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Four Phases in the Demographic Transition. Implications for Economic and Social Development in Sweden, 1820-2000

In the 21st century most countries in the world will experience a substantial ageing of their populations. This population ageing is due to a general decline in birth rates both in the developed world—from moderate to low levels of fertility—and in developing countries—from high to moderate levels. Some long-term projections show truly daunting ageing figures. If fertility rates remain very low, as they are today, and we continue to experience improvements in life expectancy, half of the population in today's industrialised countries is projected to be above age 60 in the late 21st century. Many developing countries, such as China, will be hit even harder, since fertility rates have fallen so rapidly in recent years. In a few decades, China must accommodate to an old-age burden that is about the same as that in Western Europe today.¹

What impact will population ageing have on economic development?

Basically, ageing means that a society attains a higher *old age dependency rate*. The share of old aged, that is dependent on the working population, increases. Many observers argue that this increase in the old age dependency rate is a severe threat to the future wealth of Western societies. In a few years, Europe and Japan will be

¹ W. Lutz, W. Sanderson, S. Scherbov and A. Goujon, "World Population Scenarios for the 21st Century", in W. Lutz

facing substantial labour shortages, and in the longer run, there is a risk that stagnating – or diminishing – populations will be unable to finance social security and old age care for a growing share of retired citizens. In a broader perspective, population ageing might affect international relations and the world political order. If population ageing results in economically weaker Western states, new and economically more powerful centres might emerge.²

In this essay, we argue that one way to approach the challenge of population ageing is to analyse the consequences of age structure changes in the past. In fact, dramatic changes in the age structure are not a new phenomenon. Every country that has entered the demographic transition – in some cases 200 years ago or more – has also experienced a prolonged period of substantial age structure change. With more systematic knowledge about these past changes, we will be better prepared to deal with future demographic challenges.

This essay is, in the main, an explorative contribution to the ongoing debate about the role of population in economic development. We discuss why it is reasonable to expect that age structure matters to economic and social development, and to what extent, and in what ways, this assumption is confirmed by empirical data. We have chosen Sweden as our main empirical example, since it is a country with a long series of detailed population statistics.³ Furthermore, Sweden provides a rather typical pattern of long-term age structure change. In fact, the stylised model of the demographic transition, taught today in demography classes, was originally

(ed.), *The Future Population of the World. What Can We Assume Today?*, London, 1996, p. 382-386.

² For example P. G. Peterson, *Gray dawn : how the coming age wave will transform America - and the world*, New York, 1999; *World population prospects: the 1998 revision*, United Nations, New York, 1999.

³ All Swedish population figures in the following are based on official statistics, from 1857 to 1912 in the series *BiSOS* (*Bidrag till Sveriges officiella statistik*), and for the period thereafter in the series *SOS* (*Sveriges officiella statistik*). For a valuable compilation, see Statistics Sweden, *Population development in Sweden in a 250-year perspective*, Demografiska rapporter 1999:2, Table 1.2 "Population by sex and age 1750-1998".

based on Swedish data. Our treatment of the Swedish case will be related to a comparative framework. In our comparative surveys, we build on historical as well as contemporary examples.

In recent years, students of demography have focused mainly on gross population growth, while the problem of long-term changes in the age structure has attracted less attention. In consequence, the demographic transition model has been formulated in terms of (gross) death and birth rates. The analysis has focussed on the impact of the transition on the rate of population growth. According to this classic analysis, the rate of population growth is low as long as both birth and death rates are on a high level. When the death rate begins to fall, without any corresponding decline in the birth rate, the population starts to grow. Eventually, as the birth rate falls to the low levels typical of modern, industrialised societies, the rate of population growth is once again reduced.⁴

The impact of the demographic transition on population growth is important indeed. However, if we turn our attention away from general population growth towards age structure, we will soon observe that the impact of the demographic transition on age structure is equally strong as its impact on population growth. Furthermore, the effects on age structure are more extended in time. In the wake of the demographic transition, an *age transition* follows. This age transition consists of four distinctive phases, marked by the increase of one specific age group. First comes a *child phase*, then a *young adult phase*, thereafter a *phase of population maturity*, and finally a *phase of ageing*.⁵

⁴ For overviews, see J-C. Chesnais, *The Demographic Transition. Stages, Patterns, and Economic Implications. A Longitudinal Study of Sixty-Seven Countries Covering the Period 1720-1984*, New York, 1992; and M. Livi-Bacci, *A concise history of world population*, Cambridge, MA, 1997.

⁵ D. E. Bloom och J. G. Williamson, "Demographic Transitions and Economic Miracles in Emerging Asia", *The World Bank Economic Review*, 1998, vol 12, nr 3; B. Malmberg and L. Sommestad, *Historiens dolda puls*.

The first phase of the age transition, the child phase, occurs when falling death rates during the initial stage of the demographic transition produce an increase in the number of children. The reason for this increase in the number of children is that in high-mortality populations, most of those who die are infants and children. A reduction of mortality therefore primarily spares the lives of them. Furthermore, as the cohorts who survive into adulthood become larger, the fertile population will soon grow as well, and, with unchanged fertility behaviour, this will further increase the number of children born. In consequence, some 30-40 years after a fall in mortality, the age structure of a population with unchanged fertility behaviour will assume the concave pyramid shape that is so typical of countries that experience high rates of natural population growth. From a macro-economic point of view, the child phase is a period when consumption needs tend to exceed productive capacity. The *child dependency rate* is high, and women in particular need to invest substantial financial and temporal resources in the sphere of reproduction.⁶

When fertility rates start to decline, this picture changes dramatically. Most countries that undergo a demographic transition do in fact not only experience a fall in the rate of fertility, but also a reduction in the total number of children born. This reduction creates a bulge in the age structure; a bulge built up by the cohorts that were born just before the absolute birth rate started to fall. The classic population pyramid gradually changes its appearance: the base gets narrower and the pyramid attains an increasingly convex shape.

