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133, Bd Davout, 75980 Paris Cedex 20 - France.
Tel: 33 1 56 06 20 19. Fax: 33 1 56 06 21 65.
E-mail: cicred@cicred.org
Web site: www.cicred.org

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This text will also appear as the concluding chapter of the book edited by Ian Pool, Laura Rodriguez Wong and Eric Vilquin, "Age-Structural Transitions: Challenges for Development" (in press) published by CICRED bringing together most of the papers originally presented during the Paris seminar.

Members of the policy paper committee: Sri Moertiningsih Adioetomo (Indonesia), Gervais Beninguisse (Cameroon), Socorro Gultiano (Philippines), Yan Hao (China) and Kourtoum Nacro (UNFPA).

Rapporteur: Ian Pool (New Zealand).

POLICY IMPLICATIONS OF AGE-STRUCTURAL CHANGES

Sri Moertiningsih Adioetomo

Gervais Beninguisse

Socorro Gultiano

Yan Hao

Kourtoum Nacro

Ian Pool

1. Age-Structural Transitions, A Major Twenty-First Century Population and Development Issue: A Bonus or A Lost Opportunity?

The World Community has recently passed through a crisis of very rapid population growth that resulted from very high fertility occurring at a time when mortality had declined radically. But, as a result of the concerted action of countries across the globe, of international agencies and of civil society in general, fertility has generally declined dramatically and growth has slowed. This, however, has produced age-structural transitions (ASTs) that are unprecedented in terms of their speed and their policy implication.

Thus, a new issue has emerged, and it requires equally concerted action. For most countries, the demographic changes involved could be seen as a "Demographic Bonus"[1], because the balance between dependent and working-age populations has shifted significantly while ageing is still some

[1] A very succinct and easily read introduction to this issue is in Bloom, D., Canning, D. and Sevilla, J. (2003) *The Demographic Dividend: A New Perspective on the Economic Consequences of Population Change*, RAND, Santa Monica, Calif.

way off. Because of this shift in balance, there are more people in the working-age groups than in the dependent age groups. But, as this paper will show, a failure to invest in key mechanisms, a number of which are explicit or implicit in the Millennium Development Goals (MDGs), could mean that the bonus would instead become another demographic crisis that would minimize the chances of attaining sustainable development. This paper therefore calls the favourable shifts in dependency ratio a "Window of Opportunity" rather than a "Demographic bonus". The central point is that, managed well[2], the new trends could enhance sustainable development; managed badly, they will limit significantly the possibilities for sustainable development[3]. This is the central demographic challenge for development, and is as critical, perhaps even more so, as rapid population growth was a decade or so ago.

This trend (favourable shifts in dependency ratio) results then, primarily from ASTs generated by rapid declines in fertility, and in many countries, from factors such as high rates of immigration or emigration. Where survivorship is threatened by HIV/AIDS and other causes of mortality, this factor also plays a role.

2. What is an Age-Structural Transition?

An age-structural transition is the passage from one age group to the next one, for example, 0-4 to 5-9, etc., years of age. This normal phenomenon, which is becoming an emerging twenty-first century issue, takes several forms. Firstly, momentum effects (defined below) will produce rapid growth even after fertility has declined to low levels — in a paper written by Ian Pool and Laura Rodriguez Wong[4], this was called "primary momentum". Secondly, the large birth cohorts (generations) of the past when fertility was still high will become large parental cohorts, and thus

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2 As seems to have been the case in some Asian economies. E.g., see Higgins, M. and Williamson, J. (1997) "Age Structure and Dependence on Foreign Capital" *Population and Development Review*, 23. In contrast, Muresan in her contribution to the seminar was pessimistic about the possibility of this occurring in the same way in Romania.

3 Defined here as including sustained social and economic development that is environmentally sustainable.

4 Pool, I., Rodriguez Wong, L., "Introduction" in Pool, I., Rodriguez Wong, L. and Vilquin, E., (in press). *Age-Structural Transitions: Challenges for Development*, CICRED, Paris.

produce many births even after fertility rates have dropped to low levels — the paper by Ian Pool and Laura Rodriguez Wong (see footnote 4) referred to this as "secondary momentum". Thirdly, the AST will normally involve the passage of a "population wave" across each life-cycle stage, producing peak pressure on needs and services that are appropriate to these stages (e.g., education for the young; employment for youth; etc). Fourthly, in many countries[5], these waves are very irregular (technically termed "disordered cohort effects"), a phenomenon that will make the achievement of planning and policy formulation very difficult. Muresan reminds us in her paper that these effects do not miraculously finish at age 65 years, but continue affecting the balance between age-group at older ages. This has implications for policy as the needs of the oldest old are different from those of the younger elderly[6].

