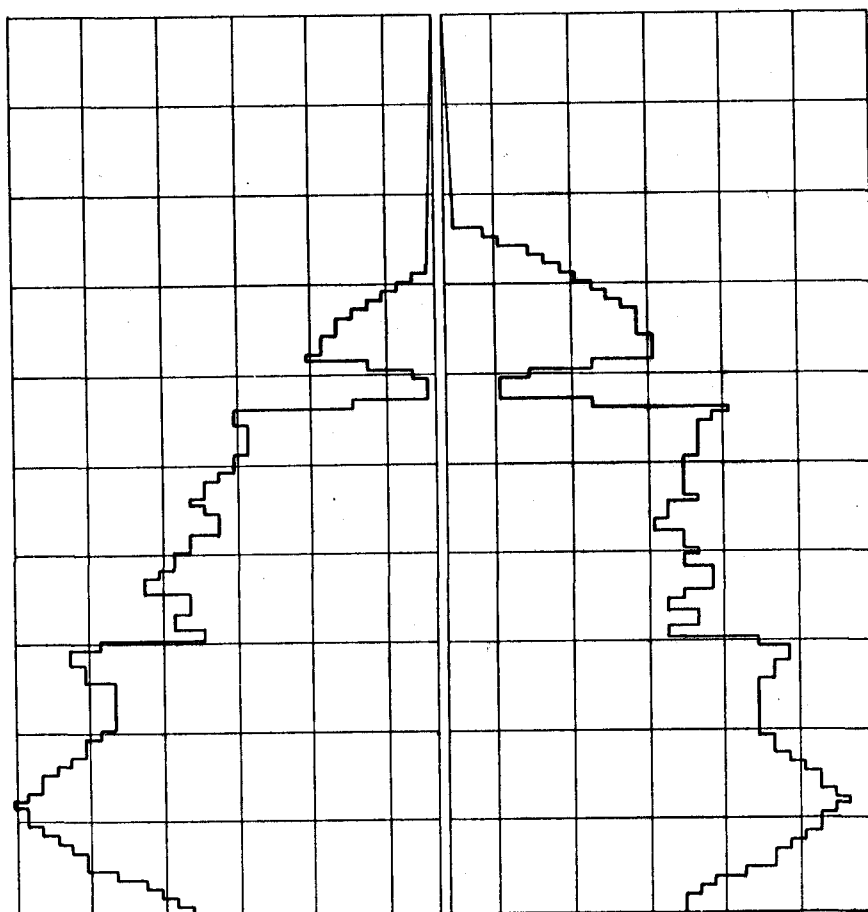# The economic implications of demographic change in the European Community: 1975 – 1995

Part 2: Technical annex

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......Brussels................, ...16th...April...1978

STUDY GROUP ON MEDIUM—TERM ECONOMIC ASSESSMENTS

The economic implications of demographic change

in the Community

1975—1995

ii) Annexes to the main report.

TABLE OF CONTENTS

ANNEX 1

The conceptual definition and analysis of activity rates.

a. The conceptual definition of activity rates

1.   Activity rates are defined as the ratio to population of the number of persons in employment or seeking work, that is the number of economically active. This is not however an unambiguous definition. The desire, indeed the necessity, of statistical offices to have an objective definition requires that precise interpretations be put on the terms 'in employment' and 'seeking work'. A number of questions will illustrate the difficulties.

(i) is a person who works in a shop for all or part of a single day of the week (but on a regular basis), but who is principally economically inactive (eg in full-time education, or retired), to be classed as 'in employment' or 'economically inactive'?

(ii) is anyone who claims to have sought work in a particular reference period to be regarded as economically active, regardless of whether or not the job application was made through official channels or involved more than reading newspaper advertisements?

(iii) does a person have to seek work actively to be economically active?

2.   The ambiguities involved in the definition of activity rates are generally thought to be the result of statistical differences which can be resolved by reference to an objective definition of 'in employment or seeking work'. In case (i) above, the answer would generally be 'in employment' for the purposes of defining activity rates only if the classification of economic activity is not into mutually exclusive categories. And yet the person, although primarily inactive, is supplying labour. In case (ii), one of the distinctions is between the total number registered as unemployed and the total number actually seeking work. Registered unemployment in most countries is an administrative count related to the social security system

in operation; the 'lesser' degrees of unemployment (for example, first-job seekers and casual workers) are often excluded, either explicitly or implicitly, because these groups have very limited entitlement to benefits. But it is widely recognised that these 'fringe groups' vary as a proportion of the population when the pressure of demand for labour varies, and in total are identified as the 'unregistered unemployed'. Labour force surveys have been set up to supplement the relatively infrequent (and expensive) Censuses of Population in order to be able to include these groups as economically active because they are actively seeking work. Estimates of economic activity are based on responses by a sample of households to questions such as 'did you work or actively seek work in the period (week/month) ending....?'

How inclusive the estimates will be depends on the interpretation placed on the word 'actively'. Analyses of activity rates in the UK and the US have concluded that estimates of activity rates derived from responses to similar 'objective'questions do vary with the pressure of demand for labour. The explanation is that individual replies by those currently out of work will be conditioned by their experience of job search, the duration-to-date of their current spell of unemployment and the labour force status of the head of household. In particular, where job search has become relatively infrequent because there are few vacancies to be considered, individuals may not have actively searched in the reference period.

But it would be extremely difficult to assess the value of responses to a question such as 'if you thought a job might be available, would you search for it?'; it would indeed be a statistician's nightmare. Conceptually, however, it is only a definition of activity rates of this nature, which sought to eliminate the effect of the current pressure of demand on responses, which could provide an indication of the 'trend' or 'potential' levels of activity rates.

5. By implication, any actual set of observed activity rates must be seen in the context of their conjunctural situation. This means that observed trends in activity rates between two dates cannot necessarily be assumed to reflect trends in potential activity rates.

b. Alternative methods of analysis

6. As an alternative to simple trend extrapolation, more recent work on forecasts of activity rates has been concerned to identify the role of the pressure of demand in determining observed levels of activity rates. Explicitly or implicitly , the analyses have been based on the following association:

$$ar_{it} = f(t) + \alpha I_t$$

where ar_{it} is the activity rate for demographic group i at time t, $f(t)$ a function of t (generally a simple linear trend) and I_t an indicator of labour market pressure. Because of a paucity of data, the analyses either presume an association for each demographic group or consider only the crude (aggregate) activity rate.

7. Recent movements in activity rates as monitored through the Community's survey, particularly for females, have not accorded with the models as defined by conventional wisdom. Historically, it has been argued that demographic factors play a small part in determining medium-term changes in activity rates and that in any case they can be proxied by a linear trend. It is then the economic factors which dominate. Mincer proposed many years ago that activity rates depended on the pressure of demand through two forces, acting in opposite ways; when the pressure of demand declined, those out of work became discouraged by unsuccessful job search and leave the labour force whilst those previously inactive would be stimulated to enter the labour force when household income fell and, in particular, when the head of household was out of work. On balance, the empirical evidence showed that activity rates moved procyclically so that the "discouragement" effect was strongest. But recent changes, showing sharp rises in female activity rates despite the large increases in unemployment, are only consistent with a dominance of the "added worker" effect; such a switch in the dominant

factor only makes sense if there is a threshold level of unemployment above which the "discouragement" effect becomes smaller and the "added worker" effect becomes larger, that is, the two responses are non-linear.

8. An alternative explanation could be provided by cohort analysis of activity rates. The analysis does not however shed any light directly on the causes of the changes but merely points out that cohort rates have risen rapidly (i.e. the observed changes are not composition effects) and that it would be unreasonable to project the "trends". However, there is a presumption that declining fertility rates and the resultant lower child dependency rates would eventually have an effect on female labour force participation.

9. In an ongoing study for the Commission, Tarling and Zighera are analysing the cohort pattern of change for activity rates which can be derived from the Community surveys. The aim is to produce a model which permits a separation of the effects of major demographic and social changes on activity rates as well as separating out the cyclical element of activity rate change.

10. The two other areas where trends in activity rates are difficult to analyse are in those age groups where economic inactivity is a consequence of education participation or retirement. Those age groups affected by retirement have trends which result from government decisions about the coverage of, eligibility to and statutory age for pension entitlements. But the effects of retirement are felt in age groups below the statutory age of pension entitlement as a result of the extension of private insurance or occupational schemes. Very little modification of orthodox methods of forecasting appear feasible; it is only possible to take explicit account of proposed and/or expected changes.

11. Where education is an important alternative to economic activity, some more detailed analysis is necessary. It is not evident that, for all countries, the categories of economic activity and full-time education are mutually exhaustive; particularly for married women, but not only for this group, there are other inactive groups. Education, like retirement, is affected directly by government decisions. Raising the minimum age for leaving

compulsory education and decisions about the supply of places in further
education have to be included explicitly; simple trend prediction is
obviously unsatisfactory. However, although in most countries forecasts
take these factors into account, it is apparent that the assumption is one
of excess demand for educational places so that the most appropriate way
to predict labour force participation amongst the age group 15-24 is to
deduct the supply of educational places from the total population in the
relevant age group. Certainly in the longer term and probably in the medium
term, this assumption appears less plausible than it used to be. Returns to
further education (either in terms of wider opportunities or of significant
wage differentials) are now smaller than they have been and the postwar
increases in real incomes have enabled a majority of households to take a
decision about whether or not to encourage their children to continue in
full-time education. Thus the presumption that there remains potential
growth in demand for educational places in excess of the demographic change
can realistically be questioned.

c. "Saturation" levels of activity rates

12. For each age/sex/marital status group, there are limits to the level of
activity rate which can be achieved. In younger age groups, the limit is
determined primarily by the extent to which further full-time education is
available or is demanded. Long term planning for the number of places
available is based on government expenditure plans, these being dependent
on resource availability, and influenced by industrial demand for qualified
entrants to the labour force and perhaps also the social demands for the
educational services. In the medium term, the number of places is flexible,
varying with the course mix, utilisation of teaching staff and buildings,
and subject also to the stringency of the application of entry requirements.
Differences between educational systems in the different countries mean
that the choice between employment and education does not affect age-
specific activity rates in all countries in the same way. But, these
differences apart, likely future levels of activity rates can be determined
in relation to the number of places demanded; the number of places supplied
will only affect activity rates if there is excess demand with supply
exogenously constrained or at least not likely to respond to excess demand.

The effects of the pressure of demand and estimates
of trend levels in 1963 and 1975

1.   Table 1 compares data on crude female activity rates from OECD labour force statistics and from the Community Surveys.   Year by year comparison of the changes suggests that, whilst the levels differ according to country definition (particularly for Germany, Belgium and Denmark), the two sources give a very similar picture of changes for all countries except for Germany.

2.   Changes in activity rates for women have differed between countries but one general feature can be observed : whatever the trend during the 1960's, the recent changes in female activity rates are all above the apparent trend increase.   This occurred despite the higher average levels of unemployment in the 1970's, and in particular the high levels of 1974-5.

3.   Variations in the pressure of demand are shown for each country in graph 1 using two indicators, the deviation of industrial production from its log trend and the level of unemployment.   The graph shows the coincidence of booms in 1963-64 and the dramatic reductions in production beginning in 1974 and deepening in 1975.

4.   The activity rates for women, measured either on OECD definitions or taken from the Community's survey, do not show much systematic relation with these cyclical indicators.   Some regressions on OECD data are shown in table 2.   Although some of the coefficients on the pressure of demand, particularly when using unemployment as an indicator, turn out to be significant, the effect is never very strong and would without exception give a highly inaccurate prediction for 1975.

Table 1 Female Activity Rate 1962–1975 / Taux d'Activite Feminin 1962–1975 / Weibliche Erwerbsquote 1962–1975

		1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
OECD labour force statistics (% of population aged 15-64)	Germany	49.2	49.3	49.0	49.0	48.5	47.5	47.7	48.0	48.1	48.1	48.2	48.7	48.7	48.7
	France							46.1	46.6	47.2	48.0	48.5	49.0	49.6	
	Italy	35.4	33.5	32.1	31.1	29.6	29.5	29.5	29.4	29.1	29.1	28.4	29.0	29.5	
	Belgium	37.6	37.5	38.0	38.0	38.6	39.0	39.4	40.3	40.3	40.9	41.4	42.5	43.6	
	United Kingdom	49.6	49.6	50.3	51.0	51.9	51.4	51.6	52.0	52.1	50.7	51.4	53.3	54.6	
	Ireland					35.2	35.0	34.9	34.7	34.3	34.0	33.5	33.2	33.0	
	Denmark				49.3		55.1		57.2	58.0	59.3	61.0	61.9	63.2	
Community labour force surveys (% of population aged 14+)	Germany							40.3	40.6	41.0	41.5		47.0		47.4
	France							46.6	47.0	47.1	47.0		48.1		50.8
	Italy							29.9	29.6	29.3	29.4		27.0		28.6
	Belgium							33.6	34.4	34.6	35.8		37.2		40.2
	United Kingdom												51.3		55.5
	Ireland														32.4
	Denmark														56.1
	Netherlands							26.3					24.6		26.4