Befolkningsutveckling och samhällsutveckling i Sverige 1820-1995, manuscript, presented at the research seminar at the Department of Economic History, Uppsala University, april 1997; B. Malmberg och M. Lundmark, "Befolkningsgeografi - en bortglömd pusselbit", *Svensk geografisk årsbok*, 1998, vol. 74.

⁶ A. F. Robertson, *Beyond the Family. The Social Organisation of Human Reproduction*, Cambridge, MA, 1991, chapter 3; ; L. Sommestad, "Welfare State Attitudes to the Male Breadwinning System: The United States and Sweden in Comparative Perspective", *International Review of Social History*, vol. 42, 1997 Supplement.

In the traditional model, this fall in the birth rate is the last phase of the demographic transition. However, the age transition is far from completed at this stage. The reason is simple. A population that has developed a bulge in its age composition will be continuously transformed for as long as it takes for the bulge to pass through the entire age structure. The second stage in the age transition, the young adult phase, is attained when the bulge passes through the young adult ages. Later the bulge will pass through the Middle Ages, which marks the third phase, the phase of maturity. Still later, more than 60 years after the onset of the fertility decline, the bulge will enter the older age groups. All in all, a society that experiences an age transition goes through remarkably predictable demographic phases, from the initial challenge of high child dependency rates up to the closing phase of maturing and finally ageing.

In Swedish data, the different phases of the age transition are quite easy to identify, as demonstrated in figure 1. The first phase, associated with an increasing number of children, started in the early 19th century and continued to the First World War. The second phase, with an expansion of the young adults, started around 1840 and continued into the inter-war years. The third phase with an expanding middle aged population started in the 1870s and continued up to the 1960s. A fourth phase with an expanding old age population started in the early 20th century and continued up to the 1990s. Still today the bulge created by the demographic transition is clearly visible, but now we have to look at the very oldest age groups, above 80 years of age, to find the bulge cohorts. The age transition in Sweden is, thus, an almost two hundred year long event.

Figure 1. Sweden's population 1800-2000, by age groups (in thousands)

FIGURE 1

Source: Statistics Sweden, Population development in Sweden in a 250-year perspective, Demografiska rapporter 1999:2, Table 1.2 "Population by sex and age 1750-1998" .

The process of age structure change, that follows a demographic transition, is important for two reasons. First, the distinctive phases of the age transition makes it possible to analyse in what ways age structure matters to social and economic development. If age structure has a systematic impact on economic development, we should be able to observe similarities between countries that pass through the same phase of the age transition.

Second, the regular pattern of the age transition points to similarities in historical experience, across time and space. Regions in the world have experienced the demographic transition at different points in time, and with varying intensity, but once the demographic transition is under way, different regions tend to pass through the four phases of the age transition in roughly the same way.

In the following, we will discuss the impact of age structure on historical development in three steps. First we ask if there are theoretical reasons to expect that an increase of certain age groups will have economic and social effects that are visible on a macro level. Second, we adopt a largely inductive strategy to find out if more children, more young adults, more middle aged, or more old people might have any distinctive effects on the development of a country. To do this we ask if countries that are in the same phase of the age transition do have certain

characteristics in common. Finally, we discuss the age-structure approach in relation to broader scholarly debates about population and economic development.⁷

The theoretical reason to expect that age structure matters to economic development is the existence of an economic life cycle that strongly influences the behaviour of people as they go from childhood to adulthood and old age. From this follows that a population might create very different economic conditions, depending on which age group that predominates population growth: children, adults or the old aged.⁸

Most important, from a life cycle perspective, is the indisputable fact that an individual's productive capacity varies over the life cycle. Newborn humans are unable to survive without the support of older, more able-bodied custodians. Many years of care, education and training are needed before children have acquired the productive potential of an average adult. Similarly, when people grow older, their individual productive capacity tends to decrease, until it finally falls short of what they need for survival. Towards the end of life, we are often as helpless as we were as newborn babies. By contrast, most adults have a capacity to produce more than they need for their own immediate survival. They are not only able to support themselves, but they also typically act as providers. Moreover, in the course of the life cycle, people acquire experience, and they also tend to build up savings. In consequence, middle aged people are often richer in resources than younger adults. All in all, the youngest and the oldest members of a society constitute an economic

⁷ It should be noted here that we will not go into the very interesting question of what caused the mortality and fertility decline. This major issue in the field of historical demography is too extensive to be discussed here. Instead, we will take the age transition as a datum and concentrate on the possible effects of this transition.

⁸ The economic theory of the life cycle was first developed by Franco Modigliani to explain individual patterns of consumption and savings (1954). It is an important contribution to micro economics. See F. Modigliani, "The life cycle hypothesis of saving twenty years later", In M. Parkin and A.R. Nobays (eds.) *Contemporary issues in economics*, Manchester, 1975; and P. Kouri. "Franco Modigliani's contribution to economics", *The Scandinavian Journal of Economics*, 1986, vol. 88, nr 2, p. 311-334.

burden, while working adults – and in particular the middle aged – produce the surplus on which economic growth and development depend.

