The dependency ratio from a historical perspective

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Extended abstract

"The ageing of the population cannot fail to have definite effects upon the economical, social, and psychological characteristics of our national life. With the gradual shift of the population toward older ages, there will be a corresponding shift in consumption requirements. (…) a new point of view and a new attitude in business planning will become necessary. This period of transition and readjustment must be prepared for. (…) Increased pressure will undoubtedly be made for plans, both public and private, to provide economical independence in old age as the aged grow in number and in proportion to total population. However, there may be a tendency to raise the usual age of retirement, now about 65 years. The needs of the rising proportion of aged may be more than can be met by those in the productive ages up to 65 years and thus lead to a labour market for persons after 65" (Dublin LI, Lotka AJ et al., 1949, pp. 258-259).

This text, warning for the negative consequences of the ageing of the population on the American economy, does not describe the current situation but comes from a demographic textbook on life expectancy, that originally dates from 1935. Louis Dublin and Alfred Lotka, the authors of the text, were surely not unique in drawing the attention to the negative consequences of the ageing of the population at that time. The French demographer Alfred Sauvy wrote in 1936 (p.330): « Le phénomène essentiel sera la modification de la pyramide des âges : moins d'enfants, moins d'adolescents, plus de vieillards, population adulte pivotant autour d'un âge central. Cette transformation n'ira pas sans poser des problèmes sociaux ou économiques délicats : c'est ainsi que les assurances sociales verront s'accroître le nombre de retraités, puis diminuer celui des cotisants. Les écoles deviendront trop vastes et les hospices insuffisants. Les conséquences morales, psychologiques, politiques d'une telle évolution, pour être moins chiffrables, n'en sont pas moins à considérer ». Remarkably, these texts warn in a similar way for the alarming consequences of the ageing population nowadays.

The worrisome predictions made before the Second World War as well as the current ones, are based on the dependency ratio or dependency coefficient, which represents the ratio of the part of the population not in the labour force (usually the persons under the age of 15 and above the age of 64) to the part of the population at an active age (usually the persons between the age of 15 and 65). The principle behind this measure lies in the premise that the structure of the population by age provides a rough indicator of economic dependency. As such, the ratio pretends to be a measure which sets the "dependent" population against the "productive" population within a society.

In the mean time, the dependency ratio has become a core notion in the ageing debate. An increase of the ratio generally raises concerns about the increased burden on the productive part of the population and about the affordability and organization of the social security system. For example, the ratio forms the reference ground of the Lisbon-strategy, which has been accepted by the European Council in march 2000 as a general

strategy to make Europe by 2010 'the most competitive and dynamic knowledge economy of the world' (European Parliament, 2000). Within the framework of this strategy, the objective of reaching an employment rate of 70% within the population between 15 and 64 years was set up. The evolution of the demographic dependency ratio was also at the basis of legislation adjustments to increase the pension age above 65 years. Germany for example plans a progressive increase to the age of 67 by 2029; in the UK a pension age of 68 is foreseen for 2044.

In the next paragraphs we will briefly illustrate the historical evolution of the dependency ratio for Belgium. Our aim is to extend this analysis to a larger set of relevant countries to broaden the variability of situations in the past as well as in the future.

1. The evolution of the dependency ratio in Belgium

Figure 1 represents the evolution of the demographic dependency ratio for Belgium from 1841 to 2060, and is based on the population figures in the Human Mortality Database (HMD) for the past and on the population projections of the Belgian Federal Planning Bureau from 2007 onwards. For the past, we do not have observed yearly population data at our disposal. But in the framework of the HMD a full sequence of population data was calculated on the basis of the observed values in the Belgian ten-yearly censuses and complemented through interpolation techniques for the intermediary periods.

Figure 1. Evolution of the dependency ratio for Belgium: 1841-2060

Source: Human Mortality database (data for the period 1841-2006) & Federal Planning Bureau, 2008 (data for the period 2007-2060)

The evolution of the dependency coefficient is usually given for a limited time frame, and the dramatic evolution of the dependency ratio is often based on recent observations only. As such, they ignore the fact that in a longer time perspective the current and future ratios are still high, but less dramatic than sometimes suggested. Figure 1 shows that the dependency ratio in 1985 was historically low (0.48), only during the interbellum period

we observe even lower values (0.43). Thus, taking the ratio of the year 1985 as a marker might result in misleading conclusions. As far as the projections are concerned, the dependency ratio of 2025 will correspond with the ratio of 1970 (0.59), and by 2035 the highest observed ratios of the second half of the 19th century (0.67) will be exceeded to reach 0.73 in 2060.