Methodologically, there are two major strategies for mapping ASTs. Both of them depart from conventional age-structural analyses that are based on cross-sectional measures, and thus that are very simple[7]. Both instead look at flow effects as well as stocks. One uses broader age ranges and thus provides a longer-term generalized overview, that is particularly useful when projecting long-term trends in age-structure and in co-variates for populations about to undergo, or are currently undergoing an AST[8]. But this tends to dampen the wave effects especially for those populations whose age-structures are highly perturbed. This pattern of perturbation has major implications for policy (it demands on-/off-again policies). The other methodology concentrates on cohort flows using finer age-groupings, but

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5 Case-studies for countries facing this problem are published as chapters in the companion book by, e.g., Yan Hao "Age-Structural Transitions and Major Policy Implications for China", Cornelia Muresan "Bonus ou Malus démographique en Roumanie", Amir H. Mehryar and Shirin Ahmad-Nia "Age-Structural Transition in Iran: Short and Long-Term Consequences of Drastic Fertility Swings during the Final Decades of the Twentieth Century".

6 This point was developed in the contribution by Ian Pool "Of Demographic Dividends, Windows of Opportunity and Development: Age-Structure, Population Waves and Cohort Flows"; see also paper by Muresan.

7 See Shryock, H. and Siegel, J. (1976) *The Methods and Materials of Demography*, Academic Press, New York. This contrasts with the methodologies in mathematical theoretical demography, an application of which was made in the Seminar in a case-study on Vietnam to show the effects of momentum, Dang Nguyen Anh "Age-Structural Transitions: Analysis Using the Stationary Population Equivalent Model".

8 This point is illustrated in the seminar paper by Bo Malmberg "Demographically-Based Global Income Forecasts up to the Year 2050".

therefore lacks the broad overview provided by the first-noted method. Nevertheless, it must be stressed that the two methods are not competitive: they each provide information on a different dimension of the same phenomenon[9].

One clarification is necessary: an AST involves changes at all ages, not just old ages. "Population Ageing" is merely one facet of an AST. When the percentage at old ages increases and aged dependency burdens go up, this is at the end-point of an AST, but prior to this, a population or a country will have faced age-structural challenges that may be more significant than the burdens associated with the aged population. Moreover, the aged population will need to be sustained by younger age-groups, so that their characteristics are as critical to policies on ageing as the financial dimensions that occupy the foreground in public debates on positive ageing. This is, of course, particularly true in those societies that have not yet been able to develop comprehensive social security systems. Beyond this, ageing itself will seldom involve a simple wave-like effect, but will see both waves and troughs pass across the younger and older, elderly population groups (say 60-79 years, and 80+). Amongst other things, this shift will have an impact on the balance between the different groups among the elderly.

The word "ageing" is itself a confusing term as it means both the process by which an AST moves across life-cycle stages to produce an older population structure or increasingly higher numbers of people at these ages. But also, particularly in popular perceptions, it is used to describe a structure that has become "older". In this paper, ageing is used in its popular sense, while the process leading to this is called an AST.

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9 See Pool, *op. cit.* Laura Rodriguez Wong in her own contribution used a version of these methods similar to that employed by Pool to provide a different graphical perspective: "Age-Structural Transition in Brazil: Demographic Bonuses and Emerging Challenges".

3. Age-Structural Transitions: An Urgent and Important Issue

In the population and development debate, some of the attention has switched dramatically from the growth crisis and from issues such as reproductive choice, to the burdens of ageing. The discourse in civil society appears, however, to have vaulted completely across the intermediate stage that, in many countries, almost all in the South, will occupy the next few decades during which growth declines, and before ageing really sets in. In fact, in many countries, particularly in sub-Saharan Africa, ageing *per se* is a very distant phenomenon, yet is often perceived as something about to occur. Before then, African nations and most other countries, have a Window of Opportunity that could be brought about by this demographic dividend/bonus, as child and total dependency, and as the costs associated with them, decline, but before aged dependency sets in. In contrast, a failure to realize this bonus could mean that these states could face unprecedented population crises, not due to growth, but to shifts in age composition.

