CHILDLESSNESS IN BELGIUM AND FLANDERS

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1) Introduction

The decline in fertility witnessed in most countries of Western Europe since the mid-sixties has often been the subject of fairly detailed study.[1] The Belgian case too has been under similar scrutiny.[2] Equal attention has however not been given, both in Belgium and elsewhere, to the study of the childless state and its loss (or elimination) through the arrival of the first child (i.e. the transition from parity zero to parity one);[3] even though it would not be difficult to find a number of important reasons pointing to the usefulness of such a study. The reasons listed immediately below serve to underline this importance by drawing attention to the special nature, and consequent importance, of the zero-to-one parity transition among other such interparity passages :

- In the absence of contraception, age at first birth is a key determinant of the final intensity of the reproductive process : the lower the age concerned the higher completed fertility.
- When fertility control is present, age at first birth still remains a determining factor as regards the timing of childbirth in the reproductive age span.
- A number of issues, such as infant and child mortality, the education and working habits of women, the economic well-being of the household..., are linked to age at first birth.

The present study aims at filling the gap brought on by an almost total absence of any detailed study of childlessness in Belgium. However, before entering into the heart of the discussion, a few definitions and preliminary distinctions would help to clear the ground.

Childlessness characterises the initial state into which a woman is born, and which she leaves at the birth of her first live child.[4]
The present study :

1) deals thus with the childlessness of women and not with that of men.
2) pays attention to both the childlessness of all women in general as also to the childlessness of married women in particular.

Consequently childlessness in female birth cohorts as well as in female marriage cohorts is analysed. Whereas attention has been almost totally limited in the past to the childlessness of married women, the need for broadening the field of study (by bringing the experience of never married women too under scrutiny) should now be obvious to anyone, given the existence of the present trend to greater degrees of extra-marital reproductive activity, accompanied by the decreasing importance of marriage, witnessed in a good part of Western Europe.[5)]

3) deals with both the permanent or definitive childlessness of women who, at the end of their reproductive age-span, have not yet given birth to live off-spring; as well the state of temporary childlessness which precedes the arrival of a live first-born.

4) gives greater place of importance to cohort analysis while not neglecting period analysis. The study of the extent to which, and the manner according to which, an initially possessed characteristic (childlessness, in our case) is lost or retained calls for a continuous follow-up of a well defined group of persons over time. This essentially cohort or longitudinal approach is however usefully helped through information gleaned from period analysis.

5) supplements information obtained from registration (i.e. vital statistics) and census data with that extracted from survey data. A survey bearing the name "NEG04" and conducted during the period Nov. 1982 - June 1983) under the aegis of the Centrum voor Bevolkings- en Gezinsstudiën in Brussels was used for this purpose. Registration data covering the period from the mid fifties to the early eighties (the data for 1981 being the latest available) and the census of December 1970 furnish the data base for a monitoring of trends in Belgium as a whole : NEG04 provides information only for Flanders.

2) Childlessness in Belgium

2A) Analysis of registration data

Distribution by birth order (carrying other elements of information necessary for analytical purposes) is available in Belgium only for marital births. A study of the trends experienced by first order births in marriage is however a fairly adequate substitute for an analysis of all first order

births in Belgium. This was undoubtedly so in the past when extra-marital natality was extremely low (the percentage of extra-marital births in relation to the total number of births in 1951 and 1961 being merely 2.3 and 2.0 respectively) : and the same situation may be held to be sufficiently valid in the present too in spite of the increase in illegitimacy indeces witnessed in the recent past (percentage illegitimacy reaching values of 3 and 4.5 in 1971 and 1981 respectively). The discussion which follows - i.e. based on registration data - will therefore be framed in terms of marital births.

A first glance at the available data shows that the evolution of the number of annual first births has to some extent parallelled that of the total number of (all) annual births - rises (mainly of a long term nature) and falls (occasional) in one case occuring more or less simultaneously with corresponding rises and falls in the other. A clearly marked trend of a different nature however sets in around 1963-64 when the proportion of first births (in relation to all births) starts to rise steadily from 0.35 in 1963-64 - it had wavered around 0.38 during the fifties - to reach 0.49 in 1975, and remain averagely at a high 0.48 thereafter. This increased relative importance of first birth incidence - due simultaneously to increasing numbers in first births and decreasing numbers in total births - is however no clear indication of a corresponding decrease in childlessness. Further analysis directed at eliminating the disturbing effects of differing numbers and distributions (by age and/or marriage duration) of women in the reproductive age span[6] is necessary before any final verdict in this regard can be reached. For this purpose, as well as for many others related to the monitoring of the state of childlessness, first birth rates were computed by age of woman on the one hand and by marriage duration on the other.[7] In each case a period-wise transversal scrutiny was used as a stepping stone to a longitudinal or cohort analysis.

Figure 1 shows how the annual (i.e. calendar year specific) cumulated first birth fertility schedule evolves over time.[8] Table 1 gives the basic age specific rates from which the cumulated rates leading to Figure 1 are drawn. The tenacity with which the childless state is retained - it is measured as the complement (with respect to unity) of the cumulated rate at any specified age of interest - is seen to diminish at all ages during the

period 1954 through 1963-66; and increase thereafter. (The evolutions at corresponding ages take paths similar to the dotted lines in the Figure) In other words, the rate of loss of childlessness goes through a maximum - this is clearly true at all ages above 20 - in the years 1963-66. While this cross-sectional form of measure provides a summary index of how the childless state is lost (or retained) from one calendar year to another, the notion of childlessness is not made completely intelligible unless it is related to a fixed group of women : and this calls for a cohort approach. In a real birth cohort, the proportion of women remaining childless (at a specified age) is equal to the complement (related to unity) of the cumulated first birth rate (at the same specified age). Figure 2 shows how this proportion varies with age in a number of chosen birth cohorts. The proportion childless is seen by and large to increase at corresponding ages across cohorts (i.e. moving from older cohorts on the left side of the figure to more recent ones on the right). Thus, for instance, the dotted line joining points corresponding to age 25 in the different curves shows an increase of childlessness (among women aged 25) since the birth cohort of 1944. The table corresponding to Figure 2[9] helps to show that increasing permanent childlessness (that of women aged 35 and above)[10] sets in already with the 1941 birth cohort; while increases in proportions childless at younger ages begin to appear more tardively - i.e. in the 1941, 43 and 52 birth cohorts at ages 30, 25 and 20 respectively. This picture of increasing childlessness is however partial since the data available covers only a fraction of the first birth experience of more recent cohorts; the fraction unobserved increasing as the cohorts become increasingly younger - i.e. more recent. (Note for instance that the behaviour of the 1956 cohort cannot be observed beyond the age of 25). The demographer is therefore led to an exercise of reasonned guesswork as regards the remaining fraction of the (as yet) unfinished cohort experience. This was attempted in two steps.

1) The cumulated first birth rates for women aged 45 in recent "unfinished" cohorts were estimated using a simple method of extrapolation suggested by Bourgeois-Pichat (1976). The estimated values - i.e. completed cohort fertility - graphed on Figure 3[11] show a monotonic decline after the 1941 cohort. The corresponding rise of permanent childlessness doubles (12% to 24%) between the cohorts 1941 and 1960 (see Figure 3). The rise in proportions childless already observed at early ages in cohorts with (as yet) unfinished reproductive

experience does not therefore seem to constitute a mere postponement of first birth incidence. It points rather to a real decline of completed cohort fertility (as regards first births) - which excludes the possibility of any late recuperation compensating for earlier postponement.

2) Using the estimations of completed first order cohort fertility found above in (1) and as many of the observed first birth rates as were available as inputs it was possible to arrive at a complete description of recent cohort behaviour via the use of the Coale nuptiality model.[12] Observed (incomplete) and estimated (complete) curves for chosen cohorts are given in Figure 4. Note that fits obtained are not satisfactory - there is in general overestimation at ages preceeding the modal age with underestimation following immediately after. The curves presented in Figure 4 serve however :

   a) to give an idea of the changes that have occurred in the recent past - note the striking fall in modal values.

   b) to document the inability of the Coale model to perform satisfactorily in the case of the first birth experience of female birth cohorts in Belgium.

The description of childlessness in Belgium given above makes no explicit reference to any context within which childbearing is likely to occur. If however childlessness is on the increase, as seen above, should it be attributed to the mere non-use of successful reproductive effort; or should it rather be linked to the increasing absence of the type of context necessary for reproduction? In the past such a context was easily identifiable (in Belgium, as in all other Western European countries) with the married state. While Belgium has begun to follow her neighbours in the generally observed drift away from such a situation, she does not however seem as yet to have gone a long way. The married state therefore continues to offer the setting for a very substantial part of her reproductive effort. A study of childlessness in marriage is therefore called for. The observations made in this connection in the present text supplement those found in Willems, Wijewickrema and Lesthaeghe (1981).

An idea of what happens transversally (or cross-sectionally) from one calendar year to another as regards first birth incidence in marriage can be obtained by a study of curve A (in Figure 5), which is a plot of the cumulated duration specific marital fertility rate for births of the first order of each calendar year[13] against time. Note that the post-war climb of this index (not seen in our Figure) gives rise to the subsequent descent (since the mid sixties) and minimum (around 1975) portrayed in our Figure. To what extent, and how this is caused by variations of proportions childless among well defined groups of married women is seen by examining the cohort measures carried by curve B (Figure 5) on the one hand and Figure 6 on the other. Curve B in Figure 5[14] shows how completed first order marital cohort fertility (obtained by cumulating duration specific marital fertility rates within marriage cohorts) varies from older (the oldest is the marriage cohort of 1958) to younger cohorts. Points to the right of L[15] (see Figure) corresponding to very recent cohorts, which have yet to complete their fertility experience, have been obtained by the use of the Bourgeois-Pichat technique once again. The approximately horizontal nature of B - none of its variations take the curve above 0.89 or below 0.865 - points to a fairly unchanging level of permanent childlessness in marriage both in the past (observed) and very probably in the future (estimated). The large variations experienced by curve A (Figure 5) can therefore be attributed to mere changes of timing in first birth arrival in cohorts. This is confirmed by the details of cohort behaviour observable in Figure 6. Increases in childlessness across cohorts at lower marriage durations - note the rise experienced by the corresponding dotted lines in the figure - are seen to be attenuated and cancelled later on - note how the corresponding dotted lines are approximately horizontal - by a compensating increase of fertility from around duration 4. More recent cohorts are thus seen to give themselves longer periods of childless existence : they seem however to be as determined as older cohorts that childlessness should not remain a permanent state.

Summarising the discussion at this point, the following observations could be said to have emerged fairly clearly :

- that the permanent childlessness of women in general is on the increase; this being accompanied by an increasing tendancy to remain longer in the childless state.

- that the permanent childlessness of married women tends to remain approximately constant. Marriage therefore seems to lead to the arrival of the first child with the same intensity now as earlier. Here too, as in the case of women in general, an increasing tendency to remain childless over a longer period is in evidence.

These two points - increasing permanent childlessness of women in general and approximate stationarity in this regard on the part of married women - fit in very well with the picture of the decreasing incidence of female nuptiality already elaborated and documented elsewhere.(16)

2B) Analysis of census data

While registration data are readily available, they are not rich in detail of information : moreover their analysis, made via the use of rates such as those defined earlier in this paper, are not free of all defect. Biases arising, for instance, from the use of estimations acting as substitutes for unobserved denominators necessary for the computation of rates (cf supra) could cause problems. The use of census data acts as a corrective to these and other problems of a similar nature, and helps both as regards search of supplementary information and confirmation of conclusions already reached.

Changes of definition (covering the data available) from one census to another preclude any possibility of a comparative study of the information furnished by the censuses of 1961 and 1970. Attention was therefore focussed on the data available through the 1970 census.
The analysis which follows deals with the childlessness of ever-married women. Available census data however carry the combined effects both of age and marriage duration. The analytical difficulty of disentangling these effects one from another is further enhanced in certain cases by the presence of other disturbing factors such as divorce and widowhood.
To circumvent these difficulties and to keep the analysis down to a manageably simple level, only the childlessness of women with an uninterrupted experience of married life - i.e. women married once and living with husband at census time - will be examined (at least principally) in what follows.

Proportions childless by age or marriage duration at census time can be easily computed off directly observed current (at census) status data. These proportions will be in constant use as instruments of analysis in this section. Note that these proportions :

1) are untroubled by problems related to the use of substitute denominators, such as were encountered earlier in connection with the use of registration data.
2) provide good estimates, under certain conditions,[17] of the corresponding proportions which would figure in a single decrement table describing first birth formation. Age specific proportions would for example (under stationary conditions)[18] give a picture of the decrease of childlessness in a female birth cohort undisturbed by factors such as mortality and emigration. The absence of these ideal conditions will of course have to be taken account of in our analysis.