DIAGRAM 1   INDICATORS OF THE RECESSION   -8-

Germany

France

Netherlands

Italy

Belgium

United Kingdom

Denmark

Ireland
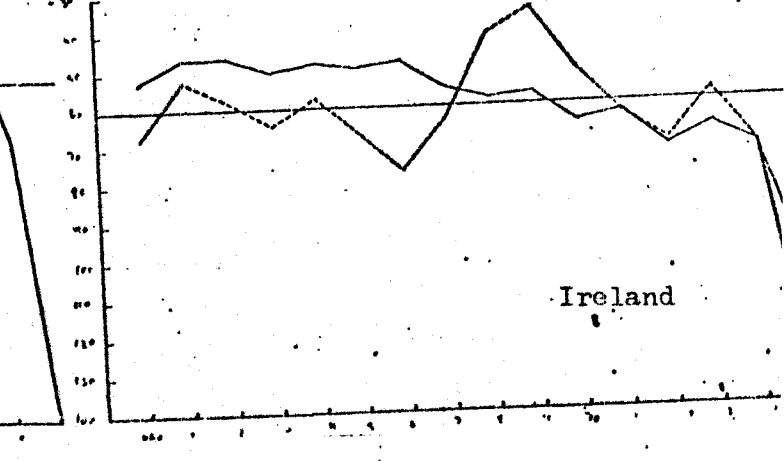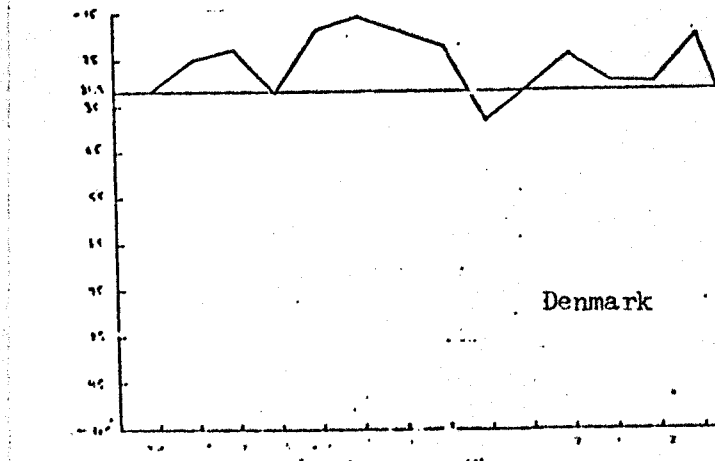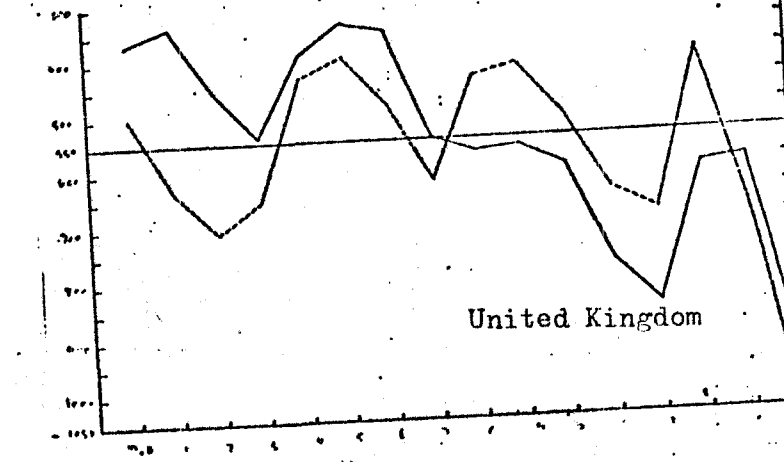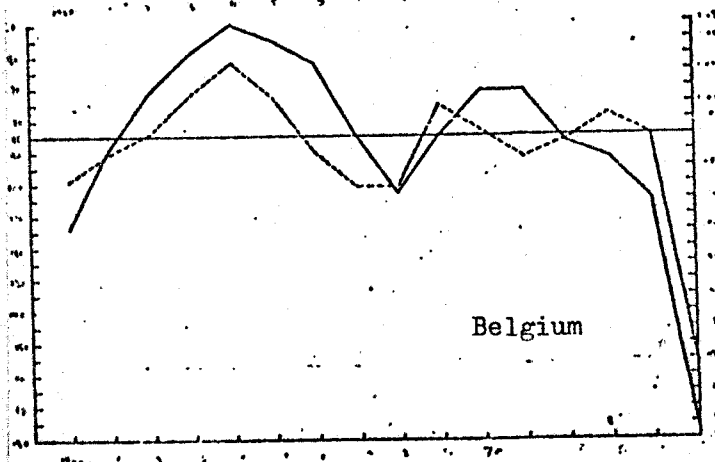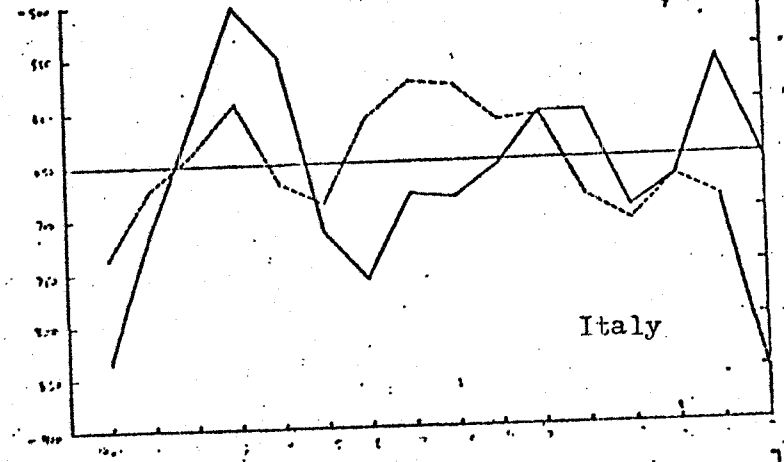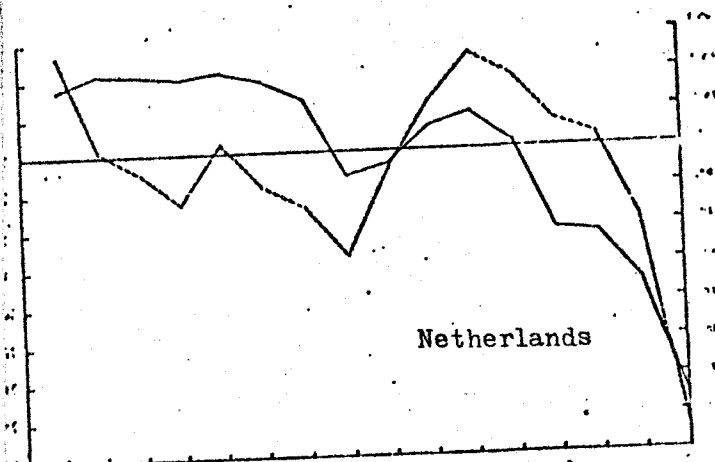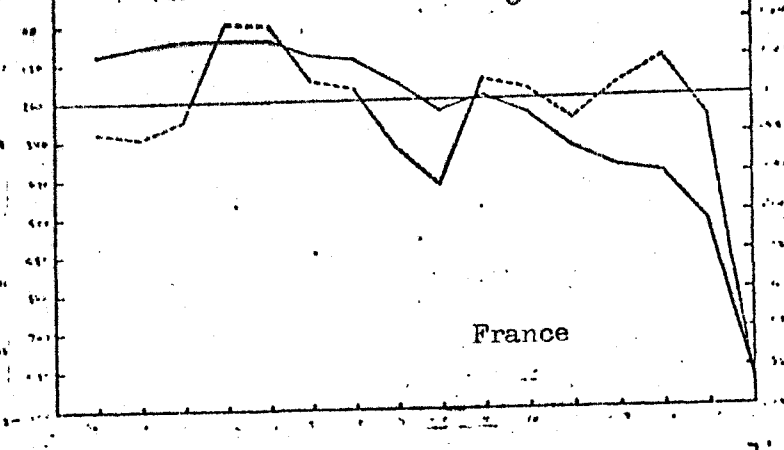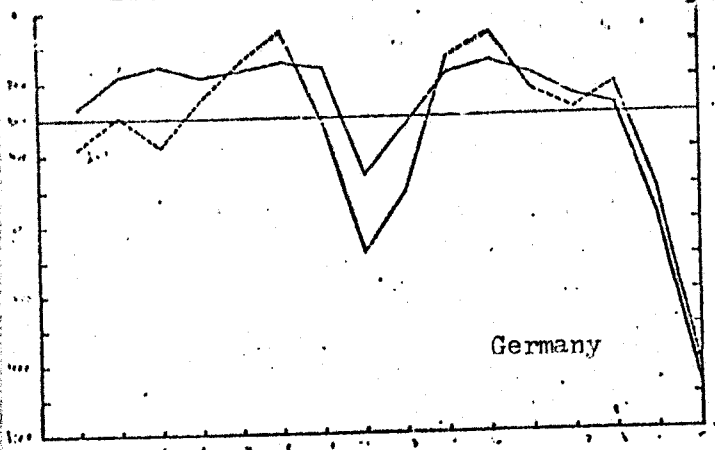
——— unemployment (on
negative scale)

- - - - deviations of industrial
production from log trend
1960-74

Luxembourg
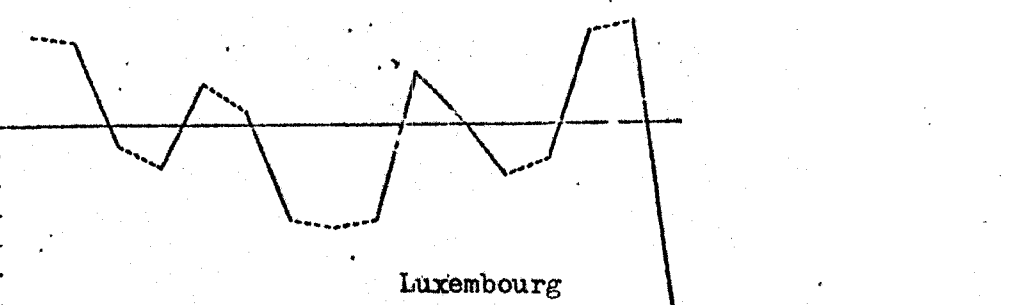
5.   It is worth noting that those countries with negative time trends for crude activity rates all have large and declining agricultural sectors; in Germany, over 10% of women employed were in agriculture in 1973, in Italy in 1973 the share is 20%, and it was over 20% in Ireland in 1971. Activity rates for Germany and Italy were recalculated excluding agricultural activity; the regressions were then rerun for these two countries. The results show some improvement with a more significant coefficient for both Germany and Italy.

6.   Only for Germany and the UK do the results show consistent results for both indicators (that is, with a negative sign on unemployment and a positive sign on deviations of industrial production about its trend); in the UK, unemployment appears to be the better indicator whereas in Germany industrial production performs better. The coefficient on unemployment is negative and significant for Italy but the coefficient on industrial production has the 'wrong' sign. Industrial production is a significant factor for Ireland and has a coefficient of the 'correct' sign for Belgium; for both countries, the coefficient on unemployment has the 'wrong' sign but is not significant. The only country for which the results are consistently 'perverse' (in the sense that the 'added worker' effect dominates) is France, but neither coefficient is significant.

Table 2 :   Regressions for pressure of demand effect on female crude activity rates
(t-ratios in parenthesis)

A. Total Crude Activity Rates

	Using unemployment as an indicator :				Using deviations of industrial production from its log trend :			
	a	$U^{(1)}$	t	R^2	a	IP	t	R^2
Germany 62-74	49.1	-0.58 (0.4)	-0.057 (1.2)	0.219	43.3	5.55 (1.4)	-0.063 (1.6)	0.331
France 68-74	41.5	0.88 (0.8)	0.555 (10.7)	0.997	43.0	-1.71 (0.9)	0.600 (33.1)	0.997
Italy 62-74	40.4	-10.45 (2.7)	-0.412 (5.6)	0.814	48.1	-13.69 (1.4)	-0.491 (5.1)	0.730
Belgium 62-74	35.4	10.08 (1.0)	0.451 (9.5)	0.953	29.2	6.60 (1.1)	0.495 (14.1)	0.954
UK 62-74	51.4	-6.62 (6.0)	0.470 (11.0)	0.927	37.2	11.94 (1.2)	0.294 (4.8)	0.710
Ireland 66-74	37.1	2.18 (0.1)	-0.301 (5.5)	0.974	33.2	3.89 (3.6)	-0.289 (26.0)	0.992
Denmark 65-74	43.5	22.52 (0.4)	1.385 (8.3)	0.964	..	..	..	..

B. Crude activity rates, excluding agricultural activity :

	a	$U^{(1)}$	t	R^2	a	IP	t	R^2
Germany 62-74	39.5	-1.09 (0.9)	0.302 (7.1)	0.856	32.2	7.12 (2.1)	0.289 (9.0)	0.893
Italy 62-74	27.0	-7.28 (3.5)	0.055 (1.4)	0.571	30.0	-7.28 (1.2)	0.009 (0.1)	0.154

(1) Coefficient X 10^3

7.   Changes in the demand for labour (as measured ex post) are shown in table 3.   In all countries except Germany and Italy, the aggregate demand for female labour increased relative to the demand for male labour.   For these countries for which we have sectoral information, this is clearly shown to be the familiar consequence of the relative expansion in public and private services (included in 'Other').   In Belgium and the UK, these increases in employment were not offset by declines in agricultural employment whereas they were only just adequate in Germany to hold female employment constant in aggregate and insufficient by over ¼ million jobs in Italy. Particularly in the UK, the changing composition of demand was highly favourable to female employment.

8.   This effect of the changing composition of demand is not however clearly reflected in relative unemployment rates, shown in table 4.   Only in the UK does the female rate of unemployment decline relative to the male rate, although it remains relatively stable in France, Ireland and (perhaps) Denmark.   In the other countries, there was a relative increase in the female rate of unemployment at some time during the late 1960's/early 1970's.   But it is highly unlikely that these relative increases could be attributed to Mincer's 'added worker' hypothesis;   if that were to be the explanation, relative increases would (given the employment changes of the last few years) have been expected between 1973 and 1975 and these are noticeably absent, except for Belgium.   A more rational explanation would be one which attributed the changes to changes in social security systems and, in particular, improved eligibility to unemployment benefits.   This, on the limited evidence collected here, seems the more plausible explanation of the observed recent changes in activity rates, with the exceptions of the UK, Irish and Danish changes.

Table 3 :   Changes in Civilian Employment, 1964-73

	Total M.	Total F.	Agriculture[1] M.	Agriculture[1] F.	Industry[1] M.	Industry[1] F.	Other[1] M.	Other[1] F.	Married women in employment
Germany									
Numbers 1973	16468	9734	912	1042	9388	3280	6168	5412	5859
Change 64-73 (thous)	-44	-51	-481	-567	-123	-46	+560	+562	+1085
(% p.a.)	0	-0.1	-4.7	-4.8	-0.1	-0.2	1.1	1.2	2.3
France[2]									
Numbers 1973	13251	7687	..	..	..	..	..	..	..
Change 68-73 (thous)	+ 449	+740	..	..	..	..	..	..	..
(% p.a.)	0.7	2.0	..	..	..	..	..	..	..
Italy									
Numbers 1973	13292	5018	2176	1016	6451	1600	4665	2402	2859
Change 64-73 (thous)	-554	-422	-1135	-609	+193	-99	+388	+286	..
(% p.a.)	-0.5	-0.9	-4.7	-5.2	0.3	-0.7	1.0	1.4	..
Belgium									
Numbers 1973	2473	1274	114	30	1225	329	1134	915	..
Change 64-73 (thous)	-7	+145	-65	-40	-138	-11	+196	+196	..
(% p.a.)	0	1.3	-5.0	-9.4	-1.2	-0.4	2.1	2.7	..
UK									
Numbers 1973	15376	9265	573	149	7930	2557	6873	6559	..
Change 64-73 (thous)	-733	+846	-276	-17	-640	-272	+183	+1135	..
(% p.a.)	-0.5	1.1	-4.4	-1.2	-0.9	-1.1	0.3	2.1	..
Ireland[3]									
Numbers 1973	762	279	..	..	..	..	..	..	..
Change 66-73 (thous)	-15	-2	..	..	..	..	..	..	..
(% p.a.)	-0.3	-0.1	..	..	..	..	..	..	..
Denmark[4]									
Numbers 1973	1404	981	..	..	..	..	..	..	647
Change 65-73 (thous)	-16	+223	..	..	..	..	..	..	+282
(% p.a.)	-0.1	3.2	..	..	..	..	..	..	7.2

Source : OECD Labour Force Statistics, 1963-74.

[1] Agriculture: ISIC 1
    Industry: ISIC 2-5
    Others: ISIC 6-0

[2] 1968-73
[3] 1966-73
[4] 1965-73

Table 4 : Rates of unemployment among men and women. 1963-75

	Germany	France	Italy	Netherlands	Belgium	UK	Ireland	Denmark
MALES								
OECD 63	0.76	..	2.39	..	1.77	2.22	..	..
65	0.62	..	3.53	..	1.74	1.35	..	1.34
66	0.67	..	3.81	..	1.86	1.32	5.31	..
68	1.40	1.66	3.23	..	2.85	2.75	6.12	..
70	0.54	1.36	2.81	..	1.57	2.90	6.75	0.75
72	0.81	1.88	3.31	..	1.96	4.18	7.36	1.03
73	0.88	1.70	2.97	..	1.76	2.99	6.76	0.69
74	1.92	1.88	2.48	..	1.71	2.87	6.50	3.48
75	3.75	3.38	2.79	..	..	4.41	..	..
CLFS 75	2.82	2.64	2.74	3.35	2.18	4.18	9.99	7.05
FEMALES								
OECD 63	0.57	..	2.68	..	1.42	1.49	..	..
65	0.42	..	3.73	..	1.48	0.81	..	0.79
66	0.46	..	4.04	..	1.54	0.69	2.77	..
68	0.93	2.81	4.14	..	2.92	0.98	3.11	..
70	0.58	2.25	3.98	..	2.28	0.90	3.12	0.65
72	1.09	2.96	4.48	..	2.59	1.43	3.47	0.82
73	1.26	2.67	4.73	..	3.12	0.98	3.46	1.11
74	2.61	2.91	3.83	..	3.62	0.85	3.44	3.65
75	4.60	5.02	4.62	..	..	1.66	..	..
LFS 75	3.17	4.30	4.95	2.89	5.43	5.23	8.87	6.58
RATIO F/M								
OECD 63	0.75	..	1.12	..	0.80	0.67	..	..
65	0.68	..	1.06	..	0.85	0.60	..	..
66	0.69	..	1.06	..	0.83	0.52	..	0.59
68	0.66	1.69	1.28	..	1.02	0.36	0.52	..
70	1.08	1.65	1.42	..	1.45	0.31	0.51	..
72	1.35	1.57	1.35	..	1.32	0.34	0.46	0.87
73	1.43	1.57	1.59	..	1.77	0.33	0.47	0.80
74	1.36	1.54	1.54	..	2.12	0.30	0.51	1.61
75	1.23	1.49	1.66	..	..	0.38	0.53	1.05
LFS 75	1.12	1.63	1.81	0.86	2.49	1.25	0.89	0.93

9.   Two sources (not yet investigated) may provide further evidence on this
question : 'First European Social Budget (1970-1975)', EEC, Brussels, Nov.
1974, and 'Reports on the Development of the Social Situation in the Community',
EEC, Brussels.   The data shown in table 4 suggests that there has been an
increased propensity to register as unemployed among women in some countries;
in Germany, the increase was between 1968 and 1972, in Italy between 1966 and
1970, and evidently throughout the late 1960's/early 1970's in Belgium.
This increased propensity is not necessarily an increase in the proportion
of 'Survey' or 'Census' unemployed who register;   it is equally possible
that women have been drawn into labour force participation, with less regard
to the pressure of demand than previously, by improved social security provisions.

10.   The evidence for systematic effects of the pressure of demand, particularly
when analysed in the conventional manner assuming simple linear time trends,
is therefore rather weak.   Not only do we have possible expansions of social
security provision but also we have declining fertility rates as a factor to
explain (non-linear) increases in activity rates independent of the pressure
of demand.   To carry out the analysis correctly, it would be necessary to
examine age specific activity rates as well as the crude rates and also to
set up tests which incorporated non-linear 'trend' changes.   But there is
evidently a case for making some adjustment to estimates for 1968 and 1975 to
bring them onto a trend basis.   The evidence is however derived from data
published by the OECD, differing from the Community Survey data to be adjusted
both because of inter country differences in definition and because the OECD
data is derived from registered labour force statistics.   But the discussion
of table 1 suggests that, for most countries, there is not too much difference
in terms of changes so that the regression results of table 2 can be used to
establish whether or not a correction should be made.