This paper directs its attention to the Window of Opportunity, emphasizing the policy implications of a massive demographic shift resulting from age-structural transitions mainly due to decreasing fertility and low mortality rates. It looks at what will eventuate "tomorrow", between now and 2015, in most countries (even the developed ones), and which will continue to be a major issue.

By focusing on ASTs, analysts can also respond to another problem: that statistical relationships between population and development have often been difficult to demonstrate in a refined way. But the linkages become much clearer once attention shifts from population size and growth to ASTs[10]. There are two reasons for this. Firstly, as noted already, changes in composition occur over short durations during an AST, even for wider age-ranges (e.g., 15-24 years), especially for more perturbed age-distributions. These fluctuations produce rapid shifts in patterns and levels of demand and needs relevant to particular age-groups, both in the public policy domain and for the market sectors, as peak numbers produced by large cohorts, are

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10 This point is developed in Malmberg, *op. cit.*, using income as a reference factor. In his paper, though, the more general point relating to development overall is also developed. See also Bloom *et al*., op. *cit.*

then followed in rapid succession by reduced demands/needs as smaller cohorts reach the same life-cycle stage, that is, as a wave is followed by a trough. Driving this is the fact that both needs for public policy interventions and for market goods and services are highly age-specific. This takes one to the second and related point, that, as a consequence, economic and social sectors, in fact, most market and public policy sectors address the needs of particular age groups, a point that will be developed later.

Development policy and planning models are well adapted to respond to these conditions. This is because the time-horizon of the planner is normally quite short, and thus is fitted well to endogenizing into the models' shorter-term, age-compositional changes, but not so well to integrating long-term overall growth trends. And the sector-specific approach implied in this paper, with its linkages to age-specific trends identified here, suits the newer planning strategies that post-date the central planning era.

The issue of ASTs is so urgent, in fact, that it must be built into the discussions surrounding ICPD+10, if a global Window of Opportunity is not to be lost. The ICPD (1994) itself had afforded an unique opportunity to map ASTs and to formulate a response, for at that moment, almost 20 percent of the world's entire population was at 15-24 years of age (See Chapter Two, Table 1), the age-group with the highest "demographic density" (where all sorts of life-status changes are occurring: reaching physiological maturity; leaving school; entering the labour force; starting a family; migrating and joining the "floating populations"; etc.)[11]. It is this age that is most pivotal for exploiting the Window of Opportunity. But at Cairo, there were pressures of other sorts, in areas such as gender equality and reproductive choice, and on ageing (at a time when only six percent of the world's population were aged), and thus due attention was not given to ASTs.

This Window of Opportunity cannot be allowed to pass by again. Fortunately, Cairo's Programme of Action does provide a blanket resolution that is apposite to this undertaking: "Countries should aim to meet the needs of youth, ensuring their integration and participation in all spheres of society" (paragraph 6.11). ICPD+10 could well lead off from this quite

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11 Outlined well, in Rindfuss, R. (1991) "The Young Adult Years: Diversity, Structural Change and Fertility", *Demography*, 28, 4.

prescriptive starting point, and then elaborate on it. But as the youth wave of 1994 has now moved on to ages 25-34 years, any elaboration would also have to provide goals and recommendations appropriate to this latter age group.

As discussed below, population and development plans and actions will need to extend beyond issues such as family building into other social and economic demographic domains, and factors of population and environment. All regional efforts could be directed to these goals. Above all, they should become central components of the New Partnership for African Development initiatives.

4. An Inexorable Trend: Age-Structural Transitions

ASTs are underway. They cannot be stopped, even in the unlikely event that fertility were to rise again (significantly above replacement). Migration is sometimes seen as a mechanism for reducing distortions, but, as the United Nations Population Division has recently shown, such strategies are fraught with problems for countries/regions, both of origin and of destination[12].

