravate the financial disequilibrium in the Brazilian system if age at retirement does not change. As seen in the simulation, transferences towards elder population would consume half of the total age-related government revenues by 2025 or about two thirds by 2050; this, of course, on the further assumption that resources are available. The Brazilian complex social security system is one of the few where a minimum age to retire is not universally imposed. According to the more recent changes, most of the workers at the private sector are entitled to retire after 30 years (women) or 35 years (men) of social security contribution, regardless of their age. On the other hand, after, at least, 78 monthly continuous contributions, one can apply for retirement at the age of 60 (women) or 65 (men).

One structural alternative to ameliorate the coming scenario is the raising of the retirement average age[22]. Recent reforms introduced into the Brazilian Social Security System changed the legislation on this aspect for government civil servants requiring from the new entrants the minimum age for retirement of 55 (women) and 60 (men). For those who were already in service some transition rules are applied. The raising deficit of the system will probably force the introduction of similar age constraints for workers of the private sector. Either in terms of minimum age of retirement or of minimum time of contribution the Brazilian legislation favors the women. This is another cause of financial imbalance in the system. Strategies like holding pension benefits constant in real terms (rather than linking them to real wage variations or reducing benefits in response to increased longevity) may be adopted. This is very often a recommendation of international creditor agencies; it may easy the pension burden although life conditions will probably deteriorate.

Incentives for staying longer in the labor force may easy the fiscal burden. Continuing to work can imply individual costs in terms of contributions paid and foregone pensions or other benefits, while it may result in permanently higher pensions after retirement; this alternative has been included in the recent proposal of changes of the Brazilian Social Security legislation. In contrast, discouragement to early retirement would raise the labor supply of older workers, and it might be difficult to absorb this increase if there is high structural unemployment, which, again, is the Brazilian case. Thus, again, it seems that raising the employment growth rate is the way to claim the demographic bonus of the AST.

Besides, re-entry to the labor market after retirement is already a fact in the Brazilian case: about one third of retirees are economically active (Liberato, 2003). This happens, in part, because the mean age at retirement is relatively low (56.5 years, according to Fígoli, 2000), but mainly because despite the 'generous social security program', benefits are unequally distributed and important proportion of retirees receives as retirement payment only one minimum wage (around U$85 a month in 2003) and returns to the labor force out of economic reasons. According to Schwarzer and Querino (2002), 43% of older people in the labor force are classified as poor. Furthermore, in important urban agglomerates like Sao Paulo, nearly 80% of retirees or pensioners that re-enter the labor force, report economic needs as main cause for doing it.. This is a common figure on other Latin American cities (SABE/PAHO, 2000).

3.3.2 Health care assistance to the older population

It is known that health care needs of older population are quite different from the rest of the population due to the high incidence of chronic and degenerative diseases and disability that require huge expenses in equipment, medicine, and skilled human resources. Given the public health system weakness in Brazil, the rapid aging process points out the need to redefine this sector's policy in order to prevent or at least attenuate destitution of older generations that have contributed for the nation's building in their active lifetime.

An example of the magnitude of increasing costs in health care due to the aging of the population is given by the number of older people with chronic conditions i. e., those in permanent need of health care. It is estimated that about 75-80% of the urban population aged 60 or more in Latin America have at least one chronic condition (SABE/PAHO/2000). A conservative figure for Brazil, applying this proportion gives a current figure of 11 millions of persons aged 60 or more having at least one chronic condition. It would arise to 27 million in 2025 and to nearly 50 million by 2050. A similar extrapolation exercise considering disability, i.e., those in need of support, results in at least 2.7 million older people nowadays with one limitation for daily life activities (6.7 in 2025 and 12 million in 2050).

How to deal with the challenges in face of the obvious threat of insufficient economic resources? Besides of the obvious need to allocated resources for health care of the elderly people, some of the possibilities lie in the implementation of specific health care programs, some others in the social network of the elderly people.

Related to public health, it is known that, in general, the health care service is oriented to child, maternal and reproductive matters and to deal with infectious diseases. As the epidemiologic transitions has been installed in Brazil, that approach is changing now and the country needs to reassure that emergent health care needs will be met. As in the case of the children, public health needs to address prevention policies, focusing, for instance, chronic deceases, that very often, and when medical treatment is missing, leads to disability. Goals, according to PAHO (2002), should look for: adequate training for health care worker, appropriate and necessary health care for older persons and primary health care also oriented to the elderly people.

