

# SELECTED CAUSES OF POPULATION AGEING AND THE PROPOSALS TO ITS MITIGATION

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## Abstract

The aim of this paper is to propose some solutions to the issue of demographic ageing which is caused by increasing life expectancy and decreasing fertility levels. In the first part, some overall figures connected to the issue are shown and the negative trend which will further worsen the situation in the future is mentioned. This problem is then illustrated on selected countries and their public expenditures on pensions. The next part introduces the social contract theory. The unwillingness of younger generation to contribute to the pension systems is explained as well as the implicit nature of contract which therefore will not be authorised by the population. The last part offers some indicators and possible solutions to the issue. These proposals are meant to mitigate the current negative situation of pension systems. Moreover, it is shown that some of the indicators have rather universal validity and they can be used to retrospectively compare generations of different era as well as improve the future outlook of pension systems if introduced.

**Key words:** ageing, pension reform, demography

**JEL Code:** J11, J14

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## Introduction

Contemporary society is currently experiencing problems which were rather of minor importance or barely noticeable in the past. Some of the serious issues connected with population growth, which gained prominence in the last decades, include increasing life expectancy and decreasing fertility. This situation has gradually begun to negatively affect some aspects of societies all around the world, resulting in population ageing and future outlook seems to be even worse. Nowadays, it is estimated that approximately 600 million people are aged 65 years or older, comprising about 8% of the total world population. By 2035, this figure will rise to 1.1 billion which corresponds to 13% of the total world population. Within a quarter of a century, this figure is therefore expected to increase two times (The Economist 2014).

Population ageing is a very important challenge because it obviously affects the very structure of population and consequently the social expenditures. Apart from increase in health-related expenditures and affiliated issues, the most affected part are pension systems. In many cases, the length of working age does not reflect the increase in longevity, therefore negatively work upon pension system balance. Because of this, many pension systems are already deep in red numbers. Nearly twenty years ago, OECD (1997) warned that public pension accounts will generally go into deficit in about ten years and they are expected to grow considerably over the next decades as the pressure on social policy, including pension, health, education or active labour market programmes. It was also noted that as the number of children declines, so the spending on education decreases, but this will be accompanied by steep increase in costs associated with commitments embedded in then contemporary systems. Retrospectively, these statements were proven true. Current age structure no longer resemble a pyramid as it was decades ago. It usually shows that the strong “population waves” are represented by people aged 40 years and more. Moreover, in case that no changes will be applied, we may witness decline in national savings and some countries may even experience net national savings to be negative. Although not easily solvable, neglecting the prolonged life cycle and ageing of population is one of the most serious mistakes made by many governments across the world.

## **1 Issues connected with demographic changes**

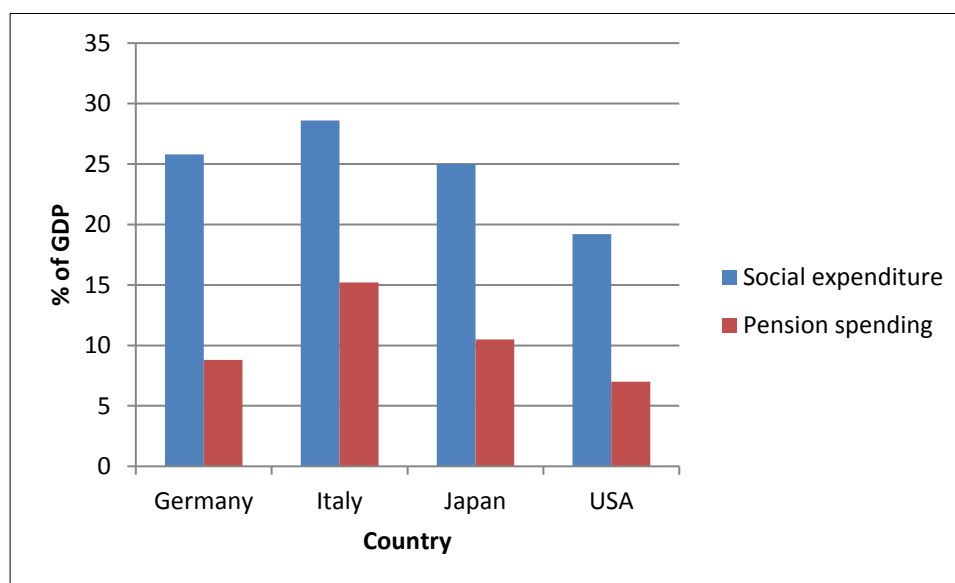
Many contemporary demographers has begun recognising this issue, taking demographic growth and age structure into the account. Also, the question of pension systems’ sustainability was raised. Giving that some pension systems (mainly self-funded) no longer guarantee defined benefits for receivers, while others have temporarily stopped the inflation indexation of the pension payouts, the focus has shifted to debate which generation should pay for the decline in the pension funds’ wealth: workers, retirees or future generations? Some contemplate that under ideal conditions, when generation retires, its pensions would be deducted from its account. The account would show zero balance when the last participant of that generation dies (Teulings and De Vries 2006).