Thus, the waves are already making their way up the age-pyramid, sequentially altering the proportion of the population at each life-cycle stage. An exception might be claimed for those sub-Saharan countries where fertility declines are not underway, or are as yet very slight. But this would be a misunderstanding, because change can occur numerically as well as proportionately: some African countries will see rapid numerical growth at each age group (e.g., see in Pool, fn. 6)[13], and thus are undergoing one form of AST. In fact, the ASTs of African countries, driven by accelerating primary and secondary momentum effects, are perhaps the most extreme anywhere.

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12 United Nations (2001). *Replacement Migration. Is it a Solution to Declining and Ageing Populations*? Population Division, Department of Economic and Social Affairs, New York.

13 This has enormous problems for development. See Gervais Beninguisse's paper in the seminar volume: "Changement de structure par âge et développement au Cameroun".

5. Age-Structural Transitions and the Millennium Development Goals: A Crosscutting Issue

To provide a more concrete review of linkages between ASTs and sustainable development it is useful to take as an example development goals that have been formulated and which represent, as it were, a consensus across the international community and civil society. The Millennium Development Goals serve this purpose well.

ASTs constitute a crosscutting issue in that they place population and development, face-to-face, across every sector. It is obvious that population changes produce shifts in demands for goods and services, and that this will be most evident in the social sectors. But each of those sectors tends to address a different lifecycle stage — education for the young, employment for youth entering the job market, housing for people at family-building ages, health for the young and old, and support in income or services for the elderly. With an AST, this synergy becomes more problematic if waves then troughs produce peak demands that then fall off. Of course, sometimes this may then permit more accent to be placed on quality as against quantity. This demand effect translates across even into the infra-structural, financial and fiscal sectors: fiscal burdens, for example, will be very much affected by who at which age needs what, and fiscal capacity by who at which ages can pay taxes; the provision of housing or institutions is very much affected by age-structural and family transitions.

ASTs also have supply-side effects, of which the supply of labour (or the over-/under-supply of labour) would be the most obvious. But one can add the supply of services (e.g., supply of teachers or nurses), and also of course, fiscal capacity (who pays the taxes). This is a factor not just of the "working ages" vs. "the dependent ages" as broad blocks, but one that varies even within these ranges, depending on factors such as seniority and promotion within the working ages — in short, on ASTs within the working ages.

6. Age-Structural Transitions and Specific Millennium Development Goals

It is important to signal that this crosscutting issue also has implications for each of the MDGs:

***Goal #1* (Eradicate extreme poverty and hunger):** ASTs have implications for both the supply and demand dimensions of poverty and hunger. For example: Stages in ASTs and family transitions when young families predominate, with young families and with only one or two "breadwinners", are more likely to see poverty and hunger. There is a rapid growth in the child population, typically in countries in which there are problems of food and/or water security[14]. Obviously, this also raises political as well as policy questions. To take another case, out-migrations to search for work can deprive regions of young workers essential for the production of subsistence foodstuffs.

In contrast, during periods in which there are Windows of Opportunity, when dependency ratios dip, there will be more productive workers. Moreover, this is also related to higher economic growth, higher incomes *per capita* and greater family savings. But this will occur only if there is also investment in employment and human capital.

***Goal #2* (Achieve universal primary education):** Education is clearly the key to the development of the human capital essential to exploiting any Windows of Opportunity. ASTs can have positive effects on this when there are large numbers of young people available to gain skills, but equally well, massive cohorts will make provision of education very difficult to achieve[15].

Although many countries have achieved universal education, others have yet to reach this stage. Window of Opportunity could allow universal education to be achieved, or if already so, this is a chance to ensure that its quality is improved. Moreover, where education is not free, if incomes

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14 A paper presented at the seminar by Philippe Collomb "Food Security and Age-Structural Transition" was a summary of a much wider study, in press at present. It shows the impact of child dependency on food security (quantity and quality).

15 This is elaborated in a number of papers published in the book, but particularly in Anne Goujon "Is Progress in Education Sustainable?"

increase, then families will have more capacity to pay for the education of their children.

***Goal #3* (Promote gender equality and empower women):** Absolutely central to the promotion of gender equality, are the human capital implications of ASTs[16]. This becomes particularly critical where there are existing inequities (e.g., in education) or where the processes producing ASTs have major gender imbalances, as in the case of migration in the Philippines where women are the out-migrants (cf. China, where the floating population has high masculinity ratios)[17].