Figure 1 also illustrates the importance to contextualize the dependency ratio, and the need to avoid a direct translation of the demographic dependency ratio into an indicator of economic dependency. Through time, a very irregular pattern of economic dependency seems hidden behind the demographic dependency ratio. Moreover, the evolution of the demographic dependency seems to have had minor influence on the evolution of the welfare and well-being within different societies, compared with the influence of other parameters.

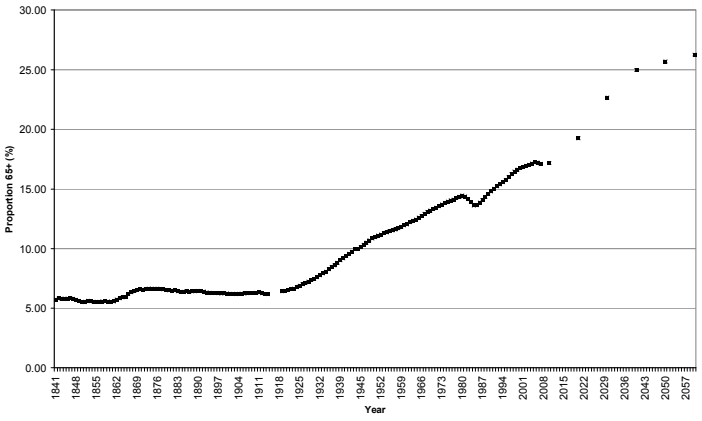
For example, right after the Second World War the dependency ratio was very low, namely 0.45 (1946). However, the post-war years were characterized by a *great labour shortage*, which is why - until the economic crisis of 1973 - the Belgian industry recruited a considerable amount of foreign workers. This is quite contrary to the common assumptions that mostly associate a high dependency ratio with labour shortage. An analysis of the economic evolution of the post-war period indicates that other factors are at work and that dependency ratios and labour demand are not necessarily closely tied. Gradually, the ratio of 1946 climbed up to a ratio of 0.58 in 1967. Behind this growing demographic dependency, different labour market trends were hided. Firstly, because of the increasing welfare and the democratization of the educational system, young people continued to study ever longer, and the participation level in secondary schools and at universities rose considerably. As a result, in 1983 the school-leaving age in Belgium was legally increased to 18 years. Consequently, the dependency of young people rose spectacularly, while the potential active population in the younger age groups decreased. Today, the majority of young people in Belgium continues to study after their 18th birthday, and it looks like this trend will persist (Vlaamse Overheid Ministerie van Onderwijs en Vorming, 2007). The boundary of 14 years (as determined for the calculation of the dependency ratio) seems to have covered ever less accurately the real situation of dependency. Secondly, similtaneously, the participation of women in the professional life changed considerably. After World War II the participation rate of women remained under 40%, with a marginal increase in the years ‘50 and ’60, until around 1968. From that moment on, the participation rate for women increased to about 60% at the beginning of the 21st century.

Hence, as the evolution of the education participation degree and of the female labour participation show, the abstract notion of the dependency ratio is a very bad indicator for both labour supply and demand and welfare evolution without taking the historical context into consideration. The shifts, in opposite direction, in the economic activity of youngsters and women, respond to other deep-seated mechanisms, which have developed independent of the variations in the demographic dependency.

2. The impact of the ageing of the population

If the aim is to assess the impact of the ageing of the population, analysing the evolution of the proportion of the population above the age of 64 in the whole population is more meaningful than the evolution of the dependency ratio. Figure 2 shows the evolution of the share of the population above 64 in the Belgian population from 1841 to 2060. This evolution explains the concerns of Dublin and others better.

Figure 2. Evolution of the proportion of the population aged 65 and more in the total Belgian population: 1841-2060



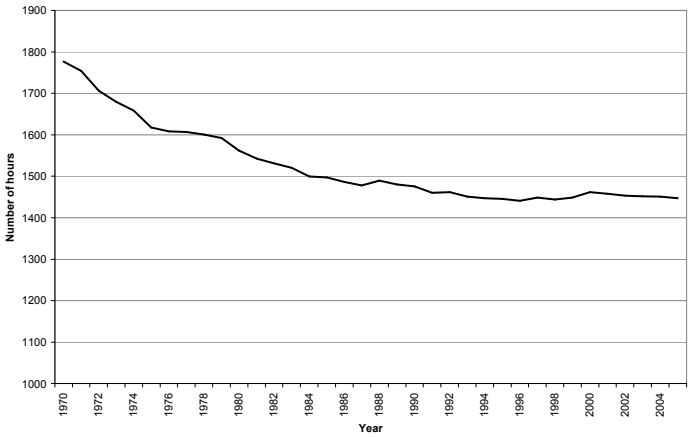
Source: Human Mortality database (data for the period 1841-2006) & Federal Planning Bureau, 2008 (data for the period 2007-2060)