So let us turn, first, to the *child phase*, the period of child abundance that initiates the age transition. England was among the first countries in the world to enter this phase of rapid population growth and child abundance. This happened around 1800, in the time of Malthus, whose influential – and largely pessimistic – analyses of population growth was based on this very experience.⁹ As regards our main case, Sweden, the most clear-cut effects of an increasing number of children can be found somewhat later, from the 1820s. At this time, Sweden entered the demographic transition, and with declining mortality rates, larger cohorts of children survived.

In a comparative context, Sweden entered the age transition at an early stage. In most other parts of the world, the child phase did not occur until the 20th century. Many Asian states experienced the child phase in the 1960s. A well-known example is India. Today, populations with an age structure that resembles England's around 1800 or Sweden's in the early 19th century are found in particular in sub-Saharan Africa. Here, the share of children in the population typically exceeds 40 percent. These are the highest figures ever registered for countries that pass through this first phase of the age transition.¹⁰

If one were asked to enumerate characteristics common to child abundant countries, such as Sweden in the 19th century, a first observation to be made is that child abundance is closely related to poverty. In Sweden, the period from the 1830s up to the early 1870s was marked by recurring political struggles

⁹ E. A. Wrigley and R. S. Schofield, *The population history of England 1541-1871: a reconstruction*, London, 1989, chapter 8 and table A9.1.

¹⁰ United Nations, *Global Estimates and Projections of Populations by Sex and Age: the 1994 revision*, United

around "the poverty question". Contemporary evidence tells the story of a country challenged by an unexpected population growth and alarming signs of disintegration and destitution.¹¹ The connection between children and rural poverty in 19th century Sweden is confirmed by the fact that the share of children (0-14 years of age) in Swedish counties around 1870 is strongly correlated with the poverty rate (defined as the share of adults unable to pay taxes). A statistical analysis shows that a one-percent increase in the share of children corresponds to a 2.5 percent increase in the poverty rate. The share of children explains slightly more than 50 percent of the regional variation in poverty.¹² Today, this close relationship between child abundance and poverty can be found again in many parts of the world, not least in sub-Saharan Africa. The sub-Saharan African states have at present remarkably high child dependency rates, and these countries are also among the poorest in the world.¹³

Another characteristic feature of child abundant economies is the occurrence of child labour, a phenomenon clearly connected to the state of poverty.¹⁴ In Sweden, child labour was widespread during the child phase, and

Nations, New York, 1994.

¹¹ S. Oredsson, "Samhällelig eller enskild fattigvård? En linje i debatten inför 1871 års fattigvårdslagstiftning", *Scandia* 1971, vol. 37; B. Petersson, "Den farliga underklassen". *Studier i fattigdom och brottslighet i 1800-talets Sverige*, Umeå 1983, p. 16-88. Similar observations of disintegration and destitution have been made in many other countries, that pass through the child phase. A typical example is A. Mager, "Migrancy, Marriage and the discourse of 'family breakdown' in a South African bantustan, 1945-1959", paper presented at the 12th International Economic History Congress, Madrid, Spain, August 1998.

¹² Statistical analysis based on data on rural poverty (the poverty rate) from O. Lundsjö, *Fattigdomen på den svenska landsbygden under 1800-talet*, Stockholm, 1975, table 29, p. 134 (share of poor people in relation to the total population above 18 years of age) and G. Sundbärg, "Ekonomisk-statistisk beskrivning öfver Sveriges olika landsdelar", in *Emigrationsutredningen. Bilaga 5. Bygdestatistik*, Stockholm 1910, table 32. We have chosen to analyse data from 1871, since this is a year when data are available from all Swedish counties. The definition of poverty as the inability to pay taxes is discussed by Lundsjö (*ibid.*), p. 38-60.

¹³ D. E. Bloom, och J. D. Sachs., "Geography, Demography and Economic Growth in Africa", *Brooking Papers on Economic Activity* 1998:2.

¹⁴ H. Cunningham and P. P. Viazzo (eds.), *Child Labour in Historical Perspective 1800-1985: Case Studies From Europe, Japan and Colombia*, Unicef, 1996; N. de Coninck-Smith, B. Sandin and E. Schrupf (eds.), *Industrious Children. Work and Childhood in the Nordic Countries 1850-1990*, Odense, 1997.

regional analyses indicate that the incidence of child labour peaked in different regions when the share of children in the population was at the heighest.¹⁵ The demographic transition in Sweden started in the south, in the first half of the 19th century, and as the number of children rose in this part of the country, the incidence of child labour appears to have risen as well. For example, child labour in Swedish urban industry, that was mostly located in the south, peaked in the 1850s. In northern Sweden, by contrast, where the child phase occurred later, child labour continued to exist well into the 20th century. Northern children worked within agriculture and lumbering, but also in the sawmill industry.¹⁶ Today, when child labour is no longer an issue in Sweden and other ageing countries, child labour has instead become very important in poor countries in Africa, Asia and Latin America, where child dependency rates are still high. As could be expected, the highest activity rates are found in sub-Saharan Africa. Here, more than 30 percent of children aged 10-14 years are considered part of the labour force. The highest incidence of child labour is registered in Burkina Faso, where 59 percent of children aged 10 to 14 are included in the economically active population.¹⁷

A third characteristic feature of child abundant countries is a strong dependence on the exploitation of natural resources. In Sweden, the devastation of forestland spread from the south towards the north during the child phase, but an even more conspicuous phenomenon, was the intense process of land reclamation.

¹⁵ Hitherto, the possible relationship between the age composition of the population on the one hand, and child labour on the other, has not been much discussed. An important exception is the analysis of labour scarcity, due to emigration, and child labour in M. Sjöberg, *Att säkra framtidens skördar. Barndom, skola och arbete i agrar miljö: Bolstad pastorat 1860-1930*, Linköping 1996, p. 127-129.