Increases in access to education, possible when there is a Window of Opportunity, could allow increased levels of school attendance by girls. At the same time, the propensity to progress to higher levels will be enhanced, thus increasing their skills, the range of jobs they can enter, and their incomes and bargaining power, in the family and the society, in general.

***Goal #4* (Reduce child mortality):** The effects of ASTs are more in terms here of the implications of volumes (the numbers of children) on the capacity to provide health services of quality, particularly where food security is weak. The occurrence of a Window of Opportunity permits a reduction in the number of malnourished children, as noted under Goal #1 above.

***Goal #5* (Improve maternal health):** The size of maternal cohorts interacts with the capacity to provide services. Thus, it is again a quantity vs. quality effect. A Window of Opportunity would enhance the capacity of countries to increase health services for women. This is central to the empowering of women.

***Goal #6* (Combat HIV/AIDS, malaria and other diseases):** HIV/AIDS, malaria and other apocalyptic epidemics have a major impact on ASTs, both directly, through mortality, and indirectly, through factors, such as orphanhood[18]. A Window of Opportunity would afford a chance to shift more resources to health services and to malaria control.

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16 This comes through in every case-study examined during the seminar.

17 See the contribution by Socorro Gultiano and Peter Xenos "Age-Structure and Urban Migration of Youth in the Philippines".

18 This theme was developed at the Seminar in P. S. Nair "Age-Structural Transition in Botswana in the Context of HIV/AIDS". See also Beninguisse, *op. cit.,* on Cameroon.

Paradoxically, a Window of Opportunity is associated with larger cohorts reaching adolescent, youth and young adult ages. These ages are those at which migration and sexual relationships with multiple partners are most likely to occur. Thus, the incidence of HIV/AIDS and STDs could well increase. HIV/AIDS also then has an effect, through age-specific mortality, on ASTs.

***Goal #7* (Ensure environmental sustainability):** The ensuring of environmental sustainability is affected by ASTs in two ways. Firstly, to exploit the Window of Opportunity requires economic development, and rapid economic growth may produce negative environmental impacts. But secondly, more direct effects are seen when, in order to reduce hunger, attempts are being made to increase agricultural productivity by campaigns that may demand land redistribution or the opening up of common and other public land, especially in the environmentally more fragile[19] regions. The debates around genetic engineering of foodstuffs in part revolve around whether or not food productivity is increased, and at what expense to the environment.

***Goal #8* (Develop a global partnership for development):** This goal and its set of indicators, essentially underpin the capacity of countries of the South to exploit Windows of Opportunity. Obviously "good governance" on the part of both the rich and economically disadvantaged, powerful and weak countries, is a prerequisite to planning for and exploiting the Window of Opportunity. The wealthy will need to aid the poor if the latter are to realize effectively, the dividends afforded by the Window of Opportunity; but to manage their Window of Opportunity, poorer countries will need to set up systems of administration that enhance their capacities to benefit and to ensure that all segments of their societies have an equal opportunity. As will be shown below, ASTs do not exactly follow the same format across all groups and regions within countries, and this affects aspects of governance and management necessary to exploit the Window in an equitable manner. But a failure to respond equitably, may produce severe tensions within a country, and thus lead to political instability. Special mention should be made of small-island countries where numbers may be small, but where

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19 See the studies for FAO, carried out under the auspices of CICRED. E.g., Gultiano, S. *et al*. (2003*) Population Dynamics, Land Availability and Adapting Land Tenure Systems in the Philippines*, FAO and CICRED, Rome and Paris.

AST effects, such as through migration, may be magnified[20]. These are demographically, politically, environmentally and economically fragile states[21].

The highest profile interaction between the North and the South is migration, a demographic trend that exacerbates ASTs and which highlights problems of managing them, both in the country of origin and that of destination. As noted earlier, migration may seem to be a mechanism for reducing distortions in age-structures in wealthy countries. Through remittances, it may also involve North→South capital transfers and aid development, or at least, sustainability in the South. But the levels needed to achieve this may introduce other distortions in the ASTs of migrant receiving countries[22]. Equally well, especially if the more talented and younger active workers migrate, emigration may generally affect the structures of source countries.