3.3.3 Participation - Social networks and intergenerational support

The increase of longevity and therefore the increasing prevalence of disabilities in an population that is getting older very fast, together with the deficiency of the health care system make the social network available to the elderly people, the best alternative for support. There is wide evidence that a strong social network will only contribute to the better welfare the elderly people[23]. In the case of Brazil, social network of the elderly people may be of significant importance. In the city of Sao Paulo, the SABE Survey shows that 60% of elderly people with at least one disability receive support from a close relative (partner, child or 'n law), which constitutes the 'informal' network of

---

[22] The OECD has published several studies recommending this alternative in developed countries (See for example, OECD, 1998) . See also, Heller, 2003.

[23] Cohen S. (2001), makes an inventory of studies related to networks.

support. The same survey reports Sao Paulo among the cities with higher interaction of the older adult and the community (Peláez and Wong, 2004). There are also indications that intergenerational support works out in the opposite direction: the family, very often takes advantage of the elderly's retirement or pension payments, particularly in the rural area. Camarano (2002) finds out that pensions and retirement payments explain the association between the elderly contribution to the household budget and living arrangements. This is a mechanism to promote integration of the family which may –or may not– favors the general condition of the elderly person.

In short, encouraging development of social network, is one way of facilitating both health care and opportunities for better conditions of life to the elderly people. Policy makers should have knowledge of this low-cost resource and stimulate and support their formation. The networks should include, particularly the family and close relatives that will probably be the care-takers of potential disable elderly persons.

4. Some Concluding Remarks

Demographic changes that cause the current Age Structural Transition in Brazil are just an example of an almost generalized process undergoing in America Latina. The windows of opportunities have given favorable conditions to the society for re-formulating a number of social policies regarding education and health of the children, for example. Sure, it is naïve to believe that the decrease in the number of births in relative or even in absolute terms and the reduction of total population growth rate as a consequence of fertility decline would result in the automatic solution of social problems (Carvalho and Wong, 1998). It will depend upon the Brazilian society to take advantage (or not) of the various opportunities brought about by the fertility transition. Favorable conditions raised by the new population dynamics should be effectively weighed in the implementation of social policies. Definition of priorities based on the new demographic patterns in which allocation of resources in sectors guaranteeing higher social yields in the medium and long term is urgent. The bonus is only on the demographic side and most of it may have already been wasted because right policies were not in place.

Another opportunity brought about by the AST is taking place during the first two decades of this century: it is the positive growth rate of the working age population, and above all, of the *mature* working age while the *junior* population enters the labor market at negative growth rates. Several advantages have been pointed out. This bonus however, can only be claimed if full employment and higher productivity are pursued. Otherwise, it can result in a potential threat to economic and social stability.

 As a necessary although not sufficient condition to achieve social economic and intergenerational balance labor force skills should be at their high levels. For this reason, on a priority basis, all opportunities to become skilled should be given to the workers-to-be. This would be a most appropriate entryway to better social conditions. Society should be always conscious that today's workers will be the ones who will have to support the rapidly growing old population in the future.

Prospectively, any simulation about the government expenditures on the future population, will result in the already known scenario: the older age group will demand massive resources in the medium and

long run, either because of social security plans, either because it is just at older ages that health care is more necessary and costly. The foretold fiscal crises due to the aging of the population combined with the unsound Brazilian Social Security System is a matter of daily discussion, mainly trough the media not only among government authorities, but also among well informed sectors, as those composed by trade unionist, entrepreneurs and intellectuals. Structural changes have been proposed and some degree of relief is expected, in spite of the strong opposition of sectors and groups that try to maintain their interests and or privileges guaranteed by the present system.

Most of the policy recommendations discussed here regarding the AST are similar to those made to developed countries decades ago thus, their experiences therefore should be considered, taking into account, above all, the striking difference in the speed of the changes in the developing countries[24]. In order to take advantage of the demographic bonuses and to prepare the society for the emerging challenges, it is extremely important to be aware of the short period to implement and accomplish plans and policies, whichever they may be.

