EDUCATIONAL ATTAINMENT IN THE OECD, 1960-1995

Angel de la Fuente*
Rafael Domenech**

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*   Instituto de Análisis Económico (CSIC) y Ministerio de Hacienda
**   Universidad de Valencia y Ministerio de Hacienda

Correspondence to:
Angel de la Fuente, Instituto de Análisis Económico, Campus de la Universidad Autónoma de Barcelona, 08193, Bellaterra, Barcelona, Spain, *Tel:* 34-93-580-6612. *Fax:* 34-93-580-1452. *E-Mail address:* delafuente@cc.uab.es, or
Rafael Domenech, Departamento de Análisis Económico, Universidad de Valencia, Campus de los Naranjos, 46022 Valencia, Spain; *E.Mail addres:* rafael.domenech@uv.es.

Abstract

This document describes the construction of series on the educational attainment of the adult population in a sample of 21 OECD countries for the period 1960-90. These series are a revised version of the data set described in de la Fuente and Doménech (2000).

1. Introduction

This document describes the construction of series on the educational attainment of the adult population in a sample of 21 OECD countries for the period 1960-95. These series are a revised and partially extended version of the data set described in de la Fuente and Doménech (2000).

There are two major changes relative to our earlier estimates. First, we have incorporated a fair amount of new information supplied by the national statistical offices of around a dozen member countries in response to a request by the OECD's Statistics and Indicators Division that was accompanied by our previous paper. Second, we have extended the series to 1995 for around three fourths of the sample[1] using national sources, the latest edition of *Education at a Glance* (EAG) and Labour Force Survey data supplied directly by the OECD (referred to as OECD/LFS data below). For the remaining countries, these sources do not seem to be consistent with the national data on which our series are based (at least in part because of differences in the age groups covered by them), so an extension may have to wait until the results of the current round of censuses are available. Finally, there are a few minor changes in the series that are mostly due to corrections of i) arithmetical mistakes, ii) the dates attributed to some census observations (usually by one year) and iii) changes in the duration attributed to some schooling cycles (following the indications of national statistical offices or to make them compatible with the cutoff levels in our data).

2. Description of the data and notes on the estimation procedure

We aim to provide estimates of the fraction of the population aged 25 and over that has started (but not necessarily completed) each of the levels of education shown in Table 1 (illiterates (L0), primary schooling (L1), lower and upper secondary schooling (L2.1 and L2.2) and two levels of higher education (L3.1 and L3.2)). For some countries, however, the available data may refer to a different age group or to the fraction of the population that has completed each schooling level, and it is not always possible to detect when this is the case.

We have tried (with uncertain success) to include upper-level vocational courses (ISCED 5 studies according to the international standard classification of educational attainment levels) in the first level of higher attainment. We report L0 only for the four countries where illiteracy rates are significant during the sample period (Portugal, Greece, Spain and Italy). For the rest of the sample, the lowest reported category is L1, and it includes all those who have not reached secondary school.

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[1] Some of these estimates may change as new census data become available.

Table 1: Attainment levels and codes

code	level
L0	Illiterates
L1	Primary schooling
L2.1	Lower secondary schooling
L2.2	Upper secondary schooling
L2	Total secondary schooling = L2.1 + L2.2
L3.1	Higher education, first cycle or shorter courses
L3.2	Higher education, second cycle or full-length courses
L3	Total higher education = L3.1 + L3.2

Our approach has been to collect all the information we could find on educational attainment in each country, both from international publications and from national sources (census and survey results and national statistical yearbooks), and use it to try to reconstruct a plausible pattern, reinterpreting some of the data if necessary. For those countries for which reasonably complete series are available, we have relied primarily on national sources. For many of the rest, we start from the most plausible set of attainment estimates available around 1990 or 1995 (taken generally from OECD sources) and proceed backwards using all the assembled information and trying to avoid unreasonable jumps in the series by choosing the most plausible figure when several are available for the same year, and by reinterpreting some of the data (as referring to broader or narrower schooling categories than the reported one) when it seems sensible to do so.[2] Missing observations are then filled in a variety of ways. Where possible, we interpolate between available observations. Otherwise, we use information on educational attainment by age group in order to make backward or forward projections, or rely on miscellaneous information from a variety of sources in order to construct plausible estimates of attainment levels. We have avoided the use of flow estimates based on enrollment data because they seem to produce implausible time profiles.

A number of countries do not separate primary education from lower secondary schooling and report a single attainment level that comprises all mandatory courses. To preserve the homogeneity of our attainment categories, we have estimated the breakdown of compulsory schooling into L1 and L2.1. For some countries we have managed to find enough information to make what seemed a reasonable guess. For others, we have used data from close neighbours. In particular, we have used information for the US, Germany and Norway to estimate the breakdown in Canada, Austria and Denmark, respectively.[3] Finally, for those countries for which there is no obvious candidate for this role (the UK and Japan), we have used an ad-hoc regression estimate of the relevant ratio. Using those

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[2] For some further details on what this means in practice, see de la Fuente and Doménech (2000).

[3] See the country notes in Section 4 below for further details.

countries in the sample for which there is decent direct data on L1 and L2.1,[4] we estimate the following equation with pooled data:

(1) $L2.1/(L1+L2.1) = 0.1730 + 0.00947 (L3+L2.2) + 0.08272(L3/L2.2) - 0.025^*\text{trend}$ adj. $R^2 = 0.674$
   (1.71)   (16.23)   (2.03)   (1.77)

where the numbers in parentheses below each coefficient are t ratios. That is, we hypothesize that those countries that are more "efficient" in getting students into the upper schooling cycles will also have greater accession rates to lower secondary schooling. Hence we specify the weight of lower secondary attainment relative to primary attainment as a function of university and upper secondary attainment and the ratio of the two, and allow it to vary systematically over time. Since the fit of the equation is reasonably good, we use it to estimate the lower secondary/compulsory attainment ratio in those countries for which this information is not available.

Table 2: Cumulative years of schooling by educational level

	L1	L2.1	L2.2	L3.1	L3.2
Australia	7	11	13	15	16
Austria	4	8/9[a]	13	15	17
Belgium	6	9	12	15	16
Canada	6	9	12	15	16
Denmark	6	9	13	14	17
Finland	6	9	12	14	17
France	5	9	12	14	16
Germany	4	10	13	15	17
Greece	6	9	12	16	16
Ireland	6	9	12	14	16
Italy	5	8	13	15	18
Japan	6	9	12	14	16
Netherlands	6	10	12	16	17
Norway	6	9	12	14	16
New Zealand	6	11	13	15	16
Portugal	6	8	12	14	16
Spain	5	8	12	14	17
Sweden	6	9	12	14	16
Switzerland	7[b]	9	13	16	17
UK	6	9	12	14	16
USA	4[c]	8[c]	12	14	16
Mode	6	9	12	14	16

- Sources: Education at a Glance 1997 (OECD, 1998), except figures in bold type (WDI, World Bank, 1999) and in italics (national sources).

([a]) The duration of compulsory schooling in Austria changed from 8 to 9 years in the mid sixities.[5]

([b]) The duration of L1 in Switzerland is 6 years, but the cutoff between L1 and L2.1 in our data is 8. Hence, we use the average of these two figures to calculate the average years of schooling.

([c]) Set in accordance with our cutoffs for L1 and L2.1.

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[4] We exclude from the sample used in this regression Norway, Finland, New Zealand and Germany (as well as Denmark, Austria and Canada).

[5] We allow for this in a crude way when computing the average years of schooling in Austria. For this calculation, we assume that the cumulative duration of L2.1 is 8 years until 1975 (since those completing L2.1 in 1965 will not enter the 25+ age group until that year). For later years, we attribute to L2.1 a cumulative duration which is a weighted average of 8 and 9 years, with the weight of the second figure set equal to the fraction of the population 25 and over in the current year that studied under the new system. The data on the age structure of the population required for the adjustment was obtained from the UN's Demographic Yearbook (DYB).

Using our attainment series, we construct an estimate of the average years of total schooling for each country and period. The assumed cumulative duration of the different school cycles in each country is shown in Table 2. In constructing these series we are implicitly assuming that everybody who starts a given school cycle does eventually complete it, which is clearly not the case. Hence, our figures will be biased upward and are not strictly comparable with Barro and Lee's (1996) average schooling series, which do incorporate estimates of completion rates.[6]

3. Some comments on data quality

Data availability varies widely across countries. Table 3 shows the fraction of the reported data points that are taken from "direct observations" and the earliest and latest such observations available for secondary and higher attainment levels. The number of possible observations is typically either 21 or 24 for each level of schooling depending on whether the series ends in 1990 or 1995 (two sublevels and a total[7] times seven or eight quinquennial observations). In the case of Italy, there seem to be no

Table 3: Some summary measures of data quality

	secondary attainment			university attainment		
	direct/tot. observ.	first observ.	last observ.	direct/tot. obs.	first observ.	last observ.
USA	24/24	1960	1995	24/24	1960	1995
Netherlands	12/24	1960	1995	12/24	1960	1995
Italy	15/24	1961	1999	5/8	1960	1998
Belgium	13/24	1961	1995	12/24	1960	1995
Spain	12/21	1960	1991	12/21	1960	1991
Greece	15/24	1961	1995	15/24	1961	1997
Portugal	12/21	1960	1991	8/21	1960	1991
France	12/21	1960	1989	12/21	1960	1990
Ireland	15/24	1961	1998	11/24	1961	1998
Sweden	9/24	1960	1995	9/24	1960	1995
Norway*	15/24	1960	1998	9/24	1960	1998
Denmark*	9/24	1973	1994	12/24	1973	1994
Finland*	16/24	1960	1995	21/24	1970	1995
Japan*	8/21	1960	1990	12/21	1960	1990
N. Zealand	10/24	1965	1998	10/24	1965	1998
UK*	6/21	1960	1993	10/21	1960	1991
Switzerland	15/24	1960	1995	15/24	1960	1995
Austria*	11/24	1961	1995	7/24	1961	1995
Australia	11/24	1965	1997	11/24	1966	1997
W. Germany	11/24	1970	1995	17/24	1961	1995
United Germany	6/6	1991	1995	6/6	1991	1995
Canada*	15/24	1961	1996	21/24	1960	1996

- (*) Countries where primary and lower secondary attainment are generally not reported separately.

[6] We have not used the available data on completion rates to refine our estimates because these data display numerous anomalies.
[7] For those countries where primary and lower secondary attainment are generally not reported separately (identified by an asterisk in Table 3), the three categories reported in the column for secondary attainment are L2.1, L2.2 and L1+L2.1 (rather than L2.1, L2.2 and L2 as in the other cases).

short higher education courses, so the number of possible observations at the university level drops to eight. We count as direct observations backward and forward projections constructed using detailed census data on educational attainment by age group and the age structure of the population, and various "reasonable guesses" that incorporate some information from census or survey data.

As can be seen in the table, for most of the countries in the sample we have enough primary information to reconstruct reasonable attainment series covering the whole sample period. The more problematic cases are higlighted using bold characters. In the case of Italy, the main problem is that much of the available information refers to the population over six years of age. For Denmark and Germany (at the secondary level), the earliest available direct observation refers to 1970 or later. In these two cases, we have projected attainment rates backward to 1960 using the attainment growth rates reported in OECD (1974), but we are unsure of the reliability of this extrapolation.

4. Detailed country notes

United States
- *Source:* U.S. Bureau of the Census (website) for 1960, 1965, 1970, 1975, 1980, 1985, 1990 and 1995.
- *Population:* 25+
- *Attainment categories:* L1 = 4 years of schooling or less; L2.1 = 5-8 years; L2.2 = 9-12 years; L3.1 = 1-2 years of college; L3.2 = more than two 2 years of college.

Netherlands
- *Source:* Dutch Statistical Yearbooks with data for 1960, 1971 and 1990 and data from the Labor Force Survey supplied by the Dutch Statistical Office (NAT2) for 1995.
- *Population:* labour force in 1960; population 15-64 in 1995; population over 14 not attending school rest of the years.
- *Attainment categories* (when not obvious how they correspond with our scheme): L2.1 = advanced elementary level (1960); L2.2 = secondary level (1960); L3.1 = semi-higher level (1960) and vocational colleges (1990).
- *Other notes:* We use linear interpolation to fill in the missing observations.
- NAT2 data was also made available for 1981, 1985 and 1990. The 1990 figures are very similar to those in the Statistical Yearbook. We have not used the data for 1981 and 1990 because they yield an implausible jump (especially for L3.2) between 1985 and 1990.