11.   Using the results of table 2, we shall make adjustments to the crude

activity rates in 1968 and 1975 as follows :

(a)   for Germany, Belgium and Ireland;   adjust for the deviation of IP

from trend.

(b)   for Italy and UK;   adjust for the deviation of unemployment from the

sample period average.

(c)   for France, Denmark and Luxemburg; no adjustment is made.

(d)   for Netherlands; adjust for the deviation of IP from trend, using the

coefficient estimated for Belgium.

Table : Adjustments[1] to crude activity rates for females, 1968 and 1975
                        (percentage points)

	1968	1975
Using Industrial Production indicator:		
Germany	+0.3 (0.28)	+1.0 (0.86)
Belgium	+0.2 (0.20)	+0.9 (0.57)
Ireland	-0.1 ( )	+0.6 ( )
Netherlands	+0.1 (0.07)	+1.0 (0.43)
Using unemployment indicator:		
Italy	+0.2 (0.19)	0 (0)
UK	+0.1 (0.08)	+2.5 (0.68) [2]

[1]   Estimates of the total adjustment, consistent with time series
        evidence for age-specific rates, are shown in parentheses.

[2]   Because of the known marked cyclical variation in the registration
        proportion among female unemployed during the 1960's, which is
        captured in OECD data on crude activity rates, the adjustment in
        1975 is much lower than required by the equation and more in line
        with corrections made for other countries.

12.   The adjustments to trend rates in both 1968 and 1975 have been made for each sex and age group. The aggregate effect on female activity rates is constrained to be of the same order of magnitude,and not more than, the effect shown in para 11 above, but the effect for each age group is assessed with regard to the trend change 1968-73 and the apparent cyclicality of the age-specific activity rate. For males, activity rates in educational age-groups (<25) and retirement age groups (>55) were assumed to be potentially cyclical : for 1968, it was assumed that the activity rates were on trend and, for 1975, an adjustment was made to bring the rates approximately into line with the trend 1968-73. Activity rates for other age groups were smoothed as follows; if no trend was apparent, the average rate observed was used as the trend rate for 1968 and 1975, but if a trend was present, this was allowed for as a displacement about the period average. The activity rates obtained from this analysis are shown in table 5.

13.   For those countries where time series evidence is not available for the 1970's (UK, Denmark and Ireland), estimates for 1968 are obtained by using the changes in the crude activity rate as an aggregate constraint and the changes in the age-specific activity rates observed in the late 1966's as an indication of the age pattern of activity rate changes 1968-75. Adjustments to trend rates are made to these estimated rates for 1968.

14.   As the results for Belgium were conflicting with significant coefficients for opposite effects, alternative projections are provided for this country on the basis of unadjusted activity rates   as well as those on the basis of these adjusted values.

Table 5 :   Estimated trend activity rates by age group in EEC countries, 1968 and 1975

A. MALES

Age group	Year	Germany	France	Italy	Nether-lands	Belgium	Luxem-burg	United Kingdom	Denmark	Ireland
15-19	1968									
	1975									
20-24	1968	84.4	84.5	79.1	83.0	73.3	79.0	93.0	82.8	91.6
	1975	77.9	82.6	66.8	73.9	73.1	80.9	89.6	76.5	91.6
25-29	1968	92.4	97.0	95.3	96.2	95.6	95.7	97.5	91.1	97.4
	1975	89.0	95.6	89.5	93.9	95.6	95.7	96.7	88.3	97.4
30-34	1968	98.0	98.6	98.0	98.8	98.1	98.8	97.8	95.0	98.3
	1975	98.0	98.6	98.0	97.4	98.1	98.8	97.8	95.0	98.3
35-39	1968	98.7	98.8	98.0	98.9	97.7	98.9	98.1	95.7	97.7
	1975	98.7	98.8	98.0	97.8	97.7	98.9	98.1	95.7	97.7
40-44	1968	98.3	97.7	97.0	98.4	96.1	97.8	97.6	95.0	97.1
	1975	98.3	97.7	97.0	97.0	96.1	98.8	97.6	95.0	97.1
45-49	1968	96.8	96.6	95.0	98.5	94.0	97.4	97.6	95.9	95.1
	1975	96.8	96.6	95.0	93.5	94.0	98.0	97.6	95.9	95.1
50-54	1968	94.2	93.5	90.0	95.6	90.3	92.8	96.3	94.6	94.6
	1975	94.2	93.5	90.0	91.0	90.3	92.8	96.3	91.8	94.6
55-59	1968	91.3	83.9	82.0	92.4	88.1	83.7	94.5	91.3	91.0
	1975	87.0	82.6	80.0	80.9	82.2	81.2	93.9	87.1	90.3
60-64	1968	80.2	65.7	50.0	83.5	73.6	54.5	87.0	85.3	81.0
	1975	63.4	57.3	43.0	66.4	59.3	52.1	84.3	77.6	81.0
65-69	1968	33.5	28.7	27.0	35.6	18.0	19.1	40.0	55.0	58.0
	1975	17.2	20.5	18.0	17.2	12.4	19.5	31.4	49.1	50.3
70+	1968	13.0	10.1	9.0	10.7	4.3	11.1	15.0	12.0	24.0
	1975	6.3	7.2	5.0	4.0	2.8	7.6	8.8	6.3	19.1

Table 5 : continued

B. FEMALES

Age group	Year	Germany	France	Italy	Netherlands	Belgium	Luxemburg	United Kingdom	Denmark	Ireland
15-19	1968									
	1975									
20-24	1968	68.6	65.1	43.2	59.4	59.7	56.8	61.0	61.5	66.5
	1975	68.5	67.0	42.8	60.4	62.4	62.5	66.3	68.5	69.5
25-29	1968	48.8	52.0	31.8	24.2	44.6	31.8	41.5	49.0	35.0
	1975	56.0	62.6	37.4	31.5	62.3	44.6	50.5	70.1	38.9
30-34	1968	40.3	44.3	28.7	14.8	36.2	23.1	42.5	44.6	21.6
	1975	49.0	56.7	31.8	22.4	51.5	30.8	52.3	65.6	24.3
35-39	1968	41.0	44.8	28.9	15.9	34.4	23.9	50.0	43.5	16.8
	1975	48.1	54.1	28.5	20.5	45.5	29.4	62.7	62.0	19.1
40-44	1968	43.6	48.7	31.1	17.5	33.2	23.9	55.0	46.7	20.3
	1975	48.6	52.9	28.5	21.7	38.1	26.3	67.4	62.1	22.6
45-49	1968	44.3	48.6	29.4	17.3	31.0	25.8	57.4	45.0	21.1
	1975	49.4	52.9	28.9	20.3	35.8	24.5	68.7	59.9	23.2
50-54	1968	42.3	48.2	25.7	16.7	27.6	24.6	53.6	41.4	21.0
	1975	46.8	50.4	24.4	17.9	29.2	24.7	66.7	53.4	23.6
55-59	1968	36.8	45.1	18.3	15.3	20.5	19.9	45.0	40.2	22.0
	1975	38.1	42.1	16.3	14.5	21.8	19.4	54.4	47.9	21.3
60-64	1968	23.9	35.0	12.7	11.1	9.1	12.1	27.0	25.7	21.0
	1975	17.8	28.3	7.4	8.9	8.8	13.3	30.9	29.2	18.6
65-69	1968	12.3	14.6	6.2	4.1	3.5	8.8	12.0	15.3	14.0
	1975	6.9	10.7	3.2	2.8	3.5	7.9	11.1	12.3	10.4
70+	1968	5.3	4.4	1.8	1.2	1.9	5.6	2.8	2.5	6.0
	1975	2.6	2.7	0.8	0.7	1.6	7.6	2.4	1.4	3.9

Traditional and Saturation levels of activity rates

The purpose of this note is to look at historical and current evidence on activity rates to provide a guide to the choice of parameters by which we can judge the stage of development in activity rate change for the different countries. For the analysis   , we require both traditional (pre-war) levels of activity rates by sex and age, and assessments of future equilibrium levels.

There is much of interest to be found in a study of activity rates since the 19th century. But it could also be argued that not much of current interest would come out of such a study. Patterns of change over periods as long as a century simply cannot be modelled, and it is doubtful if the evolution of activity rates can even be described satisfactorily. There are data, collected mainly in the course of Censuses of Population, which contain estimates of crude activity rates and industrial or occupational shares of employment. The sources of these data contain any number of strictures about intertemporal and international comparability, and yet there are many major differences between countries which can still be seen today, when (hopefully) statistical sources are more comparable.

Table 1 presents historical evidence on crude activity rates by sex in agriculture and total economic activity. For most EEC countries, it has been possible to obtain estimates for some time in the latter half of the 19th century, for the turn of the century, for the 1930's and of course for the 1960's. Apart from the differences in statistical definitions, the major problem affecting 19th and early 20th century estimates is the number of boundary changes occurring as a result of wars and other cessations and the recent unification or independence of some of the countries.

Table 1 : Historical Activity Rates[1]

	MALES				FEMALES			
GERMANY[2]	1882	1907	1933	1961	1882	1907	1933	1961
In agriculture	40.2	25.2	19.5	8.1	16.8	22.8	17.9	8.2
Other sectors	54.2	63.6	67.0	74.8	11.5	14.9	26.1	33.8
Total	94.4	88.8	86.5	82.9	28.3	37.7	44.0	42.0
FRANCE	1856	1901	1931	1962	1856	1901	1931	1962
In agriculture	40.1	39.9	29.7	16.1	16.3	18.3	19.1	7.1
Other sectors	35.6	52.2	60.6	63.4	17.0	29.5	28.2	29.1
Total	75.7	92.1	90.3	79.5	33.3	48.2	47.3	36.2
ITALY	1871	1901	1936	1961	1871	1901	1936	1961
In agriculture	62.6	61.7	44.5	22.5	33.6	29.5	15.8	7.6
Other sectors	39.7	44.2	46.4	56.8	21.7	19.9	18.3	17.2
Total	102.3	105.9	90.9	79.3	55.3	49.4	34.1	24.8
BELGIUM	1846	1900	1930	1961	1846	1900	1930	1961
In agriculture	46.9	27.3	16.4	6.3	23.1	10.8	4.5	1.1
Other sectors	40.7	72.7	73.3	67.9	26.6	29.5	26.6	24.0
Total	87.6	100.0	89.7	74.2	49.7	40.3	31.1	25.0
NETHERLANDS	1849	1899	1930	1960	1849	1899	1930	1960
In agriculture	39.8	31.5	20.2	10.2	15.0	4.7	3.9	1.0
Other sectors	49.4	60.1	69.2	71.3	19.9	20.6	23.4	21.6
Total	89.2	91.6	89.4	81.5	34.9	25.3	27.3	22.6
DENMARK	..	1901	1930	1960	..	1901	1930	1960
In agriculture	..	49.2	35.2	19.6	..	17.8	9.2	2.0
Other sectors	..	50.9	53.5	65.9	..	25.2	27.2	34.8
Total	..	100.1	88.7	85.5	..	43.0	36.4	36.8
IRELAND[3]	1861	1911	1936	1961	1861	1911	1936	1961
In agriculture	57.4	46.7	49.1	35.9	5.0	3.8	10.2	4.3
Other sectors	45.2	39.9	40.3	48.9	35.3	27.0	23.5	25.1
Total	102.6	86.6	89.4	84.8	40.3	30.8	33.7	29.4
U.K. (G.B.)	1851	1901	1931	1961	1851	1901	1931	1961
In agriculture	24.7	11.7	7.4	4.2	3.3	0.7	0.4	0.5
Other sectors	63.3	85.5	85.1	82.7	37.2	35.6	34.5	37.1
Total	88.0	97.2	92.5	86.9	40.5	36.3	34.9	37.6

Notes to Table 1

The primary source for this table is : B.R. Mitchell, 'European Historical Statistics 1750-1970', Macmillan, 1975.

(1) Activity rates are all calculated by dividing active population by total population aged 15 and over : thus, around the turn of the century, male activity rates in many countries are greater than 100% because of the numbers aged less than 15 in employment.

(2) 1882, 1907, 1933 : Germany.   1961 : West Germany (incl. W. Berlin).

For comparison :	Germany 1939	East & West Germany 1946	W. Germany 1946
In agriculture :			
males	15.8	17.9	17.7
females	17.9	14.4	13.9

(3) 1861, 1911 : Ireland.   1936, 1961, The Republic of Ireland.

For comparison :	Ireland 1911	North & South 1926	South 1926
In agriculture :			
males	46.7	46.4	52.4
females	3.8	9.2	11.8

The ranking of countries by activity rate in agriculture did not change much for either men or women over the period from 1900 to 1960; the only exception was Ireland, the country with least industrialisation. But there were marked differences between the rankings for women compared with men, both around the turn of the century and in the 1960's. Germany had an unusually high activity rate among women whilst in Ireland, and to a lesser extent Denmark and Netherlands, the activity rate was comparatively low.

For men, the pattern of change for crude activity rates is fairly similar across countries. During the 19th century, there were increases as countries industrialised but with compulsory education and earlier retirement with insurance the total activity rates have been falling during this century. The total activity rate for women has fallen in most countries as a result of the decline in agricultural participation; in no country has the increase in the 20th century been more than 5 percentage points. But even in non-agricultural sectors there has been very little increase in all countries except Germany and Denmark, with a substantial fall in Belgium.

The impression that we gain from table 1 is that there is a similar rundown in agricultural participation during this century in most countries, that the effect of this rundown on female activity rates was similar across countries, but that there has been very little systematic pattern of change in female activity rates outside agriculture. The rank correlation for total activity rates for females in 1900 and 1960 was only 0.05; when agriculture was excluded, it was still only 0.39.

The age composition of economic activity is shown in table 2; it was possible only to make a comparison between the 1930's and 1960's. Since the 1930's, nearly all of the reductions in total male activity rates can be accounted for by the increased educational participation of those under 20 (including those under 15) and the reduction in economic activity among those aged 65 and over. Among women, however, the pattern of change is somewhat different. Although there is a reduction in economic activity

of those aged 65 and over in all countries, there are offsetting tendencies

changing activity rates for the young.   Increased participation in education

is tending to reduce economic activity in most countries (as for men) but

in some countries, but by no means all, there is an increasing trend towards

economic activity evidenced by the rates for those aged 20-64.

In attempting to assess traditional and future levels of activity rates,

a number of factors must be taken into account.   These factors are discussed

separately below, both with reference to the historical perspective, the

current position and future trends :

(i) education : the impact of changes in education participation has

received much comment in the post-war period.   But, in the 1930's, it is

likely that other factors dominated the picture.   Among males, activity

rates of those aged 15-19 were in the range 70-90%;   Ireland, with a rate of

71%, was however exceptionally low.   But the case of Ireland indicates that

differences in educational systems may only be a part of the explanation;

the extent of industrialisation, and the associated urban concentration of

population, are just as important.   Activity rates of females aged 15-19

are further affected by the attitudes towards women at work, being generally

much lower than for males.[1]   Again, the rate in Ireland was relatively

low, but it was even lower in Italy;   the rates were high in developed countries

that is, in Denmark (agricultural producer) and in the UK (manufacturing).

There is some consistency in the figures - the rank correlation of activity

rate for men and women aged 15-19 in the 1900's was 0.4 - but this only implies

some common factors, not necessarily the extent of education participation.

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[1]   Although age at marriage might also be a factor, it is hardly
relevant for this age group where the highest share of married
women in the age group observed in the 1930's was only 6%.

Table 2 : <u>Activity rates by broad age group, 1930's and 1960's</u>

A. MALES

		15-19	20-64	65+		15-19	20-64	65+
Germany	1933	86.1	92.7	29.7	1961	81.3		22.3
France	1931	82.3	94.5	59.4	1962			
Italy	1931	88.2	96.3	72.6	1961	68.9		23.6
Belgium	1930	80.4	95.3	45.3	1961	50.2		9.8
Netherlands	1930	78.2	95.0	42.6	1960	63.1		19.9
Denmark	1940	85.1	95.9	3.5	1960			
Ireland	1936	71.1	95.4	67.3	1961			
U.K.(G.B.)	1931	88.3	96.7	47.9	1961			

B. FEMALES

		15-19	20-64	65+		15-19	20-64	65+
Germany	1933	63.7	44.1	13.1	1961	78.2		8.0
France	1931	58.2	49.2	23.5	1962			
Italy	1931	44.0	23.2	8.9	1961	39.3		5.1
Belgium	1930	56.0	30.4	11.0	1961	40.6		3.7
Netherlands	1930	53.7	24.5	7.5	1960	59.3		2.6
Denmark	1940	86.3	44.1	7.9	1960			
Ireland	1936	49.4	32.7	21.9	1961			
U.K. (G.B.)	1931	75.0	31.9	8.2	1961			

Estimates of activity rates in 1960 and 1975 for the age group 15-19

show, if anything, a much greater dispersion even among males.   For males

and females, we shall take the 1930's estimates as being traditional levels.