Finally, to take advantage of any demographic bonus, the whole society needs to be involved. In this era of globalization, clearly, *whole society* is not limited to national frontiers. Full employment, decent social welfare and adequate technological health care resources cannot be accomplished by any country alone. North and South hemispheres are '*the society*' and both are exposed to the (positive and negative) consequences of the Age Structural Transitions.
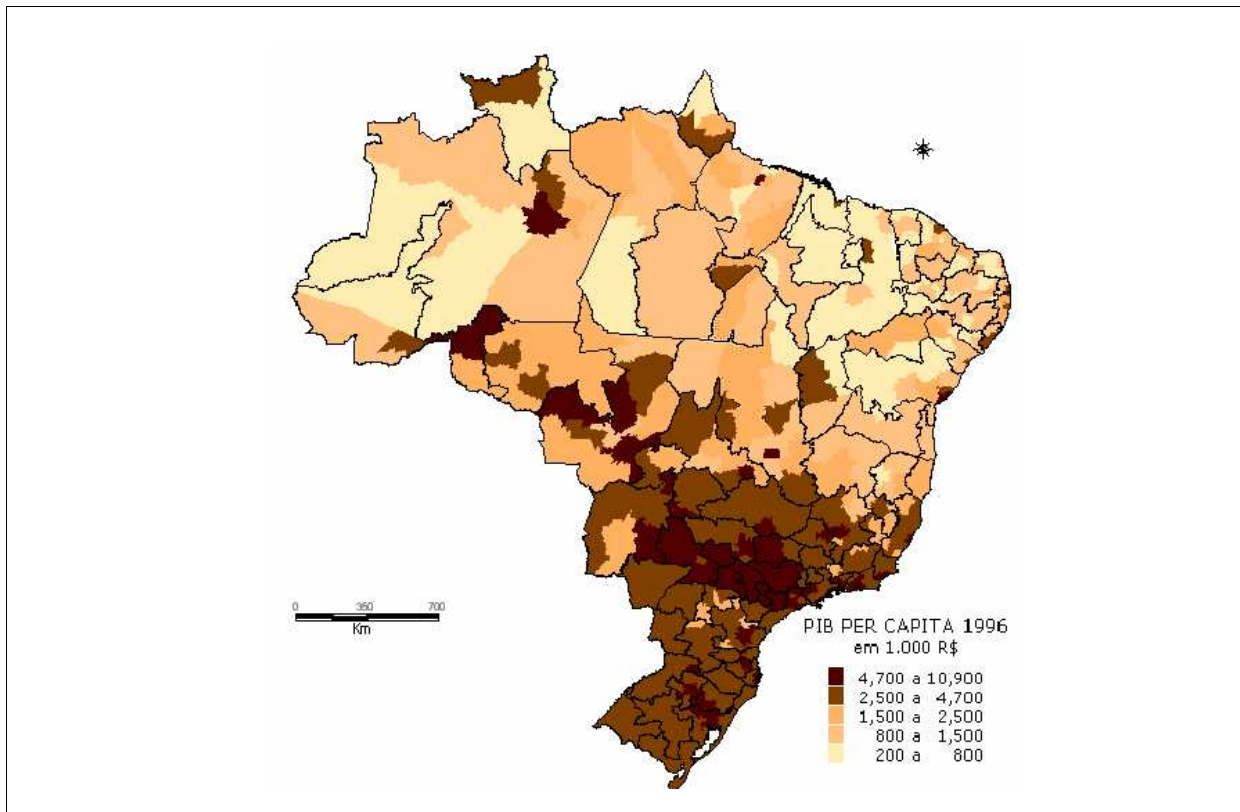
---

[24] See for instance: Ogawa et al., United Nations/ESCAP (1983).

5.   References

Aquino, R. C. and Philippi, S. T.(2002): Consumo infantil de alimentos industrializados e renda familiar na cidade de São Paulo. *Rev. Saúde Pública,* dez. 2002, 36(6):655-660.

Barreto, S. A. J. and Cyrillo, D. C. (2001): Análise da composição dos gastos com alimentação no Município de São Paulo (Brasil) na década de 1990. *Rev. Saúde Pública,* fev. 2001, 35(1):52-59.

