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– a note on methods and suggestion of a new one

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Calculation of the average age of exit from the labour market is a comprehensive way to describe the labour force participation for people in higher ages. The methods most often employed are variations of the method to calculate life expectation that is used by population statisticians. At least two variants exist: the *dynamic method* and the *static method* (the terms are used by e.g. Eurostat). The dynamic method is used by Eurostat in its computations of exit ages as published since 2001. Likewise, a Nordic group of social security institutions, among them Swedish Social Insurance Agency, employs this method, however not applied on exits from the labour market but on persons getting either old-age pension or disability pension. The static method is used by the Swedish Social Insurance Agency for calculations of the average age of exit from the labour market in general.

The dynamic approach conforms most closely to the life expectancy method in demography. In short, it is based on changes in labour force participation for given cohorts between two successive years. The static method, by contrast, uses data for only *one year* and is based on the "apparent" changes in labour force participation between successive ages in this very year.[1] It should thus be noted that neither method tells something about the average age when a certain *cohort* withdraws from work; both of them give "snapshot" pictures. These pictures show what "is in the pipeline", given current characteristics of the labour market.[2]

The dynamic method has an important draw-back. Cyclical changes in the labour market exert a powerful influence on the exit age (a problem that population statisticians need not concern themselves with). A general decline in workforce participation that is *parallel in all ages* would give a lower exit age for the year of the decline, even if the age structure were unchanged. If workforce participation the next year is still low (and unchanged) in all ages, the exit age would *return* to its original level. Such results are quite misleading. This problem is largely escaped from with the static method, which uses data for only one year.

The cyclical variations are a problem not because they are short-term *per se*, but that they are not really relevant even for short run analyses. The cyclical effects have in Sweden proved to be quite large historically, as is seen in Figure 1.

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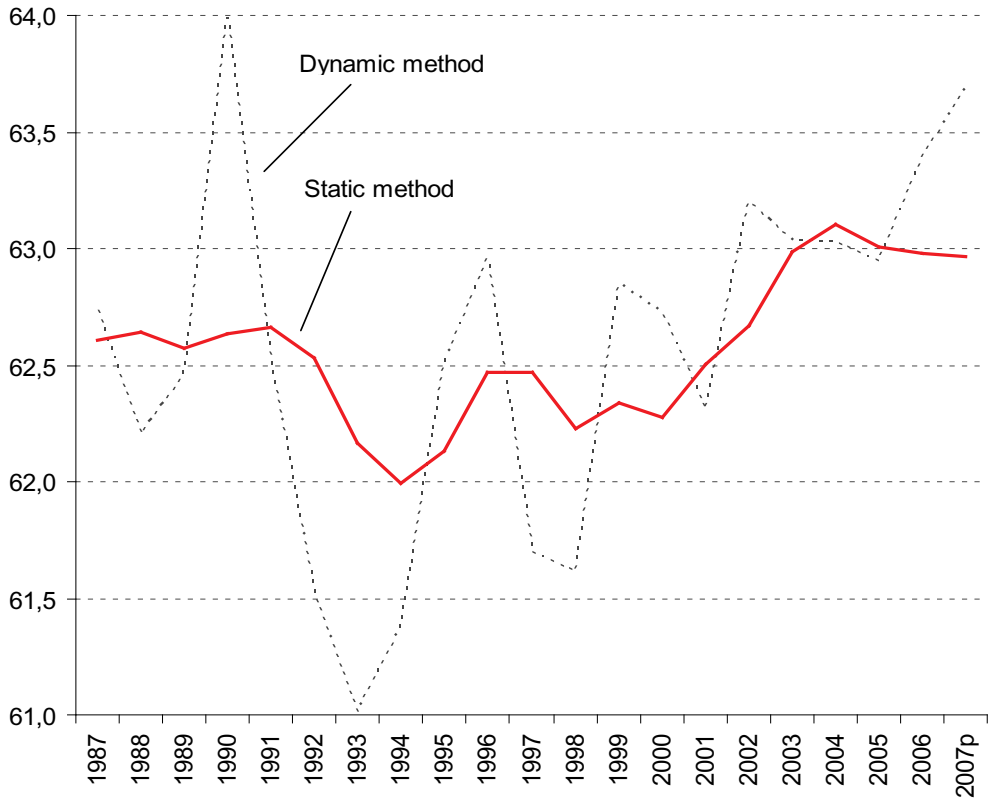
[1] For more detailed explanations, see Genomsnittlig pensionsålder i de nordiska länderna – med internationell utblick, Swedish Social Insurance Agency, Analyserar 2006:11 (also available in English from the author). Figure 4 with comments also gives a hint to the understanding.