Italy
- *Source:* For secondary schooling, Italian Statistical Yearbooks with census data for 1961, 1981 and 1991, DYB for 1971 and Istat's *Italy in Figures* for 1999. For university: Unesco for 1961, UN Demographic Yearbook (DYB) for 1971 and 1981 and Eduation at a Glance (EAG) for 1989 and 1998.

For illiterates, Statistical Yearbook for 1961, 1981 and 1991, and World Development Indicators for 1970 and 1975.

- *Population:* National yearbooks and *Italy in Figures,* 6+; Unesco and DYB, 25+; EAG, 25-64.
- *Other notes:*
  - University: we interpolate between available observations and extrapolate back to 1960.
- We do not use the information in the national Yearbook for university attainment because this source refers to the population over 6 years of age and will therefore underestimate attainment (especially at this level).
- For 1971, DYB provides only the total secondary attainment. To estimate L2.1 and L2.2, we interpolate the ratio L2.2/L2 between 1961 and 1981 and apply it to the total. The rest of the missing observations are estimated by linear inter or extrapolation.
- For illiterates, we extrapolate to 1995 and interpolate between available observations.
- There are minor changes in the series relative to the previous version of this data set because we have corrected the date of some of the observations.

Belgium

- *Source:* For secondary schooling, Belgian Statistical Yearbook with census data for 1961, 1970 and 1981, EAG for 1989 and data from the LFS provided by the OECD for 1995. For university: EAG for 89, with breakdown by level, UNESCO 1960 and DYB 1970 interpreted as L3.2, and OECD/LFS provided for 1995
- *Population:* non-student population over 15 in Yearbooks; population 25-64 in EAG; 20+ in Unesco 1960; 25+ in DYB 1970; 25-64 in OECD/LFS.
- *Other notes:*
- For 1960-81, L1 is "niveau primaire," L2.1 is "niveau secondaire inférieur inachevé et niveau secondaire inférieur," L2.2 is "niveau secondaire supérieur et enseignement normal inférieur" plus "enseignement artistique."
- Because it refers to the non-student population over 15, we do not use the Yearbook data for university attainment. We do, however, use the ratio L3.2/L3 in these data to estimate L3 from available data on L3.2 in 1960 and 1970, and from the estimate of this number (by interpolation) in 1980. In the Yearbook, L3.1 refers to "niveau supérieur non universitaire" and L3.2 to "niveau universitaire et assimilé."
- In 1995 we take total L2 from OECD/LFS but do not respect the reported L2.1 and L2.2 because they would generate an implausible jump (possibly due to changes in classification criteria with the change to the new ISCED classification). Instead, we apply the ratio L2.1/L.2 from 1989 to the reported L2 to estimate L2.1 and L2.2.
- Census data (for 25+) supplied by the Belgian Statistical Office show important discrepancies with the Yearbook secondary attainments and our estimates of higher attainment. Part of the discrepancy

may arise because these data seem to attribute to each level only those who have completed it and because of differences in the type of studies attributed to L2.1 and L2.2.

Spain
- *Source:* National census data for 1960, 1970, 1981 and 1991.
- *Population:* 25+
- *Other notes:*
- The 1960 census does not give very detailed information or a breakdown of results by age group, and its results appear implausible in the light of latter data. Hence, we do not use this source (except for illiterates), and construct attainment estimates for 1960 using the 1970 census (which gives a very fine breakdown by age), and the actual age structure of the population in 1960. We interpolate to estimate missing observations.
- The series is not extended to 1995 because the available data (from EAG and OECD/LFS for 1998 and 1995) do not seem compatible with the national data used to construct the series.

Greece
- *Source:* National census data for (1961, 1971), 1981 and 1991. For university we also use EAG with data for 1997, and for secondary data from the LFS supplied by the OECD for 1995.
- *Population:* Census, 25+; EAG and OECD/LFS, 25-64.
- *Attainment categories;* L3.1 = with certificate of intermediate school + attended a higher or intermediate school; L2.1 = have finished at least the third degree of secondary education; L1 = complete or incomplete primary or no schooling but literate; L0 = illiterate. For EAG in 1997 we include the reported figure for ISCED4 in L2.2.
- *Other notes:* The 1981 census has a finer breakdown by age and level than the previous ones. We project it backward using the observed age structures in 1961 and 1971. The results are compatible with the original census data for those years but more detailed. We interpolate to estimate missing observations.
- For illiterates, we extrapolate to 1995 and interpolate between available observations.
- The estimates for 1995 should be considered tentative, as the EAG and OECD/LFS data for this year imply relatively large changes in attainment levels since 1991 and the population of reference changes.

Portugal
- *Sources:* For university: Unesco in 1960, 1970 and 1981 (25+) interpreted as L3.2; OECD (1995) for 1991 and DYB for 1960 interpreted as L3. For secondary educaton: Unesco in 1960 interpreted as L2.2; DYB in 1960 and Unesco in 1970, 1981 and 1991 for L2. For illiterates (L0), World Development Indicators (WDI).
- *Population:* 15+ in WDI, 25-64 in OECD (1995) and 25+ in Unesco and DYB.
- *Other notes:*

- University: We have observations for both L3.1 and L3.2 in 1960 and 1991. We calculate the ratio L3.2/L3 in these two years and interpolate it to 1970 and 1981, where we have Unesco observations that we interpret as L3.2. Using the interpolated ratio and these observations, we estimate L3.1 and L3. Finally, we interpolate for the rest of the years.

- Secondary: We have an observation for L2.1 and L2.2 in 1960, and can obtain another one in 1991 applying the ratio L2.2/L2 in OECD (1995) to the total L2 given in Unesco (which refers to the desired age group). We interpolate the ratio L2.2/L2 between 1960 and 1991 and apply it to available data on L2 to estimate its breakdown. We interpolate for the rest of the years.

- The series is not extended to 1995 because the available data (from EAG and OECD/LFS for 1998 and 1995) do not seem compatible with the national data used to construct the series.

France

- *Sources*: National census for (1960), 1968, 1975 and 1990 and EAG (for 1989).

- *Population*: 25+ not attending school in census data and pop. 25-64 in EAG.

- *Attainment categories* in 1968. L2.1 = CEP, examen de fin d'apprentissage artisanal or certificat de fin de stage de la FPA; L2.2 = BEPC, BE, BEPS, CAP, BEI, BEC, BES, BEH, BEA, etc; L3.1 = bac ou brevet superieur, brevet des ENP, brevet de technicien, etc., autres diplomes; L3.2 = superieur au bac complet.

- *Other notes*: Data for 1960 are backward projections using 1968 attainments by age group and the age structure of the population in 1960. The 1990 Census seems to be missing secondary vocational qualifications, so we use EAG for 1989 instead at the secondary level.

- The series is not extended to 1995 because the available data (from EAG and OECD/LFS for 1998 and 1995) do not seem compatible with the national data used to construct the series.

Ireland

- *Sources*: 1966 national census; Unesco for 1981 and 1991; EAG with data for 1998 and OECD (1995) for ratios L2.2/L2 and L3.2/L3.

- *Population*: 25+ except OECD (1995) and EAG where it is 25-64.

- *Other notes*:

- Figures for 1961 are estimated by a backward projection of the 1966 census data on attainment by age group using the age structure of the population in 1961.

- Census and survey information does not allow a breakdown of L3 and L2 into first and second cycles. We estimate this breakdown using data from OECD (1995). For L2 we have L2.1 and L2.2 in 1991 from Unesco. OECD (1995) gives this ratio by age group; we observe that the ratio L2.1/L2.2 stabilizes for the older age groups around 0.54, which we take as the 1960 value, interpolate this ratio between the two observations and apply the result to our L2 series to recover L2.1 and then L2.2. To recover L3.1 and L3.2 we proceed in a similar way, we use the ratio L3.1/L3 in OECD 1995. Since this ratio does not change much with age in this source, we keep its value constant over time.

- The remaining missing observations are filled in by interpolation. The figures for 1960 are extrapolations from 1961 and 1966 estimates.

Sweden

We use data provided by Allan Nordin of Statistics Sweden on the educational composition of the population 25+ for 1995 (from the Education Register). We refer to these data below as NAT2.

- *Sources:* National Statistical Yearbook for 1970 and NAT2 for 1995.

- *Population:* 25+, (estimated in 1970).

- *Other notes:*

- The earliest available disaggregated data is for 1970 and refers to the population aged 25-60. We want to use this information (and census data on the age structure of the population) to estimate attainment in the same year and in 1960 for the population 25+. First, we extrapolate attainment rates to older cohorts in 1970 as follows. Let F3544 and F4559 be the fraction of the population aged 35-44 and 45-59 which has attained a given level of education. Then, we estimate F6075 and F75+ as follows:

$$F6075 = F4559 + 0.5* (F4559 - F3544)$$

$$F75+ = F4559 + (F4559 - F3544).$$

With this, we can estimate attainments for ages 25+ in 1970, using the age structure of the population in that year. Next, we estimate 1960 using the same information and the age structure in 1960.

- For 1995 we use NAT2. Following the ISCED classification, we take as our measure of L1 attendance to compulsory schooling of a duration of less than 9 years.

- We interpolate to estimate missing observations.

- We disregard the OECD/LFS data because they seem implausible in view of the available Census and Education Register observations, and the Education Register observations for 1980 and 1985 because they are known to significantly understate the educational level of the population.

Norway

- *Source:* Statistics Norway website for 1960, 1970, 1975, 1980, 1985, 1990, 1992 and 1998 and OECD/LFS data for L1 in 1995.

- *Population:* 16+, except for OECD/LFS which is 25-64.

- *Other notes:*

- We interpolate between 1992 and 1998 to estimate 1995.

- Statistics Norway does not disaggregate compulsory education into L1 and L2.1 or tertiary achievement into L3.1 and L3.2. We estimate these categories as follows.

- To estimate L3.1 and L3.2: We have data on these two categories in 1988 for all Scandinavian countries from *Education in Nordic Countries* (1994). We compute the quotient L3.1/L3 for Norway and Sweden and the ratio between them. We then apply this ratio to the Swedish L3.1/L3 series to estimate the Norwegian ratio for all years and use it to recover L3.1 and L3.2.

- Labour Force survey data supplied by the OECD gives a value of 1.54 for L1 in 1995. This coincides approximately with the reading for the 35-44 age group. For 1975 we assume L1 to be equal to the value observed for the 55-64 age group in 1995 (1.88). We then interpolate and extrapolate between these two figures to estimate missing years.

Denmark
- *Sources:* Danish Statistical Yearbooks with data for 1983, 1988, 1991 and 1994 and OECD (1974) for attainment growth rates between 1960 and 1971.
- *Population:* 25-62 or 25-69 not currently enrolled in educational institutions.
- *Other notes:*
- National sources and OECD report only L1+L2.1 (compulsory education). To separate them we use our estimate for L1 in Norway.
- Figures for 1973 are a backward projection using attainment data by age in 1983 and the age structure of the population in 1971. We then extrapolate back to 1970 using the 1973 and 1983 observations. Finally, we use the annual growth rate of attainment between 1960 and 1971 reported in OECD (1974) to estimate 1960 levels of L3 and L2.2 (We use the growth rate of attainments, which is recovered from the original data on average years of schooling by level. It coincides with the original for L3 but not for L2.2 since people with university schooling also have secondary training and we have to subtract them from the total to get those whose maximum attainment level is secondary).
- Backward projection for 1973: The 1983 disaggregation by age stops with the group 60-62. We estimate attainments for the 63-64 population by extrapolating the change between the previous two age groups and weighting it for the "length of the period", and reconstruct attainment for the 60-64 age segment. Then we extrapolate backwards again from consecutive age groups of the same length but assuming that at each step the change in the achievement ratios drops to one half for each category (This is half way between extrapolating and attributing to the oldest group in the population the achievement of the last observed age subgroup).
- Figures for 1995 are an extrapolation using data for 1991 and 1994.
- 1988 Statistical Yearbook secondary attainment figures look implausible and are ignored.
- Tertiary is broken down into three groups: post-secondary vocational (isced5), short university courses and full-length university degrees. We report the sum of the first two groups as L3.1.
- When computing the share of the population with each level of attainment, we disregard the "not stated" category (which is equivalent to imputing them to all attainment levels in proportion to their weight in those who answered the survey). This is consistent with the recommendation of the Danish Statistical Office. For 1994, the original data includes "not stated" together with L1+L2.1. We have estimated their number (by assuming that their weight in the total population 25+ not currently enrolled in school is the same as in 1991) and subtracted them from L1+L2.1 before computing percentages.
- The 1998 data from EAG does not seem compatible with our series.