¹⁶ E-L Bjurman and L. Olsson, *Barnarbete och arbetarbarn*, Stockholm, 1979; A. Johansson, *Arbetets delning: Stocka sågverk*, s. 340-352; L. Olsson, *Då barn var lönsamma. Om arbetsdelning, barnarbete och teknologiska förändringar i några svenska industrier under 1800-talet och början av 1900-talet*, Malmö, 1995 (second printing), chapter 6; and L. Sommestad, *Sågverksarbetarna i strukturomvandlingen*, Gävle, 1982, p. 90-91.

¹⁷ *Economically active population*, vol. II (Africa) and vol. V (World), STAT Working papers, Bureau of Statistics, International Labour Office (ILO), Geneva, 1997; and J. Boyden, *What works for working children*, Stockholm, 1998.

In order to secure the survival of a growing number of children and young families, all available natural resources were utilised. In Sweden, the cultivated area roughly doubled during the early phase of the age transition, from 1820 to 1865. It reached a maximum around 1920, a point in time when the number of children was at its height. In the 19th century, land was reclaimed in particular in southern Sweden, where the demographic transition first set in. Later, the focus shifted towards the north, where land reclamation continued well into the 1950s. In this late period, available data confirm the hypothesis that land reclamation was closely related to the age structure of the population.¹⁸ Today, land reclamation is still in full swing in many rapidly growing, child abundant populations, for example in sub-Saharan Africa. Between 1980 and 1996 land reclamation was particularly intense in West Africa, with increases between 20 and 40 percent in the share of arable land in countries like Gabon, Guinea, Burkina Faso, Ghana and Côte d'Ivoire.¹⁹ In Africa today, as well as in Sweden in the nineteenth century, intense exploitation of natural resources has followed by environmental devastation, such as soil erosion and destruction of forestland.²⁰

Finally, child abundant countries are dependent on foreign capital. In the Swedish case, the entire child phase, from the 1820s up to the First World War,

¹⁸ Counties with a large share of children among their inhabitants, such as the northern counties of Västerbotten and Norrbotten, tended to reclaim more land than counties with a more mature age composition. In R. Backman, *Demografin bakom Sveriges barnarbete*, Essay, C-level, Department of Economic history, Uppsala university, 1997; D. Bäcklund, *I industrisamhällets utkant. Småbrukets omvandling i Lappmarken 1870-1970*, Umeå, 1988, chapter 10; D. Hannerberg, *Svenskt agrarsamhälle under 1200 år*, Stockholm, 1971, p. 28-31, s 79; B. Hansson, "Hur användes marken?", i *Jordbruket, Sveriges Nationalatlas*, Höganäs, 1992, p. 26-27; G. Utterström, *Jordbrukets arbetare. Levnadsvillkor och arbetsliv på landsbygden från frihetstiden till mitten av 1800-talet*, Stockholm, 1957, p. 709-717.

¹⁹ World Bank, *World Development Indicators*, 1999, table 3.1.

²⁰ For exploitation of natural resources and environmental degradation in Sweden, see for example G. Fridlitzius, *Swedish Corn Export in the Free Trade Era*, Lund, 1957; E. Söderlund, *Svensk trävaruexport under hundra år*, Stockholm, 1951, p 31-40, 46-49; and N. Edling, "Staten, Norrlandsfrågan och den organiserade kapitalismen", *Historisk tidskrift*, 1994, nr 2. Local environmental devastation due to poverty in developing countries today is dealt with in P. Dasgupta, "The Environmental Resource Base and Human Welfare", in K. Lindahl-Kiessling and H.

was marked by capital imports. Lennart Schön has shown that Sweden's current account was negative for 60 years, from the 1850s up to the 1910s. By 1910, Sweden was probably one of the most indebted nations in the world. The estimated debt amounted to 75 percent of GNP.²¹ A similar correspondence between age structure and the dependence on foreign capital has been observed for several countries in the 20th century as well.²²

To sum up, empirical evidence indicates that the first phase in the age transition, the child phase, is characterised primarily by scarce resources, or poverty. In relation to this basic condition, other characteristic features stand out, such as child labour, an intense exploitation of natural resources, and dependence on foreign capital. These characteristic features of child abundant societies fit well with expectations. From a life cycle perspective, childhood is a period of life when the productive capacity of individuals falls short of their consumption needs. However, due to the predominance of young people, child abundant societies are also clearly oriented towards the future. Survival strategies, such as land reclamation, reveal a strong ambition to work hard in order to secure the well being of new generations. This prospective spirit becomes even more marked when we turn to the next phase in the age transition, *the young adult phase*.

In Sweden, the young adult phase started in the 1840s and continued – with some delay during the period of emigration – to about 1930/40 (the figure 1 above). The most clear-cut period of youth increase lasted from the 1890s to about

Landberg (eds.) *Population, Economic Development, and the Environment*, Oxford, 1994.

²¹ Lennart Schön, *Omvandling och obalans*. Appendix 3 to *Långtidsutredningen 1994*, Stockholm, 1994, p. 47-54.

²² T. T. Herbertsson and G. Zoega, "Trade Surpluses and Life-Cycle Saving Behaviour", *Economics Letters*, November 1999; M. Higgins, och J. G. Williamson, "Age Structure Dynamics in Asia and Dependence on Foreign Capital", *Population and Development Review*, vol. 23, June 1997, no 2; T. Lindh och B. Malmberg, "Age Distributions and the Current Account – a Changing Relation?", working paper 1999:21, Department of Economics, Uppsala University; and A. M. Taylor, "External Dependence, Demographic Burdens, and Argentine Economic Decline After the *Belle Epoque*", *Journal of Economic History*, vol. 52, 1992, no. 4.