[2] The same goes for life expectancy in demography: it is the age that a person in a certain age (e.g. at birth) is expected to reach should he/she at each future age meet the current mortality risks during the chosen calculation year.

Figure 1. Expected exit ages 1991-2007 in Sweden, according to the static and dynamic methods (year 2007 based on three quarters)



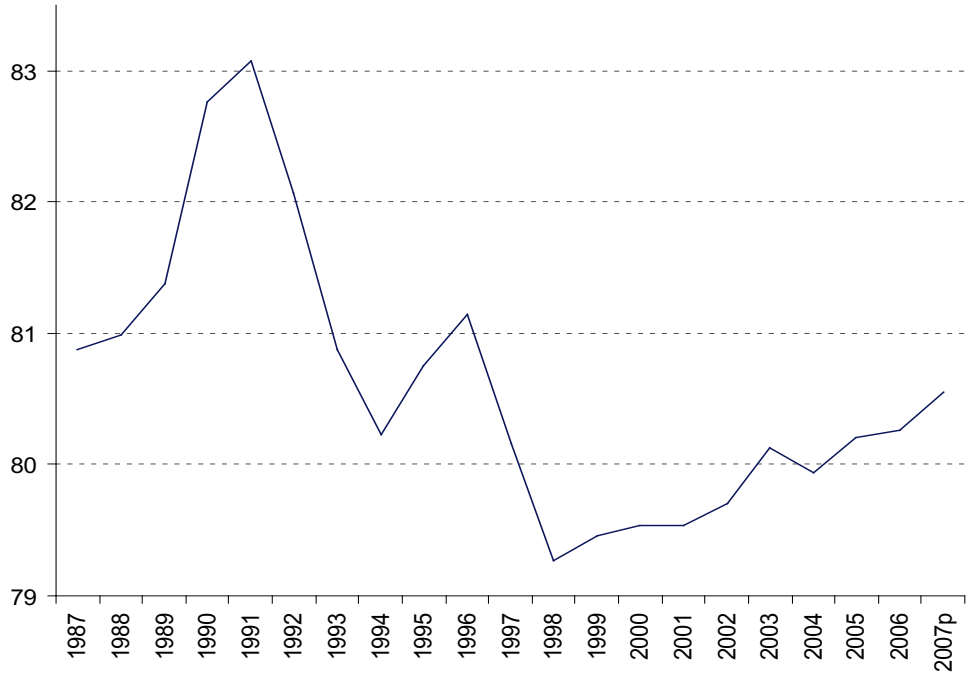
The extent of cyclical fluctuations on labour force participation varies between countries, in part presumably depending on institutional differences. Generally, cyclical changes influence employment and unemployment in opposite ways: during a recession, employment drops and unemployment rises, and vice-versa during a boom. But experience shows that workforce participation (the sum of employment and unemployment) is also affected: participation decreases when the economy weakens (and vice-versa). One reason for this may be that people give up the idea of getting a work after a long period of unemployment. Marginal groups may not consider it worthwhile to approach the labour market at all. Furthermore, labour market problems have in Sweden to a rather large extent been met by measures that statistically move people from unemployment to activities *outside* the labour market. Whatever the reasons, cyclical variations in labour force participation have been stronger in Sweden than in many other countries. See for instance the huge fall in labour market participation in the 1990s pictured in Figure 2, following a strong increase in the late 1980s[3]

The curve in Figure 2 suggests almost by itself a modification of the dynamic method. The changes in labour force participations for the different cohorts between two successive years can be "deflated" by the relative change in the *general* labour force

[3] The curve refers to 45-64-years-olds of a reason that will be clear immediately.

participation between the two years. Since the calculations are based on 47-years-olds or in the present computations 50-years-olds[4], the general labour force participation in the age group 45-64 years is used. In this way the exit age is adjusted for overall cyclical changes in the labour market.

Figure 2. Labour force participation for 45-64-years-olds 1991-2007 in Sweden, per cent of the population (year 2007 based on three quarters)



It is clear from Figure 3 that the short-term variations are smaller after this adjustment of the dynamic method. Nevertheless, even after adjustment, there seems to be more pronounced stochastic variations compared to the static method.