Finland

- *Sources:* For 1970-95, we use data provided by Alia Repo of Statistics Finland. These data are obtained from the Register of Completed Education and Degrees and their breakdown by levels is compatible with our own except that L1 and L2.1 are grouped together. We also use data from UNESCO on L3 for 1960 and 1970, and on L2, interpreted as L2.2 for 1960, from the DYB for L2 in 1960 and from EAG for L2.1 in 1990.

- *Population:* 25+ for 1970-95; EAG is 25-64; Unesco and DYB, 25+.

- *Other notes:*

- The Statistics Finland data seem to refer to people who have completed (rather than started) each educational level.

- To extend the L3.1 and L3.2 series back from 1970 to 1960 we use the growth rate implied by the Unesco L3 readings for these two years. We then interpolate between 1960 and 1970 to estimate 1965. We cannot use the Unesco readings directly because their 1970 values seem inconsistent with the national data. The UNESCO data falls in between the national readings for L3.2 and L3. They may refer either to started, rather than completed, upper-level university studies or to some definition of university attainment that includes some but not all of the studies that we are including in L3.1.

- To complete the L2.2 series we use UNESCO's L2 reading for 1960, interpreted as L2.2 and interpolate between this observation and the one in 1970 to estimate L2.2 in 1965.

- To complete the L1+L2.1 series and separate the two attainment categories we proceed as follows. For 1990, EAG gives us an estimate of L2.1. For 1960, we estimate L2.1 as the difference between the L2 in DYB and the Unesco observation for L2 that we interpret as L2.2. We then calculate L1+L2.1 for 1960 and interpolate between this year and 1970 to estimate L1+L2.1 in 1965. Next, we calculate the ratio L2.1/(L1+L2.1) for 1960, and 1990, interpolate it for missing years and extrapolate it to 1995. Using this ratio and the observed or estimated value of L1+L2.1, we estimate L2.1 in missing years and complete the series.

Japan

- *Sources:* We use data supplied by Takao Ito of Japan's Statistical Office. The original source are the national censuses of 1960, 1970, 1980 and 1990. They provide information on L1+L2.1, L2.2, L3.1 and L3.3 for each census years.

- *Population:* 25+

- *Other notes:*

- We include in each educational level all those who have either completed it or are currently enrolled in it. For 1960 and 1970 we only have the total number of people over 25 who are currently enrolled in some educational institution, but we do not know the breakdown by level. To estimate it, we use the shares of each level in total enrollment in 1980.

- We interpolate between available observations to estimate missing ones.

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- To disaggregate L1 and L2.1 we use a regression estimate of the ratio L1/(L1+L2.1). See Section 2 for a more detailed description of the procedure.

- The series is not extended to 1995 because the available data (from EAG and OECD/LFS for 1998 and 1995) do not seem compatible with the national data used to construct the series.

New Zealand

- *Sources:* Higher education: Statistical Yearbook for 1965 and 1970, interpreted as L3.2, and for 1975 and 1981, interpreted as L3; OECD (1995) for 1992 and EAG for 1998 with full breakdown. Secondary schooling: Statistical Yearbook for 1965; for 1981 we use the DYB and add to this source's reported L2.2 part of Barro and Lee's (1996) L3, as explained below. For 1992 we use OECD (1995), adding to L2.2 part of Barro and Lee's L3.1, as above. For 1998 we use EAG.

- *Population:* 25+ except OECD (1995) and EAG where it is 25-64.

- *Other notes:*

- Higher education: We interpolate L3.2 between 1970 and 1992, compute the ratio L3.2/L3 for 1975 onwards and extrapolate this ratio back to recover L3 and its breakdown in 1965 and 1970. Finally, we extrapolate backward L3 and the ratio L3.2/L3 to estimate attainments in 1960. We assume the difference between Barro and Lee's L3 and our estimate is part of L2.2 and add it to that category.

- Secondary education: For L2, we interpolate between 1965, 1981 and 1992, and extrapolate backward to 1960. We compute the ratio L2.2/L2 in 1981 and 1992 and interpolate it between these years. We assume this ratio remains constant for all years before 1981 and use it to break down L2 into its upper and lower levels.

- For 1995 we interpolate between 1992 and 1998. EAG does not break down L1 and L2.1. We assume the ratio L1/(L1+L2.1) remains constant at its 1992 value.

- The estimates for 1995 should be considered tentative.

UK

Peter Scrimgeour and Wilma Schofield, of the Education and Children Statistics service of the Scottish Executive, provide data for Great Britain obtained from the 1971, 1981 and 1991 censuses for L.1+L.2, L3.1 and L3.2 and additional series for 1985 and recent years based on the Labour Force Survey (NAT2).

- *Sources:* For higher education, in 1960 Unesco interpreted as L3.2; in 1971, 1981 and 1991 L3.1 and L3.2 from NAT2 (with Census data). For secondary attainment: Unesco for 1960 and 1970 interpreted as L2.2, and NAT2 (from Labor Force Survey data for the entire UK for 25+) for 1993.

- *Population:* NAT2 25+, UNESCO 25+.

- *Other notes:*

- Higher education: We interpolate L3.2 between 1960 and 1991 to recover the full series, and L3.1 between 1971 and 1991. We then compute the ratio L3.1/L3.2 in 1971 and 1981, extrapolate it

backward to 1961 and use it with the observed L3.2 to estimate L3.1 in that year. Finally, we interpolate to estimate L3.1 and L3.2 in 1965 and 1970.

- Secondary education: We interpolate between available observations to complete the L2.2 series. To construct L2.1, we use a regression estimate of the ratio L2.1/L1+L2.1.

- The series is not extended to 1995 because the available data (from EAG and OECD/LFS for 1998 and 1995) do not seem compatible with the national data used to construct the series. The NAT2 Census and Labour Force Survey observations for around 1990 look very different from each other in terms of university attainment. We stick with the census data and do not use the LFS series to extend the data to 1995.

Switzerland

We reproduce with only minor adjustments the estimates supplied by Anna Borkowsky, from the Swiss Federal Office of Statistics for 1960, 1970, 1980, 1991 and 1995. To estimate attainment levels in 1965, 1975, 1985 and 1990, we interpolate between the closest available years.

- *Sources:* Censuses of 1960, 1970 (harmonized version) and 1980 (harmonized version), Labor Force Surveys for 1991 and 1995, and 1994 survey for IALS.

- *Population:* 25+

- *Other notes:* The estimates include vocational training at the appropriate level. The cutoff between L1 and L2.1 is set at 8 years of schooling (9 being required for inclusion in L2.1). The 1994 IALS survey contains rather detailed data disaggregated by age group which is used to construct backward extrapolations and to make several corrections or refinements of the data provided by other sources.

Austria

- *Sources:* University, Unesco for 1961, 1971, 1981 and 1991 interpreted as L3.2 and 1995 Microcensus for L3.1 and L3.2. Secondary, L2.2 from the Austrian Statistical Yearbook for 1961, 1971, 1981 and 1991 and the 1995 Microcensus.

- *Population:* Unesco, 25+; microcensus, 15+; Austrian Statistical Yearbook, 16+.

- *Other notes:*

- University: We use the ratio L3.1/L3.2 from the 1995 microcensus (which does not vary significantly across age groups) to estimate L3.1 in years before 1995. Our guess for L3.1 in the 1995 microcensus is called "secondary technical and vocational" and lasts 5 years, two more than other upper secondary categories. We don't use the Austrian Statistical Yearbook series for university schooling because it refers to the population 16+ and will tend to underestimate tertiary attainment.

- Secondary: For 1961-91, we guess that reported L2.2 includes our estimate of L3.1, so we subtract it from reported L2.2 to obtain the final estimate. For L2.2, we interpolate between available observations and extrapolate backward from 1961 to 1960. To estimate L2.1, we use the L2.1/(L1+L2.1) ratio for Germany until 1985. For 1995 we have direct Austrian data on L1 from the Microcensus and for 1990 we interpolate L1 between 1985 and 1995.

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Australia

- *Sources:* University, in 1966 Unesco (as reported in Barro and Lee for 1965) interpreted as L3.2; in 1971 Unesco (as reported in Barro and Lee for 1970) as L3, and in 1982, 1992 and 1997 Year Book Australia 1994 as explained below (YBK). Secondary: For 1966 we use as L2 Unesco minus our estimate of L3.1; for 1971 Unesco as L2, for 1982, 1992 and 1997 YBK.

- *Population:* 25+ (for YBK it is 25-69 in 1992).

- *Other notes:*

- Year Book Australia 1994 gives data on the educational attainment of the population 15-69 not attending school broken down by age group in 1992. These data is roughly consistent with EAG figures for 1991 provided we allocate "trade qualifications" to L2.2. Under the same condition, the data is also roughly consistent in terms of the breakdown between those with and without post-school qualifications and the weight of L3.2 with 1991 Census data supplied by Philip Everingham of the Australian Bureau of Statistics, after we correct the latter source for an estimate of the population attending school using YBK data for 1991. The share of L3.1 and trade qualifications in the latter source is much lower than in the YBK, but this may be because a large fraction of those reporting post-school qualifications in the Census data are reported under "not classifiable" and "not stated." Since the Yearbook data contain additional detail on the breakdown by levels and ages, we have relied primarily on it for our end-of-period estimates.

For 1992, we use the breakdown given in the Year Book for the 25-69 population not currently attending school as follows: L3.2 = degree; L3.1 = certificate or diploma; L2.2 = trade qualification, other post-school qualification, attended highest secondary school available or left school at age 16 or over; L2.1 = left school at ages 14 or 15; and L0+L1 = left school at age 13 or under or did not attend school. For 1982 we use the 1992 data for the age group 35+. For 1997 we use 1992 data for the age group 20+ with the following adjustement. We take from the Year Book the total number of people aged 20-24 who were attending in 1991 either a university or a Technical and Further Education (TAFE) course. We subtract these figures from the L2.2 obtained from the 1992 data for the population 20+, and add them to L3.1 and L3.2. We allocate to L3.1 all TAFE students and a share of the university student equal to the fraction of 1991 university enrollment that was following shorter degrees (diploma and associate).

- For 1982 onward, we interpolate between available observations for all schooling levels. For prior years we proceed as explained below.

- University: We interpolate between 1966 and 1982 to estimate L3.2, and between 1971 and 1982 to estimate L3.1. We extrapolate backward L3.2 to 1965 and 1960. Then, we compute the ratio L3.2/L3 in 1971 and 1982 and extrapolate it backward to 1970, 1965 and 1960. We use the estimated ratio to recover L3 (and hence L3.1) in 1960, 1965 and 1970.

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- Secondary: We interpolate L2 for missing years after 1966 and extrapolate it backward to 1965 and 1960. We then compute the ratio L2.2/L2 in 1982 and 1992 and extrapolate it backward. Using this ratio we estimate L2.1 and L2.2.

West Germany

- *Sources:* Walter Hörner, of the Federal Statistical Office, provided partial data for the territory of the former West Germany from the 1961, 1970 and 1987 Censuses and the Labor Force Surveys of 1976, 1982, 1985, 1991 and 1995. We will refer to these data below as NAT2.

- L3.2: NAT2 for 1961, 1970, 1976, 1982, 1985, 1991 and 1995.

- L3.1: NAT2 for 1976, 1982, 1985, 1991 and 1995.

- L1: NAT2 for 1970 and 1985,

- For L2.2 we use NAT2 for 1991 and 1995, EAG for 1989 and for 1970 and 1980 DYB interpreted as L2.2.

- *Population:* DYB, 25+; EAG, 25-64; NAT2 (?).

- *Other notes:*

- University: We interpolate between available observations. For L2 we extrapolate backward to estimate 1960. To estimate L3.1 in 1960, 1965 and 1970, we extrapolate back the L3.1/L3.2 ratio using its 1976 and 1982 values and use the result and the observed values of L3.2 in these years to compute L3.1.

- Primary schooling: we interpolate and extrapolate to recover missing observations, assuming that L1 becomes zero from 1990 onward (the extrapolation becomes negative otherwise).

