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Socioeconomic implications of demographic change

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Abstract: The article focuses on discussing individual sociological and economic implications of demographic change. While demographic characteristics of developed societies have changed since the industrial age and are now slowing down into a form of stronger old and old-old kohort, this aging of a population has strong effects on the behavior of individuals, societies and policy makers. Increasing costs of health and long-term care as much as pensions are driving policy changes across the world. The article provides insight on these implications and their effect, such as rejuvenation, singularization and feminization of society on the sociological part and increase in public expenditure as well as ambiguous effects on savings, labor force and total factor productivity when discussing the economic impacts.

Keywords: demographic change, demographic transition, aging, sociological and economical implications

1. INTRODUCTION

Since the beginning of the 19th century the world's population's structure has been changing more dramatically and faster than in any other era before. The industrial revolution and hence advances in medicine and technology have lengthen the human life in an unprecedented way. Increasing life expectancy however resulted in a trend of falling fertility rates and thus lead to a change in the demographics of world's population as such. The fact is, the worldwide society is aging. The developed countries are progressively entering the most crucial phase of this development as their baby boom generations are just crossing the productive age into retirement around 2010. The situation in developing countries is less apparent though not less critical due to faster aging trends and much lower levels of per capita income than within their developed counterparts (Shrestha, 2000). While state welfare models in distinct parts of the world differ, the economists are concerned not with "whether" but rather with "when" and "how strong" the impact on the likely costs of the aged care services will be. The relative magnitude of these consequences remains still uncertain.

2. DEMOGRAPHY AND GLOBAL AGING

The characteristics of a country's population are crucial determinants influencing its economic and social structure. Total population growth, age composition of the population and the "quality" of the population influence the aggregate demand for goods and services. At the same time, demographics influence the amount of labor available for production and the circumstances under which that labor will be offered. Consequently this has effect on population's investment into social and health insurance, which are the two main financing components within the care sector.

As Lee (2003, p. 170) states, "the classic demographic transition starts with mortality decline, followed after time by reduced fertility, leading to an interval of first increased and than decreased population growth and, finally, population aging" and may be defined as the process of an age shift towards the elderly cohort within the populations of the world. The transition may be described best using the original demographic transition model developed by Warren Thompson in 1929 and popularized by Frank W. Notenstein in 1940s. The model – while it's basic facts remain uncontroversial – does not indicate connections to any theories or interpretations although it uses the economic development as an external variable. It is based on observations of changes in birth and death rates of a population. Illustration 1 provides a graphical render of this effects (CBR being the Crude Birth Rate and CDR the Crude Death Rate).

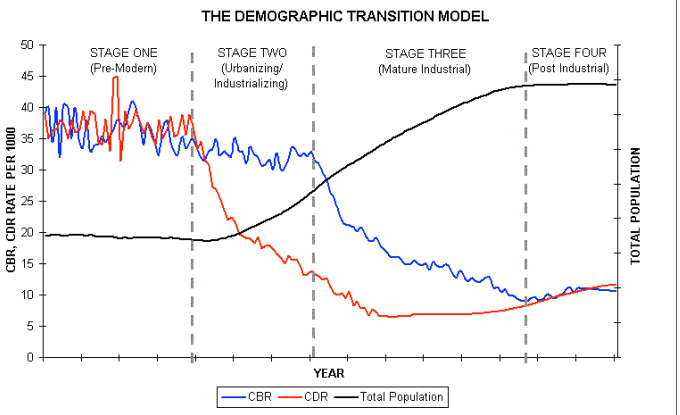

Illustration 1: The Demographic Transition Model (Montgomery, 2016)

3. IMPLICATIONS OF DEMOGRAPHIC CHANGE

The aging population raises not only macroeconomic issues of the impact of aging on the economy as whole but also microeconomic issues of individual prospects for consumption and income.

At the beginning, it is important to state that while conventional approaches use rather static measures of the burden, calculated by dependency ratios, thus examining the interaction between the economically dependent and economically active parts of the population at a certain point in time or within a certain period, they also neglect behavioral responses from the "inactive" part of the population or the over-time development of successive generations within the population. Forward-looking perspective may be enabled by using the life-cycle hypothesis which considers individuals passing through their stages of childhood, economic activity and retirement participating by their consumption and production decisions. Generational transactions, which differ according to the stage they being linked to, may include re-distributive tax-policy systems but also behavioral forms (altruistic, strategic, etc.) (Disney, 1996).

Before providing insight into economic implications for a society after aging, first the imminent consequences of the aging on demographic statistics are discussed.

