Age of Withdrawal from the Labour Force in OECD Countries

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SUMMARY

The age of withdrawal from the labour force is an issue of great policy importance. As populations age, an accurate understanding of trends and cross-country differences has become important. However, the age of withdrawal from the labour force cannot be measured directly using cross-sectional data only. Direct observation of net withdrawal rates are needed. This paper presents estimates of these rates derived from comparisons of activity rates at five year periods. A method is proposed (in the Annex) for using data on the stock of people employed at age 65 and above to derive estimates of the net rate of withdrawal at ages 65 and above. The results indicate that net age of withdrawal for men and for women is similar in most countries, and that both show strong cyclical fluctuations.

RESUME

L'âge de retrait de la population active est une question d'une grande importance politique. Alors que la population vieillit, une juste compréhension des tendances et des différences internationales est devenue importante. Toutefois, on ne peut pas mesurer directement l'âge de retrait de la population active en utilisant uniquement des données en coupe. Des observations directes des taux nets de retrait sont nécessaires. Ce document présente des estimations de ces taux, dérivées des comparaisons des taux d'activité par périodes de cinq ans. Une méthode est proposée (en Annexe) pour utiliser les données concernant les personnes employées à l'âge de 65 et plus afin d'arriver à des estimations sur les taux nets de retrait à l'âge de 65 ans et plus. Les résultats montrent que l'âge net de retrait est similaire pour les hommes et les femmes dans la plupart des pays. De fortes fluctuations cycliques sont en outre enregistrées à la fois pour les hommes et pour les femmes.

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MEASURING RETIREMENT TRENDS

1.   Discussions of retirement trends in OECD countries have been dominated by the trend to earlier retirement. This trend is difficult to measure directly, as "retirement" differs in its meaning from country to country, and also between types of pension arrangements within each country. For this reason, most international studies have used movement out of the labour force, as measured by labour force survey data, as a proxy for "retirement". Those above a specified age (usually 45) are defined are regarded as "retired" if they are not in the labour force at the time of the survey. Net movement into retirement is then the change in time in the proportion of the population above 45 who are neither working nor classified as unemployed.

2.   Clearly, this definition is only loosely related to the common meaning of "retirement". Retirement is generally associated with cessation of work from a "main" job and receipt of a pension, rather than labour force status as such A person can cease to work (or to actively look for work) not because he or she has "retired" in this sense, but because no opportunities for work are thought to be available: that is withdrawal from the labour force can be hidden unemployment. Common usage is particularly ambiguous in the case of people who have been intermittently in the labour force, and so feel they never had a "job": particularly those whose spouse <u>was</u> employed in a "main" job.

3.   Conversely, people who have "retired" from their main job can well start a new career or find new employment to supplement their pension, while still feeling they have "retired" from their main career. Furthermore, the ILO definition of employment (one hour or more a week in employment for pay or profit) will include in the labour force pensioners engaged in part-time work who regard themselves (or are regarded by others) as retired.

4.   However, for purposes of international comparisons – or even national comparisons over time as pension rules change and pension schemes mature, or between groups with different pension entitlements – it is difficult to arrive at a definition which does correspond more closely these common usages of the term, while being measurable with available data. While it is possible to define retirement more satisfactorily in national surveys of the retirement process[1], none of these definitions has been adopted as an international standard. Data using any one of them are not available for other countries[2].

5.   For these reasons, "net withdrawal from the labour force" is probably the only definition of "retirement" which is operationally useable for international comparison at present. Using this definition, a secular increase in the proportion of the population who are retired can be observed in most OECD countries.

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[1]   For example, the Australian Bureau of Statistics' *Retirement and Retirement Intentions Survey* defines retired people as "those aged 45 years and over who have ceased full-time work and who do not intend to work or to look for work on a full-time basis in the future". However, for other analyses by the same Bureau, early retirement is examined "mainly in terms of men aged 55-64 years who are not in the full-time labour force". It will be seen that these definitions ignore part-time work, even if it is of a permanent nature, and the latter definition excludes women entirely. See ABS, 1994: 126

[2]   Gendell (1998) has published estimates based on rates of withdrawal from the labour force for four OECD countries. He (and a co-author) have published similar times series over the years for the United States, and he has compared this with the age of first receipt of old age social security. In the United States, the two series do on the whole move in parallel. (Gendell, 2001)

STATIC ESTIMATION: THE LATULIPPE/ILO METHOD

6.   In order to summarise this trend, the ILO has published a proposal for calculating the average age of movement into retirement. (Latulippe, 1996). This proposes that the average age of movement into retirement be calculated by comparing the proportions in each five-year age group who remain in the labour force. For example, the proportion of the population who retire between the ages 45-49 and the ages 50-54 is estimated from the difference between participation rate of those aged 45-49 and that of those aged 50-54.

7.   Using this method, the average age of retirement can be calculated for any year using labour force data classified by age. Latulippe's paper uses ILO estimates of the age distribution of the labour force from 1950 onwards to show retirement rates for a number of OECD countries at 10 year intervals. Estimates of retirement ages computed using this method have been used in several policy studies, including one by the OECD.

8.   There is however a basic problem with this method. If labour force participation rates are increasing with each age cohort, the difference between adjacent cohorts in any one year will reflect this. When age groups are compared in any one year, there will appear to be a high age of withdrawal. If participation is falling, the age of withdrawal will appear to be lower.

9.   But the participation rate of those 45-49 will be greater than those age 50-54 because 45-49 year olds are members of a cohort with a greater participation rate at all ages than those born five years earlier. If participation rates are higher for each cohort, the data will show an apparent withdrawal between ages 45-49 and 50-54 even if there is no withdrawal from the labour force between the two age groups. In fact, they can suggest a fall even if women are still entering the labour force (so far from there being net rate of withdrawal, participation rates are increasing).

10.   Latulippe argues against the comparison of participation rates over time by observing that this encounters difficulties where participation rates are rising in the age groups 45 to 55, due to the entry of women into the labour force after raising their children. But this effect exists in reality: it can be observed even for estimates using the static estimation method he derived when participation rates are stable or rising only slowly (Japan is a case in point). However, it is masked if age-specific participation rates are rising significantly from one cohort to the next, which has been the pattern in most OECD countries over the past three decades. This masking of the effect is not an advantage of the static method, it is symptom of the systematic bias it entails. Other people who have used the estimates he derived have recognised this problem, and have concentrated on the male rates. However, as will be discussed below, these also are inaccurate as a guide to fluctuations in withdrawal rates over time.

11.   This observation about females illustrates a fundamental feature of the method proposed by Latulippe. It will only measure net retirement rates correctly if participation rates are stable between one cohort and another. Since the calculation of the average requires comparisons (as will be argued further below) from age 45 to 75: that is, for people born over a 30 year period, this will not in general be the case.

12.   The method proposed by Latulippe is equivalent to estimating mortality tables by comparing the number of people in each age cohort in any particular year. A mortality table based on this assumption would only be meaningful if the population structure were stationary (that is, deaths in each age group were exactly proportional to the number of people reaching that age). Demographers frequently need to estimate birth and death rates in populations for which there are no registration data, but they almost never make such an extreme assumption.

13.		Mortality rates are, ideally, measured by direct observation of the age of those who die. However, in the absence of registration data, estimates of death rates can be derived from two successive censuses or surveys which classify the population by age. On the assumption of zero net migration, the difference over time can be assumed to be due to deaths, and so death rates per age category can be derived.

14.		The counterpart of direct data on age at death for retirement would be longitudinal data on transition from labour force activity to retirement. In the absence of such longitudinal data, comparisons of labour force participation rates can be used – provided that retirement is independent of population changes (that is, provided the following assumption holds.

> *Participation in the labour force is not correlated with mortality (those in the labour force are as likely to die as those outside it) nor with net migration (immigrants and emigrants are as likely to be in the labour force as those who stay).*

DYNAMIC ESTIMATES

15.		This paper proposes and illustrates a method for estimating net age of withdrawal from the labour force which uses comparisons of labour force participation rates over time. Table 1, which presents a hypothetical example, illustrates the approach, and in particular has been constructed to illustrate the differences between the outcomes to be expected from the "static" approach and those which result from a "dynamic" analysis. In it, column 3 shows participation rates for a hypothetical country at five-year intervals. All the cases show the same 'static' estimate of average retirement age (56.6: column 8, row 9), since the ratio of participation rates is constructed to be identical in each case. However in the first block of data (Block A "Men") participation is actually falling at all age groups. The 'dynamic' estimate of the retirement age, which compares each cohort at an interval of five years, is lower than the static estimate (54.6: column 13). By contrast, for Block B ("Women") the participation rate is rising. In this case, the "dynamic" estimate, which follows through each cohort, has an average retirement age that is higher than the static estimate.

16.		In this example, it is clear that men are in fact retiring on average at a lower age than women. The "dynamic" estimate gives a more accurate summary of the situation than does the "static" one.

17.		Panel "C" of the example shows a case which is more difficult to interpret. In this case, "female" participation rates are rising so fast that the earliest age at which these "women" can be observed to retire is age 60, and not 50. As a result of this higher growth in participation, the "dynamic" estimate is even higher. Undoubtedly, some of the women in the labour force aged 45 to 54 in "1995" would have retired over the following five years, but the number who do so are outweighed by new entrants. The "net" estimates show no retirement before age 60.

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Table 1. Hypothetical example

	1	2	3a	3b	4a	4b	5a	5b	6a	6b	7a	7b	8a	8b	9	10	11	12	13
	Age group	Age at which retirement is assumed to occur	Participation rate		Conditional probability of not retiring at this age		Conditional probability of retiring at this age		Unconditional probability of not retiring before this age		Unconditional probability of retiring at this age		Contribution to average retirement age		Conditional probability of not retiring at this age	Conditional probability of retiring at this age	Unconditional probability of not retiring before this age	Unconditional probability of retiring at this age	Contribution to average retirement age
			1995	2000	1995	2000	1995	2000	1995	2000	1995	2000	1995	2000	1995-2000				
	A. "Men", falling participation rates but holding cross-section structure constant																		
1	45-49		80	70					1	1						1			
2	50-54	50	60	52.5	0.75	0.75	0.25	0.25	0.75	0.75	0.25	0.25	12.0	12.0	0.66	0.34	0.66	0.34	16.5
3	55-59	55	40	35	0.67	0.67	0.33	0.33	0.50	0.50	0.25	0.25	13.3	13.3	0.58	0.42	0.38	0.27	14.5
4	60-64	60	20	17.5	0.50	0.50	0.50	0.50	0.25	0.25	0.25	0.25	14.5	14.5	0.44	0.56	0.17	0.22	12.5
5	65-69	65	10	8.75	0.50	0.50	0.50	0.50	0.13	0.13	0.13	0.13	7.9	7.9	0.44	0.56	0.07	0.09	5.9
6	70-74	70	5	4.375	0.50	0.50	0.50	0.50	0.06	0.06	0.06	0.06	4.3	4.3	0.44	0.56	0.03	0.04	2.8
7	75-79	75	2	1.75	0.40	0.40	0.60	0.60	0.03	0.03	0.04	0.04	2.7	2.7	0.35	0.65	0.01	0.02	1.5
8	80-84	80	0	0	0.00	0.00	1.00	1.00	0.00	0.00	0.03	0.03	2.0	2.0	0.00	1.00	0.00	0.01	0.9
9	Sum										1.00	1.00	56.6	56.6				1.00	54.6
	B. "Women", rising participation rate but holding cross-section structure constant																		
1	45-49		60	70					1	1							1		
2	50-54	50	45	52.5	0.75	0.75	0.25	0.25	0.75	0.75	0.25	0.25	12.0	12.0	0.88	0.13	0.88	0.13	6.0
3	55-59	55	30	35	0.67	0.67	0.33	0.33	0.50	0.50	0.25	0.25	13.3	13.3	0.78	0.22	0.68	0.19	10.3
4	60-64	60	15	17.5	0.50	0.50	0.50	0.50	0.25	0.25	0.25	0.25	14.5	14.5	0.58	0.42	0.40	0.28	16.4
5	65-69	65	7.5	8.75	0.50	0.50	0.50	0.50	0.13	0.13	0.13	0.13	7.9	7.9	0.58	0.42	0.23	0.17	10.4
6	70-74	70	3.75	4.375	0.50	0.50	0.50	0.50	0.06	0.06	0.06	0.06	4.3	4.3	0.58	0.42	0.14	0.10	6.6
7	75-79	75	1.5	1.75	0.40	0.40	0.60	0.60	0.03	0.03	0.04	0.04	2.7	2.7	0.47	0.53	0.06	0.07	5.3
8	80-84	80	0	0	0.00	0.00	1.00	1.00	0.00	0.00	0.03	0.03	2.0	2.0	0.0	1.00	0.00	0.06	4.9
9	Sum										1.00	1.00	56.6	56.6				1.00	59.9
	C. "Women", sharply rising participation rate but holding cross-section structure constant																		
1	45-49		60	90					1.00	1.00							1.00		
2	50-54	50	45	67.5	0.75	0.75	0.25	0.25	0.75	0.75	0.25	0.25	12.0	12.0	1.0	0.00	1.00	0.00	0.0
3	55-59	55	30	45	0.67	0.67	0.33	0.33	0.50	0.50	0.25	0.25	13.3	13.3	1.0	0.00	1.00	0.00	0.0
4	60-64	60	15	22.5	0.50	0.50	0.50	0.50	0.25	0.25	0.25	0.25	14.5	14.5	0.8	0.25	0.75	0.25	14.5
5	65-69	65	7.5	11.25	0.50	0.50	0.50	0.50	0.13	0.13	0.13	0.13	7.9	7.9	0.75	0.25	0.56	0.19	11.8
6	70-74	70	3.75	5.625	0.50	0.50	0.50	0.50	0.06	0.06	0.06	0.06	4.3	4.3	0.75	0.25	0.42	0.14	9.6
7	75-79	75	1.5	2.25	0.40	0.40	0.60	0.60	0.03	0.03	0.04	0.04	2.7	2.7	0.60	0.40	0.25	0.17	12.3
8	80-84	80	0	0	0.00	0.00	1.00	1.00	0.00	0.00	0.03	0.03	2.0	2.0	0.00	1.00	0.00	0.25	19.7
9	Sum										1.00	1.00	56.6	56.6				1.00	67.9

Note: The participation rates are constructed for illustrative purposes . The formulae used are set out in Table 2.

18. This effect poses problems for comparisons. Suppose one wishes to compare "men" with "women". At first sight, a "fair" comparison would suggest the exclusion of all cases of retirement before age 60. If that is done, the average retirement age for men is automatically higher: in the case of this hypothetical example, it rises to 61.7, but with actual data it can easily rise to be equal to or exceed the estimate for women.

19. However, such an adjustment would be an error. The averages here represent <u>net</u> withdrawal rates. All the estimates are over-estimates of gross retirement ages, as they all include in the activity rates people who are late entrants. In the case of men, these are retirees who return to work part time or in second jobs. The (more numerous) women are largely (re-) entering the labour force after childbearing. In this hypothetical example, a net total 62% of men would have retired by age 60, yet this early retirement would be excluded from such a censored estimate for them. At the same time, the impact of the entry of women aged 45-54 into the labour force <u>should</u> itself be reflected in a figure that summarises net movement. If anything, the practice adapted here of imposing a zero net exit rate when women are still entering the labour force itself imposes a downward bias on the estimate, since actual net entry rates at younger ages are (in a sense) negative.

20. The difference between the "static" and the "dynamic" estimates shown in the illustrative Table demonstrate the true nature of the "static" average retirement rates. The static rates are the average withdrawal rates that would prevail in the population in question *if the age-specific participation structure remained stable over time*. In other words, they show what the average withdrawal age that would be required to keep unchanged the participation distribution by age. In an age in which participation structures are changing markedly, such an estimate has little intrinsic interest.

CROSS-SECTIONAL AND COHORT ESTIMATES

21. In neither case is the actual retirement experience of a particular cohort being estimated. The issue here is similar to that which obtains with summary demographic statistics. Estimates of life expectancy and of gross and net reproduction rates sum together the mortality and birth-rates of different cohorts in a particular year. They show what the actual average lifespan and the actual average number of children would be if the one cohort experienced over the entire lifespan the rates observed in the year in question.

22. Such estimates can be misleading. For example, if a generation of women is deferring childbearing, gross reproduction rates will be low for a period even if the eventual number of children born per woman does not fall. And the age specific death rates of older generations who had poorer nourishment and care when young may be a poor guide to the longevity of those who are still young.

23. In the case of withdrawal from the labour force, it is an open question whether current early withdrawal by some middle aged men is a process which involves a selection bias (so that the survivors, who are men who like their jobs, will be more likely to work longer). Withdrawal could also be a Markov process in which the probability is not affected by the size of the remaining cohort. Similarly, nor can we know from these data alone whether the low (or negative) withdrawal rate amongst 45 year old women will be followed by net withdrawal at rate as fast as that of men, or by a longer worklife to compensate for the time lost when child-raising. These issues can be explored for past generations, but any projections of the conclusions into the future is necessarily speculative. Understanding such trends involves hypothesising and then modelling behaviour, for which the data used here are at best a starting point.

24.   The estimates are summary indicators. They summarise the latest information available for each cohort in one average. The method implies (though it does not assume) that withdrawal is a Markov process, in which the probability of withdrawal is independent of past experience. As is shown by the example of birth deferment, such assumptions can be misleading. But the alternative would be to wait forty years until the last of those currently aged 40 move out of the labour force: a useless approach for tracking current trends.

ANALYTIC BASIS OF THE ESTIMATES

25.   Consider those in the labour force at age (a-1). Let W_a be the probability that each person will withdraw from the labour force at age a, and $S_a \equiv (1- W_a)$ its supplement: the probability that each person will stay in the labour force at age a. If m is the minimum age at which withdrawal occurs (so that $W_j \equiv 0$, $j<m$), then the overall probability that any person will still be in the labour force at age (a-1) will be

$$s_a = \Pi_{j=m}^{a-1} S_j, \quad where \quad S_j \equiv 1 \quad for \quad j < m \tag{1}$$

Then the probability that any individual will withdraw from the labour force at age a will be

$$w_a = W_a \ s_a$$
$$\equiv (1 - S_a)\Pi_{j=1}^{a-1} S_j \tag{2}$$

26.   Now assume that there is a maximum age, n, above which no one remains in the labour force. This implies $W_n=1$: everyone still in the labour force at age (n-1) withdraws at age n, so that $S_n=0$

In this case, it is easy to show that

$$\sum_{a=m}^{n} w_a = 1 \quad ^3$$

and the expected age of withdrawal, G, is the sum of the retirement ages weighed by the probability of withdrawal, i.e.

$$G = \sum_{a=m}^{n} a w_a \tag{3}$$

EMPIRICAL ESTIMATION

27.   Data on participation in the labour force held in the OECD labour force database are currently available for five-year age groups. It is therefore necessary to assume that withdrawal from the labour force occurs at a uniform rate over five year age groups. For purposes of calculation, this amounts to the assumption that all withdrawal is at the intersection between five year age groups: for example, those who withdraw between age 55-59 and 60-64 all do so at age 60[4].

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3   see endnote (a)

4   Arithmetically, this is equivalent to assuming that withdrawal occurs at a uniform rate over the five years in question, so the average (and nedian) age is the mid-point between the age groups: 60 in this case.   This assumption is occasionally close to reality (people often do move into retirement at age 60 or 65, since this is

On this basis:

"y" refers to a particular calendar year

"a" is a five year age group which, for convenience, is written as the first of the five year group. Thus "a= 65" in fact means "the age group 65-69".

Then define

L_a^y as the number of people in the labour force in year y and age group a

(L_{65}^{1977} is the number of 65-69 year olds in the labour force in 1977).

P_a^y as the population in year y and age group a

$A_a^y \equiv L_a^y / P_a^y$ as the activity rate (labour force participation rate) for age group a in year y

$\widehat{S}_a^y = A_a^y / A_{a-5}^{y-5}$ as the proportion of those who were in the labour force five years ago who have stayed in it in age group a in year y

28. By the convention described above, all those who did withdraw are assumed to have done so at the age "a" which we have used to label the five year age range. For the dynamic estimate of net withdrawal age, the overall probability in the population of staying in the labour force at age a in year y, S_a^y, is then estimated by the <u>observed</u> withdrawal rate $\widehat{S}_a^y$.

29. The corresponding <u>static</u> estimate of the probability of staying in the labour force (as estimated by Latulippe) is A_a^y / A_{a-5}^y. The minimum age at which anyone withdraws from the labour force in Table 1 is 45, and the maximum age is 80: ie. m=45 and n=80. The relation between the theoretical probabilities, the empirical estimates and the illustration in Table 1 is set out in Table 2[5].

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often the age at which the public pension become available). However, often this assumption is not correct (e.g. in the United States, the first age at which old age social security is payable is 62). (I am grateful to Denis Latulippe for pointing out that such differences, if not taken into account, can lead to an illusion of precision) Future work will need to adjust for such effects to derive more accurate estimates.

5 Column 3 of Table 2 shows one of the attractions of Latulippe's method: using only current year data simplifies the calculations. The implicit assumption that the structure of activity rates is invariant means the unconditional probabilities cancel out when multiplied together. However, such computational simplicity is not a reason for adhering to a method that yields misleading results.

The method also has the apparently seductive advantage of only requiring one years' data for each estimate: Latulippe's paper includes estimates of activity rates at 10 year intervals (five sets of data are given for each country, running from 1950 to 1990). However, this is similar to using single-year census data to derive net (death plus emigration) rates: the method only has validity if activity rate structures are stable. But if they were stable, the time series would be of no interest!

Table 2. Formulae used for empirical estimates

1	Symbolic Form	Estimates		Corresponding Column in Table 1	
	2	3	4	5	6
		Static	Dynamic	Static	Dynamic
Probability at age a and year y:					
of staying in the labour force	S_a^y	A_a^y / A_{a-5}^y	A_a^y / A_{a-5}^{y-5}	Column 4 Row 1-8	Column 9 Row 1-8
of <u>not</u> staying in the labour force	$W_a^y \equiv 1 - S_a^y$	$1 - \left(A_a^y / A_{a-5}^y \right)$	$1 - A_a^y / A_{a-5}^{y-5}$	5 1-8	10 1-8
of still being in the labour force	$s_a^y = \prod_{j=9}^{a/5-1} S_{5j}^y$	A_{a-5}^y / A_{40}^y	$\prod_{k=9}^{a/5-1} \left(A_{5k}^y / A_{5k-5}^{y-5} \right)$	6 1-8	11 1-8
of withdrawing at this particular age	$w_a^y = W_a^y s_a^y$	$\left(A_y^{a-5} - A_y^a \right) / A_y^{40}$	$W_a^y s_a^y$	7 1-8	12 1-8
Expected (mean) age of withdrawal from the labour force in year y	$G_y = \sum_{a=9}^{14} (5a) w_{5a}^y$	$\sum_{k=9}^{14} (5k)(A_y^{a-5} - A_y^a) / A_y^{40}$	$\sum_{k=9}^{14} (5k) \cdot w_{5k}^y$	8 9	13 9

30.   Data on participation rates until age 70-74 were available for three countries (France, the USA and Japan) for some years. When combined with the assumption that no-one is in the labour force above age 80, this allows retirement at ages 65, 70, 75 and 80 to be taken into account. Estimates of average net withdrawal ages (G_y) can then be derived.

31.   However, for most countries (and for most years for the USA and Japan) data on participation rates by age are only available up to age 65. However, the total number in the labour force above this age is available. This total number is an important indicator of the extent of late retirement, but cannot directly be integrated into the approach described in the above illustration.

32.   The Annex describes a method for using this total to derive an estimate of S_a for age groups above the age of 65. Because only one figure is available, this is done by assuming that the value of S_a does not vary by age for a≥65. The Annex compares the estimates of average net withdrawal ages (G_y) which result from using this assumption with those calculated using data for activity rates above the age of 65. Except for Japanese women (where the data used to derive rates for age groups above 65 is clearly inconsistent over time) the results are almost exactly the same.

33.   The rest of this paper assumes that this method is valid, and uses it to calculate average net withdrawal ages for 17 countries. Because at least five years' data are needed , only countries with at least that many years' data are included. In some cases[6], data are only available for ten-year age groups for ages below 55. In these cases, activity rates in five-year groups have been devised by interpolation, and then the formulae given above have been used. This does not influence the accuracy of the results greatly, as the ages at which most retirement occurs are the ages between 55 and 65.

34.   Finally, if the simplifying assumption of all retirements occurring at the boundary between two age groups is dropped, and a more realistic (though arithmetically similar) uniform transition between each age range is substituted, it is possible by interpolation to derive the quartiles of the distribution of net withdrawal. To do this, it is necessary to assume that movement out of the labour force continues until the age 82.5. These estimates are less affected by the assumed truncation of employment at this age, except for Japan where the final quartile of the distribution is at a very high age.

RESULTS

35.   Figure 1 shows the "dynamic" and "static" estimates of average age of withdrawal over time for 16 countries. Figure 2 shows the three quartiles for dynamic estimates for both genders. It should be born in mind that all these estimates have been obtained from data truncated at age 65, using the method described in Annex 1. This particularly affects the upper quartile. In the cases of Japan and Korea, it is also directly affected by the imposed assumption that all labour force participation ceases above age 82: this assumption is strictly not correct anywhere, and clearly produces a downward bias in the estimate of the upper quartile in these two cases.

Difference in levels between "Static" and "Dynamic" estimates

36.   The pattern suggested in the hypothetical example (Table 1) is confirmed by the empirical data. Out of 16 countries, for 13 the "dynamic" estimate of average age of withdrawal for women is consistently

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6   Australia, Canada, Finland, the United Kingdom and (before 1983) Italy

higher than the static estimate, since it eliminates the bias due to the secular increase in female participation in the labour force over time. This bias is not present, of course, when female participation ceases to increase, and so the systematic difference in the two series disappears in Sweden and Denmark from 1995 and in Finland from 1990.

