The trend to later childbearing: is there evidence of postponement?

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Abstract

Fertility rates in most developed societies have been declining at younger ages and rising at older ages. This phenomenon is widely referred to as reflecting the postponement of fertility. But is this an accurate description? The paper considers whether recent changes in the age-pattern of childbearing in France can be described as postponement. The statistical features of time series of rates are distinguished from the underlying behavioural process generating these. Criteria for the presence of postponement are proposed. In the absence of detailed, longitudinal information on intentions, the occurrence or otherwise of postponement is assessed by indirect means. Some evidence is found consistent with fertility postponement in recent decades. However, it cannot be interpreted causally, and so cannot be used either to explain recent trends or to anticipate future trends. Much more detailed evidence is required to establish the existence of postonement in the behavioural sense than is generally assumed.

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There appear to be at least three requirements for giving an accurate account of fertility trends. First, we must have appropriate measures of fertility change through time. By appropriate, we mean measures that are both demographically precise and reflect behavioural elements that could be the focus for explanatory inquiry. Second, we require interpretations of such movements that are not only plausible but subject, in principle, to empirical test. Third, the mechanisms implied by such interpretative ideas need to be specified precisely and tested against evidence – that is, identifying the impact that particular mechanisms would have on time-trends in closely specified rates, as distinct from an overall total fertility rate. Of course, well-documented theory is the ultimate goal, but in the current state of demography and the social sciences generally, identifying possible behavioural mechanisms driving shorter- or longer-term trends, and testing them against evidence, seems a more realistic aim.

Recent decades have seen substantial progress in methods of measuring fertility, particularly with the rediscovery and diffusion of the period parity progression approach to fertility measurement, originally due to Henry (Henry 1953, Ní Bhrolcháin 1987, Feeney and Yu, 1987, Hoem 1993a, Rallu and Toulemon 1994, Andersson 1999, 2002). These methods have

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been used to provide a more precise description of fertility trends in developed countries in the 50+ years since the Second World War. However, progress has been slower in identifying processes and mechanisms of fertility change, and documenting these by reference to the detail and location in time of fertility rates measured in these more refined ways. The outstanding example of a case in which such a mechanism has been identified and documented is the demonstration by Hoem (1990, 1993b) that the increase in fertility rates, differentially higher at short durations after the previous birth, around 1975-1986 in Sweden was probably attributable to accelerated childbearing motivated by changes in the regulations associated with financial provision for maternity leave in Sweden. Andersson (1999) shows further that the disproportionately higher increases in second and third birth rates at short durations continued well into the 1990s. We have in that case a phenomenon well documented by time-series of parity- and duration-specific fertility rates, interpreted as reflecting accelerated childbearing, an interpretation backed up by the fit between the detail of the maternity leave provisions and the detail and precise behaviour in time of the parity- and duration-specific rates. Hoem did not attempt to present a theory to account for the fertility movements involved – his was an interpretation which specified a behavioural mechanism and provided evidence to back up the existence of such a mechanism. Nor would the evidence meet strict criteria for establishing a causal effect. Nevertheless, the evidence presented is probably the nearest we have to a documentation of a causal mechanism at the root of short-run fertility trends in a modern developed society, leaving aside fertility around war-time, the mechanical effect of the sudden restriction of abortion in 1966 in Romania on subsequent birth rates in 1967-1970 and the years of the fire-horse in Japan (not quite so mechanical a phenomenon but very short lived). If demography accumulates enough and sufficiently well-documented instances of the kind presented by Hoem, sensible theory may ultimately be built inductively, an approach that we would favour.

In broad outline the last 50 years of developed country fertility saw first an increase in marriage and fertility rates to the late 1950s/early 1960s – the baby boom – and subsequently a decline in these from the mid 1960s early 1970s. Interpretations of these trends have been many and varied, but there have been few attempts to tie down such interpretations to the detail of the fertility rates and surrounding (candidate) causal environment that are as focussed as the Swedish case in the late 1970s-1990s. For the last two to three decades, since the mid- to late-70s, fertility trends in the developed world have been displaying a new and distinctive pattern. Rates have been declining at younger ages and rising at older ages. This is true both of basic age-specific rates and also, as we will see presently, of age-parity specific rates. This phenomenon has been widely interpreted as reflecting a "postponement" of fertility, rather than that the average number of births per woman is declining. Is this interpretation correct? The proposition that women and/or couples have recently been "postponing" childbearing is not self-evidently true. It is an empirical statement and so could be false. Describing the trends in this way may be perfectly reasonable in a journalistic context, and is certainly intelligible in a personal and social sense. But what evidence supports the interpretation? Leaving aside its journalistic utility and personal plausibility is it, in fact, a scientific statement? How do we test its empirical validity? The present paper makes an initial approach to evaluating empirically whether, in the case of France, it is correct to interpret the fertility trends of the last few decades as reflecting postponement of childbearing.

Why should this issue matter? The question whether developed countries in recent decades have been experiencing fertility postponement matters for several reasons. From an applied perspective, it has practical implications for population projection: clearly, more realistic scenarios can be formulated in relation to future trends if we have solid information on the presence or absence in the recent past of links between trends at different ages. Beyond

practical purposes are academic concerns: descriptive and interpretative accuracy and appropriateness matter in any science, particularly since they influence thinking about and investigation of underlying causes. If recent trends do, indeed, reflect a postponement phenomenon this implies that the downward trend in fertility rates at younger ages and the upward trend at older ages have a common cause – one which is, furthermore, capable of having a long-term effect in individuals' lives. If not, however, declines in fertility rates at younger ages may be occurring for reasons that are entirely unconnected with those influencing the rises at older ages. The differing trends at younger and older ages may be connected with each other, as the postponement idea implies, or, alternatively, the decline in rates at young ages may be quite unrelated – or only weakly related – to the rising rates at older ages. If this is so, then the divergence between the trends at younger and older ages is not a single, integral phenomenon. Thus, the forces driving down fertility rates at younger ages may have no relationship at all with the factors determining the increase in fertility rates at older ages. It would be very useful, for both practical and academic purposes, to know.

Before delving in more detail into the issue of postponement, and what it might mean in concrete terms, we consider an alternative way of describing, in words, the differential trends by age in fertility seen in recent decades. We could interpret the diverging trends by age by saying that the last 25 years or so have seen a change in the age pattern of childbearing, a shift towards later ages in the age-specific fertility schedule. There can be no disputing this – the age specific fertility schedule has unquestionably shifted along the age axis, with fertility schedules peaking at later ages currently than has been true in the recent past. This is seen in Figures 1a and 1b for France, with Figure 1a presenting the absolute age-specific fertility rates and Figure 1b, the age-specific schedules standardised to sum to 1, so as to abstract from the overall level of fertility. From the late 1940s to the mid 1970s there was a decided change

in the shape of the fertility schedule, with an increase in fertility at younger ages and a decline at older ages, inrelative terms. During this period the mean age at childbirth declined, for two reasons: on the one hand, a decrease in the mean age at the birth of the first child and, on the other, a decline in the number of high order births, and with a narrowing of the range of ages at childbearing. From the mid-1970s to the present, the overall shape of the curve is relatively stable, but it moves along the age axis, with a corresponding increase in the mean age at first birth, and with the distribution of births by order remaining the same (Toulemon and Mazuy 2001). The standardised mean age of childbearing rose by 2.7 years in France (26.5 to 29.2) between 1977 and 1997. Saying that the age-schedule of childbearing has shifted is an accurate and uncontroversial description of the statistical patterns. But how far does such a description get us in explanatory terms? Not far, we believe. The reason is that we have no behavioural model to account for the characteristic shape of the age-specific fertility schedule. A unimodal distribution of age-specific fertility rates is universal to all known populations, with variations through time and in space in the peak age of childbearing, and some variation in the shape of the schedule. But we have no well-founded behavioural explanation for this pattern. Lacking an empirically verified behavioural model that could explain *why* and *how* cross-sectional fertility schedules behave as they do (the same is true of cohort fertility by age), stating that the fertility schedule has shifted along the age axis does not give us any pointers as to how to explain the shift. Nevertheless, though not providing us with explanatory clues, a description of recent trends as a shift in the age-pattern of childbearing has the inestimable scientific merit that it does not carry any implications regarding untested explanatory propositions. It is an accurate description without implicit explanatory baggage: it is not an interpretative Trojan horse while an account in terms of postponement may be.

Personal experience and scientific subject matter are intermingled in demography, as in the other social sciences, and so there are reasons for worrying that our scientific judgement and perspective can be subverted, biased and weakened by personal involvement in – whether actual, associational, or empathic – the processes and phenomena we attempt to represent scientifically. It seems advisable therefore to do what we can to disengage from the natural plausibility of such ideas as postponement of childbearing as an explanation of differential fertility movements by age while investigating empirically whether the postponement interpretation fits. What evidence is relevant to deciding whether it is an accurate representation of recent fertility trends?

