

## Is there a childbearing season?

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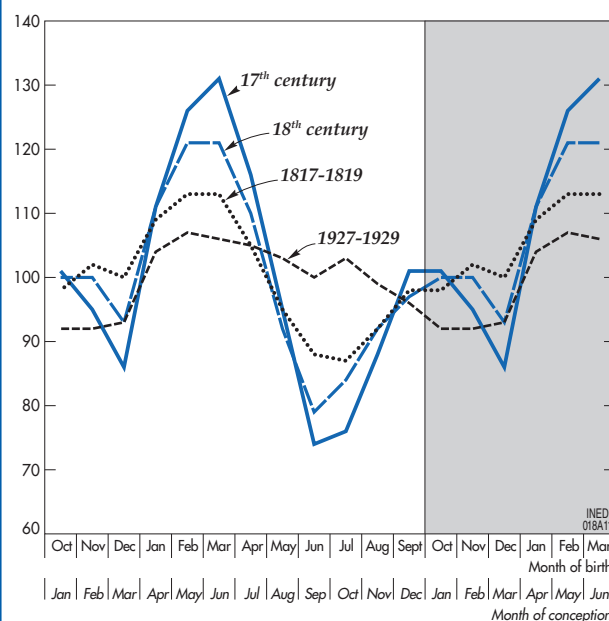
Births are not evenly distributed over the seasons, and tend to be more numerous at certain times of year. These variations have always existed, but their pattern has changed over time. Arnaud Régnier-Loilier and Jean-Marc Rohrbasser explain the seasonality of births in France and the reasons behind the changes observed over the last four centuries.

**In the 17<sup>th</sup> century,  
twice as many conceptions  
in June as in September**

In the 17<sup>th</sup> century in France, more babies were born between January and April, and fewer between May and December [1] (Figure 1), with almost twice as many births (1.8 times more) in March as in June. Moving back the distribution of births by nine months to obtain the annual pattern of conceptions, we see that the birth trough in December corresponds to a shortfall of conceptions in March. This is the period of Lent, during which sexual relations were proscribed by the Church. A similar dip in conceptions was observed in the month before Christmas (Advent). The May-June peak in conceptions is explained in part by the resumption of sexual relations after Easter, but also by an increase in marriages, which were also forbidden during Lent. At that time, sexual relations generally did not begin until after marriage. This meant that, in the absence of contraception, the marriage peak was accompanied by an upsurge in conceptions over the months which followed. The drop in conceptions in late summer and early autumn, in August, September and

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Figure 1 - Seasonal pattern of births in France from the 17<sup>th</sup> to 20<sup>th</sup> centuries (monthly indices, base 100)



Source: Indices calculated by Dupâquier, 1976 [1].  
Interpretation: An index of 105 corresponds to a month where a 5% increase in births was observed with respect to the annual average.

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**Editorial – Is there a childbearing season?**

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October, is an after-effect of the May-June upsurge. It may also be a consequence of the large seasonal migrations that took place in the peak farming season, which separated couples or limited their opportunities for sexual intercourse.

Wargentin, an 18<sup>th</sup> century Swedish scholar, had observed this conception peak between May and July and attributed it to “natural causes”, “writing that spring and early summer restore life to everything in nature” [2] (Box 1). A half-century later, the seasonality of births was again attributed to nature by the French physician Villermé, who placed particular emphasis on the role of temperature and the position of the sun: “... arising from the many oscillations due to the coincidence of place, time and circumstance”, a pattern is revealed, possessing a universal character; it is “the annual movement of temperature or [...] the influence of the various positions of the sun with respect to the earth” [3] (Box 1).

### ◆ A seasonality that decreases over the centuries

Between the 17<sup>th</sup> century and the first half of the 20<sup>th</sup> century, the pattern of births continued to vary over the year, with a consistent peak in February-March and a dip at the end of the year. But the amplitude of variation decreased substantially, except under certain exceptional circumstances such as the two World Wars (Box 2). The ratio between the months with the most births and those with the least fell from 1.8 in the 17<sup>th</sup> century, to 1.2 in the early 20<sup>th</sup> century. This trend invalidates the explanations based on temperature or on nature, since the French climate changed little over the period in question. The lesser observance of religious precepts and the decreasing share of farm workers in the active population over the centuries probably played a part in this attenuation of birth seasonality.