37. The fall in male labour force participation has been less pronounced and less general than the rise in female participation. However, it is sufficiently widespread to cause the male dynamic estimate to be generally lower than the static estimate in about nine of the 16 countries.

38. The dynamic estimates therefore show female withdrawal rates to be closer to male rates than do the static estimates. In four cases (the US, France, Spain and Portugal) the average age of withdrawal for females is in fact consistently above that for men. For five other countries, the two genders are not consistently different, but in seven countries the estimate of average age of withdrawal for men remains consistently above that for women.

39. The estimates for women are influenced by the fact that within each cohort, participation often increases up to age 45-49 and even 50-54. The method adopted imposes a zero rate of withdrawal from the labour force for these age groups when this happens, and so does not result in a relatively higher age for women unless men do start to withdraw in these age groups. The quartile estimates can be used to see whether men "catch up" to women after these ages are passed: in most cases this does not occur.

Trends

40. Trends over time in the static and dynamic series can be very different. While in most cases both show a fall from relatively high average ages in the 1960's and 1970's to lower ones more recently, this is by no means general. The static series for women can be particularly misleading. However, the static series for men is generally similar in trend to the dynamic one.

41. Chart 2 shows the changes over the last decade in the "dynamic" estimates. It will be seen that on average there has been no trend to earlier retirement over this period for these OECD countries: increases in some countries have been matched by falls in others.

Cyclical Fluctuations

42. Unlike the static series, the dynamic series show strong cyclical fluctuations, showing clearly that withdrawal from the labour force by both genders is strongly responsive to general labour market trends. However, this pattern is by no means uniform: for example, the strong increase since the period 1995-1994 in the average age in the US for men is not reflected at all in the series for women, and by 1993-1998 the average for men in the US had risen above that for women for the first time in 20 years.

43. Some of the changes over time show trends which are different to popular perceptions. For example, there has been a great deal of policy concern on Norway over growth in early retirement. But whatever is happening to the age of payment of state pensions, the data show that increasingly premature withdrawal from the labour force in that country ceased for both genders as from the period 1987-1992. The average age of withdrawal has increased by about three years for both men and women since then.

Data problems

44.   All this is not to say the dynamic estimates are free of faults. They share with static estimates the approximations due to the use of censored data, but because they are more sensitive to the data they more strongly reflect its inadequacies. These are particularly pronounced in Europe, particularly in years prior to 1983 and for countries (such as Belgium and Denmark) where labour force surveys are only carried out to fulfil a mandate from Eurostat. On the first issue, the strong increase in average age in the estimates for Italy from 1971-76 and for the following five years are due to a doubling in one year of the reported number in the labour force above age 65, a doubling which is certainly a data inconsistency. Similar unlikely fluctuations in that and other age groups for Belgium and Denmark influence their series.

45.   Many of the difficulties addressed in this paper – and particularly in Annex 1 – derive from the use of grouped and truncated data. Unit record data or detailed tabulations from labour force surveys can now allow data showing single years of age to be used. Preliminary trials using such data show that the annual variation in the resultant estimates is higher than for the grouped data used for this paper. This appears to reflect annual changes in labour market conditions. Further work on the correlates of these annual variations is needed[7].

46.   Finally, while it would clearly be possible to make data available in a more detailed manner for future surveys, it may be difficult to do so retrospectively in all cases. Hence the estimation processes described in this paper will necessary for several decades, even if data were released from now on in a more comprehensive form.

CONCLUSION

47.   In spite of the inevitable problems in interpretation, the dynamic series are a much better guide to both secular and cyclical trends in withdrawal from the labour force. They provide a more accurate guide for current policy. This methodology should therefore be used as the basis for future data development in this field.

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7   Such detailed data could certainly be used for future work to address the issue raised in note 3 above: the "bunching" of withdrawal at the age of eligibility for pensions. Where this age does not coincide with the dividing point between five-year age ranges, estimates based on the assumption of "uniform" rates over the five-year range will be biased.

_____

(a)   End note.

$$\sum_{a=m}^{n} W_a \quad = \sum_{a=m}^{n} (1 - S_a) \Pi_{j=1}^{a-1} S_j$$

$$= 1 - S_m$$

$$+ S_m - S_{m+1} S_m$$

$$+ S_{m+1} S_m - S_{m+2} S_{m+1} S_m$$

$$+ \Pi_{j=1}^{h-2} S_j - \Pi_{j=1}^{n-1} S_j$$

$$+ \Pi_{j=1}^{h-2} S_j - S_n \Pi_{j=1}^{n-1} S_j$$

$=1$ as $S_n=0$ by assumption.

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Chart 1. Average age of withdrawal from the labour force

USA
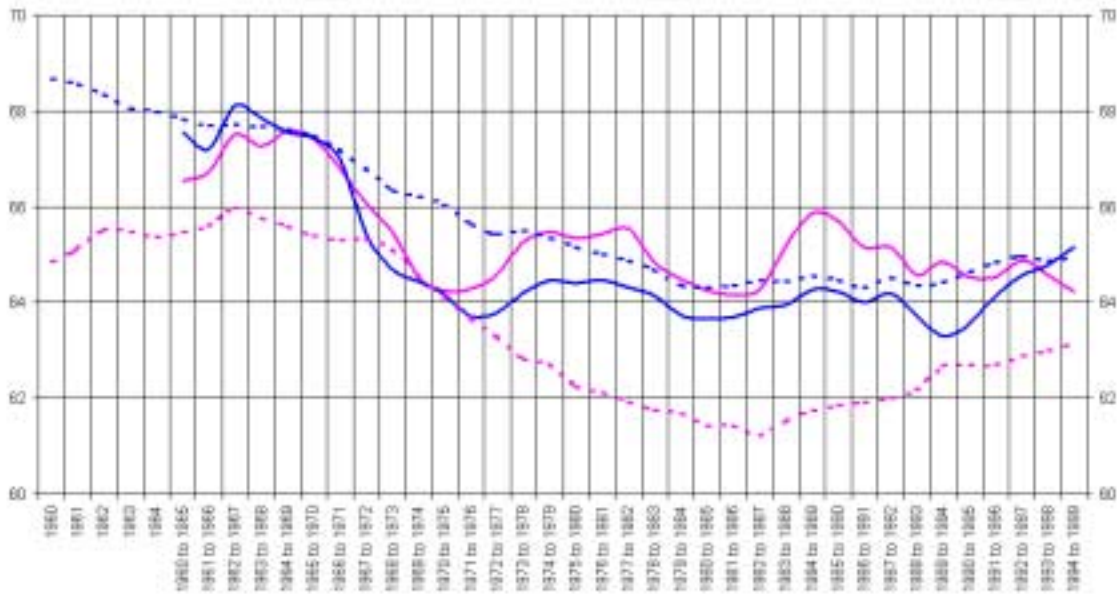
JAPAN

Men Dynamic Estimate   Women Dynamic Estimate   Men Static Estimate   Women Static Estimate

20

Chart 1. Average age of withdrawal from the labour force (cont.)
WEST GERMANY
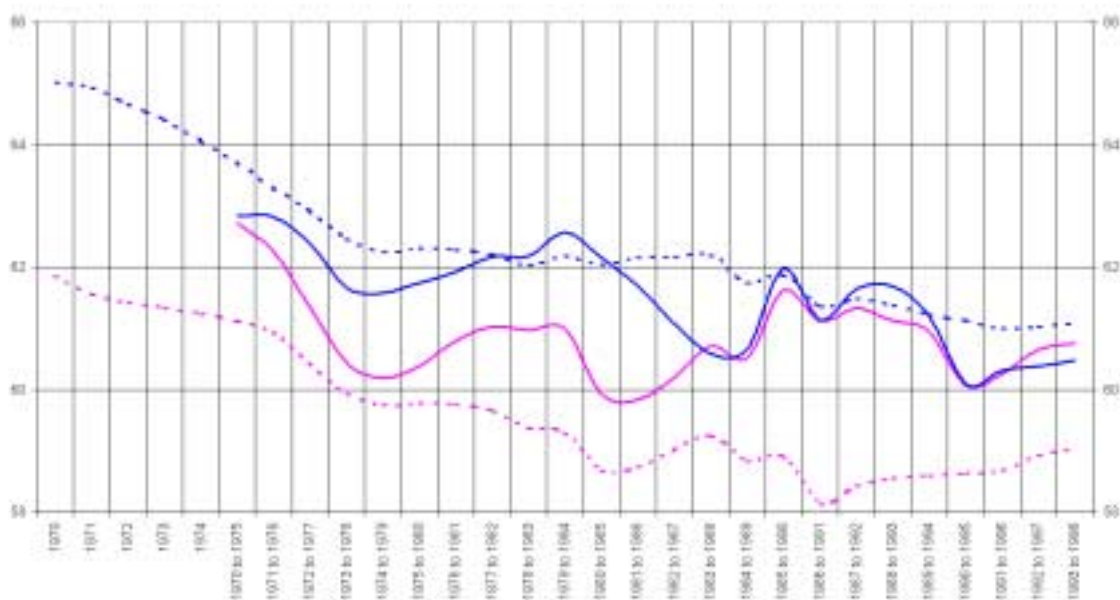
FRANCE

Men Dynamic Estimate — Women Dynamic Estimate ▪ ▪ ▪ Men Static Estimate ▪ ▪ ▪ Women Static Estimate

Chart 1. Average age of withdrawal from the labour force (cont.)

ITALIE
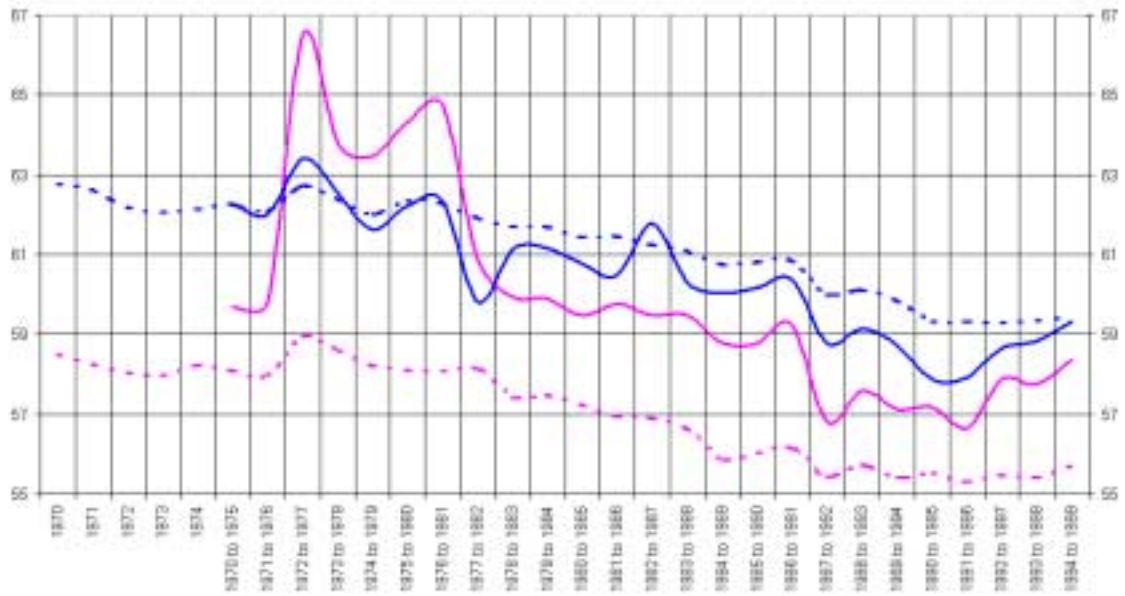
UNITED KINGDOM
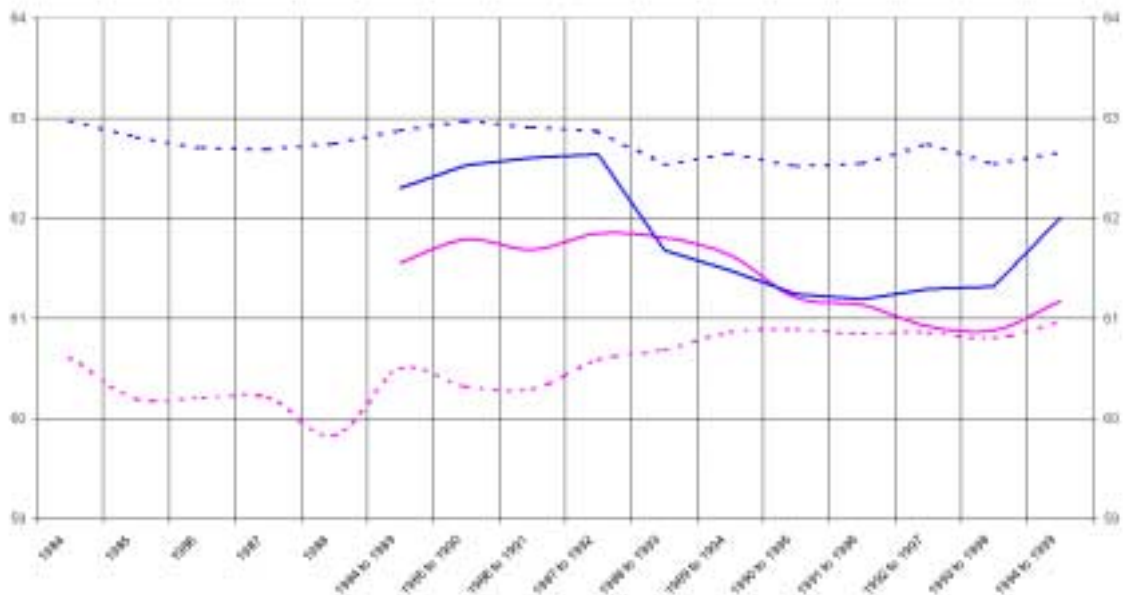
Men Dynamic Estimate ———— Women Dynamic Estimate ▪ ▪ ▪ Men Static Estimate ▪ ▪ ▪ Women Static Estimate

Chart 1. Average age of withdrawal from the labour force (cont.)

CANADA
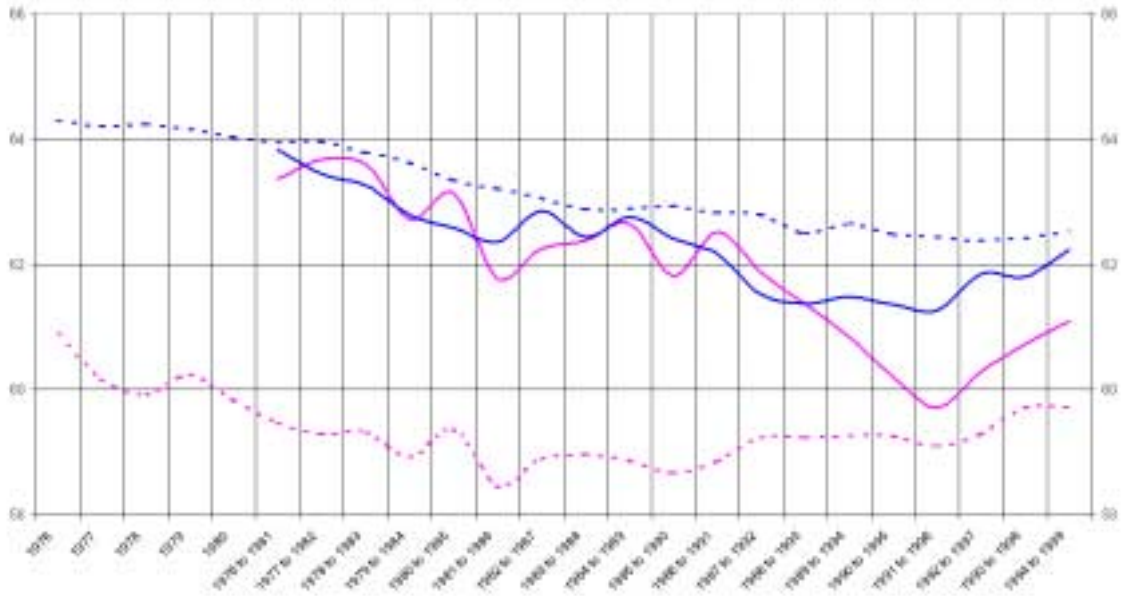
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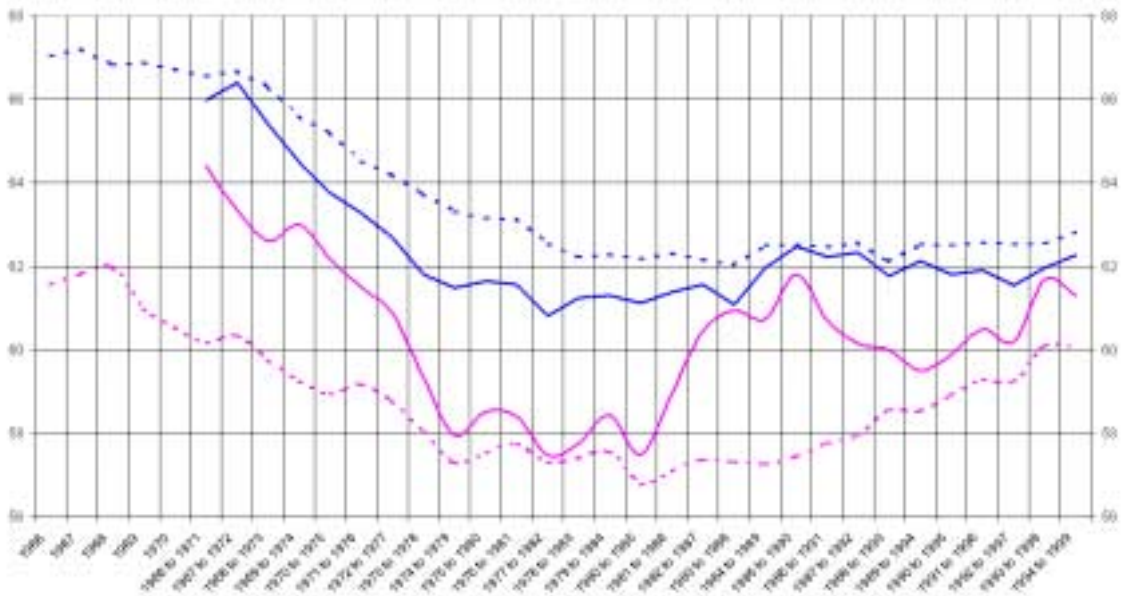
Men Dynamic Estimate ——— Women Dynamic Estimate ▬ ▬ ▬ Men Static Estimate ▬ ▬ ▬ Women Static Estimate

Chart 1. Average age of withdrawal from the labour force (cont.)

BELGIUM
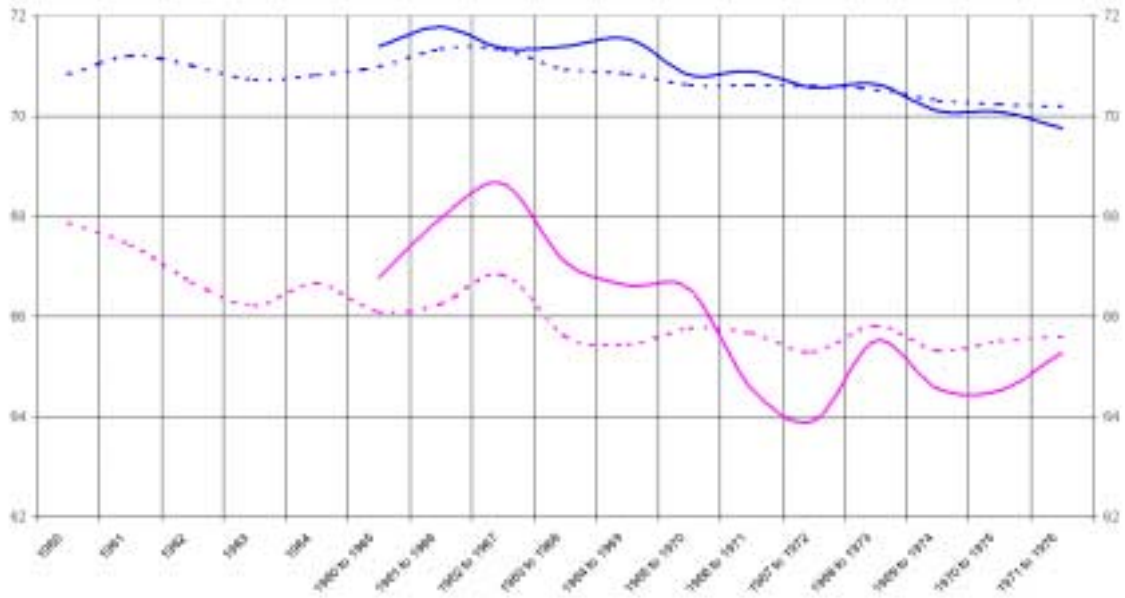
DANEMARK
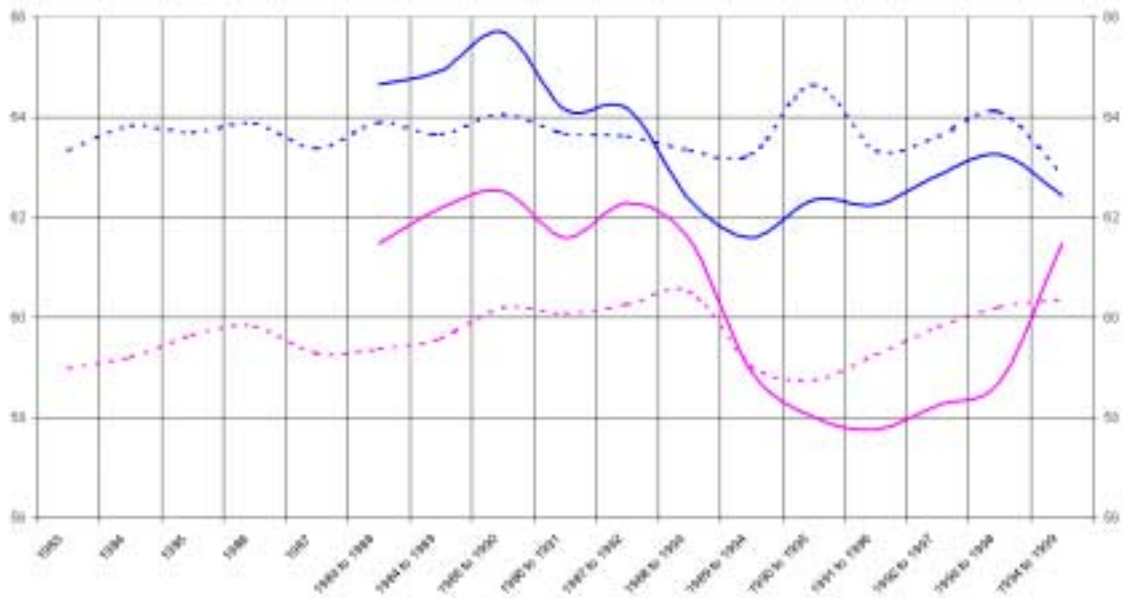
| ——Men Dynamic Estimate ——Women Dynamic Estimate ▪ ▪ ▪Men Static Estimate ▪ ▪ ▪Women Static Estimate |

Chart 1. Average age of withdrawal from the labour force (cont.)

FINLAND
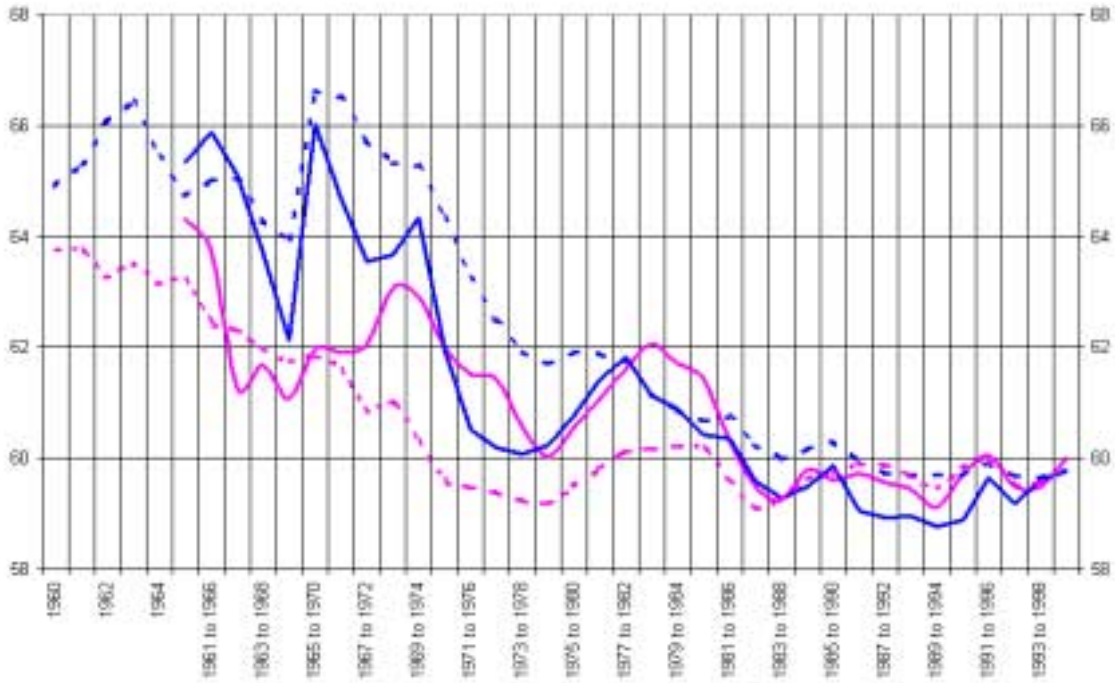
GREECE
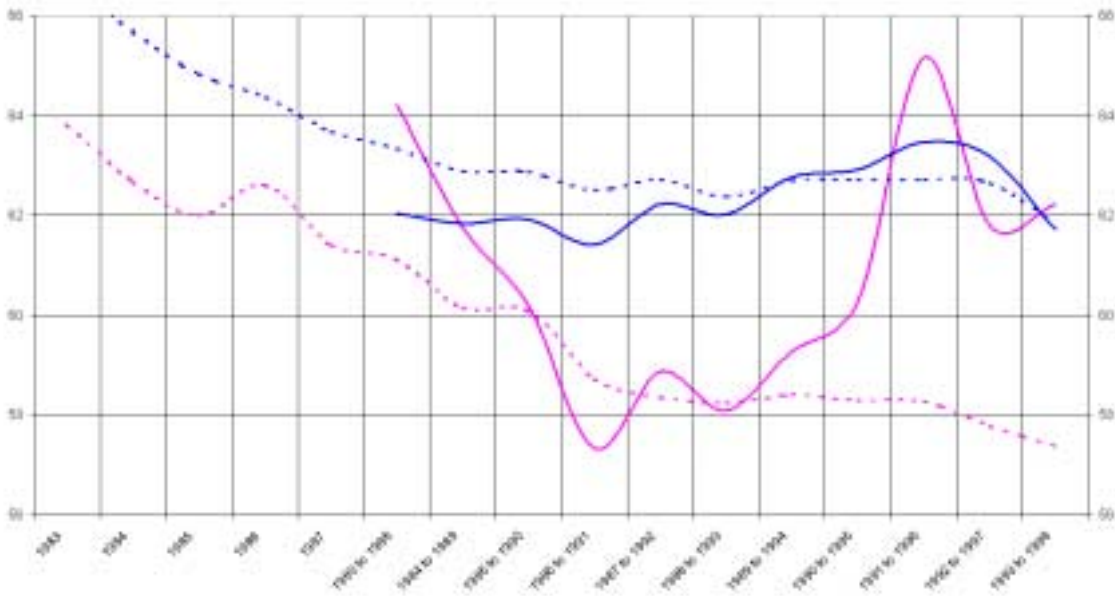
Men Dynamic Estimate ——— Women Dynamic Estimate = = = Men Static Estimate = = = Women Static Estimate

Chart 1. Average age of withdrawal from the labour force (cont.)