It must be borne in mind that this is somewhat unsatisfactory since subsequent

changes comprise negative changes as educational participation increases

and positive changes as industrialisation increases.   But, for males, the

first factor dominates for all countries except Ireland; that is, the

industrialisation effect was nearly complete.   For females, there is the

third element of increased opportunities for, and social acknowledgement of,

women at work.   Although the industrialisation process may be more-or-less

complete in most countries, the presence of two strong counteracting influences

means that the pattern of change in these activity rates will not be logistic

in shape.   Given that education participation is the first process to get

under way, initial changes are downwards (as shown for 1930-60) but there

will be an upward push later. [1]

Future equilibrium levels are chosen assuming that compulsory education

until 16 will be established in all countries and that the extent of further

education depends on the current political pressures on the ease of entry;

for example, entry qualification standards are likely to be more strongly

enforced in UK and Germany than in France or Italy.   Furthermore, increases

in educational participation are likely to be greater for females than for

males.

(ii) rural/urban migration :

To some extent, this factor is relevant in all countries.   Urban (or

suburban) concentration of population tends to be associated with higher

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[1]
    for example:
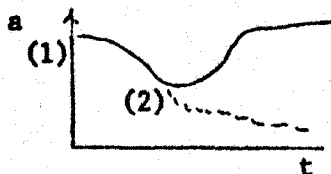
(1) beginning of increased
    educational participation.

(2) beginning of improvement in
    job opportunities for women.

female activity rates because of the greater ease of securing service jobs; rural concentration leads to lower activity (as in Italy and Ireland) as jobs in agriculture disappear. Generally high population density can also raise activity rates as it is easier for manufacturing industry to relocate its new plant, particularly if it is willing to employ women.

These factors are unlikely to have a dramatic impact in most countries. Ireland and Italy are exceptions. Rapid (eventual) industrialisation on a wider spatial scale, for example resulting from effective regional policies[1], could have a substantial impact in the long run. The urban concentration of jobs in these two countries, unless it is expected to be reduced, is likely to keep female participation rates in these countries relatively low. Rural-urban migration may take place but it is likely that the urban social infrastructure will reach capacity and effectively reduce the inflow before the migration has had much impact.

(iii) Activity rates over age 65 :

In the discussion of table 1, it was suggested that the extent of activity in agriculture was a major factor explaining activity beyond age 65. In the 1930's, the rank correlation between the two was strong for females (0.74) but less so for males (0.40). The alternative factor which is suggested as relevant is the extent of self-employment. This is plausible in the sense that this would be much more important for males and could explain the low rank correlation above for males.

Both agricultural activity and self-employment are declining. The reason for these factors being important is that they lead to continued activity beyond normal retirement age because of a personal commitment;

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[1] As in Ireland.

people own their agricultural holdings, shops and businesses, have
frequently built it up in their lifetime, and wish at least to remain
actively involved.   But agriculture holdings have increased in size as
small holdings have been absorbed (a process partly slowed up by the death rate
among the owners of smallholdings) and small shops and businesses absorbed.

The consequences of industrialisation will be very similar in most
countries so that the reasons for continued participation will diminish in
all countries and, as they have done since 1930, show some considerable
convergence.   Small differences, reflecting the relative importance of
agriculture, may persist but in general activity rates should become very similar
in all countries.

Traditionally, however, it is difficult to assert what activity levels
were appropriate.   Not only was the extent and structure of agriculture
quite different, and the extent of entrepreneurial ownership different
(that is, different stages of industrialisation) but also there were very
limited schemes for provision for retirement.   However, because of the higher
mortality rates for the age group, retirement age is regarded as a minor factor
and traditional levels are set according to past levels of agricultural activity;
in addition, the earlier the industrialisation began the larger is the effect
of small businesses assumed to be.

(iv)   Retirement ages :

As implied above, no effect has been assumed for retirement age on
activity rates for those aged over 65+, neither traditionally nor in the
future.   But there has been a considerable amount of earlier retirement in
the 1960's and 1970's.

In the UK, the establishment of the National Insurance Scheme in 1948
created a class of employees (known as late-age entrants) who opted to join
the scheme for 10 years in order to obtain a state pension;   this group
lead to a short term increase in activity rates among older people between

1948 and 1958 but had nearly all disappeared by 1963. Since then, the
increase in certain public sector occupations, for instance the police force
and firemen, has increased the amount of early retirement (these occupational
retirement ages are at around 50-55 years old) but, offsetting this, has been
reduced early retirement from the Armed Forces as these have been reduced
in total numbers. The major trend in the UK has been towards a large increase
in the number of occupational pension schemes run by private companies, many
of which have options for retirement at the age of 60.

The statistics for recent years show that the UK is significantly behind
most countries in the reduction in the retirement age. In many other
European countries, retirement ages for eligibility for state benefits have
already been reduced to somewhere between the age of 60 and 65 and, although
occupational pension schemes are rare, private insurance is proving to be
a realistic alternative.

I have assumed that a reasonable future level for the age at which
people qualify for state retirement benefits is 60 years old for males, and
uniform across country. In addition, a significant impact of early retirement
is allowed for in the age group 55-59. Whilst it is clearly possible, and
perhaps in some countries quite likely, that retirement ages will fall even
more, the implied dependency rates would lead to a public sector burden of
higher pension payments in total, and lower per capita periods of contribution,
which may well appear to be not feasible.

For whatever reason, female retirement ages are generally lower than
for males (perhaps, as suggested, due to the age difference in marriages).
However, there are two reasons for thinking that this may be eliminated, or
at least reduced.[1]   Firstly, the average age difference in marriages has
been reducing in most countries; it still exists but is now generally

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[1] This ignores the short-run pressure of excess labour supply.

significantly less than 5 years[1].   Second there is quite a strong indication

that at least a part of the increase in female participation is the result

of a return to work after child-rearing, say over age 45.   With this desired

return to work, there is not that much scope for reduced retirement age

and expecting a very strong effect on activity rates.

(v) Marriage and fertility rates :

In economies with relatively high activity rates among single women

below the age of 35, marriage frequently is associated with some departure

from the labour force; that is, the activity rates of married women without

children are lower than for single women of the same age (again less than

35 years old).   Thus higher marriage ratios, particularly among younger

age groups, would (cet.par.) be associated with lower total female activity

rates for these age groups.   Similarly fertility and family size is also

associated with lower activity rates.

Table 3 shows the activity rates in 1930's for females aged 20-64,

together with various vital statistics.   Marriage ratios (the proportion

of each age group married) do not differ markedly between the countries,

except for Ireland where they are low, reflecting the much later average

age at marriage.   These do not contribute much to the explanation, although

the late age of marriage in Ireland is perhaps an explanation of the apparently

high activity rate.   The crude birth rate and final descent fertility

(included to give an indication of family size and dependency) were relatively

high for Italy and the Netherlands, both countries in which activity rates

were low; but there are clear contradictions in other countries.

The one factor not shown in the table is the activity rate in agriculture.

There is a rank correlation coefficient between the 20-64 year olds activity

rate and agricultural activity rates of 0.51, suggesting that this may be a

major part of the explanation of differences.   On this basis, I would conclude

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[1] To estimate the effect by 1990, one would need age differences for
marriages among those born around 1930, compared say to those born
in 1910 and more recent cohorts.

Table 3 : Female activity rates, marriage ratios and fertility rates in the
1930's

	Activity rate age group 20-54	Marriage ratio age group		Fertility rates Crude birth rate (1)	Final descent fertility (2)	
		30-39	20-64	1930-34	1920	1930
Germany	44.1	72	64	16.3	1.9	2.2
France	49.2	79	(70)	17.0	2.5	2.6
Italy	23.2	75	63	24.5	2.4	2.3
Belgium	30.4	81	70	17.3	2.1	2.3
Netherlands	24.5	78	66	21.7	2.9	2.7
Denmark	44.1	79	69	18.0	..	..
Ireland	32.7	58	49	19.5	..	..
U.K.(G.B.)	31.9	74	62	15.3 [3]	2.0 [3]	2.3 [3]

[1] Source : 'European Historical Statistics, 1750-1970',
B.R. Mitchell, Macmillan, 1975.

[2] Source : 'Natalité et Politique Démographique', G. Calot, A. Girard
and H. Leridon, Institut National d'Études Démographiques,
Presses Universitaires de France, 1976.

[3] England and Wales.

that neither marriage rates nor fertility rates had much impact on activity rates in this period. Traditional levels of activity rates among women are therefore assumed to be governed by industrialisation, with the exception of Ireland, Italy and the Netherlands.

For the future, agricultural activity is assumed to play very little part in the determination of activity rates. The dominant factors are assumed to be marriage ratios and fertility rates. In 'equilibrium', the population projections will incorporate the following assumptions for final descent fertility :

	1975	Future steady state assumption
Germany	1.5	1.6
France	1.9	2.0
Italy	2.2	2.0
Belgium	1.8	1.9
Netherlands	1.7	1.8
Denmark	1.9	2.0
Ireland	3.6	2.9 [1]
UK	1.8	1.95
Luxemburg	1.5	1.7

These final descent fertility rates are all considerably lower than those observed (or constructed) for the 1920's and 1930's. On that basis, we would expect higher participation rates. But the effect of changing marriage and fertility rates differs between countries There is differential provision of creche and nursery facilities, and differential opportunities for part-time employment. In addition, for these and other reasons, there are different rates of leaving the labour force at marriage or confinement in the different countries.

In setting future levels of activity rates for women, it will be assumed that marriage ratios will converge in the future. In particularly, it is assumed that industrialisation in Ireland, by freeing the male from the need to wait for his inheritance of an agricultural holding and reducing emigration in recent years, has been associated with a falling age at marriage.

(1) in 1990 : by 2010   2.3

The effect of different fertility rates is to be included but its impact by age group within the age range 20-45 will differ across country. It is assumed that the pattern of activity rates across the main marriage and fertile age groups reflect the relative effects of different drop-out rates and child-care facilities, and that these differences will continue to exist. Beyond the age of 45, where necessary dependency ratios are low, it is assumed that the desire to return to work will (cet.par.) be the same across countries.

(vi) Other factors :

Differences in social attitudes also contribute to different levels of activity rates across country, even after allowing for other factors previously mentioned. In the case of Italy and Ireland, the Catholic religion places emphasis on the family and it appears that the main cause of low activity rates is the rate at which women leave the labour force at marriage (if they ever enter in the first place). In France, the effect of the religious ethic is by no means so apparent. It is assumed that social attitudes, in so far as they have their origins in the religious ethic, will tend to converge.

Two other factors of some importance are the nature of the social security systems and the extent of part-time working. These two are partly related; in particular, the UK system currently favours part-time employment. In the future, employee's options to opt out of the National Insurance scheme is to be removed, but the generous threshold levels for contribution liability and the maintenance of an earnings-related contribution system are likely to lead to continued incentives towards part-time employment. This is an important difference compared to other EEC countries, where the social security systems are more nearly flat-rate systems and unemployment benefits are substantial. The differential incentives to join the labour force on a full-time basis are generally assumed to vanish, except in relation to the UK and Ireland.

The 1975 Community Survey contained the following information on part-time employment, showing the percentage of thse women who worked in the reference week whose <u>main</u> occupation was part-time :

Germany	France	Italy	Belg.	Neth.	Lux.	UK.	Denmark	Ireland
22.8	14.0	9.9	18.6	11.6	15.4	40.9	40.3	9.9

It is assumed that (cet.par.) the UK and Denmark will have higher activity rates, measured in terms of persons, than the other countries, for whom differences are not regarded as significant, particularly as regards the age of return to work.

The only remaining group for which no discussion has been offered is the prime age group for males. Historically, activity rates in this age group have been remarkably stable, with the sole exception of the Netherlands in recent years. The explanation of the change in the Netherlands appears to be recent legislation permitting substantial benefits in cases of declared 'unfitness for work'. If this is the case, then this is a once and for all effect, but one which might be expected to occur in other countries. The residual (inactive) category has historically comprised the institution-alised population, those in prison, mental homes and the long-term sick and disabled. Because of the experience in the Netherlands, some lowering of activity rates in these age groups (particularly the older ones) is considered likely at some time in the future, although the reductions are only likely to be very small.

Table 4 contains estimates of traditional and saturation levels for cach sex and age group. For males, the main differences arise because of differences in education systems and differences in the effect of agriculture and small businesses. For females, the major factor discriminating between countries is the fertility rate and the pattern of return to work; traditional levels, however, are also influenced by agricultural activity and social attitudes.

As noted at the beginning of this working paper, much of the value
of the historical data on activity rates rests on the international comparability
of national census definitions. Some of the specific notes on data sources
suggest that definitions have been quite wide in some countries, particularly
as regards family work in agriculture. It is however not only the statistical
definitions themselves which can give rise to differences. The stage of
economic development, particularly the rural/urban concentration of population
and the extent of agricultural small-holding in subsistence agriculture,
will necessarily give rise to differences between countries in the nature
of responses to similar questions. Because of these factors, the estimates
in table 4 for traditional levels (and to a lesser extent for saturation
levels) show a greater degree of international uniformity than actual activity
rates might suggest.

The extent to which these assumed levels are an important determinant
of the actual projections is investigated separately in Annex 7, where it is
shown that in general more precision in these estimates would improve
the projections but that the parameter estimates are crucial when processes
are either very young or very old.

Table 4 : Traditional and Saturation levels of activity rates

A. MALES

		Germany	France	Italy	Netherlands	Belgium	Luxembourg	United Kingdom	Denmark	Irela
15-19	Trad	86.0	82.0	88.0	78.0	80.0	80.0	88.0	85.0	75.0
	Sat									
20-24	Trad	90.0	88.0	94.0	90.0	90.0	90.0	92.0	89.0	90.0
	Sat	75.0	70.0	60.0	70.0	72.5	80.0	85.0	70.0	85.0
25-29	Trad	98.0	98.0	98.0	98.0	98.0	98.0	98.0	95.0	98.0
	Sat	85.0	90.0	85.0	90.0	95.0	95.0	95.0	85.0	95.0
30-34	Trad	98.0	98.6	98.0	98.8	98.1	98.8	97.8	95.0	98.3
	Sat	98.0	98.6	98.0	96.8	98.1	98.8	97.8	95.0	98.3
35-39	Trad	98.7	98.8	98.0	98.9	97.7	98.9	98.1	95.7	97.7
	Sat	98.7	98.8	98.0	96.9	97.7	98.9	98.1	95.7	97.7
40-44	Trad	98.3	97.7	97.0	98.4	96.1	98.8	97.6	95.0	97.1
	Sat	98.3	97.7	97.0	96.4	96.1	98.8	97.6	95.0	97.1
45-49	Trad	96.8	96.6	95.0	98.5	94.0	98.0	97.6	95.9	95.1
	Sat	96.8	96.6	95.0	90.0	94.0	98.0	97.6	95.9	95.1
50-54	Trad	94.2	93.5	90.0	95.6	90.3	92.8	96.3	94.6	94.6
	Sat	94.2	93.5	90.0	90.0	90.3	92.8	96.3	90.0	94.6
55-59	Trad	94.0	94.0	93.0	95.0	90.0	92.0	95.0	93.0	93.0
	Sat	80.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0
60-64	Trad	90.0	90.0	90.0	90.0	90.0	90.0	90.0	90.0	90.0
	Sat	30.0	30.0	30.0	30.0	25.0	25.0	30.0	40.0	40.0
65+	Trad	60.0	60.0	80.0	60.0	65.0	65.0	60.0	70.0	75.0
	Sat	8.0	7.5	7.5	7.0	7.0	7.0	8.0	8.0	8.0

Table 4 : <u>Traditional and Saturation levels of activity rates</u>

B. FEMALES

		Germany	France	Italy	Nether-lands	Belgium	Luxem-bourg	United Kingdom	Denmark	Ireland
15-19	Trad	50.0	50.0	30.0	40.0	40.0	40.0	50.0	40.0	30.0
	Sat									
20-24	Trad	45.0	45.0	25.0	35.0	35.0	35.0	45.0	35.0	35.0
	Sat	75.0	75.0	70.0	70.0	70.0	70.0	75.0	75.0	70.0
25-29	Trad	40.0	40.0	20.0	22.5	30.0	27.5	35.0	30.0	25.0
	Sat	65.0	65.0	60.0	60.0	65.0	65.0	72.5	72.5	50.0
30-34	Trad	30.0	30.0	15.0	12.5	25.0	20.0	30.0	25.0	17.5
	Sat	60.0	60.0	50.0	55.0	60.0	60.0	70.0	70.0	40.0
35-39	Trad	30.0	30.0	15.0	15.0	25.0	20.0	30.0	25.0	15.0
	Sat	60.0	60.0	50.0	55.0	60.0	60.0	67.5	67.5	40.0
40-44	Trad	35.0	35.0	25.0	15.0	25.0	20.0	35.0	30.0	20.0
	Sat	65.0	65.0	60.0	65.0	65.0	65.0	70.0	70.0	50.0
45-49	Trad	35.0	35.0	25.0	15.0	25.0	22.5	35.0	30.0	20.0
	Sat	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0
50-54	Trad	35.0	35.0	25.0	15.0	22.5	22.5	35.0	30.0	20.0
	Sat	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0
55-59	Trad	30.0	30.0	20.0	15.0	20.0	20.0	30.0	25.0	20.0
	Sat	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0
60-64	Trad	25.0	25.0	20.0	15.0	15.0	12.5	25.0	22.5	20.0
	Sat	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
65+	Trad	20.0	20.0	20.0	15.0	15.0	10.0	20.0	20.0	20.0
	Sat	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0

A N N E X 4

The maturity of the processes of change in activity rates,
and likely future changes

The parameter which describes the maturity of the process for logistic
specification is given

$$S = \ln \frac{a_t - \alpha}{\beta - a_t}$$

where S is an indicator of the maturity of the process, β is the saturation
level, α the traditional level and a_t is the activity rate at time t.