Hajnal (1947) is the originator in modern demography of both the cohort approach to fertility analysis and of the idea of postponement as underlying sharp, short-term, compensating movements in period fertility rates at differing ages/durations of marriage. He defines postponement as occurring when there is a "fall in fertility rates balanced by a subsequent rise so that the size of the family remains relatively constant..." (Hajnal, 1947: 151). He goes on to remark that the participants in a postponement phenomenon need not "have the idea clearly in their minds that they will later have the children they are "postponing"' (ibid: 151). Frejka and Calot (2001) adopt Hajnal's version of the concept and describe it as a "formal demography" definition of postponement[2]. We do not believe that this is a defensible definition of postponement, which must, if it means anything at all, imply human agency and intention at some level. Nor can it be considered a "formal demography" definition of the concept. If we require a term that refers purely to short term fluctuations in fertility rates that compensate for each other, a neutral, statistical term is required that implies nothing about the

[2] They use the term "postponement" without further elaboration to refer to situations where a decline in cohort fertility occurs at younger ages that is offset, wholly or partially, by a rise in rates at older ages relative to preceding cohorts. "The record suggests, however, that birth cohorts that postpone childbearing only rarely catch

underlying mechanisms: such terms as tempo or timing changes or change in the age pattern of fertility fit the bill in this respect. Hajnal's innovative concept was important because it drew attention to the existence of short-term fluctuations in period fertility – to the volatility of period fertility – and to the absurdity of interpreting a single year's or short period's fertility as an indicator of long-run prospects. However, 50 years later, it is time to be more rigorous in our terminology and *defining* as postponement a purely statistical feature of fertility rates appears to us to be both unnecessary and potentially very misleading.

As we see it, postponement is a behavioural hypothesis that could, in principle, explain particular statistical features of time trends in fertility and other demographic rates; essentially the postponement idea posits a (causal) link between an initial decline in fertility at younger ages and a subsequent increase at older ages. Such a link could also be present for reasons other than postponement. The position at its simplest can be viewed as in the following table setting out the various possible combinations of, on the one hand, events in the statistical-demographic domain and, on the other, underlying behavioural processes. Thus when declines in rates occur at younger ages, rises in rates at older ages may or may not subsequently occur to offset these. Where declines at younger ages are followed by rising rates at older ages, the combination may be attributable to an underlying behavioural process describable as postponement, or it could be due to e.g. a once-for-all medium-term shift in the structure by age of opportunities and incentives for childbearing. In this context, we would suggest that postponement is seen as a short-term phenomenon, a temporary change that is not the result of a fundamental shift in childbearing customs, while a more permanent change in the age pattern of childbearing is described otherwise. A final possibility is that the divergent trends at different ages may be due to quite unrelated factors (table 1).

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up at more advanced ages so as to equal or surpass the completed cohort fertility of women born earlier" (Frejka and Calot, 2001, p126).

Table1

Behavioural process		**Statistical -demographic sequence of events**	
		A decline in rates occurs at younger ages. At older ages rates:	
		subsequently rise	do not later rise
Women/men/couples postpone childbearing		Example: wartime	"Postponed" births do not occur
Postponement does not occur	Other process in which declines in rates at younger ages are linked with rising rates at older ages	Example: a shift to older ages in the opportunities and incentives to have children that occurs over the medium-term	
	No such process	Factors influencing trends at younger and older ages are independent	No postponement, no links between trends at different ages, no rise at older ages

If the pattern of change in the rates, alone, is not, in itself, evidence of a postponement phenomenon, how can we establish the presence or absence of postponement in particular cases? One approach – a traditional one in social science – would be to seek questionnaire survey data. In order to account for change through time, a survey would have to be conducted at two or more time-points or ideally a sequence of such surveys about 5 years apart. Along with details of fertility history, we would ask direct questions of women and/or men and/or couples about whether they were postponing childbearing. Whether such questions would be well understood by respondents would, in itself, be a substantively interesting issue – there being a long history in fertility research of respondent difficulty in answering questions around fertility desires and intentions. Let us suppose that the questions were clearly understood and well answered. What we would expect, if postponement were responsible for the decline in rates at younger ages, is an increase across the time-interval in the proportions of the younger age groups who said they were postponing childbearing. We

would seek here a *gross* rather than a *net* effect since the postponement hypothesis relates to gross (aggregate) fertility change. That is, an increase would have to be observed in the overall proportion of the younger age groups who say they are postponing childbearing rather than in the proportion postponing "net of other factors". If the scale of the increase in this proportion were consistent with the change in age-parity specific fertility rates, we would have evidence that was at minimum consistent with the postponement hypothesis at younger ages. On the other hand, if there were no such increase, the plausibility of the postponement hypothesis would suffer. At older ages, a longitudinal component would be necessary to the study design. For this purpose we require a minimum of three time points, t_1 t_2 and t_3. We would expect to find, under the postponement hypothesis, that in older age groups, increases between t_2 and t_3 in age-parity specific birth rates are confined to those who stated at t_1 and t_2, respectively (when younger) that they were postponing or deferring childbearing. Again, this should be a gross rather than a net effect. If the increase between t_2 and t_3 in rates at older ages were independent of postponement status at younger ages or inconsistently or only weakly related, then the evidence would be inconsistent with the proposition that individual deferral was a correct and complete interpretation of the observed differential movements by age in the rates.

Were the collection of such evidence to be contemplated, a variety of ancillary hypotheses could no doubt be specified to accompany these outline predictions, and the precise way in which the occurrence of postponement might be identified in questionnaire data could be a matter both of conceptual elaboration and of preliminary technical field tests. Various refinements and revisions could be anticipated: for example, if the survey evidence were against the idea, the argument could be advanced that postponement is not necessarily something that individuals are aware of, that it is a subconscious process and so could be

difficult to identify via direct questions. Perhaps, it might be suggested, postponement at a particular time-point would be better operationalised as occurring when individuals say that they intend to have a birth later but not soon and so on, or as the difference between the strength of intentions to have a birth within a relatively short and a relatively long time period. Discussion of this kind could eventually refine the measurement of postponement and, at a minimum, investigate its feasibility. Whatever the outcome, the issue would be an empirical one. Well-designed studies of this kind whose findings were interpreted with care, might reveal whether postponement is a sensible concept and could in principle be the mechanism underlying recent trends. While we have discussed the issue here largely in terms of postponement, the same considerations apply to the interpretation of recent fertility trends as "delay" or "deferral". Essentially these are similar if not identical concepts to postponement, and just as direct evidence is lacking on postponement as an explanation for recent fertility trends, neither delay nor deferral – which also imply an underlying behavioural process – have yet been precisely operationalised when it comes to mechanisms underlying recent age-specific fertility trends. To the best of our knowledge, survey data and analyses of the kind specified here as suitable for investigating the reality or otherwise of the postponement idea are not available and so the validity of the postponement idea cannot be evaluated by means of direct, follow-up survey data. In the absence of direct observations in the form of responses to survey questions, we adopt in this paper an indirect approach to evaluating the postponement idea, the details of which are presented in a later section. We start by giving details of the data source used here and by outlining the recent history of fertility in France.

Data

Age specific fertility rates are computed by the French national institute of Statistics (INSEE), and series are now available for the entire 20th century (Daguet 2002). Unfortunately, vital registration sources do not allow parity-specific fertility rates to be obtained: birth order is not accurately registered by the civil registration system, and estimates of the female population are not available specific by parity of woman. To fill this gap, INSEE has, since 1962, conducted a one-percent survey of fertility and family history as an integral part of the census. One enumerator out of 50 distributes with the census forms an additional form including questions on fertility and partnership histories. Before 1982, only married or formerly married women, aged 18 to 64, were asked to complete this form. At the 1982 and 1990 censuses, all women aged 18 to 64, irrespective of their marital status, were asked to participate. The most recent census in France took place in 1999. On that occasion, the fertility and family survey was largely redesigned. The sample was enlarged: men were included in the sample (some enumerators distributed bulletins to men, other to women); no upper age limit was applied: 235,000 women and 145,000 men completed a form, the response rate reaching 79%. Apart from fertility and marriage histories, questions were asked on adopted and stepchildren and unmarried partnerships as well as marriages; a set of questions was devoted to the languages customarily spoken within the family (Cassan, Héran, Toulemon 2000). This survey allows us to compute age- and parity-specific rates for the period 1946 to 1998 (Toulemon and Mazuy 2001). We use here primarily age-specific first birth rates, for the years 1946-98. We use only data collected from women born in 1911 and later (35 years old in 1946, 88 in 1999).

The age-specific fertility rates generated from the 1999 Family Survey have been validated against national vital registration rates and found to be very close (Mazuy and Toulemon 2001). In some cases, the age-parity specific rates are based on fairly small samples and so

subject to substantial sampling error, especially at higher ages where relatively few women are still childless, and among older cohorts with fewer survivors (50% of women born in 1919 are still alive in 1999). The rates were smoothed by means of a three-year moving average.

The setting: recent fertility trends in France

Figures 2a and 2b set the scene in the French context and present time series of age-specific fertility rates for France 1940-2000 at selected ages 18-42. We see that during the 1950s and 1960s, fertility rates were, on the whole, moving in the same direction at each age. From about the mid 1970s, however, the rates diverge – at younger ages they continue the decline begun in the late 1960s, while at older ages, they level off and begin to rise. The divergence seen here in French rates from the mid 1970s onwards is common to developed countries generally and is what is interpreted very widely as reflecting postponement or delay of childbearing.

Since what is usually meant by delayed childbearing is, in fact, deferral of the start of childbearing, we focus in this paper particularly on the transition to first birth. Unconditional and parity-specific first birth rates are considered in turn. Unconditional first birth rates (*taux de deuxième catégorie* in French demographic terminology) are first births per 1000 women of all parities, while conditional, or parity-specific, first birth rates (*taux de première catégorie*) are first births per 1000 childless women (those of parity 0); in each case, the rates used here are age-specific. Trends in unconditional first birth rates by age are presented in Figure 3 and show even more clearly than the overall age specific rates the diverging trends at younger and older ages – the boundary between them being about age 26 – during the period since the mid 1970s. Figure 4 presents the same data as Figure 3 expressed as a ratio of 1974-

76 values and displays clearly the differential trends in first birth rates by age since the mid 1970s.