- Given L1 and L3 we have an estimate of L2. In some years we have a direct observation of L2.2 and we recover L2.1 as the difference L2 - L2.2. To separate L2.1 from L2.2 in 1960 and 1965, we extrapolate backward the ratio L2.1/L2 using the 1970 and 1980 observations and apply the result to L.2. For 1975, 1985 and 1990 we interpolate L2.2 between available observations and obtain L2.1 as a residual.

United Germany   (only in 1991 and 1995)

- We use EAG for 1991 and data from the Labor Force Survey (25-64) collected by the OECD for the INES project for 1995. NAT2 gives a reading for L1 in 1996. We project it backward to 1995 and 1991 using the annual growth rate of L1 between 1970 and 1985 in West Germany. For each year, we subtract the result of this projection from the original L2.1 value.

Canada

- *Sources:* Statistics Canada has provided us with data on L1+L2.1, L2.2, L3.1 and L3.2 at five year intervals between 1971 and 1996 and with additional observations for L1+L2.1, L2.2+L3.1 and L3.2 for 1951 and 1961. For 1961 we use UNESCO data for L3 and estimate L3.1 as the difference between the UNESCO figure and the L3.2 reading provided by Statistics Canada. For 1961 we subtract from the

reported figure for L2.2+L3.1 our estimate of L3.1 to obtain L2.2. We use LFS data provided by the OECD to obtain the ratio L1/(L1+L2.1) for 1995.

- *Population:* 25+.

- *Other notes:*

- We interpolate to fill in missing observations and to estimate values at five-year intervals starting in 1960 rather than in 1961. For secondary schooling and L3.1, we use the 1961 and 1971 observations or estimates to extrapolate back to 1960. For L3.2 we interpolate between 1951 and 1961.

- We interpret as L3.2 data on people who have obtained a Bachelors or higher university degree, and as L3.1 other non-university higher education, shorter degrees and university attendance without a degree. For L1+L2.1 we use data on less than grade 9 achievement, and for L2.2 the sum of grades 9-13 and trades certificate or diploma.

- No data are reported by Statistics Canada for L2.1, which is grouped together with L2.1 as a single category (less than grade 9). For 1995 we have separate estimates of L1 and L2.1 from Labour Force Survey data provided by the OECD. To estimate L2.1 in 1995 we apply the ratio L1/(L1+L2.1) from these data to the total L1+L2.1 from Statistics Canada. For earlier years, we extrapolate back this ratio using the growth rate of the same ratio for the US and proceed in the same way.

5. Data tables and comparative figures

Tables 4-6 contain our estimates of attainment levels (in percentages) for the adult population. We report higher and secondary attainment for all countries in the sample, and an illiteracy series for four countries (Spain, Italy, Greece and Portugal). For the remaining countries, illiteracy rates are extremely low and are therefore ignored. Primary attainment can be obtained as L1 = 100 - L3 - L2 (- L0). Character types are used to indicate data quality as indicated in the note to Table 4.

Table 7 contains an estimate of the average number of years of total schooling. This variable is constructed by combining the attainment series with the cumulative durations by educational level and country given in Table 2.

Tables 8-10 give the data sources and summarize the estimation method used to obtain each observation. See the notes to Table 8 for a key to the notation used in these tables. Notice that interpolations are generally constructed taking into account the exact year to which the original observation refers, rather than bringing them to the beginning or the end of the quinquenium.

Figures A1-A3 compare our current estimates (2001, version 2.1) of average years of schooling and secondary and higher attainment rates with those from the previous version of this data set (2000, version 1.0). The use of the newly available national data has resulted in significant changes in our estimates for average years of schooling in Canada, Switzerland, Germany, Finland, Denmark and Norway. In the last two cases the change is due mostly to the important reduction in our estimate of primary attainment. Our estimate of years of schooling in the US changes because we have changed the assumed duration of L1 and L2.1 to make it compatible with our cutoffs for these levels. Figures

B1-B4, finally, plot our new series together with Barro and Lee's (1996) and (2000) estimates to facilitate country-by-country comparisons between the two data sets.

Table 4: University attainment levels

Country	level	1960	1965	1970	1975	1980	1985	1990	1995
USA	L3	16.50	18.30	21.20	26.30	31.90	35.70	39.20	47.80
USA	L3.1	8.80	8.90	10.20	12.40	14.90	16.30	17.90	24.80
USA	L3.2	7.70	9.40	11.00	13.90	17.00	19.40	21.30	23.00
Neth.	L3	3.30	4.64	5.97	8.22	10.70	13.18	15.66	19.38
Neth.	L3.1	1.90	3.11	4.32	5.92	7.62	9.32	11.02	13.74
Neth.	L3.2	1.40	1.53	1.65	2.30	3.08	3.86	4.64	5.64
Italy	L3.2 = L3	1.96	2.66	3.37	4.05	4.73	5.44	6.30	7.8
Belgium	L3	7.75	9.91	12.07	13.70	15.33	17.93	20.77	24.60
Belgium	L3.1	3.75	5.16	6.57	7.02	7.46	8.87	10.59	13.56
Belgium	L3.2	4.00	4.75	5.50	6.68	7.87	9.05	10.17	11.05
Spain	L3	3.07	3.53	3.98	5.41	6.84	8.17	9.48	
Spain	L3.1	1.59	1.85	2.11	2.77	3.43	4.08	4.73	
Spain	L3.2	1.48	1.68	1.87	2.64	3.42	4.09	4.75	
Greece	L3	3.71	4.31	4.92	6.56	8.45	9.73	10.86	14.03
Greece	L3.1	1.13	1.31	1.49	2.43	3.56	3.41	2.93	3.74
Greece	L3.2	2.58	3.00	3.43	4.12	4.89	6.33	7.94	10.29
Portugal	L3	1.50	1.70	1.90	3.18	4.46	5.51	6.50	
Portugal	L3.1	0.40	0.45	0.50	0.82	1.15	1.41	1.65	
Portugal	L3.2	1.10	1.25	1.40	2.35	3.31	4.10	4.85	
France	L3	9.41	10.43	11.79	13.68	16.43	19.17	21.92	
France	L3.1	6.83	7.54	8.32	9.19	11.48	13.76	16.05	
France	L3.2	2.58	2.89	3.48	4.49	4.95	5.41	5.87	
Ireland	L3	3.99	4.36	5.36	6.51	7.67	10.58	13.93	18.31
Ireland	L3.1	2.03	2.22	2.73	3.31	3.90	5.38	7.09	9.18
Ireland	L3.2	1.96	2.14	2.63	3.20	3.77	5.20	6.84	9.13
Sweden	L3	4.83	5.74	6.65	10.12	13.60	17.07	20.55	24.02
Sweden	L3.1	2.1	2.405	2.71	4.68	6.65	8.62	10.59	12.56
Sweden	L3.2	2.73	3.335	3.94	5.44	6.95	8.45	9.96	11.46
Norway	L3	4.20	5.45	6.70	8.70	11.10	13.60	15.70	19.65
Norway	L3.1	2.00	2.50	3.00	4.41	5.96	7.54	8.88	11.28
Norway	L3.2	2.20	2.95	3.70	4.29	5.14	6.06	6.82	8.37
Denmark	L3	7.08	9.93	12.79	14.79	16.78	18.26	19.31	20.84
Denmark	L3.1	5.26	7.39	9.52	11.19	12.87	14.01	14.61	15.70
Denmark	L3.2	1.81	2.55	3.28	3.60	3.92	4.25	4.70	5.14
Finland	L3	6.86	8.53	10.21	12.56	15.11	17.58	20.20	23.63
Finland	L3.1	4.01	4.98	5.96	7.19	8.46	9.81	11.38	13.41
Finland	L3.2	2.85	3.55	4.25	5.38	6.65	7.76	8.82	10.23
Japan	L3	7.08	8.32	9.56	12.01	14.45	17.84	21.23	
Japan	L3.1	3.61	3.785	3.96	4.73	5.50	7.03	8.56	
Japan	L3.2	3.47	4.535	5.60	7.23	8.95	10.81	12.67	

Table 4: University attainment levels (continued)

Country	level	1960	1965	1970	1975	1980	1985	1990	1995
N. Zealand	L3	11.96	14.08	16.20	18.90	21.44	22.55	23.30	25.10
N. Zealand	L3.1	7.86	9.11	10.31	11.83	13.19	13.14	12.69	13.20
N. Zealand	L3.2	4.09	4.97	5.89	7.07	8.25	9.41	10.61	11.90
UK	L3	4.90	6.26	7.63	8.85	10.04	11.90	13.93	
UK	L3.1	3.10	3.72	4.35	4.61	4.79	5.61	6.59	
UK	L3.2	1.80	2.54	3.28	4.24	5.25	6.29	7.34	
Switzerland	L3	4.24	5.80	7.36	9.17	10.98	14.11	17.24	19.11
Switzerland	L3.1	1.47	2.74	4.00	5.08	6.15	8.63	11.10	11.08
Switzerland	L3.2	2.77	3.07	3.36	4.10	4.83	5.48	6.14	8.03
Austria	L3	4.12	4.50	4.88	6.03	7.36	9.23	11.24	12.40
Austria	L3.1	1.96	2.14	2.32	2.87	3.50	4.39	5.35	5.90
Austria	L3.2	2.16	2.36	2.56	3.16	3.86	4.84	5.89	6.50
Australia	L3	10.60	15.98	20.64	24.46	28.15	30.17	31.08	33.05
Australia	L3.1	7.91	11.62	14.60	16.74	18.75	19.86	20.37	21.60
Australia	L3.2	2.69	4.36	6.04	7.72	9.40	10.31	10.71	11.46
W. Germany	L3	4.18	6.72	9.12	11.35	13.20	15.60	18.52	20.50
W. Germany	L3.1	2.14	3.36	4.42	5.32	5.97	6.70	7.78	7.80
W. Germany	L3.2	2.03	3.37	4.70	6.03	7.23	8.90	10.73	12.70
Germany*	L3							21.80	22.60
Germany	L3.1							10.60	9.69
Germany	L3.2							11.20	12.91
Canada	L3	12.36	16.42	20.57	29.32	36.26	40.38	43.82	48.02
Canada	L3.1	9.07	12.22	15.37	22.16	27.06	29.58	31.36	33.54
Canada	L3.2	3.29	4.20	5.20	7.16	9.20	10.80	12.46	14.48

(*) *Germany* refers to the united country. In this case, the "1990" observations refer to 1991.

- *Note:* Character types are used to indicate the quality of the data. A **bold** character indicates a direct census or survey observation (or interpolation from census or survey data no more than two years away in time). ***Bold italic*** indicates that we are using census or survey data (usually from Unesco or DYB compilations) after reinterpreting it as an attainment category slightly different from the one reported in the original source. *Italics* are used for educated guesses based on census or survey information (e.g. when we apply ratios from a census sources to DYB totals to break down an attainment category into subcategories). The rest of the observations are interpolations or more uncertain estimates.