Table 2 shows how proportions childless change with age (of women) at census time. The decrease observed is practically monotonic at the start and points to nothing more than the expected effect of age - the higher the age the greater the percentage of women who have had their first child. A halt is however called to this decrease at age 35 when 9.2% of the women - they were born in 1935 - are childless. This level, which is maintained during three years, gives place to a subsequent, almost monotonic, rise; a rise which continues to ages 64 and 65+, when the proportion childless is equal to 18.4%.[19] The rise observed from age 34 onwards is a fair sign of increasing permanent childlessness as birth cohorts get older.[20] In other words, starting from birth cohorts formed around the turn of the century (1905 more exactly) right up to the mid-thirties women show a decreasing tendancy to be permanently childless in marriage. If one were to assume that contraceptive habits remained constant or increased (perhaps) with time, this decrease could probably be attributed only to the biological effect of improving conditions in public health. (Note that the same picture comes into focus, and the same conclusions are therefore valid, even when all categories of ever-married women are taken into consideration : the corresponding tables are not presented here).

The variation of proportions childless (in marriage cohorts, of women married once and living with husband) by duration of marriage

at census time can be studied in Table 3. The decrease in these proportions observed at the start - nothing other than the effect of increasing duration can be seen in this - disappears with duration 13 (corresponding to the marriage cohort of 1957) and is replaced by a regular rise which is unbroken except at durations 26 through 30 (corresponding to marriage cohorts formed during the war years 1940-44). Thus permanent childlessness can be said to have been on the increase going back from the 1956 marriage cohort to that of 1939. Note in this connection that since the proportional representation of women who married young increases as the duration of a marriage cohort increases, it is altogether probable that the proportions childless characterising older marriage cohorts would have been even higher than those observed had they (the marriage cohorts) retained their initial distribution by age at marriage right up to census time. This last comment serves to add strength to the conclusion that permanent childlessness in marriage cohorts has been on the decrease as one moves forward from the late thirties to the mid fifties[21] - once again, a result probably of improving health conditions.

A more detailed idea of how childlessness (whether permanent or not) in birth cohorts depends simultaneously on age at marriage and duration of marriage can be obtained by appropriately rearranging chosen proportions childless calculated from published census data. Table 4,[22] which does this, shows

1) how the proportion of childless married women varies with marriage duration (at census time) within the same birth cohort group[23]; and
2) what variations (of proportions childless) are observable across such groups.

The reading of the table involves some difficulty and calls for a certain degree of caution since the entries within each birth cohort group (i.e. in each column) change simultaneously with age at, and duration of, marriage. Working down a column (of the table) brings into focus the expected combined effect of increasing marriage duration and decreasing age at marriage - both tend to lower proportions childless. The lowest incidence of childlessness (4.4%) is found among women belonging to the birth cohort group 1935-40 who with 15 years of marriage at census time would have married young (aged 15-20 at marriage) in the mid-fifties. This minimum has its importance as an estimation of the upper limit of permanent

childlessness due to primary sterility[24] in Belgium. Going across from left to right in any row is the equivalent of increasing age at marriage while marriage duration remains constant. In all rows except the first proportions childless increase with increasing age at marriage. Since this is observed even at ages far below those at which women experience menopause (i.e. ages at which reproduction is still possible) it could not be said to be the mere biological result of increasing age : socio-economic and other behavioural reasons too will have their part to play in the explanation. In short, women who marry at later ages seem to be more prone to childlessness (permanent or otherwise) for reasons other than those which are purely biological.

Census data helps also to throw some light on the differential effect of educational achievement and professional status in relation to the childlessness of married women. The following observations emerge from a study of the proportions childless, at census time, of women married once and living with husband.

Education and childlessness are seen to be clearly positively correlated at early ages : thus (see Table 5)[25] the proportion of women childless in the age group 15-19 moves from 50% (for women with only primary education) to 69% (for highly educated women). While the same order of relationship remains true at all ages (at census) the gap narrows down considerably at later ages when childlessness can be qualified permanent : thus in the age group 40-44 the relevant proportion moves only from 10% (low education) to 12% (high education). While efforts consecrated to studies do seem to keep women more childless than not (probably through the intervening mechanism of late marriage) in the early part of their reproductive age span this is no longer equally true at later ages. The permanent childlessness of fairly recent generations is thus close to being the same at all educational levels. That this has not always been the rule is seen by the increase evidenced by the above-mentionned gap (C-A in the table) as age at census moves from 40-44 upwards. In other words the toll exacted by society from women engaged in pursuits of study has grown less with the passage of time - the "penalty" of permanent childlessness brought on by prolonged studies tends to disappear as we get closer to the present.

Table 6 presents proportions childless for women, with (bracketed entries of Table) and without (main entries of Table) a profession, classified by professional status of husband and age (of woman) at census. (Reading from left to right in a row is equivalent to a movement from higher to lower professional status (of husband)).[26] No clear picture emerges from a study of entries corresponding to ages below 40. With the arrival of permanent childlessness (age groups above 40) the childlessness of women without a profession is seen to be by and large negatively correlated to the professional status of their spouses.[27] Thus the material prosperity that goes hand in hand with status in profession (even if it be that of the husband) clearly does help women to leave the childless state. A comparison between main and bracketed entries shows how female professional life unmistakeably helps to prevent women from leaving the childless state. While this is true at all points of the Table, it is interesting to note that female professional life has been of relative benefit to those women whose husbands were bereft of all profession (category corresponding to column D in Table). Women in this category are clearly at one end of the spectrum when they are professionless - they are characterized by the highest proportions childless. They are however seen to move upwards in order of position as soon as female professional life enters the picture - column D now gets ahead of column C. The direction of the influence exerted by material well-being in this instance thus adds weight to our earlier observation that material prosperity does help to lower proportions childless.

3) Childlessness in Flanders

3.1. Introduction

Many important aspects of first birth incidence falling outside the reach of available registration or census data can be dealt with through an analysis of adequate survey material. Survey data available for the present study (i.e. the NEGO 4 survey) does not however cover family formation processes in Belgium as a whole - only Flanders is covered. This material was therefore used to study the first birth related behaviour - hence the corresponding patterns and extent of childlessness - of female marriage cohorts in Flanders; cross-classification by religion, level of education, seniority of marriage cohort and age at survey being used to effect a multivariate study. This examination of childlessness in marriage

cohorts was supplemented by a parallel investigation of first birth related behaviour in "partnership cohorts": i.e. cohorts formed by (or taking their rise in) the stable union of men and women irrespective of whether or not these unions are accorded the status of marriage in the eyes of the law.[28] Comparisons effected between these different parallel investigations were aimed at uncovering any differences of behaviour following on mere cohabitation as opposed to marriage.

Cross-classification with reference to the four covariates mentioned above was brought about via the categories found in the following list.

a) Religion (REL) - 3 categories,
   - REL1 : Catholics with regular attendance at Mass - "Active Catholics".
   - REL2 : Catholics irregular in this regard - "Non Active Catholics".
   - REL3 : Others

b) Education (EDU) - 3 categories,
   - EDU1 : Women with a low level of secondary education.
   - EDU2 : Women with a higher degree of secondary education.
   - EDU3 : Women with post secondary education. This group includes both women with university diplomas as well as those who have non-university post secondary qualifications.

c) Seniority of marriage (partnership) cohort (DUR) - 2 categories,
   - DUR1 : Women whose first marriages (entry into cohabitation) took place at some point less than ten years before the survey; therefore between 1973 and 1983.
   - DUR2 : where the time-point in question occurred ten years or more before the survey; therefore during or before 1973.

d) Age at survey (AGE) - 2 categories,
   - AGE1 : Women with less than 35 years (completed) of age at survey; therefore belonging to birth cohorts formed between 1948 and 1968.
   - AGE2 : Women aged 35+ at survey; therefore born during or before 1948.

Single decrement tables (based on the life table model) describing first birth incidence - and furnishing the corresponding probability of remaining childless (i.e. proportion childless) - can in principle be

constructed for female marriage (partnership) cohorts belonging to any sub-group resulting from the cross-classification employed. These tables carry their full meaning and importance as descriptions of a process (first birth incidence in our case) occurring in the absence of the usually considered disturbances (mortality and migration of women) only when the experience of women entering first marriage (first partnership) is undisturbed in other ways[29]: i.e. when consideration is limited to women married once (in first partnership) and living with their husbands (partners) at the time of interview.[30] This category of women was therefore given particular attention in the analysis which follows. (Note that the same strategy has already been followed earlier in the text). Attempts were however also made at extracting information concerning the effect of the disruption of unions (following widowhood, divorce or separation) on childlessness by bringing consideration to bear on other categories of women - in all five different types of women.

1) Women married once and living with husband at interview - (M_1, say).
2) Women married once and ever-married (i.e. widowed, divorced, separated, or married) at interview - (M_2, say).
3) Women with one or more marriages to their credit and ever married at interview - (M_3, say).
4) Women in first partnership (i.e. first marriage or first cohabitation) and living with partner at interview - (P_1, say).
5) Women with one partnership to their credit and either ever-married or in cohabitation at interview (P_2, say).

Cohorts are formed and initiated through first marriage in the case of M_1, M_2 and M_3; and duration since first marriage is then taken as the time variable even if some women, in the case of M_2 and M_3, spend part of this time in the widowed, divorced, separated, or remarriage. Entry into first partnership constitutes the point of departure in the case of P_1 and P_2, and time is measured from the moment of first marriage or first cohabitation - whichever occurs first, in the case of women experiencing both events.

Two phases can be distinguished in the analysis which follows. In the first, only three covariables at a time were considered in an effort at avoiding problems due to small numbers. The following two sets (of 3 covariates) were chosen for detailed scrutiny :

- set A : REL, DUR, AGE - 12 subgroups.
- set B : EDU, DUR, AGE - 12 subgroups.

Single decrement tables for births of the first order were constructed for each of these sub-groups (the process being repeated for each of the five different types of women, specified earlier).[31] In each set the three subgroups formed of women aged 35+ (AGE 2) and recently married (DUR 1) had to left aside as their numbers were unreliably small. Analytical comments covering the remaining subgroups are given below (cf. section entitled "Phase One").

Three major difficulties encountered by the procedure used in the present phase can be overcome via the use of a suitable model. The difficulties in point are the following :

1) Some sub-groups have had to be left out of analysis.
2) Only incomplete descriptions - i.e. partial histories - of the process under study are often available even among the groups retained.
3) The simplifying effect of considering only three variables at a time could possibly hide important aspects of the complete picture in which all four variables are considered simultaneously.

Phase two, which was designed to provide solutions to these difficulties, has the added advantage of quantifying the relative strengths of the different covariates used. The Proportional Hazards model used for these purposes is briefly described, and the results obtained are commented on in "Phase two" of the text.

3.2. Phase one - commentary

Figure 7 shows how the childlessness of women married once and still married at interview is influenced by religion in sub-groups formed in relation to seniority of marriage cohort and age at interview. Figure 8 portrays the effect of different levels of education in the context of the same scenario. The following observations merit attention.

- The strong influence of religion. Active Catholics form a group apart, both in and before permanent childlessness; and in all cases (as shown in all three panels of Figure 7). The greater pronatalist tendency, even as regards the zero-one parity transition, evidenced by Catholics of earlier generations and in older marriaga cohorts (Panel 3) is

easy to understand given the official Catholic attitude concerning fertility : an attitude that found expression in Pius XI's Casti Conubii. This position however has been subject to heavy questioning by Catholics themselves around and even after the second Vatican council; and this has continued ever since in spite of "Humanae Vitae" in which Paul VI reiterated the old ("traditional") Catholic viewpoint. Following this contestation and the more liberal atmosphere that has pervaded post-Vatican II Catholicism, it is only natural to expect that earlier Catholic-non Catholic fertility differences should now tend to be non-existant. Some demographers have put this down as a fact - ita Westoff in particular - even if others on the contrary continue to insist that the matter remains at least subject for controversy.(32)

That Catholics in Flanders who are keen about their religious observances are seen to continue, even among younger generations (Panel 2) and in recent marriage cohorts (Panel 1), to be less childless than others is therefore a valuable contribution to the debate in question.

- Education is noticeably weaker than religion as far as its effects on the zero-one transition are concerned. This emerges from a comparison of corresponding panels in Figures 7 and 8.
- In spite of this weak differential effect of education, the following points can still be made :
    - that highest educational level categories tend to be least prone to permanent childlessness in older generations (Panel 3) though this negative relationship is brought to zero in younger generations (Panel 2).
    - that those who are least favoured education-wise are early starters (in first order reproduction) (all panels).

  Note that these last observations confirm the impressions concerning education and childlessness obtained from census data and outlined earlier in the present text.

An illustration of what can be observed when differences due to marital context (i.e. continuous or disrupted marital life) or type of union (i.e. partnership or marriage) come into play can be seen in Figure 9.(33)

This figure, which pertains to the religion-childlessness relationship, shows only the behaviour of young generations of recently married women (i.e. sub-group AGE1 and DUR1). Studying this and other similar figures[34] (drawn for other sub-groups both in connection with religion and education) permits the following remarks

- the relative position of the curves remains unchanged in all cases when it is a question of the religion-childlessness relationship. Thus the Catholic-non Catholic difference, to which reference was made earlier continues to be found (and in all cases). The gap between "Active Catholics" and "Others" however widens (both when disruption of marriage life enters the scene (compare Panels 1 and 2) or when performance in continued partnership is contrasted with performance in unbroken marriage (compare Panels 1 and 3)) in the case of the sub-group corresponding to the curves in Figure 9.[35]
- the most striking observation to be made in connection with the education-childlessness relationship is the change in the relative position of the curves,[36] following a difference of partnership context, occuring when childlessness comes close to being permanent (around 12 years of partnership duration) in the case of young generations who first entered union 10 years or more before the survey i.e. group (AGE1, DUR2). Thus, whereas in unbroken married life (i.e. type M_1) minimally educated women (in the AGE1, DUR2 group) are found to be most childless, they are beaten into a clear second place by those who are most favoured education-wise when types M_2, P_1 or P_2 are considered; this change being found to be almost entirely due to rising childlessness brought about by rupture of marital union occurring in the highest educated group. Table 7 carries the relevant proportions childless (i.e. the lowest observed proportion (in the group AGE1, DUR2): in each case around duration 11).