Differential shifts by age in unconditional first birth rates are, however, not in themselves evidence of postponement, however that term is defined, in that they do not necessarily reflect change in propensities – that is the probability among the childless of having a first birth. For the idea of postponement to have meaning, it must entail that first birth rates *among those at risk of a first birth* – the childless – decline at younger ages and subsequently rise at older ages *among those at risk of such a birth* – again, those who are childless. However a decline in *unconditional* first birth rates at younger ages could in principle be followed later by a rise at older ages in *unconditional* first birth rates that was due purely to the increase in the numbers at risk of a first birth at older ages, resulting from the earlier decline in unconditional first birth rates at younger ages, rather than to a rise in first birth rates among childless women at older ages. If this were the case, the combination of the two trends could not be interpreted as reflecting underlying postponement, since the only *propensity* to have changed is the probability of first birth at younger ages. In the light of these points, do the rises at older ages in Figures 3 and 4 reflect anything more than increases in the proportion at risk of a first birth at older ages resulting from declines in first birth rates at younger ages? Figures 5-7 reveal that they do: change in denominators at older ages is not the whole story since the upward trend in first birth rates among older women is due both to rising propensities to have a first birth at older ages and to rising proportions at risk of such a birth. The first birth rates of childless women have been rising at older ages (above about 28) in recent decades and, like the unconditional rates, the parity specific (conditional) first birth rates have been diverging at younger vs older ages since the mid-1970s, though the divide between them occurs at a slightly later age in the case of conditional than unconditional rates (Figure 5). Figure 6

presents the changes in the parity-specific rates in relative terms – relative to 1974-76 – while Figure 7 shows trends in the proportions childless by age. Thus, a change occurred subsequent to the mid 1970s in the age pattern of the propensity of childless women to have a birth or, alternatively put, in the age pattern to the start of childbearing. The net result of these recent trends is that the age-pattern of the onset of childbearing has changed. This is seen in Figure 8 which shows period schedules of age-specific first birth rates for selected years, both unconditional and parity-specific. Both sets of rates display in the last couple of decades much the same shift towards older ages that has occurred in the overall fertility schedule by age[3]. Can this complex of changes be ascribed to postponement?

As noted earlier, a natural social science approach to identifying the operation of a behavioural mechanism such as postponement would be to survey individuals about their attitudes and intentions. In the absence of such data, we seek evidence in the age-parity specific rates themselves – and specifically in the age specific birth rates of childless women. What internal relations would be expected in such time series if a process corresponding to the postponement idea is in operation? Two criteria can be specified by which a postponement phenomenon might be identified, both instances of what can be described statistically as negative feedback. If women or couples have in recent decades been increasingly putting off childbearing at younger ages with the intention of having children later, two predictions can be made. A first prediction is that the cumulative proportions having had a birth of a particular order by age x in year t should be negatively associated with conditional birth rates of that order in year t. Applied to the start of childbearing, we expect that the fewer women who, in year t, have had a first birth by age x, the higher the expected first birth rate among childless women aged x in year t. This is because a postponement phenomenon should result

[3] In fact, almost the entire shift in the age pattern of childbearing in the last few decades in France is attributable to the changing age pattern of first birth (Toulemon and Mazuy 2001).

in (1) an increase in the proportions at older ages who have not have a first birth and (2) an increase in the proportions of the childless at older ages who nevertheless intend to have a first birth because they have put it off at younger ages and finally (3) an increase in the first birth rates of older childless women. Postponement, as a *behavioural* phenomenon, need not have all three of these consequences. For example, we can envisage circumstances in which women at younger ages "put off" the start of childbearing, but that when they reached older ages no longer wished to have a child. However, if deferred childbearing is the correct explanation for the differential trends in age specific fertility we have been seeing in developed countries, all three consequences would have to follow. A second prediction from the postponement hypothesis is that we would expect that declines in age-parity specific fertility rates at a particular period would be associated with increases, some years later, in age-parity specific rates. In the case of the first birth, we would expect that the first differences in the fertility rates of childless women aged x in year t should be negatively associated with first differences in the corresponding rates at age x+d in year t+d, where d is the time interval over which the delay occurs. However, whether this prediction is correct depends on how the process of postponement occurs in the aggregate – for example, that year on year the proportion of women of any given age who postpone a birth begins by being quite small but increases gradually. Various qualifications could be introduced here which depend essentially on the precise process of change, thus illustrating that, to be useful and testable, the idea of postponement needs to be specified in greater detail. We focus particularly on the transition to first birth, since it is a crucial stage in individuals' fertility histories and also because the start of childbearing is what most commentary on delayed childbearing, implicitly or explicitly, appears to have in mind.

The proportions childless and conditional first birth rates

Figure 9 displays the joint path, year by year, of the proportions childless and the conditional first birth rate, for selected ages between 20-38. The points plotted are distinguished by sub-period: 1946-60, 1960-79 and 1980-98. The sub-periods have been chosen somewhat arbitrarily but the first of them corresponds to the immediate post-war baby-boom, the second to the subsequent fertility decline, and the most recent to the period when the age pattern of childbearing has been changing. If negative feedback occurs these plots should slow a positive slope – that is, the higher the proportion childless, the higher the age-specific first birth rate among women of parity 0. Such a relationship might hold either in general, across the time period as a whole or during delimited sub-sets of the overall period if, for example, a postponement or negative feedback mechanism were operating during only a subsection of the overall period. We see that at ages under 28, the relationship between childlessness and the first birth rates of zero-parity women is negative rather than positive. The negative slope is largely due to, though not confined to, the most recent period and probably reflects the impact of recent first birth rates at young ages on survivorship – that is, since first birth rates at young ages have been declining, the proportions childless at those ages have, as a result, been rising since survivorship is a function of previous years' conditional first birth rates. Such an effect will be much less important at older ages because of the cumulative effect of first birth rates at younger ages. While the patterns at older ages are less clear-cut, the plots do indeed tend to have a positive slope, as would be predicted from the postponement hypothesis. Product moment correlations at these ages between the proportion childless and the conditional first birth rate are moderate to high positive during 1946-60 and 1980-98, but mainly negative in 1960-79. At ages 30-38, the correlations range between .35 and .94 in 1946-60, -.7 .43 in 1960-80, and .55 to .87 during 1980-98. The age-specific correlations are set out in Figure

10, for the 1946-98 period as a whole, and for sub-periods. There is, thus, some statistical evidence of negative feedback during the immediate post-war period and also in the most recent period: the proportions childless and the propensity of childless women to have a first birth are moderately positively related. But this relation is not present during the whole period: between 1960 and 1980 it does not hold; during that period the rates at ages above 30 began to increase while the proportion childless were declining.

That this criterion should produce evidence of negative feedback immediately after the second world war suggests that it may well be a reasonable one. Though they do not always have this effect, wars are known to disrupt childbearing in a population in a way that probably constitutes the clearest case of postponement in action. Births that would ordinarily have taken place during the war years do not occur because of civil disruption, and there is a subsequent bulge in births.

Our findings are in some respects similar to those of Rindfuss et al (1988, Table 4) whose analyses reveal a negative association between proportions childless and conditional first birth rates at younger ages, and a slight positive relationship at older ages, though the latter is not significant and also emerges only when period factors are controlled for. Our findings are also not dissimilar to those of Bosveld who found that in a range of European countries between 1980 and 1992 the proportion childless and conditional first birth rates vary inversely at age 26, but that at age 31 there is more evidence of a direct relationship between proportions childless and conditional first birth rates. The pattern is by no means uniform – France, Norway, Sweden and the Netherlands conform to it but West Germany, Italy and some East European countries do not. At age 37, the picture is different again (Bosveld, 1996, Figure 8.2). However, our findings suggest that such associations may be confined to specific time-periods and the relevant period could vary between countries.

Correlations between lagged first differences

Since what evidence we have of a positive relationship between the proportions childless and the conditional first birth rates is strongest in the later part of the period, data on the relationship between the lagged first differences in the conditional first birth rates is presented here for the most recent period only. If declines in conditional first birth rates at younger ages were being compensated for by increases in these rates at older ages we would expect that the lagged first differences would be negatively correlated, particularly at those ages – under 28 – at which the sharpest declines in first birth rates were occurring since the mid 1970s. Figure 11 shows the correlations at each age between the first differences (i.e. annual change) in the conditional first birth rates at age x in year t ($df_{x,t}$) and those at age x+d in year t+d ($df_{x+d,t+d}$) for ages 17-37 and lags (d) of 1 to 6 years, during the period 1975-98. One can think of these either as lagged period relationships or as intra-cohort correlations, since those aged x in t and x+d in t+d are the same birth cohort of women. The plots reveal little or no tendency for these correlations to be systematically negative at younger ages, though at lag 5, low negative correlations appear at ages 21-26[4]. These data thus provide little evidence that declines in conditional first birth rates at younger ages are at all linked to rises in rates at older ages, or indeed at any age. Essentially, little or no pattern is evident. However, the type of mechanism that would give rise to such a direct link would have to be a very simple one, and more complex mechanisms giving rise to some other form of negative feedback could be envisaged. While there is some suggestion of negative feedback in recent decades in relation to the proportions childless, the second criterion reveals little evidence of it. It may be that the dataset used is not large enough to provide sufficiently precise measures of first differences,

[4] The rates from which the first differences are obtained were smoothed using a 3-point moving average. The smoothing has the effect of raising the correlations of first differences at lag 1 by an average of about 0.2 by comparison with those obtained from the unsmoothed values. Thus the by and large positive values shown for

and thus that the correlations between lagged first differences contain a lot of random error. Our search for evidence of negative feedback in the form of negative correlations between lagged differences within cohorts may also have been unfruitful because the macro-level phenomenon of "postponement" could appear at longer lags if the process of delay is spread across several ages.