### ◆ More spring births in the 1970s and 1980s

Although less pronounced than three centuries ago, seasonal fluctuations were still evident in the 1970s, with more births between April and July (mainly late April – early May), and fewer in the autumn and winter (Figure 3). Several explanations have been suggested. The first links the surplus births in May to the summer peak in weddings (more frequent in July, and no longer in May) and hence in conceptions. Cohabitation before marriage was rarer in the 1970s than it is today, and marriage still often marked the start of sexual relations. But this explanation is unsatisfactory for two reasons. First, conception in the first months of marriage was increasingly rare in the 1970s. Moreover, the concentration

#### Box 1

### A seasonality disrupted by war

Curiosity about the annual distribution of births is not new. Several monthly data series are available for births in the past, dating as far back as 1451 for the city of Florence, for example. In the 18<sup>th</sup> century, reliable data were collected by the Swedish scholar Pehr Wargentin (1717-1783) and by the French scientists Jean-Baptiste Moheau (1745-1794) and Louis-René Villermé (1782-1863). Villermé also provided data for the first half of the 19<sup>th</sup> century for cities (Saint Petersburg, Brussels, Palermo, etc.) and for countries (Italy). The Belgian astronomer Adolphe Quetelet supplied data for the Netherlands from 1815 to 1826, which were reproduced by Villermé.

Wargentin looked for the cause of the phenomenon in Sweden. In an academic memoir published in 1767 [2], he stated that it was first “necessary to move backward nine months to determine the season when the children are conceived”. He then notes that in Sweden, in the mid-18<sup>th</sup> century, “it is in December that most children were conceived, then in April, May and June, and the fewest in August, September and October”. A comparison with French and foreign data of the same period corroborates this result, with the exception of the December peak which is a Swedish exception.

Wargentin rejects the hypothesis that the quality of food influences conceptions. It may be true over a short period but, in his view, the overall effect is negligible. The hypothesis of a varying quantity of “difficult and uninterrupted labour” is “not entirely satisfactory” to him either. For Wargentin, the cause was “spring and early summer that restore life to everything in nature”, though he notes that “the only exception [in Sweden at that time] to this order is the fertility of December which may be due to different causes acting concurrently” [2]. He also notes that the pattern was identical in Stockholm.

Moheau makes very similar observations in 1778. While taking care to separate the cities from the countryside, he observes a preference for the spring months in both cases. Moheau attributes this simply to the “revolution of the seasons”.

In the first half of the 19<sup>th</sup> century, Villermé led a long discussion on the possible causes of birth seasonality. He concluded that the seasonal fluctuations vary according to the intensity and combination of diverse causes, which differ from one place to another. He considered temperature variations to be the main cause, however [3].

in May concerns not only first births (first children born to a couple) but also second births, which are not linked to the wedding date; in fact, the spring peak is even larger for second than for first births [1].

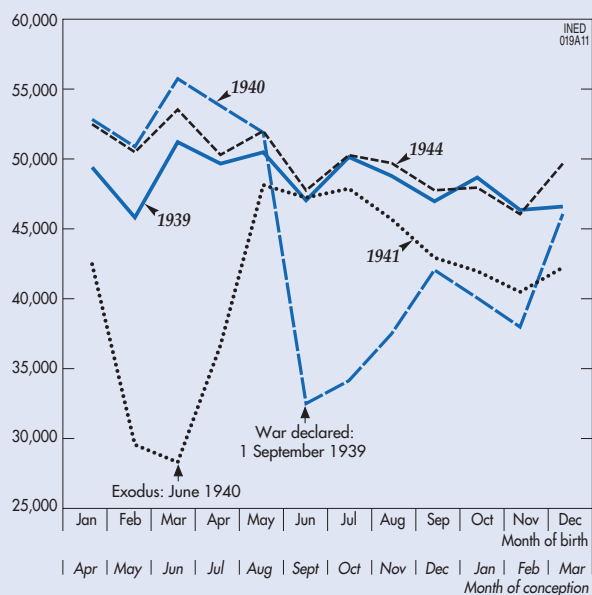
The second suggested explanation is that the surplus spring births coincide with conceptions during the summer holidays. Since the introduction of paid leave in 1936, July and August have been the most popular holiday months. Couples are more favourable to the idea