1940. In these decades, when emigration finally came to an end, Sweden experienced a continuous growth of the young population.

The young adult period in Sweden is strongly associated with modernisation. This was a time of agricultural transformation, liberalisation, railway building, emigration, urbanisation, industrialisation, popular movements, and, towards the end of the period, rapidly falling birth rates. New industries emerged, international trade developed, and financial markets boomed – and collapsed. Furthermore, the increase in the share of young people coincided with increasing social and political conflict, and, in response to this, democratisation and more extensive state intervention. In the late 19th century Sweden, modern ideas about public health, social security, protective labour legislation, urban housing, vocational education, etc. were launched, and these policies, designed to deal with the multiple risks, dangers and possibilities of early industrialisation, would later form the basis for more comprehensive welfare state policies.²³

Few would at once be willing to ascribe these rapid changes to the increase of the young adult population. However, if we look at other countries experiencing a similar demographic transformation, it is striking that we in these cases also find examples of countries undergoing very rapid economic change. England, for example, between 1800 and 1900, Germany between 1870 and 1930, China from 1965 to 1995 and Algeria from 1980 and onwards.²⁴ The list can easily

²³ L. Jörberg, "Structural Change and Economic Growth: Sweden in the 19th Century", in P. K. Brien (ed.), *The Industrial Revolutions in Europe*, vol. 5 of *The Industrial Revolutions* series, Oxford, 1994; H. Lindgren, "Finanssektorn och dess aktörer 1860-1992", in *Äventyret Sverige. En ekonomisk och social historia*, Stockholm, 1993; K. Ohrlander, *I barnens och nationens intresse*, Stockholm, 1992; S. Olsson, *Social Policy and Welfare State in Sweden*, Lund, 1990; Sommestad, "Welfare State Attitudes to the Male Breadwinning System", B. Stråth, "Industri borgerskapets roll i den svenska samhällsomvandlingen", in K. Kjeldstadli *et al.* (eds.) *Formeringen av industrisamfundet i Norden fram till 1920*, Oslo, 1994, p. 29-46.

²⁴ B. R. Mitchell, *International Historical Statistics, Europe 1750-1988*, Stockton, 1992, p. 21-22, 41-43; United Nations, *Global Estimates and Projections of Populations by Sex and Age: the 1994 revision*, United Nations, New York, 1994.

be extended. As it seems, the "chock of modernity" is closely associated with a particular demographic situation, the young adult phase.²⁵

In fact, many historians have argued that young people played a remarkably prominent role in Europeans history during this period. The Swedish historian Henrik Berggren, for example, observes that youth associations proliferated in Europe at the time, and parallel to this, a discourse on youth and adolescence had a powerful impact on political and cultural debates. Youthfulness was increasingly associated with energy, purity, modernity and progress. In the early 20th century, he notes, Swedish society was seemingly completely pervaded by enthusiasm for the youth of the nation.²⁶

The strong increase in the adult working population, that marked the period, has also attracted the attention of a long row of economists and challenged them to theorise about the possible relationship between population dynamics and economic change. A classic analysis is Simon Kuznets' discussion about population growth and economic development in the time of the industrial revolutions, *Modern Economic Growth* (1966).²⁷

Kuznets argued that population growth in the Western world during the late 19th and early 20th centuries had largely positive effects. The most important reason, he noted, was precisely the fact that population growth in this period resulted in a more favourable age structure. In contrast to the earlier phase, when children dominated population growth, a growing share of people was now in the most productive years. Second, the decline in infant- and child mortality, that

²⁵ Compare A. Pred, *Lost words and lost worlds : modernity and the language of everyday life in late nineteenth-century Stockholm*, Cambridge, MA, 1990.

²⁶ H. Berggren, *Seklets ungdom. Retorik, politik och modernitet 1900-1939*, Stockholm, 1995, p. 11-51.

²⁷ S. Kuznets, *Modern Economic Growth. Rate, Structure and Spread*, New Haven and London, 1969.

marked this stage of the demographic transition, eliminated the waste involved in rearing large number of infants that died before they could themselves contribute to the production and welfare of society. Furthermore, lower birth rates and a decline in infant mortality reduced the domestic work of women, and thus released women for gainful occupations. Third, according to Kuznets, the decline in death rates was related to a lower incidence of disease, and with improving health, it could be expected that the productivity of the population increased. Fourth, following the classic argument of Adam Smith, Kuznets pointed to the greater opportunities for economies of scale, and he also noted the broader scope for venturesome entrepreneurial undertakings and the more plentiful stock of possible contributors to the stock of knowledge.²⁸ These arguments of Kuznets can easily be extended. For example, a growing young adult population will make investments in communication and infrastructure more profitable and increase the demand for housing.