In light of the fact that impact of age structure on economic cycle and growth is crucial, more emphasis should be placed on older generation. Whereas the size of young population may have ambiguous effect on economy, there is rather clear age stratification associated with typical older generation features. It was found out that the age group of 50-64 years old have a

positive influence on overall economic growth, while that of the age 65 and older have a negative effect (D'albis and Moosa 2015).

For the illustration, we selected several countries and showed their public expenditures on pensions (Fig. 1). Although all of these are ranked among highly developed countries, differences in their spending are noticeable. Not surprisingly, Italy, where overall social situation is not favourable, gives more than half of its social expenditure to pension system. On the other hand, only one third of social expenditure in Germany goes to pension account. Japan and the US with enormous public debt shows relatively stable figures and are not affected by this situation. Generally, countries around the world show rising trend in expenditures to pension systems.

**Fig. 1: Comparison of social expenditures and pension spending in selected countries in 2014 (own construction**



Source: (own construction based on OECD data)

## 2 Social Contract

The new stratification will also affect connections between old and young generations. Apart from stabilisation which will take this new situation into account, the other aspect of this might be that of intergenerational tension. Some social and demographic assumptions might not be valid anymore (OECD 1997). At this point, it is appropriate to mention the social contract theory. In the widest sense, it is an implicit contract “closed” among members of society and it

may refer to many political or social aspects of society. Nowadays, the pension system is one of most discussed issues in this respect. That is because the younger generation will have to bear the costs associated with population ageing. Renowned economist Paul Samuelson significantly helped to develop some aspects of this theory. He constructed a model where two periods are distinguished. The first period covers younger individuals who receive a certain amount of a perishable consumption good, while the second period represents the older part of population which receives nothing at all. An intergenerational contract in which each younger generation gives a certain amount of their perishable commodity to their parents would be optimal for each individual. Steurer (2008) adds that under the assumption that individual lifetime utility depends on consumption during young as well as old age (and the consumption function is stronger than linear) this statement is true for every individual of all generations if the model has an infinite horizon. It is true for every individual except those of the last generation if the model is finite. Nevertheless, it assumes rational and identical individuals. Such contract with rational individuals with perfect foresight would fail. Specifically in a finite model, the last generation would not be willing to support the system and by backward induction every other generation before them as well. Also, savings entitled to certain generation can be deflated by many factors, thus causing uncertainty. The intergenerational contract would not be established because of these arguments.

As mentioned above, the contract is implicit, so it cannot be enforced and its voluntariness would further add to disapproval of members of each generation. Samuelson model can be thus applied to pensions as well and can be seen as extension of the overlapping generations (OLG) model with minor adjustments. In the first period, people work and spend some of their earnings, but also save some of it for the second period. In the latter part of their life when they do not work, they consume all of their savings from the first period and the earnings on those savings, which have grown with investment income from the first period at rate  $r$ . Fully funded social security system has no impact on capital accumulation, since accounts earn the rate of return on capital  $r$  (Andrews 2008). But the introduction of pay-as-you-go social security system is less certain because the return on capital is equal to the rate of population growth.