The following comments hold good if differences brought in by type of women (M_1, M_2, P_1, P_2 or M_3) are examined within each of the different sub-groups formed (i.e. by REL, DUR and AGE on the one hand, and by EDU, DUR and AGE on the other).

- In all cases where an almost permanent state of childlessness could be observed, differences were seen to be provoked by the presence of marital disruption[37] - higher childlessness showing up in the absence of continuous partnership. This was most evident

  (a) in the case of "Non-Active Catholics" (REL2) and "Others" (REL3); this disruption of marriage having hardly any effect on the childlessness of "Active Catholics";

  (b) in the presence of the highest level of education (EDU3).

  Figure 10 gives some illustrative idea of the points just made for two chosen subgroups.

- Differences of childlessness within the first few years of partnership are seen most clearly in the "Others" group among women less than 35 years of age, where a higher level of childlessness is by and large seen to be present when cohabitation is taken into consideration. The rise in the dotted lines when curves P_1 and P_2 are encountered in Figure 11, which presents only two obvious cases of this occurrance, illustrates this last remark.

3.2. Phase two - methodology and comments

A Proportional Hazards model[38] (operated via the "GLIM3" computer package)[38] was used in this phase (where all four covariates are considered simultaneously) for reasons already explained in section 3.1. The piece-wise proportionality of hazards[38] which is basic to the model can be outlined summarily as follows.

a) For any given subgroup z and within any specified interval of duration l, the instantaneous rate of experiencing first order births at duration t is taken to be a constant dependant on z and l.[39]
   Thus
   $$\mu(t;z) = e^{\alpha_{lz}}$$
   $\mu(t;z)$ being the instantaneous rate, α_{lz} being a constant characteristic of l and z, and the time point t being situated in the l^{th} duration interval.

b) $\mu(t;z_1)$ for any subgroup z_1 is assumed to be proportional to $\mu(t;z_2)$ for any other sub-group z_2, t being the same in both cases (though it could take any value).

Thus

$$\frac{\mu(t;z_1)}{\mu(t;z_2)} = \text{a positive constant independant of t but dependant on } z_1 \text{ and } z_2.$$

This constant measures the risk of z_1 with respect to that of z_2. The effect arising from the fact that one belongs to a particular subgroup as opposed to any other is therefore independant of time.

c) Fixing on any one sub-group z_o as a reference group for which $\mu(t;z_o) = e^{\alpha_1}$ say, it is now possible to write

$$\frac{\mu(t;z)}{\mu(t;z_o)} = \text{a positive constant measuring the risk of any specified sub-group z with respect to that of } z_o.$$

$$= e^{\beta_z} \text{ say.}$$

= the "relative risk of z", which is independent of t.

The general formula for the piece-wise proportional hazards model is therefore often expressed (using the symbols given above) as

$$\mu(t;z) = e^{\alpha_1 + \beta_z}$$

In our case the sub-group defined by REL1, EDU1, DUR1 and AGE1 was taken as the reference group and the GLIM3 package was used to estimate e^{β_z} for each of the sub-groups z. Quite obviously the resulting estimations of relative risks and other consequent calculations (i.e. proportions childless in our case) based on these estimations depend on the validity of the basic assumptions. For the purposes of the work reported here, not too much attention was paid to the various possibilities of arriving at more satisfactory modifications of the basic model.[40] Among the possibilities offered by GLIM3 we opted for the model in which only the main effects of the covariates are taken into consideration. This choice was dictated by considerations of parsimony of model as well as the fact that tests related to the model including interactions between all the four covariates showed that it was not significantly (at the 5% level) better than the simple main effects model.

Table 8 carries (1) the values of the relative risks corresponding to the different sub-groups (36 in all) together with (2) the proportions childless at chosen ages corresponding to these 36 groups. Note that high relative risks always accompany low proportions childless, and vice versa. A study of this table leads to the following observations, in the case of women married once and living with husband (M_1).

- Older marriage cohorts are (ceteris paribus) less childless than their more recent counterparts. This can be seen by comparing relative risks in the upper half of the Table with corresponding ones in the lower half.
- Younger women are (c.p.) less childless than older women (compare relative risks of first quarter of Table with corresponding entries in second quarter; and 3^{rd} quarter with the 4^{th}).
- The effect of religion follows the expected pattern without exception : i.e. highest relative risks among "Active Catholics" (REL1) and (c.p.) lowest among "Others" (REL3). (Compare each entry with the 3^{rd} following it within each quarter of the Table.
- Comparisons between entries of groups formed of three successive sub-groups (starting from the first sub-group) shows that the middle level of education is (c.p.) least childless with the highest education group at the opposite end. One exception however in the 3^{rd} quarter of the Table.
- Young "Active Catholics" with middling education who were married 10 years or more before the interview (DUR2, AGE1, REL1, EDU2) are least childless; while "Others" with high education recently married and belonging to earlier generations (DUR1, AGE2, REL3, EDU3) are at the opposite end of the spectrum.

The following caveat concerning the simple proportional hazards model used above should be taken into account. In a simple proportional hazards model the risk curve of a given sub-group z is obtained at all points, by multiplying the risk curve of the reference sub-group z_o by the same positive constant (i.e. the relative risk). The estimated risk curve of z will therefore be, at all points, above or on the contrary, below that of z_o. The same would hold good in the case of the curve showing the proportions childless. Thus if the risk curves of z and z_o were in reality to cross each other, this cross-over effect would not be captured by the estimated curves of the model. In view of these remarks the reader

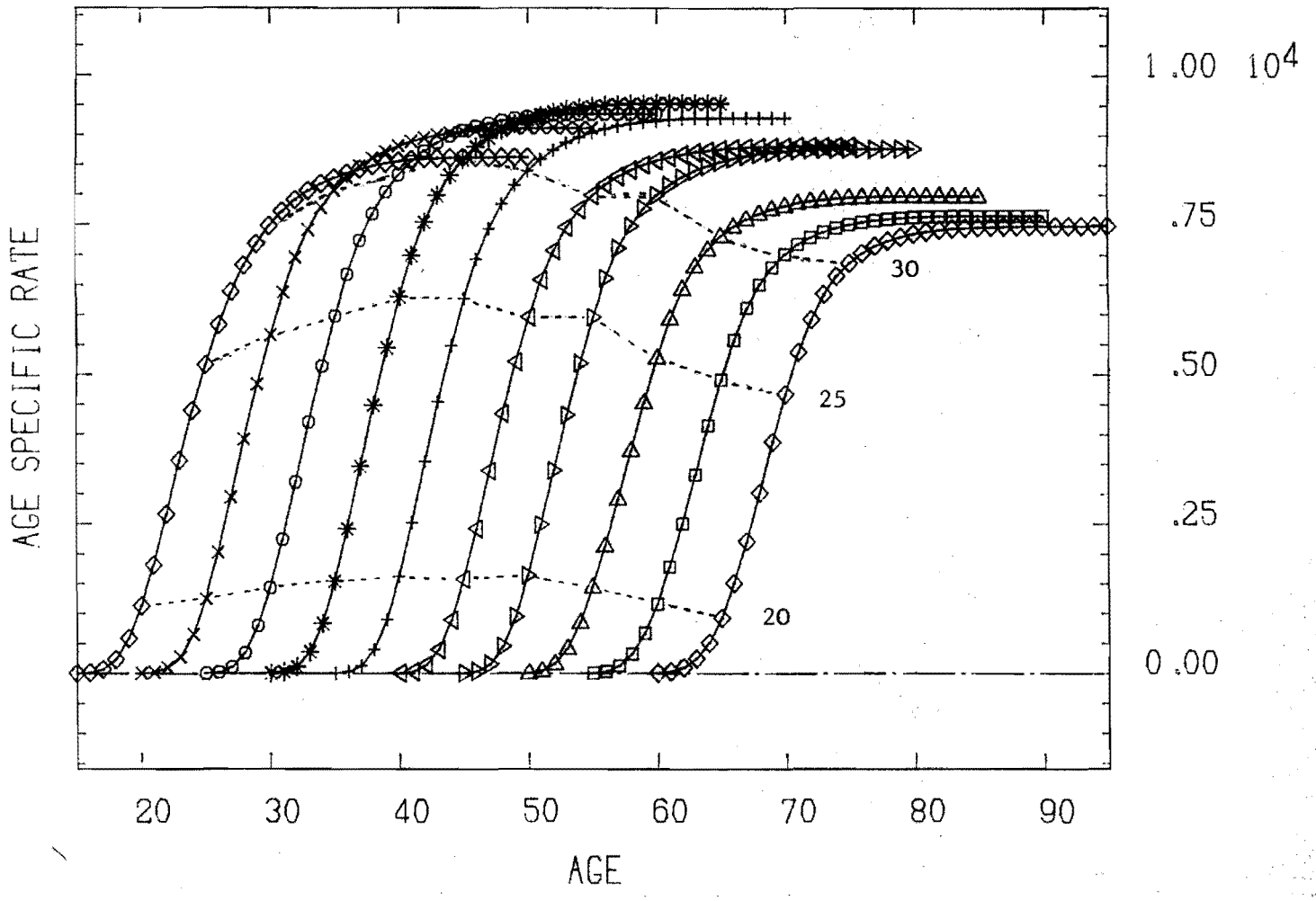
of Table 8 should concentrate most of his attention on the entries in the RR column; since each of these values gives a quantitative evaluation of the strength of a particular combination of covariates specific to a given z (in relation to those of the reference group z_o) after an examination of all the observed points of the relevant curves corresponding to all zs and z_o has already been made. The entries of column PC, which deserve less credence (in our opinion) than those of RR, are given mostly for illustrative purposes.

4) Conclusion

Even though permanent childlessness in recent marriage cohorts of women in Belgium tends to remain constant the same cannot be said of female birth cohorts. The estimated rise foreseen in the latter case, probably due to falling levels in nuptiality indeces, is accompanied by longer periods of life in the childless state. Longer periods of married life without children too seems to be part of recent behaviour when the zero-one parity transition is eventually effected. While religion still plays an important role in Flanders where Catholic-non Catholic fertility differences are clearly in evidence as regards transition from the childless state, the level of education reached by women is seen to be less effective in its influence. Disruption of married life by and large increases permanent childlessness in the absence of Active Catholicism on the one hand or when high education levels are present on the other. Cohabitation tends to increase non-permanent childlessness (i.e. within a few years of partnership formation) in the case of women who are not Catholics or are highly educated.

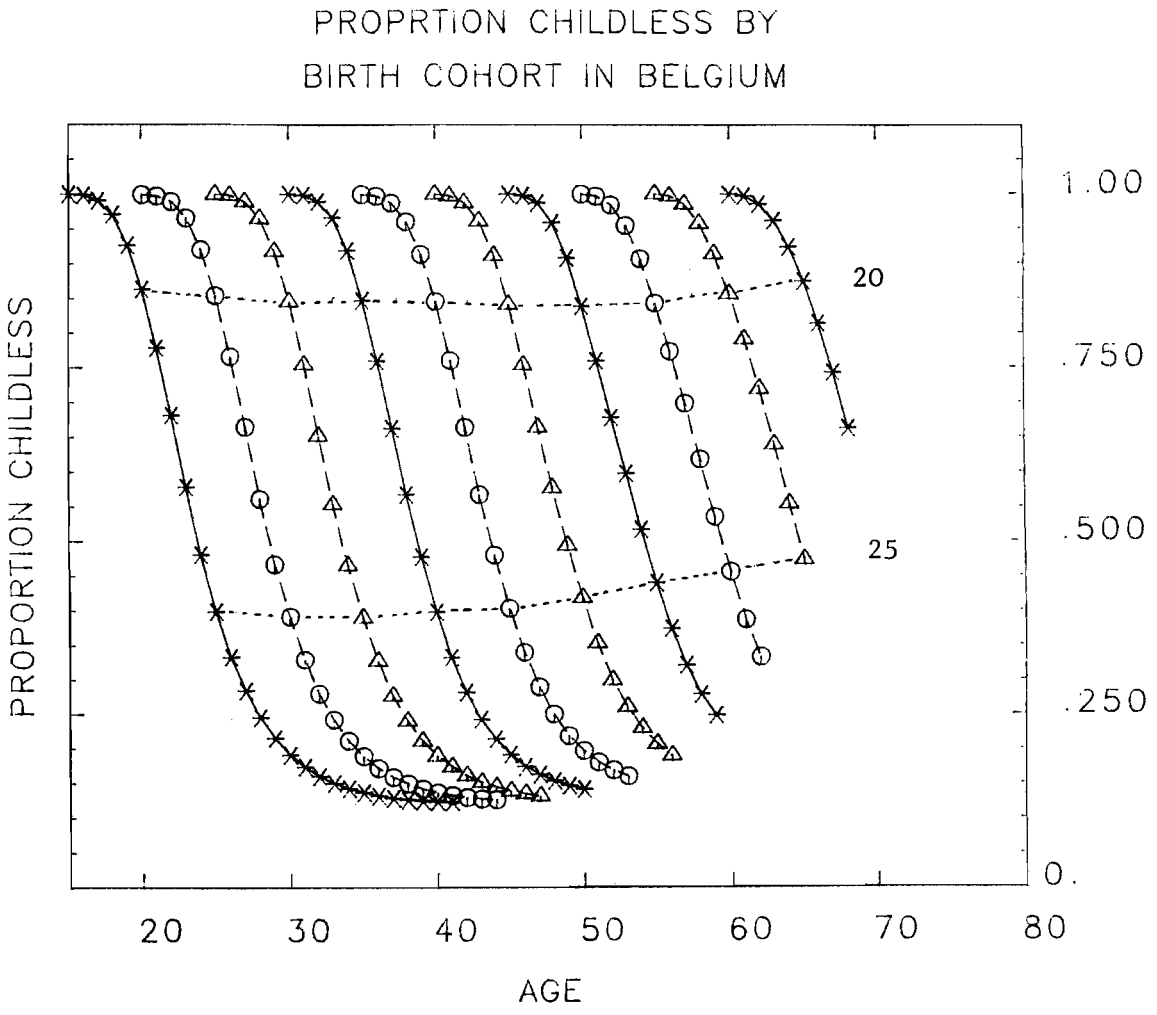
Certain areas of study covered by other researchers (e.g. voluntary vs. involuntary childlessness) have hardly been touched in the present study. Limitations of time and quality of data presently available force us to leave research into these areas for some future date.