Rejuvenation

The demographic change is impacted by a rejuvenation of the population in question. There are different aspects of this effect, some of them positive, other negative or neutral. The subjective age is getting lower in contrast with the chronological age of individuals. There is a ten years of difference in

subjective age when comparing the elderly in the 1960s and nowadays. A 70-year old in 1960s would have been considered old, whereas currently only 26% of the 70- till 75-year old think of themselves as old (Tews, 1991 in: Ritter and Hohmeier, 1999). The change in the perception of the elderly can be seen for example in commercials and marketing campaign, which portray especially the "youngest old" as open-minded, flexible, empathic, financially independent and modern people.
On the other hand side, the labor market may still regard older citizens (e.g. 40+ years of age) as unsuitable for hiring while these do not regards themselves as old at all. This group of older unemployed persons is a critical one, as without employment and missing personal training and development their human capital may decrease even further. Retirement at a "younger" age or long-term unemployment may provide sparks for life-crisis situations. Particularly the 50- till 60-year old are concerned with their further life. This strong focus on latter life stages provides these with new structural and historical meaning.
Neutral effects of the rejuvenation may be found within the family life. Especially women, who care for their children, may use the remaining life time more effectively by adding further skills to their personal portfolio and exercising these longer.

Disemployment

Disemployment means longer retirement or time without economic activity and the process of giving up employment. Since the introduction of a legally binding retirement age the age at retirement has been dropping mostly. This international trend may be seen as negative due to the elimination of still active human capital and the shortening of the human resources within the labor market. On the other hand, such a policy has decreased the rate of unemployment.
We may not see this trend continue (and indeed we do not as the latter years have proven) in the future due to several reasons:

a) on a macroeconomic level, the pension and unemployment payments keep getting tenser and tenser,
b) reforming social security systems due to rising labor costs is a way how to improve the rating of a country as a potential location for new investors thus decreasing the unemployment numbers,
c) due to the demographic changes the human capital cannot be renewed by employing younger generations and laying off the older ones; companies have to improve their innovation competence by changing their human resource strategies.

Feminization

Part of the demographic development is also the rising portion of women within the population due to their greater life expectancy. In the older cohorts this ratio is two thirds, within the group over 75 years of age the amount of women is even higher (75%).
The higher life expectancy means that women are more probable to become widows. This further means that in case of a disease or disability they do not have the possibility to call their partner for help. Older women thus face a more difficult situation being dependent on further help within the family, age-specific or gender-specific, professional or private help.
The other critical implication of feminization within the older cohorts is the increasing poverty. Especially older women are stricken by poverty due to the lower premiums they have been paying while in employment because of lower salaries or due to the interruption of the premium payments because of family matter (childbearing, care for older persons).

Singularization

The phenomenon of singularization does not only concern older generations. However at older age, the effect can be accounted for by two main reasons.
Firstly, the life expectancy, which coupled with the decimation of the male population during the World War II, is responsible for the increasing numbers of singular living people, especially women.
Secondly, the life style of the generations is changing. This kind of singularization cannot be taken as isolation or soleness. This trend does begin in the younger age and continues till older ages. On the other hand side, the number of divorces is rising successively and it may be said that it may further increase in the future.

Oldest-Old-Ageism

One of the direct consequences of population aging is the increase in oldest old in the society. Has this group been previously defined as those above 75 years of age, nowadays the members are at least 80 years old due to the increased longevity. The main part of this group consists of alone-living or widowed women. According to an aging study (Mayer, Baltes, 1996 in: Ritter and Hohmeier, 1999) these may experience one or more of the following problems:

- isolation and soleness,
- diseases, especially chronic or psychic diseases, even multiple morbidity, which complicate medical drug treatment due to contraindications,
- loss of autonomy due to higher dependence on medical and social care.

With these demographic outcomes of the transition of the population's age structure towards an aging society established another step may be made forward in discussing the impact of these on the economy. How does disemployment and singularization affect the capital formation and savings behavior? What consequences on labor supply does rejuvenation have? Are interest rates and exchange rates influenced by the changes in the demographics? Successively we discuss these areas of effect of an aging population on the economy.

Public expenditure

According to the academic voices, most impact on public expenditure can be expected in areas of pension and health spending. These have consumed most of the transfers towards the households (i.e. social benefits) and have accounted for almost two-thirds of the increase in the total government expenditure to GDP ratio in the EU since 1970 (Mc Morrow and Roeger, 2004).