Behrman J. R., Duryea, S. and Székely, M. (2001): Aging and Economic Opportunities: Major World Regions around the Turn of the Century. Proceedings of the IUSSP General Conference – Salvador, Brazil.

Camarano, A.A. (2002): Brazilian Population Aging: Differences in well-being by rural and urban areas. – Texto para discussão n. 878 – IPEA- Rio de Janeiro. – 27 pages.

Camargo A. B. and Frias L.A. de M. (2001): Some Aspects of the Brazilian Mortality: the XXth Century and Perspectives - Brazilian Demography – IUSSP Salvador. Brazil.

Carvalho, J.A. M. de and Wong, L.R.: Demographic and Socioeconomic implications of Rapid Fertility decline in Brazil: A window of opportunity. In: Martine G. Das Gupta M e Chen L. (eds): *Reproductive Change in India and Brazil*. 1998 - Oxford University Press p. 208-240.

Cohen S. (2001): Social relationships and health: Berkman & Syme (1979). Advances in Mind–Body Medicine 17, 5-7 - John E. Fetzer Institute 2001 - Department of Psychology at Carnegie Mellon University.Berkman LF

DATASUS – Ministério da Saúde Informações de Saúde - http://tabnet.datasus.gov.br (01/07/2004)

Demographic and Health Surveys - Macro International Inc. & Sociedade Civil Bem-Estar Familiar No Brasil - BEMFAM (1996): *Brasil, pesquisa Sobre Saúde familiar no Nordeste Brasil* - 1997 - Rio de Janeiro.

Doyle, E. I. and Feldman, R. H. L. (1997):   Preferências nutricionais entre adolescentes da classe média de Manaus, AM (Brazil). *Rev. Saúde Pública*, ago. 1997 – 31(4):342-350.

Fígoli M. G. B. (2000): Envelhecimento Populacional e comportamento das aposentadorias urbanas no Brasil. In: Wong L. (coord) O Envelhecimento da população brasileira e o aumento da longevidade – subsídios para políticas orientadas ao bem-estar do idoso. – CEDEPLAR/UFMG/ABEP. Pgs. 127-164.

Fígoli M. G. B. and Wong, L. R. (2003) El camino hacia la estabilización demográfica y el proceso de envejecimiento en América Latina: una ilustración a partir de algunos países seleccionados. In: Papeles de Población – Nueva Época Ano 9 No. 35 Janeiro a Março/2003; pg. 29 a 44. CIEAP - UNAEM - Estado de México.

Gama, S.G.N., Szwarcwald, C. L., Leal, M.C. et al. (2001): Gravidez na adolescência como fator de risco para baixo peso ao nascer no Município do Rio de Janeiro, 1996 a 1998. Rev. *Saúde Pública*, fev. 2001 – 35(1):74-80.

Instituto Brasileiro de Geografia e Estatística (FIBGE) http://www.ibge.gov.br/brasil_em_sintese/default.htm (01/07/2004)

Moreira de M.M. (1997): Envelhecimento da População Brasileira – Ph D theses - Cedeplar/UFMG – Belo Horizonte

Muniz O. J. (2003): As descontinuidades Demográficas Exercem Efeito Sobre o Mercado de Trabalho Metropolitano dos Jovens? - Ms.C Dissertation - Cedeplar/UFMG – Belo Horizonte.

Navaneetham, K. (2001): Age Structural Transition and Economic Growth: Evidence From South and Southeast Asia. - Proceedings of the IUSSP General Conference – Salvador, Brazil.

Ogawa N., Sadahiro, A., Kondo M. et al., (1983): Demographic-economic model building for Japan. In: United Nations/ ESCAP. Modelling Economic and Demographic development. Asian Population Studies, 1983. N. 54, pgs 117-223.

Pan American Health Organization/ Merck Institute of Aging (2004): *The State of Aging and Health in Latin America and the Caribbean*. Washington DC.

Pan American Health Organization (2002): *Envejecimiento Activo: Un Cambio de Paradigma*. Washington: OPS, 1999.

Pan American Health Organization (2002): SABE Survey, (Salud y Bienestar de la población adulta mayor)

Pelaez M. and Wong R.L. (2004) Vejez y recursos sociales en América Latina. – Internal document. OPS. AD/THS/MH

Peliano, A.M. et alii Pesquisa Nacional de Saúde e Nutrição. Brasília: INAN/IBGE/IPEA, 1990.