Our two criteria of postponement are not altogether in agreement. Given the widespread currency of the idea of postponement, it is perhaps surprising that the evidence for negative feedback is not stronger. More formal time-series methods might possibly be helpful in investigating further the empirical basis for the postponement idea. But using more refined methods (or looking for relations at longer lags) would require the construction of long time series, and would involve assuming that the relation we are trying to identify is stable. Fertility trends during the 20th century present both practical and theoretical difficulties in this respect. We have only begun to scratch the surface of this issue. A large number of questions arise. For example, it is conceivable that compensating movements in fertility that are due to postponement can be identified retrospectively but not foreseen prospectively, just as the weather can be better explained retrospectively than predicted prospectively. If that is the case, then their occurrence would have little or no practical value in anticipating future trends though the postponement idea would still retain scientific utility and have an explanatory role[5]. Note that criteria of postponement that we have adopted here are, strictly speaking, merely a way of identifying a statistical link between declining rates at younger ages and rising rates at older ages; we would expect such a link to be found if postponement is occurring, but if they are present they need not be due to postponement - they could result

lag 1 may be to some extent an artefact. However, at lags of 2 and above, smoothing has a minimal effect on the correlations, and so it is unlikely that the correlations are biased.

from some other process, such as a shift in the overall age distribution of childbearing. Hence, the positive correlations between proportions childless and first birth rates among childless women in the last two decades do not *prove* that postponement has been taking place, though they are consistent with such a process. The occurrence or otherwise of postponement cannot be established from the behaviour of the rates alone – it requires, in addition, evidence of the social, economic and cultural factors influencing fertility movements at varying ages, as well as longitudinal information on intentions. Ultimately, the postponement hypothesis is a causal one, and could be extremely difficult to substantiate in full, though its status could certainly be subject to more thorough empirical testing.

To elaborate a little further on how differential movements in fertility rates by age might be generated, some hypothetical scenarios maybe useful.

1. Postponement might operate as follows: some causal agent F1 becomes operative which has the effect of reducing younger women's desire for (a) birth(s) in the short term while encouraging them to plan to have (a) birth(s) in the medium to long term, when they are older, in such a way that their intentions remain firm and are fairly insensitive to future conditions.

2. An alternative is a causal agent F1a which works just as in scenario 1 but that women/couples are very sensitive to future conditions. Whether this should be described as postponement is a matter of opinion – we think not, since the likelihood that future births will "make up" for the births that did not occur at younger ages is highly dependent on future economic and social circumstances.

[5]See Lieberson and Lynn (2002) who argue that just as evolutionary theory has little predictive power and is largely given to explaining past events, so capacity to predict future events is both an inappropriate criterion of the success of a social science explanation or theory and an inappropriate objective for the social sciences.

3. Another scenario which may or may not be termed postponement could be as follows: a causal agent F2 becomes operative, either suddenly or gradually, which has the effect that younger women no longer have the opportunity to have (a) birth(s) in the short term, but has no impact or perhaps increases fertility desires/opportunities when they are older. There is no question of decision-making here – the option simply disappeared at younger ages.

4. A further scenario, which certainly does not involve postponement in any sense is that causal factor F3 comes into play, again slowly or all at once, which reduces the fertility desires and intentions of young women and that a quite unrelated factor F4 occurs around the same time which has the effect of increasing the fertility desires/intentions or opportunities of older women. In this case, the diverging trends at younger and older ages have independent and unrelated causes, and postponement cannot be said to be the cause of the diverging trends by age.

5. Finally, the entire structure by age of incentives and disincentives to childbearing may change over the medium to long term so that the age pattern of childbearing shifts to older ages.

Attempting to set out the detail of the process in this way emphasises that we need to think harder about and gather more information on the link between fertility intentions/plans, decisions (active or passive) to have a child in a particular year, and external, macro-level causal factors that vary through calendar time. With greater clarification and precision of this kind, we could expect to advance our understanding of time-trends in fertility and the forces that drive them.

We conclude with a practical issue of current interest. Fertility rates at ages under 25 in France have stabilised, are no longer declining and may even be rising (see Figure 1). *If* what has been happening in the last 20 or so years in France is a postponement phenomenon, and that the rises in fertility rates at older ages are entirely due to the declines at younger ages, then we might predict that rates at older ages will in a few years' time stop rising. However, if postponement is not the reason for the rising rates at later ages, or not the entire reason, such a prediction would be unfounded and we would not predict an end to the rising rates at older ages. The evidence examined here is not sufficient to allow either prediction to be defended empirically.

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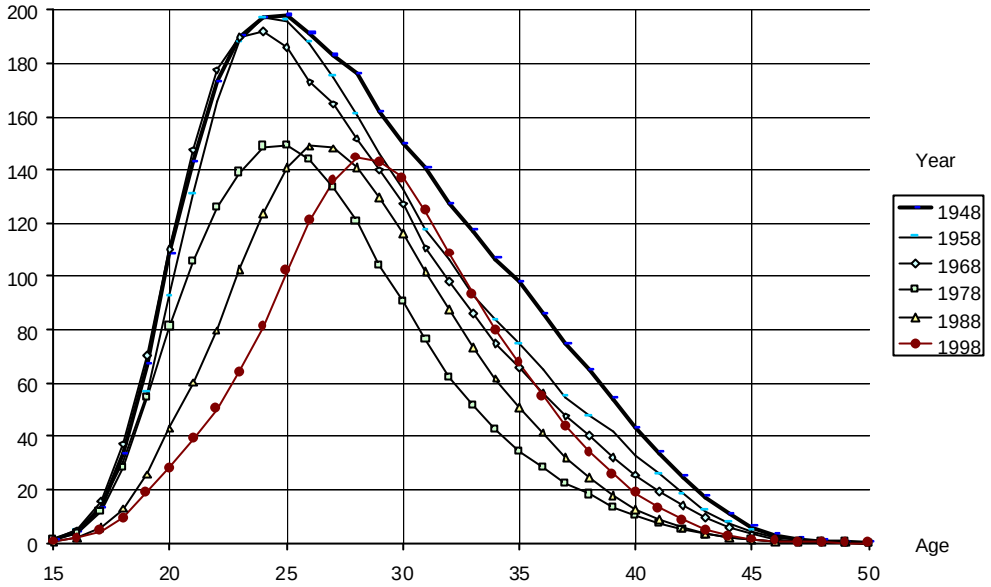
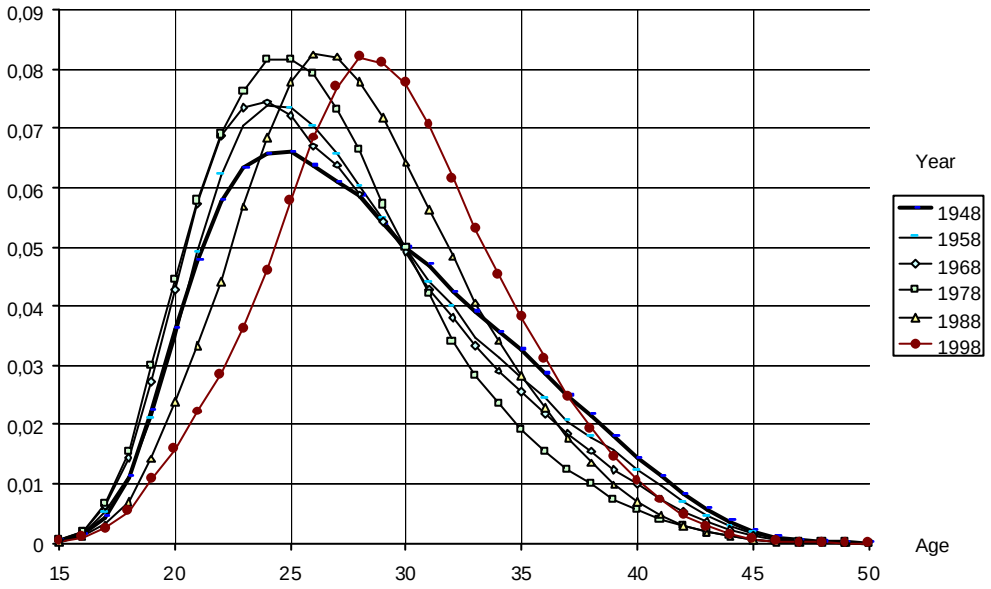
Figure 1. Period age-specific fertility schedules, France, selected years, 1948-98

a. Births per 1000 women



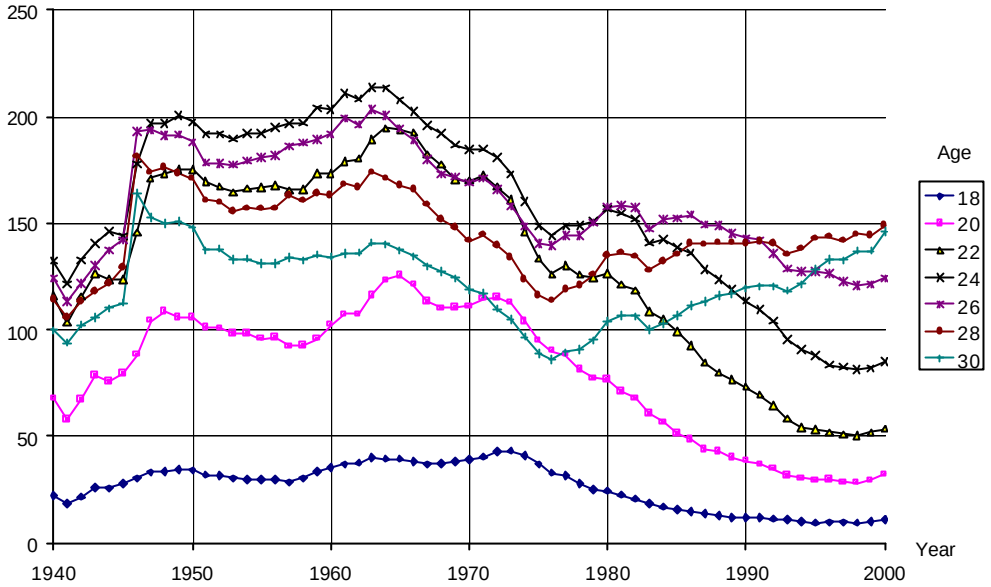
b. Standardised (to sum to 1)