KOREA
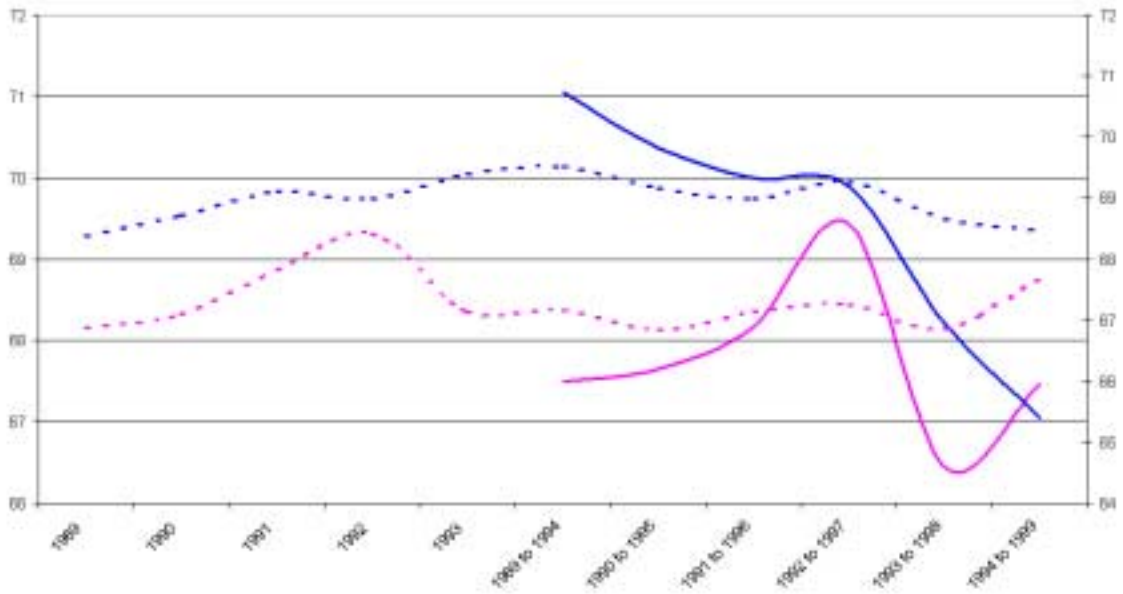
NETHERLANDS
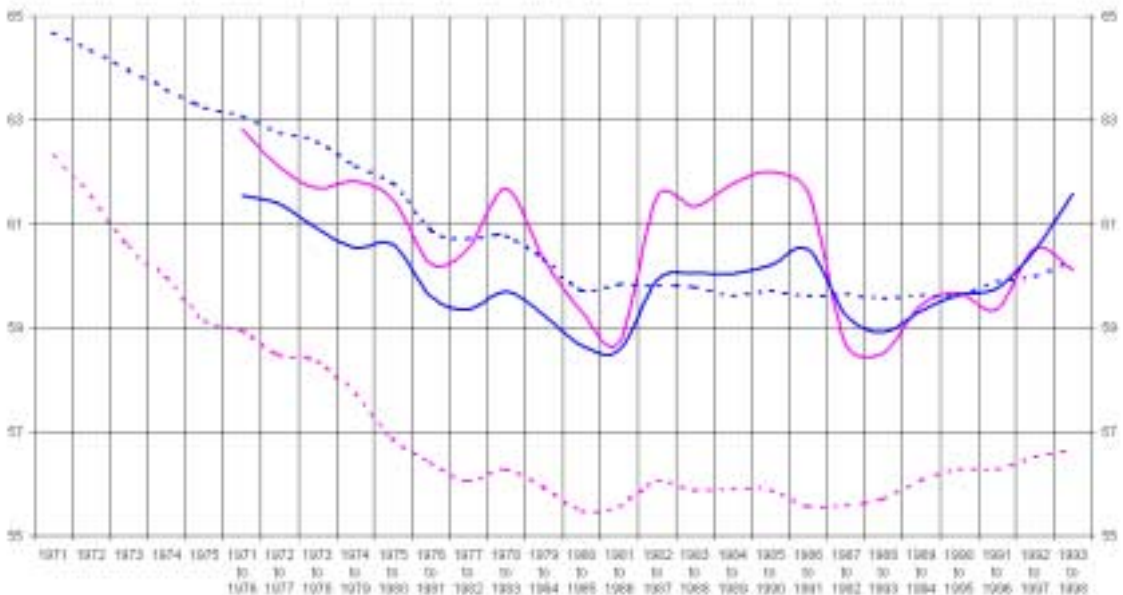
| ───Men Dynamic Estimate | ───Women Dynamic Estimate | ▪ ▪ ▪ Men Static Estimate | ▪ ▪ ▪ Women Static Estimate |

Chart 1. Average age of withdrawal from the labour force (cont.)

NORWAY
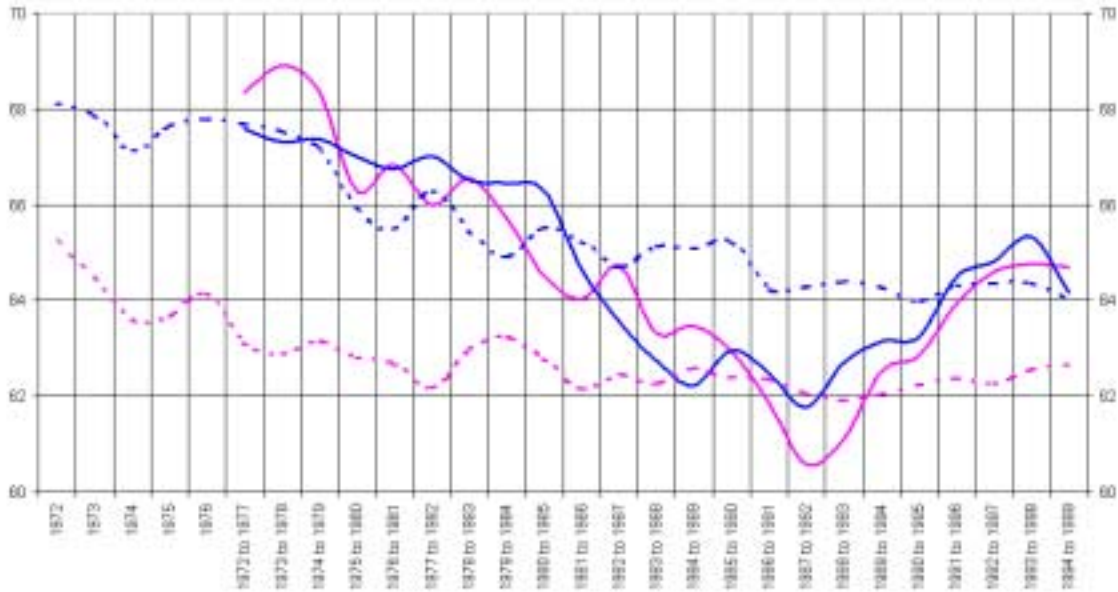
POLAND
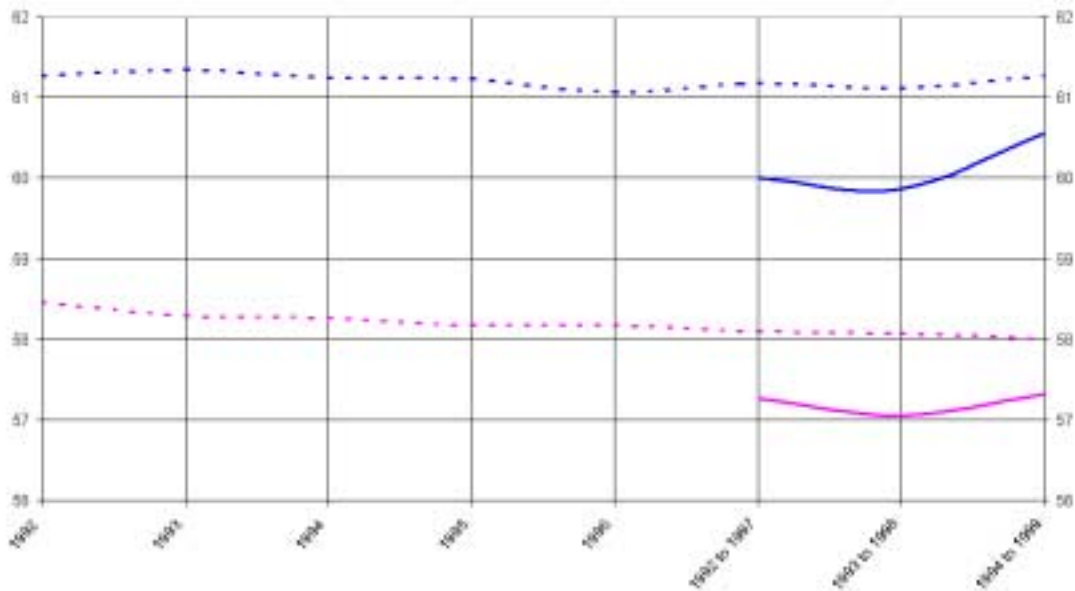
Men Dynamic Estimate ——— Women Dynamic Estimate ‒ ‒ ‒ Men Static Estimate ‒ ‒ ‒ Women Static Estimate

Chart 1. Average age of withdrawal from the labour force (cont.)

PORTUGAL
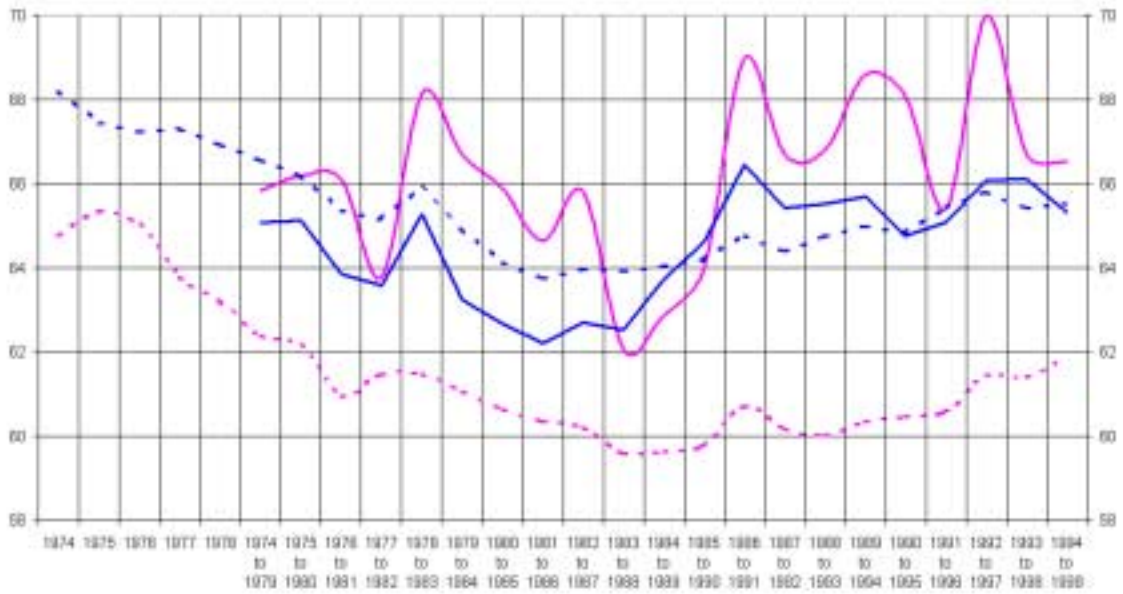
SPAIN
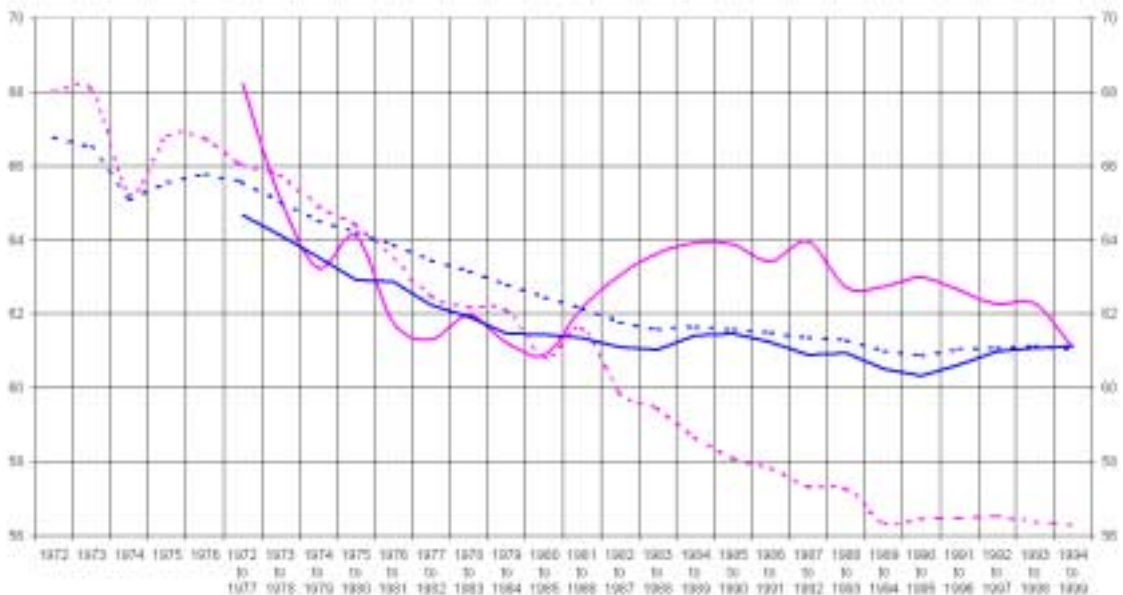
Men Dynamic Estimate ——— Women Dynamic Estimate ▪ ▪ ▪ Men Static Estimate ▪ ▪ ▪ Women Static Estimate

Chart 1. Average age of withdrawal from the labour force (cont.)

SWEDEN

Men Dynamic Estimate   Women Dynamic Estimate ▪ ▪ ▪ Men Static Estimate ▪ ▪ ▪ Women Static Estimate
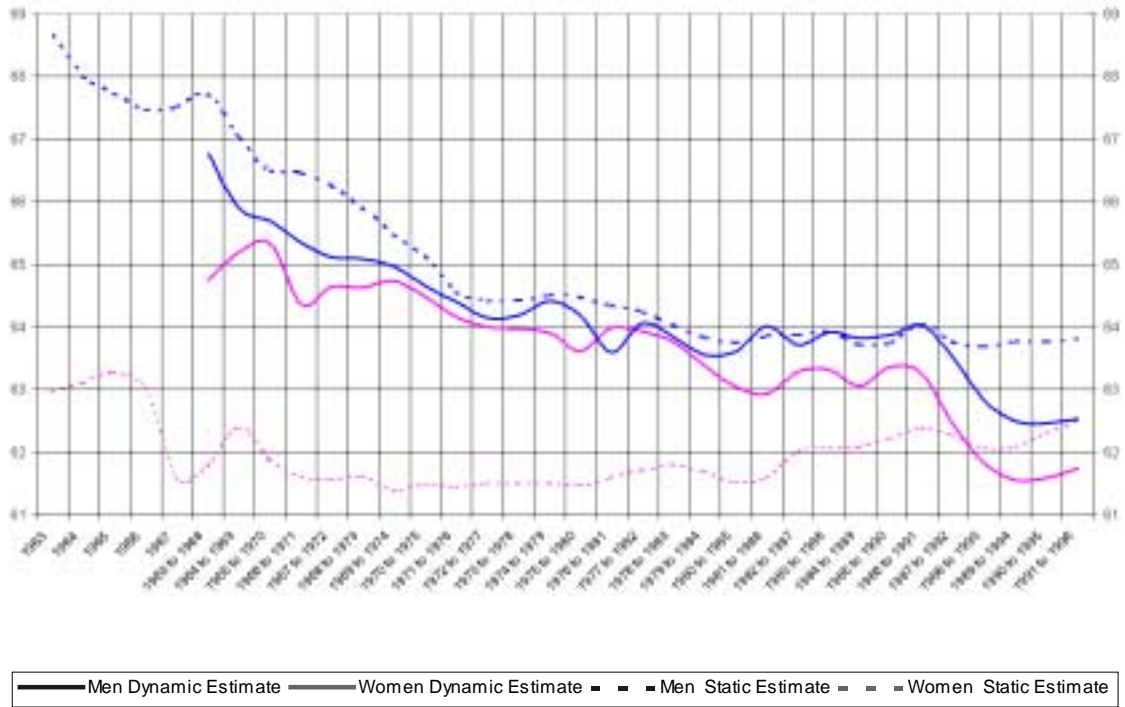
Chart 2. Average age of withdrawal from the labour force since 1983

Women		Men

Countries (top to bottom):
Poland, Italy, France, Finland, Netherlands, Germany, Spain, Canada, United Kingdom, Australia, Denmark, Sweden, **Unweighted average**, Greece, United States, Norway, Japan, Portugal, Korea

Legend: ■ 1983-88 ■ 1994-99
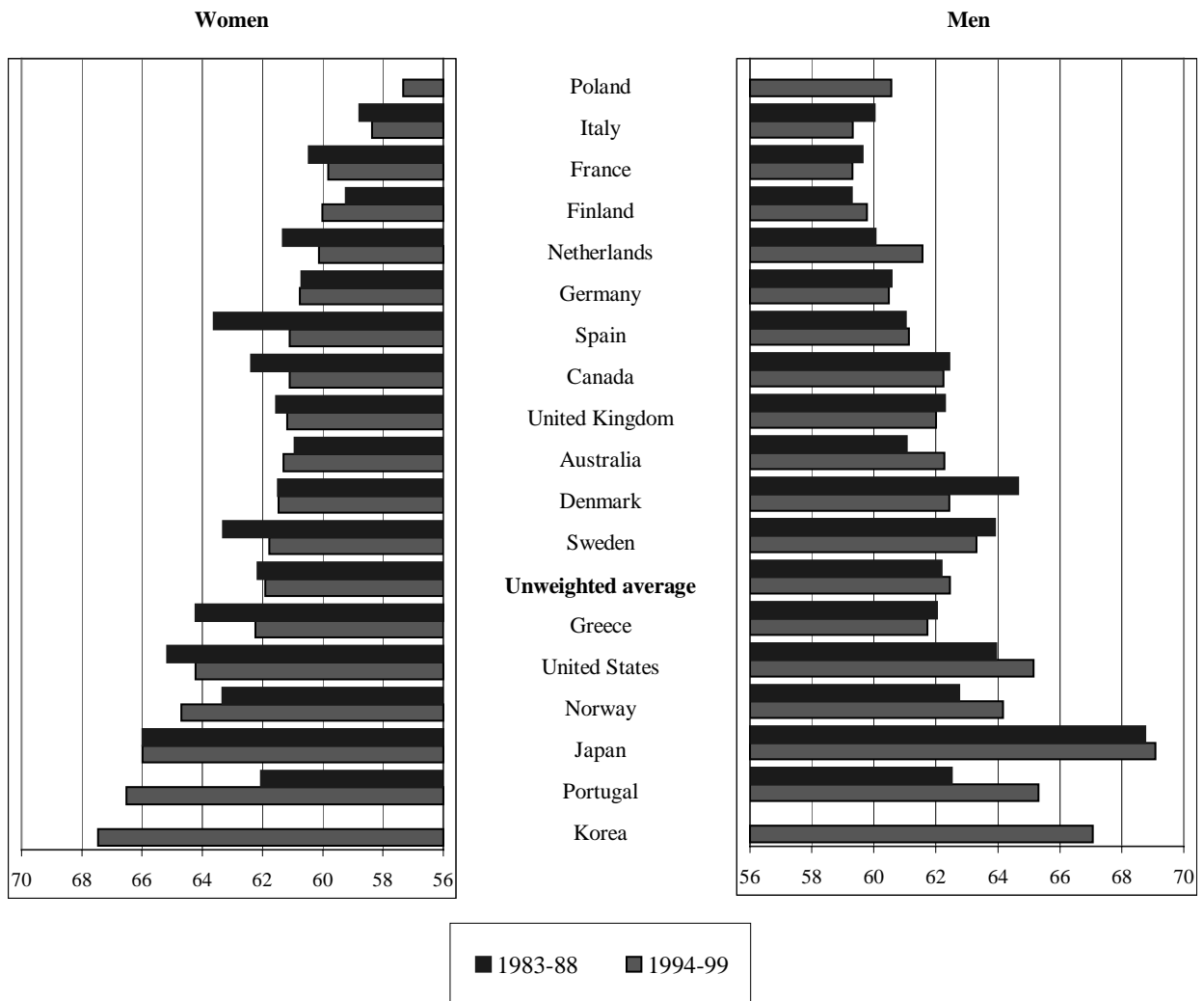
Table 3. Estimates of average age of withdrawal from the labour force