Figure 1 : Cumulated age specific first birth rates by age (of mother) in Belgium for the calendar years 1954 (curve at extreme left), 1957, 1960, 1963, 1966, 1969, 1972, 1975, 1978 and 1981 (curve at extreme right).



N.B. : 1) Age scale correct for 1954 curve : other curves displaced to the right.
2) Dotted lines join ages 20, 25 and 30 of different curves.

Figure 2 : Proportion childless by birth cohort in Belgium.



N.B. : 1) Curves (from left to right) correspond to birth cohorts 1940, 42, 44, 46, 48, 50, 52, 54, 56 and 58.

2) Age scale is correct for the 1940 cohort : other curves displaced to the right.

3) Dotted lines correspond to ages 20 and 25 across the cohorts.

Fig. 3 : Evolution of Completed Cohort Fertility(1)/of Proportion Childless in cohorts (2), in Belgium.

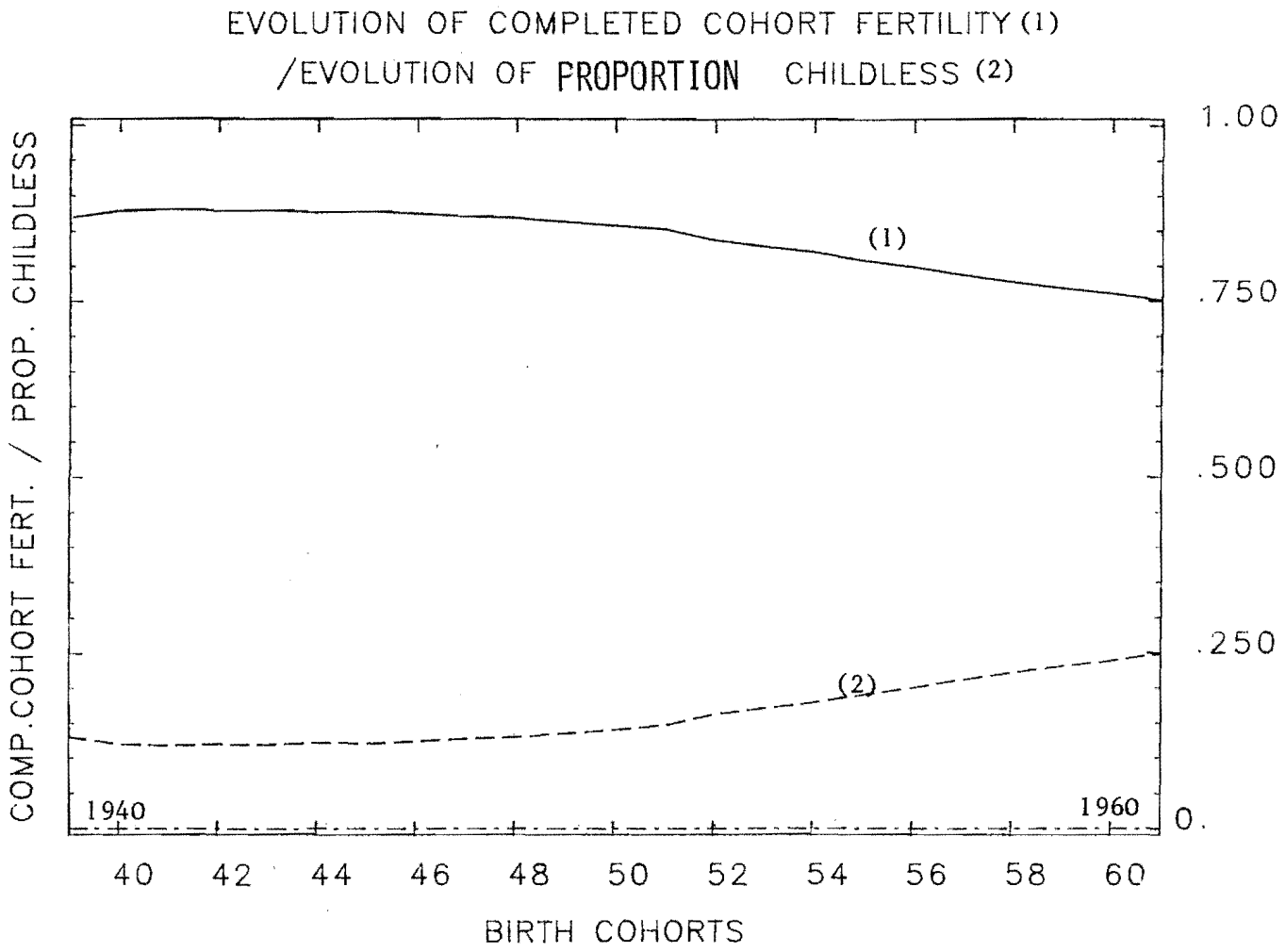
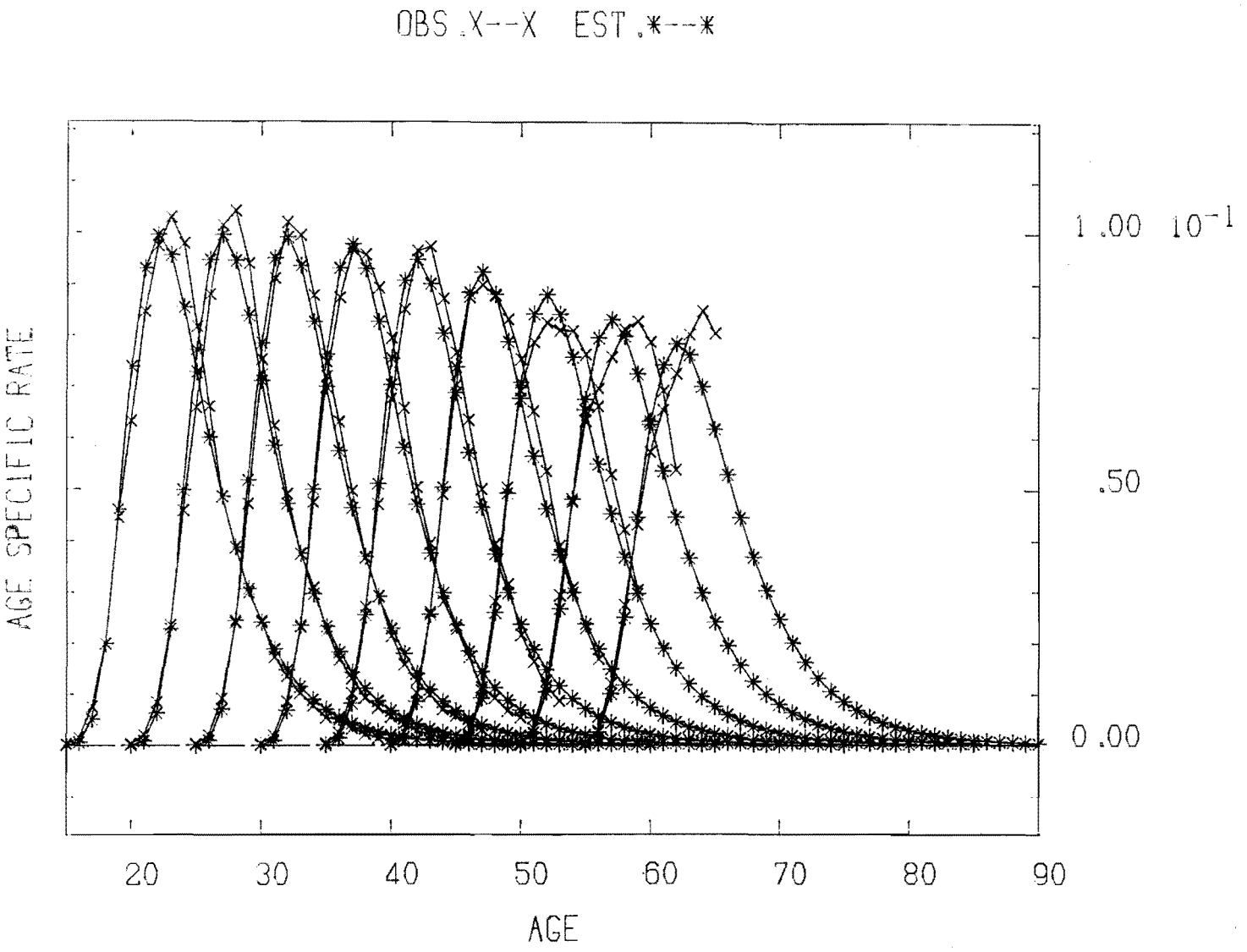


Figure 4 : Observed x———x and estimated *———* age specific first birth rates by age (of mother) for chosen birth cohorts, in Belgium



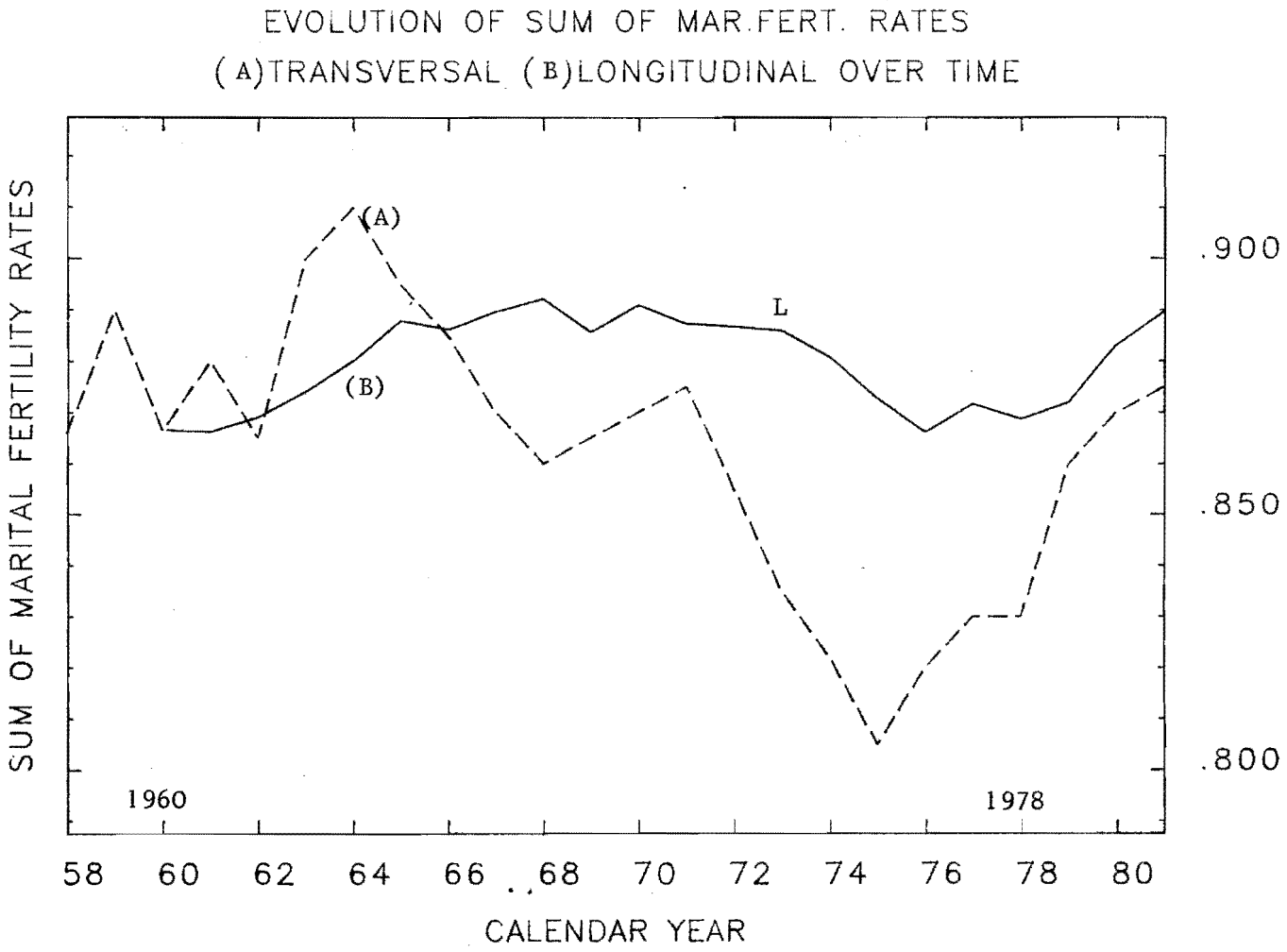
N.B. : 1) Curves correspond to the birth cohorts 1940 (extreme left), 42, 44, 46, 48, 50, 52 and 1956 (extreme right).