This may be expected also on theoretical grounds. Recall that the calculations are based on labour force participations in different ages. In Figure 4 a very simplified collection of such data is pictured for a certain year: the curve A starts at the age of 50, where the participation is 1.0 (i.e. 100 per cent), and decreases linearly to zero at 70 years. With the static method the curve is assumed to be the "survival curve". The remaining expected survival time in the workforce from the age of 50 is estimated as the sum of "survival probabilities" from 51 years of age and upwards. The result is 10 years[5], and thus the average exit age is 60 years.

[4] Since the labour force participation generally decreases very little between 47 and 50 years of age, the choice is of very minor importance.
[5] After addition of 0.5 to take account for the fact that 50-year-olds are on average 50,5 years, etc.

Figure 3. Expected exit ages 1991-2007 in Sweden, according to the static, the dynamic and the adjusted dynamic methods (year 2007 based on three quarters)

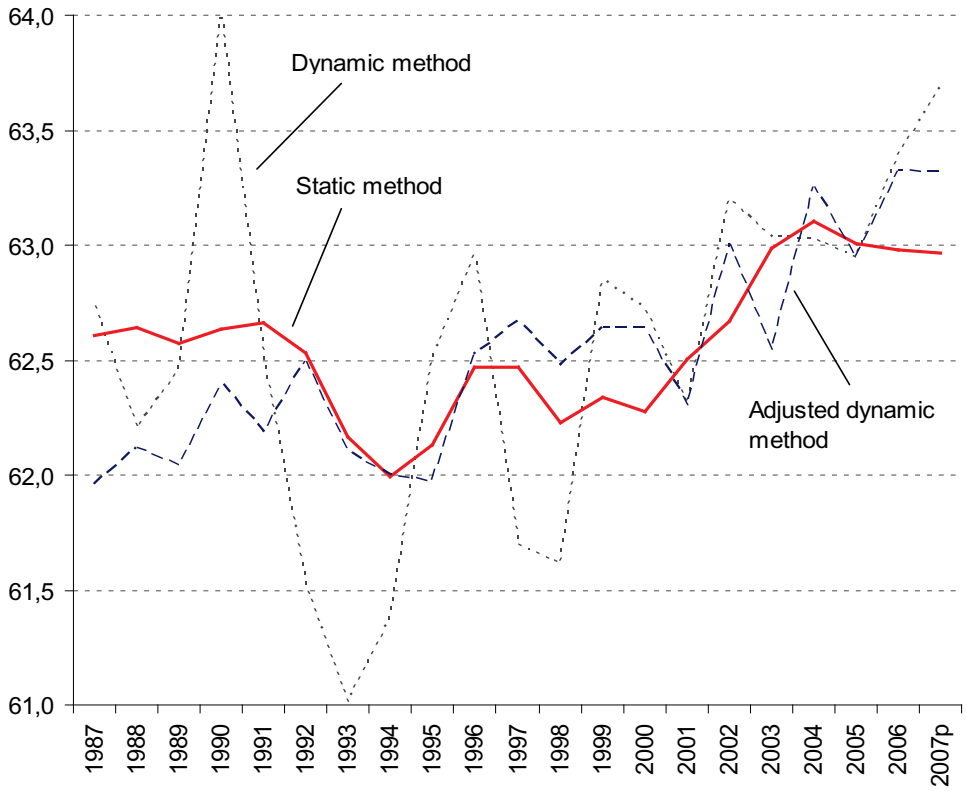
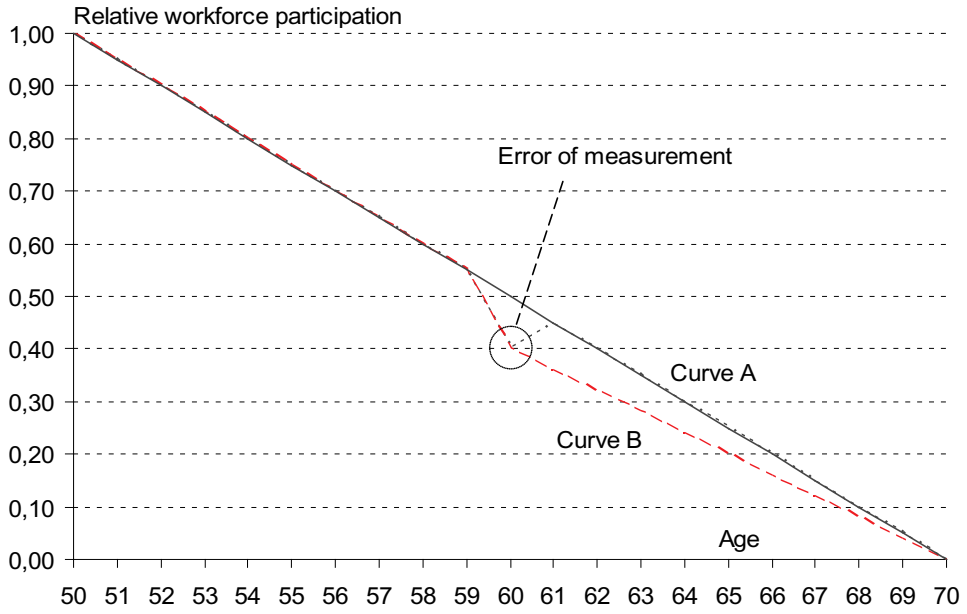