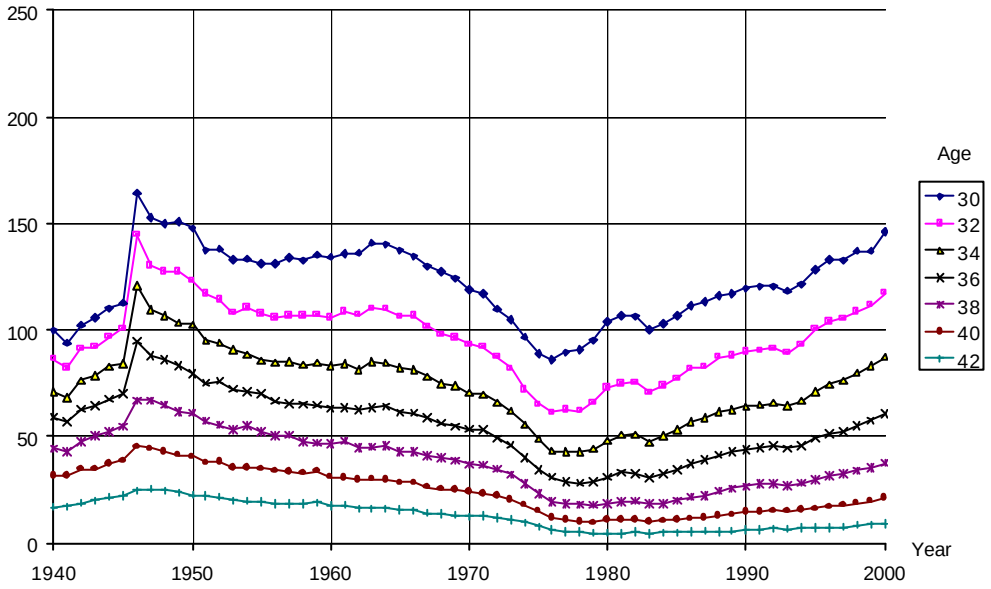
Source: Daguet, 2002.

Figure 2. Age-specific fertility rates, selected ages. France 1940-2000

a. Ages 18 to 30



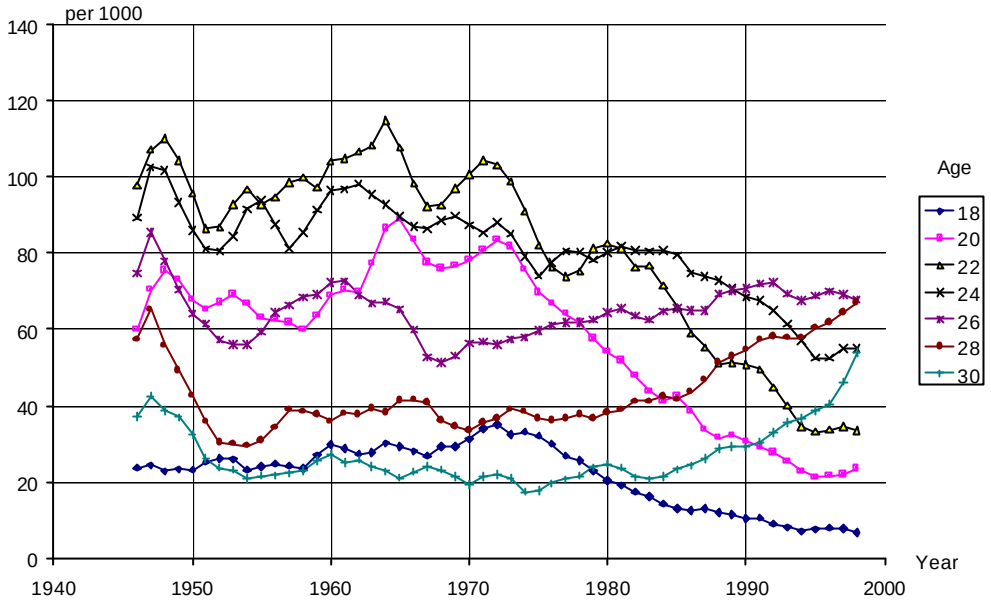
b. Ages 30 to 42



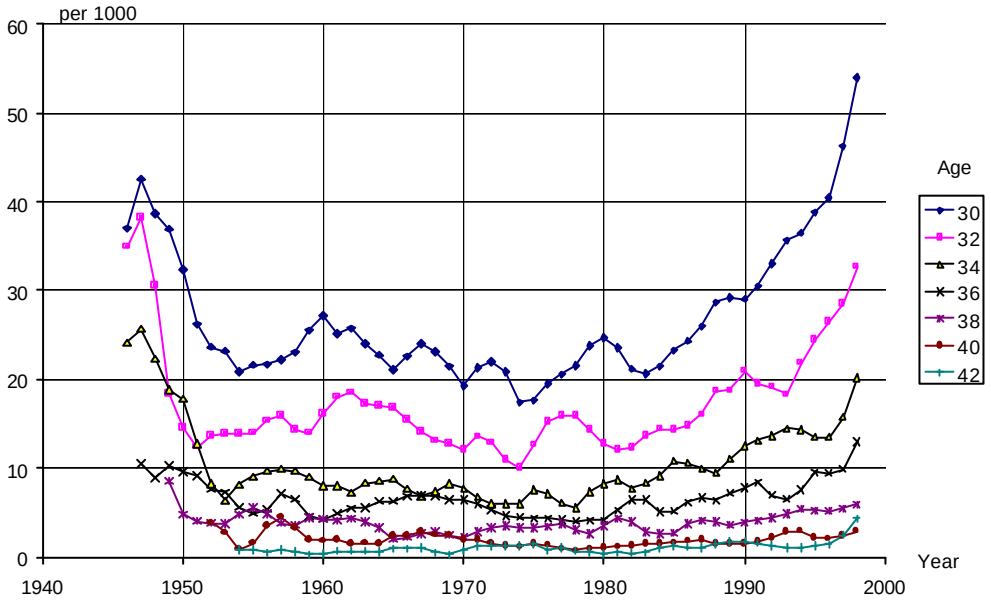
Source: Daguet, 2002

Figure 3. Unconditional first birth rates, selected ages, France 1946-98

a. Ages 18 to 30



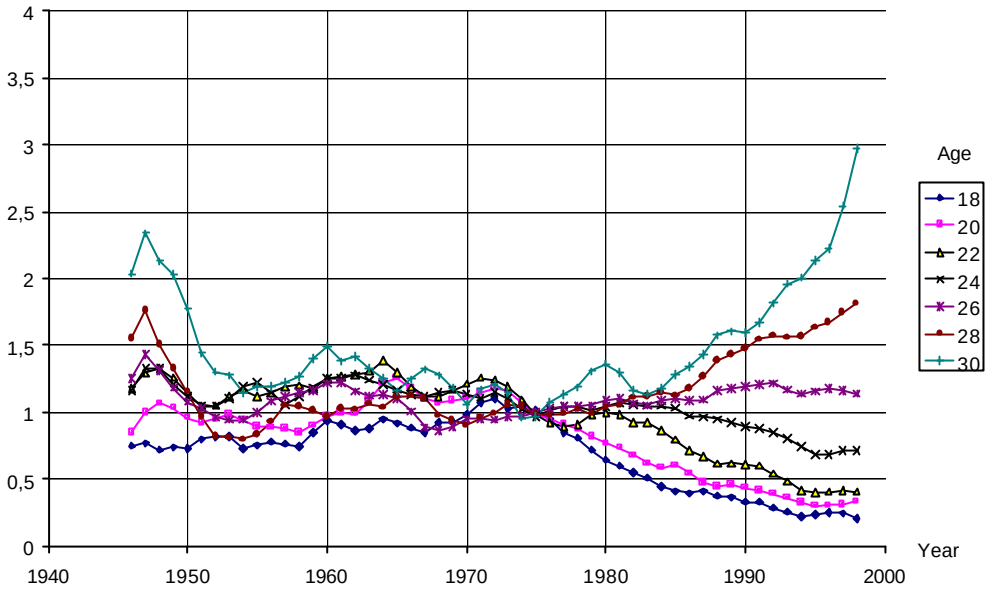
b. Ages 30 to 42



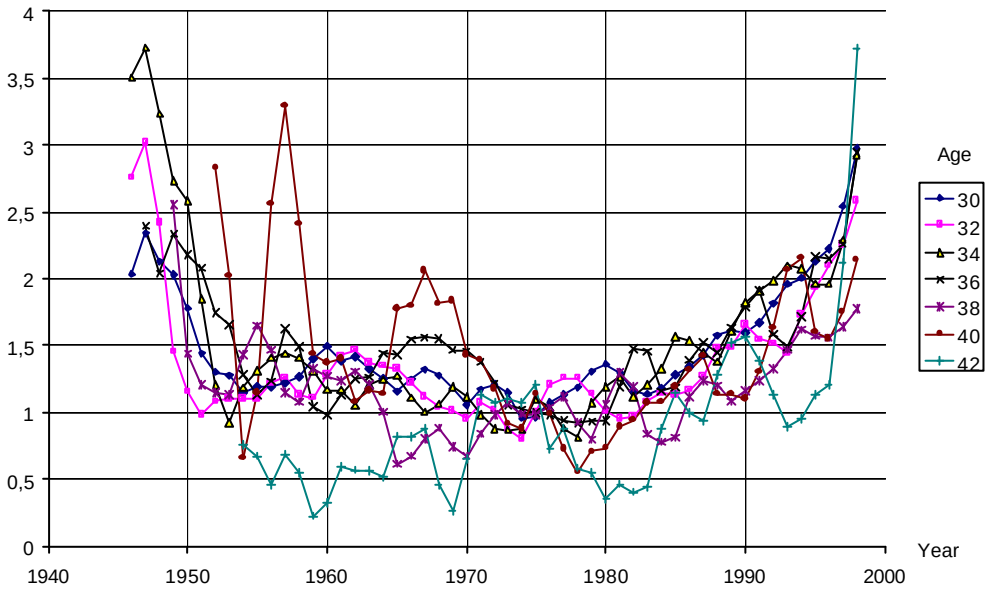
Source: Ined-Insee, 1999 Family History Survey