Table 5: Secondary attainment levels

country	level	1960	1965	1970	1975	1980	1985	1990	1995
USA	L.2	75.20	74.90	73.50	69.50	64.80	61.60	58.40	50.40
USA	L2.1	31.40	26.20	22.40	17.70	14.10	11.20	8.80	6.50
USA	L2.2	43.80	48.70	51.10	51.80	50.70	50.40	49.60	43.90
Neth.	L.2	40.60	46.00	51.39	55.18	58.57	61.96	65.35	65.62
Neth.	L2.1	33.50	37.81	42.13	40.12	36.52	32.93	29.34	26.95
Neth.	L2.2	7.10	8.18	9.26	15.07	22.05	29.03	36.01	38.67
Italy	L2	12.84	17.85	22.87	28.44	34.15	40.88	47.87	52.64
Italy	L2.1	8.92	12.28	15.65	19.32	23.06	26.56	30.00	30.35
Italy	L2.2	3.92	5.57	7.22	9.12	11.09	14.32	17.87	22.29
Belgium	L2	27.55	31.05	34.55	40.07	45.59	48.35	50.24	51.44
Belgium	L2.1	22.14	23.14	24.13	25.99	27.85	29.11	30.14	30.87
Belgium	L2.2	5.41	7.91	10.41	14.07	17.74	19.24	20.10	20.58
Spain	L2	4.20	5.03	5.85	9.21	12.57	19.74	27.86	
Spain	L2.1	2.17	2.71	3.24	5.21	7.18	10.95	15.17	
Spain	L2.2	2.03	2.32	2.61	4.00	5.39	8.79	12.69	
Greece	L2	12.53	13.75	14.97	16.89	19.00	22.30	25.89	33.02
Greece	L2.1	4.31	4.58	4.86	5.34	5.87	6.10	6.24	7.92
Greece	L2.2	8.22	9.17	10.11	11.56	13.13	16.20	19.65	25.10
Portugal	L2	6.40	6.60	6.80	8.53	10.25	12.28	14.38	
Portugal	L2.1	2.90	3.07	3.24	4.19	5.13	6.30	7.53	
Portugal	L2.2	3.50	3.53	3.56	4.34	5.12	5.98	6.85	
France	L2	47.45	53.99	59.28	62.70	61.38	60.06	58.74	
France	L2.1	36.18	40.31	41.40	37.95	33.68	29.41	25.15	
France	L2.2	11.27	13.69	17.89	24.75	27.70	30.64	33.59	
Ireland	L2	22.98	25.96	30.09	34.50	38.92	42.36	45.56	51.69
Ireland	L2.1	12.43	13.48	14.86	16.32	17.79	18.49	19.00	22.81
Ireland	L2.2	10.56	12.48	15.23	18.18	21.13	23.87	26.56	28.87
Sweden	L2	30.22	33.80	37.38	40.97	44.57	48.16	51.76	55.35
Sweden	L2.1	7.25	8.39	9.53	9.86	10.19	10.51	10.84	11.17
Sweden	L2.2	22.97	25.41	27.85	31.12	34.38	37.65	40.91	44.18
Norway	L2	93.67	92.50	91.34	89.42	87.11	84.69	82.68	78.81
Norway	L2.1	77.37	72.40	67.44	61.92	55.01	46.39	41.28	30.16
Norway	L2.2	16.3	20.1	23.9	27.5	32.1	38.3	41.4	48.65
Norway	L1+L2.1	79.5	74.45	69.4	63.8	56.8	48.1	42.9	31.7
Denmark	L2	90.79	88.02	85.24	83.33	81.42	80.03	79.06	77.62
Denmark	L2.1	54.84	52.34	49.85	45.21	40.58	37.76	37.32	34.66
Denmark	L2.2	35.95	35.67	35.40	38.12	40.85	42.27	41.75	42.96
Denmark	L1+L2.1	56.98	54.39	51.81	47.09	42.37	39.47	38.94	36.20

Table 5: Secondary attainment levels (continued)

country	level	1960	1965	1970	1975	1980	1985	1990	1995
Finland	L2	27.80	38.08	47.37	55.42	62.81	68.42	72.41	74.21
Finland	L2.1	21.80	28.77	34.75	39.19	41.09	42.11	42.00	41.53
Finland	L2.2	6.00	9.31	12.62	16.22	21.72	26.32	30.41	32.67
Finland	L1+2.1	87.14	82.16	77.17	71.21	63.17	56.11	49.38	43.69
Japan	L2	44.41	48.83	52.89	58.55	63.21	64.48	65.20	
Japan	L2.1	22.75	23.45	23.79	24.13	23.47	22.41	20.80	
Japan	L2.2	21.66	25.38	29.1	34.42	39.74	42.07	44.4	
Japan	L1+2.1	71.26	66.3	61.34	53.58	45.81	40.09	34.37	
N.Zealand	L2	53.82	54.80	55.78	56.77	57.75	58.70	59.63	58.65
N.Zealand	L2.1	21.11	21.49	21.88	22.27	22.65	18.71	13.52	11.30
N.Zealand	L2.2	32.71	33.31	33.90	34.50	35.10	39.99	46.11	47.35
UK	L2	46.75	49.42	51.90	55.76	59.29	62.54	65.33	
UK	L2.1	22.25	22.72	23.00	23.23	23.12	22.74	21.89	
UK	L2.2	24.50	26.70	28.90	32.53	36.17	39.80	43.44	
UK	L1+2.1	70.60	67.04	63.47	58.61	53.79	48.29	42.63	
Switzerl.	L2	64.53	67.73	70.93	71.79	72.65	72.19	71.72	71.62
Switzerl.	L2.1	21.19	20.59	19.98	19.58	19.17	18.13	17.10	14.88
Switzerl.	L2.2	43.34	47.15	50.95	52.22	53.48	54.05	54.63	56.74
Austria	L2	73.01	74.82	77.03	79.79	83.26	87.13	86.59	86.89
Austria	L2.1	41.25	42.25	43.65	43.23	42.92	43.37	39.49	35.39
Austria	L2.2	31.76	32.57	33.38	36.56	40.33	43.76	47.10	51.50
Austria	L1+2.1	64.12	62.93	61.74	57.41	52.30	47.00	41.66	36.10
Australia	L2	40.89	44.26	47.63	53.73	60.52	63.22	63.21	61.96
Australia	L2.1	24.33	24.91	25.28	26.80	28.25	27.49	25.46	23.57
Australia	L2.2	16.57	19.35	22.34	26.93	32.26	35.73	37.74	38.39
W. Germany	L2	73.56	75.04	76.68	78.48	80.67	82.30	81.48	79.50
W. Germany	L2.1	40.17	37.27	34.28	30.98	28.07	25.03	21.03	18.60
W. Germany	L2.2	33.38	37.78	42.40	47.50	52.60	57.27	60.45	60.90
Germany*	L2							73.65	74.79
Germany	L2.1							13.65	13.71
Germany	L2.2							60.00	61.08
Canada	L2	69,73	67,87	66,66	59.78	55.16	52.45	49.95	46.67
Canada	L2.1	31,91	28,65	26,04	22.16	17.72	14.29	10.69	8.93
Canada	L2.2	37.82	39.22	40.62	37.62	37.44	38.16	39.26	37.74
Canada	L1+2.1	49.82	44.36	38.81	33.06	26.30	21.46	16.92	14.24

(*) Germany refers to the united country. In this case, the "1990" observations refer to 1991.

Table 6: Illiteracy rates

country	level	1960	1965	1970	1975	1980	1985	1990	1995
Italy	L0	8.58	7.29	6.00	5.10	3.41	2.698	2.23	1.77
Spain	L0	11.20	10.63	10.05	9.48	8.90	7.01	4.79	
Greece	L0	23.92	20.81	17.69	14.78	11.92	10.35	9.09	7.84
Portugal	L0	34.00	30.20	26.40	22.60	18.30	15.70	12.80	

Table 7: Average years of schooling

country	1960	1965	1970	1975	1980	1985	1990	1995
Australia	9.84	10.48	11.06	11.72	12.41	12.76	12.88	13.01
Austria	9.00	9.16	9.34	9.75	10.28	10.88	11.31	11.71
Belgium	7.73	8.11	8.49	8.92	9.36	9.73	10.08	10.49
Canada	10.37	10.73	11.12	11.63	12.13	12.46	12.74	13.00
Denmark	10.78	10.94	11.10	11.32	11.54	11.68	11.73	11.87
Finland	7.65	8.21	8.74	9.32	9.94	10.48	10.97	11.40
France	8.13	8.57	9.04	9.57	9.86	10.16	10.45	
W. Germany	9.91	10.44	10.97	11.50	12.01	12.55	12.95	13.11
United Germany							12.85	13.06
Greece	5.56	5.87	6.18	6.62	7.09	7.51	7.91	8.68
Ireland	7.36	7.54	7.84	8.17	8.49	8.94	9.41	10.06
Italy	5.41	5.80	6.19	6.58	6.98	7.51	8.04	8.62
Japan	8.62	8.98	9.34	9.90	10.42	10.84	11.24	
Netherlands	8.11	8.48	8.85	9.35	9.88	10.42	10.95	11.39
Norway	9.68	9.87	10.07	10.29	10.57	10.90	11.11	11.56
New Zealand	10.46	10.72	10.98	11.30	11.60	11.86	12.11	12.26
Portugal	4.37	4.62	4.87	5.29	5.73	6.06	6.41	
Spain	4.97	5.08	5.19	5.53	5.87	6.45	7.10	
Sweden	8.04	8.30	8.57	9.08	9.60	10.11	10.62	11.14
Switzerland	10.43	10.79	11.15	11.39	11.63	11.93	12.23	12.50
USA	10.56	10.96	11.32	11.76	12.15	12.44	12.67	13.01
UK	8.57	8.84	9.10	9.44	9.77	10.15	10.52	

Figure A.1: Average years of schooling of the population 25 and over (Human).
(Old and new estimates)

Figure A.2: Percentage of the population 25 and over with secondary education.
(Old and new estimates)
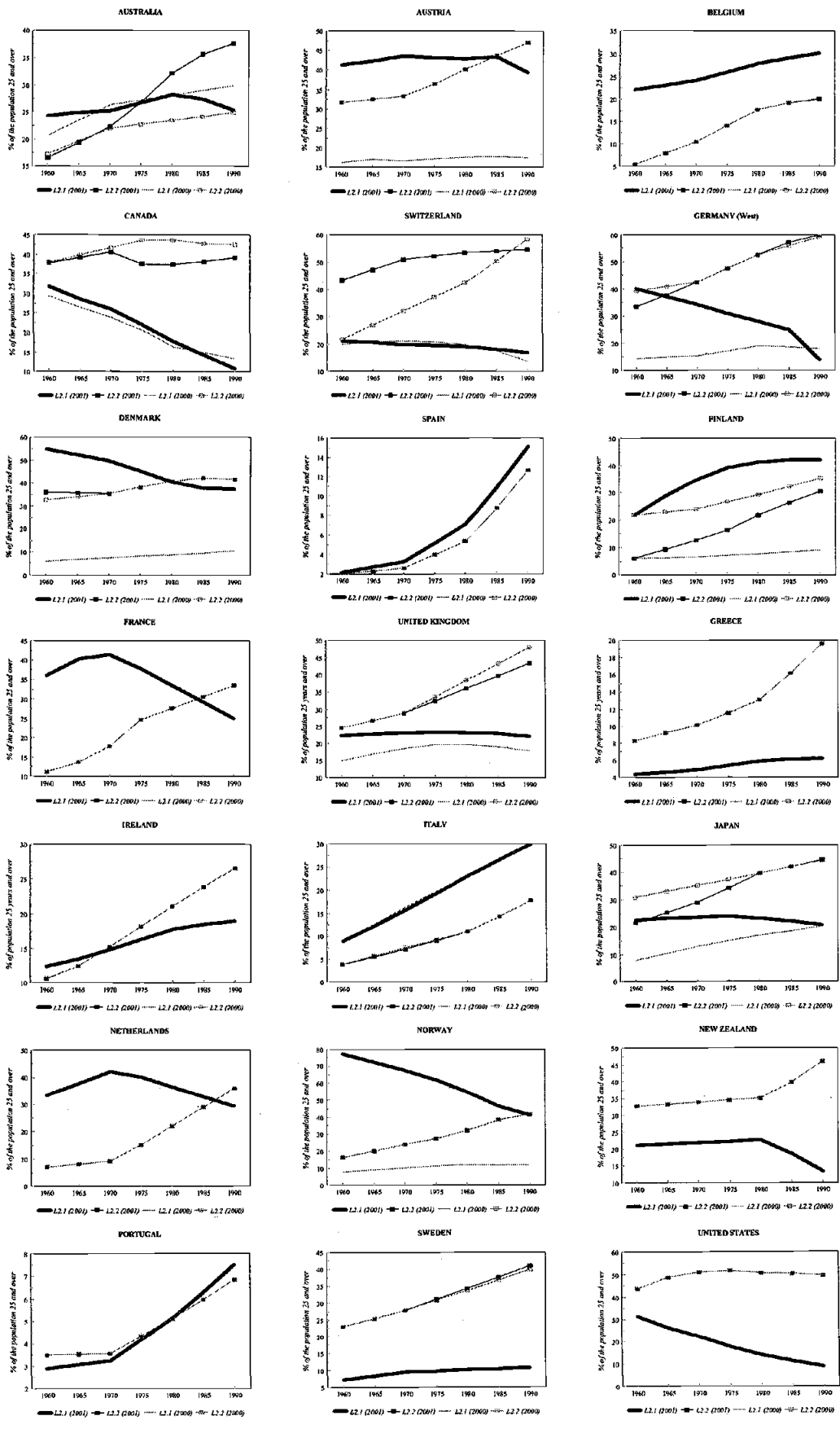
Figure A.3: Percentage of the population 25 and over with higher education.
(Old and new estimates)

Figure B.1: Average years of schooling of the population 25 and over.
(January, 2001)