Generally, a clear upward trend may be witnessed in the developed countries in the last 40 years all over the world accompanied by an upward movement of taxes and debt burdens. The main contributors towards these trends were pensions, health care and education, which of only the latter has been leveling off in the recent decades.
"In the case of pensions, about 30 – 45% of the increase in the pension expenditure to GDP ratio of the EU and the US between 1960 and 2000 can be explained by movements in the old-age dependency ratio, with the remainder due to non-demographic factors such as labor market developments, increased benefits and a widening in eligibility, associated with the general expansion of the welfare state in the 1960s and 1970s" (Mc Morrow and Roeger, 2004, p. 27). Regarding health care, the age-related

increases in the public health expenditure in the last 40 years account for about 25 – 40%. The remaining increase originated mostly from increases in income levels, improvements in terms of insurance coverage as well as rapid advances in medical technologies (Mc Morrow and Roeger, 2004).
Education is believed to have a large endemic fixed cost element, which does not change dependent on the share of the younger group of the population. This leads to the assumption that aging will not have a large-scale effect on the public expenditure on education.

Savings behavior

Masson, Bayoumi and Samiei (1998 in Mc Morrow and Roeger, 2004) list the three most important determinants for the influence of aging of the private savings: income growth, real interest rates and demographic effects. Still, the specific relationship between demographics and savings is unclear. The multiple theoretical concepts which claim to model the private savings behavior, including the life cycle hypothesis, the bequest model or the "buffer stock" theory, remain just that – theory.
Due to constraints laying on the neoclassical theory (e.g. timelessness) where the undated, single-period utility function is considered by which "the individual allocates its income among goods in each period so as to maximize utility" (Jackson, 1998, p. 48) a more an extended life-cycle model is being used. The prerequisite for such long-term life planning however are more than uncertain as the knowledge about future preferences, consumption, opportunities, income, health, etc. – meaning the life as it is being lived and the choices one makes – can be either assessed in a probabilistic way or neglected. With these constraints in mind a planning over the whole life-cycle is indeed possible, however its feasibility is rather doubtful. Jackson though sees the potential of the life-cycle modeling in creating an imperfect institutional account of external constraints (legal retirement ages, formal pension schemes, etc.) and by that providing this as a projection arena, however he also states that the model does not speak about the reasons why these external constraints have been introduced in the first place, which reduces its explanatory power.

As follows the findings of Mc Morrow and Roeger (2004) are summarized: they postulate that the implication of aging on overall savings is ambiguous. The individual trends may have positive, negative or neutral influence: while increased savings for retirement by forward-looking households and lower dissaving in retirement due to prolonged life expectancy may boost saving rates, an increase in the share of low saving retirees, higher expected future labor income and lower investment needs would be expected to deplete savings.
These contradicting results have also been discussed by Jackson (1998), however with the distinction that the contradiction is rather visible in cross-section studies than time-series data analyses. The unweighted averages of different studies however come with a conclusion which suggests that "the savings rate would fall by 0.75 and 0.52 of a percentage point for every 1 percentage point increase in the elderly and youth dependency ratios respectively" (Mc Morrow and Roeger, 2004, p. 36).
In opposition to those results, household surveys challenge this evidence by suggesting that any effect of the demographic change on the savings rate may be negligible. Also studies after 1995 claim a much lower impact of the dependency ratios on the savings: negative 0.2 for the elderly and 0.1 for the youth (Mc Morrow and Roeger, 2004).

Jackson (1998) also doubts the relationship between age and saving observed at the individual level and proposes (based on Weil, 1994: in Jackson, 1998) that bequest model should be considered with higher intensity. The idea is that the old sage to make bequests to the young thus diminishing the savings by the younger generations leading to an increase in intergenerational transfers. Also private consumption and

motives for individual savings should be taken more into account. On the same issue however efforts to test the bequest model directly have proved inconclusive thus heightening the general uncertainty of the life-cycle models it builds upon.

Labor supply

The effect of aging population on labor market taken to be rather straightforward: it tends to reduce labor supply, as the participation of the older cohorts in the labor market tends to be lower. This trend of lower participation may be motivated by generous social benefits (pensions) and a broader coverage of supplementary private plans. Other factors include health, labor market opportunities and higher valuation of leisure time (Kuné, 2003). Characteristics of the labor market, such as activity rates, unemployment, taxes and social security contributions as retirement schemes, have also an impact and are responsible for the behavior of labor market developments.

Jackson (1998) analyzes this aspect by using the dynamic labor supply model, "whereby a person is free to choose labor supply in each period as well as consumption and savings" as based in Weiss, 1972 and Ghez and Becker, 1975 both in: Jackson 1998). This planning would depend on preferences, wages and the availability of unearned income and optimally lead to a start with high working hours which would decline smoothly over time consequently decreasing to zero, meaning retirement. This is in stark contrast with the legal regulatory restraints on the determination of the retirement age observed in reality. The binding retirement age artificially raises the significance of a certain age above the individual choice with serious policy implication mostly unattended in the ideal model as described previously.
Even so people have certain power over their retirement decisions. The labor supply will mostly depend on the level of pensions: higher pensions would increase the social security wealth of a person thus increase the lifetime wealth leading to a life-cycle planning with falling labor supply in the aggregate. Empirical tests draw however no clear overall conclusions and the effects may reflect other trends as social and cultural factors (Jackson, 1998).