	United States				Japan				Western Germany				France				Italy			
	Men		Women		Men		Women		Men		Women		Men		Women		Men		Women	
	Dynamic	Static	Dynamic	Static	Dynamic	Static	Dynamic	Static	Dynamic	Static	Dynamic	Static	Dynamic	Static	Dynamic	Static	Dynamic	Static	Dynamic	Static
1960		68.7		64.8		70.8		67.9												
1961		68.6		65.1		71.2		67.4												
1962		68.4		65.5		71.0		66.7						66.4		66.4				
1963		68.1		65.5		70.7		66.2						65.7		65.3				
1964		68.0		65.4		70.8		66.7						66.1		66.3				
1960 to 1965	67.5	67.8	66.5	65.5	71.4	71.0	66.8	66.1						65.3		66.2				
1961 to 1966	67.2	67.7	66.7	65.6	71.8	71.3	67.9	66.3						65.6		66.2				
1962 to 1967	68.1	67.7	67.5	66.0	71.4	71.3	68.7	66.8					63.9	64.8	64.6	64.9				
1963 to 1968	67.8	67.7	67.3	65.8	71.4	70.9	67.1	65.6					66.3	65.7	67.7	66.2				
1964 to 1969	67.5	67.6	67.6	65.6	71.5	70.9	66.6	65.4					65.8	65.8	66.9	65.9				
1965 to 1970	67.4	67.5	67.4	65.4	70.8	70.6	66.5	65.8		65.0		61.9	65.4	65.2	68.1	65.7		62.8		58.5
1966 to 1971	67.0	67.2	66.8	65.3	70.9	70.6	64.6	65.7		64.9		61.6	65.1	65.0	65.1	64.8		62.6		58.3
1967 to 1972	65.4	66.8	66.1	65.3	70.6	70.6	63.9	65.3		64.7		61.4	65.6	64.8	66.0	64.6		62.2		58.0
1968 to 1973	64.7	66.3	65.4	65.1	70.6	70.5	65.5	65.8		64.4		61.3	64.3	64.5	64.4	64.3		62.1		58.0
1969 to 1974	64.4	66.2	64.5	64.6	70.1	70.3	64.5	65.3		64.1		61.2	63.8	64.4	63.9	63.6		62.1		58.2
1970 to 1975	64.2	66.0	64.3	64.1	70.1	70.2	64.5	65.5	62.8	63.7	62.7	61.1	63.5	63.9	63.8	63.1	62.3	62.3	59.7	58.1
1971 to 1976	63.7	65.7	64.3	63.7	69.8	70.2	65.3	65.6	62.8	63.3	62.2	60.9	62.9	63.6	64.0	62.4	62.0	62.1	59.8	58.0
1972 to 1977	63.8	65.4	64.6	63.3	69.6	70.1	66.2	65.6	62.4	62.9	61.3	60.4	62.7	63.5	63.8	62.4	63.4	62.7	66.5	59.0
1973 to 1978	64.2	65.5	65.3	62.8	69.1	69.9	66.0	65.4	61.7	62.5	60.4	59.9	61.8	62.8	63.2	61.6	62.5	62.4	63.8	58.6
1974 to 1979	64.5	65.4	65.5	62.7	69.2	69.7	66.8	65.4	61.6	62.2	60.2	59.8	62.0	62.7	63.2	61.3	61.6	62.0	63.5	58.2
1975 to 1980	64.4	65.2	65.3	62.3	69.5	69.9	67.1	65.3	61.7	62.3	60.4	59.8	62.3	62.8	63.6	61.1	62.2	62.4	64.3	58.1
1976 to 1981	64.5	65.0	65.4	62.1	69.5	69.9	66.8	65.2	61.9	62.3	60.8	59.8	61.7	62.3	63.1	60.6	62.3	62.3	64.8	58.1
1977 to 1982	64.3	64.9	65.5	61.9	69.4	69.7	66.8	65.1	62.2	62.2	61.0	59.7	60.9	61.7	62.1	60.3	59.8	61.9	60.9	58.2
1978 to 1983	64.1	64.7	64.8	61.8	69.3	69.6	66.8	65.0	62.2	62.0	61.0	59.4	60.2	61.0	61.4	59.5	61.1	61.7	59.9	57.4
1979 to 1984	63.7	64.4	64.5	61.7	68.6	69.3	66.4	64.7	62.6	62.2	61.0	59.3	59.9	60.8	61.0	59.3	61.2	61.7	59.9	57.5
1980 to 1985	63.7	64.3	64.2	61.5	68.4	69.2	66.3	64.8	62.2	62.0	59.9	58.7	59.7	60.7	60.6	58.8	60.8	61.5	59.5	57.2
1981 to 1986	63.7	64.4	64.2	61.4	68.2	69.1	66.2	64.5	61.7	62.1	59.8	58.7	59.6	60.1	60.3	58.8	60.5	61.5	59.8	57.0
1982 to 1987	63.9	64.5	64.3	61.2	68.4	69.1	66.1	64.8	61.1	62.2	60.2	59.0	59.5	60.1	60.3	58.7	61.8	61.3	59.5	56.9
1983 to 1988	63.9	64.4	65.2	61.5	68.7	69.2	66.0	64.9	60.6	62.2	60.7	59.2	59.6	60.1	60.5	58.6	60.3	61.1	59.5	56.7
1984 to 1989	64.3	64.5	65.9	61.7	69.2	69.2	66.9	64.8	60.6	61.8	60.5	58.8	59.7	60.0	60.4	58.5	60.0	60.8	58.8	55.9
1985 to 1990	64.2	64.5	65.7	61.8	69.9	69.4	67.6	64.9	62.0	61.9	61.6	58.9	59.6	59.9	60.1	58.2	60.2	60.8	58.8	56.0
1986 to 1991	64.0	64.3	65.1	61.9	70.9	69.6	69.0	65.2	61.1	61.4	61.1	58.1	59.3	59.7	60.3	58.3	60.4	60.9	59.2	56.2
1987 to 1992	64.2	64.5	65.1	62.0	71.0	69.7	69.0	65.4	61.6	61.5	61.3	58.4	59.4	59.7	60.1	58.3	58.8	60.0	56.8	55.4
1988 to 1993	63.7	64.4	64.6	62.2	70.9	69.5	67.8	65.2	61.7	61.4	61.1	58.5	59.2	59.7	60.1	58.4	59.1	60.1	57.6	55.8
1989 to 1994	63.3	64.4	64.9	62.7	70.5	69.6	66.9	65.3	61.2	61.2	60.9	58.6	59.2	59.5	60.2	58.4	58.7	59.9	57.1	55.4
1990 to 1995	63.6	64.6	64.5	62.7	70.2	69.6	66.1	65.3	60.1	61.1	60.1	58.6	59.1	59.4	60.4	58.5	57.9	59.3	57.2	55.5
1991 to 1996	64.1	64.8	64.5	62.7	69.6	69.3	65.4	65.2	60.3	61.0	60.3	58.7	59.5	59.5	60.4	58.6	57.9	59.3	56.7	55.3
1992 to 1997	64.6	65.0	64.9	62.9	69.3	69.4	65.7	65.3	60.4	61.0	60.6	58.9	59.4	59.5	60.1	58.6	58.7	59.3	57.9	55.5
1993 to 1998	64.8	64.9	64.6	63.0	69.0	69.3	66.0	65.3	60.5	61.1	60.8	59.0	59.4	59.4	59.8	58.7	58.8	59.3	57.7	55.4
1994 to 1999	65.1	65.0	64.2	63.1	69.1	69.3	66.0	65.3					59.3	59.4	59.8	58.8	59.3	59.4	58.4	55.7

Table 3. Estimates of average age of withdrawal from the labour force (cont.)

	United Kingdom				Canada				Austalia				Belgium				Denmark			
	Men		Women		Men		Women		Men		Women		Men		Women		Men		Women	
	Dynamic	Static	Dynamic	Static	Dynamic	Static	Dynamic	Static	Dynamic	Static	Dynamic	Static	Dynamic	Static	Dynamic	Static	Dynamic	Static	Dynamic	Static
1960														60.2		55.0				
1961														59.7		54.7				
1962														59.4		54.4				
1963														58.8		54.2				
1964														58.3		53.2				
1960 to 1965													57.2	58.3	55.0	53.6				
1961 to 1966										67.0		61.6	57.4	58.1	54.8	53.5				
1962 to 1967										67.2		61.8	57.0	57.9	55.4	53.6				
1963 to 1968										66.8		62.0	57.6	58.1	56.0	53.5				
1964 to 1969										66.9		61.0	57.9	58.2	57.0	54.0				
1965 to 1970										66.7		60.6	57.4	57.9	58.4	53.9				
1966 to 1971									66.0	66.6	64.4	60.2	57.8	58.3	58.5	54.2				
1967 to 1972									66.4	66.7	63.3	60.4	58.6	58.5	59.4	54.6				
1968 to 1973									65.4	66.3	62.6	59.7	58.1	58.2	57.6	54.2				
1969 to 1974									64.5	65.6	63.0	59.3	58.1	58.2	57.7	54.5				
1970 to 1975									63.8	65.2	62.2	58.9	58.2	58.2	57.4	54.7				
1971 to 1976						64.3		60.9	63.3	64.5	61.5	59.2	59.0	58.7	58.9	55.1				
1972 to 1977						64.2		60.2	62.7	64.2	60.9	58.8								
1973 to 1978						64.2		59.9	61.8	63.7	59.3	58.0								
1974 to 1979						64.2		60.3	61.5	63.3	58.0	57.3								
1975 to 1980						64.0		59.8	61.7	63.2	58.5	57.5								
1976 to 1981					63.8	64.0	63.4	59.5	61.6	63.1	58.4	57.7								
1977 to 1982					63.4	64.0	63.7	59.3	60.8	62.6	57.5	57.3								
1978 to 1983					63.3	63.8	63.6	59.3	61.2	62.2	57.8	57.4						63.3		59.0
1979 to 1984		63.0		60.6	62.8	63.6	62.7	58.9	61.3	62.3	58.4	57.6						63.8		59.2
1980 to 1985		62.8		60.2	62.6	63.4	63.1	59.4	61.1	62.2	57.5	56.8						63.7		59.6
1981 to 1986		62.7		60.2	62.4	63.2	61.8	58.5	61.4	62.3	59.0	57.1						63.9		59.8
1982 to 1987		62.7		60.2	62.9	63.1	62.2	58.9	61.6	62.2	60.5	57.4						63.4		59.3
1983 to 1988		62.7		59.8	62.4	62.9	62.4	59.0	61.1	62.0	60.9	57.3					64.7	63.9	61.5	59.4
1984 to 1989	62.3	62.9	61.6	60.5	62.8	62.9	62.7	58.9	62.0	62.5	60.7	57.3					64.9	63.7	62.2	59.6
1985 to 1990	62.5	63.0	61.8	60.3	62.4	62.9	61.8	58.7	62.5	62.5	61.8	57.5					65.7	64.1	62.5	60.2
1986 to 1991	62.6	62.9	61.7	60.3	62.2	62.8	62.5	58.9	62.2	62.5	60.7	57.8					64.1	63.7	61.6	60.1
1987 to 1992	62.6	62.9	61.8	60.6	61.5	62.8	61.9	59.2	62.3	62.6	60.1	58.0					64.2	63.6	62.3	60.3
1988 to 1993	61.7	62.5	61.8	60.7	61.4	62.5	61.4	59.2	61.8	62.1	60.0	58.6					62.4	63.4	61.5	60.5
1989 to 1994	61.5	62.7	61.6	60.9	61.5	62.7	60.8	59.3	62.1	62.5	59.5	58.5					61.6	63.3	58.9	59.0
1990 to 1995	61.2	62.5	61.2	60.9	61.4	62.5	60.2	59.3	61.8	62.5	59.9	58.9					62.3	64.7	58.0	58.8
1991 to 1996	61.2	62.5	61.1	60.8	61.3	62.4	59.7	59.1	61.9	62.6	60.5	59.3					62.2	63.3	57.8	59.3
1992 to 1997	61.3	62.7	60.9	60.9	61.8	62.4	60.3	59.3	61.6	62.5	60.2	59.2					62.8	63.6	58.3	59.8
1993 to 1998	61.3	62.5	60.9	60.8	61.8	62.4	60.7	59.7	62.0	62.6	61.7	60.1					63.3	64.1	58.7	60.2
1994 to 1999	62.0	62.7	61.2	61.0	62.2	62.5	61.1	59.7	62.3	62.8	61.3	60.1					62.4	62.8	61.5	60.4

Table 3. Estimates of average age of withdrawal from the labour force (cont.)

	Finland				Greece				Korea				Netherlands				Norway			
	Men		Women		Men		Women		Men		Women		Men		Women		Men		Women	
	Dynamic	Static	Dynamic	Static	Dynamic	Static	Dynamic	Static	Dynamic	Static	Dynamic	Static	Dynamic	Static	Dynamic	Static	Dynamic	Static	Dynamic	Static
1960		64.9		63.7																
1961		65.3		63.7																
1962		66.1		63.3																
1963		66.4		63.5																
1964		65.4		63.2																
1960 to 1965	65.3	64.7	64.3	63.2																
1961 to 1966	65.9	65.0	63.7	62.5																
1962 to 1967	65.1	65.0	61.3	62.3																
1963 to 1968	63.7	64.3	61.7	62.0																
1964 to 1969	62.1	64.0	61.1	61.8																
1965 to 1970	66.0	66.6	62.0	61.8																
1966 to 1971	64.7	66.5	61.9	61.6										64.7		62.3				
1967 to 1972	63.5	65.7	62.0	60.9										64.4		61.5		68.1		65.2
1968 to 1973	63.7	65.4	63.0	61.0										64.0		60.6		67.9		64.5
1969 to 1974	64.3	65.3	62.9	60.3										63.6		60.0		67.1		63.6
1970 to 1975	62.0	64.3	62.0	59.6										63.2		59.1		67.6		63.7
1971 to 1976	60.5	63.2	61.5	59.5									61.5	63.1	62.8	58.9		67.8		64.2
1972 to 1977	60.2	62.5	61.4	59.4									61.4	62.8	62.1	58.5	67.6	67.7	68.3	63.1
1973 to 1978	60.1	61.9	60.6	59.3									60.9	62.6	61.7	58.4	67.3	67.5	68.9	62.9
1974 to 1979	60.2	61.7	60.0	59.2									60.5	62.1	61.8	57.7	67.4	67.1	68.3	63.2
1975 to 1980	60.8	61.9	60.6	59.5									60.6	61.8	61.5	56.9	67.0	65.9	66.3	62.8
1976 to 1981	61.4	61.9	61.1	59.8									59.6	60.9	60.2	56.4	66.7	65.5	66.8	62.7
1977 to 1982	61.8	61.8	61.6	60.1									59.4	60.7	60.5	56.1	67.0	66.3	66.0	62.2
1978 to 1983	61.1	61.2	62.1	60.2		66.7		63.8					59.7	60.8	61.7	56.3	66.5	65.4	66.5	63.0
1979 to 1984	60.9	60.9	61.7	60.2		65.7		62.7					59.2	60.3	60.3	55.9	66.4	64.9	65.7	63.2
1980 to 1985	60.4	60.7	61.4	60.2		64.8		62.0					58.7	59.7	59.3	55.5	66.3	65.5	64.5	62.8
1981 to 1986	60.4	60.7	60.3	59.6		64.4		62.6					58.6	59.8	58.8	55.6	64.6	65.2	64.0	62.2
1982 to 1987	59.6	60.3	59.5	59.1		63.7		61.4					59.9	59.8	61.6	56.1	63.6	64.7	64.7	62.5
1983 to 1988	59.3	60.0	59.2	59.3	62.0	63.3	64.2	61.1					60.1	59.8	61.3	55.9	62.7	65.1	63.3	62.3
1984 to 1989	59.5	60.2	59.8	59.6	61.8	62.9	61.8	60.1		69.3		66.9	60.0	59.6	61.8	55.9	62.2	65.1	63.5	62.6
1985 to 1990	59.9	60.3	59.6	59.7	61.9	62.9	60.2	60.1		69.5		67.1	60.2	59.7	62.0	55.9	63.0	65.2	62.9	62.4
1986 to 1991	59.0	59.7	59.7	59.9	61.4	62.5	57.3	58.7		69.8		67.8	60.5	59.6	61.6	56.3	62.5	64.3	61.9	62.4
1987 to 1992	58.9	59.7	59.6	59.9	62.2	62.7	58.9	58.4		69.7		68.4	59.2	59.7	58.7	55.6	61.8	64.3	60.6	62.1
1988 to 1993	59.0	59.7	59.4	59.7	62.0	62.4	58.1	58.2		70.1		67.2	58.9	59.6	58.5	55.7	62.7	64.4	61.1	61.9
1989 to 1994	58.8	59.7	59.1	59.5	62.8	62.7	59.3	58.4	71.0	70.1	67.5	67.2	59.3	59.6	59.4	56.1	63.2	64.3	62.5	62.1
1990 to 1995	58.9	59.7	59.7	59.9	62.9	62.7	60.3	58.3	70.4	69.9	67.7	66.8	59.6	59.6	59.7	56.3	63.2	64.0	62.8	62.2
1991 to 1996	59.7	59.9	60.1	60.0	63.5	62.7	65.2	58.3	70.0	69.7	68.2	67.1	59.8	59.9	59.4	56.3	64.5	64.3	63.9	62.4
1992 to 1997	59.2	59.7	59.5	59.6	63.2	62.7	61.8	57.8	69.9	70.0	69.4	67.3	60.5	60.0	60.5	56.5	64.8	64.4	64.6	62.3
1993 to 1998	59.6	59.7	59.5	59.6	61.7	61.9	62.2	57.4	68.2	69.5	66.4	66.9	61.6	60.3	60.1	56.7	65.3	64.4	64.8	62.6
1994 to 1999	59.8	59.8	60.0	59.9					67.1	69.4	67.5	67.7					64.2	64.1	64.7	62.6

Table 3. Estimates of average age of withdrawal from the labour force (cont.)

	Poland				Portugal				Spain				Sweden			
	Men		Women		Men		Women		Men		Women		Men		Women	
	Dynamic	Static	Dynamic	Static	Dynamic	Static	Dynamic	Static	Dynamic	Static	Dynamic	Static	Dynamic	Static	Dynamic	Static
1960																
1961																
1962																
1963															68.6		63.0
1964														68.0		63.1
1960 to 1965														67.7		63.3
1961 to 1966														67.5		63.0
1962 to 1967														67.5		61.6
1963 to 1968													66.8	67.7	64.7	61.8
1964 to 1969													65.9	67.0	65.2	62.4
1965 to 1970													65.7	66.5	65.3	61.9
1966 to 1971													65.3	66.5	64.4	61.6
1967 to 1972										66.8		68.0	65.1	66.3	64.7	61.6
1968 to 1973										66.5		68.1	65.1	65.9	64.6	61.6
1969 to 1974						68.2		64.7		65.1		65.2	65.0	65.5	64.7	61.4
1970 to 1975						67.5		65.3		65.5		66.8	64.7	65.1	64.5	61.5
1971 to 1976						67.2		65.0		65.8		66.7	64.4	64.6	64.2	61.4
1972 to 1977						67.3		63.8	64.7	65.6	68.2	66.0	64.1	64.4	64.0	61.5
1973 to 1978						66.9		63.2	64.1	65.0	65.1	65.8	64.2	64.4	64.0	61.5
1974 to 1979					65.1	66.6	65.8	62.4	63.5	64.5	63.2	64.9	64.4	64.5	63.9	61.5
1975 to 1980					65.1	66.2	66.2	62.1	62.9	64.2	64.1	64.4	64.2	64.5	63.6	61.5
1976 to 1981					63.8	65.4	66.1	61.0	62.9	63.9	61.8	63.5	63.6	64.3	64.0	61.6
1977 to 1982					63.6	65.2	63.8	61.5	62.2	63.5	61.3	62.5	64.1	64.2	63.9	61.7
1978 to 1983					65.3	65.9	68.1	61.5	61.9	63.2	62.0	62.2	63.8	64.0	63.8	61.8
1979 to 1984					63.2	64.9	66.7	61.1	61.5	62.8	61.2	62.1	63.6	63.8	63.4	61.7
1980 to 1985					62.7	64.1	65.9	60.7	61.4	62.5	60.9	60.8	63.6	63.8	63.0	61.5
1981 to 1986					62.2	63.7	64.6	60.3	61.4	62.2	62.1	61.6	64.0	63.9	62.9	61.6
1982 to 1987					62.7	64.0	65.8	60.2	61.1	61.8	63.0	59.9	63.7	63.9	63.3	62.0
1983 to 1988					62.5	63.9	62.1	59.6	61.0	61.6	63.6	59.5	63.9	63.9	63.3	62.1
1984 to 1989					63.7	64.0	62.9	59.6	61.4	61.7	63.9	58.7	63.8	63.7	63.1	62.1
1985 to 1990					64.6	64.2	64.0	59.8	61.5	61.6	63.9	58.1	63.9	63.8	63.4	62.2
1986 to 1991					66.4	64.8	69.0	60.7	61.2	61.5	63.4	57.8	64.0	64.0	63.3	62.4
1987 to 1992		61.3		58.5	65.4	64.4	66.7	60.2	60.9	61.4	63.9	57.3	63.5	63.8	62.4	62.3
1988 to 1993		61.4		58.3	65.5	64.7	66.8	60.0	60.9	61.3	62.7	57.3	62.8	63.7	61.8	62.1
1989 to 1994		61.2		58.3	65.7	65.0	68.6	60.3	60.5	61.0	62.7	56.4	62.5	63.8	61.5	62.1
1990 to 1995		61.2		58.2	64.7	64.8	68.1	60.5	60.3	60.9	63.0	56.4	62.5	63.8	61.6	62.3
1991 to 1996		61.1		58.2	65.1	65.4	65.4	60.6	60.6	61.0	62.6	56.5	62.5	63.8	61.7	62.5
1992 to 1997	60.0	61.2	57.3	58.1	66.1	65.8	70.0	61.4	61.0	61.1	62.3	56.5	62.6	63.8	61.6	62.4
1993 to 1998	59.9	61.1	57.1	58.1	66.1	65.4	66.7	61.4	61.1	61.1	62.3	56.4	63.2	64.0	61.3	62.0
1994 to 1999	60.6	61.3	57.3	58.0	65.3	65.5	66.5	61.9	61.1	61.0	61.1	56.3	63.3	55.1	61.8	62.2

Chart 3. Age of withdrawal from the labour force: dynamic estimate

USA
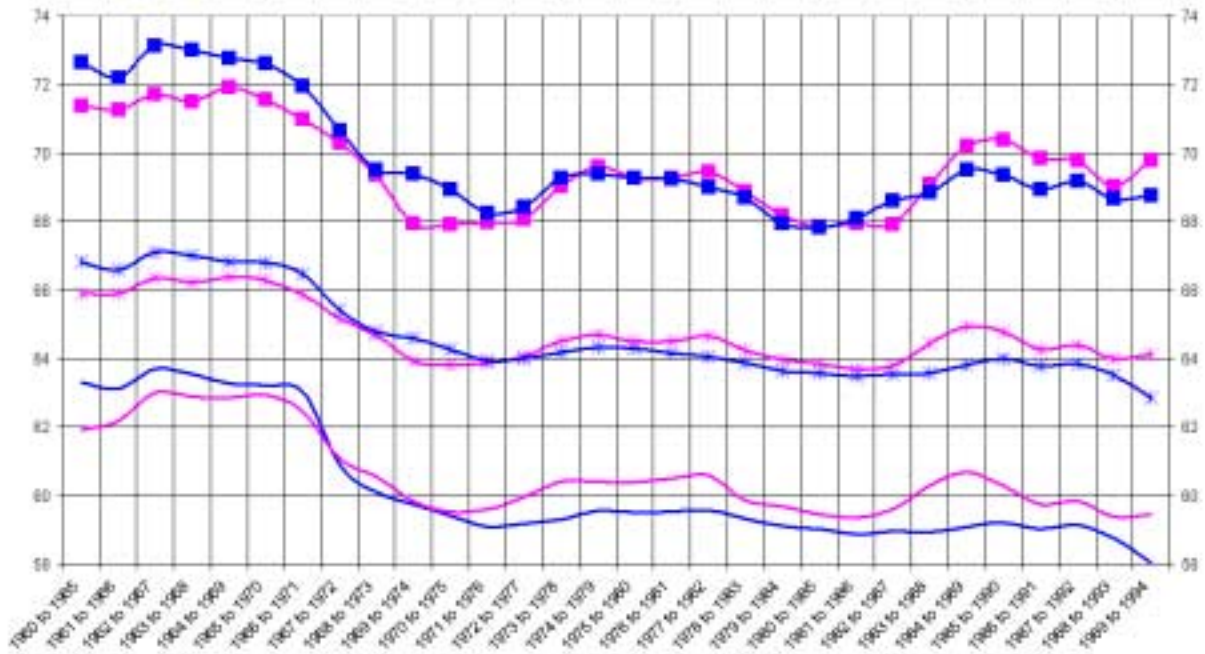
JAPAN
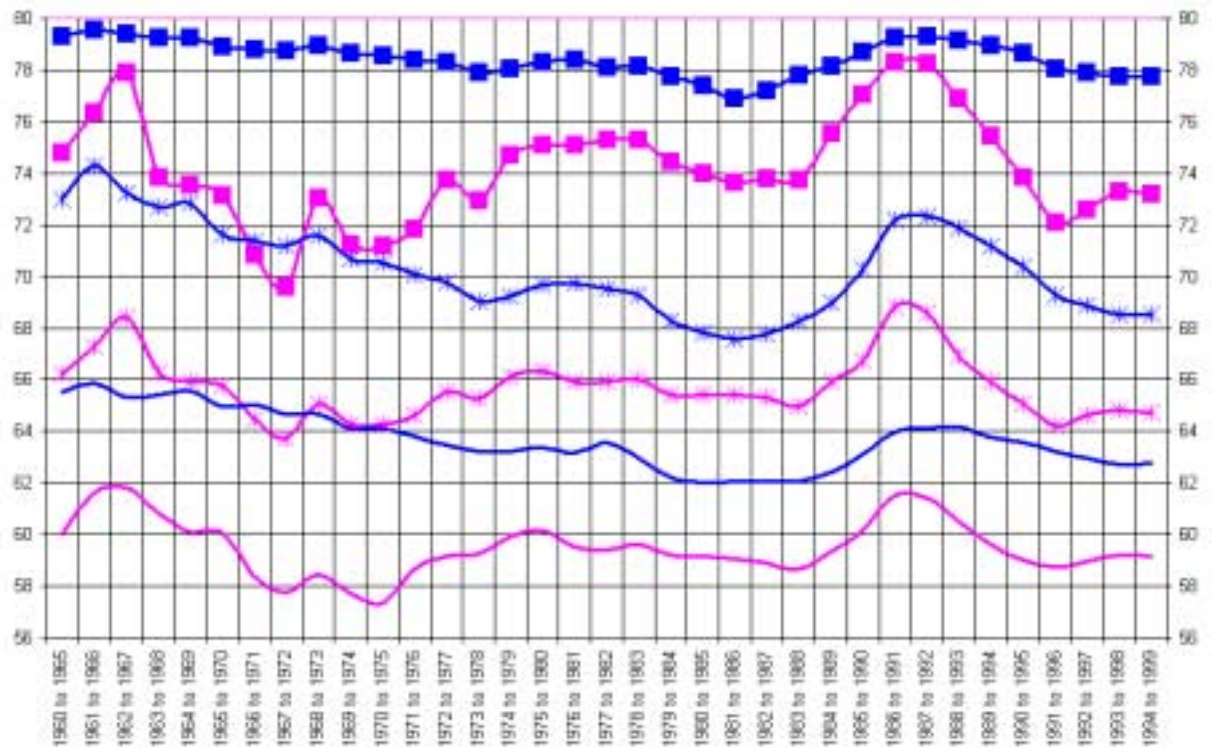
Women: Third quartile — Men: Third quartile — Women: Median — Men: Median — Men: First quartile — Women: First quartile

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Chart 3. Age of withdrawal from the labour force: dynamic estimate (cont.)
WEST GERMANY
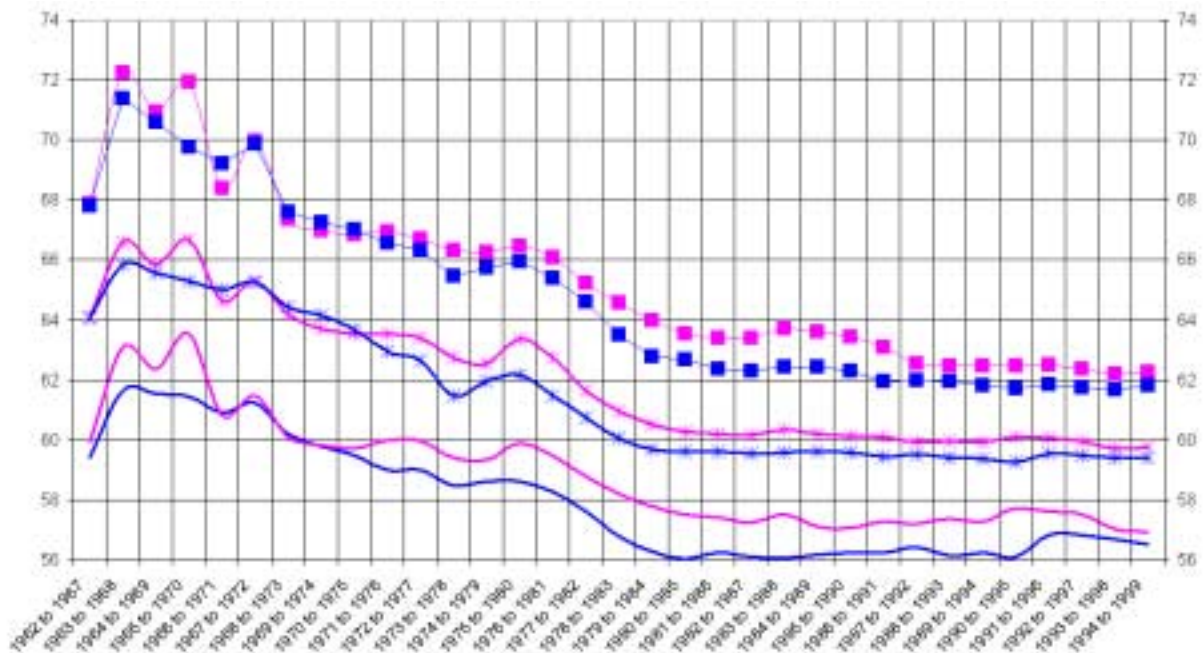
FRANCE

Chart 3. Age of withdrawal from the labour force: dynamic estimate (cont.)