### **3 Indicators connected with possible solutions**

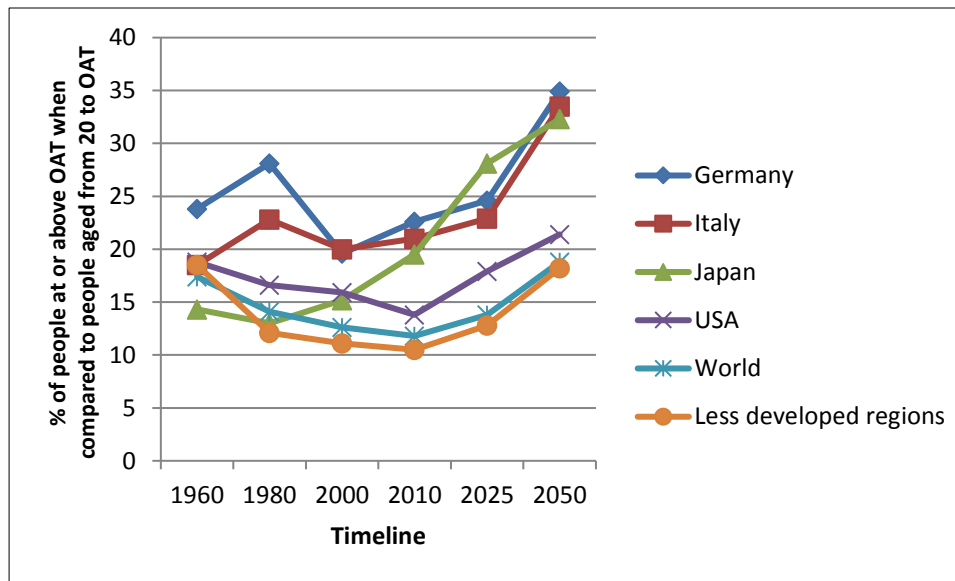
Because of the uncertainty of social contract, there is a demand for indicators which would better grasp and analyse the whole issue. Increase in average or median age is one of the ways how to express change in the population ageing, although this indicator is completely insufficient and can be easily manipulated. The comparison between older and younger population, explained for example by the old age dependency ratio (OADR), seems to be more precise. OADR is one of the most commonly used indicator, representing the ratio of the population aged 65 years and more to the population which age ranges from 20 to 64 years of age although some sources give another range – 15 to 64 years of age. Therefore, this indicator should represent the ratio of the retired population to the economically active population and has been used to analyse many different aspects of ageing from retirement to the burden of public pensions to the more amorphous concept of old age dependency itself (Sanderson and Scherbov 2007). The threshold of 65 years of age seems to correspond to the reality of some European countries. For example, OADR for the EU-28 was 28.1% in 2014 (Eurostat 2015). That means there were approximately four persons of working age for every person aged 65 and older. This indicator ranges from 19.0% in Slovakia (less than 5:1 ratio) to 33.1% in Italy (nearly 3:1 ratio). The average world OADR was 12.3% in 2014, thus confirming that developed countries (not only the EU) are more affected by population ageing.

Nevertheless, OADR indicator would be a good tool to help analyse older generation if the threshold of 65 years of age would not be just nominal. The actual retirement age differs from nominal retirement age in most countries. It is normally two or three years below the level of retirement age defined by the law. Moreover, OADR does not reflect the progress in health care which generally means that – for example – two persons aged 70, but born in different year, do not share the same chronological age. Because of this, as the average life expectancy is growing, the number of people aged 65 years and more is growing as well. Therefore, OADR is becoming obsolete.

One of the better ways how to illustrate the ageing of population is the old age threshold. It determines the age when the average remaining life expectancy first falls under 15 years. During the period of 1960-2050, this is globally expected to increase by 9.8 years. In combination with this, Sanderson and Scherbov (2007) also mention the prospective old age dependency ratio (POADR). POADR is defined as the ratio of the population above the old age threshold to the number of people of age 20 to that old-age threshold. That provides much better picture about the population ageing, because the increase in longevity is taken into account. It is thus expected that the group of people of age 20 to the old-age threshold will grow, compared to the group above the old-age threshold. This is confirmed by OECD data (2016) and shown

in Fig. 1. Overall, this ratio is 1:8 in the world. Relatively good situation is in the USA, where this figure is similar. Nevertheless, other developed countries show much worse figures, usually around 1:4 ratio. Less developed countries (average of lower half of all countries) are also getting closer to average ratio of the world. In the future, the ratio of some developed countries will reach 1:2 or more.

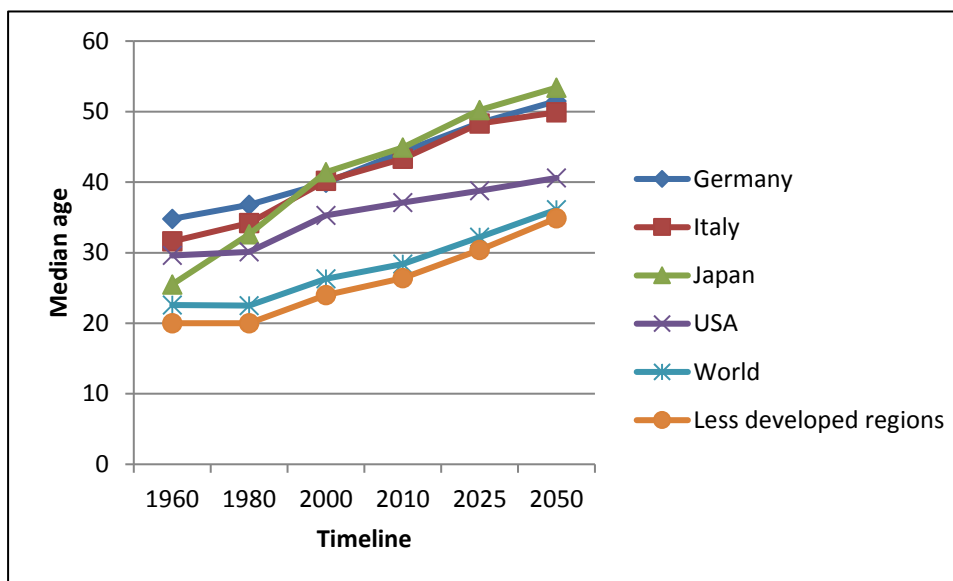
**Fig. 2: The prospective old age dependency ratio**