Figure 4. Illustration of the dynamic and the static methods, with errors of measurement



With the dynamic method another survival curve is constructed. The probability for x-year-olds to remain in the workforce as (x+1)-year-olds is estimated by the workforce participation of (x+1)-year-olds during the given year, divided by the workforce participation of x-year-olds during the previous year. These probabilities are multiplied consecutively to obtain a new survival curve, which is then used in the same way as in the static model. Suppose that curve A is completely unchanged from the previous year. In this case the survival curve for the dynamic method will be identical to curve A, and the average exit age will be 60 years, as with the static method.

Now there are almost certainly *errors of measurement* of workforce participation by age. Such errors can lead to larger effects on the exit age according to the dynamic method (whether adjusted or not) than to the static method. In figure 4, suppose there is an error for 60-year-olds so that the participation rate is measured to be 0.40 instead of the true 0.50. For other ages no errors are assumed. The error will of course lead to a somewhat lower exit age calculated by the static method: 59.9 years rather than 60. But with the dynamic method, the error is transmitted to the whole reminder of the curve (curve B). The calculated exit age would be 59.45 years – a considerably larger error than for the static method. The earlier suggested adjustment makes no difference in this respect, of course.

On the other hand, the static method can in certain cases have a weakness which the dynamic method does not have – namely when large structural changes have taken place in workforce participation over one or two decades. In many countries, the increasing participation of women in working life is very striking. Low workforce participation among older women reflects in such cases more the fact that these women already had rather low workforce participation 15-20 years ago than that they have exited gainful employment particularly early. When the static method is used – i.e. assuming that "apparent" changes in labour force participation between successive ages in one single year is relevant – the exit age for women may be underestimated. As far as Sweden and the other Nordic countries are concerned, female activity rates where quite high already in the end of the 1980s. Hence this effect should by now be of minor importance. In other cases, however, the adjusted dynamic method could be a good alternative to the static one.

It should once again be emphasized that no method so far mentioned describe the average age at which an actual cohort withdraws from work. The methods give "snapshots" of the exit age for each year of calculation: the age at which people on average would exit the workforce if the pattern of gainful employment of different age groups for the given year remained constant. A calculation for a certain generation or cohort is in principle only possible when the last member of the cohort has left the workforce. Then one would be able to determine at what age (of those who at the age of 47 or 50 participated in the workforce) the members on average exited, and thus calculate a *cohort-based* average exit age.[6]

[6] The same goes for reports of average length of life in population statistics. It is not the length of life of those of us now living that is revealed – of course an absurdity! – but the age a person would reach should he/she at each future age meet the mortality risks current during the chosen calculation year.

Using preliminary estimates for the year 2007, it is possible to measure with reasonable after-the-event accuracy the exit age for the generation of current 65-year-olds, i.e. those born in 1942. Rather few people work after 65, and for them special assumptions may be made. Such a calculation[7] indicates that people born 1942 on average exited at 62.5 years, i.e. a somewhat lower age than the expected exit ages estimated by the other methods. The cohort-based exit age is of historical interest of course, but it has little to say about the prevailing patterns for younger persons.

[7] Assuming that workforce participation after the age of 65 will be about the same as it was for elderly persons.

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