ITALY

UNITED KINGDOM

| ■ Women: Third quartile | ■ Men: Third quartile | ✳ Women: Median | ✳ Men: Median | Men: First quartile | Women: First quartile |
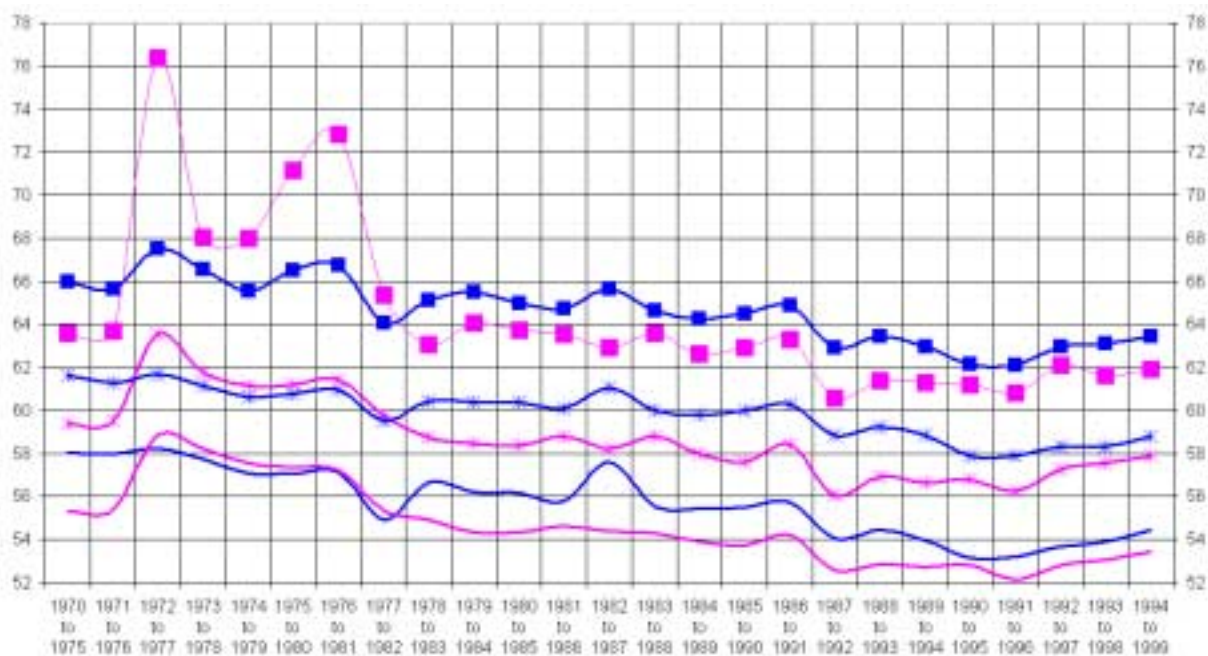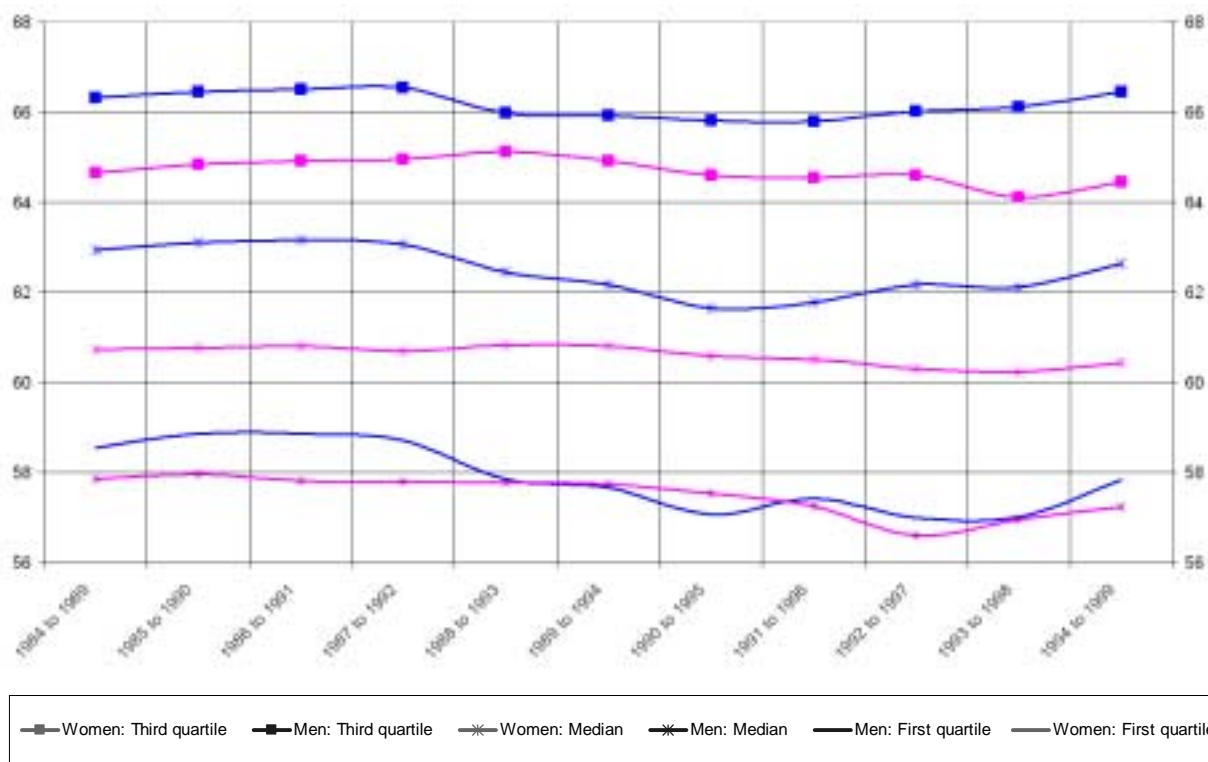
Chart 3. Age of withdrawal from the labour force: dynamic estimate (cont.)

CANADA
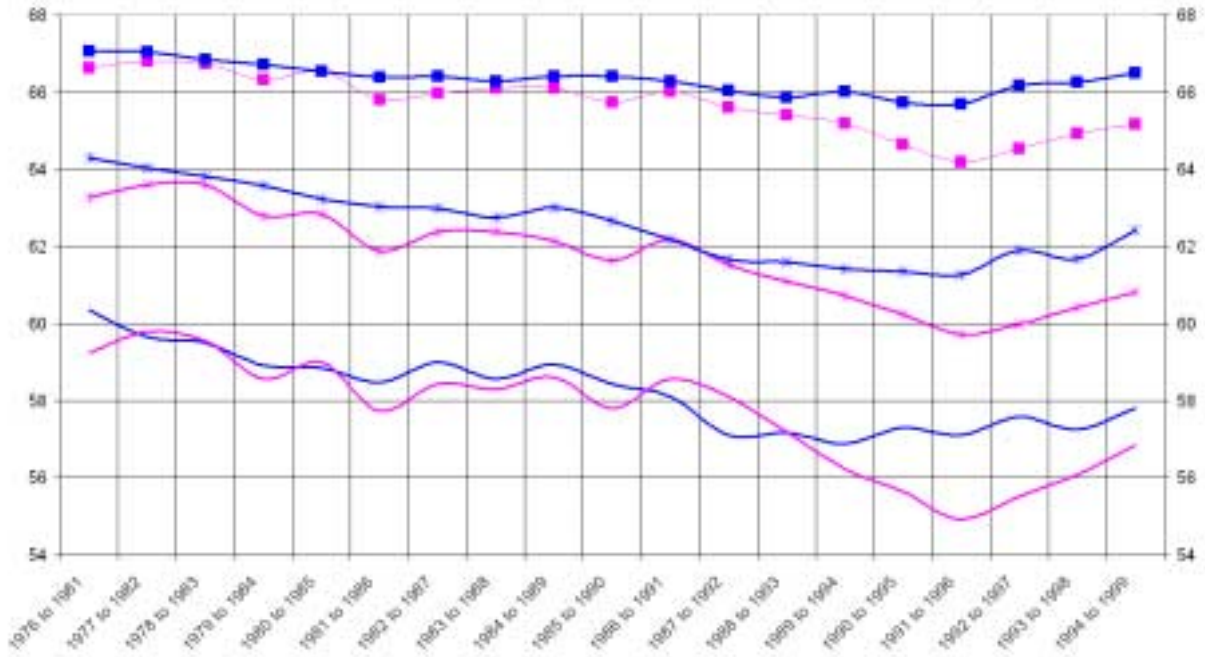
AUSTRALIA
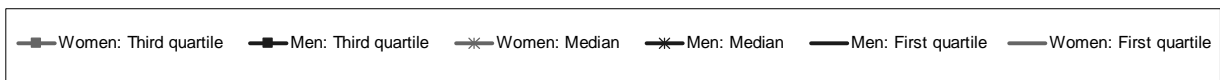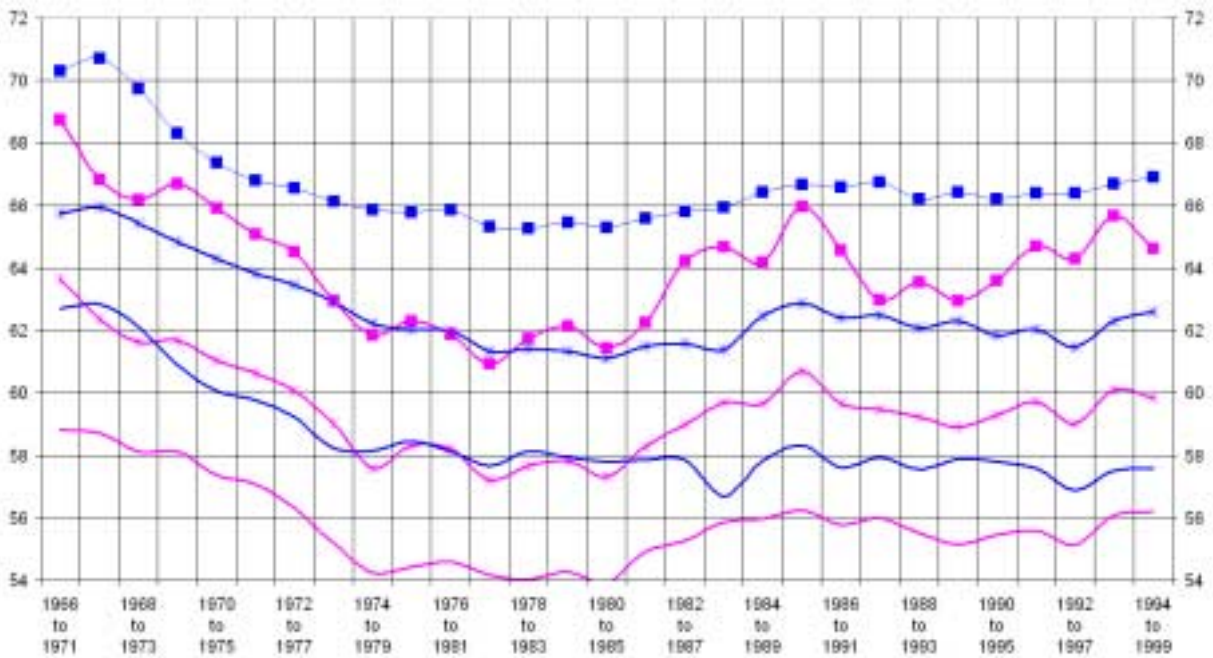
Chart 3. Age of withdrawal from the labour force: dynamic estimate (cont.)

BELGIUM

DANEMARK

Women: Third quartile — Men: Third quartile — Women: Median — Men: Median — Men: First quartile — Women: First quartile

Chart 3. Age of withdrawal from the labour force: dynamic estimate (cont.)

FINLAND

GREECE

| —■—Women: Third quartile | —■—Men: Third quartile | —✳—Women: Median | —✳—Men: Median | ——Men: First quartile | ——Women: First quartile |
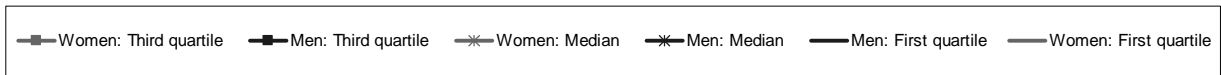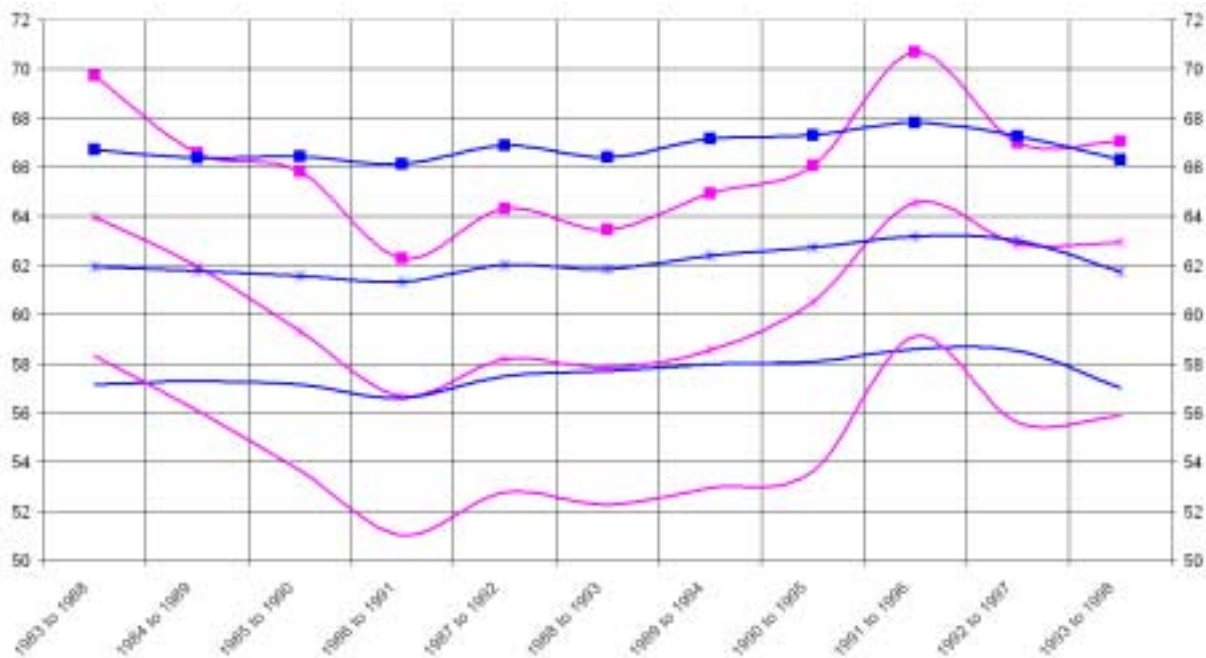
Chart 3. Age of withdrawal from the labour force: dynamic estimate (cont.)

KOREA
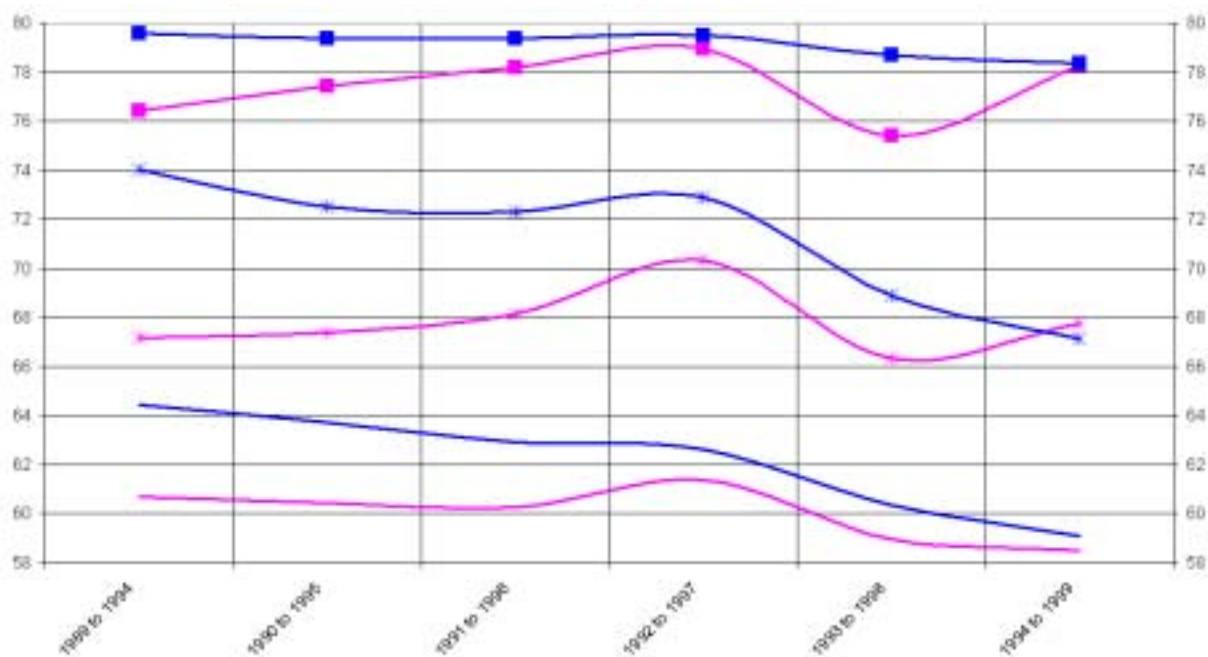
NETHERLANDS
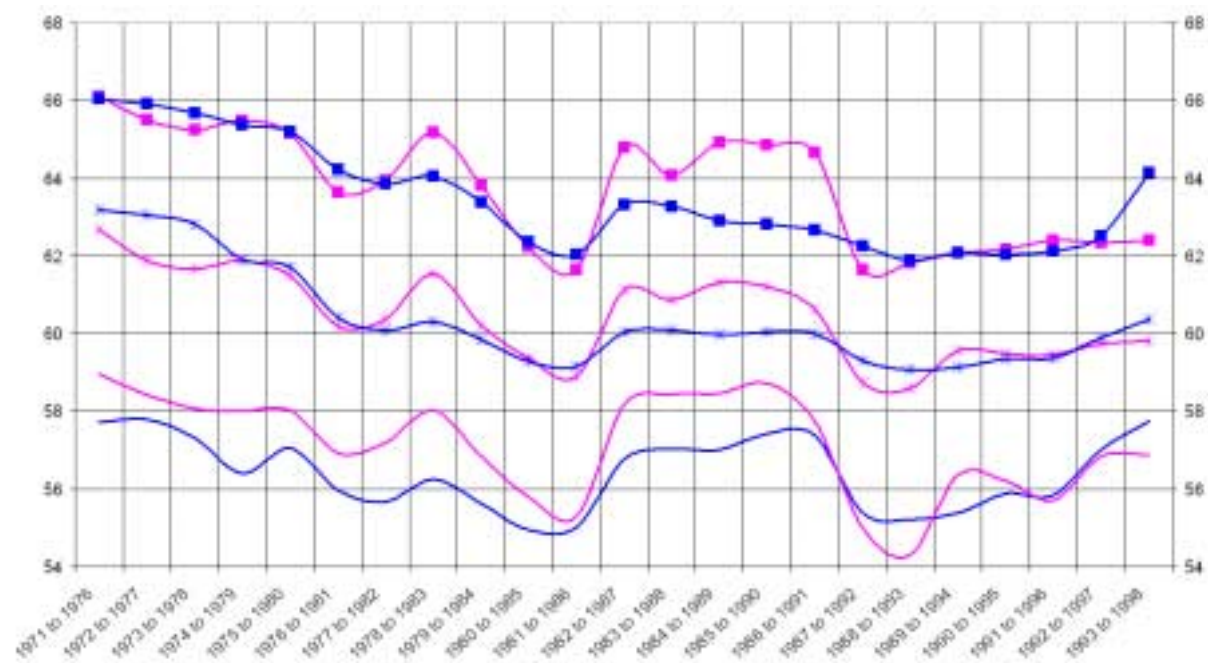
Women: Third quartile   Men: Third quartile   Women: Median   Men: Median   Men: First quartile   Women: First quartile

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Chart 3. Age of withdrawal from the labour force: dynamic estimate (cont.)

NORWAY
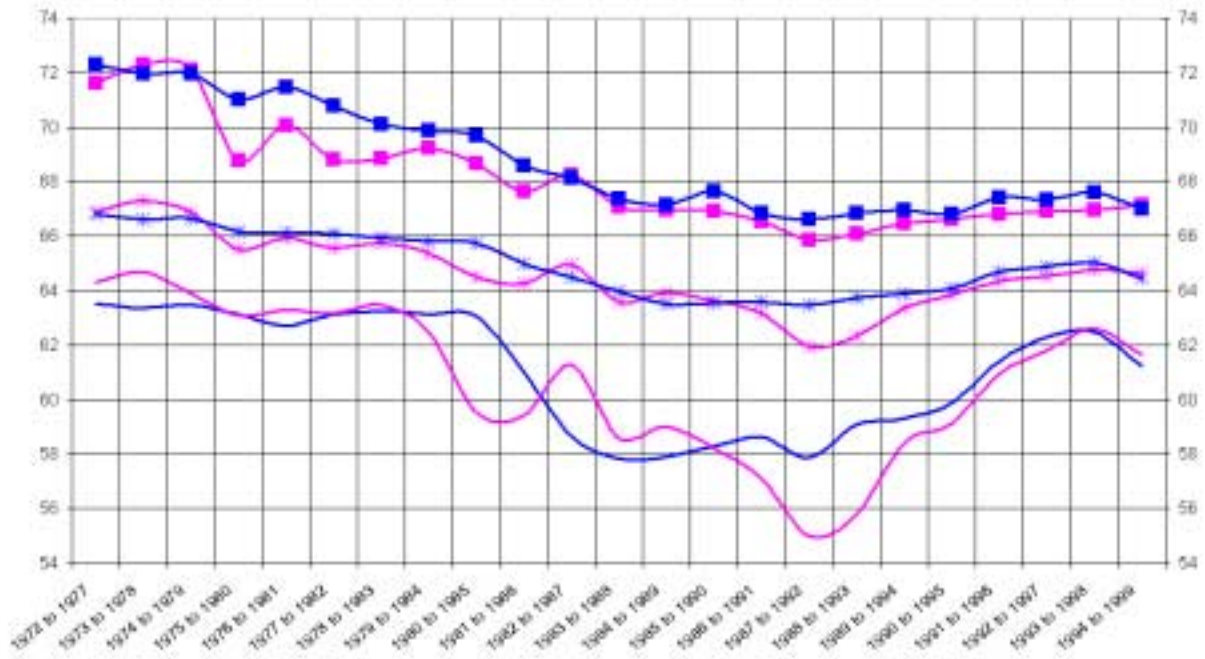
POLAND
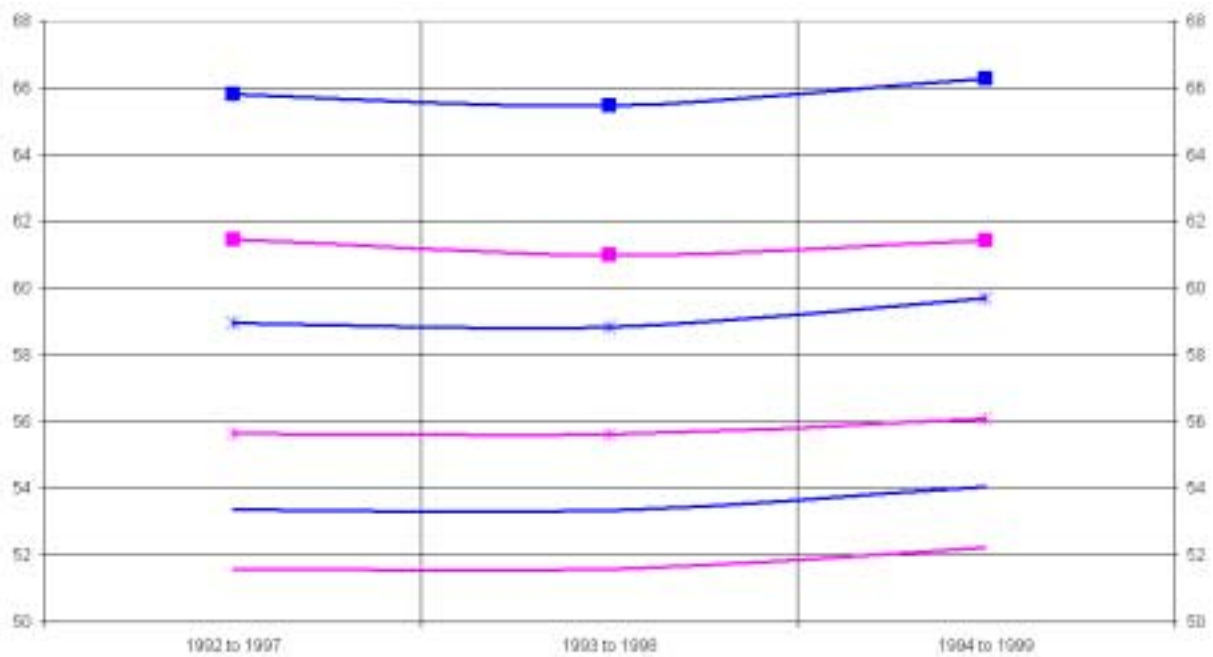
Women: Third quartile	Men: Third quartile	Women: Median	Men: Median	Men: First quartile	Women: First quartile

Chart 3. Age of withdrawal from the labour force: dynamic estimate (cont.)