Source: (own construction based on OECD data)

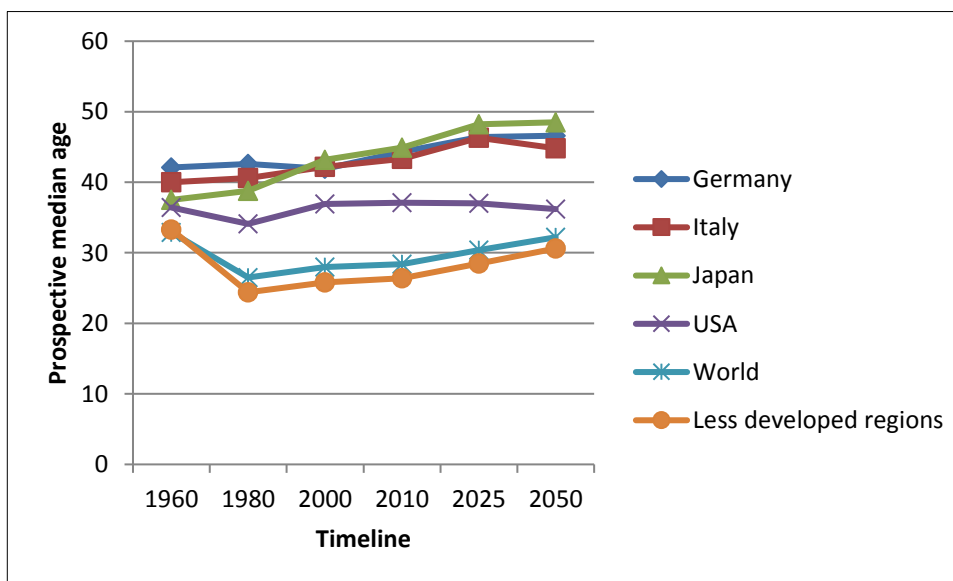
There are also some other iterations of these indicators, for example the prospective median age (Gavrilov and Heuveline 2003, Sanderson and Scherbov 2007). The median age of a population separates the higher half of population from a lower half. The prospective median age is defined as the prospective age of a person at that median age. For example (according to OECD data), the median age in Germany in 1980 was 36.8 years. The prospective median age of a “median person” in Germany was 42.6 years back then (Fig. 3 and 4). It is clearly visible that because of increasing life expectancies, prospective median ages rise less rapidly than median ages.

**Fig. 3: Median age**



Source: (own construction based on OECD data)

**Fig. 4: Prospective median age**



Source: (own construction based on OECD data)

There is also a possibility to analyse age groups from different period (Sanderson and Scherbov 2007). Imagine two people, one alive in 1950 and the other in 2000. If these two people both were 40 years old (or alternatively had a retrospective age of 40), then naturally each would have lived 40 years by those two dates. People who share a prospective age, on the other hand, share a remaining life expectancy. If a 40 year old person in 1950 had a remaining life expectancy of 30 years, and a 50 year old person in 2000 also had a remaining life

expectancy of 30 years, then the 50 year old in 2000 would have a prospective age of 40, using 1950 as a standard. In this example, we call 2000 the index year to indicate that it is the year with which we are concerned. It is stressed that chronological and prospective age are complementary measures and quantify two different aspects of ageing. This two dimensional concept can provide much better insight into the issue of population ageing.

## Conclusion

The population ageing is considered to be one of the most serious issues in contemporary world. The group of people aged approximately 65 years and more who has already passed the threshold between productive and retirement part of life is growing rapidly and affects the social system in negative ways. According to the social contract theory, the intergenerational tension will prevent the younger generation from supporting the whole system, resulting in the refusal of the contract. New indicators, like the prospective old age dependency ratio or the prospective median age were suggested. Their applications on developed countries show the difference between their outcome and classical “chronological” age. According to the increase in longevity, there will also be increasing need for the adjustments in the pension systems. If properly inducted by policymakers, this could help to consolidate the grave state of current pension systems around the world.

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