Figure 4. Ratio of unconditional first birth rates to average of 1974-76, selected ages, France 1946-98.

a. Ages 18 to 30



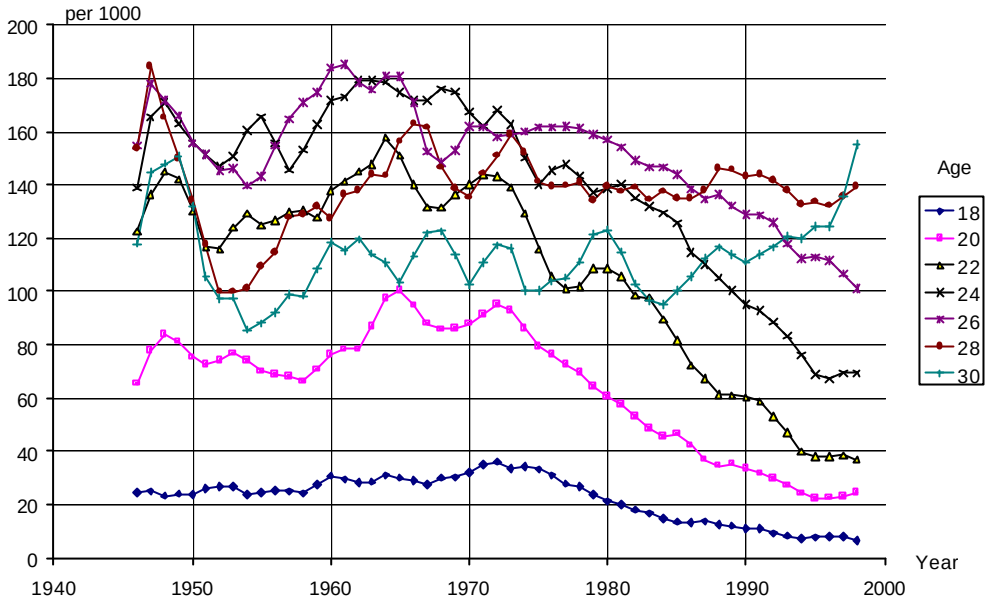
b. Ages 30 to 42



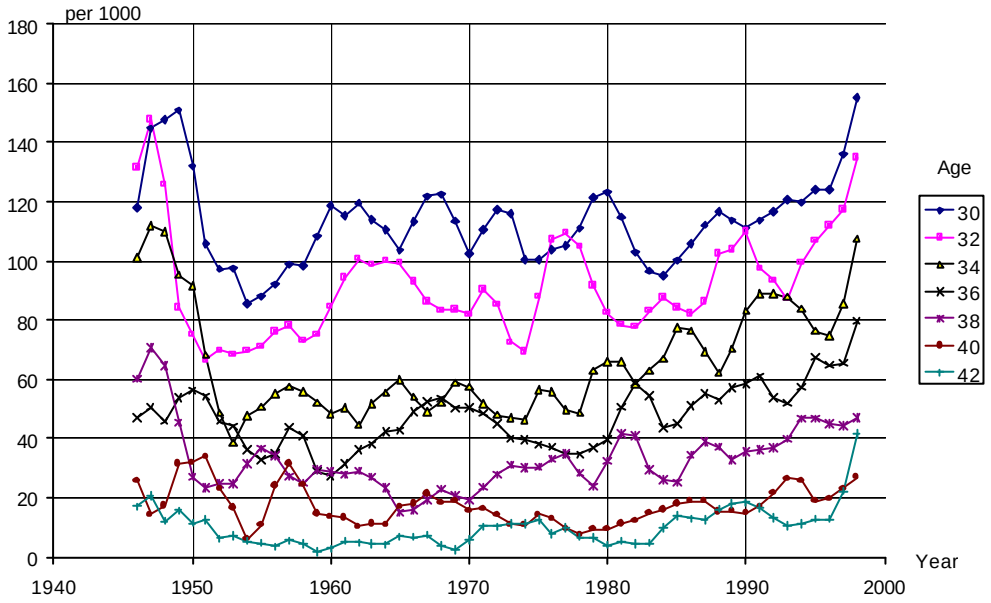
Source: Ined-Insee, 1999 Family History Survey

Figure 5. Conditional first birth rates, selected ages, France 1946-98

a. Ages 18 to 30



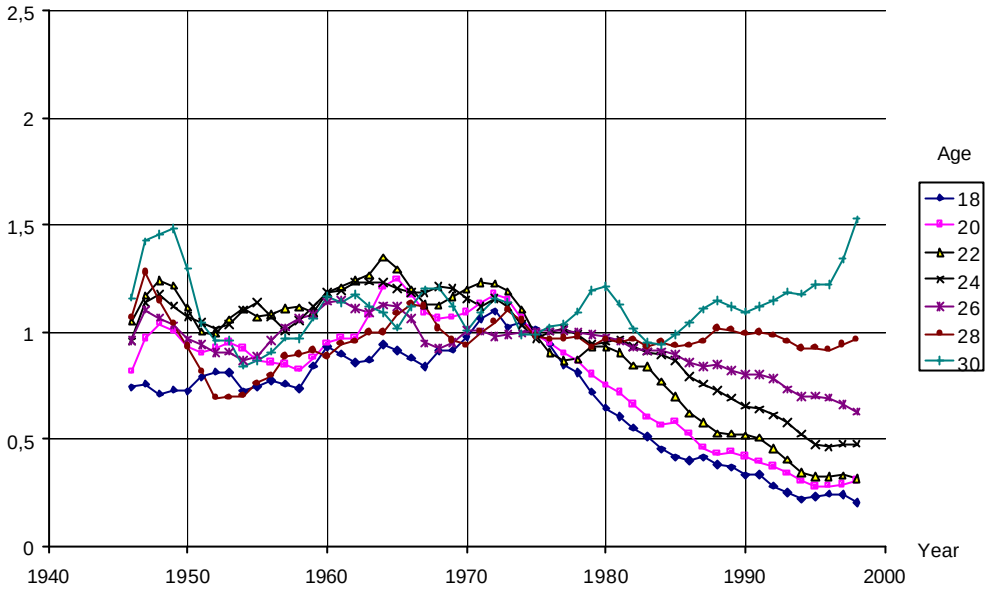
b. Ages 30 to 42



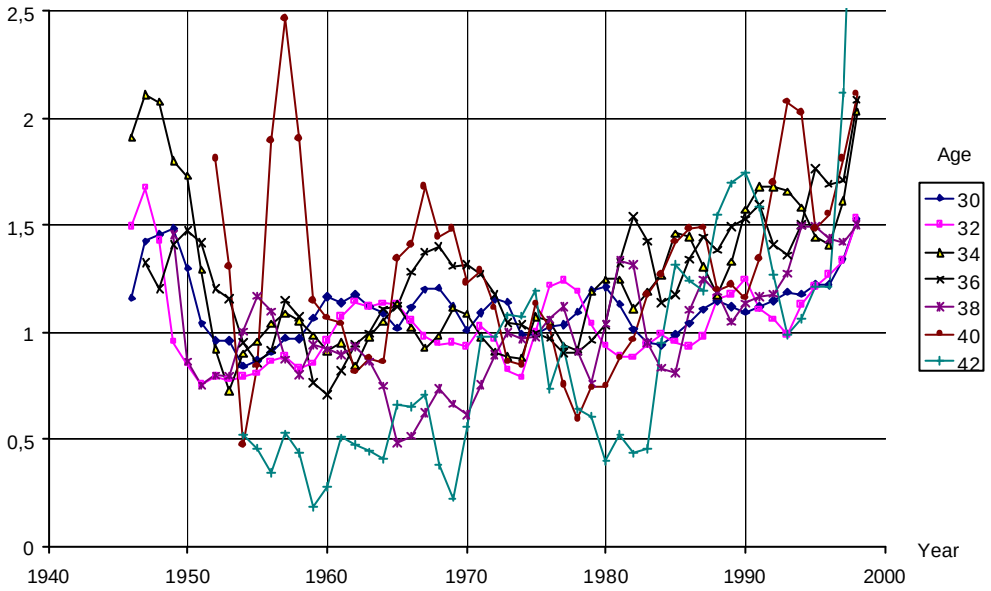
Source: Ined-Insee, 1999 Family History Survey

Figure 6. Ratio of conditional first birth rates to average of 1974-76, selected ages, France 1946-98.