2) Age scale correct for 1940 curve : other curves displaced to the right.

Fig. 5 : Evolution of the sum of duration specific Marriage Fertility Rates of the first order over time, in Belgium.

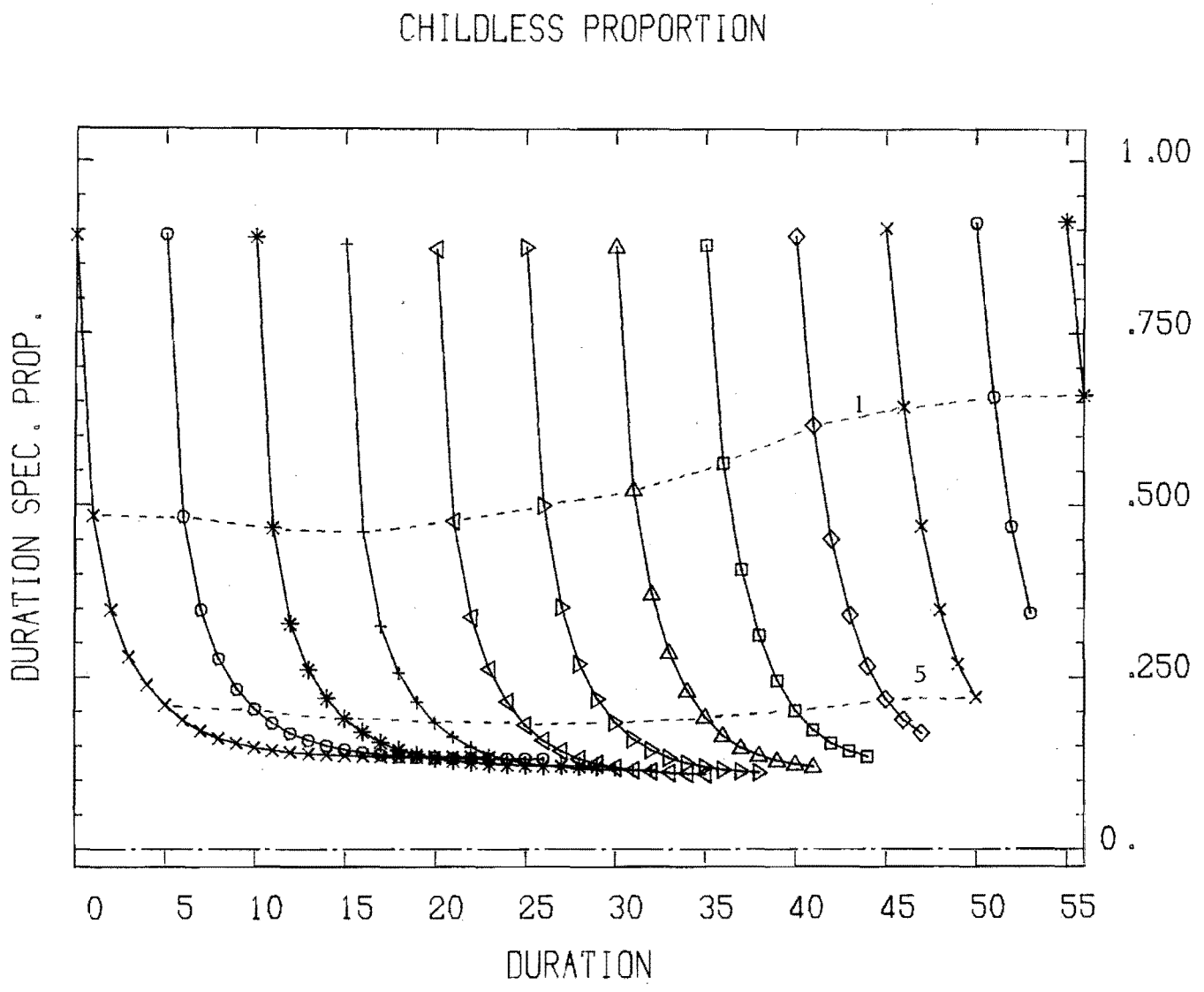
A) Summation within calendar years (-Transversal-)

B) Summation within marriage cohorts (-Longitudinal-)



N.B. : Points on (B) have abscissae (year of formation of marriage cohort) given by the calendar year on figure minus two years.

Fig. 6 : Proportion childless in chosen marriage cohorts (1958, 60, 62, 66, 68....., 78, 1980) by duration of marriage, in Belgium.

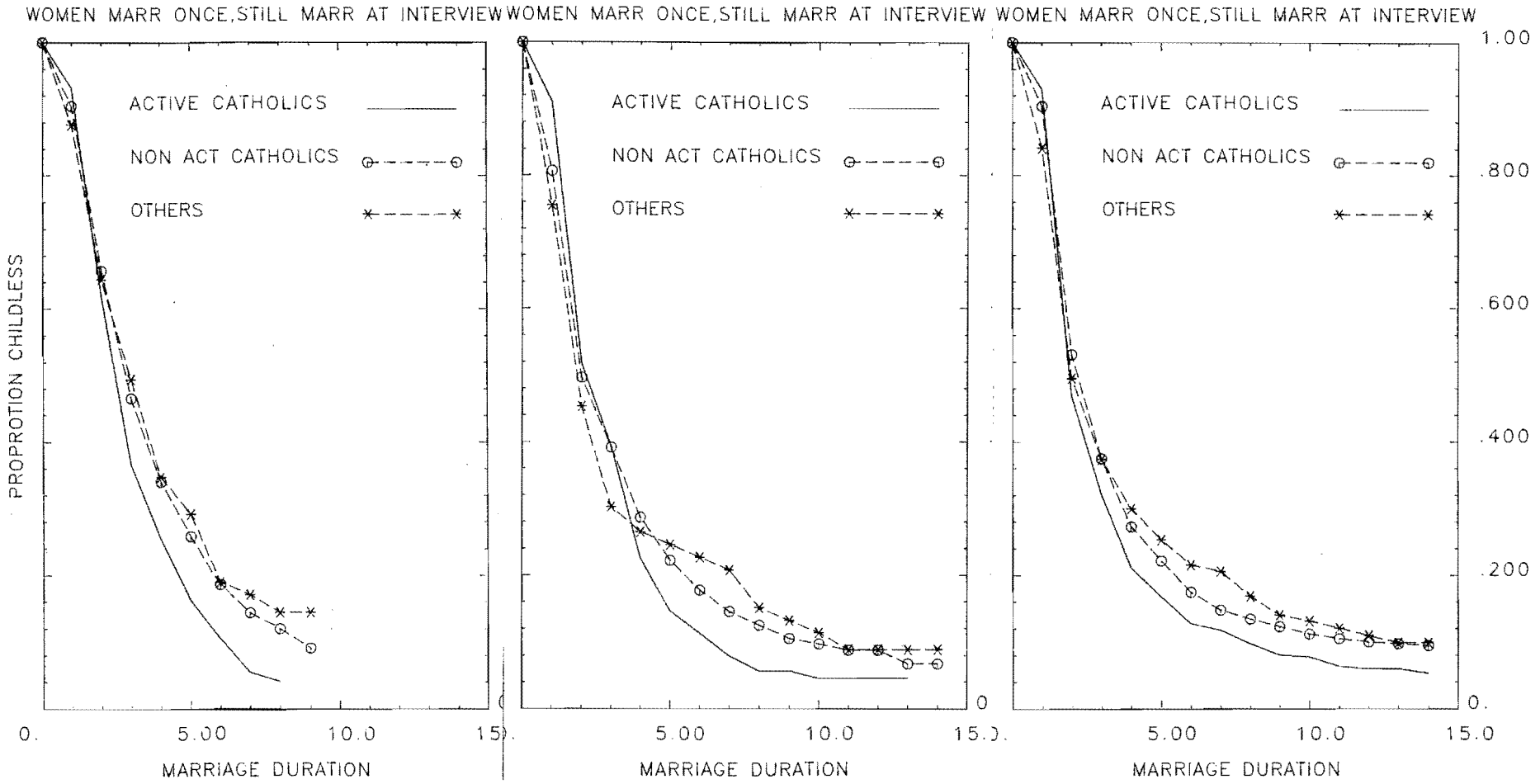


N.B. : 1) Duration of marriage given as a period difference in years (between year of marriage and year of birth incidence)

2) Duration scale correct for the 1958 curve (extreme left) : other curves shifted to the right.

3) Dotted lines correspond to duration 1 and 5.

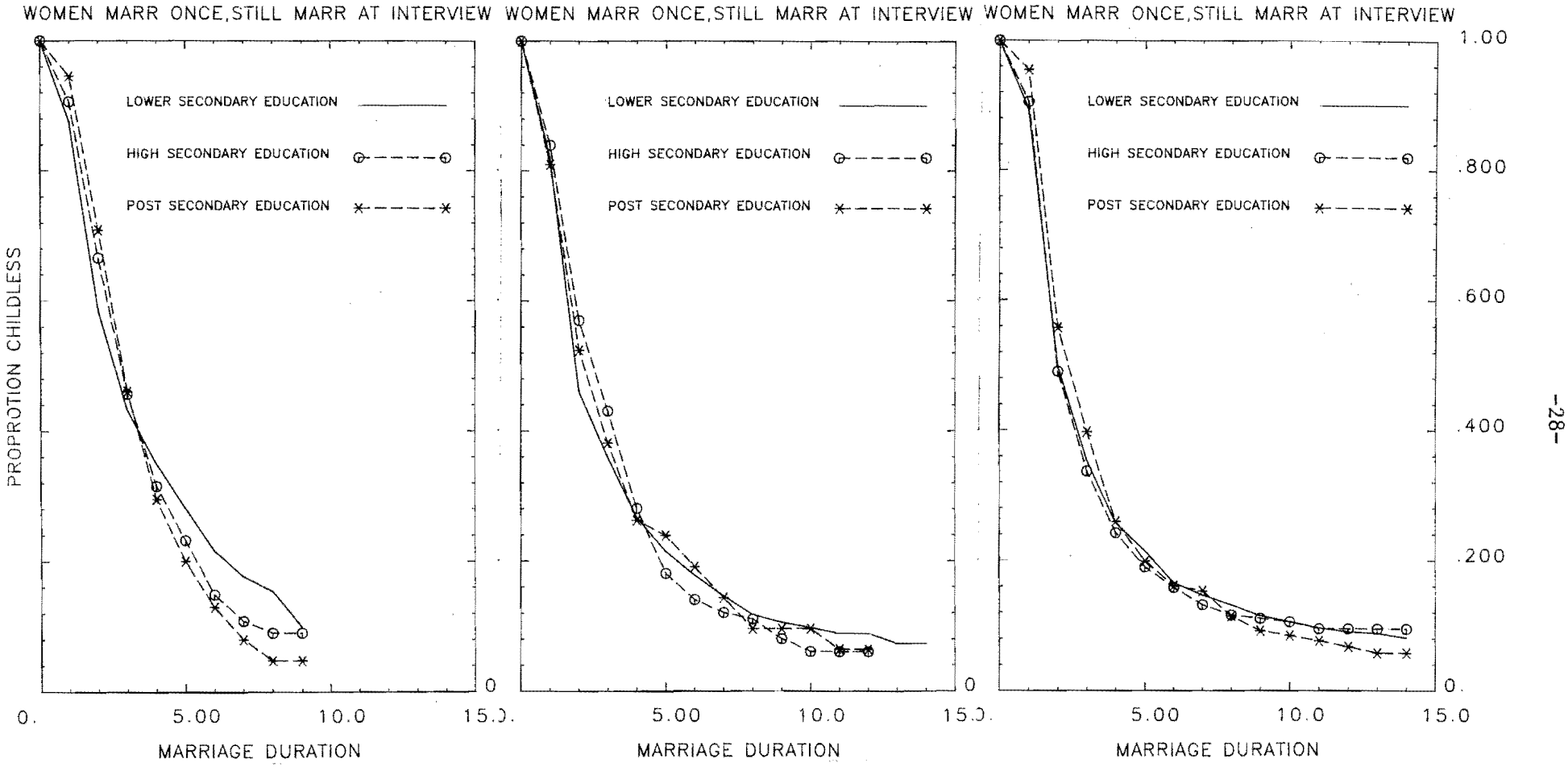
Figure 7 : Proportions childless by marriage duration and according to religious affiliation among women in Flanders.
(Only women married once and living with husband at interview are taken into account)



N.B. : -Panel left : Group AGE1, DUR1 - young women recently married. Size = 1019.
Panel centre : Group AGE1, DUR2 - young women with 10+ years of marriage. Size = 390.
Panel right : Group AGE2, DUR2 - older women with 10+ years of marriage. Size = 854.