However, in contrast to Kuznets' largely positive view, a strong scholarly tradition has also pointed to possibly negative consequences of a growing, young labour force. The most influential thinker in this tradition is of course Robert Malthus, who formulated his influential theory about overpopulation already in the late 18th century. Malthus argued that in the wake of population growth, wages would be driven down and marriages postponed. Following Malthus, in the 1880s, the Swedish economist Knut Wicksell argued that population growth was in the main negative for the wellbeing of a population. According to Wicksell, phenomena such as emigration, low living standards, social discontent and low levels of moral were all caused by a disproportionate increase in the labour force. Knut Wicksell

²⁸ Ibid, p. 56-58.

and other neo-classical economists maintained that there was an optimal population for a given level of technology and available natural resources.²⁹

In view of the typical life cycle pattern, it is actually not surprising that observations from the young adult phase show a largely positive macro-economic development, mixed with reports about individual economic hardships and political instability. In contrast to children, young adults can support themselves with their labour. This favours economic development. However, young people are in general less stable than older citizens are: they are more mobile, lack life experience, earn less, and have a limited capacity to generate savings. Furthermore, it is probable that a large increase in the share of young, less experienced labour will push down the relative wages of this age group, while the growing need for investments, not least in housing and infrastructure, will drive up the price of capital. Income inequality and inflationary pressures may follow.³⁰

As we will soon see, more stable economic conditions characterise the third phase of the age transition, *the phase of population maturity*. In Sweden this phase started around 1870 and continued up to about 1970. The increase of the middle-aged group was particularly strong in the period 1920 to 1960 (see figure 1 above). In Great Britain, Australia and Canada the phase of population maturity started somewhat earlier, and in the United States the relative expansion of the middle-aged group took off already in the mid-19th century. In Denmark, Switzerland, Germany, and Belgium the time pattern was similar to Sweden's, while

²⁹ The two sections about population and economic development are based on Lundsjö, *Fattigdomen på den svenska landsbygden*, p. 12-17; A. Carlsson, *The Swedish Experiment in Family Politics. The Myrdals and the Inter-War Population Crisis*, New Brunswick, NJ, 1990, p. 11-15.

³⁰ B. Malmberg och L. Somme stad, "Arbetslöshet och inflation. Lärdomar från mellankrigstiden", in S. Ackum Agell och J. Hassler (eds.), *Tretton inlägg om arbetslöshet*, Stockholm, 1997; G. Fuller and F. R. Pitts, "Youth cohorts and political unrest in South Korea", *Political Geography Quarterly*, vol 9, 1990:1; M. Higgins and J. G. Williamson, *Explaining Inequality the World Round: Cohort Size, Kuznets Curves, and Openness*, Federal Reserve Bank of New York, Staff Reports, June 1999, no. 79.

the expansion of middle aged in Italy, the Netherlands, and Norway did not start until the inter-war years. All in all, the rapid expansion of the middle-aged group in the industrialised world is largely a 20th-century phenomenon.³¹

Outside the western world, Japan was the first country to enter the phase of population maturity. Here, the share of the middle-aged population has been growing from the 1950s to the early 1990s. In Korea the share of the middle-aged population has been growing from the end of the 1960s, and in Chile, Mexico and Thailand since the early 1970s. In Brazil, Colombia and China the expansion of the middle-aged group started about 1980, whereas for example in Morocco, India and Vietnam it started as late as in the early 1990s. Countries that have not yet entered this third phase of the age transition include a number of sub-Saharan states such as Tanzania, Uganda and Mozambique.³²

If we look for common characteristics among countries that have entered the phase of population maturity, the most obvious choice would be sustained economic growth. Countries that for a number of decades have benefited from increases in the middle-aged group seem without exception to have entered the club of industrialised countries. An increase in the group of middle-aged people is thus clearly associated with a more developed stage of economic growth, a stage that the economist Walt Rostow once designated "the drive to maturity".³³

As regards Sweden, the phase of population maturity overlaps almost

³¹ B. R. Mitchell, *International Historical Statistics, Europe 1750-1988*, Stockton, 1992, p. 14, 16-17, 21-22, 28-31, 37-39, 40-43; and B. R. Mitchell, *International Historical Statistics, The Americas and Australasia*, Stockton, 1982, p. 57, 67-69, 77.

³² United Nations, *Global Estimates and Projections of Populations by Sex and Age: the 1994 revision*, United Nations, New York, 1994.

³³ B. Malmberg, "Age Structure Effects on Economic Growth: Swedish Evidence", *Scandinavian Economic History Review* 42, no. 3; T. Lindh and B. Malmberg, "Age Structure Effects and Growth in the OECD, 1950-90", *Journal of Population Economics* 12, no. 3; W. W. Rostow, *The stages of economic growth : a non-communist manifesto*, 3. ed., Cambridge, 1990.

exactly with the most successful period of economic growth. Between 1920 and 1970 the Swedish GNP per capita grew by almost 400%. The average annual growth rate was 3.2 %. This compares to a 1.1% annual growth rate in the fifty years before 1920 and a 1.6% annual growth rate from 1970 to 2000.³⁴ In view of this tremendous rate of growth, it is important to note that this was also the period, when the work force participation among Swedish women decreased markedly. In the 1950s it eventually reached its lowest level ever, slightly above 40 percent. This was the short "era of the housewife" in Swedish history.³⁵

Possible causal factors behind the correlation between middle-aged people and economic growth are not yet fully clarified. However, observations of economies that pass through the phase of population maturity fit well with the micro-economic characteristics of middle aged people. One important factor is savings behaviour. When people enter this part of the life cycle, they tend to save more, and in addition, they increasingly switch their investments from housing, for example, to financial assets. This is important for industrial investments. Another factor is long life experience and well-developed social networks among the middle aged. It can be expected that this type of capacity, that we may label "human capital", is of great importance in modern industrial economies.³⁶ As regards women's low work force participation in this period, it is likely that low youth- and old age dependency rates makes it possible to do without married women's gainful labour. With an ample labour supply, women can more easily focus on domestic

³⁴ A. Maddison, *Dynamic forces in capitalist development : a long-run comparative view*, Oxford, 1991; O. Krantz, *Swedish historical national accounts 1800-1990 – aggregated output series*, Manuscript, 1997; Statistics Sweden, *National account data*, 1999.

³⁵ M. Neramo, *Structured by Gender. Patterns of sex segregation in the Swedish labour market. Historical and cross-national comparisons*, Stockholm, 1999, p. 38-39, including table 2.1.