In demographics, migration may be a solution as how to offset the shrinking labor force. For the EU however, the rate of immigration would need to be twice as high as it is currently to keep the labor force at the 2000 level; as for a labor force growth scenario the migration rate would need to reach 4 times the current rate (Mc Morrow and Roeger, 2004).

Total factor productivity

What way does aging influence the productivity of the labor force? The literature speaks of various relationships and thus produces uncertainty and difficulty in establishing clear connections between these two measures.
According to several studies (Simon, 1986; Wattenberg, 1987; Romer, 1990; Jones, 2002, all in: Mc Morrow and Roeger, 2004) the innovation slow down due to a loss of dynamism in older labor force. Others (Disney, 1996 in: Mc Morrow and Roeger, 2004) argue otherwise – that aging will have no adverse effects on productivity growth. Cutler et al (1990 in: Mc Morrow and Roeger, 2004) even empirically proves that a decline in the annual labor force growth rate of 1 percentage point is associated with about a 0.5 percentage point increase in productivity growth. His view is marked by the "the scarcity is the mother of invention" argument.

Regarding the human capital capacities, Mérette (1997 in: Mc Morrow and Roeger, 2004) believes that investments in the human capital may increase with increased longevity. This would result in a favorable effects on the economic growth in the long-term.
Mc Morrow and Roeger (2004) but also Kuné (2003) in the end take all a neutral position due to the conflicting nature of the different strands of research.

Jackson (1998) is considering the link between investment and productivity – while investment being tightly interwoven within the neoclassical model with savings – as fragile. His argument being that a simple positive relationship between investment and productivity cannot be understood by a production function lacking internal details. Social aspects of production as work intensity, working conditions, working hours or employer-worker conflicts are not being taken into account thus "weakening the supposedly deterministic relation between investment and productivity" (Jackson 1998, p. 58). He also mentions the Keynesian model which treats investment as exogenous based rather on the willingness to invest than on the availability of capital, meaning that changes in savings rates induced by population aging are not longer crucial.

Financial markets effects

Previously discussed trends of labor force developments, savings and investment do impact also financial markets including exchange rates, interest rates and international capital movements.
With evident downward shift in the levels of savings and investment trends in the last 40 years all over the world, resulting in a 3 – 3.5 percentage points decline as a share of the GDP in overall national savings and gross fixed capital formation during this era. The individual regions behaved either relatively stable (like the EU with small surpluses and small deficits alterations), declined drastically (like the US, which – after small surpluses in the 1960's and 1970's – is facing an averaging deficit of 1.5 – 1.75% of GDP) or were rising steadily (like Japan, especially in the period of 1995 to 2000) (Mc Morrow and Roeger, 2004).

The demographically induced fundamental changes in savings and investment balances within the domestic markets will have a long-term impact on the individual economies thus leading to a crucial change in net foreign asset positions of countries. The outcome of these regarding the extent and timing of the aging phenomenon on a worldwide scale will be mainly affected by a negative impact on private and public savings, a negative impact on output growth and changes in the relative shares in world output of developed and developing countries. The latter resulting in a change of weights of the developed and developing groups of countries. The developing countries will likely assign a higher portion of their growing share of world output to investment, while the developed countries will face a sharp downward movement in both savings and domestic investment after an initial phase of savings growth at the beginning of the aging phenomenon. Investment will be mainly affected by shrinking prospects of the labor force and the effect of external investment due to higher rates of return.
All of these factors will in the end generate exchange rate and current account movements. Depending on the development of the global savings / investment balance even changes in worldwide real interest rates may appear (Mc Morrow and Roeger, 2004).

4. CONCLUSION

This literature review has highlighted the in many cases uncertain and sometimes controversial effects and impacts of demographic change and transition on the economic situation of individuals and

societies. While societies may ripe into a state where young-olds will still be part of the active work force (either through their own involvement or state-induced need due to increasing pensions), the steady increase in elderly population will provide eventual burdens on the society and the labor force. Migration – an important topic nowadays (though in a controlled and profiting manner) – may be an interesting factor which could provide economies with potential labor force and productivity in regards to labor costs. Especially due to an increase in public expenditure regarding health and long-term care costs and pensions, which is being expected to reach almost 40 %, the individual economies and their policy makers have to regard these upcoming changes with heightened scrutiny.

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