Between 1841 and 1920 the proportion of the population above 64 years remained relatively stable at around 6 to 7%. During that period, the increasing life expectancy didn't influence the ageing of the population since the decrease of mortality was almost entirely due to a decrease in the high mortality of children. But since the First World War, the rise in life expectancy was no longer age-specific. From that moment on, the increase in life expectancy, and partly the dejuvenation, have resulted in an almost continuous growth of the proportion of the population above 64 years. Only two interruptions are observed in this trend, namely during 1981-1985 and 2006-2010, as a consequence of the lower inflow of persons above 64 years out of the birth cohorts during the war years. Nowadays, the proportion of persons above the age of 64 in Belgium is about 17%. On the basis of projections it is expected to increase to 25% in 2040, whereupon the growth rate will lower and end up at 26% in 2060 (Planning Bureau, 2008).

So, the ageing of the population has already started 80 years ago, while, remarkably, most welfare systems were developing. Almost parallel with the increase of the share of older people, the average number of worked hours per employee per year has decreased as well as a result of a long term struggle by the labour movement, resulting in e.g. the reduction of the working week and the introduction of the yearly paid leave. However, the rhythm of the decrease in the number of performed working hours is not the same in all

countries. Until the seventies the average number of working hours was higher in many European countries than in the US. But since the eighties the reverse trend is observed. In the US the yearly number of working hours evolved of about 1850 in the nineties to approximately 1700 in 2004. During the same period the yearly number of working hours in Europe reduced from more than 2100 to about 1600 (Gornick, Heron et al. 2007). In 1997 the Belgian Planning Bureau collected for the first time data on all elements contributing to a correct assessment of the yearly working time for Belgium for the period of 1955 to 1995. In the fabricating and processing industries, the conventional working time between 1955 and 1995 decreased from about 2300 working hours per year to 1700 hours. This decrease of almost 30% over 40 years reflects the general trend (Hendrickx, Masure et al. 1997). Figure 3 shows the evolution of the yearly average number of working hours per employee for Belgium since 1970, on the basis of data from the databank EU KLEMS 2008.

Figure 3. Evolution of the yearly average number of working hours per employee for Belgium: 1970 – 2005



Source: EU KLEMS, 2008

In fact, the rise in the share of people above 64 in the past exceeds the projected future growth. The question is: 'How then did most welfare systems have been able to carry this increase in the past?'. The key answer lies in the continuous growth in productivity. The gross national product has continued to grow in most welfare states, while the yearly working hours per worker have been decreasing. Nevertheless, the available means have sufficed to bear the increase of the burden on the pension and health care system posed by the ageing of population. To correctly assess the relationship between labour participation and dependency one has to calculate how many people can be economically dependent or be maintained on the basis of one hour work. This results in a 'maintenance coefficient' that takes into account different parameters such as the demographic dependency, the participation rate, the unemployment rate and the average number of production hours per year per employee. Only by combining these factors the total work required to realise the welfare of a population can be calculated.

Population ageing often gets a negative connotation, derived from the connotation we tend to give to older people. However, from a historical perspective, it can hardly be said that the current Belgian population is less dynamic than the population 100 years ago, even if the proportion of persons aged 64 and over has risen with almost 18% during the last century. If we want to accurately assess the dynamics of a population as well as her capacity to create prosperity and well-being, a whole set of different parameters should be taken into account, as for example the education rate, the access to information, the capacity to critically and independently form an opinion, the development of the courage to stand up for its own rights, creativity and the solidarity feeling, as well as the general and mental health of a population. Clearly, this kind of determinants, all contributing to the welfare and well-being of a population, evolve in contradictory ways. In general though, most of these factors seem to have been developing positively in the course of the last decennia, resulting in an older population that is in a lot of aspects more dynamic than younger populations of the past.

In Belgium, despite the much younger composition of the population, the economic situation was not more favourable at the dawn of the 20th century then at the beginning of the 21st century, when a large proportion of the population is aged 65 and more. The main reason for this, is not so much the large amount of children (which actually remained relatively low because of high child mortality rates) but the great number of unproductive and, as a consequence, dependent persons within the so-called 'active' age group at the beginning of the 20th century. Firstly, child labour and heavy labour in general resulted in a large proportion of early ill and worn out persons. As a consequence, before the First World War, the number of poor and ill agricultural and industrial workers was considerable in Belgium. Secondly, the housing, food and labour circumstances of the working population brought along different kinds of health problems as well as early disability. Thirdly, poverty was the destiny of a great part of the active population. Individuals who were no longer able to cope with their work, ended up in the poor houses. Some were compulsory employed in so-called 'correction houses', but apparently their productivity was very low. Gradually, after World War I, solidarity and insurance systems have been developed within the labour movement, and policies aiming at the establishment of a social security system have been implemented.

Reflecting on this historical overview, it is clear that dependency ratios as they are commonly used are not very relevant to assess future challenges.

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