Using the typical process observed for female activity rates, with a saturation
level of 70% and a traditional level of 20%, we show the correspondence between
the stage of development reached (s) and the actual activity rate (a):

s	a	s	a	s	a	s	a
-10	20.00	-4	20.90	0.5	51.12	5	69.67
-8	20.02	-3	22.37	1	56.55	6	69.88
-7	20.05	-2	25.96	2	64.04	7	69.95
-6	20.12	-1	33.45	3	67.63	8	69.98
-5	20.33	-0.5	38.88	4	69.10	10	70.00
		0	45.00				

The range of s is technically $+\alpha$ to $-\infty$ but in practical terms it is much
smaller; (i) to two decimal places, it is $\pm$ 10 whilst (ii), to one decimal place,
it is $\pm$ 7, and (iii), if we look in terms of significant changes in activity
rates (say of 0.1 points per year), then the range is $\pm$ 5. The observed rates of
development cluster around 0.005, 0.1, 0.2 and have a maximum of 0.28 per year
so that the periods of time spanned by the processes, using the narrowest
definition with a range of $\pm$ 5, will be as shown below:

Rate of development (p.a.)	Period of process (years)
0.05	200
0.10	100
0.20	50
0.28	36

Combining the traditional and saturation levels (α, β respectively) specified
in Annex 3 with the"trend" levels of activity rates in 1968 and 1975 in Annex 2,

we can obtain estimates of the maturity of the process in 1968 and 1975.
For prime age males ages (30-54), activity rates have historically been fairly
stable. These age groups are therefore not considered here. Estimates of the
parameter for 1975 in the other age/sex groups for each country are shown in
table 1.

The age groups are classed together in table 1 according the basic principle
which determined their dominant process and saturation levels; these were

Males:	15-29	Education participation
	55 +	Retirement

Females:	15-19	Education participation
	20-24	Education participation/marriage
	25-39	Fertility and child care
	40-59	Return to work
	60+	Retirement/agricultural activity

Table 1 : Parameters describing the maturity of processes in 1975 for each country (1)

MALES	D	F	I	NL	B	LUX	UK	D	IRL
age group									
15-19									
20-24	1.43	-0.85	1.39	1.42	3.34	3.06	-0.65	0.65	− ∿
25-29	0.81	-0.85	0.64	0.27	1.39	1.19	-0.27	0.71	-1.39
(2)									
55-59	0	1.48	+ ∿	2.75	1.27	2.20	-2.54	-0.19	-1.34
60-64	-0.23	0.18	1.29	-0.43	-0.11	0.34	-2.25	-1.10	-1.52
65+	2.94	2.34	3.21	3.24	+ ∿	2.26	1.39	1.18	0.62
FEMALES									
15-19									
20-24	1.29	1.01	-0.42	0.97	1.28	1.30	0.90	1.64	4.23
25-29	0.58	2.24	-0.26	-1.15	2.48	-0.18	-0.35	2.82	0.22
30-34	0.55	2.09	-0.08	-1.19	1.14	-0.99	0.23	2.22	-0.84
35-39	0.42	1.41	-0.47	-1.84	0.35	-1.18	1.92	1.91	-1.63
40-44	-0.19	0.39	-2.20	-1.87	-0.72	-1.82	1.45	1.40	-2.36
45-49	-0.36	0.05	-2.36	-2.24	-1.15	-3.12	3.26	1.09	-2.68
50-54	-0.87	-0.47	− ∿	-2.98	-1.92	-3.13	1.34	0.08	-2.66
55-59	-0.99	-0.39	− ∿	− ∿	-3.06	− ∿	1.47	0.64	-3.39
60-64 (3)									
65+	1.60	1.29	3.26	3.30	2.28	-1.07	1.20	1.32	1.00

Notes (1) The parameter is positive if the process is more than half completed; its sign is independent of whether the process will increase or decrease activity rates . − means the process has not started; + denotes that it is complete

(2) The recent statutory conditions on unfitness to work in the Netherlands means that, technically speaking, there are values for this country in the age range 30-54. They are however omitted as it is expected to be a relatively short process (see note '4')

(3) The conflict of increased return-to-work, earlier retirement and reduced agricultural activity make this age group unmanageable at present.

(4) The parameters for the Netherlands, for a process which began only 4 years ago are given here for age groups 30-54, the same process is assumed to affect age groups 55+ and hence the estimates shown in the table are in brackets

30-34   0.85

35-39   0.20

40-44   0.85

45-50   0.36

50-54   1.53

Because traditional and saturation levels generally vary less between countries than do observed activity rates (1), the parameter s may reflect activity rate differentials between countries; but, in so far as there are persistent reasons for differences, those differentials are smaller than actual differentials. The broad pattern which emerges for educational participation is that it can be expected to increase most rapidly in France, UK and Ireland but very little in Belgium and Luxembourg. Male retirement rates are already high in the original 6 member countries,all are much lower for the 3 new member countries; some convergence may be expected.

Among females aged 25-39, Denmark has activity rates relatively near to "saturation" levels but Italy, Netherlands, Luxembourg and Ireland have substantial potential increases in activity rates in this group. The return to work pattern is markedly different as between UK and Denmark compared with the other 7 countries. This undoubtedly relates to the substantially more important degree of (main occupation) part-time working in the two countries. Noticeably left behind are

the four countries identified as late starters in age group 25–39, Italy,

Netherlands, Luxembourg and Ireland. For 3 out of the 4 countries, the crucial

factor is undoubted¹ythe rate of departure from the labour force at marriage

and the fact that subsequent return to work is minimal.

Retirement and agricultural activity are both acting to reduce the

female activity rate for those aged over 65. In most countries, the process

is well advanced, with the surprising exception of Luxembourg (1).

By comparing parameters for 1968 and 1975, we can deduce the

implied slope factor of each process, that is,

given

$$S = \lambda + \mu t$$

$$s(1975) - s(1968) = 7\mu$$

The estimates of μ, the parameter which describes the rate at which the process

is taking place, are shown in table 2.

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(1) This may indicate too low a traditional level chosen for this country :

see annex (3) table 4

Table 2 : Annual rates of change in the parameters, 1968-75[1]

MALES	D	F	I	NL	B	LUX	UK	D	IRL
age group									
15-19									
20-24	0.28	0.08	0.23	0.29	0.04	0	+	0.20	0
25-29	0.16	0.13	0.28	0.22	0	0	0.19	0.17	0
55-59	0.20	0.08	+	(0.62)	0.39	0.20	0.12	0.24	0.05
60-64	0.20	0.08	0.09	(0.24)	0.14	0.02	0.10	0.17	0
65+	0.26	0.12	0.18	0.28	+	0.05	0.10	0.07	0.05
FEMALES									
15-19									
20-24	0	0.04	0	0.02	0.06	0.11	0.04	0.14	0.29
25-29	0.17	0.31	0.09	0.27	0.40	0.27	0.17	0.43	0.09
30-34	0.17	0.31	0.05	0.24	0.27	0.21	0.15	0.35	0.09
35-39	0.14	0.21	0	0.28	0.19	0.15	0.26	0.31	0.13
40-44	0.11	0.08	–	0.15	0.09	0.08	0.17	0.25	0.32
45-49	0.09	0.07	–	0.13	0.10	–	0.38	0.23	0.16
50-54	0.09	0.03	0	0.08	0.04	0.01	0.21	0.17	0.19
55-59	0.03	–	0	0	0.19	0	0.21	0.13	–
60-64									
65+	0.15	0.09	0.19	0.15	0.02	–	0.02	0.07	0.09

Notes (1) a "+" indicates a change from the traditional level, which cannot be quantified since the 1968 estimate of ᵇ is - ∞ A "-" indicates a "perverse" change, in that acutal activity rates changed in the opposite direction that implied by the process.

There is a remarkable degree of uniformity in these changes. For males, the uniformity is within country rather than across age groups, with rates of change being relatively slow in France and practically absent in Ireland. Rates of change are fastest in Netherlands, Germany and Denmark. But the pattern of change for females is quite different. The uniformity is marked by age group, although there persists some uniformity by country. The counterbalancing effects of increased education and more flexible employment policy towards women show up in the very small trends for age group 20-24. The increased participation among those aged 25-29 is taking place rapidly in all countries except Italy and Ireland (where fertility rates, although lower than previously, have remained high). Among those aged 40-59, rates of change are quite slow in most countries (being totally absent in Italy) but the expansion of part-time employment in the UK and Denmark has led to rapid change as has the success of regional policy in Ireland. For those aged over 65, the change is quite slow.

These changes in the processes are not the same as changes in activity rates. For example, a higher rate of change in table 2 for a particular country does not mean that activity rates in that country are necessarily changing faster than in other countries, either in absolute or relative terms.

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For any rate of change in the process, the implied change in activity rates will depend on the stage of maturity of the process; if the process is more than half complete $(S > 0)$, then the rate of change in activity rates for a constant change in S will be slowing down. Thus expectations of future changes in activity rates have to be judged by reference $_{to}$ the level and change in the parameter(s) describing the maturity of the process.

We now turn our attention to expected future changes in the parameter S. At the beginning of this section, it was indicated that in a pure process the parameter $S = \lambda + \mu t$ and that μ would remain constant throughout the process. But we have already seen in table 2 that there is some mixture of processes currently underway. In a mixed process, we would have (as an approximation) :

$$S = \lambda_1 + \lambda_2 + \mu_1 t + \mu_2 (t + \pi)$$

where subscripts $_1$ and 2 refer to two processes, with process 2 beginning π periods after process 1.

Hence

$$S = (\lambda_1 + \lambda_2 + \mu_2 \pi) + (\mu_1 + \mu_2) t$$

But this means that we have ignored the impurities of the process which depend on the relative magnitudes of μ_1 and μ_2. Effectively, the actual trend in S is a weighted average of μ_1 and μ_2, with the weights changing through time. Thus, in discussing future changes in S, we should allow for changes in the trend of S due to the changing importance of the different processes.

In table 3, we show the assumptions about future movements in the parameter S; these are shown as changes of five year periods and, unless indicated otherwise, apply for the whole period 1975-95. In the educational age groups, past trends in S are expected to continue for the next 5 years for males and the next 10 years for women but, after that period (1980 for males, 1985 for females), another process, that of increasing capacity constraints, will reduce the average trend in S.

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Table 3 : Expected future changes in the parameter S

(change over 5 year period)

Age Group	Period	D	F	I	NL	B	LUX	UK	D	IRL
Males										
15-29	1975-80	1.10	0.50	1.25	1.25	0.10	0	1.00	0.90	1.00
	1980-95	0.50	0.25	0.60	0.60	0	0	0.50	0.45	1.00
55-65+	1975-95	1.10	0.45	0.65	1;00	1.25	0.50	0.55	0.75	0.75
Females										
15-19	1975-85									
	1985-95									
20-24	1975-85	0.25	0.40	0.25	0.35	0.40	0.25	0.25	0.50	0.25
	1985-95	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
25-39	1975-95	0.80	1.40	1.00	1.30	1.45	1.05	0.95	1.30	1.00
40-59	1975-85	0.40	0.30	0.50	0.50	0.50	0.25	1.25	1.00	1.10
	1985-95	0.80	0.60	1.00	1.00	1.00	0.50	1.25	1.00	1.10
65+	1975-95	0.75	0.50	1.00	0.75	0.10	0.10	0.10	0.35	0.50

In retirement age groups, the pattern of change in S is expected to continue; for males, the average trend is quite rapid because of the impact of early retirement measures but, for females, where the trend depends more on the extent of agricultural activity, the trends are much slower.

Among females, three age groups have been distinguished; in the group aged 20-24, where reduced fertility has a positive effect and increased education a negative one, the next ten years is expected to show a somewhat higher trend value as reduced fertility takes effect and this trend is expected to increase further after 1985 when the demand pressure on the trend induced by increased education is reduced. Age groups 25-39 have three factors operating on the trend; reduced fertility, smaller famil size and earlier return to work. This trend is therefore expected to continue throughout the period. For the age group 40-59, earlier return to work is likely to become a significant factor in determining the trend change in the parameter. However, changes in social attitudes are reflected more slowly in demand for female labour than the response in terms of supply of that labour. Hence the trend is expected to increase in the second decade.

Ireland and Italy present particular difficulties in this analysis since in those countries some processes have apparently yet to become significant. In Italy, it is necessary to suggest a time when the process of

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increased participation will get underway; it is assumed that this occurs during the next five years but the effect on activity rates (because the trend change in S is small) should not be dramatic in the initial stages. In Ireland, education as a result of regional development is expected to become significant in the next 5 years.

The following tables contain estimates of the maturity of the processes for each sex/age group for each country in 1980, 1985, 1990 and 1995; there is a separate table of estimates for each year which can be compared to the estimates for 1975 shown in table 1.

Table 4 : Future estimates of the maturity of the processes 1980

Age group	D	F	I	NL	B	LUX	UK	D	IRL
Males									
15-19									
20-24	2.53	-0.35	2.64	2.67	3.44	3.06	0.35	1.55	(-3.00)
25-29	1.91	-0.35	1.89	1.52	1.49	1.19	0.73	1.61	-0.39
55-59	1.10	1.93	+∞	3.75	2.52	2.70	-1.99	0.56	-0.59
60-64	0.87	0.63	1.94	0.57	1.14	0.84	-1.70	-0.35	-0.77
65+	4.04	2.79	3.86	4.24	+∞	2.76	1.94	1.93	1.37
Females									
15-19									
20-24	1.54	1.41	-0.17	1.32	1.68	1.55	1.15	2.14	4.48
25-29	1.38	3.64	0.74	0.15	3.93	0.87	0.60	4.62	1.22
30-34	1.35	3.49	0.92	0.11	2.59	0.06	1.18	4.02	0.16
35-39	1.22	2.82	0.53	-0.54	1.80	-0.13	2.87	3.71	-0.63
40-44	0.21	0.69	-1.70	-1.37	-0.22	-1.57	2.70	2.40	-1.26
45-49	0.04	0.35	-1.86	-1.74	-0.65	-2.87	4.51	2.09	-1.58
50-54	-0.47	-0.17	-3.50	-2.48	-1.42	-2.88	2.59	1.08	-1.56
55-59	-0.59	-0.09	-3.50	-3.50	-2.56	-3.75	2.72	1.64	-2.29
65+	2.35	1;79	4.26	4.05	2.38	-0.97	1.30	1.67	1.50

For each of the sex and age groups analysed , we can construct a table showing the period of the process implied by the rate of development 1968-75, the time elapsed since the process began to generate significant changes and the date by which 90% of the process would be completed (i.e. when s=4.0).

Sex/age group	Implied Period of process (years)	Stage in 1975 Period elapsed (years)	Proportion (%)	Proportion completed by 1995 [1] (%)	Date by which 90% complete [1] [2]	Years from 1975
GERMANY						
Males 20–24	36	29	64	90	1995	20
25–29	62	26	58	84	2001	26
55–59	50	23	50	94	1993	18
60–64	50	22	48	92	1994	19
65+	38	36	79	100	1985	10
Females 25–29	59	35	56	88	1996	21
30–34	59	35	56	88	1996	21
35–39	71	34	54	86	1998	23
40–44	91	60	48	72	2006	31
45–49	111	58	46	70	2007	32
50–54	111	52	41	65	2011	36
55–59	333	50	40	64	2011	36
65+	67	44	66	96	1991	16
FRANCE						
Males 20–24	125	52	42	54	2067	92
25–29	77	32	42	54	2067	92
55–59	125	81	65	83	2003	28
60–64	125	65	52	70	2017	42
65+	83	61	73	91	1993	18
Females 25–29	32	23	72	100	1981	6
30–34	32	23	71	100	1982	7
35–39	48	31	64	100	1984	9
40–44	1?5	67	54	72	2010	35
45–49	143	72	50	68	2013	38
50–54	333	151	45	63	2017	42
55–59	..	..	46	64	2017	42
65+	111	70	63	83	2002	27

(1) because the rate of development is assumed to vary for some groups, these columns are not directly comparable with the first three which use the estimated rate of development for 1968–75.