Perpétuo I. O. H. and Wong, L. R (2003): Programas y políticas nacionales que afectaron el curso de la fecundidad en el Brasil. Paper presented at the Seminar "La Fecundidad En America Latina y El Caribe: Transición O Revolución?" - CELADE June, 9-11, 2003. Santiago, Chile.

Pool, I (2000): "Age-structural Transitions and Policy: Towards Frameworks", Paper seminar IUSSP/Asian Meta-Centre, "Age-Structural Transitions and Policy", Phuket, Dec 2000

Potter, J.E. (1990): 'Social and Economic Consequences of Rapid Fertility Decline in a Period of Economic Crisis'. Paper presented at Seminar on the Fertility Transition in Latin America. IUSSP/CELADE/CENEP. Buenos Aires, 2-5 April, 1990.

Preston, S.H. (1984): Children and the Elderly: Divergent Paths for America's Dependents. Demography - 21(4):435-457.

Riani, J. L. Ruas (2001) Impactos da estrutura etária em indicadores de educação no Brasil, 1991. In: *Revista Brasileira de Estudos de População*, 18(1/2):15-33 , jan./dez. 2001

Rosenberg G, F. (1995): 'Fecundidade, Educação Infantil e Género'. Paper presented at: Seminar Rapid Fertility Decline in Brazil and India: Social Determinants and Consequences. Harvard Center for Population and Developments Studies. Cambridge, 3-4 April, 1995.

Silva Leme M.C. and Wajnman S. (2000) A Alocação do Tempo dos Adolescentes Brasileiros Entre o Trabalho e a Escola. Proceedings – XII National Meeting of the Brazilian Association for Population Studies. Caxambu, 2000 (22 pgs.).

Silva, Loraine Storch Meyer da, Giuglian, Elsa Regina Justo e AERTS, Denise Rangel Ganzo de Castro. Prevalência e determinantes de anemia em crianças de Porto Alegre, RS, Brasil. *Rev. Saúde Pública*, fev. 2001, vol.35, no.1, p.66-73. ISSN 0034-8910.

Sawyer O. D.; Wong, L.R., Carvalho J.A. M., Fígoli, M., Andrade F.C.D., Barbieri A. F. e Tavares C.R.G. (1999). Projeção Populacional, por Sexo e Grupos Qüinqüenais, das Unidades da Federação, Brasil, 1990-2020. Belo Horizonte: CEDEPLAR–UFMG. (PRONEX).

Turra, C. M. (2000): Contabilidade das Gerações: riqueza, sistemas de transferncias e conseqüências de mudanças no padrão Demográfico Brasileiro. Ms.C Dissertation UFMG/CEDEPLAR - Belo Horizonte/Brazil.

Turra, C. M. (2001): Intergenerational Accounting and Economic Consequences of Aging in Brazil. *Proceedings of the IUSSP General Conference* – Salvador, Brazil.

United Nations (2003): *World Population Prospects* – The 2002 Revision – Department of Economic and Social Affairs – Population Division. New York.

Wong, R. L. (2000) A projeção da fecundidade – um exercício aplicado ao Brasil para o período 1991-2020) *Proceedings – XII* - National Meeting of the Brazilian Association for Population Studies - ABEP, 2000.

OECD (1998): The retirement decision-OECD Economic Outlook, June, 1998 OECD Publications and Information - Centre in association with The Gale Group http://www.findarticles.com/cf_dls/m4456/n63/20792419/print.jhtml - 12/Jan/2004)

Schwarzer, H. and Querino A.C. (2002) Benefícios Sociais e Pobreza: Programas não Contributivos da Seguridade Social Brasileira – Texto para discussão No 929 – IPEA/Brasília

Annex 1 - Brazil, 1996: Economic density according to GNP strata

PIB PER CAPITA 1996
em 1.000 R$

■ 4,700 a 10,900
■ 2,500 a 4,700
■ 1,500 a 2,500
   800 a 1,500
   200 a   800

Source: http://www.cedeplar.ufmg.br/pesquisas/pronex/regional.html
1,000 Rs=US $750