a. Ages 18 to 30

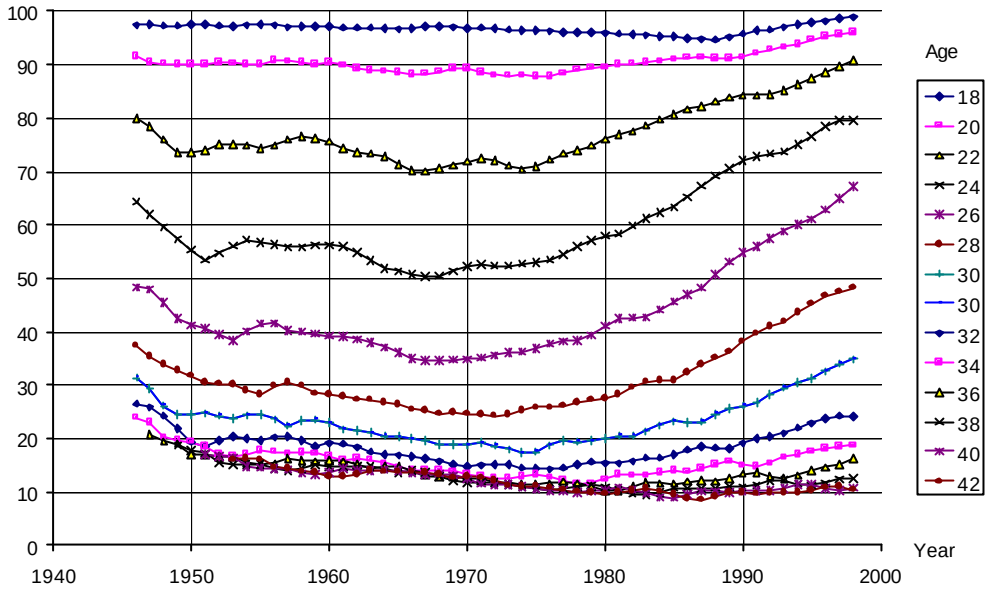


b. Ages 30 to 42



Source: Ined-Insee, 1999 Family History Survey

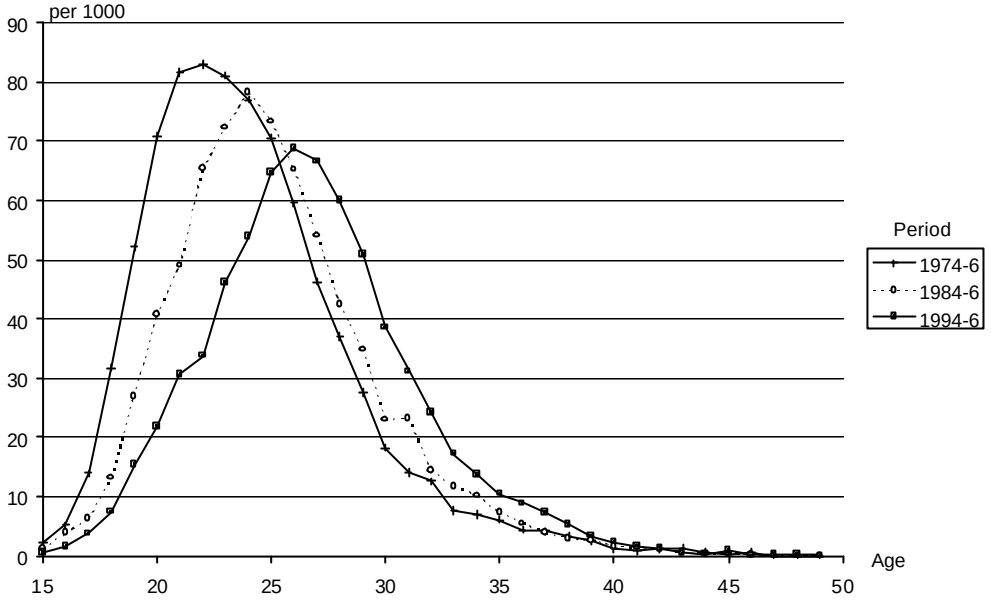
Figure 7. Proportion of childless women, selected ages, France 1946-98



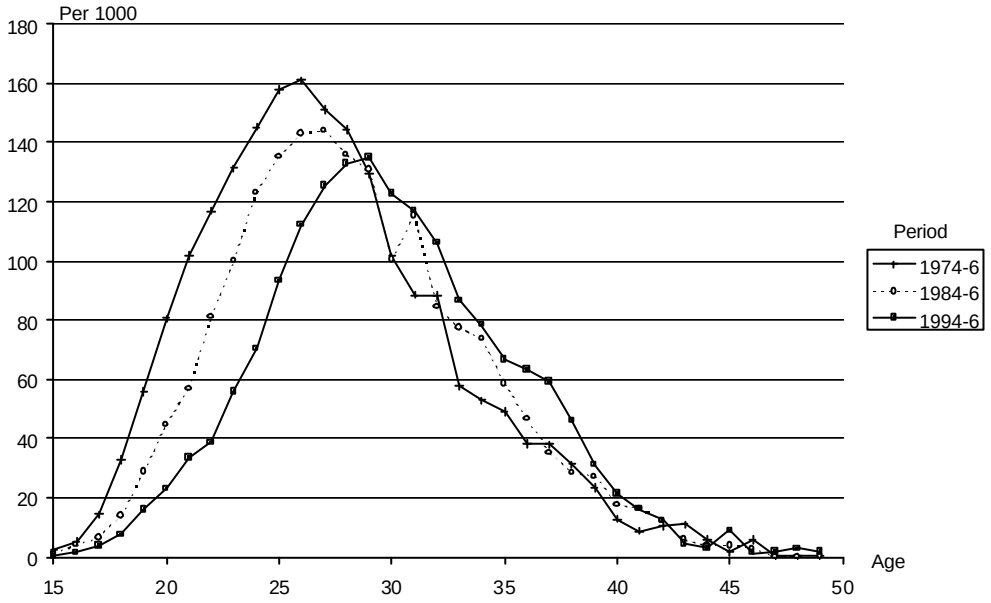
Source: Ined-Insee, 1999 Family History Survey