-Marriage duration in years at last marriage anniversary.

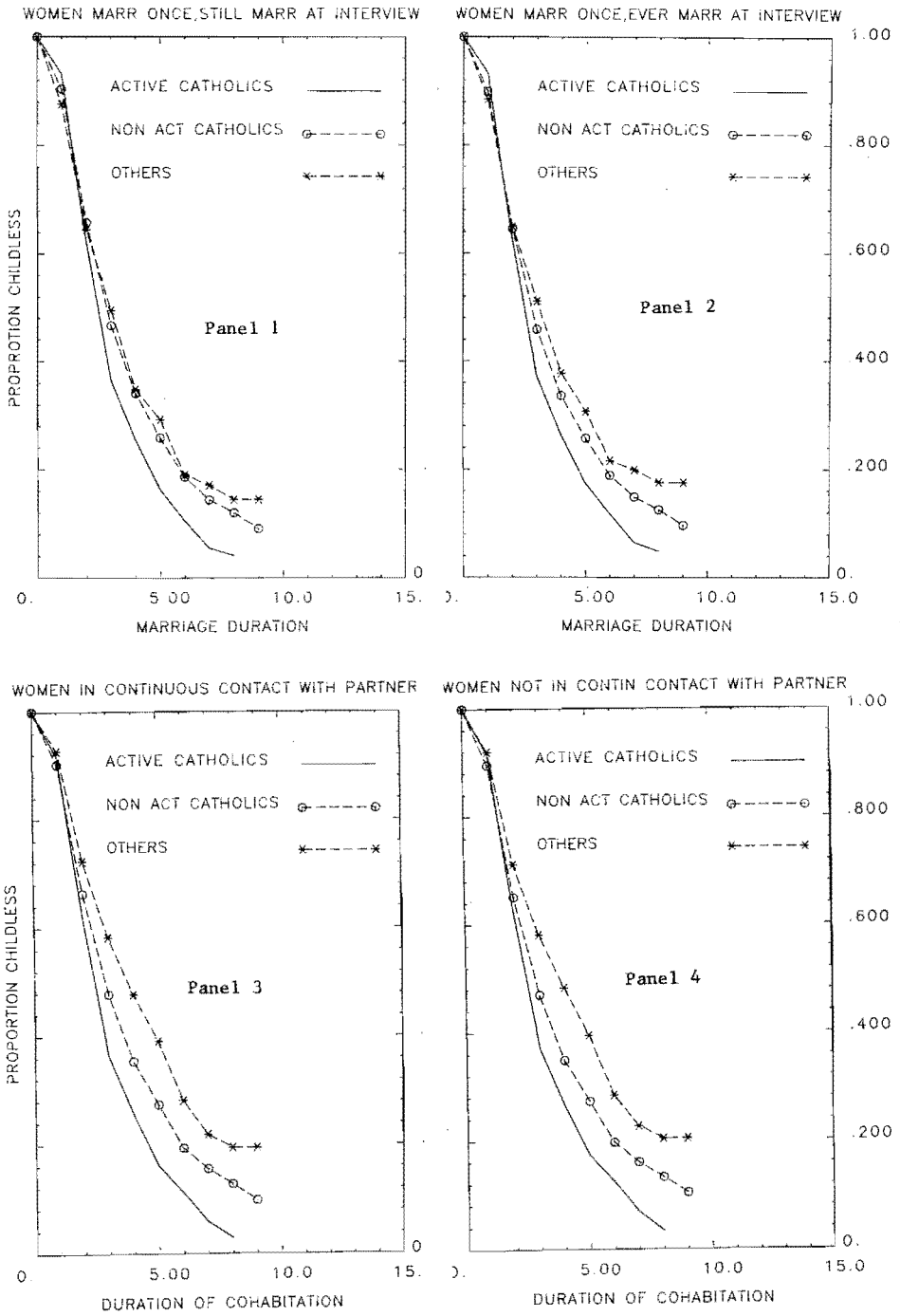
Figure 8 : Proportions childless by marriage duration and according to education level among women in Flanders.
(Only women married once and living with husband at interview are taken into account)



N.B. : -Panel left : Group AGE1, DUR1 - young women recently married. Size = 1019
Panel centre : Group AGE1, DUR2 - young women with 10+ years of marriage. Size = 390
Panel right : Group AGE2, DUR2 - older women with 10+ years of marriage. Size = 854

-Marriage duration in years at last marriage anniversary.

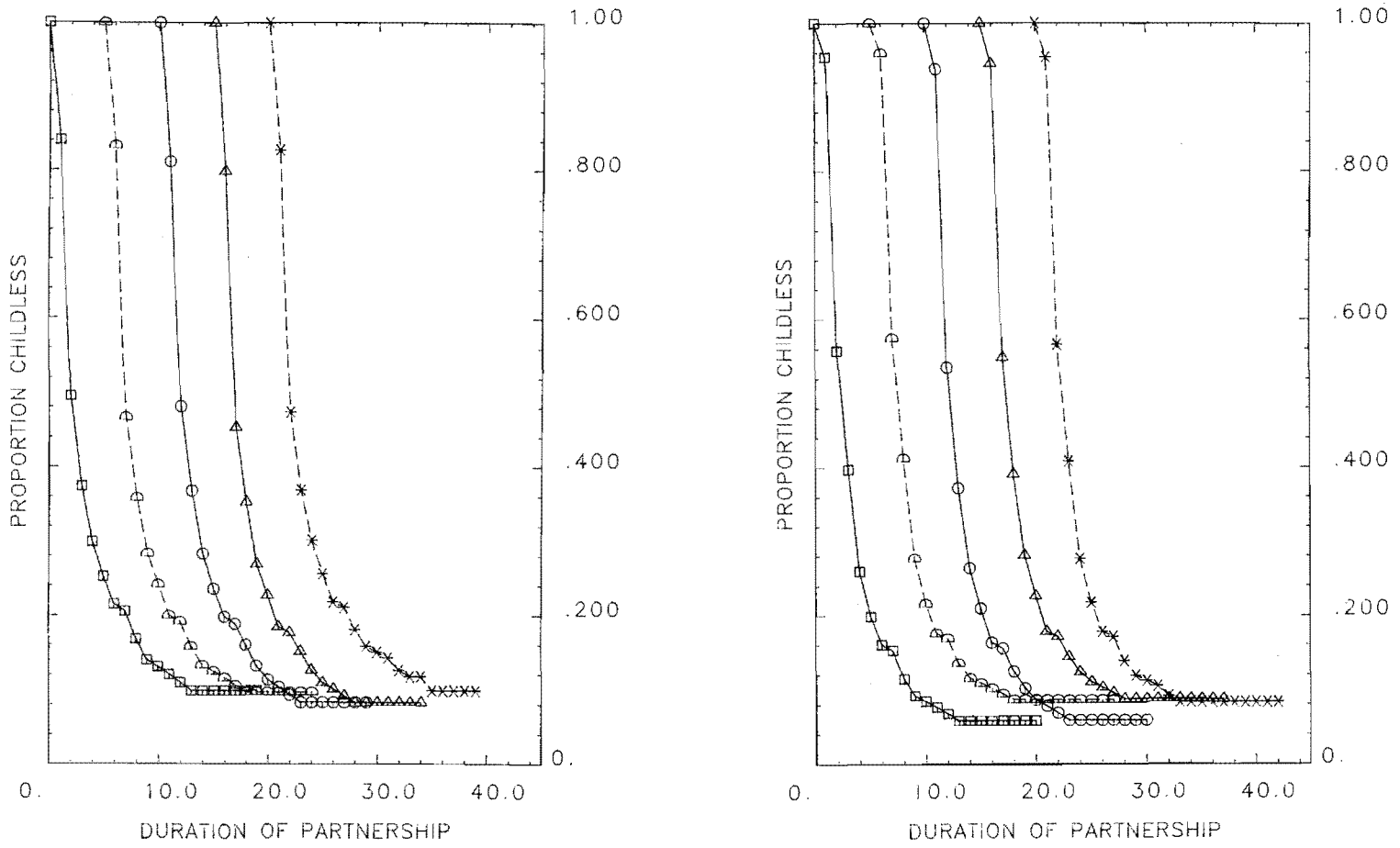
Figure 9 : Proportions childless by duration of partnership (in years at last anniversary of entry into first partnership) and according to religious affiliation among women in Flanders - Only young women with recent entry into partnership (< 10 years) i.e. group AGE1, DUR1 are taken into account.



N.B. : Panel 1 : Type M_1. Size = 1019 Panel 2 : Type M_2. Size = 1065

Panel 3 : Type P_1. Size = 1038 Panel 4 : Type P_2. Size = 1085

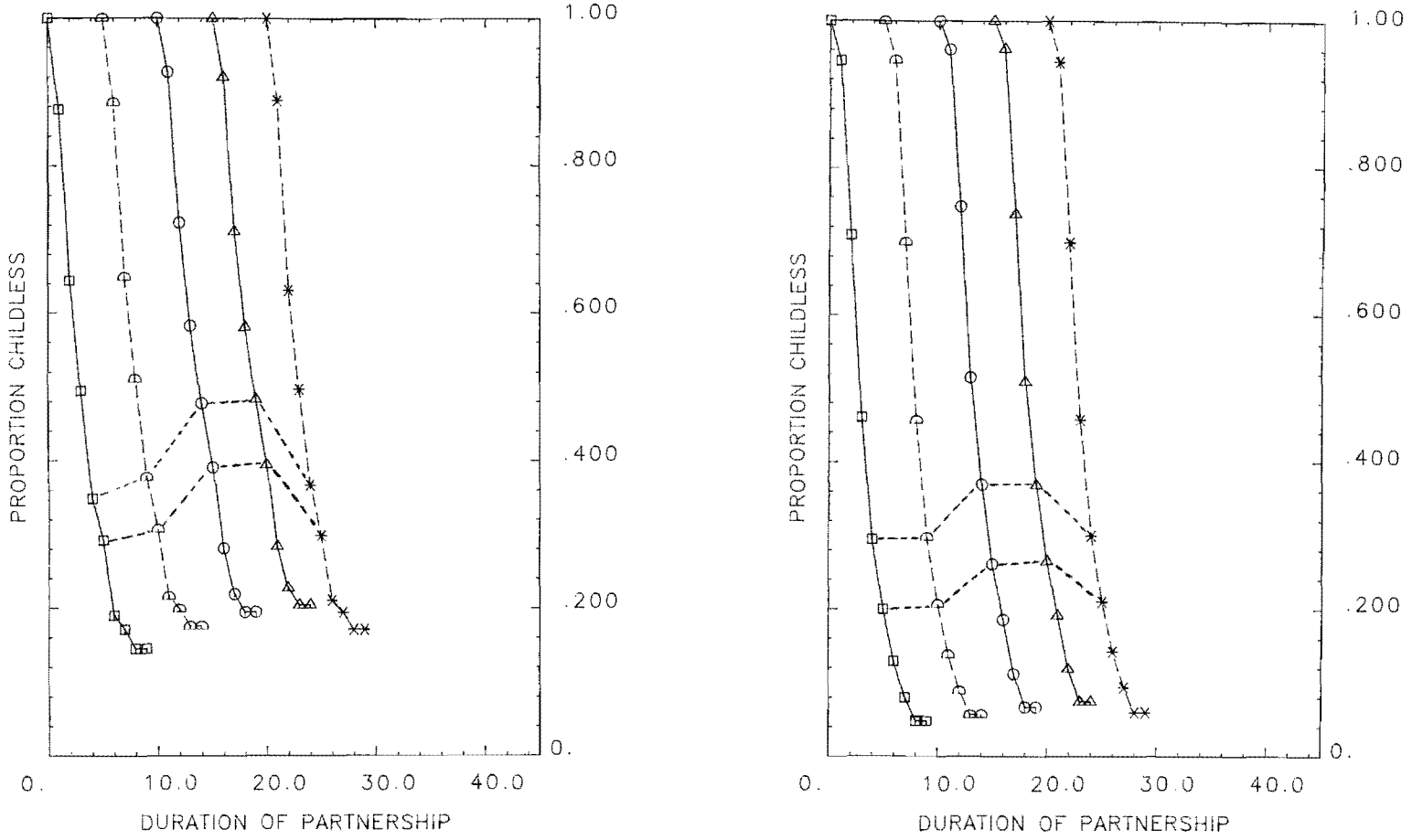
Figure 10 : Proportions childless by duration of partnership (in years, at last anniversary of entry into first partnership) according to type of partnership context (M_1, M_2, P_1, P_2 or M_3) for chosen sub-groups among women in Flanders.



N.B. : -Panel left : Group REL3, AGE1, DUR2
Panel right : Group EDU3, AGE1, DUR2

-From left to right in each panel, curves M_1, M_2, P_1, P_2, M_3.