(2) when the process is 90% complete, the activity rates change by less than 1 point in 4 years even for the widest range (20–70%) and the fastest rate of development (0.3 per year).

Sex/age group		Implied Period of process (years)	Stage in 1975		Proportion completed by 1995 (1) (%)	Date by which 90% complete (1) (2)	Years from 1975
			Period elapsed (years)	Proportion (%)			
ITALY							
Males	20-24	44	28	64	100	1986	11
	25-29	36	20	56	87	1992	17
	55-59	..	..	100	100	..	0
	60-64	111	70	63	89	1996	21
	65+	56	46	82	100	1981	6
Females	25-29	111	53	47	87	1996	21
	30-34	200	98	49	89	1995	20
	35-39	..	..	45	85	1997	22
	40-44	..	..	28	58	2011	36
	45-49	..	..	26	56	2012	37
	50-54	..	..	0	40	2020	45
	55-59	..	..	0	40	2020	45
	65+	53	43	83	100	1979	4
NETHERLANDS							
Males	20-24	34	22	64	95	1991	16
	25-29	46	24	46	83	2001	26
	55-59	16	12	78	100	1981	6
	60-64	42	19	46	86	1997	22
	65+	36	29	82	100	1979	4
Females	25-29	37	14	38	90	1995	20
	30-34	42	16	38	90	1995	20
	35-39	36	11	32	84	1997	22
	40-44	67	21	31	61	2009	34
	45-49	77	21	28	58	2011	36
	50-54	125	25	20	50	2015	40
	55-59	..	..	0	40	2020	45
	65+	67	55	83	100	1980	5
BELGIUM							
Males	20-24	250	208	83	86	2036	61
	25-29	..	..	64	66	2231	56
	55-59	26	16	63	100	1986	11
	60-64	71	35	49	100	1991	16
	65+	..	..	100	100	..	0

Sex/age group	Implied Period of process (years)	Stage in 1975		Proportion completed by 1995 (1) (%)	Date by which 90% complete (1) (2)	Years from 1975
		Period elapsed (years)	Proportion (%)			
BELGIUM						
Females 25-29	25	19	75	100	1980	5
30-34	37	23	61	100	1985	10
35-39	53	28	54	100	1988	13
40-44	111	48	43	82	1999	24
45-49	100	38	38	78	2001	26
50-54	250	77	31	70	2005	30
55-59	53	10	19	59	2011	36
65+	500	364	73	77	2061	86
LUXEMBOURG						
Males 20-24	..	..	81	83	2029	54
25-29	..	..	62	64	2123	148
55-59	50	36	72	92	1993	18
60-64	500	267	53	75	2010	35
65+	200	145	73	93	1992	17
Females 25-29	37	18	49	90	1995	20
30-34	48	19	40	82	1999	24
35-39	67	25	38	80	2000	25
40-44	125	40	32	47	2048	73
45-49	..	..	19	34	2061	86
50-54	..	..	19	34	2061	86
55-59	..	..	0	25	2070	95
65+	..	..	39	43	2278	303
U.K.						
Males 20-24	..	..	44	68	2017	42
25-29	53	25	47	72	2013	38
55-59	83	20	25	47	2044	69
60-64	100	28	28	50	2041	66
65+	100	64	64	86	1999	24
Females 25-29	59	27	46	84	1998	23
30-34	67	35	52	90	1995	20
35-39	38	27	69	100	1986	11
40-44	59	38	64	100	1985	10
45-49	26	22	83	100	1978	3
50-54	46	30	63	100	1986	11
55-59	48	31	65	100	1985	10
65+	500	310	62	66	2115	140

Sex/age group		Implied Period of process (years)	Stage in 1975		Proportion completed by 1995 (1) (%)	Date by which 90% complete (1)(2)	Years from 1975
			Period elapsed (years)	Proportion (%)			
DENMARK							
Males	20-24	50	28	56	79	2007	32
	25-29	59	34	57	80	2007	32
	55-59	42	20	48	78	2003	28
	60-64	59	23	39	69	2009	34
	65+	143	88	62	92	1994	19
Females	25-29	23	18	78	100	1978	3
	30-34	29	21	72	100	1980	5
	35-39	32	22	69	100	1981	6
	40-44	40	26	64	100	1988	13
	45-49	44	26	61	100	1990	15
	50-54	59	30	51	91	1995	20
	55-59	77	43	56	96	1992	17
	65+	143	90	63	77	2013	38
IRELAND							
Males	20-24	..	0	0	50	2020	45
	25-29	..	..	36	76	2002	27
	55-59	200	73	37	67	2011	36
	60-64	..	..	35	65	2012	37
	65+	200	112	56	86	1998	23
Females	25-29	111	58	52	92	1994	19
	30-34	111	46	42	82	1999	24
	35-39	77	26	34	74	2003	28
	40-44	31	8	26	70	2004	29
	45-49	62	14	23	67	2005	30
	50-54	53	12	23	67	2005	30
	55-59	..	..	16	60	2009	34
	65+	111	67	60	80	2005	30

ANNEX 5

A note on activity rates in the age group 15-19

Persons of the age group 15-19 are generally either in the labour force or in education. However, there is a significant male minority in some countries who are not classified to either and, among females, there is a greater inactive population as a result of young girls remaining at home with their parents or as a result of leaving the active population at marriage. Table 1 shows the proportions of the population not classified or in the labour force or in education in 1968, 1973 and 1975 in each country.

The two activities, the labour force and education, appear to account for nearly all of the male population in each country, the lowest coverage being 97 1/2% in Germany. The estimates for males of the residual proportion seem reasonably stable as between 1973 and 1975. For females, the coverage is somewhat lower, being around 96% in most countries. However, the coverage in Italy is markedly lower with only 83 1/2% covered in 1975. This coverage has increased over the period of the Community surveys and, although in part may be due to refinements in the survey, is almost certainly not just a statistical artifact. In most countries, the coverage increased between 1973 and 1975 and it is possible that it may do so further in the future.

It is worth considering Italy in more detail. Table 2 provides

Table 1 : Proportion of the population aged 15-19 not classified or in the labour force or in education in 1968, 1973 and 1975

	D	F	I	NL	B	LUX	UK	IRL	DK
Males									
1968	(-1.8)[1]	1.7	1.2	0.6	4.1				
1973	2.6	1.4	1.9	0.6	0.7	0.4	1.9		
1975	2.5	1.7	2.0	0.7	0.6	0.4	1.7	0.9	1.4[2]
Females									
1968	(-3.6)[1]	5.8	26.7	7.4	5.8				
1973	4.6	3.8	19.5	4.6	5.0	4.5	6.3		
1975	4.7	4.1	16.6	3.9	3.8	2.5	4.5	3.6	2.3[2]

(1) Results of the Mikrozensus : the labour force plus students sums to more than the population base

(2) These have been adjusted because of an apparent underrecording of students aged 15

Table 2 : Proportion of Italian females aged 15-19 not classified or in the in the labour or education, by 1-year age group

	15	16	17	18	19
1968	22.6	21.9	26.1	29.0	33.2
1969	21.6	23.6	24.7	27.2	28.7
1970	20.5	20.9	25.3	26.8	28.6
1971	18.6	19.0	23.8	25.9	29.0
1973	14.2	16.9	19.4	23.7	23.3
1975	9.8	13.6	16.8	20.0	23.8

Table 3 : Changes 1968-75 in labour force, education and "not classified" for Italian females of each age 15-19

Change	15	16	17	18	19
Labour force activity rate	-13.6	-14.9	-13.2	-12.8	- 8.1
Education participation	+26.4	+23.2	+22.5	+21.8	+17.6
Not classified	-12.8	- 8.3	- 9.3	- 9.0	- 9.5

the same information as shown in table 1 for Italian females, but classified

by 1-year age group. The improvement in coverage over the period has been

marked for all ages, but greatest in recent years for those aged 15. But

it can be seen from Table 3 that the explanation of the increased coverage

is a dramatic increase in participation rates in education, ranging from

26% among 15 years old to 18% for 19 year olds, over the period 1968-1975.

Both labour force activity rates and persons"not classified" have decreased.

Thus the increased coverage is not the result of increased labour force

activity in rural or urban areas. As for persons "not classified" (see table

2), the big declines in activity rates occurred between 1970 and 1975, marking

the period of major educational expansion in the first 5 years of .. this decade.

Table 4 shows a similar analysis of changes to that shown in

table 3, but relates to the three other countries for which the necessary

data are available [1]. The estimates for France show the impact of raising

the minimum age for leaving compulsory education to 16, in so far as the

educational system continued to offer 2 years of further schooling , activity

rates in age groups 17 and 18 were also affected. In the Netherlands, the

increases in education have been as large as in Italy, with absorption of

females "not classified" into one or other activity. In Belgium, the increases

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(1) Germany is excluded as the Mikrozensus double- counts labour force activity
   and education participation.

have been much more modest, except in the age group 19 where the increase has
been relatively rapid for both males and females when compared to changes
in other countries.

Table 4 : Changes 1968-75 in labour force, education and 'not classified'
in France, Netherlands and Belgium.

	Males					Females				
	15	16	17	18	19	15	16	17	18	19
FRANCE										
Change in LFAR	-11.2	-32.6	-14.3	-14.2	- 7.8	- 5.0	-21.2	-12.9	-10.1	- 3.9
Ed. Part.	+11.9	+43.4	+14.0	+14.4	+ 6.6	+ 6.7	+24.0	+12.6	+11.5	+ 5.7
Not Class.	- 0.7	-10.8	+ 0.3	- 0.2	+ 1.2	- 1.7	- 2.8	+ 0.3	- 1.4	- 1.8
NETHERLANDS										
LFAR	- 4.8	-16.3	-20.9	-21.9	-20.3	- 7.7	-20.2	-19.4	-15.5	- 4.5
Ed. Part.	+ 4.8	+16.2	+20.2	+21.8	+20.6	+12.2	+23.3	+23.7	+17.4	+ 8.4
Not Class.	0	+ 0.1	+ 0.7	+ 0.1	- 0.3	- 4.5	- 3.1	- 4.3	- 1.9	- 3.9
BELGIUM										
LFAR	- 2.7	- 7.5	- 3.9	- 2.5	+ 6.1	- 2.8	- 5.0	- 4.3	- 5.1	- 7.9
Ed. Part.	+ 2.7	+ 6.9	+ 4.1	+ 2.7	+12.3	+ 3.4	+ 5.4	+ 5.8	+ 6.3	+13.5
Not Class.	0	+ 0.6	- 0.2	- 0.2	-18.4[1]	- 0.6	- 0.4	- 1.5	- 1.2	- 5.6

(1) This estimate is clearly doubtful : it could well arise from a failure to treat military
service consistently.

Table 5 shows the levels of activity rates, education participation rates and shares "not classified" in each of the 9 countries in 1975. For males and females, the differences between educational systems in the various countries are apparent in this table, not only in terms of the compulsory age (wheter it be 14, 15 or 16) but also in terms of the length of advanced school courses. Education participation rates beyond age 17 are highest in Belgium, Italy and the Netherlands, reflecting the greater ease with which people can remain in further education, despite entry standards. The more vigorous enforcement of entry qualification standards in Germany and the UK greatly reduce education participation at age 19, and the lack of facilities in Ireland has a similar effect.

In general, the labour force activity rate reflects these variations in the extent of education by age but there are some important exceptions. At ages where many people leave education, the share "not classified" tends to be higher, reflecting unemployment among first job seekers. Among females, the share "not classified" rises progressively with age and almost certainly reflects the marriage ratio for each age group. It is only in Italy that there is a significant proportion of females not active in the labour force or in education.

Table 5 : Labour force activity, participation in education and persons not
classified by 1-year age group, 9 countries, 1975, as % of population

	Males					Females				
	15	16	17	18	19	15	16	17	18	19
GERMANY										
LFAR	4.2	34.2	55.1	66.3	74.4	3.7	25.3	48.5	67.0	66.9
Ed. Part.	92.3	63.2	42.8	31.5	23.1	93.9	70.6	47.3	28.3	24.3
Not Class.	3.5	2.6	2.1	2.2	2.5	2.4	4.1	4.2	4.7	8.8
FRANCE										
LFAR	2.4	8.1	34.7	49.6	64.6	0.2	3.5	23.9	39.8	56.4
Ed. Part.	97.0	90.8	63.4	48.4	32.5	99.5	94.5	71.4	54.0	35.7
Not Class.	0.6	1.1	1.9	2.0	3.9	0.3	2.0	4.7	6.2	7.9
ITALY										
LFAR	8.1	19.4	29.2	37.9	46.5	6.5	15.6	22.4	28.5	36.6
Ed. Part.	90.9	79.0	68.7	59.8	49.9	83.6	70.8	60.7	51.5	39.6
Not Class.	1.0	1.6	2.1	2.3	3.6	9.9	13.6	16.9	20.0	23.8
NETHERLANDS										
LFAR	0.3	5.9	17.7	34.7	50.8	0.1	8.0	24.2	42.6	60.2
Ed. Part.	99.4	93.7	81.4	64.4	48.1	99.2	90.0	72.6	51.4	31.8
Not Class.	0.3	0.4	0.9	0.9	1.1	0.7	2.0	3.2	6.0	8.0
BELGIUM										
LFAR	6.6	12.7	24.3	36.6	45.7	4.3	10.4	20.7	30.9	43.6
Ed. Part.	93.2	86.4	75.2	62.8	53.3	94.1	87.2	76.2	63.5	49.8
Not Class.	0.2	0.9	0.5	0.6	1.0	1.6	2.4	3.1	5.6	6.6
LUXEMBOURG										
LFAR	0.4	34.6	46.3	53.4	63.6	0.4	29.3	51.5	62.1	73.4
Ed. Part.	99.6	64.6	53.2	46.6	35.5	99.6	69.9	47.2	32.9	21.4
Not Class.	0	0.8	0.5	0	0.9	0	0.8	1.3	5.0	5.2
UNITED KINGD.										
LFAR	0	4.7	54.3	72.6	81.5	0	3.0	48.7	65.1	71.0
Ed. Part.	100.0	93.6	43.4	24.7	16.6	100.0	94.9	47.4	27.3	18.8
Not Class.	0	1.7	2.2	2.7	1.9	0	2.1	3.9	7.6	10.2
IRELAND										
LFAR	10.2	26.7	50.3	64.6	78.9	9.4	24.3	38.9	56.4	72.6
Ed. Part.	89.2	72.3	48.9	34.4	20.4	89.4	74.2	58.8	38.2	19.2
Not Class.	0.6	1.0	0.8	1.0	0.7	1.2	1.5	2.3	5.4	8.2
DENMARK										
LFAR	0.3	7.0	24.3	56.2	72.3	0.2	2.8	13.9	50.0	62.2
Ed. Part.	(96.9)	92.2	74.3	42.1	27.2	(99.2)	95.6	85.2	46.1	32.7
Not Class.	(2.8)	0.8	1.4	1.7	0.5	(0.6)	1.6	0.9	3.9	5.1

To obtain forecasts of future levels of activity rates
for the age group 15-19, it is necessary to specify activity rates in each
one-year age group. It is assumed that the compulsory age of education
will become 16 in all countries, that male education participation rates
for ages 17-19 will not increase much further, and that some future
increases are still possible for females. Table 6 provides estimates of
"saturation" levels of activity rates by 1-year age groups and for the
15-19 age as a whole, and compares this aggregate with the activity
rate in 1975.

The activity rates are chosen so as to reflect the
apparent transition from the education system of each country; female
rates are put lower than males by the age at which marriage ratios begin to
become significant. The comparison for the aggregate 15-19 age group of
actual 1975 levels with the "saturation" levels indicates (in general)
the effect of raising the compulsory age of education to 16 in each country;
a 5 % activity rate is allowed to cope with the timing of the census in
relation to school leaving regulations.

Table 6 : "Saturation" levels of activity levels, 1-year age groups and age group 15-19

	Germany	France	Italy	Netherl.	Belgium	Luxemb.	UK	Irel.	Denm.
MALES									
16	5	5	5	5	5	5	5	5	5
17	50	35	30	20	25	45	50	50	25
18	60	50	35	30	35	50	70	60	55
19	70	60	45	50	45	60	80	75	70
15-19 (1)	35	29	22	20	21	32	39	36	31
Actual 15-19 (1975)	45.4	31.2	27.6	21.3	24.4	39.5	40.4	44.1	32.1
FEMALES									
16	5	5	5	5	5	5	5	5	5
17	50	25	25	20	20	45	50	45	25
18	60	45	30	30	30	50	65	55	50
19	65	55	40	45	40	55	70	70	60
15-19 (1)	34	25	19	19	18	31	36	33	28
Actual 15-19 (1975)	40.3	24.2	21.4	26.0	21.2	44.0	35.4	38.5	25.6

(1) obtained using 1975 population weights.

