A method for calculating the average effective age of retirement

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1. Conceptually, the average effective age of retirement can be thought of as the average age of all persons withdrawing from the labour force in a given period, whether during the course of any particular year or over any five-year period. The average age of retirement (AAR) is thus simply the sum of each year of age weighted by the proportion of all withdrawals from the labour force occurring at that year of age.

2. In the formulae below, L_j^y refers to the labour force in year *y* for the age group *j* and, similarly, A_j^y refers to the participation rate in year *y* for the age group *j*. It is assumed that no withdrawals occur before the age of 40. Equivalently, the formulae can be interpreted as providing estimates of the AAR for all persons aged 40 and over. It is also assumed, without affecting the general formulation but simply for convenience, that no person 80 years of age or older is in the labour force. The formulae given below also correspond to the use of data by 5-year age groups rather than by single year of age (and each age subscript, *j*, refers to the 5-year age group *j* to *j+5*). Again this does not affect the general form of the expressions.

3. A "static" estimate of the average age of retirement can be obtained by assuming for any given year that withdrawals can be estimated by the difference in the size of the labour force at different ages in that year. In other words, this assumes that between successive years the labour force (and participation rates) is constant at each age. In this case, the estimate of the AAR can be written as follows:

$$AAR = \sum_{k=9}^{16}(5k)(L_{5(k-1)}^y - L_{5k}^y) / \sum_{k=9}^{16}(L_{5(k-1)}^y - L_{5k}^y)$$

$$= \sum_{k=9}^{16}(5k)(L_{5(k-1)}^y - L_{5k}^y) / L_{40}^y \qquad (1)$$

This estimate will include withdrawals from the labour force because of deaths and will be affected by changes over time within countries and differences across countries in the age structure of the population. Instead, an alternative "standardised" formulation can be constructed in terms of participation rates, which both excludes retirements due to deaths and abstracts from the age structure of the population.

4. First of all, equation 1 can re-written equivalently as:

$$AAR = \sum_{k=9}^{16}(5k)(A_{5(k-1)}^y * P_{5(k-1)}^y - A_{5k}^y * P_{5k}^y) / A_{40}^y * P_{40}^y$$

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Now if we assume that the population for each age group is the same (i.e. death rates are zero and there is zero net migration) then this expression collapses to the following:

$$AAR = \sum_{k=9}^{16} (5k)(A_{5(k-1)}^{y} - A_{5k}^{y}) / A_{40}^{y} \tag{2}$$

It should be noted that this expression corresponds exactly to the "static" estimate of the average expected age of retirement in Scherer (2002).

5. In actual fact, a pseudo-cohort method can be used to obtain estimates of labour market withdrawals that do not rely on any assumption that these withdrawals are the same across years. Using this method, the total number of withdrawals from the labour force that occurred during any 5-year period is simply the sum of the difference in the size of the labour force at the beginning of the period for each age group and its size at the end of the period for the age group that is 5 years older. In this case, a "dynamic" estimate of the AAR, corresponding to the estimate in equation 1, can be constructed as follows:

$$\begin{aligned} AAR &= \sum_{k=9}^{16} (5k)(L_{5(k-1)}^{y-5} - L_{5k}^{y}) / \sum_{k=9}^{16} (L_{5(k-1)}^{y-5} - L_{5k}^{y}) \\ &= \sum_{k=9}^{16} (5k)(L_{5(k-1)}^{y-5} - L_{5k}^{y}) / (L_{40+}^{y-5} - L_{45+}^{y}) \end{aligned} \tag{3}$$

6. Again, if we make the assumption that the population is constant both over time and for each age group, a "standardised" AAR estimate can be written in terms of participation rates as follows:

$$AAR = \sum_{k=9}^{16} (5k)(A_{5(k-1)}^{y-5} - A_{5k}^{y}) / \sum_{k=9}^{16} (A_{5(k-1)}^{y-5} - A_{5k}^{y}) \tag{4}$$

It should be noted that in this case, the AAR estimate in equation 4 will not, in general, correspond to the "dynamic" estimate of the average expected age of retirement in Scherer (2002), even though both formulations use exactly the same information. Apart from the conceptual difference, his formulation corresponds to a geometric weighted mean of retirement ages whereas equation 4 corresponds to an arithmetic weighted mean. Conceptually, equation 4 provides an estimate of the actual average age of retirement for all persons who withdrew from the labour force over a given (5-year) period, whereas the estimates in Scherer (2002) correspond to an average expected age of retirement.

7. The attractive features of these estimates of the average effective age of retirement in equations 1-4 are that that they are both simple conceptually and simple to formulate. They correspond to the average age of all persons who retired in a given period of time. They also provide a way of calculating the actual effective age of retirement[2], *i.e.* both allowing for deaths and the actual age

[2] Of course, one of the advantages of using participation rates only in any formulation of average retirement ages is that they abstract from any breaks in the level of the labour force because of the incorporation of new population benchmarks. One way around this problem would be to apply the participation rates to time-consistent demographic estimates of the population. However, these estimates would still be affected by net migration flows. These flows will be less of an issue in the formulation using participation rates only to the extent that participation rates for "movers" are the same as "stayers". On the other hand, the participation rate formulation is sensitive to the treatment of the institutional population. Most labour force surveys only survey the non-institutional population. Therefore, the declines in participation rates in these surveys will tend to underestimate the extent of withdrawal from the labour market. For example, assume that the participation rate for a group of individuals is 100% in the first period but 20% of this population stop working and withdraw to a

structure of the population, as well as a standardised estimate of the average age of retirement that abstracts from both deaths and the age structure of the population.

References:

Scherer, P. (2002), “Age of Withdrawal from the Labour Market in OECD Countries”, OECD Labour Market and Social Policy – Occasional Papers, No. 49.

retirement home while the rest continue to work. Then in a labour force survey of the non-institutional population only there will be no change observed in participation rates over time whereas in actual fact, participation rates relative to the entire population have declined from 100% to 80%.