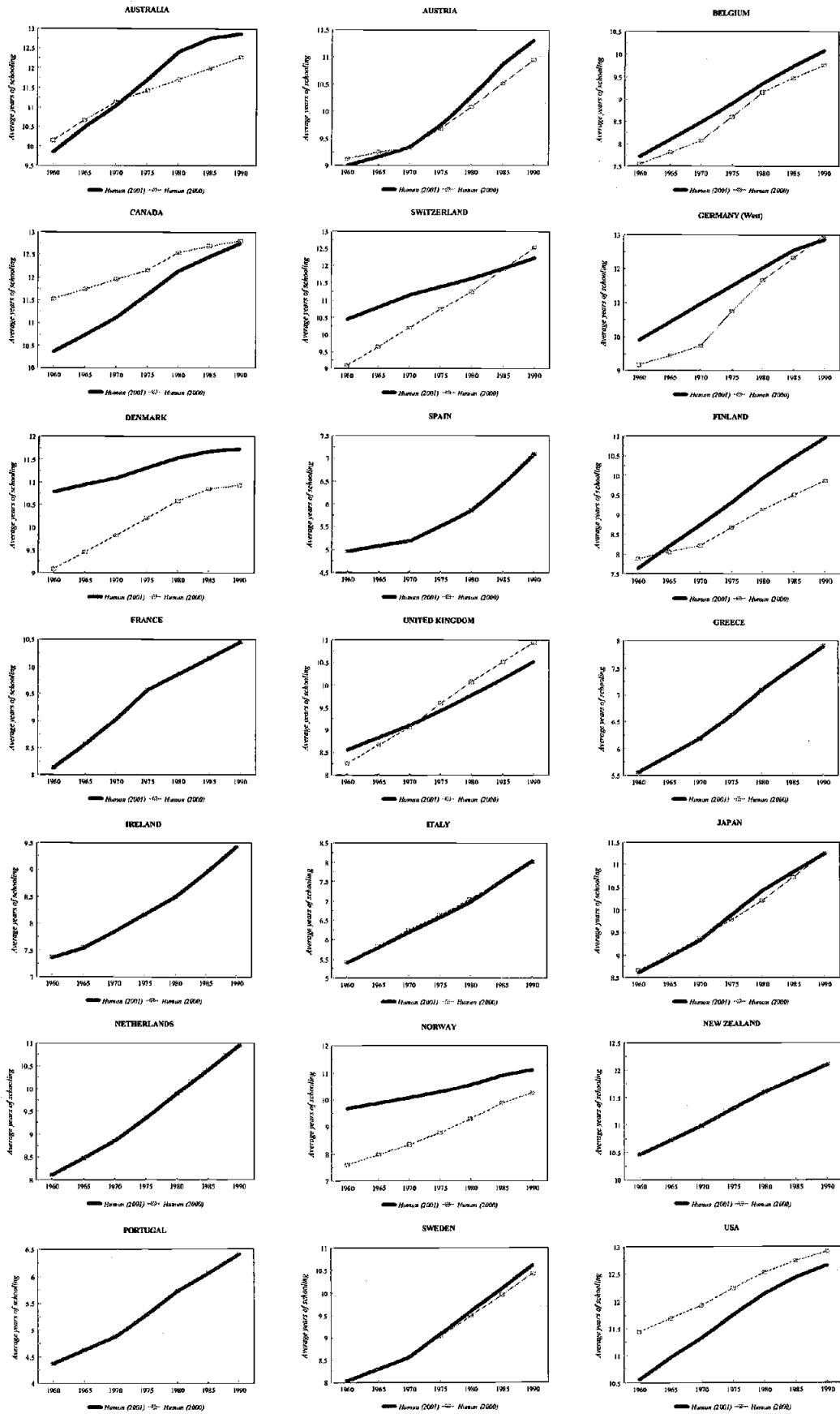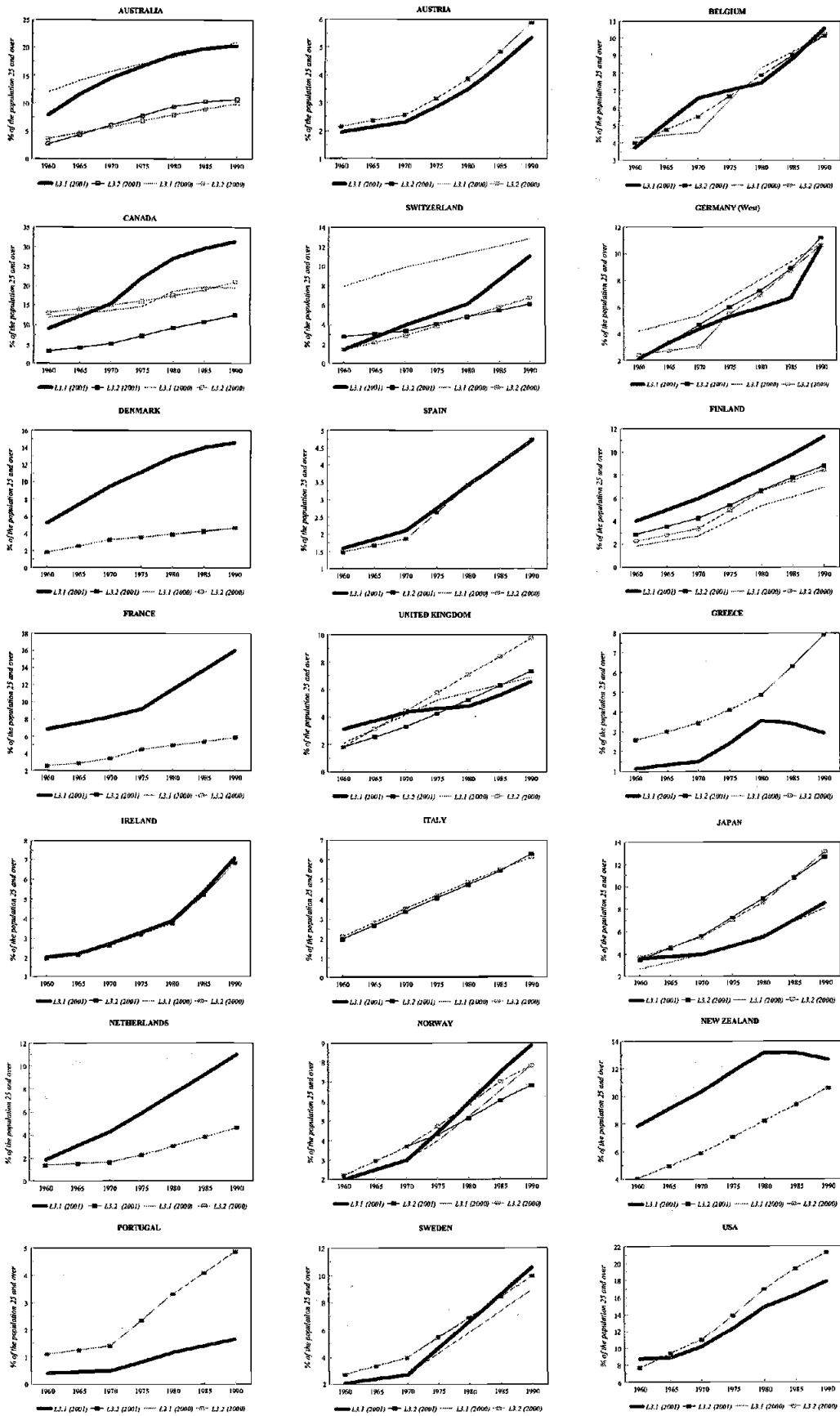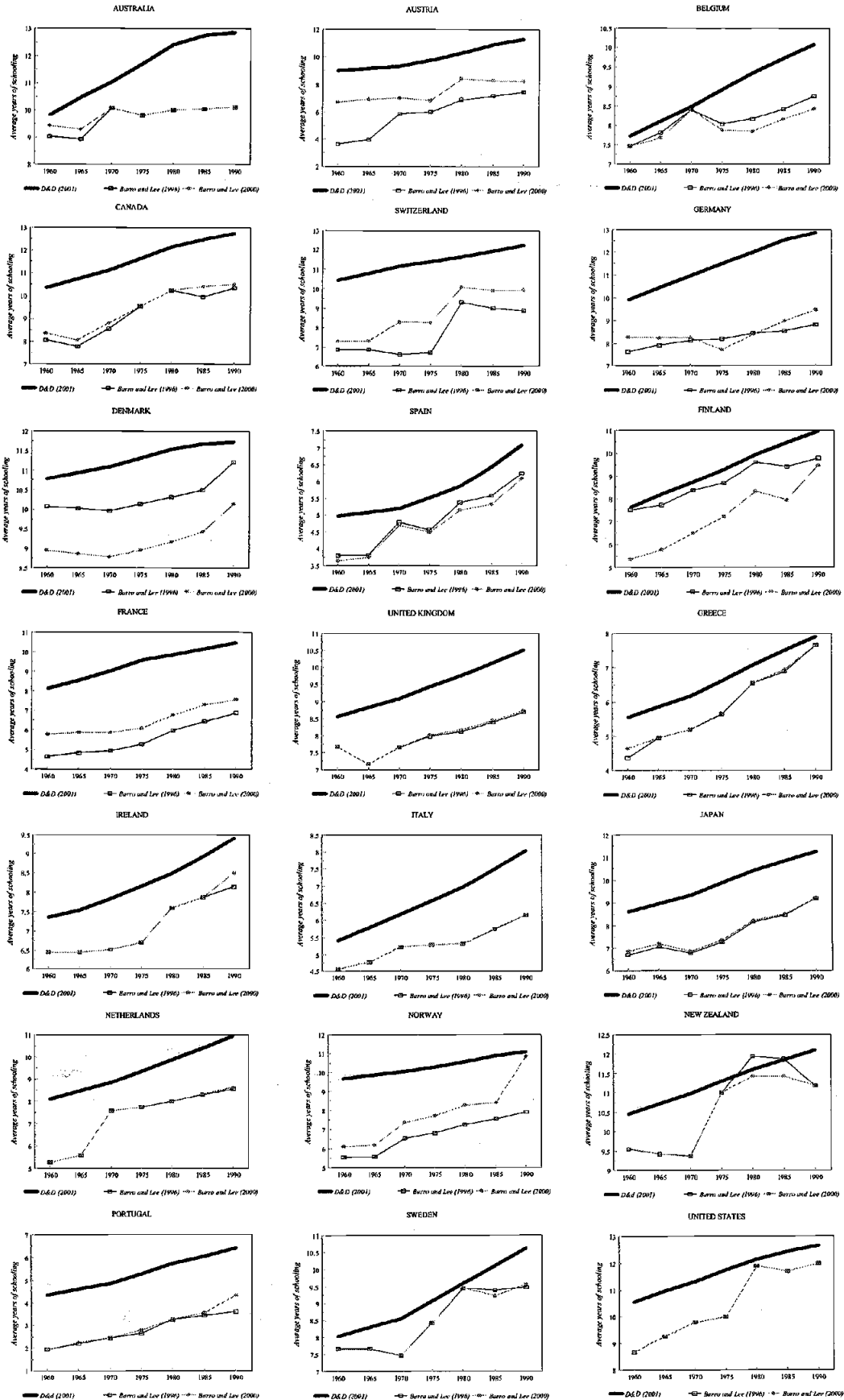**Figure B.2**: Percentage of the population 25 and over with primary education.
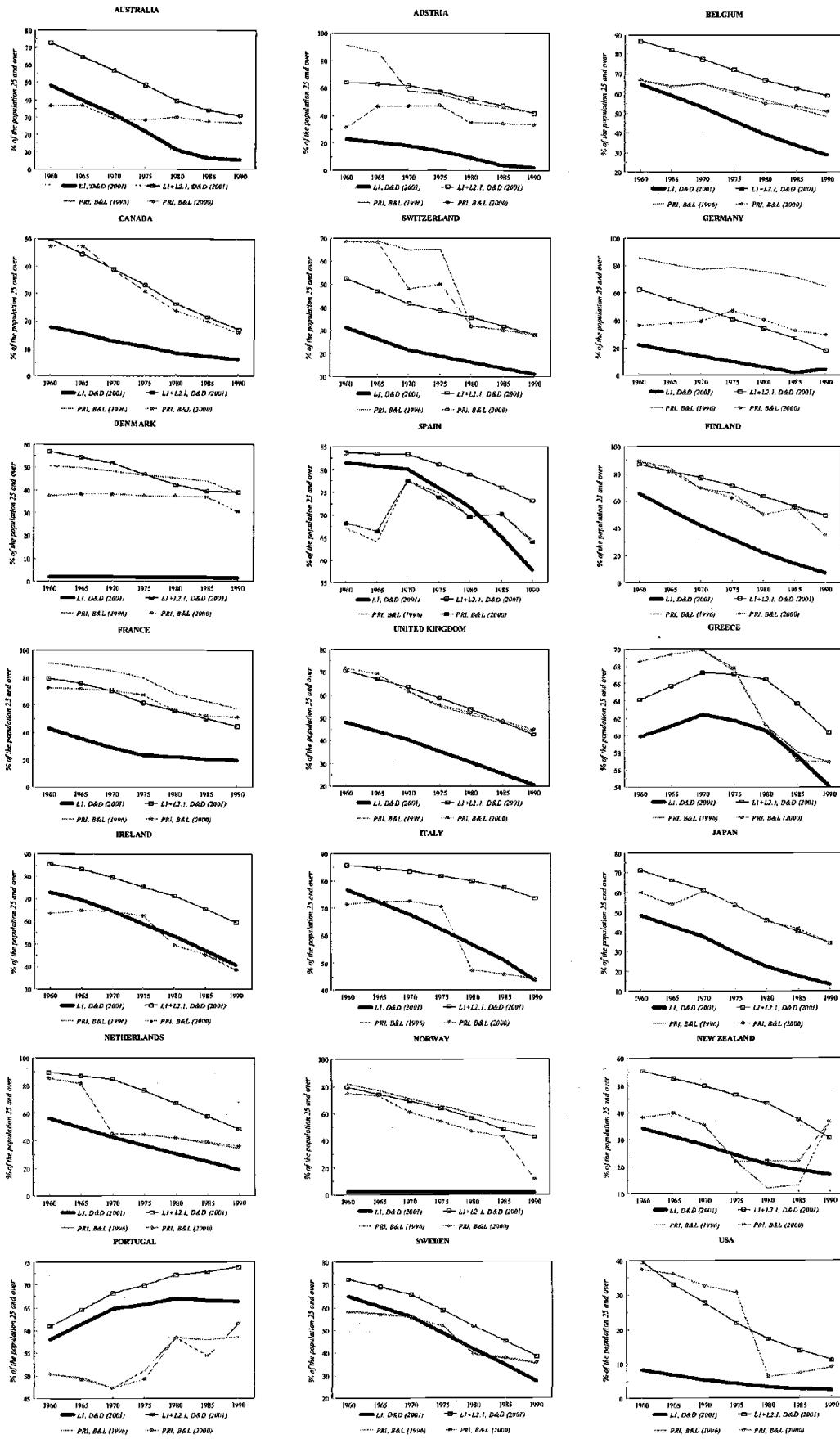(January, 2001)