Activity rates for males aged 60-64 in Germany, 1975-85

At constant 1975 activity rates for single year ages, the pattern of change in activity rates would be U-shaped:

1975	1976	1977	1978	1979	1980	1985
62.4	60.5	59.6	59.5	63.2	65.9	63.1

This occurs because the numbers of men born between 1911 and 1915 were so much lower than in other years that the survivor population in 1975 for these age groups is as little as 50% of the 'expected' level. As can be seen, the population age composition can accelerate the fall in activity rates between 1975 and 1977/8 by 3 percentage points and then slow it down by 6 points between 1978 and 1980. A further accelerated reduction of 3 points occurs between 1980 and 1985, by which time the population age composition has returned to 'normal'.

If we assume a continued reduction in activity rates in this age group, but no sharp discontinuous reduction in the effective age of retirement, then an activity rate of about 55% would be expected in 1980; with a reduction in the effective age of retirement to 60 by 1980, an activity rate of 49% would be more likely. By 1985, the activity rate is expected to be below 40%.

Estimates for 1980 are therefore likely to be above trend because of the age composition shift by about 2½ points and to fall more rapidly than trend between 1980 and 1985. The effect of deferring a lowering of the effective age of retirement until after 1980 is likely to be to raise the 1980 activity rate by a further 6 points above trend.

By the time pattern of the population .projections for the age group as a whole, I suspect that the age composition shift giving a positive bias to activity rates for the age group might not occur until after 1980 (this

can be checked using rates   60   81.4   and comparing the

                                    61   73.0

                                    62   67.4

                                    63   57.8

                                    64   36.2

result with my estimated population which gave 65.9). Thus a revised estimate for Germany would be between 52½% and 55%. Note that this should not be much lower than 76/77 estimates because the age composition effects in the first two years after 1975 give a downward bias to the estimates which is subsequently reversed by 1980. A likely time pattern would be

(Relative to 1975)	1975	1976	1977	1978	1979	1980	
Age composition effect	–	-2.0	-3.0	-3.0	0	+2.5	(assuming my population estimates)
Change in single year activity rates	–	-2.0	-4.0	-6.0	-8.0	-10.0	(linear approx)
Change since 1975	–	-4.0	-7.0	-9.0	-8.0	-7.5	
Activity rate	62.4	58.4	55.4	53.4	54.4	54.9	

The sensitivity of forecasts to traditional and saturation levels and the rate of development of processes

The most important area for sensitivity testing is for forecasts of female activity rates, particularly in the age groups 20-59. Typically, traditional levels are around 20% and saturation levels are about 70%, with process development rates (over 5-year periods) of either 0.5 or 1.0. The table illustrates the sensitivity of projections to assumed traditional saturation levels. By varying both of these levels by $\pm$ 5 points, we can construct matrices of forecasts. The central forecast is the middle element of the matrix; the maximum estimate occurs by stretching the range of the process (raising the saturation level and lowering the traditional level) whilst the minimum estimate obtains if the range is shortened at both ends. When actual activity rates are near the traditional level, the estimates are relatively insensitive to the assumed saturation level but quite sensitive to the traditional level assumed. When the actual activity rates are near the traditional or saturation level, then the difference in the change can be quite large, particularly at lower levels, because small changes in the traditional or saturation level leads to a large change in the inferred current stage of development of the process. But, when actual rates are in a range of between 40 and 60% of the development completed, the effect of a change in either level is really rather small as a 'forecasting' error.

Estimates of activity rates in 1980 and 1985

:tivity ite 1975	Trad. level	1980 Saturation level %			1985 Saturation level %			Range of changes	
		65	70	75	65	70	75	1975-80	1975-85
26.0	15	30.9	31.1	31.2	36.7	37.3	37.7		
	20	29.1	29.2	29.2	33.3	33.5	33.7	0.6-5.2	1.6-11.7
	25	26.6	26.6	26.6	27.6	27.6	27.6		
33.4	15	39.5	39.9	40.3	45.6	46.8	47.8		
	20	38.5	38.8	39.1	44.1	44.9	45.7	3.8-6.9	8.4-14.4
	25	37.2	37.4	37.5	41.8	42.3	42.7		
45.0	15	50.6	51.5	52.3	55.2	57.1	58.9		
	20	50.3	51.1	51.8	54.8	56.6	58.2	4.9-6.2	9.2-13.9
	25	49.9	50.6	51.2	54.2	55.8	57.2		
56.6	15	59.5	61.0	62.3	61.5	64.2	66.6		
	20	59.5	60.9	62.1	61.5	64.1	66.4	2.8-5.7	4.8-10.0
	25	59.4	60.8	62.0	61.4	63.9	66.2		
64.0	15	64.4	66.2	67.8	64.6	67.6	70.4		
	20	64.4	66.2	67.8	64.6	67.6	70.4	0.4-3.8	0.6-6.4
	25	64.4	66.2	67.7	64.6	67.6	70.3		

Note: Activity rate 1975 correspondes to parameter $s = -2.0, -1.0, 0, 1.0, 2.0$ with the central assumptions for traditional and saturation levels of 20 and 70% respectively.

The process development rate assumed is 0.5 in five years; thus the change by 1985 is 1.0, and could be considered as showing the effect of a faster rate of development over a five year period.

Alternative projections for female activity rates in Belgium

In Chapter 2 , adjustments were made for the effects of the pressure of demand on female activity rates. These altered the estimates of the stage of the process reached in 1968 and 1975, and hence the estimated rate of process development (for the period 1968-75), and, by changing the parameter s , altered the future rate of change in actual activity rates implied by the development of the process. The statistical basis for these adjustments was weakest in the case of Belgium, both pressure of demand variables being significant but implying opposite effects. It was felt necessary therefore to produce alternative estimates for Belgium based on actual activity rates, that is, making no cyclical adjustment. The tables give these alternative projections for females : since no adjustment was made for males, these projections are unaffected.

The third table gives a comparison. It is demonstrated that the only age groups for which there is a significant difference (that is, in excess of one percentage point) are those age groups 50-54 and 55-59 where there is a fast rate of development of a process which is only in its infancy in 1975, so that the estimated stage reached in 1975 (parameter value for s in 1975) is of some importance for these groups.

Unadjusted activity rates

	1968	1975	Stage of development (Parameter s) 1968	1975	Change per annum 1968-75	Assumed 5-year change for projections (as in W.P. 8) 1975-85	1985-95
15-19	26.5	21.2	..	..	..		
20-24	59.7	62.4	0.87	1.28	0.06	0.40	0.50
25-29	44.1	61.8	-0.39	2.30	0.38⎞		
30-34	35.7	51.0	-0.82	1.06	0.27⎬	1.40	1.40
35-39	34.4	45.5	-1.00	0.35	0.19⎠		
40-44	33.2	38.1	-1.36	-0.72	0.09⎞		
45-49	31.0	35.3	-1.87	-1.21	0.09⎟	0.50	1.00
50-54	27.1	28.2	-2.34	-2.11	0.03⎟		
55-59	20.5	21.3	-4.37	-3.39	0.14⎠		
60-64	8.9	7.8	..	..	..		
65+	2.3	1.7	2.28	2.94	0.10	0.50	0.50

Projections : alternative estimates

	Parameter s					Activity rates			
	1980	1985	1990	1995		1980	1985	1990	1995
15-19	..	..	..	..		21.1	18.0	18.0	18.0
20-24	1.68	2.08	2.58	3.08		64.5	66.1	67.5	68.5
25-29	3.70	5.10	6.50	7.90		64.2	64.8	65.0	65.0
30-34	2.46	3.86	5.26	6.66		57.2	59.3	59.8	60.0
35-39	1.75	3.15	4.55	5.95		54.8	58.6	59.6	59.9
40-44	-0.22	0.28	1.28	2.28		42.8	47.8	56.3	61.3
45-49	-0.71	-0.21	0.79	1.79		39.8	45.1	56.0	63.6
50-54	-1.61	-1.11	-0.11	0.89		31.2	35.5	47.3	59.7
55-59	-2.89	-2.39	-1.39	-0.39		22.1	23.4	28.0	36.1
60-64	..	..	..	..		8.8	9.3	10.3	11.8
65+	3.44	3.94	4.44	4.94		1.4	1.3	1.2	1.1

Excess of main projections over these alternative estimates (percentage points)

	1980	1985	1990	1995	
15-19	..	..	..	..	
20-24	..	..	..	..	
25-29	0.1	0	0	0	
30-34	0.4	0.1	0.1	0	
35-39	0.2	0.1	0.1	0.1	
40-44	..	..	..	..	(..) indicates no
45-49	0.6	0.7	0.5	0.3	change in projection
50-54	1.5	2.0	2.5	2.0	
55-59	0.8	1.1	2.3	3.3	
60-64	..	..	..	..	
65+	0.8	0.8	0.8	0.8	

Migration in the Community.
Some econometric relationships.

Econometric analysis of migration flows and employment of migrants are rare. The few available studies tackle only partial analysis of the problem and are limited essentially to economic variables and simple estimation methods (OLS). These attempts do not therefore do justice to the complexity of the problem to be investigated.

For the United Kingdom a study exists to explain the migration between the U.K. and Ireland, between which two countries there is an agreement on free movement. This study showed for the period 1951-1971 that the relative tension on the labour market (measured in relation to the unemployment rate) and the relative wage and salary level of both countries were strong and statistically significant explanatory variables[1].

For Belgium it could be shown that net immigration was dependent on the level of internal demand for labour[2].

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[1] B. Walsh, "Expectations, information and human migration: specifying an econometric model of Irish migration to Britain". Journal of Regional Science, no. 1, 1974 pp. 107-120.

[2] 2ème congrès des économistes belges de langue française, Nov. 1976, Economie ouverte face aux mutations internationales, Charleroi 1977

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More extensive and more detailed analyses exist for the Federal Republic
of Germany, especially by Drettakis[1] and Franz[2].

Drettakis investigated for the period 1962-1971 amongst other things
the net migration of foreign workers and the annual changes in the levels of
foreign wage and salary earners. As explanatory variables he used (alternative)
indicators of the tension on the internal labour market (vacancies and number
of unemployed) and the macro-economic situation (industrial production and
real GNP) in each case with a trend variable. These simple exercises are
sufficient to approximate well the actual development. As examples Table 1
shows the $\bar{R}^2$ for different estimators of the change in the stock of foreign wage and
salary earners. All coefficients are significant at the 5 % probability level.
The differences can not be discussed here individually. As a whole the relation-
ships are very close. Of course many complicated relationships can
be hidden in the (not separately identified) trend components.

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[1] E.G. Drettakis, Analyse der jährlichen Wanderungsströme in der Bundesrepublik
Deutschland, 1962/1971, in : Institut für Arbeitsmarkt- und Berufsforschung
der Bundesanstalt für Arbeit, Ausländische Arbeitnehmer und Arbeitsmarkt,
Beiträge zur Arbeitsmarkt- und Berufsforschung, No. 7, Nürnberg 1976, pp. 23 ff.

[2] W. Franz, International Factor Mobility and the Labor Market: A macroeconomic
Analysis of the German Labor Market, Institut für Volkswirtschaftslehre und
Statistik der Universität Mannheim, Discussion Paper No. 79/1976,
unpublished.

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Table 1

The relationship between annual changes in the stock of foreign workers
and alternative economic domestic variables and a trend variable in Germany
1962-1971 $(\bar{R}^2)$

Dependent variable	Trend and		
	vacancies	unemployed	industrial production
(1)	(2)	(3)	(4)
total change in stock	0.93	0.92	0.93
of which: Italians	0.57	0.71	0.51
Greeks	0.93	0.88	0.92
Spaniards	0.92	0.90	0.83
Turks	0.89	0.90	0.89
Portuguese	0.65	0.84	0.66
Yugoslavs	0.77	0.63	0.74
Males total	0.93	0.92	0.94
Females total	0.73	0.84	0.84

Source : E.G. Drettakis, op. cit. p. 34

The results for the net migration of foreign workers are similar, as are those for the gross immigration of workers[1], for which the estimated partial elasticities with relation to unemployment in Germany are as follows:

	Males	Females
Total	- 0.74	- 0.82
Italians	- 0.48	- 0.62
Greeks	- 1.17	- 1.45
Spaniards	- 1.18	- 1.11
Turks	- 0.77	- 1.12
Portuguese	- 1.04 *	- 1.02
Yugoslavs	- 0.74	- 0.89

* not significant at the 5 % level.

The totality of the results (only some of which are recorded here) support the hypothesis of migration processes induced by domestic economic factors. This "pull"-hypothesis is further supported in that the inclusion of various variables relating to the source countries brought no improvement in the results. This is not surprising given the migration policy followed during this period (see main text)

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[1] On the other hand no significant relationships were found with gross emigration.

[2] E.G. Drettakis, op. cit. page 36.

The research done by Franz covers the period from 1960 to 1975[1], and includes therefore the first two years of restrictions on the immigration of foreign workers. The work is also of a different nature. Equations for the growth in the number of foreign workers, on the one hand with EEC status, on the other without, are (separately) estimated, in the context of a complete labour market model for the Federal Republic.

With free entry (as in the migration relationship between Ireland and the U.K.) the real wage difference and the situation on the labour market in both countries should be the decisive influencing factors. By far the largest share of foreign workers from EEC member states in Germany are Italian. It has been shown that the development of this migration statistically can be well explained using real wage differentials and vacancies per worker in Germany [2)3)]. There is an average lag of about one year, which in the down-swing consists essentially of payment limits on unemployment benefits[4] and in the upswing probably of information delays.

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[1] Quarterly information.

[2] Because of the problems of Italian employment statistics, the situation on the labour market of the source country was not considered.

[3] The parameters have the expected signs and are statistically significant at the 5 % level. The fit is good (with seasonal variables ($\bar{R}^2$ = 0.951, DW = 1.967).

[4] Unemployment pay in Germany is for many Italians higher than the potential wage level in Italy.

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With respect to foreign workers from non-EEC countries it was assumed
that the policy of the responsible public authorities is guided on the one
hand by the level of domestic unemployment and on the other hand by the
percentage of (non-EEC) foreign workers to the total. As long as unemploy-
ment remains below a critical value (not-rejected hypothesis: 400,000)
net immigration is permitted (and administratively encouraged) in line with
the demand for labour, as long as a critical threshold of foreign population
(e.g. 12 %) is not reached), when net immigration is stopped. Above the
critical value for unemployment, stricter restrictions are introduced, which
prohibit as far as possible gross immigration, or even encourage migrant
workers to leave. These are plausible hypotheses on the policy towards foreign
immigration which was actually followed officially though not explicitly
before 1976. However one of the cases, namely the reaching of a critical
threshold of foreigners,has not yet been operative. However, if growth had
continued normally after 1973, an acute problem would soon have become evident.
If the recession had not taken place, a more restrictive policy towards
foreigners would probably have been introduced (see main paper).

The case of less-than-critical unemployment existed in the periods
1960, I to 1966, III and 1969, I to 1973, III[1]. During these periods the
closest relationship existed between the growth of the non-EEC foreigner
ratio in the workforce and the macro-economic performence measured by the
GNP.

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[1] Roman numbers relate to the quarters.

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During the periods 1966, IV to 1968, IV and 1973, IV to the end of the
study period 1975, IV, the critical threshold of unemployment was exceeded
and the number of non-EEC foreign workers was sharply reduced[1]. This reduction
was correlated very closely with unemployment (the difference between the
actual and the assumed critical threshold).

An estimate for the whole period showed a dependency of the change in the
stock of workers from third countries not only on the level of unemployment
but also on its time path: even below the critical threshold there were
reactions to changes in the level of employment - the faster the greater.
On statistical criteria the (best) equation for the whole period is however
less satisfactory than the estimates for the sub-periods mentioned above.

This study also underlined the importance of the influence of the labour
market situation on migration and the employment of foreign workers in the
past. However it also points explicitly to the existence of other economic
and socio-demographic aspects[2], which modify or reject the simple demand-pull
explanations. They must be taken into account when consideration is given
to future migration possibilities given alternative assumptions about the
development of the labour market in the countries, which until now have been
importers of labour. In addition the many qualitative divergences between
national and foreign workers, which remain hidden in the macro-economic analyses,
should be considered. Finally, the policy on the immigration of dependents of
foreign workers and other integration measures, especially in respect to the
second generation of foreigners, play an important role.

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[1] See the main text.

[2] Idem.