7. The Window of Opportunity: Seizing on it and Exploiting It

It is simple to define the Window of Opportunity, but much more difficult to formulate a precise index that identifies when countries are about to commence transition, and when an AST is coming to an end[23]. Put most-simply, a Window of Opportunity will be available when levels of dependency decrease, normally as a function of decreases in fertility and thus in child dependency, and before they start to increase again as ageing sets in. Parenthetically, it is worth noting that in most countries, total dependency is primarily being driven, even today, by child dependency, and that a shift to a balance weighted towards aged dependency is still well into the future.

In the CICRED Seminar papers used for this policy paper, most of the case-

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20 See Seminar paper by Kesaia Seniloli "To Take Advantage of the Demographic Bonus or Not — That Is the Question: The Case of Fiji".

21 Pool, I (1988), Plenary paper to Asian-Pacific Population Conference, Colombo (published in proceedings).

22 Dittgen, A. (2002). "Après la transition démographique: L'équilibre ou les turbulences?" in AIDELF (eds.) *Vivre plus longtemps, avoir moins d'enfants: Quelles implications? Colloque international de Byblos-Jbeil*, Presses Universitaires de France, Paris.

23 Bloom *et al.*, *op. cit.,* suggest a formula.

studies focus on identifying **when** ASTs are about to occur, and **what** their impacts might be[24]. A number of very important points were identified:

- In most countries, a Window has arrived, or will soon arrive, over the next decade or so. Thus, there is a real need to look urgently but carefully at ASTs, especially during the life of ICPD.
- The speed with which the Windows of Opportunity will come and go, that is, the duration that they will last, varies enormously from country to country — no single rule applies.
- In most countries, there are regional differences in ASTs and thus in Windows of Opportunity; in some countries, this may be extreme. In Brazil, this South→North difference almost mirrors the global North→South difference. China is another example where the differences are vast. As a result, internal migration is a critical outcome as young workers move from areas of under-development to developed zones. Even in small-island countries, there can be outer-island — capital-island differences.
- There are also many other AST differentials, such as by gender, by tax revenue and expenditure (by age), by ethnic group, etc.
- Above all, the exploitation of the Window of Opportunity can occur only if many national and international resources are mobilized. This is why the issue is highly pertinent for MDG #8.
- Central to the exploitation of Windows of Opportunity are three mechanisms: savings, human capital and employment[25]. The quantum, flows and stocks of human capital are very much demographic issues driven by ASTs; the quality is, of course, non-demographic in form. But as noted earlier, when looking at MDG #2, demographically driven Windows of Opportunity are the determinants of the bonuses that will permit the non-demographic quality factors to be enhanced.

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24 Contributions to the 2004 CICRED seminar provided case-studies on Windows of Opportunity, based on analyses of the way the demographic transitions produced age-structural transitions, e.g., Sri Moertiningsih Adioetomo "Age-Structural Transition and its Implications: The Case of Indonesia over a Century", Hao, *op. cit.,* Rodriguez Wong, *op. cit.,* Virgilio Partida Bush "How the Demographic Transition Forms the Demographic Bonus and the Ageing Population in Mexico" presented at the seminar, and Ali Ben Brahim "Transition des structure par âge et vieillissement en Tunisie".

25 Identified by Bloom *et al*., *op. cit.*

8. ASTs, Windows of Opportunity and Interrelated factors

Finally, it must be stressed that ASTs are not occurring in isolation from other changes in the society, economy and environment. A number of interrelated transitions can be noted here:

- *The Demographic Transition* is the driver of ASTs. But ASTs, in turn, have an impact on demographic transition. For example, a population with an age-structure weighted towards the younger, more fecundable, reproductive ages will have a greater potential for high fertility, than one with higher proportions at older reproductive ages.
- *The Epidemiological Transition* is also linked to ASTs. An epidemiological transition at first, is played out by rapid declines in the force of mortality at the younger ages, but later sees the force shift to older and older ages. In developed countries, the possibilities for further increases in survivorship depend on improvements at older ages, as the probability of surviving from birth to old age is very high except for a very small minority in each cohort. But equally well, the age-composition of a population is related to its potential for mortality.
- *Transitions in Family Formation, Structures and Forms*: The interlinkages between ASTs and the family transition are very strong. The sizes and age-structures of families are an obvious manifestation, but this is true for the context in which family formation takes place — the forms of the union (marriage or cohabitation, and whether or not ex-nuptial births are prevalent or rare), the structures of unions (e.g., nuclear or extended; the support networks), and the actual process of childbearing (e.g., timing, spacing and limitation, that are the central concerns of reproductive choice initiatives). For example, Muslim countries in which almost all childbearing is nuptial, but in which ages at marriage are late and celibacy levels high, face a particularly critical interface between their family transitions and their ASTs. Women at prime reproductive ages are not marrying at all, or are delaying to ages when levels of fecundability have declined[26].
- *Industrial labour force sectoral transformation*: Basic to development theory is the issue of labour force transformation. The growth of the tertiary sector, and especially the highly skilled, pose particular