PORTUGAL
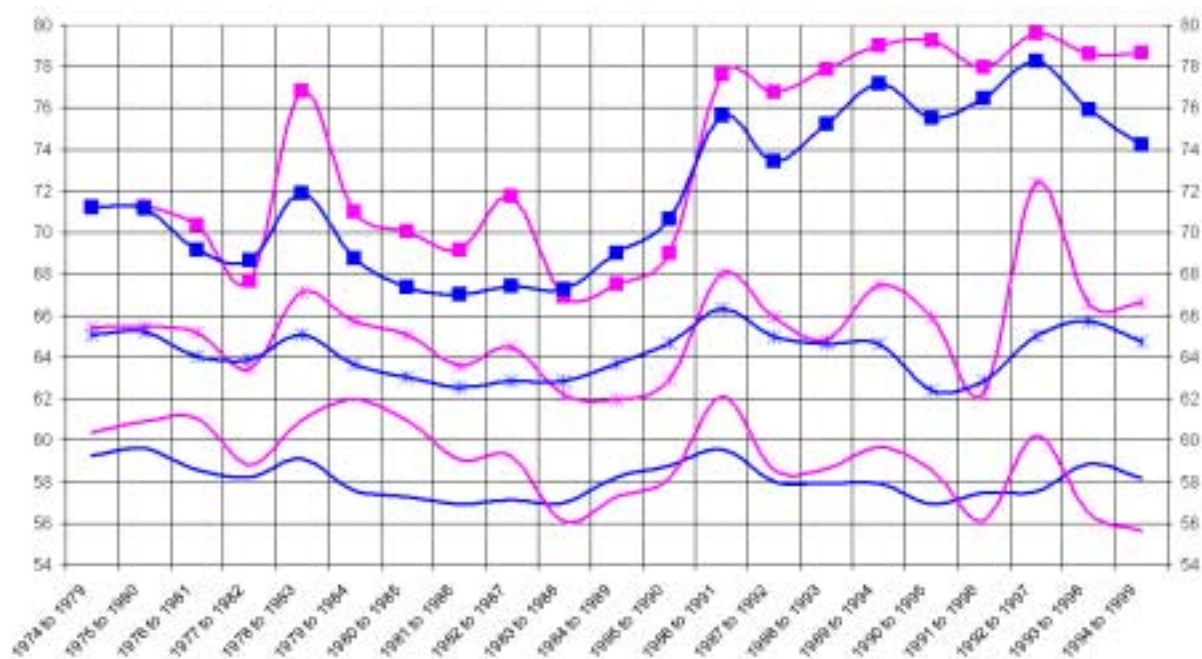
SPAIN
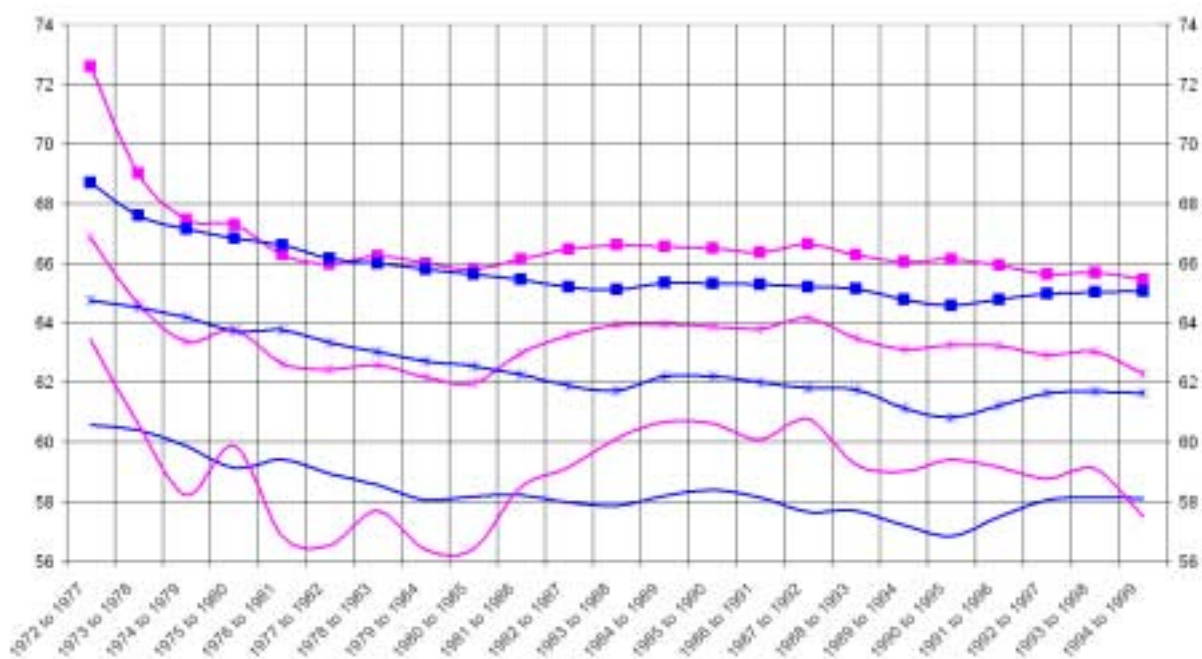
Women: Third quartile   Men: Third quartile   Women: Median   Men: Median   Men: First quartile   Women: First quartile

Chart 3. Age of withdrawal from the labour force: dynamic estimate (cont.)

SWEDEN
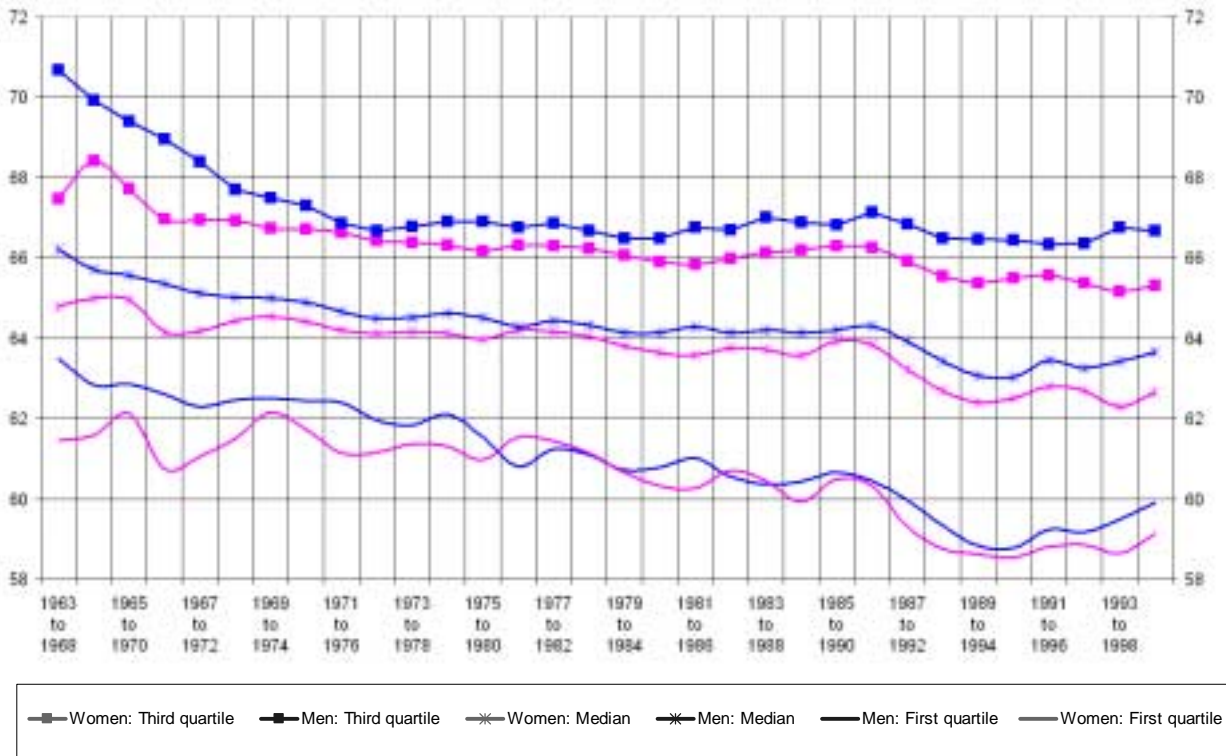
Table 4. Distribution of age of withdrawal from the labour force (Dynamic estimates)

|	United States						Japan						Western Germany						France						Italy					
	Men			Women			Men			Women			Men			Women			Men			Women			Men			Women		
	1st quartile	Median	3rd quartile	1st quartile	Median	3rd quartile	1st quartile	Median	3rd quartile	1st quartile	Median	3rd quartile	1st quartile	Median	3rd quartile	1st quartile	Median	3rd quartile	1st quartile	Median	3rd quartile	1st quartile	Median	3rd quartile	1st quartile	Median	3rd quartile	1st quartile	Median	3rd quartile
1960 to 1965	63.3	66.8	72.7	61.9	65.9	71.4	65.5	73.0	79.3	60.0	66.2	74.8																		
1961 to 1966	63.1	66.6	72.2	62.2	65.9	71.3	65.8	74.3	79.6	61.6	67.3	76.3																		
1962 to 1967	63.7	67.1	73.1	63.0	66.4	71.7	65.3	73.2	79.4	61.8	68.4	77.9							59.4	64.1	67.8	59.9	64.1	67.9						
1963 to 1968	63.6	67.0	73.0	62.9	66.2	71.5	65.4	72.7	79.2	60.8	66.3	73.8							61.6	65.8	71.4	63.1	66.6	72.2						
1964 to 1969	63.3	66.8	72.8	62.9	66.4	71.9	65.6	72.8	79.3	60.1	65.9	73.5							61.5	65.6	70.6	62.4	65.8	70.9						
1965 to 1970	63.2	66.8	72.6	62.9	66.3	71.5	64.9	71.6	78.9	60.0	65.8	73.1							61.4	65.3	69.8	63.5	66.7	71.9						
1966 to 1971	63.0	66.5	72.0	62.4	65.9	71.0	65.0	71.4	78.8	58.4	64.5	70.9							60.9	65.0	69.2	60.8	64.7	68.4						
1967 to 1972	60.9	65.4	70.6	61.1	65.2	70.3	64.7	71.2	78.8	57.8	63.7	69.6							61.2	65.3	69.0	61.5	65.3	70.0						
1968 to 1973	60.1	64.8	69.5	60.6	64.7	69.4	64.7	71.6	78.9	58.5	65.1	73.0							60.2	64.4	67.6	60.1	64.2	67.4						
1969 to 1974	59.7	64.6	69.4	59.8	63.9	67.9	64.1	70.7	78.6	57.7	64.3	71.2							59.8	64.1	67.3	59.8	63.7	67.0						
1970 to 1975	59.4	64.3	68.9	59.5	63.8	67.9	64.1	70.5	78.6	57.4	64.3	71.2	59.1	63.3	66.6	58.9	61.4	65.6	59.5	63.7	67.0	59.7	63.5	66.8	58.1	61.6	66.0	55.3	59.4	63.6
1971 to 1976	59.1	63.9	68.3	59.6	63.9	68.0	63.8	70.1	78.4	58.7	64.6	71.8	59.2	62.9	66.3	58.7	61.1	64.9	59.0	62.9	66.6	60.0	63.5	66.9	58.0	61.3	65.7	55.4	59.5	63.7
1972 to 1977	59.2	64.0	68.4	59.9	64.1	68.1	63.5	69.8	78.3	59.2	65.5	73.8	59.0	62.3	65.9	58.2	60.6	63.8	59.0	62.6	66.3	60.0	63.4	66.7	58.2	61.7	67.5	58.9	63.5	76.4
1973 to 1978	59.3	64.2	69.3	60.4	64.5	69.0	63.2	69.0	77.9	59.2	65.3	73.0	58.6	61.6	65.3	57.7	60.1	62.5	58.5	61.5	65.5	59.4	62.7	66.3	57.8	61.2	66.5	58.2	61.8	68.0
1974 to 1979	59.6	64.3	69.4	60.4	64.7	69.6	63.2	69.2	78.0	59.9	66.1	74.7	58.5	61.5	65.2	57.5	59.9	62.3	58.6	61.9	65.7	59.4	62.5	66.3	57.1	60.6	65.5	57.6	61.1	68.0
1975 to 1980	59.5	64.3	69.3	60.4	64.5	69.3	63.3	69.7	78.3	60.2	66.3	75.1	58.5	61.7	65.4	57.5	60.0	62.4	58.6	62.2	65.9	59.9	63.4	66.4	57.1	60.8	66.5	57.4	61.2	71.2
1976 to 1981	59.5	64.2	69.2	60.5	64.5	69.3	63.1	69.7	78.4	59.5	65.9	75.1	58.6	61.8	65.5	57.8	60.2	62.7	58.3	61.5	65.4	59.5	62.7	66.1	57.1	61.0	66.7	57.2	61.4	72.8
1977 to 1982	59.6	64.1	69.0	60.6	64.7	69.5	63.6	69.5	78.1	59.4	65.9	75.3	58.7	61.8	65.6	57.9	60.2	62.5	57.6	60.8	64.6	58.8	61.7	65.2	54.9	59.5	64.1	55.4	59.8	65.3
1978 to 1983	59.3	63.9	68.7	59.9	64.2	68.9	63.0	69.3	78.2	59.6	66.0	75.3	58.7	61.5	65.5	57.9	60.2	62.4	56.8	60.1	63.5	58.2	61.0	64.6	56.7	60.4	65.1	54.9	58.8	63.0
1979 to 1984	59.1	63.6	67.9	59.7	64.0	68.2	62.2	68.3	77.8	59.2	65.4	74.5	59.0	61.5	65.6	58.1	60.3	62.5	56.3	59.7	62.8	57.8	60.5	64.0	56.2	60.4	65.5	54.3	58.5	64.0
1980 to 1985	59.0	63.6	67.8	59.4	63.7	67.9	62.0	67.8	77.4	59.1	65.4	74.0	58.8	61.2	65.1	57.1	59.7	62.1	56.0	59.6	62.7	57.5	60.3	63.5	56.2	60.4	65.0	54.3	58.4	63.7
1981 to 1986	58.9	63.5	68.1	59.4	63.7	67.9	62.1	67.6	76.9	59.1	65.4	73.6	58.6	61.2	64.9	57.0	59.7	62.1	56.2	59.6	62.4	57.4	60.2	63.4	55.8	60.1	64.7	54.6	58.8	63.5
1982 to 1987	59.0	63.5	68.6	59.6	63.8	67.9	62.1	67.8	77.2	58.9	65.3	73.8	58.2	60.9	64.7	57.7	60.0	62.2	56.1	59.5	62.3	57.3	60.2	63.4	57.6	61.1	65.7	54.4	58.2	62.9
1983 to 1988	58.9	63.6	68.8	60.3	64.4	69.1	62.1	68.3	77.8	58.7	65.0	73.7	57.9	60.7	64.5	58.2	60.3	62.4	56.1	59.6	62.4	57.5	60.3	63.7	55.5	60.0	64.7	54.3	58.8	63.6
1984 to 1989	59.1	63.8	69.5	60.7	64.9	70.2	62.4	69.0	78.2	59.4	65.9	75.6	57.7	60.5	64.1	58.0	60.1	62.3	56.2	59.6	62.4	57.1	60.2	63.6	55.4	59.8	64.2	53.9	58.0	62.6
1985 to 1990	59.2	64.0	69.4	60.3	64.8	70.4	63.1	70.3	78.7	60.1	66.7	77.0	58.6	61.2	65.0	58.5	60.6	63.4	56.2	59.6	62.3	57.1	60.1	63.4	55.5	60.0	64.5	53.7	57.6	62.9
1986 to 1991	59.0	63.8	68.9	59.7	64.3	69.9	63.9	72.2	79.3	61.5	68.8	78.3	58.2	60.7	64.0	58.4	60.4	62.4	56.2	59.4	62.0	57.3	60.1	63.1	55.7	60.3	64.9	54.2	58.4	63.3
1987 to 1992	59.1	63.8	69.2	59.8	64.4	69.8	64.1	72.3	79.3	61.4	68.6	78.2	58.4	60.9	64.5	58.4	60.4	62.4	56.4	59.6	62.0	57.2	59.9	62.5	54.1	58.8	62.9	52.6	56.1	60.6
1988 to 1993	58.8	63.5	68.7	59.4	64.0	69.0	64.1	71.9	79.1	60.5	66.9	76.9	58.4	60.9	64.5	58.3	60.3	62.3	56.2	59.4	61.9	57.4	60.0	62.5	54.4	59.2	63.5	52.9	57.0	61.4
1989 to 1994	58.0	62.9	68.8	59.4	64.1	69.8	63.7	71.2	78.9	59.6	65.9	75.4	58.1	60.7	64.3	58.1	60.2	62.3	56.2	59.4	61.8	57.3	59.9	62.5	53.9	58.8	63.0	52.7	56.7	61.3
1990 to 1995	58.2	63.0	69.2	59.2	63.9	69.4	63.6	70.4	78.6	59.0	65.1	73.8	56.7	60.0	63.3	57.5	59.8	62.1	56.1	59.3	61.7	57.7	60.1	62.5	53.2	57.9	62.2	52.8	56.8	61.2
1991 to 1996	58.6	63.6	70.2	59.2	63.9	69.2	63.2	69.3	78.1	58.8	64.2	72.1	57.3	60.2	63.6	57.6	59.9	62.2	56.8	59.5	61.9	57.6	60.1	62.5	53.2	57.9	62.1	52.2	56.2	60.8
1992 to 1997	58.9	63.9	70.6	59.6	64.2	69.5	62.9	68.9	77.9	59.0	64.6	72.6	57.3	60.2	63.7	57.8	60.1	62.4	56.8	59.5	61.8	57.5	60.0	62.4	53.7	58.3	63.0	52.8	57.3	62.1
1993 to 1998	59.1	64.3	70.9	59.2	63.9	69.3	62.7	68.5	77.7	59.2	64.8	73.3	57.4	60.3	63.9	57.8	60.1	62.4	56.7	59.4	61.7	57.0	59.7	62.2	53.9	58.3	63.1	53.1	57.6	61.6
1994 to 1999	59.4	64.6	71.4	59.0	63.4	68.8	62.7	68.5	77.7	59.1	64.7	73.2							56.5	59.4	61.8	56.9	59.7	62.3	54.5	58.8	63.4	53.4	57.9	61.9

**Table 4. Distribution of age of withdrawal from the labour force (Dynamic estimates)(cont.)**

	United Kingdom						Canada						Austalia						Belgium						Denmark					
	Men			Women			Men			Women			Men			Women			Men			Women			Men			Women		
	1st quartile	Median	3rd quartile	1st quartile	Median	3rd quartile	1st quartile	Median	3rd quartile	1st quartile	Median	3rd quartile	1st quartile	Median	3rd quartile	1st quartile	Median	3rd quartile	1st quartile	Median	3rd quartile	1st quartile	Median	3rd quartile	1st quartile	Median	3rd quartile	1st quartile	Median	3rd quartile
1960 to 1965																			53.4	57.1	61.0	50.5	54.8	59.2						
1961 to 1966																			53.6	57.5	61.2	50.5	54.6	59.0						
1962 to 1967																			53.2	57.0	60.9	51.1	55.2	59.4						
1963 to 1968																			53.9	57.8	61.3	51.7	56.1	60.1						
1964 to 1969																			53.8	57.8	61.7	52.1	56.9	61.1						
1965 to 1970																			53.4	57.4	61.5	53.6	58.2	61.4						
1966 to 1971													62.7	65.8	70.3	58.8	63.6	68.7	53.9	58.0	61.6	53.7	58.7	61.7						
1967 to 1972													62.8	65.9	70.7	58.7	62.4	66.8	54.6	58.8	62.1	54.6	58.8	61.9						
1968 to 1973													62.1	65.4	69.7	58.1	61.6	66.2	54.1	57.9	61.6	52.9	57.3	60.9						
1969 to 1974													60.9	64.8	68.3	58.1	61.7	66.7	54.2	58.1	61.7	53.9	57.9	61.1						
1970 to 1975													60.1	64.3	67.4	57.4	61.0	65.9	54.5	58.5	61.8	53.3	58.0	61.1						
1971 to 1976													59.8	63.8	66.8	57.1	60.6	65.1	54.4	58.6	62.2	54.6	58.8	61.7						
1972 to 1977													59.2	63.5	66.5	56.3	60.1	64.5												
1973 to 1978													58.2	62.9	66.1	55.2	59.0	62.9												
1974 to 1979													58.1	62.2	65.8	54.2	57.6	61.8												
1975 to 1980													58.4	62.0	65.8	54.4	58.3	62.3												
1976 to 1981							60.4	64.3	67.1	59.2	63.3	66.6	58.1	62.0	65.9	54.6	58.2	61.9												
1977 to 1982							59.6	64.0	67.0	59.8	63.6	66.8	57.7	61.3	65.3	54.2	57.2	60.9												
1978 to 1983							59.5	63.8	66.8	59.5	63.6	66.7	58.1	61.4	65.3	54.0	57.7	61.7												
1979 to 1984							58.9	63.6	66.7	58.6	62.8	66.3	57.9	61.3	65.5	54.3	57.8	62.1												
1980 to 1985							58.8	63.2	66.5	59.0	62.8	66.5	57.8	61.1	65.3	53.9	57.3	61.4												
1981 to 1986							58.5	63.0	66.4	57.7	61.9	65.8	57.8	61.5	65.6	54.9	58.3	62.2												
1982 to 1987							59.0	63.0	66.4	58.4	62.4	66.0	57.9	61.6	65.8	55.3	59.0	64.2												
1983 to 1988							58.6	62.7	66.3	58.3	62.4	66.1	56.7	61.4	65.9	55.8	59.7	64.7							59.9	63.8	68.7	58.3	61.1	64.9
1984 to 1989	58.5	62.9	66.3	57.9	60.7	64.7	58.9	63.0	66.4	58.6	62.1	66.1	57.8	62.5	66.4	56.0	59.6	64.2							60.5	64.0	68.0	58.8	61.3	65.3
1985 to 1990	58.9	63.1	66.5	58.0	60.8	64.8	58.4	62.7	66.4	57.8	61.6	65.7	58.3	62.9	66.7	56.2	60.7	66.0							60.4	64.2	70.2	58.8	61.6	65.7
1986 to 1991	58.9	63.2	66.5	57.8	60.8	64.9	58.1	62.2	66.3	58.6	62.2	66.0	57.6	62.4	66.6	55.8	59.7	64.6							59.9	63.2	67.1	58.5	61.2	65.0
1987 to 1992	58.7	63.1	66.5	57.8	60.7	64.9	57.1	61.7	66.0	58.1	61.5	65.6	57.9	62.5	66.7	56.0	59.5	63.0							59.7	62.9	67.4	59.0	61.5	65.5
1988 to 1993	57.9	62.4	66.0	57.8	60.8	65.1	57.2	61.6	65.9	57.2	61.1	65.4	57.6	62.1	66.2	55.5	59.2	63.5							58.5	62.0	66.4	57.8	60.9	65.4
1989 to 1994	57.7	62.2	65.9	57.7	60.8	64.9	56.9	61.4	66.0	56.2	60.7	65.2	57.9	62.3	66.4	55.2	58.9	63.0							58.3	61.3	65.6	55.0	59.4	62.4
1990 to 1995	57.1	61.6	65.8	57.5	60.6	64.6	57.3	61.3	65.7	55.6	60.2	64.6	57.8	61.8	66.2	55.5	59.3	63.6							58.3	62.1	67.0	53.6	58.5	61.8
1991 to 1996	57.4	61.8	65.8	57.1	60.5	64.5	57.1	61.3	65.7	54.9	59.7	64.2	57.6	62.0	66.4	55.6	59.7	64.7							57.8	61.3	66.5	53.1	58.1	61.4
1992 to 1997	57.0	62.2	66.0	56.6	60.3	64.6	57.6	61.9	66.2	55.5	60.0	64.5	56.9	61.5	66.4	55.1	59.0	64.3							58.3	61.5	67.3	52.9	58.6	62.0
1993 to 1998	57.0	62.1	66.1	57.0	60.2	64.1	57.2	61.7	66.3	56.1	60.4	64.9	57.5	62.3	66.7	56.1	60.1	65.7							58.2	61.3	68.9	54.2	59.2	62.2
1994 to 1999	57.8	62.6	66.5	57.2	60.4	64.5	57.8	62.4	66.5	56.8	60.8	65.2	57.6	62.6	66.9	56.2	59.8	64.6							58.7	61.7	65.9	58.4	61.0	64.9

Table 4. Distribution of age of withdrawal from the labour force (Dynamic estimates) (cont.)