Figure B.3: Percentage of the population 25 and over with secondary education.
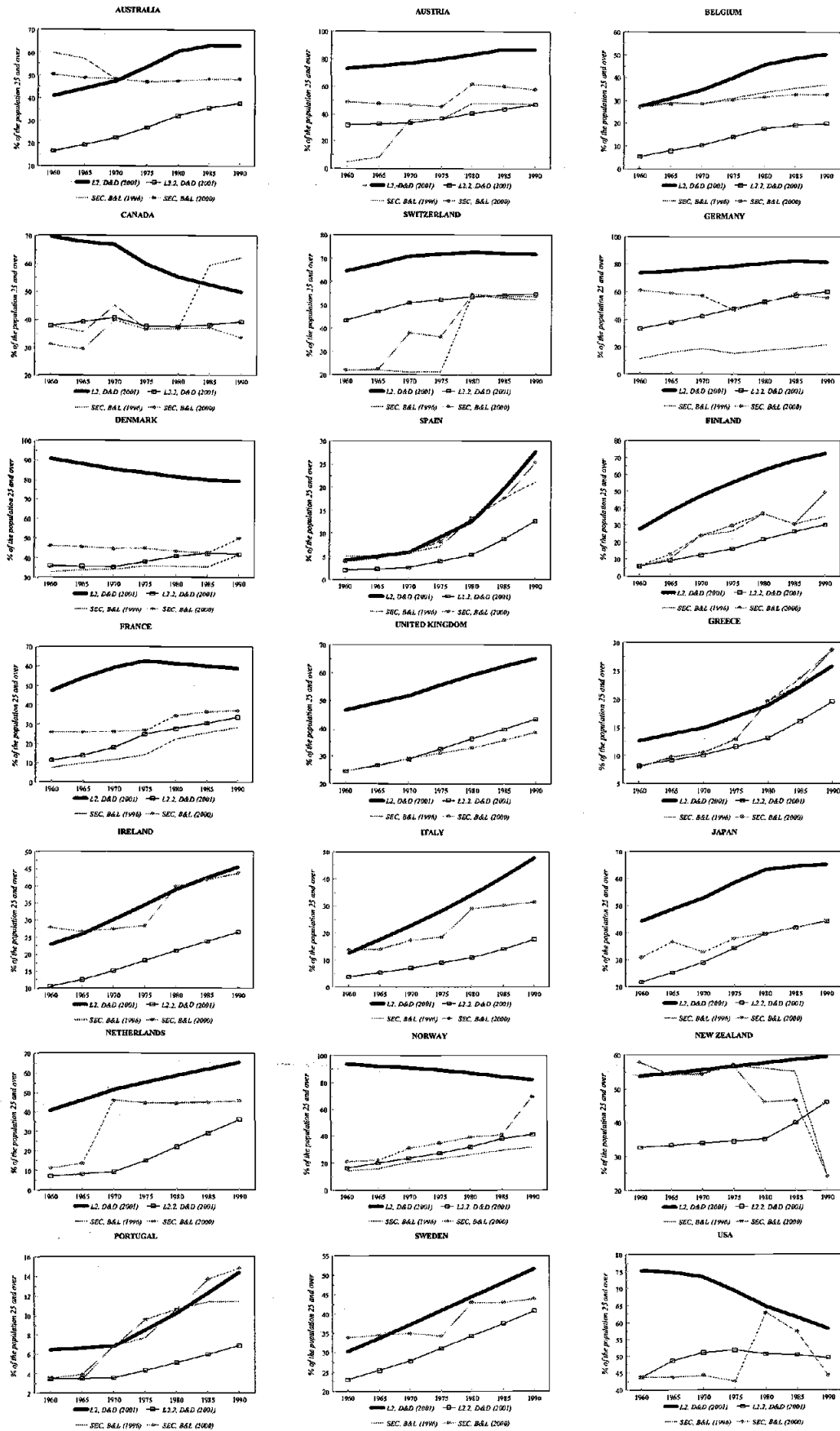(January, 2001)

Figure B.4: Percentage of the population 25 and over with higher education.
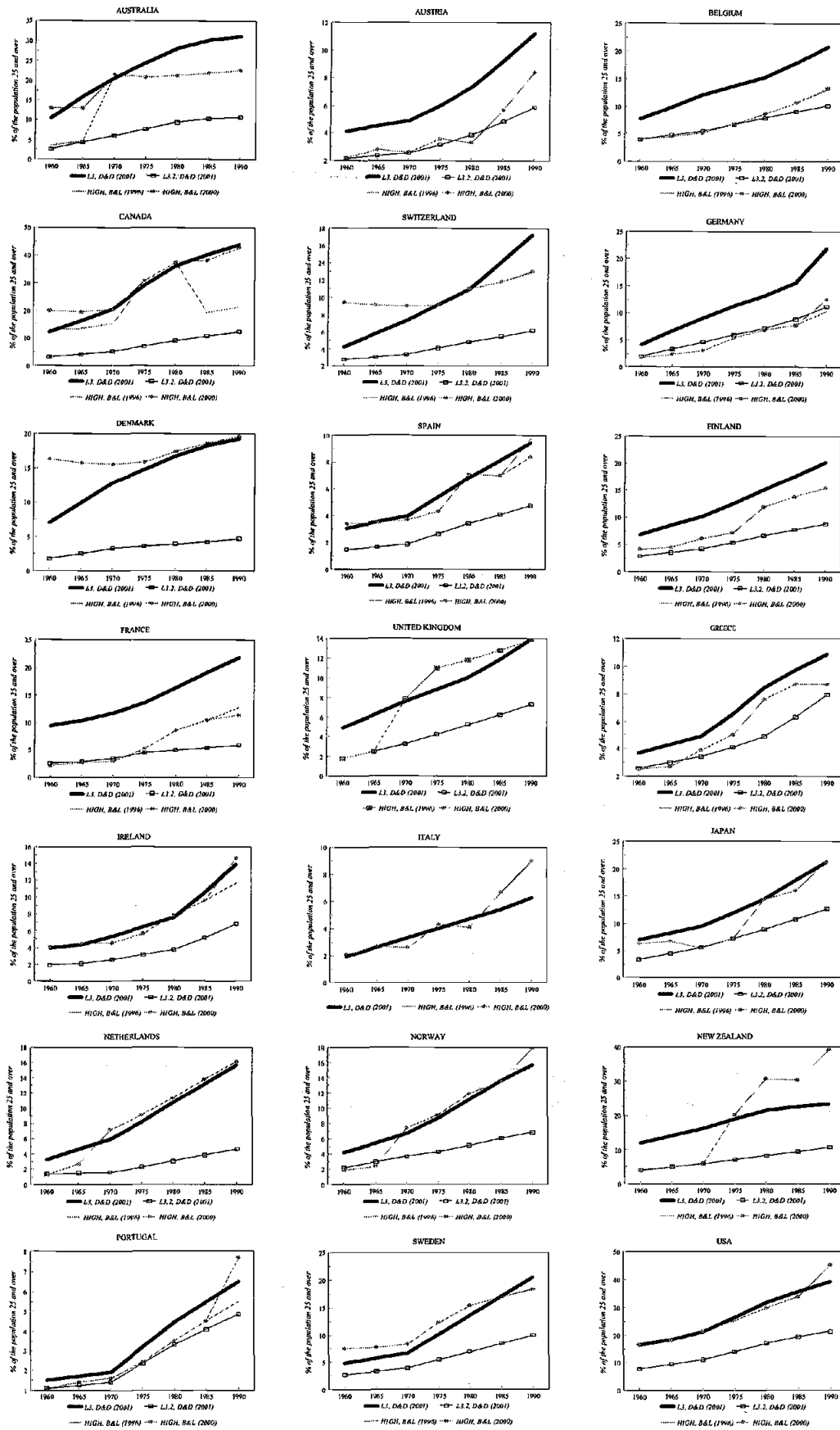(January, 2001)

Table 8: Data sources and construction, university attainment

country	level	1960	1961	1965	1966	1968	1970	1971	1975	1980	1981	1985	1989	1990	1991	1995	1997	1998
USA	L3.1	NC		NC			NC		NC	NC		NC		NC		NC		
USA	L3.2	NC		NC			NC		NC	NC		NC		NC		NC		
Neth	L3.1	NC		int			int	NC	int	int		int			NC	NAT2		
Neth	L3.2	NC		int			int	NC	int	int		int			NC	NAT2		
Italy	L3.2	ext	UNE	int			int	DYB	int	int	DYB	int	EAG	int		int		EAG
Belgium	L3	est (NC)		int			est (NC)		int	est (NC)		int	EAG	int		OECD2		
Belgium	L3.1	est (NC)		int			est (NC)		int	est (NC)		int	EAG	int		OECD2		
Belgium	L3.2	UNE		int			DYB		int	int		int	EAG	int		OECD2		
Spain	L3.1	BP		int			NC		int	int	NC	int			int	NC		
Spain	L3.2	BP		int			NC		int	int	NC	int			int	NC		
Greece	L3.1	ext	BP	int			int	BP	int	int	NC	int			int	NC	int	EAG
Greece	L3.2	ext	BP	int			int	BP	int	int	NC	int			int	NC	int	EAG
Portugal	L3	DYB		int			est		int		est	int		int		OECD95		
Portugal	L3.1	est		int			est		int		est	int		int		OECD95		
Portugal	L3.2	UNE		int			UNE		int	int	UNE	int		int		OECD95		
France	L3	BP		int		NC	int		NC	int		int			NC			
France	L3.1	BP		int		NC	int		NC	int		int			NC			
France	L3.2	BP		int		NC	int		NC	int		int			NC			
Ireland	L3	ext	BP	int	NC		int		int	int	UNE	int		int	UNE	int		EAG
Ireland	L3.1	est	est (OECD95)	int	est (OECD95)		int		int	int	est (OECD95)	int		int	est (OECD95)	int		EAG
Ireland	L3.2	est	est (OECD95)	int	est (OECD95)		int		int	int	est (OECD95)	int		int	est (OECD95)	int		EAG

- *Key:* NC = national census or survey data, or national statistical yearbook; *DYB* = UN Demographic Yearbook; *UNE* = Unesco Yearbook; *EAG* = OECD, Education at a Glance; *OECD95* = OECD (1995); *B&L* = Barro and Lee (1996); *EdinNC* = Educational indicators in the nordic countries (1974); *NAT2* = data supplied directly by national statistical offices; *OECD2* = Labour Force Survey data collected by the OECD for the INES project.

int = interpolation between available observations; *ext* = extrapolation (forward or backward); *est* = indirect estimate; *dif* = estimate obtained as a residual, i.e as the difference between two other categories; *BP/FP* = Backward / forward projection using census or survey data disaggregated by age.