## Box 2

**A seasonality disrupted by war**

The monthly number of births during the Second World War was dictated by the unfolding of history, and the traumatic events affecting France over that period are reflected in its demography (Figure 2). The sudden drop in the number of births in June 1940 corresponds to a shortfall of conceptions in September 1939: on 1 September 1939, Germany invaded Poland. France entered the War on that day, and a general mobilization was announced on 2 September, leading to the separation of numerous couples. Some 5 million French men were mobilized, representing almost one-third of the male population of childbearing age. A similar observation can be made for the birth trough of March 1941, which corresponds to conceptions in June 1940, a period of exodus in France. In 1944, seasonality returned to its pre-war pattern.

Figure 2 - Monthly number of births in 1939, 1940, 1941 and 1944 (metropolitan France)



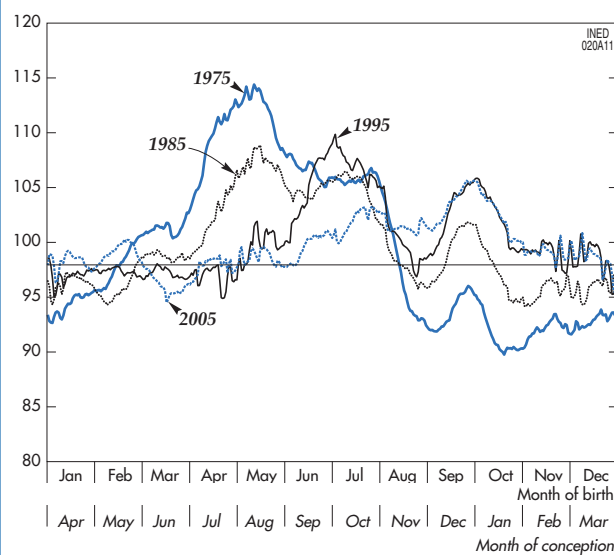
Source: Insee.

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of conceiving a child at this time, and have more free time for intimate lovemaking. The seasonality of births may thus be “determined” by the seasonal rhythm of France’s economic activity.

The idea that couples deliberately plan the birth date of their child has also been suggested. The legalization of contraception in 1967 (Neuwirth Act) and the widespread adoption of the pill has enabled couples to control the timing of pregnancies. As spring may be seen as a good time to give birth, the spring birth peak may be the consequence of a deliberate strategy on the part of future parents. The distribution of births among primary school teachers is very illustrative in this respect. Among this group, births are much more frequent in spring and much rarer during the school summer

Figure 3 - Seasonal pattern of births in metropolitan France (1975-2005) (base 100: daily average in the year)



Source: INSEE

Interpretation: An index of 105 corresponds to a day when a 5% increase in births was observed with respect to the number that would be expected in the absence of seasonal and weekly variations.

Calculation of indices: See reference [5].

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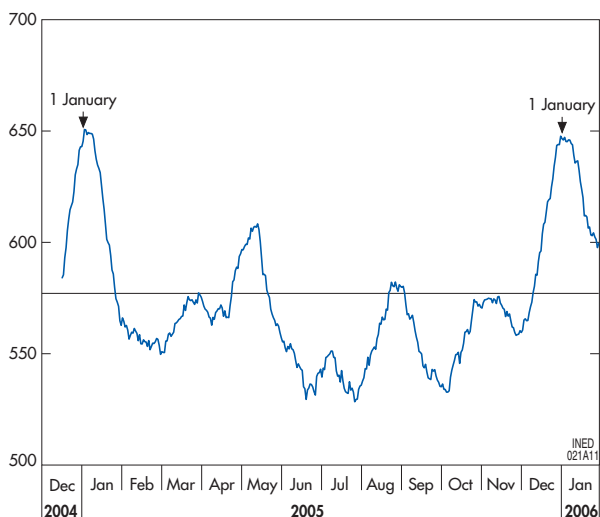
holidays, reflecting a strategy to take advantage of maternity leave just ahead of the long summer break [4].