ANNEX 10

THE PUBLIC FINANCE IMPLICATIONS OF DEMOGRAPHIC CHANGE [*]

The crucial demographic relationship in the field of public finance is the ratio between, on the one hand, the number of children and old people, who are the principal beneficiaries of income (and tax-relief) arising from the redistributive activities of government and who receive a substantial proportion of the resources devoted to education and health services, and, on the other hand, the working population , whose income provides the basis of taxation, the source of most government revenue. The prospect in the next twenty-five years is that the proportion of children in the population of the Community will fall from almost a quarter to a fifth, and the proportion of people over 65 years is expected to rise by only 1 per cent. The global view of population trends therefore gives little cause for alarm.

The influence of demographic change on public expenditure is felt in four main areas, cash transfers by way of pensions and child allowances and direct expenditure on education and health. The effect of a sustained reduction in fertility will eventually be felt in each of these areas, but at different time horizons. The reduction in the numbers of young children reaching school age has already affected the recruitment of teachers and school building programmes. The fall in the birth rate has already affected the training of midwives and the construction of maternity units, but a significant increase in health costs per head due to the ageing of the population will not occur. for many years. The relationship between people of pensionable age and the active population will also not deteriorate until the last decade of the century.

In the years since 1960 demographic change has not been the dominant factor in the rapid growth of social expenditure, now a major element of public expenditure. The efforts of member countries to improve and extend income support, health and education schemes have had an influence which has far outweighed the effect of the growth in the dependent population. It is probable, however, that the big growth period may now be nearing its

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[*] A separate group of experts of the Directorate General for Social Affairs at the EEC Commission is investigating this problem and will report on it in greater detail at a later date.

close with the achievement of many of the aims of the post-war social reformers, and that over the next quarter century demographic factors may have relatively more weight than in the recent past, except possibly in the field of health care.

Changes in the methods of caring for the sick are likely to be more important for health expenditure than either a reduction in births or an increase in old persons. Even in education, improvements in facilities, reductions in class size and increases in the school-leaving age may well offset some of the effect of the reduction in the child population. Nevertheless in the long run the demographic factors cannot be ignored if the postulated decline in fertility becomes a permanent fact.

The results of the analysis for the Community as a whole cover up considerable differences which exist between the member states. These differences are a reflection of the various demographic structures described in the first Chapter of this report. The situation in Germany with respect to demographic effects on public finance is not remotely reflected in the Irish situation for instance. Although in most member states a reduction in fertility since the mid-nineteen sixtees has been noted, nevertheless the population structures are generally different and therefore the influence of demographic change on public finance is also different. This should be borne in mind when statistics for the Community as a whole are presented.

A. Pensions

The ratio of the 65 years and older age group to the total population in the EEC will decline during . from 1980 to 1985 . but will start rising again from 1985 onwards. Between 1975 and 1995, this age group will increase from approximately 13,3 % of the total population to 14 % , an increase of slightly over 3 million. The rise from 1985 to the end of the period amounts to 3 1/2 millions.

This overall development hides very different trends in the member states. Germany and the United Kingdom with around 14 % of their population aged 65 and over in 1975 will finish the period with between 14,5 % and 15 %. At the other extreme Ireland with the youngest population structure in 1975 will see the proportion of its population of over 65 fall to only slightly over 9 % of total population in 1995.

This increase is of very small magnitude when compared with the post-war increase up to 1975. However the projections of activity rates described in Chapter 2 (3) also assumed that the retirement age will fall gradually over the period to 60 years. If one simplifies by assuming that the whole increase in the non-active 60-64 years old age group over the period represents the increase in the number of pension recipients (i.e. the absolute number of those in this age group not receiving a pension does not change after 1975), then a considerable additional pensions burden will appear between now and 1995.

.../...

Table 1

a) <u>Number of persons over 65 years of age in the E.C.</u> (millions)

Year	Males	Females	Total
1975	13.5	20.8	34.3
1980	14.2	22.3	36.6
1985	13.2	21.5	34.7
1990	13.8	22.6	36.5
1995	14.5	23.1	37.6

b) <u>Proportion of total population over 65 years of age</u> (millions)

Year	Males	Females	Total
1975	10.74	15.69	13.28
1980	11.22	16.73	14.05
1985	10.28	15.98	13.20
1990	10.67	16.69	13.75
1995	11.05	16.88	14.02

Table 2

Non-active persons in 60-64 age group in the E.C. ('000)

Year	Males	Females	Total	Activity rate %
1975	2209	6082	8,291	40,15
1980	1896	4431	6,327	37,00
1985	3335	6369	9,704	32,06
1990	3737	5942	9,679	30,02
1995	4004	5806	9,810.	28,20

Table   shows a large fall in the number of non-active persons in this age group between 1975 and 1980 (a largely demographic phenomenon) but a very rapid increase thereafter (a result of falling activity rates). The total increase of non-active (i.e. pension recipients) in this age group between 1975 and 1995 will therefore be of the order of 1 1/2 million, with over 1 million of which . accounted for by changes in the activity rate of the group (see statistical annex).

The real increase in the total number of pension recipients aged 60 years and over between 1975 and 1995 may well be in the order of 3 1/2 million persons. In the comparable twenty year period from 1955 to 1975 the number of persons of 65 years and over alone grew by over 11 millions. During the same period the level of real benefit rose considerably. In comparison the increase in the number of pensionees up to 1995 appears small, though there are considerable variations between countries.

The increase in the percentage of persons over 65 years of age in the total population is nowhere very rapid over the period up to 1995. In the case of Ireland, this percentage declines. If however one looks briefly at the following 20 year period up to 2015, it is evident that the population will start to age rapidly. This is especially the case in Germany, where the projected reduction in fertility is greatest. Attention should be drawn to this ageing the population beyond the study period in its relationship to the pensions burden.

The increase in the number of pension recipients over the period 1975 to 1995 is even less dramatic when viewed in relation to the developments in the active population sketched in the main report.   During this period, the proportion of the population between 15 and 65 years of age will rise from 63,3 % to 65,8 %. However, the rise in the proportion of the population in the active labour force will rise from 41,1 % to 45,4 % during the same period, although this increase would of course be less if expressed in terms of hours worked.

.../...

Table 3

Percentage of the population over 65 years of age
in the E.C. Member States

%

Land	1975	1980	1985	1990	1995	2005	2015
Germany	14,30	15,40	14,15	14,52	14,90	17,1	18,4
France	13,32	13,70	12,12	12,73	13,23	13,8	14,9
Italy	12,03	13,18	12,56	13,52	14,15	15,2	15,6
Nether-lands	10,73	11,41	11,68	12,32	12,62	13,3	16,1
Belgium	13,91	14,03	12,60	13,05	13,38	13,7	14,0
Luxem-bourg	12,99	13,56	12,78	12,92	13,88	15,3	16,7
United Kingdom	13,97	14,64	14,45	14,82	14,55	13,9	15,1
Ireland	10,86	10,76	10,31	9,87	9,23	8,1	8,1
Denmark	13,25	14,19	14,44	14,69	14,36	13,7	16,1

Given a development of the economy over the long-term in line with potential growth, the additional pension burden in terms of number of pensions to be paid does not seem to be a serious problem. Although the number will grow, this growth will be both less than in the past and will be accompanied by a substantial increase in the labour force. On the other hand, the problem rapidly become more serious after 1995.

B. Education

The influence of demographic change on education expenditure is extremely important in the short as well as the long-term. The two major problem areas are of course capital investment programmes and teacher supply.

In 1955, there were 52.7 million children less than 15 years of age in the nine Member States, or 23,6 % of the total population. By 1972, this absolute number had climbed to a maximum of 61,3 million or 24,2 %. The current projections show that by 1995 children under 15 years of age will make up only 20,2 % of the total population, that is 54 millions.

.../...

It can be reasonably assumed that 100 % of the children between 5 and 15 years of age will attend school during the period under consideration. For children of less than five years, it is to be assumed that there will be a greater demand for pre-school education, to some extent at least because more women will be in employment. For those over 16 years of age, it may be assumed that there will be some increase in the rate of participation in full-time education (see Chapter 2).

1. Children of pre-school age

The number of children in the age group 0-4 years reached a maximum in the late nineteen-sixties, at which period facilities such as day nurseries

Table 4

Children aged 0-4 years in the Member States

(thousands)

Land	1970	1975	1980	1985	1990	1995
Germany	4130	3492,8	3038,0	3334,0	3586,0	3438,6
France	4720	4223,9	3688,6	4082,6	4090,8	4076,7
Italy	4371	4335,6	4041,4	3888,0	4024,1	4167,3
Netherlands	1186	1055,9	916,4	985,0	1029,1	1032,9
Belgium	664	645,9	612,5	693,7	709,5	674,8
Luxembourg	18	20,8	21,7	22,2	21,4	19,9
United Kingdom	4618	3953,7	3475,8	3786,6	4063,3	4109,2
Ireland	312	338,5	351,7	387,1	418,7	427,4
Denmark	381	362,1	356,1	361,3	369,7	368,8
Community	20392	18429,1	16502,1	17540,5	18312,6	18315,6

and nursery schools were rapidly expanded in some Member States, but seldom sufficiently to meet the demand. The reduction in the number of children in this age group in the coming years will probably allow a larger percentage of these children to obtain these facilities, without leading to surplus capacity (though of course such surplus capacity may occur in certain areas). In any case, the numbers will rise again after 1985 to reach almost the same level in 1995 as attained in 1975. If a higher participation rate in state facilities by the 0-4 years old group is allowed in the early nineteen-eighties, then at the end of the period either facilities must be expanded or the participation rate must fall again.

.../...

2. Children from 5-15 years of age

In all countries, except Ireland, there will be a decline in the number of children of compulsory school age to a minimum around 1990 after which there will be some increase up to the end of the period. By 1990, there will be almost exactly 25 % less children in compulsory school age as in 1975. The primary schools will reach a minimum in pupil numbers in the first half of the nineteen-eighties, the secondary schools in the latter half of the eighties or early nineties. On the very aggregate level countries are confronted with the choice between reducing the number of teachers or improving the staff-pupil ratio.

Table 5

Children aged 5-15 years in the Member States

(thousands)

Land	1970	1975	1980	1985	1990	1995
Germany	9468	9991,0	8265,1	6403,7	6341,4	6888,2
France	8413	8463,9	8423,4	7880,3	7735,9	8136,7
Italy	8856	9118,2	8878,8	8332,9	7890,2	7875,1
Netherlands	2379	2427,7	2253,8	1964,2	1894,0	2006,4
Belgium	1550	1515,9	1401,3	1275,3	1299,5	1381,2
Luxembourg	51	51,4	45,7	42,3	43,7	43,4
United Kingdom	8780	9121,3	8556,3	7481,6	7236,3	7822,6
Ireland	607	653,1	662,2	687,3	735,0	802,0
Denmark	766	784,4	755,0	715,0	714,8	728,4
Community	40870	42126,9	39241,6	34782,6	33890,4	35698,4

The choice of the action to be taken depends on the extent to which economic growth provides additional resources for education. If the present policy of resource constraint in education is maintained, it is fairly clear that the surplus of teachers already evident in some countries will be increased. Some member states have drawn up medium-term plans for reducing the number of places available in teacher training colleges and this will undoubtedly spread to other countries. In the United Kingdom for instance the Department of Education and Science has announced a reduction in initial teacher training places from 115000 in 1972 to 35000 in the early 1980's (1).

.../...

The problem of teacher supply is made worse by the effect of decreasing fertility on the rate of teachers leaving the profession to have children.

Even on the population forecasts contained in this report, the number of children of compulsory school age will begin to increase again (th ough briefly) towards the end of the period; for primary school age groups in the mid-nineteen-eighties. Although the numbers reached at the end of the sixties or early seventies may not be reached again, a cyclical variation in the short-term fertility index could provoke peaks and troughs in the number of school children, which would be difficult and costly to cope with as far as teacher training and investment in school buildings are concerned. To reduce training facilities too much to meet forecast school population based on the ap- parently new low level fertility might in the long-term prove costly. Never- theless considering the generation of children already born, it is clear that some reduction in facilities is necessary if staffing ratios are not going to be increased significantly.

For school building, the same difficulties emerge, with the addition that whereas teachers can be transferred from one area to another, school buildings can not. It may well be that while buildings are being converted to other uses in one area, new schools will need to be constructed in others, despite falling numbers of school children.

3. Students

Whereas the perticipation rate in education in the under-16 year old group is close to 100%, it is a major variable in assessing the future demand for places in higher education, together with the demographic variable.

The number of persons in the 15-24 year old age group will increase through 1980 to peak between 1985 and 1990. Already by 1990 the numbers will have fallen significantly and by 1995 there will be 17% less people in this age group in the Community than in 1985. Indeed, in Germany there will be over 35% less in 1995. Only in Ireland will there be continuous growth throughout the period (see table 6).

The scope for an increase in participation rates differs somewhat from country to country depending on the existing situation and the financial constraints. There has been a very rapid increase in the participation rates in third level education in most member states in the last ten years and there is doubt whether this rate can rise substantially in the future. In Germany for instance there was an increase of 50% in numbers in third level education between 1970 and 1975 alone. On the other hand in the United Kingdom, where numbers in higher education are lower, announced policy would suggest that participation rates for university education at least will not rise in any way sufficiently to compensate for the demo- graphic decline. Perhaps various forms of further education, providing

retraining for those already in jobs, may add to the demand for the future,
but the total demand for third-level education will nevertheless probably
fall after the mid-nineteen-eighties in most member states.

Several countries have reacted to the problem of rapidly increasing
student numbers between 1975 and 1985 in a way which already takes account
of the reduction in numbers after that date. This has been done by decreasing
staff-student ratios and increasing the intensity of use of existing
buildings and equipment. It is conceivable therefore that the readjustment
after 1985 may be achieved without major problems of redundancies of staff
and buildings.

Table 6

Population between 15 and 24 years of age, 1975 - 1995.

	1975	1980	1985	1990	1995
Germany	8729	9458	9846	8196	6351
	14.08	15.47	16.24	13.61	10.66
France	8509	8372	8410	8366	7824
	16.16	15.65	15.41	15.04	13.82
Italy	7947	8556	9064	8824	8281
	14.29	15.04	15.69	15.06	13.94
Netherlands	2287	2379	2414	2241	1954
	16.81	17.08	16.90	15.31	13.06
Belgium	1541	1574	1523	1393	1267
	15.73	16.07	15.46	14.03	12.72
Luxembourg	55	53	51	45	42
	15.29	14.92	14.32	12.82	12.02
U.K.	8023	8661	9084	8524	7454
	14.32	15.43	16.09	14.95	12.94
Ireland	539	608	645	659	684
	17.06	18.34	18.23	17.37	16.87
Denmark	747	755	779	751	711
	14.78	14.71	14.97	14.24	13.35
E.E.C.	38376	40416	41816	38999	34568
	14.86	15.53	15.92	14.69	12.91

C. Health

There is firm evidence from several research studies (a) that the relationship between cost of health care and age gives a U-shaped curve. If the cost of child-birth and pre- and post-natal care is attributed to the child rather than to its mother, the male and female age-specific health cost curves are similar. They fall sharply over the first few years of life and thereafter rise at a gradually increasing rate into old age. Public expenditure on health has risen very rapidly as a percentage of GDP in most countries in the Community in recent years, and although this increase may moderate in the years to come because of the difficulties of financing further growth in health costs, the underlying tendency imposed by the changes in the structure of population until the end of the century will be to reinforce the upward trend in expenditure. The application of an age-specific weighting system based on the studies mentioned above indicates that the aging of the population alone will raise the average real burden of health costs in the Community by almost 9 per cent by 1995, with particularly high increases in Ireland, Italy and the Netherlands.

Increases in Age-Specific Health Cost, 1995 (1975 = 100)

Germany	3.5	Netherlands	20.9	United Kingdom	6.1
France	10.5	Belgium	2.9	Ireland	22.9
Italy	13.7	Luxembourg	3.6	Denmark	10.1
		Community	8.9		

An effect which cannot at present be measured numerically is the increase in costs which is likely to arise if there is a growth in the proportion of very old people in the population over 65 years of age. A substantial proportion of the very old require residential care, which is at present often carried out in general or mental hospitals, rather than at home or in specialised institutions. On present assumptions about survival, the numbers aged 85 years or more will increase from 2 million in 1975 to 3 1/2 million in 1995 and from 6 per cent to 9 per cent of the population over 65 years, and a substantial increase in the demand for residential care can therefore be foreseen.

.../...

(a) "Health Care costs when the population changes" - Denton and Spencer - Canadian Journal of Economics, Vol. VIII no 1, February 1975

"Fluctuations démographiques et dépenses de sécurité sociale" - J-C. Chesnais- Population, vol.32.2, 1977.

The application of a fixed weighting system cannot reflect the cost differences between countries due to national attitudes towards care of the aged, the supply of residential places and the activity rates of women. The increase in female activity rates foreseen in Chapter 2 is likely to give rise to a greater demand for residential care for old people than at present, and the rise in expenditure might be reduced if specialised institutions were to be provided which could supply the same level of care for the aged as a hospital, but at a substantially smaller cost.