Figure 11 : Proportions childless by duration of partnership (in years, at last anniversary of entry into first partnership) according to type of partnership context (M_1, M_2, P_1, P_2 or M_3) for chosen sub-groups among women in Flanders.



N.B. : -Panel left : Group REL3, AGE1, DUR1
Panel right : GROUP EDU3, AGE1, DUR1

-From left to right in each panel, curves M_1, M_2, P_1, P_2, M_3.

Table 1 : Age specific birth rates (per 10 000) for calendar years 1960 to 1981 in Belgium. (Rows at the bottom give the sum of the rates (-TFR-), the mean and variance of the schedule, and the total number of first births for each calendar year)

AGE SPECIFIC FIRST BIRTH RATES (X10000)

AGE	CALENDAR YEAR 1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974
15	3.	3.	2.	4.	3.	2.	3.	3.	1.	5.	4.	5.	5.	6.	5.
16	20.	23.	19.	21.	24.	23.	25.	25.	21.	24.	33.	31.	29.	33.	32.
17	85.	72.	72.	86.	95.	101.	95.	102.	100.	108.	114.	126.	122.	121.	126.
18	235.	228.	241.	246.	232.	265.	271.	268.	261.	258.	283.	292.	294.	286.	275.
19	457.	458.	460.	472.	489.	475.	497.	471.	466.	490.	490.	504.	493.	476.	452.
20	632.	682.	659.	704.	723.	728.	720.	707.	675.	681.	703.	725.	692.	662.	633.
21	811.	844.	831.	880.	905.	911.	905.	874.	862.	851.	873.	875.	852.	787.	747.
22	950.	974.	974.	1042.	1014.	1054.	1020.	1017.	967.	964.	965.	964.	899.	882.	825.
23	1013.	1018.	1009.	1029.	1042.	1042.	1006.	995.	954.	957.	979.	973.	931.	878.	857.
24	938.	967.	928.	966.	978.	932.	940.	898.	878.	873.	893.	881.	872.	838.	832.
25	833.	841.	827.	853.	850.	817.	790.	753.	762.	748.	768.	795.	770.	766.	751.
26	699.	703.	651.	689.	693.	675.	661.	638.	624.	624.	631.	626.	657.	632.	635.
27	565.	568.	517.	555.	547.	531.	505.	486.	478.	491.	497.	497.	501.	504.	494.
28	443.	454.	412.	442.	422.	409.	405.	376.	388.	387.	375.	381.	367.	385.	395.
29	366.	360.	328.	337.	343.	314.	314.	309.	291.	300.	279.	309.	291.	292.	284.
30	284.	287.	262.	265.	270.	246.	242.	233.	224.	235.	244.	239.	225.	215.	214.
31	224.	216.	209.	213.	195.	192.	196.	179.	174.	179.	175.	173.	164.	168.	173.
32	177.	169.	156.	155.	167.	159.	152.	142.	143.	136.	130.	135.	136.	125.	131.
33	138.	140.	104.	125.	131.	120.	124.	121.	124.	110.	103.	109.	104.	102.	103.
34	114.	108.	107.	103.	103.	101.	97.	96.	90.	91.	82.	83.	80.	76.	78.
35	93.	89.	82.	83.	83.	80.	78.	71.	74.	70.	70.	70.	71.	60.	59.
36	70.	74.	69.	67.	71.	67.	58.	61.	60.	59.	54.	49.	59.	48.	45.
37	54.	54.	55.	51.	53.	54.	56.	48.	45.	46.	48.	41.	41.	36.	38.
38	45.	48.	44.	42.	44.	42.	37.	42.	40.	36.	39.	38.	35.	30.	29.
39	35.	35.	38.	30.	37.	33.	29.	35.	31.	29.	28.	29.	26.	26.	23.
40	26.	27.	25.	26.	24.	23.	21.	21.	24.	22.	25.	23.	19.	18.	16.
41	22.	19.	17.	18.	17.	18.	21.	15.	19.	19.	15.	16.	15.	12.	14.
42	10.	19.	14.	14.	14.	12.	12.	12.	13.	12.	11.	13.	10.	10.	12.
43	11.	7.	10.	9.	9.	9.	8.	7.	6.	6.	8.	8.	8.	7.	6.
44	6.	5.	6.	6.	5.	7.	5.	7.	4.	4.	5.	5.	5.	3.	4.
45	4.	3.	4.	4.	2.	3.	2.	3.	2.	3.	2.	3.	2.	2.	1.
46	1.	1.	1.	1.	1.	2.	1.	1.	2.	1.	1.	1.	1.	1.	0.
47	0.	0.	1.	0.	1.	0.	1.	1.	1.	0.	0.	1.	0.	0.	0.
48	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.
49	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
50	0.	0.	0.	0.	0.	1.	0.	0.	0.	1.	0.	0.	1.	0.	0.
TFR	.936	.952	.918	.954	.959	.945	.930	.904	.881	.882	.893	.902	.878	.849	.829
MEAN	24.791	24.730	24.640	24.566	24.556	24.453	24.408	24.391	24.411	24.371	24.286	24.265	24.276	24.264	24.332 24
VARNC	20.782	20.626	20.701	19.926	20.090	20.121	19.938	20.105	20.142	20.049	19.819	19.799	19.634	19.126	19.204 18
TOTAL	54626.	54915.	52565.	54323.	55047.	55262.	55785.	55790.	55806.	57195.	58952.	60382.	59777.	58685.	58115. 56

N.B. : Age is expressed as the period difference in years between the year of birth (of mothers) and the calendar year in question.

Table 1. (Continued)

AGE SPECIFIC FIRST BIRTH RATES (X10000)

AGE	CALENDAR YEAR 1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
15	4.	5.	5.	6.	5.	6.	5.	4.	4.	4.	3.	3.
16	33.	31.	29.	33.	32.	35.	33.	29.	25.	23.	23.	21.
17	114.	126.	122.	121.	126.	117.	113.	105.	93.	79.	82.	69.
18	283.	272.	294.	286.	275.	256.	241.	206.	198.	174.	164.	148.
19	490.	504.	493.	476.	452.	432.	405.	380.	347.	328.	294.	263.
20	703.	725.	692.	662.	633.	591.	573.	522.	484.	476.	446.	417.
21	873.	875.	852.	787.	747.	696.	665.	655.	624.	605.	595.	582.
22	965.	964.	899.	882.	825.	781.	758.	749.	726.	733.	714.	705.
23	979.	973.	931.	878.	857.	810.	811.	812.	814.	803.	806.	806.
24	893.	861.	872.	838.	832.	807.	809.	815.	828.	832.	849.	858.
25	768.	795.	770.	766.	751.	754.	772.	763.	775.	788.	804.	805.
26	631.	626.	657.	632.	635.	651.	652.	679.	661.	696.	692.	702.
27	497.	497.	501.	504.	494.	501.	536.	536.	537.	529.	548.	539.
28	375.	381.	367.	385.	395.	377.	394.	388.	390.	396.	422.	424.
29	279.	309.	291.	292.	284.	282.	293.	316.	292.	309.	289.	304.
30	244.	239.	225.	215.	214.	224.	228.	218.	217.	228.	230.	217.
31	175.	173.	164.	168.	173.	158.	165.	172.	164.	164.	151.	169.
32	130.	135.	136.	125.	131.	121.	127.	129.	114.	125.	116.	121.
33	103.	109.	104.	102.	103.	93.	89.	99.	92.	93.	90.	87.
34	82.	83.	80.	76.	78.	74.	74.	72.	70.	71.	68.	63.
35	70.	70.	71.	60.	59.	54.	54.	56.	55.	57.	55.	55.
36	54.	49.	59.	48.	45.	47.	50.	49.	42.	42.	42.	36.
37	40.	41.	41.	36.	38.	31.	30.	33.	31.	28.	33.	31.
38	39.	38.	35.	30.	29.	25.	29.	24.	22.	28.	20.	23.
39	28.	29.	26.	26.	23.	20.	19.	19.	17.	14.	18.	13.
40	25.	23.	19.	18.	16.	15.	15.	18.	16.	11.	13.	9.
41	16.	16.	15.	12.	14.	11.	12.	8.	9.	6.	7.	8.
42	11.	13.	10.	10.	12.	7.	7.	7.	6.	5.	4.	5.
43	8.	8.	8.	7.	6.	6.	4.	5.	5.	4.	5.	4.
44	5.	5.	5.	3.	4.	2.	3.	2.	2.	1.	1.	2.
45	2.	3.	2.	2.	1.	1.	2.	1.	1.	1.	1.	1.
46	1.	1.	1.	1.	0.	0.	0.	1.	1.	0.	1.	0.
47	0.	1.	0.	0.	0.	0.	0.	1.	0.	0.	1.	0.
48	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.
49	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
50	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TFR	.893	.902	.878	.842	.829	.799	.797	.787	.766	.765	.758	.749
MEAN	24.286	24.265	24.276	24.264	24.332	24.351	24.458	24.574	24.591	24.669	24.717	24.782
VARNC	19.819	19.799	19.634	19.126	19.204	18.544	18.451	18.230	17.624	16.987	16.778	16.203
TOTAL	58952.	60382.	59777.	58685.	58115.	56892.	57542.	57733.	56936.	57356.	57069.	56609.

Table 2 : Proportions childless by age at census (Dec. 1970) of women (married once and living with husband at census) in Belgium.

Age (completed years) at census	Proportion childless	Age (completed years) at census	Proportion childless	Age (completed years) at census	Proportion childless
15	0.71901	35	0.09182	55	0.13753
16	0.62903	36	0.09207	56	0.14082
17	0.56062	37	0.09258	57	0.14366
18	0.51925	38	0.09226	58	0.14853
19	0.53247	39	0.09590	59	0.15217
20	0.50459	40	0.09819	60	0.15534
21	0.48336	41	0.09920	61	0.16215
22	0.44103	42	0.10262	62	0.16612
23	0.37675	43	0.10860	63	0.17204
24	0.32527	44	0.10937	64	0.16679
25	0.26201	45	0.11610	65+	0.18364
26	0.20995	46	0.11854		
27	0.17444	47	0.11975		
28	0.14943	48	0.12684		
29	0.12655	49	0.12666		
30	0.11372	50	0.13043		
31	0.10676	51	0.12984		
32	0.10144	52	0.13179		
33	0.09656	53	0.13036		
34	0.09421	54	0.13257		

Table 3 : Proportions childless by duration (at census, Dec. 1970) of marriage of women (married once and living with husband at census) in Belgium.

Duration (completed years)	Proportions childless	Duration (completed years)	Proportions childless	Duration (completed years)	Proportions childless
0	0.84098	15	0.10683	30	0.11246
1	0.47634	16	0.10561	31+	0.13339
2	0.32245	17	0.10943		
3	0.24644	18	0.10907		
4	0.19432	19	0.11255		
5	0.15845	20	0.11687		
6	0.13652	21	0.11738		
7	0.12691	22	0.12452		
8	0.11660	23	0.12594		
9	0.11134	24	0.12548		
10	0.10933	25	0.12481		
11	0.10509	26	0.09995		
12	0.10433	27	0.10544		
13	0.10249	28	0.10867		
14	0.10439	29	0.10672		

Table 4 : Proportions childless by Birth Cohort Group and Duration of marriage (completed years) at census in Belgium

Duration of marriage	Birth Cohort Group 1950-55	1945-50	1940-45	1935-40	1930-35	1925-30	1920-25	1915-20	1910-15	1905-10	1900-05	1895-00	1890-95	<1884
0	.74967	.86988	.79173	.78289	.76364	.76161								
5		.09721	.15233	.16387	.23235	.38741	.59796	.72329						
10			.05285	.08758	.12072	.19549	.40206	.63025	.79919					
15				.04433	.08335	.11525	.23063	.41192	.62019	.73753				
20					.04505	.08940	.13633	.22706	.40694	.66237	.76488			
25						.04915	.08893	.13833	.20036	.36975	.67553	.76316		
30							.04774	.08165	.13286	.21938	.43224	.67089	.78689	
31+								.06455	.11337	.16600	.24129	.39773	.66859	.76176

N.B. : Entries in this table concern women in Belgium married once and living at census time (Dec. 1970) with husband.