	Finland Men			Finland Women			Greece Men			Greece Women			Korea Men			Korea Women			Netherlands Men			Netherlands Women			Norway Men			Norway Women		
	1st quartile	Median	3rd quartile	1st quartile	Median	3rd quartile	1st quartile	Median	3rd quartile	1st quartile	Median	3rd quartile	1st quartile	Median	3rd quartile	1st quartile	Median	3rd quartile	1st quartile	Median	3rd quartile	1st quartile	Median	3rd quartile	1st quartile	Median	3rd quartile	1st quartile	Median	3rd quartile
1960 to 1965	63.0	65.0	67.1	62.6	64.5	66.3																								
1961 to 1966	63.5	65.4	67.3	61.3	63.9	66.0																								
1962 to 1967	63.1	65.4	67.7	57.8	62.1	65.2																								
1963 to 1968	60.8	64.5	67.0	58.1	63.0	65.5																								
1964 to 1969	58.3	63.6	66.6	57.6	61.9	65.1																								
1965 to 1970	58.7	65.8	76.7	58.2	61.4	65.6																								
1966 to 1971	58.3	64.5	72.1	57.4	61.6	66.5																								
1967 to 1972	57.6	63.1	70.3	58.1	61.3	65.8																								
1968 to 1973	57.6	63.0	71.1	58.9	62.2	66.4																								
1969 to 1974	58.0	63.9	72.4	58.9	61.9	66.1																								
1970 to 1975	56.8	62.7	67.1	58.6	61.4	65.3																								
1971 to 1976	55.3	60.5	65.8	58.0	61.0	65.0													57.7	63.2	66.0	59.0	62.7	66.1						
1972 to 1977	55.4	60.4	65.3	58.0	61.0	64.8													57.8	63.1	65.9	58.4	61.9	65.5	63.5	66.8	72.3	64.3	66.9	71.6
1973 to 1978	55.8	60.3	64.9	57.2	60.4	64.0													57.3	62.8	65.7	58.1	61.7	65.2	63.4	66.6	72.0	64.7	67.3	72.3
1974 to 1979	56.3	60.6	64.9	56.4	60.0	63.8													56.4	61.9	65.4	58.0	61.9	65.5	63.5	66.7	72.0	63.9	66.9	72.1
1975 to 1980	56.6	61.0	65.4	57.4	60.6	64.5													57.0	61.7	65.2	58.0	61.5	65.2	63.1	66.2	71.0	63.1	65.5	68.8
1976 to 1981	57.0	61.7	66.1	57.4	61.2	65.3													56.0	60.4	64.2	56.9	60.2	63.6	62.7	66.1	71.4	63.3	65.9	70.1
1977 to 1982	57.4	62.1	66.4	58.0	61.7	65.5													55.7	60.1	63.9	57.2	60.4	64.0	63.1	66.1	70.8	63.2	65.6	68.8
1978 to 1983	56.4	61.1	65.8	58.2	62.2	65.7													56.3	60.3	64.1	58.0	61.5	65.2	63.2	65.9	70.1	63.5	65.7	68.8
1979 to 1984	56.5	60.8	65.3	57.9	61.9	65.5													55.6	59.8	63.4	56.8	60.2	63.8	63.1	65.8	69.9	62.5	65.4	69.2
1980 to 1985	56.1	60.4	64.9	57.5	61.3	65.2													55.0	59.3	62.4	55.8	59.4	62.2	63.0	65.7	69.7	59.5	64.5	68.7
1981 to 1986	56.2	60.3	64.7	56.4	60.1	64.0													55.0	59.2	62.0	55.3	58.9	61.6	61.0	65.0	68.6	59.4	64.3	67.7
1982 to 1987	55.6	59.5	63.6	55.9	59.3	62.4													56.8	60.0	63.3	58.2	61.1	64.8	58.6	64.5	68.1	61.3	64.9	68.2
1983 to 1988	55.3	59.2	63.3	55.7	59.2	62.3	57.2	61.9	66.7	58.3	64.0	69.8							57.0	60.1	63.3	58.5	60.9	64.1	57.8	63.9	67.4	58.6	63.6	67.1
1984 to 1989	55.4	59.3	63.4	56.4	59.7	62.8	57.3	61.8	66.4	56.1	62.0	66.6							57.0	60.0	62.9	58.5	61.3	64.9	57.9	63.5	67.1	59.0	63.9	67.0
1985 to 1990	55.9	59.8	64.0	56.4	59.6	62.4	57.2	61.6	66.4	53.7	59.3	65.8							57.4	60.0	62.8	58.7	61.2	64.9	58.3	63.5	67.6	58.2	63.6	66.9
1986 to 1991	55.1	59.2	63.3	56.3	59.7	62.7	56.6	61.4	66.1	51.0	56.7	62.3							57.4	60.0	62.7	57.8	60.6	64.7	58.6	63.6	66.8	57.1	63.2	66.5
1987 to 1992	55.0	59.1	63.1	56.3	59.6	62.5	57.5	62.0	66.9	52.8	58.2	64.3							55.4	59.3	62.3	55.0	58.8	61.6	57.9	63.5	66.6	55.0	61.9	65.8
1988 to 1993	55.3	59.2	62.6	56.4	59.5	62.2	57.7	61.8	66.4	52.3	57.8	63.5							55.2	59.1	61.9	54.3	58.6	61.8	59.1	63.7	66.8	55.8	62.3	66.1
1989 to 1994	55.3	59.2	62.3	56.3	59.3	61.8	58.0	62.4	67.2	52.9	58.6	64.9	64.4	74.0	79.6	60.7	67.2	76.4	55.4	59.1	62.1	56.4	59.6	62.1	59.3	63.9	67.0	58.4	63.4	66.5
1990 to 1995	55.4	59.2	62.3	56.8	59.6	62.1	58.1	62.7	67.3	53.6	60.5	66.1	63.7	72.5	79.4	60.4	67.4	77.5	55.9	59.3	62.0	56.2	59.5	62.2	59.9	64.1	66.8	59.1	63.9	66.6
1991 to 1996	56.4	59.9	63.4	57.2	59.9	62.4	58.6	63.2	67.8	59.1	64.6	70.7	62.9	72.3	79.4	60.3	68.1	78.2	55.9	59.4	62.1	55.7	59.5	62.4	61.4	64.7	67.4	60.9	64.3	66.8
1992 to 1997	55.5	59.3	62.7	56.4	59.3	61.9	58.5	63.0	67.3	55.6	62.9	67.0	62.6	72.9	79.5	61.4	70.3	79.0	57.0	59.9	62.5	56.8	59.8	62.3	62.3	64.9	67.4	61.8	64.5	66.9
1993 to 1998	55.9	59.5	62.9	56.4	59.4	62.0	57.0	61.8	66.3	55.9	62.9	67.1	60.4	68.9	78.7	59.0	66.3	75.4	57.8	60.4	64.1	56.9	59.8	62.4	62.5	65.0	67.6	62.6	64.8	67.0
1994 to 1999	56.0	59.6	63.0	56.8	59.8	62.5							59.1	67.1	78.4	58.5	67.7	78.3							61.2	64.4	67.0	61.6	64.6	67.1

Table 4. Distribution of age of withdrawal from the labour force (Dynamic estimates) (cont.)

	Poland Men			Poland Women			Portugal Men			Portugal Women			Spain Men			Spain Women			Sweden Men			Sweden Women		
	1st quartile	Median	3rd quartile	1st quartile	Median	3rd quartile	1st quartile	Median	3rd quartile	1st quartile	Median	3rd quartile	1st quartile	Median	3rd quartile	1st quartile	Median	3rd quartile	1st quartile	Median	3rd quartile	1st quartile	Median	3rd quartile
1960 to 1965																								
1961 to 1966																								
1962 to 1967																								
1963 to 1968																			63.5	66.2	70.7	61.5	64.8	67.5
1964 to 1969																			62.8	65.7	69.9	61.6	65.0	68.4
1965 to 1970																			62.9	65.6	69.4	62.1	65.0	67.7
1966 to 1971																			62.6	65.4	69.0	60.8	64.2	67.0
1967 to 1972																			62.3	65.1	68.4	61.1	64.2	67.0
1968 to 1973																			62.5	65.0	67.7	61.5	64.4	66.9
1969 to 1974																			62.5	65.0	67.5	62.1	64.5	66.7
1970 to 1975																			62.4	64.9	67.3	61.7	64.4	66.7
1971 to 1976																			62.4	64.7	66.9	61.1	64.2	66.6
1972 to 1977													60.6	64.8	68.7	63.4	66.9	72.6	62.0	64.5	66.7	61.2	64.1	66.4
1973 to 1978													60.4	64.5	67.6	60.6	64.6	69.0	61.8	64.5	66.8	61.4	64.2	66.4
1974 to 1979							59.3	65.1	71.2	60.4	65.4	71.3	59.9	64.2	67.1	58.2	63.4	67.5	62.1	64.6	66.9	61.3	64.1	66.3
1975 to 1980							59.6	65.3	71.1	60.9	65.5	71.3	59.1	63.7	66.8	59.9	63.8	67.3	61.5	64.5	66.9	61.0	64.0	66.2
1976 to 1981							58.6	64.0	69.2	61.0	65.2	70.4	59.4	63.8	66.6	56.8	62.6	66.3	60.8	64.3	66.8	61.5	64.2	66.3
1977 to 1982							58.2	63.9	68.7	58.8	63.4	67.7	58.9	63.3	66.2	56.5	62.4	66.0	61.2	64.4	66.9	61.4	64.2	66.3
1978 to 1983							59.1	65.1	71.9	60.9	67.1	76.8	58.6	63.0	66.0	57.7	62.6	66.3	61.1	64.3	66.7	61.2	64.0	66.2
1979 to 1984							57.6	63.6	68.8	62.0	65.7	71.0	58.1	62.7	65.8	56.4	62.2	66.0	60.7	64.1	66.5	60.7	63.8	66.1
1980 to 1985							57.3	63.1	67.4	60.9	65.1	70.1	58.2	62.5	65.6	56.4	62.0	65.8	60.8	64.1	66.5	60.3	63.6	65.9
1981 to 1986							56.9	62.6	67.0	59.1	63.6	69.2	58.2	62.3	65.4	58.5	63.0	66.1	61.0	64.3	66.8	60.3	63.6	65.8
1982 to 1987							57.1	62.8	67.4	59.2	64.5	71.7	58.0	61.9	65.2	59.2	63.6	66.5	60.5	64.1	66.7	60.7	63.8	66.0
1983 to 1988							57.0	62.8	67.3	56.1	62.2	66.9	57.9	61.7	65.1	60.1	63.9	66.6	60.4	64.2	67.0	60.4	63.7	66.1
1984 to 1989							58.2	63.7	69.0	57.3	62.0	67.5	58.2	62.2	65.3	60.7	64.0	66.6	60.4	64.1	66.9	59.9	63.6	66.2
1985 to 1990							58.8	64.7	70.6	58.2	63.0	69.0	58.4	62.2	65.3	60.6	63.9	66.5	60.7	64.2	66.8	60.5	63.9	66.3
1986 to 1991							59.6	66.3	75.6	62.1	68.0	77.6	58.1	62.0	65.3	60.1	63.8	66.4	60.5	64.3	67.1	60.3	63.8	66.3
1987 to 1992							58.0	65.0	73.4	58.6	66.0	76.8	57.7	61.8	65.2	60.8	64.2	66.6	60.0	63.9	66.8	59.3	63.2	65.9
1988 to 1993							57.9	64.6	75.2	58.6	64.8	77.9	57.7	61.8	65.1	59.3	63.5	66.3	59.3	63.4	66.5	58.8	62.7	65.5
1989 to 1994							57.9	64.6	77.2	59.7	67.5	79.0	57.2	61.1	64.8	59.0	63.1	66.0	58.8	63.1	66.5	58.6	62.4	65.4
1990 to 1995							57.0	62.4	75.5	58.6	65.9	79.2	56.9	60.8	64.6	59.4	63.3	66.1	58.8	63.0	66.5	58.5	62.5	65.5
1991 to 1996							57.5	62.8	76.5	56.1	62.3	78.0	57.5	61.2	64.8	59.2	63.2	65.9	59.2	63.5	66.3	58.8	62.8	65.6
1992 to 1997	53.4	59.0	65.8	51.6	55.7	61.5	57.5	65.0	78.3	60.2	72.4	79.6	58.1	61.6	65.0	58.8	62.9	65.6	59.2	63.3	66.4	58.9	62.7	65.4
1993 to 1998	53.3	58.8	65.5	51.6	55.6	61.0	58.9	65.7	75.9	56.5	66.6	78.6	58.2	61.7	65.0	59.1	63.0	65.7	59.5	63.4	66.8	58.6	62.3	65.2
1994 to 1999	54.0	59.7	66.3	52.2	56.1	61.4	58.2	64.7	74.2	55.6	66.6	78.7	58.1	61.6	65.0	57.5	62.3	65.4	59.9	63.7	66.7	59.1	62.7	65.3

ANNEX A

ESTIMATING AVERAGE AGE OF WITHDRAWAL WITH CENSORED DATA

48.   Since data for activity rates by age are generally not available above age 65, some form of truncation or imputation has to be used to derive central estimates of age of withdrawal from the labour force. One simple possibility is to simply ignore workforce participation above the highest age known, or to assume that all those in the labour force above age 65 are in fact aged 65-70. Such an assumption will, however, bias changes over time and comparisons between countries. Chart A1 compares estimates of average age of withdrawal for France and the USA which assume, respectively, that no-one works above age 70 and no-one works above age 80. It will be seen that for the USA for all years, and for France in the 1960's and 1970's, the "censored" series is significantly below the uncensored one. Only when average withdrawal ages are very low (as is the case for France in recent decades) do the two series converge. It is clear that any truncation will bias the series downwards, but that a truncations at an age about 20 years greater than the average will have little substantive impact.

49.   This annex proposes a method to take account of withdrawal that occurs at ages 65 and above. However, to keep the calculations tractable it does assume that activity is truncated at age 80: that is,

$$L_a^y = A_a^y = 0 \quad \text{for } a \geq 80$$

for all countries. This means that all those in the labour force aged 75 and over are assumed to be 75-79.

50.   For most countries, data are only available for five year age groups up to age 60-64. However, for three countries we do know L_{65}^y and L_{70}^y and (by the above assumption) L_{75}^y for some years.

51.   Hence for these countries, we can calculate W_a^y and d_a^y for a = 65, 70 and 75 for a range of years (in all cases, we assume $W_{80}^y = 1$ in all years).

52.   However, for most countries we only know

$$L_{65+}^y = \sum_{a=65}^{75} L_a^y$$

(we assume in these cases also that $L_a^y = 0$ for $a \geq 80$)

To calculate average retirement age for these countries, we will have to impute values of S_a^y for $a \geq 65$.

This requires the addition of some additional terminology:

$d_a^y = P_a^y / P_{a-5}^{y-5}$ is the population survival rate over the past five years for those in age group a in year y

$[(1 - d_a^y)$ is the sum of death rate and net out-migration rate for this age group over the five years]

By definition,

$$S_a^y = A_a^y / A_{a-5}^{y-5}$$

$$= (L_a^y / L_{a-5}^{y-5}) / (P_a^y / P_{a-5}^{y-5})$$

Hence $\quad L_a^y = L_{a-5}^{y-5} \cdot d_a^y \cdot S_a^y$ $\hfill$ (A1)

So $\quad L_{65}^y = L_{60}^{y-5} \cdot d_{65}^y \cdot S_{65}^y$ $\hfill$ (A2)

$$L_{70}^y = L_{65}^{y-5} \cdot d_{70}^y \cdot S_{70}^y$$

$$= L_{60}^{y-10} \cdot d_{65}^{y-5} \cdot d_{70}^y \cdot S_{65}^{y-5} \cdot S_{70}^y \qquad (A3)$$

$$L_{79}^y = L_{60}^{y-15} \cdot d_{65}^{y-10} \cdot d_{70}^{y-5} \cdot S_{65}^{y-10} \cdot S_{70}^{y-5} \cdot S_{75}^y \qquad (A4)$$

Now, $L_{65+}^y = L_{65}^y + L_{70}^y + L_{75}^y$ $\hfill$ (A5)

As $\quad L_a^y = 0$ for a > 79 by assumption.

$$L_{65+}^y = L_{60}^{y-5} d_{65}^y S_{65}^y$$

$$+ L_{60}^{y-10} \cdot d_{65}^{y-5} \cdot d_{70}^y \cdot S_{65}^{y-5} \cdot S_{70}^{y-5}$$

$$+ L_{60}^{y-15} \cdot d_{65}^{y-10} \cdot d_{70}^{y-5} \cdot d_{75}^y \cdot S_{65}^{y-10} \cdot S_{70}^{y-5} \cdot S_{75}^y \qquad (A6)$$

53. Those in the labour force above the age of 65 represent the survivors of previous cohorts who worked when aged less than 65. The greater the rate of withdrawal at age 65 and above, the smaller this total will be. Hence the total number working aged 65 and over contains information about the rate of withdrawal above age 65. However, since we only have only one figure, it is not possible to derive any information about differences in the rate of withdrawal above age 65. The simplest way to address this is to impose the assumption that retention rates are the same <u>in a particular year</u> for all age groups above 65.

i.e.

$$S_*^y = S_{60}^y = S_{70}^y = S_{70}^y \text{ i.e.}$$

$$L_{65+}^y = L_{60}^{y-5} \cdot d_{65}^y \cdot S_*^y + L_{60}^{y-10} \cdot d_{65}^{y-5} \cdot d_{70}^y \cdot S_*^{y-5} \cdot S_*^y$$

$$+ L_{60}^{y-15} \cdot d_{65}^{y-10} \cdot d_{70}^{y-5} \cdot d_{75}^y \cdot S_*^{y-10} \cdot S_*^{y-5} \cdot S_*^y$$

$$= S_*^y [L_{60}^{y-5} \cdot d_{65}^y + L_{60}^{y-10} \cdot d_{65}^{y-5} \cdot d_{70}^y \cdot S_*^{y-5}$$

$$+ L_{60}^{y-15} \cdot d_{65}^{y-10} \cdot d_{70}^{y-5} \cdot d_{75}^y \cdot S_*^{y-10} \cdot S_*^{y-5}]$$

$$= S_*^y \cdot F(L, d, S) \qquad (A7)$$

54.   This equation allows S_*^y to be calculated for a given value of L_{65+}^y if an estimate of F(L,d,S) can be derived. The problem is that F(L,d,S) is a function of lagged values of L, d and S, which will not be available for the initial years for L and d, and which have to be estimated for S.

55.   The only possibility for the initial five year period is to assume that past population and labour force structure and withdrawal rates were the same as for this period. This means for the last year of this initial five year period, we have

$$S_*^y = S_*^{y-5} = S_*^{y-10}$$

$$L_{60}^{y-5} = L_{60}^{y-10} = L_{60}^{y-15}$$

$$= d_{65}^y = d_{65}^{y-15} = d_{65}^{y-10}$$

$$d_{60}^y = d_{70}^{y-5}$$

So that the equation (A7) is a cubic in S_*^y:

$$L_{65+}^y = L_{60}^{y-5} \cdot d_{65}^y \cdot (S_*^y) + L_{60}^{y-5} \cdot d_{65}^y \cdot d_{70}^y \cdot (S_*^y)^2$$

$$+ L_{60}^{y-15} \cdot d_{65}^y \cdot d_{70}^y \cdot d_{75}^y \cdot (S_*^y)^3 \tag{A8}$$

56.   This can be solved to yield an initial estimate of S_*^y. The same formulation can be used for subsequent years, though there is an internal contradiction in the estimation, as the assumption that S_*^y does not vary is contradicted by the change over time in the estimate as the (current) parameters of equation (8) change. This is the "cross-section" estimate of S_*^y.

57.   An alternative procedure is to revert to equation (A7), but to use the initial values of d_a^y and L_{60}^y as proxies for the unavailable lagged values. That is, if we denote the initial year as year I, the function F is evaluated using the initial values (ie. the value for y= I) for L, D and S where y-10 and y-15 ‹ I, and using the actual past values for L and D and the calculated value of S where y-10 and y-15 $\geq$ I. This is the "recursive" estimate of S_*^y

58.   These calculations yield two alternative series for S_y^*, which can be inserted in equation (3) to derive imputed estimates of the average age of retirement. Table A1 shows these estimates, and compares them with the known (uncensored) estimates for France, the US and Japan. Charts A2 and A3 show the two estimated values of S_y^* and compares them with the average of the empirical estimates of S_{65}^y, S_{70}^y and S_{75}^y for two of the countries for which detailed data are available.

59.   It will be seen from Table A1 that both alternative series for censored data yield an average age which is almost identical to the uncensored series. The "recursive" estimate (which uses more information) is slightly better, and so this is the one which is used in the estimates for all countries.

60.   Chart A2 indicates that the empirical estimate is close to S_{65}^{y} and S_{70}, but is generally less than S_{75}. However, the latter is biased upwards by the assumption that $S_{80} = 0$. It is apparent that no upper bound on age of participation is strictly correct. However, this has little or no effect on the average. The accumulated probability of still being in the labour force at age 75 is so low that the upward censorship has no noticeable effect on the mean, and does not impact on the upper quartile either.

61.   The exception is the case of Japan which, since the underlying data are sparser and more unreliable, has not been included in Chart A3. In the case of that country, the comparison is approximate because the uncensored data, available only for employment and only at five-year periods, are from a different source to the censored data. In spite of this, the overall trends in the two sources for men are similar. The considerable divergence in the estimates for women is not due to the method, but to the fact that the uncensored data are have an inconsistent relation over time with the censored data[8].

62.   Finally, for the static estimate the equation (A8) simplifies still further: the estimates d_a all have the form P_a/P_{a-5}, so that the equation collapses to

$$L_{65+}/(L_{60}/P_{60}) = P_{65}.s + P_{70}.s^2 + P_{75}. s^3 \qquad\qquad (A9)$$

63.   The static estimates use the estimate of s derived from this equation for the proportion of those working in each age group aged 60 to 74 who stay in the labour force when they are five years older. (The value is assumed to be zero for those aged 75 to 79). These values of s are inserted in equation (2) to derive the static estimate of the average retirement age.

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8   The employment data for the 1960's, when compared with the labour force data, suggest a high unemployment rate for women, which is totally at variance with what we know of the state of the labour market inthat period. It appears that in this period some forms of non-standard employment were not included.