Figure 8. Unconditional and conditional first birth rates by age, selected years

a. Unconditional first birth rates



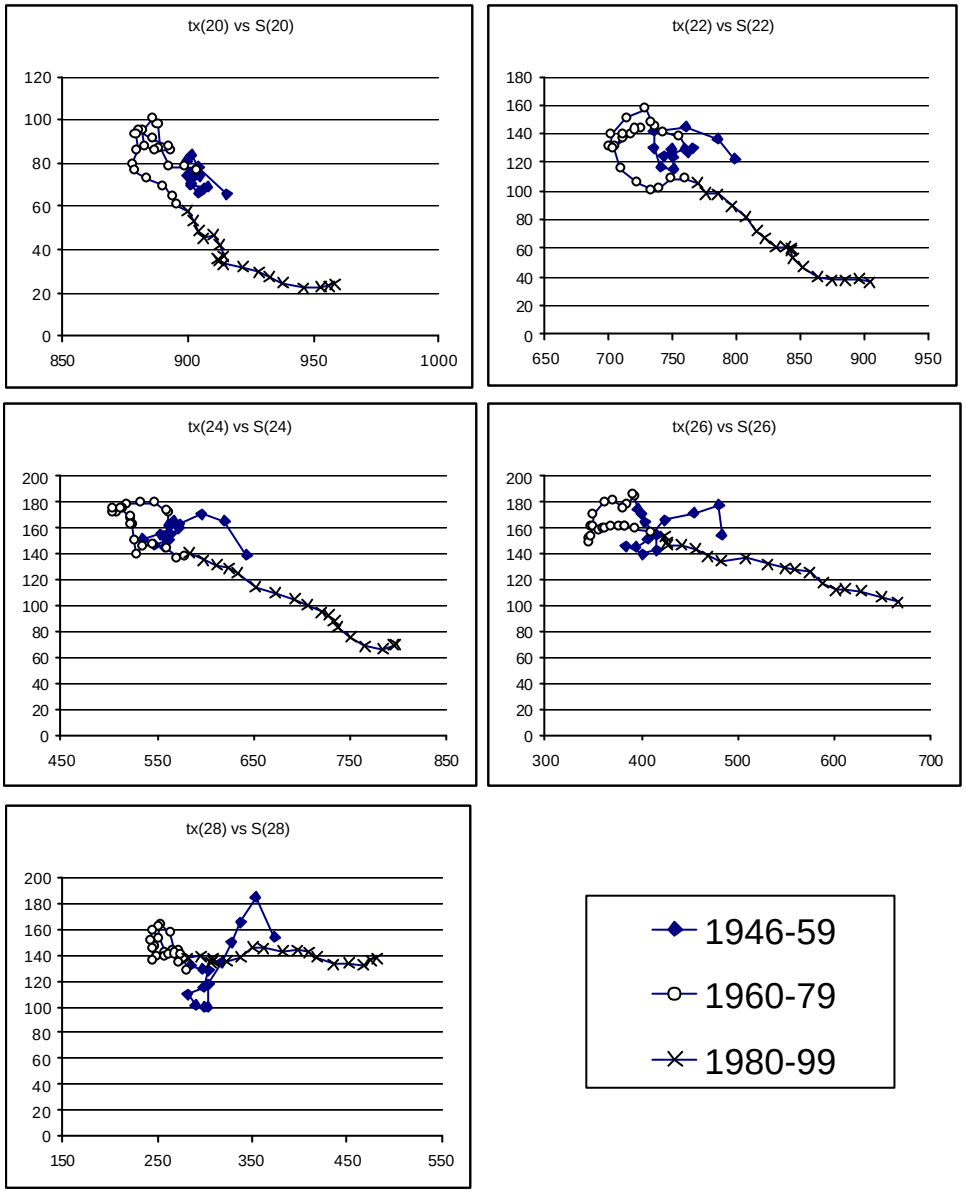
b. Conditional first birth rates



Source: Ined-Insee, 1999 Family History Survey

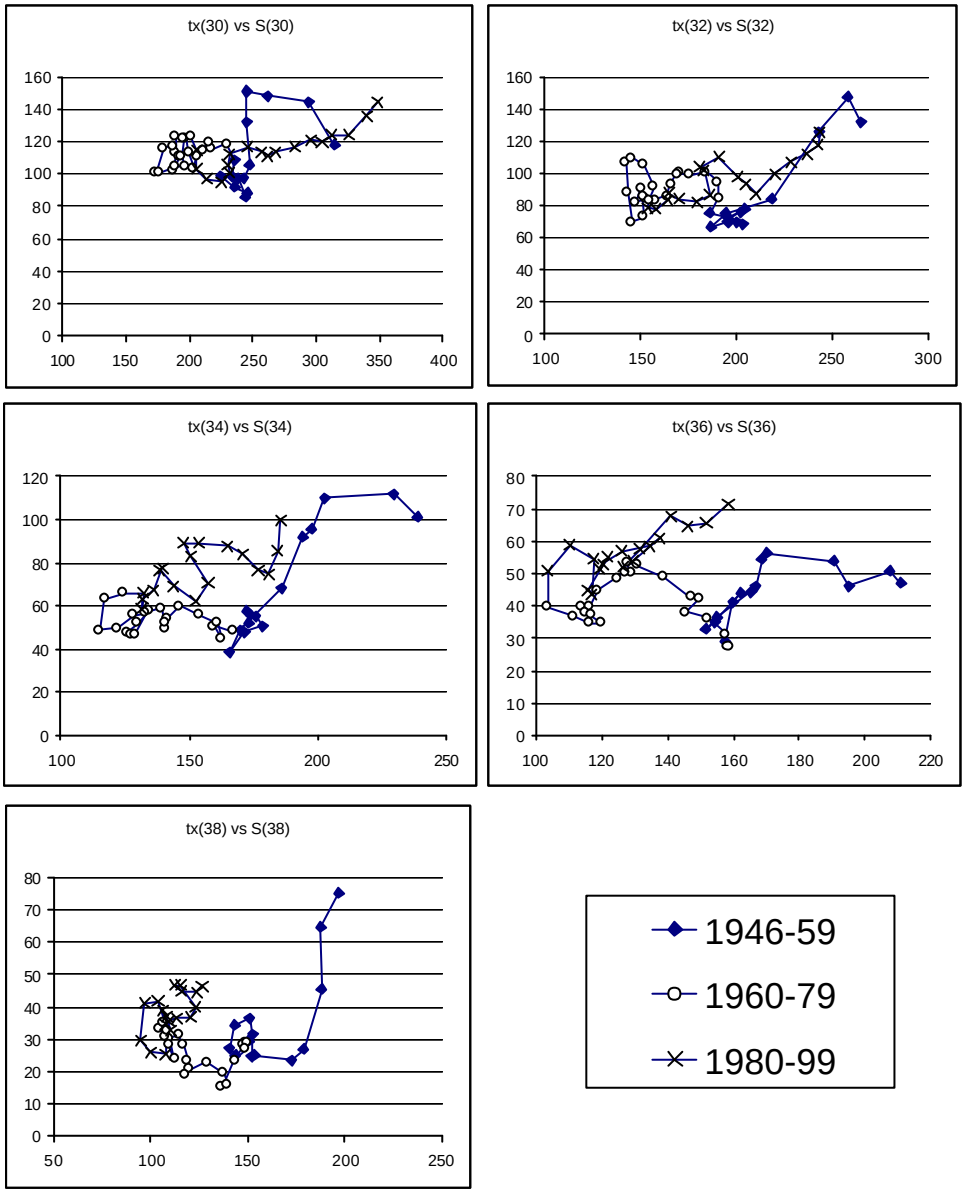
Figure 9. Joint time path of conditional first birth rates (per 1000)
and proportion childless (per 1000), selected ages, France 1946-98

a. Ages 20 to 28



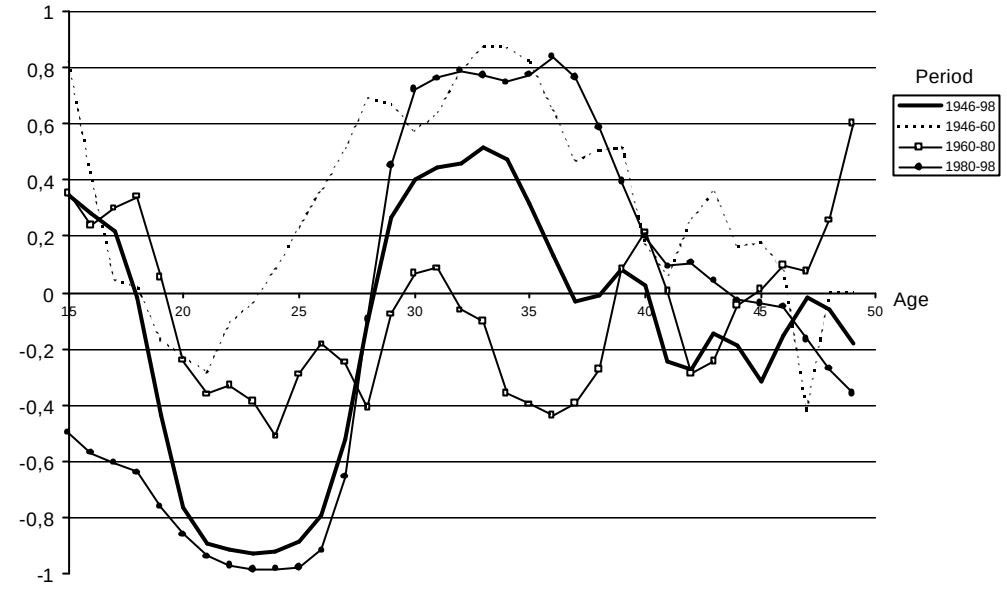
Source: Ined-Insee, 1999 Family History Survey

Figure 9. Joint time path of conditional first birth rates (per 1000)
and proportion childless (per 1000), selected ages, France 1946-98
b. Ages 30 to 38



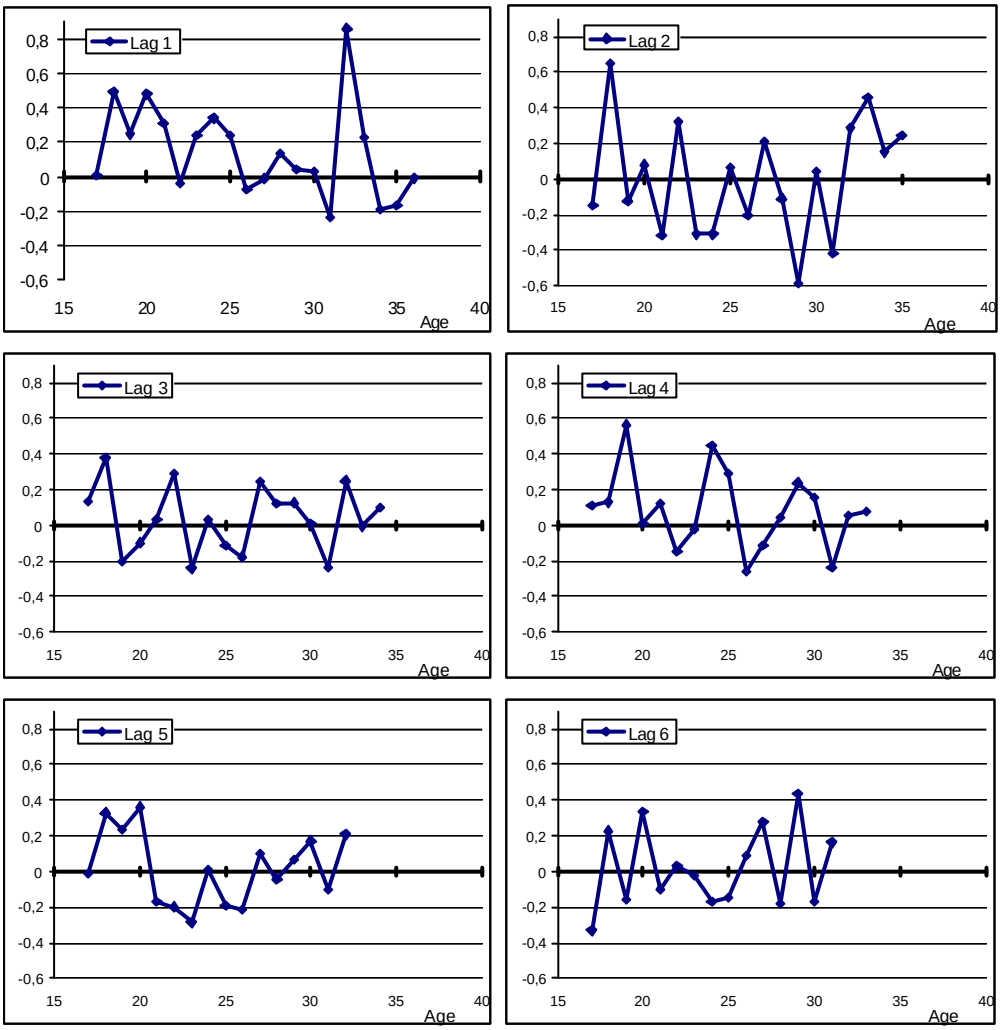
Source: Ined-Insee, 1999 Family History Survey

Figure 10. Age-specific correlations between conditional first birth rates and proportion childless, selected periods, France 1946-98



Source: Ined-Insee, 1999 Family History Survey

Figure 11. Correlations between the lagged first differences in conditional age specific first birth rates, lags 1 to 6, selected ages, France 1975-98



Source: Ined-Insee, 1999 Family History Survey