### ◆ The birth peak has moved from May to September

The seasonal pattern of births has changed since the 1970s, however: fluctuations are smaller and the birth peak has gradually shifted from May to September (Figure 3). This trend remains partly unexplained, given that holiday timing and preference for spring births have remained unchanged. Most couples still take their holidays in July and August and, when French women are asked about the best month to give birth (assuming that a choice is possible), May is by far the most popular month (27%) ahead of June (20%), April (19%) and March (9%). A full three-quarters of women report a preference for spring, while September, currently the month with most births, is chosen by only 2% of them [5].

This “season of birth paradox” – more children are born at a time when the least women prefer to give birth – may be due to couples’ ignorance of the fact that a pregnancy is not always achieved immediately after stopping contraception, and that it often takes several months to conceive [6]. The probability that a woman having unprotected sexual intercourse will conceive over a menstrual cycle is no more than 20-25% [7]. This hypothesis appears to be confirmed by looking at the months in which couples stop using contraception: a higher proportion do so in July and August, resulting in

**Figure 4 - Number of pregnancies terminated by induced abortion (conceptions from 15 December 2004 to 31 January 2006)**



Source: INED, abortion statistics, 2005 and 2006.

Note: 21-day moving averages.

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more births in the autumn (and not in the spring) because of this waiting time to pregnancy [5].

### ◆ Twice as many conceptions as usual on New Year's Eve

In the 1970s and 1980s, September was generally a low month for births, but with a peak at the end of the month. While seasonality of births has become less marked over time, this pattern has persisted and is now the most visible seasonal fluctuation in France, with excess births peaking on 23 September (Figure 3). A similar pattern is observed in many other countries [5]. Given that pregnancy lasts 265 days on average, this peak corresponds to conceptions that occurred over the New Year holiday [8]. There are almost twice as many conceptions resulting in a live birth on New Year's day as on any other day of the year. A larger than normal number of couples wishing to conceive (and hence not using contraception) are probably together on that day and the circumstances are favourable for sexual relations over the festive period. In addition, couples not wishing to conceive may be less careful than usual. The number of induced abortions performed for pregnancies beginning on that day is three times higher than for a normal day<sup>(1)</sup>. The distribution of induced abortions by day of conception for the period from 15 December 2004 to 31 January 2006 is shown in Figure 4. As the exact day of conception is not known (only the number of weeks

(1) This observation is based on the distribution of abortions by day of conception estimated from the abortion notifications which give the date of each abortion and the number of weeks of pregnancy. The date of conception can thus be deduced quite accurately.

of pregnancy is indicated), the induced abortions corresponding to conceptions around 1 January 2005 and 1 January 2006 are spread over several days. Lower contraceptive vigilance not only concerns couples using "traditional" contraceptive methods, i.e. linked to the sexual act itself, such as withdrawal, condoms or periodic abstinence, but also pill users. Over the New Year festive period, women are more likely to forget their daily pill, to take it later than usual, or to vomit it up before it has been absorbed. This said, many New-Year conceptions, even if unplanned, are nonetheless desired and explain the rise in births at the end of September.

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### ABSTRACT

In the 17<sup>th</sup> century in France, there were more births between January and April, and fewer between May and December. Twice as many children were born in March as in June. This pattern of births was long thought to be a product of nature, with the increase in conceptions from April being linked to spring and the increase in temperature. In reality, it was linked to the seasonality of marriages and to the religious calendar, since sexual relations and weddings were forbidden during Lent and Advent. The seasonality of births became less marked in the 19<sup>th</sup> and 20<sup>th</sup> centuries, and the birth peak moved from winter to spring. These changes reflect a shift in behaviours, notably the less strict observance of religious precepts. Today, there is just one birth peak at the end of September, linked to conceptions during the New Year festive period which are twice as frequent as on a normal day of the year, resulting in a surplus of births and of induced abortions.