³⁶ R. Lee, (1994a), "Population age structure, intergenerational transfers, and wealth: A new approach, with applications to the U.S." (with the assistance of Timothy Miller), *Journal of Human Resources* 29, 1994, no. 4; J. Mincer, *Schooling, experience and earnings*, New York, 1974; D. N. Weil, "The saving of the elderly in micro and

chores and child rearing.³⁷

It should be noted, finally, that the phase of population maturity in Sweden coincided with the height of the "Swedish model", 1930-1970. In view of the age composition of the Swedish population during this successful phase of welfare institutionalisation, it is worth noting that Sweden in this period could benefit not only from low dependency rates and high rates of economic growth, but also from a large stock of knowledge and experience. It has often been emphasised that an extraordinary spirit of consensus and constructive collaboration, not least between employers and trade unions, marked the classic Swedish model. It is unlikely that this feature of the Swedish model was unrelated to the rich human resources and the remarkably high share of experienced people in the population.³⁸

The final phase of the age transition, *the phase of ageing*, is largely a late 20th century phenomenon. The first country to enter this phase was Great Britain, that already by 1914 was experiencing an increase in the share of older age groups. In the inter-war years the expansion started in Australia, Austria, Belgium, Germany, and Switzerland, and in these countries (with Australia as an exception) the relative expansion of the old age group continued into the post-war period. In Sweden, as well as in the other Scandinavian countries, the growth in the share of old aged did not accelerate until after World War II. However, once the process of ageing had begun in Sweden, it was remarkably rapid, and up to 1990, no other industrialised welfare state has had such a pronounced ageing process as Sweden.³⁹

macro data", *Quarterly Journal of Economics* 109, 1994 no. 1.

³⁷ L. Somme stad, "Komparation - en stimulans för kvinnohistorisk teoriutveckling", forthcoming in report from The Sixth Meeting of Nordic Women Historians, Tilsvildeleje, 12th to 15th of August, 1999.

³⁸ J. Myhrman, *Hur Sverige blev rikt*, Stockholm, 1994, p. 246-255, in particular p. 250; L. Magnusson, *Sveriges ekonomiska historia*, chapter 13 (The Swedish model), p. 445-472.

³⁹ B. R. Mitchell, *International Historical Statistics, Europe 1750-1988*, Stockton, 1992, p. 13, 14, 16-17, 21-22, 31, 37-39, 40-43; and B. R. Mitchell, *International Historical Statistics, The Americas and Australasia*, Stockton, 1982, p. 77.

In recent years, a number of countries in Asia and Latin America have also entered the phase of ageing. In Japan the share of people above 60 years of age has been growing rapidly since about 1980. In Korea as well as in Thailand the share of old aged has started to grow in the 1990s, and towards 2010, the process of ageing will accelerate. In Chile, Brazil and China, the old age group has begun to increase and will accelerate further in the next two decades.⁴⁰

Thanks to good availability of comparative data for recent decades, collected by the OECD, it is relatively easy to find out how the expansion of the old age group is correlated with macro-economic phenomena. Two features stand out. First, ageing countries have experienced a decline in economic growth, along with a number of related negative economic trends. Thus, statistical analyses of OECD data show that there is a negative association between, on the one hand, the share of people aged 60 and above, and, on the other hand, per capita income growth, productivity growth, rate of capital formation in the business sector, foreign balance, and housing investments. Ageing is also associated with increasing long-term interest rates. If we differentiate between different groups of old aged, people above 80 years of age stand out as particularly costly.⁴¹

Second, population ageing in the OECD countries has been closely connected with growing public expenditure and budget deficits. There is thus a strong positive association between, on the one hand, the share of people aged 60 and above, and, on the other hand, government consumption, public sector employment, public debt, and taxes paid. All in all, these correlations indicate that the old age phase of the age transition is associated with a major structural shift in

⁴⁰ United Nations, *Global Estimates and Projections of Populations by Sex and Age: the 1994 revision*, United Nations, New York, 1994.

⁴¹ Analyses based on data in OECD, *Statistical Compendium, Vol. 97:1*, Paris, 1997; Lindh and Malmberg, "Age

the economy away from a traditional high-growth industrialised economy towards an economically less vigorous welfare state. If the results are compared to life cycle behaviour, it is evident that the decreasing productive capacity, that marks individual ageing, translates to the macro economy as well.⁴²

In Sweden, with its pronounced process of ageing from the 1970s onwards, the correlation between ageing and welfare state growth is evident indeed. In particular, expenditures for old age care and services, health care, and childcare have expanded. Parallel to this, women's labour force participation has increased, and in particular within the public sector, part time work has become institutionalised. In contrast to the 1940s and the 1950s, very few Swedish women are today fully occupied as homemakers.⁴³

In some respects, this last phase of the age transition is similar to the first, the phase of child abundance. From a theoretical point of view this is not surprising, since both the earliest and the last phase of the life cycle are characterised by a deficit productive capacity. There are, however important differences. The old-age phase of the transition comes after a period of strong economic growth and, therefore, it is not likely that it will generate mass-poverty. Another difference is that in the child abundant period subsistence problems are largely left to be coped with by individual families on their own. This is not so in the

Structure Effects and Growth in the OECD”.

⁴² Analyses based on data in OECD, *Statistical Compendium, Vol. 97:1*, Paris, 1997. The impact of ageing on welfare state growth has been analysed by several scholars. Important studies include P. H. Lindert, "The Rise of Social Spending, 1880-1930", *Explorations in Economic History* 31, 1994; F. C. Pampel and J. B. Williamson, *Age, Class, Politics and the Welfare State*, Cambridge, MA, 1989; and J. B. Williamson and F. C. Pampel, *Old Age Security in Comparative Perspective*, New York, 1993.