Table 8: Data sources and construction, university attainment (continued)

country	level	1960	1965	1970	1971	1973	1975	1980	1981	1983	1985	1988	1990	1991	1992	1994	1995	1998
Sweden	L3	BP	int	NC			int	int			int		int				NAT2	
Sweden	L3.1	BP	int	NC			int	int			int		int				NAT2	
Sweden	L3.2	BP	int	NC			int	int			int		int				NAT2	
Norway	L3	NC	int	NC			NC	NC			NC		NC		NC		int	NC
Norway	L3.1	est	int	est			est	est			est		est(EdNC)				est	
Norway	L3.2	est	int	est			est	est			est		est(EdNC)				est	
Denmark	L3	est	int	ext		BP	int	int	NC		int	NC	int	NC		NC	ext	
Denmark	L3.1	est	int	ext		BP	int	int	NC		int	NC	int	NC		NC	ext	
Denmark	L3.2	est	int	ext		BP	int	int	NC		int	NC	int	NC		NC	ext	
Finland	L3	est (UNE)	int	NAT2			NAT2	NAT2			NAT2		NAT2				NAT2	
Finland	L3.1	est	int	NAT2			NAT2	NAT2			NAT2		NAT2				NAT2	
Finland	L3.2	est	int	NAT2			NAT2	NAT2			NAT2		NAT2				NAT2	
Japan	L3	NAT2	int	NAT2			int	NAT2			int		NAT2					
Japan	L3.1	NAT2	int	NAT2			int	NAT2			int		NAT2					
Japan	L3.2	NAT2	int	NAT2			int	NAT2			int		NAT2					
N. Zealand	L3	ext	ext	ext			NC	int	NC		int		int		OECD95		int	EAG
N. Zealand	L3.1	est	est	est			est	est	est		est		est		OECD95		int	EAG
N. Zealand	L3.2	est	NC	NC			int	int	int		int		int		OECD95		int	EAG
UK	L3	est	int	int	NAT2		int	int	NAT2		int		int	NAT2				
UK	L3.1	est	int	int	NAT2		int	int	NAT2		int		int	NAT2				
UK	L3.2	UNE	int	int	NAT2		int	int	NAT2		int		int	NAT2				

Table 8: Data sources and construction, university attainment (continued)

country	level	1951	1960	1961	1965	1966	1970	1971	1975	1976	1980	1981	1982	1985	1986	1990	1991	1992	1995	1996	1997	1999
Switz.	L3		NAT2		int		NAT2		int		NAT2			int		int	NAT2		NAT2			NAT2
Switz.	L3.1		NAT2		int		NAT2		int		NAT2			int		int	NAT2		NAT2			NAT2
Switz.	L3.2		NAT2		int		NAT2		int		NAT2			int		int	NAT2		NAT2			NAT2
Austria	L3		ext	est	int		int	est	int		int	est		int		int	est		NC			
Austria	L3.1		ext	est	int		int	est	int		int	est		int		int	est		NC			
Austria	L3.2		ext	UNE	int		int	UNE	int		int	UNE		int		int	UNE		NC			
Australia	L3		est		est	est	B&L	int		int			BP	int		int		NC	int		FP	
Australia	L3.1		dif		dif	dif	dif	dif		dif			BP	int		int		NC	int		FP	
Australia	L3.2		ext		ext	B&L	int	int		int			BP	int		int		NC	int		FP	
W. Germ.	L3		est		est		est			NAT2	int		NAT2	NAT2		int	NAT2		NAT2			
W. Germ.	L3.1		est		est		est			NAT2	int		NAT2	NAT2		int	NAT2		NAT2			
W. Germ.	L3.2		ext	NAT2	int		NAT2		int	NAT2	int		NAT2	NAT2		int	NAT2		NAT2			
Germany	L3																	EAG	OECD2			
Germany	L3.1																	EAG	OECD2			
Germany	L3.2																	EAG	OECD2			
Canada	L3		sum	UNE	sum		sum	NAT2	int	NAT2	int	NAT2		int	NAT2	int	NAT2		int	NAT2		
Canada	L3.1		ext	dif	int		int	NAT2	int	NAT2	int	NAT2		int	NAT2	int	NAT2		int	NAT2		
Canada	L3.2	NAT2	int	NAT2	int		int	NAT2	int	NAT2	int	NAT2		int	NAT2	int	NAT2		int	NAT2		

Table 9: Data sources and construction, secondary attainment

country	level	1960	1961	1965	1966	1968	1970	1971	1975	1980	1981	1985	1989	1990	1991	1995	1998	1999
USA	L2.1	NC		NC			NC		NC	NC		NC		NC		NC		
USA	L2.2	NC		NC			NC		NC	NC		NC		NC		NC		
Neth	L2.1	NC		int			int	NC	int	int		int		NC		NAT2		
Neth	L2.2	NC		int			int	NC	int	int		int		NC		NAT2		
Italy	L2	ext	NC	int			int	DYB	int	int	NC	int		int	NC	int		NC
Italy	L2.1	ext	NC	int			int	est	int	int	NC	int		int	NC	int		NC
Italy	L2.2	ext	NC	int			int	est	int	int	NC	int		int	NC	int		NC
Belgium	L2	ext	NC	int			NC	int	int	int	NC	int	EAG	int		OECD2		
Belgium	L2.1	ext	NC	int			NC	int	int	int	NC	int	EAG	int		est(EAG)		
Belgium	L2.2	ext	NC	int			NC	int	int	int	NC	int	EAG	int		est(EAG)		
Spain	L2.1	BP		int			NC		int	int	NC	int		int	NC			
Spain	L2.2	BP		int			NC		int	int	NC	int		int	NC			
Greece	L2.1	ext	BP	int			int	BP	int	int	NC	int		int	NC	OECD2		
Greece	L2.2	ext	BP	int			int	BP	int	int	NC	int		int	NC	OECD2		
Portugal	L2	DYB		int			UNE		int	int	UNE	int		int	UNE			
Portugal	L2.1	est		int			est		int	int	est	int		int	est (OECD95)			
Portugal	L2.2	UNE		int			est		int	int	est	int		int	est (OECD95)			
France	L2	BP		int		NC	int		NC	int		int	EAG	ext				
France	L2.1	BP		int		NC	int		NC	int		int	EAG	ext				
France	L2.2	BP		int		NC	int		NC	int		int	EAG	ext				
Ireland	L2	ext	BP	int	NC		int		int	int	UNE	int		int	UNE	int	EAG	
Ireland	L2.1		est	int	est		int		int	int	est	int		int	UNE	int	EAG	
Ireland	L2.2		est	int	est		int		int	int	est	int		int	UNE	int	EAG	
Sweden	L2	BP		int			NC		int	int		int		int		NAT2		
Sweden	L2.1	BP		int			NC		int	int		int		int		NAT2		
Sweden	L2.2	BP		int			NC		int	int		int		int		NAT2		

- Notes: same notation as above, plus OECD (1974); regr = regression estimate of the ratio L2.1/L2.2; (+) indicates that the given source has been corrected in some way using other information.

Table 9: Data sources and construction, secondary attainment (continued)

country	level	1960	1961	1965	1970	1971	1973	1975	1980	1981	1983	1985	1990	1991	1992	1993	1994	1995	1998
Norway	L2	est		est	est			est	est			est	est		est			est	est
Norway	L2.1	est		est	est			est	est			est	est		est			est	est
Norway	L2.2	NC		int	NC			NC	NC			NC	NC		NC			int	NC
Norway	L1+L2.1	NC		int	NC			NC	NC			NC	NC		NC			int	NC
Denmark	L2	est		int	est		est	int	int		est	int	int	est				est	
Denmark	L2.1	est		int	est		est	int	int		est	int	int	est				est	
Denmark	L2.2	est (OECD74)		int	ext		BP	int	int		NC	int	int	NC			NC	ext	
Denmark	L1+L2.1	est		int	ext		BP	int	int		NC	int	int	NC			NC	ext	
Finland	L2	DYB		est	est			est	est			est	est					est	
Finland	L2.1	est		est	est			est	est			est	EAG					est	
Finland	L2.2	UNE		int	NAT2			NAT2	NAT2			NAT2	NAT2					NAT2	
Finland	L1+L2.1	est		int	NAT2			NAT2	NAT2			NAT2	NAT2					NAT2	
Japan	L2	est		est	est			est	est			est	est						
Japan	L2.1	reg		reg	reg			reg	reg			reg	reg						
Japan	L2.2	NAT2		int	NAT2			int	NAT2			int	NAT2						
Japan	L1+L2.1	NAT2		int	NAT2			int	NAT2			int	NAT2						
N. Zealand	L2	ext		NC	int			int	int	est		int	int		est			int	est
N. Zealand	L2.1	est		est	est			est	est	DYB		int	est		OECD95			int	est
N. Zealand	L2.2	est		est	est			est	est	DYB+		int	est		OECD95+			int	EAG
UK	L2.2	UNE		int	UNE			int	int			int	int			NAT2			
UK	L2.1	regr		regr	regr			regr	regr			regr	regr						
Switzerland	L2	NAT2		int	NAT2			int	NAT2			int	int	NAT2				NAT2	
Switzerland	L2.1	NAT2		int	NAT2			int	NAT2			int	int	NAT2				NAT2	
Switzerland	L2.2	NAT2		int	NAT2			int	NAT2			int	int	NAT2				NAT2	
Austria	L2.2	ext	NC	int	int	NC		int	int	NC		int	int	NC				NC	
Austria	L2.1	est		est	est			est	est			est	int					NC	

Table 9: Data sources and construction, secondary attainment (continued)

country	level	1960	1961	1965	1970	1971	1975	1976	1980	1981	1982	1985	1986	1989	1990	1991	1992	1995	1996	1997
Australia	L2	ext		UNE+	UNE		int		int		BP	int			int		NC	int		FP
Australia	L2.1	dif		dif	dif		dif		dif		BP	int			int		NC	int		FP
Australia	L2.2	est		est	est		est		est		BP	int			int		NC	int		FP
W. Germany	L2	est		est	NAT2		est		est			NAT2		EAG	int	NAT2		NAT2		
W. Germany	L2.1	est		est	dif		dif		dif			dif		EAG	dif	NAT2		NAT2		
W. Germany	L2.2	est		est	DYB		int		DYB			int		EAG	int	NAT2		NAT2		
Germany	L2															EAG91		OECD2		
Germany	L2.1															EAG91		OECD2		
Germany	L2.2															EAG91		OECD2		
Canada	L2	est		est	est		est		est			est			est			est		
Canada	L1+2.1	ext	NAT2	int	int	NAT2	int	NAT2	int	NAT2		int	NAT2		int	NAT2		int	NAT2	
Canada	L2.2	ext	NAT2	int	int	NAT2	int	NAT2	int	NAT2		int	NAT2		int	NAT2		int	NAT2	
Canada	L2.1	est		est	est		est		est			est			est			est		

Table 10: Data sources and construction, illiterates (L0)

country	1960	1961	1965	1970	1971	1975	1980	1981	1985	1990	1991	1995
Spain	NC		int	int		int	int	NC	int	int	NC	
Italy	ext	NC	int	WDI		WDI	int	NC	int	int	NC	ext
Portugal	ext		ext	WDI		WDI	WDI		WDI	WDI		
Greece	ext	BP	int	int	BP	int	int	NC	int	int	NC	ext

- WDI = World Bank, World Development Indicators1999, Washington D.C. 1999.

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