Table A1. Comparison of Direct and Censored Estimates of Expected Age of Withdrawal, adjusted for censored "Direct" data

Years	France Men Direct Estimate	France Men Recursive	France Men Cross-section	France Women Direct Estimate	France Women Recursive	France Women Cross-section	Japan Men Direct Estimate (a)	Japan Men Recursive	Japan Men Cross-section	Japan Women Direct Estimate (a)	Japan Women Recursive	Japan Women Cross-section	USA Men Direct Estimate	USA Men Recursive	USA Men Cross-section	USA Women Direct Estimate	USA Women Recursive	USA Women Cross-section
1960 to 1965								71.4	71.4		66.5	66.5	65.5	65.7	65.7	64.9	64.9	64.9
1961 to 1966								71.8	71.6		67.7	67.5	65.3	65.5	65.5	65.1	65.1	65.1
1962 to 1967	64.2	64.4	64.4	64.6	64.8	64.8	71.9	71.3	71.2	67.8	68.3	68.1	66.1	66.2	66.2	65.8	65.8	65.8
1963 to 1968	65.7	65.9	65.8	67.1	67.0	67.1		71.4	71.2		66.9	67.1	65.9	66.0	66.0	65.6	65.6	65.6
1964 to 1969	65.6	65.8	65.7	66.5	66.6	66.7		71.6	71.3		66.4	66.3	65.6	65.7	65.7	65.7	65.8	65.8
1965 to 1970	65.2	65.3	65.3	67.7	68.3	68.5		70.8	70.6		66.3	66.4	65.5	65.6	65.6	65.7	65.8	65.8
1966 to 1971	64.9	65.1	65.1	64.9	64.8	65.1		71.0	71.0		64.4	64.6	65.2	65.4	65.4	65.2	65.4	65.3
1967 to 1972	65.4	65.3	65.5	65.7	65.7	66.1	71.2	70.6	70.5	72.7	63.8	64.1	64.0	64.2	64.2	64.7	64.8	64.7
1968 to 1973	64.3	64.2	64.4	64.3	64.2	64.4		70.6	70.4		65.3	65.0	63.5	63.7	63.7	64.2	64.4	64.3
1969 to 1974	63.8	63.8	64.0	63.9	63.8	64.0		70.1	69.8		64.4	64.3	63.3	63.4	63.4	63.6	63.7	63.7
1970 to 1975	63.5	63.5	63.7	63.7	63.7	63.9		70.1	69.8		64.4	64.2	63.0	63.2	63.2	63.3	63.4	63.4
1971 to 1976	62.9	62.9	63.0	63.9	63.9	64.0		69.8	69.3		65.1	64.8	62.7	62.9	62.9	63.3	63.4	63.4
1972 to 1977	62.6	62.7	62.8	63.7	63.7	63.9	68.7	69.6	69.2	65.9	66.0	65.4	62.8	62.9	62.9	63.7	63.7	63.7
1973 to 1978	61.7	61.8	61.9	63.1	63.1	63.2		69.1	68.9		65.8	65.4	63.0	63.2	63.1	64.1	64.2	64.2
1974 to 1979	61.9	62.0	62.1	63.0	63.0	63.1		69.2	69.0		66.6	66.0	63.2	63.4	63.4	64.2	64.3	64.2
1975 to 1980	62.1	62.2	62.3	63.3	63.4	63.6		69.5	69.2		66.9	66.2	63.2	63.3	63.3	64.1	64.2	64.2
1976 to 1981	61.6	61.7	61.9	62.9	63.0	63.2		69.5	69.1		66.5	65.9	63.2	63.4	63.4	64.2	64.3	64.2
1977 to 1982	60.8	60.9	61.1	61.9	62.0	62.2	69.2	69.4	69.1	68.9	66.5	65.9	63.1	63.3	63.3	64.3	64.4	64.3
1978 to 1983	60.2	60.2	60.5	61.2	61.3	61.5		69.3	69.1		66.6	66.1	63.0	63.2	63.2	63.7	63.8	63.8
1979 to 1984	59.9	59.9	60.1	60.9	60.9	61.2		68.6	68.5		66.2	65.7	62.8	62.9	63.0	63.5	63.6	63.6
1980 to 1985	59.7	59.7	59.8	60.5	60.6	60.7		68.4	68.4		66.1	65.7	62.7	62.9	62.9	63.4	63.4	63.4
1981 to 1986	59.6	59.6	59.6	60.5	60.5	60.6		68.2	68.4		66.0	65.7	62.7	62.8	62.8	63.2	63.3	63.3
1982 to 1987	59.5	59.5	59.5	60.3	60.3	60.3	68.5	68.4	68.3	66.1	65.9	65.6	62.8	62.9	62.9	63.3	63.4	63.4
1983 to 1988	59.6	59.6	59.6	60.4	60.4	60.4		68.8	68.6		65.7	65.4	62.8	62.9	62.9	64.0	64.1	64.1
1984 to 1989	59.6	59.7	59.7	60.4	60.4	60.4		69.2	68.8		66.6	66.0	62.9	63.1	63.0	64.4	64.5	64.4
1985 to 1990	59.5	59.6	59.6	60.1	60.1	60.1		70.0	69.3		67.3	66.6	64.4	64.3	64.1	65.7	65.6	65.2
1986 to 1991	59.3	59.3	59.3	60.2	60.2	60.2		70.9	69.7		68.6	67.6	64.1	64.1	64.0	65.1	65.1	64.8
1987 to 1992	59.4	59.4	59.4	60.0	60.0	60.1	72.0	71.2	69.8	71.3	68.7	67.7	64.3	64.2	64.2	65.1	65.1	64.8
1988 to 1993	59.2	59.2	59.2	60.1	60.1	60.1		71.0	69.6		67.5	66.8	63.8	63.8	63.8	64.5	64.5	64.4
1989 to 1994	59.2	59.2	59.2	60.2	60.2	60.2		70.6	69.3		66.6	66.1	63.3	63.4	63.3	64.6	64.8	64.6
1990 to 1995	59.1	59.1	59.1	60.4	60.4	60.4		70.2	69.1		65.8	65.4	63.6	63.6	63.4	64.4	64.4	64.3
1991 to 1996	59.5	59.5	59.5	60.4	60.4	60.4		69.6	68.9		65.2	65.0	64.2	64.1	63.9	64.4	64.5	64.4
1992 to 1997	59.4	59.4	59.4	60.1	60.1	60.1	69.0	69.3	68.6	66.9	65.5	65.3	64.5	64.6	64.4	64.9	64.8	64.7
1993 to 1998	59.4	59.4	59.4	59.8	59.8	59.8		69.0	68.4		65.8	65.5	64.8	64.8	64.6	64.5	64.5	64.3
Correlation with Direct Estimate — All years		0.9997	0.9995		0.9991	0.9987		0.9567	0.8596		-0.0723	-0.0404		0.9967	0.9907		0.9974	0.9995
1967-1989														0.9998	0.9996		0.9993	0.9995
1990-1998														0.9911	0.9819		0.9885	0.9872

(a) These are employment rates from the Employemnt Status survey. Those for women are clearly inconsistent with the Labour Force survey data (used for the censored

(b) Estimates up to 1989 are censored at age 70.

Chart A1: Comparison showing effect truncation of participation at age 70 instead of age 80
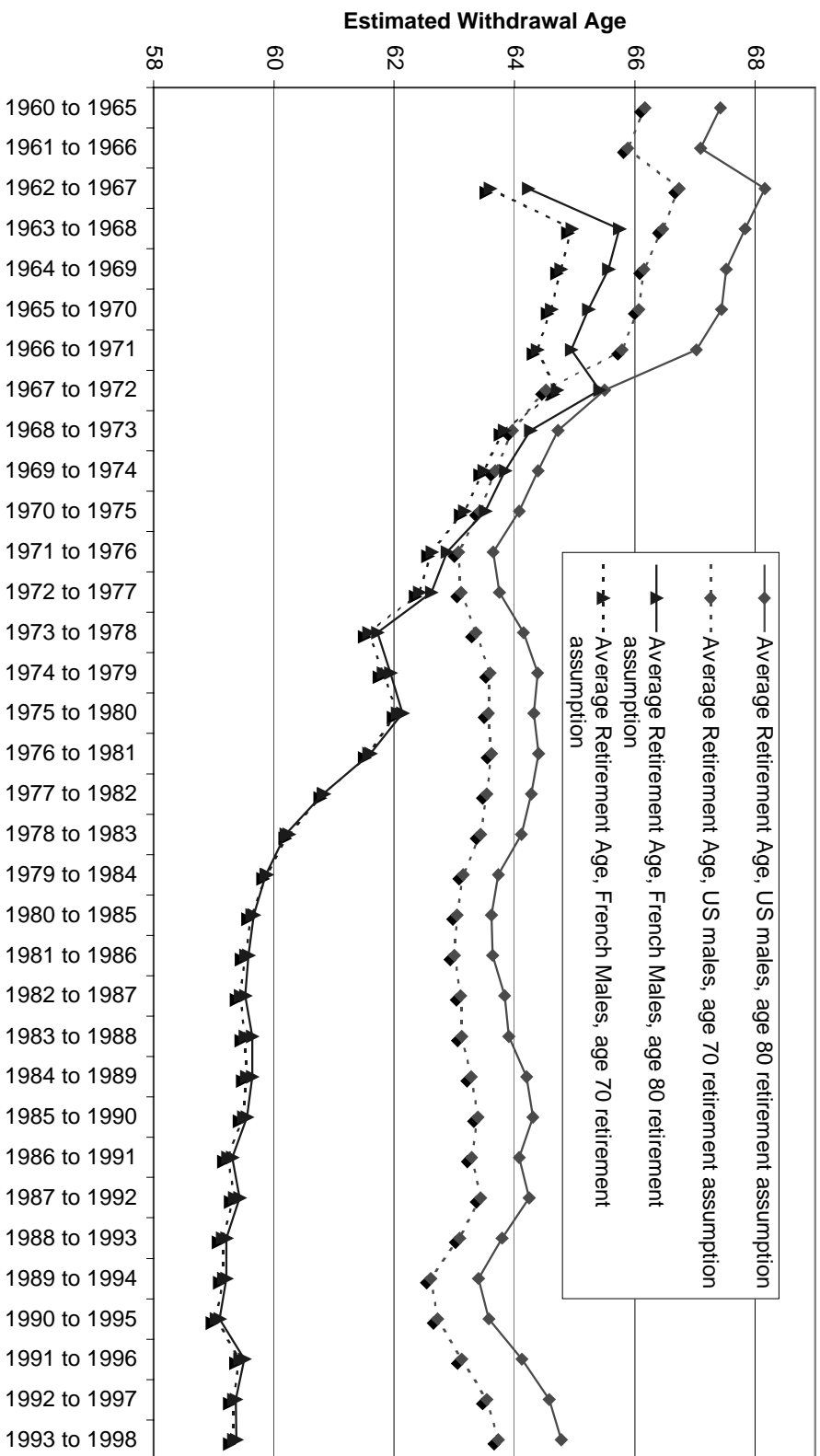

Estimated Withdrawal Age

Legend:
- Average Retirement Age, US males, age 80 retirement assumption
- Average Retirement Age, US males, age 70 retirement assumption
- Average Retirement Age, French Males, age 80 retirement assumption
- Average Retirement Age, French Males, age 70 retirement assumption

X-axis (Estimated Withdrawal Age): 58, 60, 62, 64, 66, 68

Y-axis categories:
1960 to 1965, 1961 to 1966, 1962 to 1967, 1963 to 1968, 1964 to 1969, 1965 to 1970, 1966 to 1971, 1967 to 1972, 1968 to 1973, 1969 to 1974, 1970 to 1975, 1971 to 1976, 1972 to 1977, 1973 to 1978, 1974 to 1979, 1975 to 1980, 1976 to 1981, 1977 to 1982, 1978 to 1983, 1979 to 1984, 1980 to 1985, 1981 to 1986, 1982 to 1987, 1983 to 1988, 1984 to 1989, 1985 to 1990, 1986 to 1991, 1987 to 1992, 1988 to 1993, 1989 to 1994, 1990 to 1995, 1991 to 1996, 1992 to 1997, 1993 to 1998

Chart A2 (a): Actual and Estimated Average Staying Rates over five year period, men, ages 60-64 to 75-79, USA

Legend:
- actual men, all three age groups
- estimated recursive, men
- estimated cross-section, men
- actual men, first two age groups only

X-axis (years): 1960 to 1965, 1961 to 1966, 1962 to 1967, 1963 to 1968, 1964 to 1969, 1965 to 1970, 1966 to 1971, 1967 to 1972, 1968 to 1973, 1969 to 1974, 1970 to 1975, 1971 to 1976, 1972 to 1977, 1973 to 1978, 1974 to 1979, 1975 to 1980, 1976 to 1981, 1977 to 1982, 1978 to 1983, 1979 to 1984, 1980 to 1985, 1981 to 1986, 1982 to 1987, 1983 to 1988, 1984 to 1989, 1985 to 1990, 1986 to 1991, 1987 to 1992, 1988 to 1993, 1989 to 1994, 1990 to 1995, 1991 to 1996, 1992 to 1997, 1993 to 1998

Y-axis (staying rate over five year period): 0.40, 0.45, 0.50, 0.55, 0.60, 0.65, 0.70
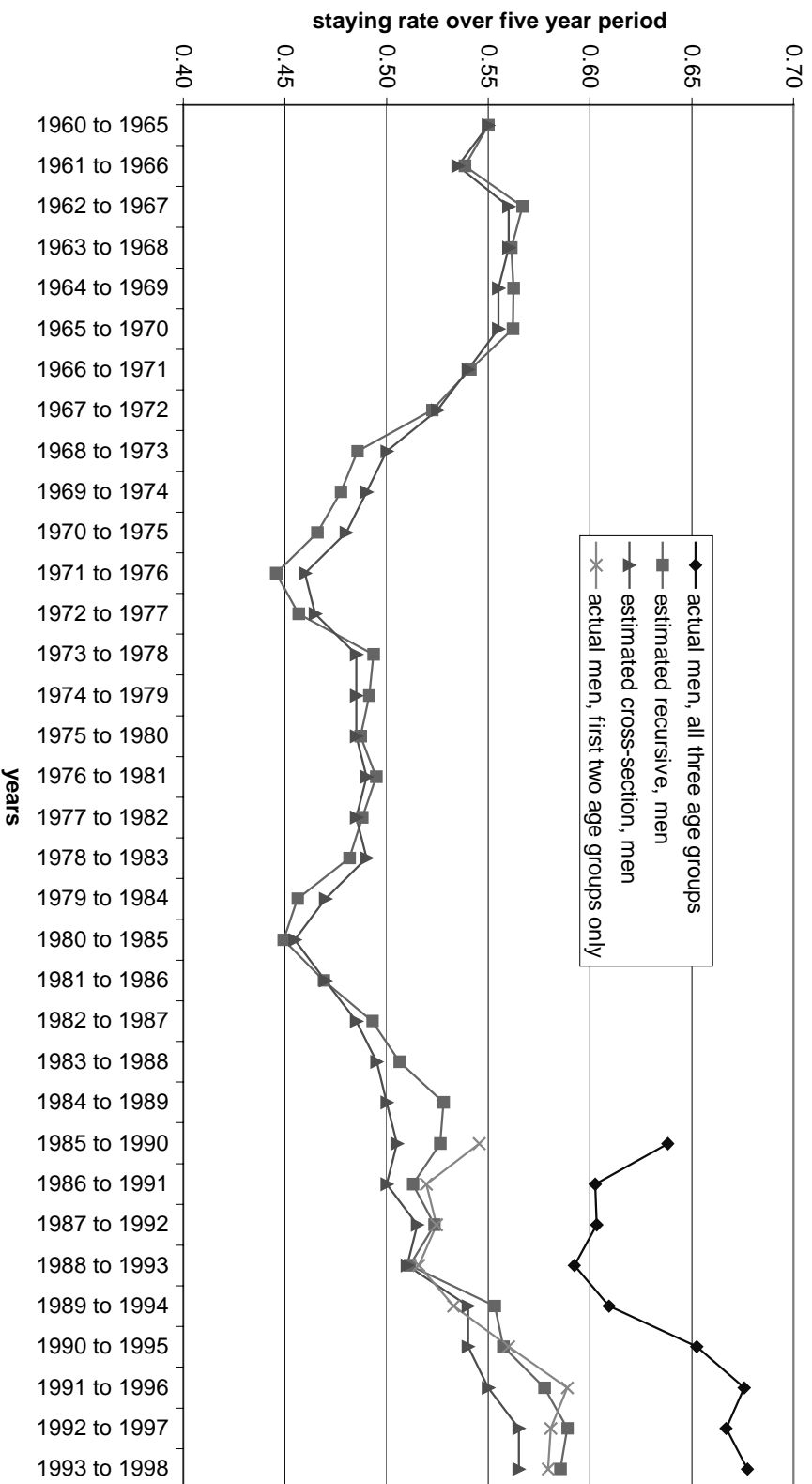
Chart A2 (b): Actual and Estimated Average Staying Rates over five year period, women, ages 60-64 to 75-79, USA

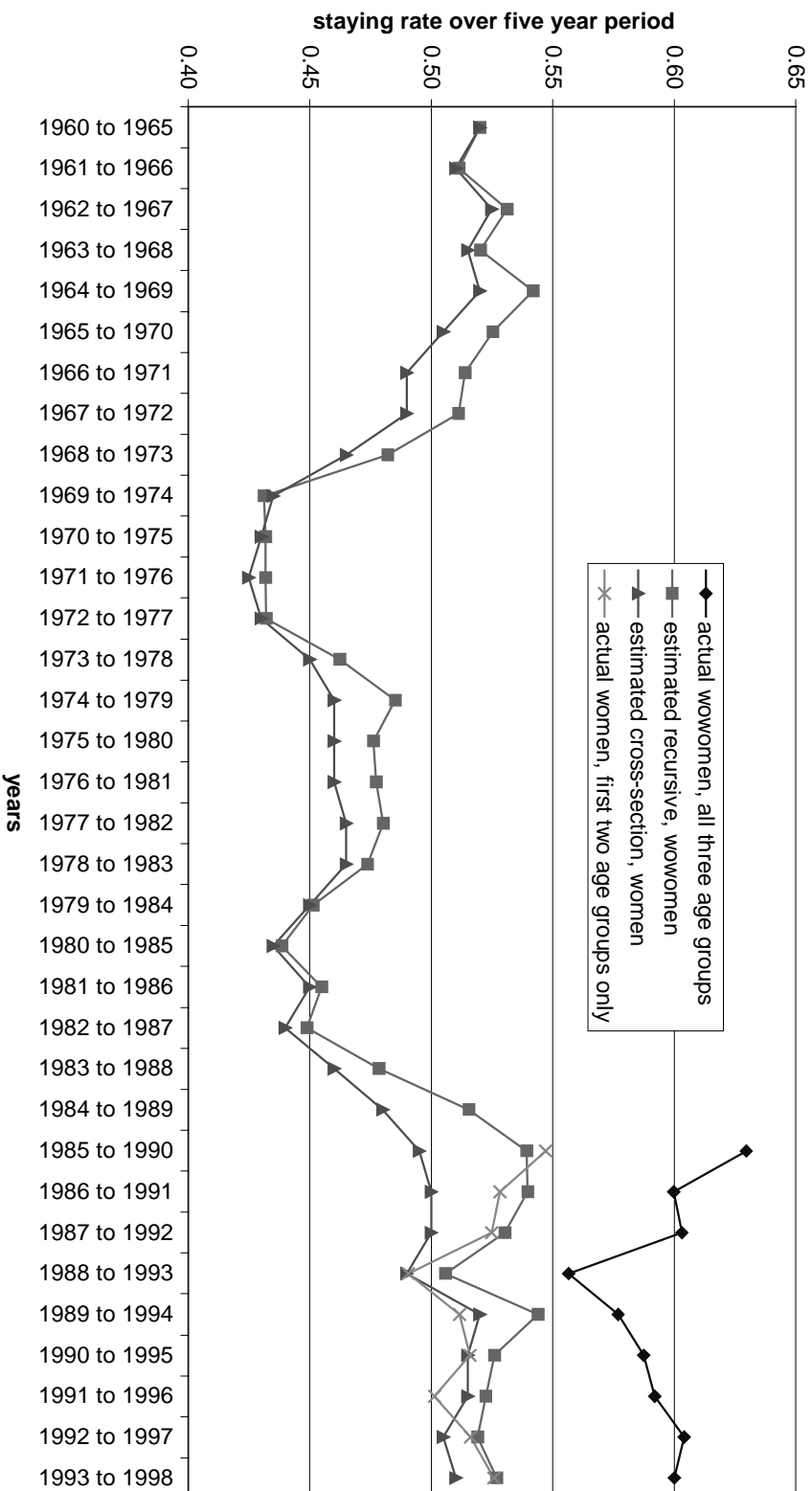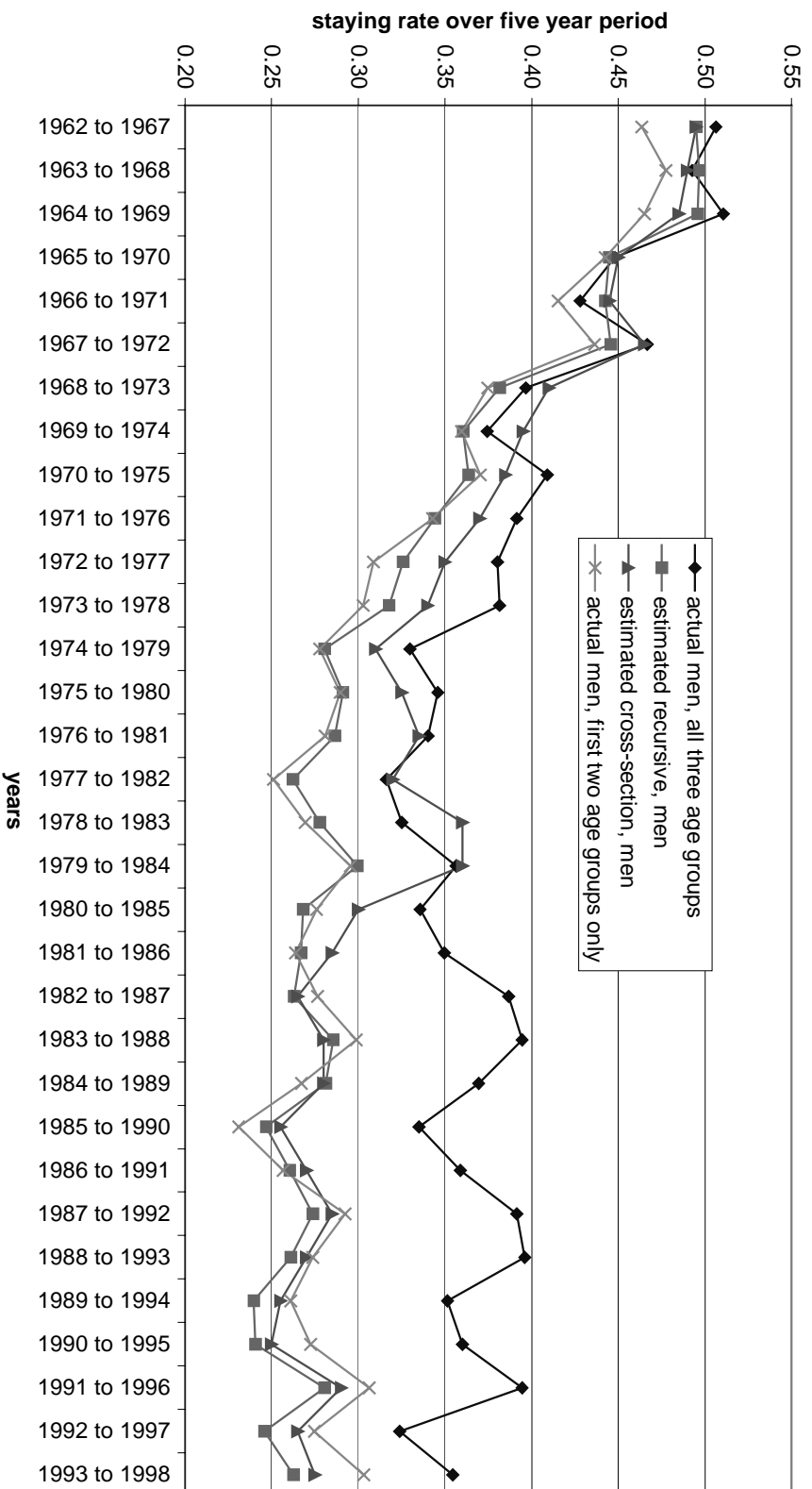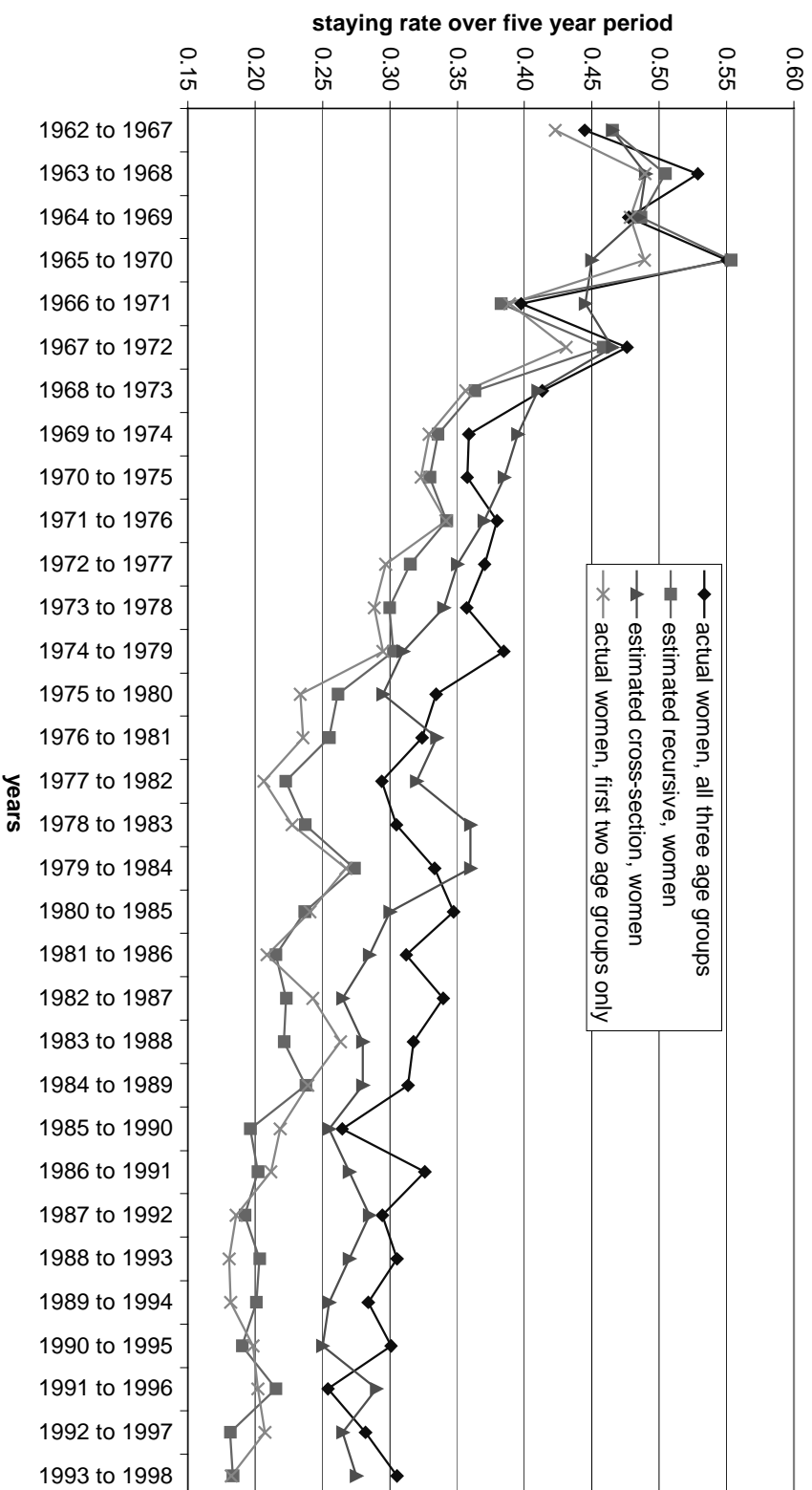**Chart A3 (a): Actual and Estimated Average Staying Rates over five year period, men, ages 60-64 to 75-79, France**

staying rate over five year period

Legend:
- actual men, all three age groups
- estimated recursive, men
- estimated cross-section, men
- actual men, first two age groups only

years

Chart A3 (b): Actual and Estimated Average Staying Rates over five year period, women, ages 60-64 to 75-79, France

staying rate over five year period

years

legend:
- actual women, all three age groups
- estimated recursive, women
- estimated cross-section, women
- actual women, first two age groups only

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