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26 See Brahim, *op. cit.;* Mehryar and Nia, *op. cit.*

problems for countries going through rapid ASTs and that wish to exploit a Window of Opportunity by upgrading their human capital.

- *Mobility Transitions*: The links to these have been noted already but cannot be over-emphasized.
- *Nutritional Transitions*: The shift from grains to meat proteins, as is occurring across Asia, is another co-varying factor. The impacts of this transition will be most marked in the large cohorts that are currently at youth or young adult ages.

To conclude, returning to the starting point of the paper, the ASTs are a key component of all social and economic development. The Window of Opportunity that the ASTs might provide, may be exploited to generate sustainable development. To repeat, to fail to exploit Windows of Opportunity will produce crises for population and development.

List of contributions to the seminar

Papers are available on the CICRED website

Sri Moertiningish ADIOETOMO (Demographic Institute, Faculty of Economics, University of Indonesia, Indonesia) – Age-Structural Transitions and its Implication. The Case of Indonesia over a Century, 1950-2050.

Gervais BENINGUISSE (IFORD, Yaoundé, Cameroon) - Changement de structure par âge et développement au Cameroun.

Ali BEN BRAHIM (ONFP, Tunis, Tunisia) - Transition des structures par âge et vieillissement en Tunisie.

Philippe COLLOMB (CICRED, Paris, France) - Food Security and Age-Structural Transition: Some Observations.

DANG Nguyen Anh (Department for Population Studies, Institute of Sociology, Hanoi Vietnam) - Age-Structural Transitions: Analysis Using the Stationary Population Equivalent Model.

Anne GOUJON (Vienna Institute of Demography, Austrian Academy of Sciences, Vienna, Austria) - Is Progress in Education Sustainable?

Socorro GULTIANO (Office of Population Studies, University of San Carlos TC, Cebu City, Philippines) - Age-Structure and Urban Migration of Youth in the Philippines.

Yan HAO (Institute of Economic Research, National Development and Reform Commission, Beijing, China) – Age-Structural Transitions and Major Policy Implications in China.

Bo MALMBERG (Department of Social and Economic Geography, Uppsala University, Uppsala, Sweden) - Demographically Based Global Income Forecasts up to the Year 2050.

Amir H. **MEHRYAR** and **Shirin AHMAD-NIA** (Center for Population Studies and Research, Tehran, Iran) – Age-Structural Transition in Iran: Short and Long-Term Consequences of Drastic Fertility Swings during the Final Decades of Twentieth Century.

Cornelia MURESAN (Centre d'Etude de la Population, Université Babes-Bolyai de Cluj, Cluj-Napoca, Romania) - Bonus ou malus démographique en Roumanie.

P.S. NAIR (Department of Population Studies, University of Botswana, Gaborone, Botswana) – Age-Structural Transition in Botswana in the Context of HIV/AIDS.

Virgilio PARTIDA BUSH (Director General de Estudios Sociodemográficos y Prospectiva, CONAPO, Mexico City, Mexico) – How the Demographic Transition Forms the Demographic Bonus and the Population in Mexico.

Ian POOL (Professor of Demography, University of Waikato, Hamilton, New Zealand) - "Demographic Dividends", "Windows of Opportunity" and Development: Age-Structure, Population Waves and Cohort.

Laura Lidia RODRIGUEZ WONG (CEDEPLAR, Belo Horizonte, Brazil) – Age-Structural Transition in Brazil – Demographic Bonuses and Emerging Challenges.

Kesaia SENILOLI (Population Studies Program, University of the South Pacific, Suva, Fiji) - To Take Advantage of the Demographic Bonus or Not – That Is the Question: The Case of Fiji.