⁴³ Statistics Sweden, National Accounts, table "Arbetade timmar efter näringsgren", 1980-1998; A. Lindbeck, *The Swedish Experiment*, Stockholm, 1997, p. 20-25; Neramo, *Structured by Gender*, p. 38-40; R. Olsson, "Det svenska välfärdssamhällets framväxt – tacka kvinnorna för det", *Socialvetenskaplig tidskrift* nr 1, 1995; and L. Svensson, *Politics for gender equality? : the impact of welfare state policies on the position of women in the Swedish labour market*, Lund, 1995.

old-age phase when public institutions and public transfers of income play a much larger role for the redistribution of resources between people of different ages, and also between regions.

However, it remains to be seen whether societies with increasingly older populations will be able to sustain and develop existing institutions for redistribution between generations. If we look more closely at educational and social policies in ageing societies, tendencies of increased conflict around available tax resources can no doubt be found. In Sweden, for example, there have lately been signs of a growing political incapability to comply with the needs and demands of youth and children. During the 1990s, when Sweden experienced a severe economic crisis, children and young people were in many respects more hardly hit than older citizens were.⁴⁴

To conclude, the debate about how population change affects economic and social development has always been a hot topic in the social sciences. On the one hand, there has been the Malthusian view that emphasises the negative effects of population growth. This strand of thought has been remarkably strong, and it has gained additional support during the extraordinarily rapid world population growth after World War II. On the other hand, there has been a smaller group, sometimes labelled "population optimists", who have argued that population growth is an important positive factor in economic growth. To this group belongs Simon Kuznets, together with the influential Danish economist Ester Boserup, who convincingly has argued that the introduction of new technology is closely linked to the size of the resident population.⁴⁵

⁴⁴ *Välfärd vid vägsfäl. Utvecklingen under 1990-talet*. Delbetänkande, Kommittén för välfärdsbokslut, SOU 2000:3, p. 271-272.

⁴⁵ E. Boserup, *Population and Technology*, Oxford, 1981.

Clearly, both "population pessimists" and "population optimists" have been able to put forward empirical studies that support their positions. These seemingly contradictory empirical results have led some scholars to conclude that population growth has in fact only few – or weak – effects on economic development, and from this "neutralist" position, the conclusion has been drawn that major explanations for long-term historical change should be sought elsewhere. However, our argument in this paper is that population dynamics must still be considered as a main driving force behind historical change, and that the seemingly contradictory results of earlier research disappear, if we introduce age structure as an analytical category. In short: the effects of population growth depend on which age groups that are involved. Population growth dominated by children will have Malthusian effects on the subsistence situation. Population growth dominated by increases in the middle age groups, on the other hand, will have the favourable effects that population optimists proclaim.

One way to demonstrate the importance of taking age structure into account is to use Edward A. Wrigley's and Roger Schofield's classical data set on the English population to look at the impact of population growth on real wages. In these data there is some evidence of a Malthusian mechanism, but the pattern is in no way clear-cut. For quite long periods, notably the early 17th century and in the 19th century, there is – in contradiction with the Malthusian model – a simultaneous increase in both population and the real wages. Thus, the Malthusian model cannot be upheld as a general model although it seems to account for some patterns in the data. A general solution to this problem has been to propose the existence of a Malthusian regime during periods when a Malthusian correlation is found and to proclaim the end of the Malthusian regime when the correct correlation fails to show up.

If changes in the age structure are taken into account these difficulties are greatly diminished. Wrigley's and Schofield's data show that during the whole of the 1541 to 1871 period the English population have undergone several cycles of age structure change. If these changes in the age structure are correlated with the real wage index it becomes evident that real wages have been high when there have been large increases in the middle-aged population (30-64 years). There is also, fully in accordance with the Malthusian paradigm, a negative correlation between the share of young adults and the real wage. Moreover, these correlations are valid for the entire 1541 to 1871 period. This implies that with age structure changes taken into account there is no longer any pressing need to formulate different models for different historical periods.

Moreover, a consideration of age effects might explain why population optimists often rely on long run data when they want to demonstrate the positive impact of population growth.⁴⁶ Thus, in Wrigley's and Schofield's data, it is only increases in the middle-aged population that is associated with high real wages. In the short run, however, population growth is associated with increasing numbers of children and young adults. Therefore, optimists may come into trouble when they are confronted with fresh examples of rapid population growth.⁴⁷ The post Second-World War experience in Asia and Africa is a case in point. In the wake of constantly rising youth dependency rates, many countries in Asia and Africa experienced remarkable economic setbacks. Only recently have falling birth rates turned the tide, so that population growth increasingly goes together with economic progress.

⁴⁶ See e.g. M. Kremer, "Population Growth and Technological Change: One Million B.C. to 1990", *Quarterly-Journal-of-Economics* 108, no 3, 1993.

⁴⁷ An interesting example is P. Harrison, *The third revolution—Population, Environment and a Sustainable world*, London, 1993, p. 83-87.

Taken together, our analysis of the age transition in Sweden and elsewhere suggests that age structure changes have played a potent role in macro-economic processes of change. We do not argue here that the multiple phenomena discussed in this article – such as poverty, urbanisation, economic growth, or welfare state expansion – are fully explained by demographic factors alone. However, we do argue that in view of the very limited interest that has hitherto been given this potentially fruitful field of research, more studies are indeed needed – not only in order to understand our past, but also in order to see where we are now going.

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