Table 5 : Proportions childless by age group (at census, Dec. 1970) and educational level of women (married once and living with husband at census) in Belgium

Age at census (completed years)	Proportions childless			
	A	B	C	C - A
15 - 19	0.49584	0.57988	0.69231	0.19647
20 - 24	0.31621	0.44259	0.59837	0.28216
25 - 29	0.14438	0.20392	0.27076	0.12638
30 - 34	0.09283	0.11280	0.11278	0.01995
35 - 39	0.08925	0.09844	0.09888	0.00963
40 - 44	0.09965	0.10977	0.11512	0.01547
45 - 49	0.11688	0.12856	0.14009	0.02321
50 - 54	0.12465	0.14031	0.16652	0.04187
55 - 59	0.13791	0.16216	0.19722	0.05931
60 - 64	0.15427	0.20331	0.22365	0.06938
65+	0.17431	0.22972	0.27120	0.09689

N.B. : A = Primary Education

B = Secondary Education

C = Post Secondary Education

Table 6 : Proportions childless among women (married once and living with husband at census, Dec. 1970) in Belgium by age (of women) at census and professional status of husband

Age (completed years) at census	P R O P O R T I O N S C H I L D L E S S			
	Professional status of husband			
	A	B	C	D
15-19	0.56098 (0.86207)	0.49372 (0.68750)	0.41654 (0.67870)	0.45133 (0.62864)
20-24	0.25159 (0.45515)	0.29919 (0.47440)	0.20627 (0.57137)	0.38055 (0.65073)
25-29	0.09193 (0.19458)	0.11401 (0.24213)	0.08044 (0.32022)	0.16612 (0.40694)
30-34	0.05250 (0.10897	0.06503 (0.13562)	0.05688 (0.19785)	0.07528 (0.13966)
35-39	0.05777 (0.10088)	0.06660 (0.11860)	0.061198 (0.17691)	0.07149 (0.10666)
40-44	0.06504 (0.11365)	0.07309 (0.13840)	0.07905 (0.18425)	0.08586 (0.12590)
45-49	0.07771 (0.13281)	0.08789 (0.16018)	0.10279 (0.19617)	0.12020 (0.16534)
50-54	0.08115 (0.13320)	0.09770 (0.16225)	0.11690 (0.19316)	0.14453 (0.19018)
55-59	0.10139 (0.14077)	0.11039 (0.15583)	0.13358 (0.20541)	0.16360 (0.18510)
60-64	0.11394 (0.13691)	0.14264 (0.17691)	0.16980 (0.20363)	0.16606 (0.17141)
65+	0.15010 (0.20099)	0.20628 (0.23302)	0.26974 (0.37166)	0.17761 (0.20484)

N.B. :- A Employer (and independent in professional life)
- B Independent in professional life
- C Employed
- D No profession
- Main entries in Table correspond to professionless women.
- Entries in brackets correspond to women with profession.

Table 7 : Proportions childless around 11 years (approx) duration of partnership among women in Flanders, by level of Education and type of woman (only young women who first entered partnership 10 years or more before interview are taken into account)

	M_1	M_2	P_1	P_2
EDU1	0.0727	0.0833	0.0701	0.0780
EDU2	0.0600	0.0556	0.0600	0.0556
EDU3	0.0635	0.1309	0.0833	0.1456

N.B. : See text for the signification of the symbols used above.

Table 8 : Relative risks (RR) and proportions childless (PC) at chosen marriage durations (MD) for sub groups formed by religion (REL), education (EDU), seniority of marriage cohort (DUR) and age at survey (AGE) in Flanders. (Women married once and living with husband at interview).

(DUR, AGE, REL, EDU)				RR	PC	
					MD = 10	MD = 20
1	1	1	1	1.0000	0.0852	0.0651
1	1	1	2	1.0000	0.0851	0.0651
1	1	1	3	0.9760	0.0904	0.0695
1	1	2	1	0.8452	0.1247	0.0994
1	1	2	2	0.8456	0.1246	0.0993
1	1	2	3	0.8250	0.1311	0.1050
1	1	3	1	0.8246	0.1312	0.1052
1	1	3	2	0.8249	0.1311	0.1051
1	1	3	3	0.8048	0.1378	0.1110
1	2	1	1	0.9512	0.0961	0.0744
1	2	1	2	0.9516	0.0960	0.0743
1	2	1	3	0.9284	0.1016	0.0792
1	2	2	1	0.8039	0.1381	0.1113
1	2	2	2	0.8043	0.1379	0.1112
1	2	2	3	0.7847	0.1448	0.1173
1	2	3	1	0.7843	0.1449	0.1174
1	2	3	2	0.7846	0.1448	0.1173
1	2	3	3	0.7655	0.1518	0.1236
2	1	1	1	1.1710	0.0558	0.0408
2	1	1	2	1.1720	0.0558	0.0407
2	1	1	3	1.1430	0.0598	0.0440
2	1	2	1	0.9902	0.0873	0.0669
2	1	2	2	0.9906	0.0872	0.0668
2	1	2	3	0.9664	0.0925	0.0714
2	1	3	1	0.9659	0.0926	0.0715
2	1	3	2	0.9664	0.0926	0.0714
2	1	3	3	0.9428	0.0981	0.0761
2	2	1	1	1.1140	0.0643	0.0477
2	2	1	2	1.1150	0.0642	0.0476
2	2	1	3	1.0880	0.0687	0.0513
2	2	2	1	0.9418	0.0983	0.0764
2	2	2	2	0.9422	0.0982	0.0763
2	2	2	3	0.9192	0.1039	0.0812
2	2	3	1	0.9188	0.1041	0.0813
2	2	3	2	0.9192	0.1040	0.0812
2	2	3	3	0.8967	0.1099	0.0864

N.B. : 2 1 2 3 in the first column, for example, stands for the sub-group (DUR2, AGE1, REL2, EDU3).

NOTES

(1) Cf. Bourgeois-Pichat (1976), Calot and Blayo (1982), Van de Kaa (1980), Wijewickrema (1984).

(2) Cf. Willems, Wijewickrema and Lesthaeghe (1981).

(3) This situation has been remedied to some extent in other countries thanks to the efforts (among others) of Veevers (1971, 1972), Poston (1974, 1976, 1984), Leridon (1982), Casterline and Trussell (1980), Bloom (1982, 1984), Bloom and Pebley (1982).

(4) The notion of childlessness used in the present study is defined with reference to live offspring (1) because it is only a live birth that has a part to play in population dynamics and (2) because of the ready availability of the corresponding data.

(5) Wijewickrema (1984), Willems and Wijewickrema (1984).

(6) The number of annual first births, which is not a mere function of a push away from (or a propensity to leave) the childless state, is influenced by the number and distribution of the women present in the ages of reproduction.

(7) An age (duration) specific birth rate, defined as the ratio of the number of annual live first births at a specified age (duration) to the mid-year population of all (married) women present at that age (duration), succeeds :

   (1) in shaking off the disturbing effects of numbers - we are dealing with a rate - and distribution - the rate in question is age (duration) specific.

   (2) in getting rid, under certain assumptions, of the nuisance effects of certain factors such as mortality (end of nuptial union). The assumptions in question (a) affirm the existence of independence between first birth incidence and the occurrance of the nuisance factor; and (b) consider any difference between the survival functions of women (nuptial unions) who (which) have and have not

experienced first births as negligible.
The age (duration) rates used in this study follow the above definition. However since the denominator necessary for the duration specific rate is not known, it is replaced by the number of women aged 15-44 (compl. yrs.) initially forming the relevant marriage cohort. The presence of this substitute denominator could lead to a biased rate : underestimation if the marriage cohort concerned were to experience high divorce, widowhood or emigration rates, and overestimation on the contrary with immigration.

(8) The age scale given in the Figure is correct only for the curve at the extreme left - 1954 in this case. Each subsequent curve has been moved a fixed number of age units to the right of its immediate neighbour on the left. This same procedure, designed to facilitate the reading of the figure, is adopted on many occasions in what follows. The three dotted lines drawn across the curves in Figure 1 correspond to ages 20, 25 and 30.

(9) This table (not presented here) can be obtained by rearranging the entries of Table 1 in the appropriate birth cohorts.

(10) About 98% of first birth incidence in a cohort is already over by the time age 35 is reached. The proportion childless at this age is therefore a fair estimation of permanent childlessness.

(11) The estimated values result from the extrapolation (linear when possible or following the simplest convenient polynomial function otherwise) of observed cumulated cohort rates using least-squares fits. (See Bourgeois-Pichat (1976) for details of the special type of cumulation involved etc.).

(12) The Coale nuptiality model (cf. Coale (1971), and Coale and McNeil (1972)) has been found to provide adequate fits for the first birth fertility schedule in a number of instances (cf. Bloom (1982)). A programme, elaborated by C. Vanderhoeft, incorporating a maximum likelihood estimation of the best fitting curve was used in our work.

(13) The summation which gives the cumulated rate in question extends over rates belonging to different marriage cohorts.

(14) Each point in B has been given an abscissa which is two units less than the abcissa of the point in A immediately above or below it. (The calendar years indicated in the figure correspond exactly with the abscissae of points in A). Given that the mean duration of first birth incidence in cohorts is approximately two years, this setting of abscissae ensures that if completely stationary conditions were to prevail or if cohort intensity alone were to change linearly (timing remaining the same), the two curves would tend to be identical.

(15) Points to the left of L correspond to cohorts with at least 10 years of observed marriage duration. Since 98% of first birth incidence (in cohorts) has already been experienced within 10 years of marriage, the percentage childless at this duration (of marriage) can be taken as a fairly satisfactory index of permanent childlessness among married women.

(16) Cf. Willems and Wijewickrema (1984).

(17) These conditions are identical to those specified earlier as being necessary for rates (calculated off registration data) to be free of the disturbing effects of mortality etc. (cf. supra).

(18) The cross-sectional view provided by the proportions calculated at census time would be equally valid for any cohort if first birth formation remained stationary (i.e. constant intensity and timing) from one cohort to another.

(19) Here, as elsewhere in this section, if proportions childless rise with increasing age (marriage duration) at census it should be noted that a succession of different birth (marriage) cohorts are under observation. Such a rise would be extremely unlikely in the experience of any one cohort, and moreover impossible if the cohort were free of all forms of migration influence.

(20) This is certainly true, and with no need of further nuance, of cohorts of women who are above 45 years of age at census time when reproductive potential is practically zero. The possibility of reproduction between ages 35 and 44 makes the conclusion less certain in the case of cohorts aged 35-44 at census - especially those closer to 35 - where age at marriage (and hence duration in marriage) could be a determining factor. Note however that the chances of an increase in proportions childless arising from mere late entry into marriage becomes very small when the persons concerned are close to being permanently childless at age of marriage : i.e. above 40 years.

(21) The marriage cohorts formed under exceptional war time conditions being exceptions!

(22) Computed from Table IV(A) found in "Recensement de la population : Dec. 1970, Tom 7". (Institut National de Statistique, Bruxelles, 1975).

(23) A collection of annual birth cohorts is referred to as a birth cohort group. Note that there is a small overlap of annual cohorts at the boundaries of adjoining groups. This results from the nature of the data available, and cannot be avoided.

(24) A woman is sterile when she is incapable of conceiving outside periods of non-susceptibility. Her fecondability is then equal to zero. Primary or total sterility refers to the permanent sterility of a woman who is in this condition from the very beginning. Since both primary sterility (biological in nature) and/or contraception (behavioural in nature) could result in permanent childlessness, the minimum observed percentage childless (4.4%) is only an index of the upper level of primary sterility. Half this value (i.e. 2.2% in our case) is sometimes taken an index of the true level of primary sterility.

(25) Women classified as "Autres" in the published data (i.e. probably with no education whatsoever) are numerically insignificant in recent cohorts. They have not been given a place in Table 5.

(26) Two categories (corresponding to status of husband defined as (a) helper and (b) of unknown status) were left out of Table 6 because of the problem of small numbers.

(27) Note that only two groups (those in column D and corresponding to ages above 60) are not in line with the negative correlation. These groups could however contain some women with husbands declared as "without profession" at census time even though they did enjoy a higher professional ranking in earlier life. If so these women, who would be characterised (because of the negative correlation observed) by childless proportions lower than those of others in the same group, have been wrongly classified and are partly responsible for the low values (0.16606 and 0.17761) observed.

(28) Both cohabitation and marriage are thus taken to be forms of "partnership".

(29) Divorce and widowhood are obvious examples of the kind of interference referred to.

(30) Note that the data necessary for dealing with cohabitation (taken here as a form of partnership) was available only for :

a) never-married women in cohabitation at time of interview.
b) women in first marriage who had cohabited (prior to marriage) with their husbands and are still living with them at interview.

These were treated as cases of first cohabitation.

(31) The S.P.S.S. sub-routine "Survival" : Life Table Analysis" was used for this purpose.

(32) Cf. Westoff (1975), (1979); Jones and Westoff (1979); Poston (1984).

(33) i.e. when M_1, M_2, P_1, P_2 (cf. supra) are taken into account.

(34) These are not presented due to limitations of space.

(35) Disruption of marriage has a similar though less pronounced effect also in the case of young women whose first marriage took place 10 years or more before interview (i.e. group AGE1, DUR2). The group (AGE2, DUR2) is practically unaffected.

(36) I.e. curves of the type found in Figure 9; though related to the education-childlessness relationship in this case. These curves are not presented.

(37) Since all cases of cohabitation considered in our study concerned women who live up to interview with partner (cf. Note 30), disruption of partnership can occur only through marital rupture.

(38) Cf. Vanderhoeft (1985) for details.

(39) t is the time elapsed between entry into first marriage (first cohabitation) and occurrance of first birth. Since work was carried out in single years of time, a maximum of 24 intervals was allowed i.e. l could take values between 1 and 24. Thus for example l=1 would contain or include all values of t specified by $0 \leqslant t < 1$; l=2 would contain..... $1 \leqslant t < 2$ etc.

(40) In view of the defective quality of the data in hand it would have been useless to push the search for perfection too far. (Some of these defects of NEGO4 have been referred to in Vanderhoeft (1983), and Willems and Vanderhoeft (1985). Moreover limitations of time available for research had to be kept in mind. The tests we did perform (see text) thus seemed to be sufficient for our purposes.

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