

The fertility decline in the industrial area of Charleroi during the second half of the 19th century

Did sedentaries and migrants have a different behaviour?

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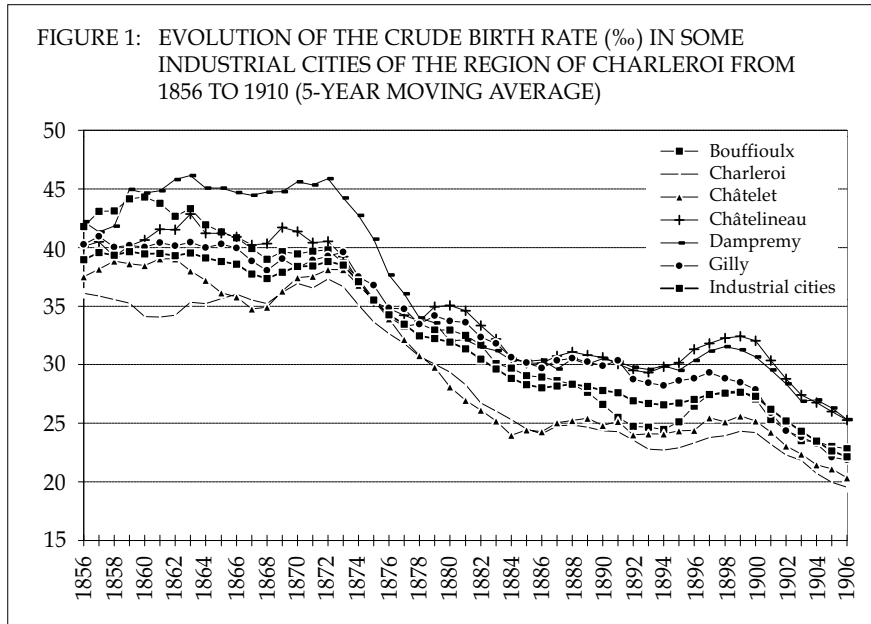
INTRODUCTION

Industrial cities are a particularly dynamic element of nineteenth century Walloon demography. The new slightly hybrid urban model, grown from small rural communities but which never looked like classical cities, was characterised by a very quick demographic growth, resulting from a high number of births and a relatively low mortality together with a relatively high in-migration (Eggerickx, 1998).

Birth rates in industrial cities had a net and decisive decline during the last quarter of the century. From 1872-1875 their decline was uncontrollable.¹ The general fertility index (I_t) and the marital fertility index (I_g) also experienced an important decrease between the censuses of 1866 and 1880 (Eggerickx, 1995; Oris, 1995). Figure 1 shows the evolution of the crude birth rate from 1856 to 1910 for several communes of the industrial area of Charleroi. During the first three quarters of the century, birth rates remained high between 35 and 45 per thousand, but around 1872-1875 they brutally and irreversibly diminished. From 1873 to 1886, birth rates in all these communes decreased in average about 30 per cent. This descent stopped from 1886 until 1900 and restarted with greater speed at the beginning of the twentieth century. This chronology and more specifically the moment at which birth rates started to fall, around 1872-1875, was common for nearly all communes. This irreversible decrease of birth rates and fertility in the industrial basin of Charleroi can be situated within the historical context of the great economic depression of 1873-1892.

¹ In these same years the irreversible decline of birth rates starts in the industrial area south of Li  ge (Leboutte, 1988). It is also around 1870 that fertility rates strongly diminish in Verviers (Alter, 1988).

Our objective is not to explain the changes in fertility behaviour of the last quarter of the nineteenth century,² but to compare migrant and sedentary couples' reproductive strategies within the context of industrial crisis. Industrial cities have an important number of 'non-natives' and a migratory dynamic which ensures that an important part of the population is nearly constantly renewed. Therefore, the analysis of fertility diminution cannot leave aside the in-migrants' reproductive behaviour. On the one side, we intend to



² This issue was extensively developed in several chapters of our doctoral thesis (Eggerickx, 1998). In brief, there was a direct link between the rapid and irreversible decline of fertility in industrial areas during the 1870's and the economic crisis. Our explicative hypothesis is that industrialisation broke the link between demographic pressure and real income per capita. From then on, population growth was no longer an obstacle. On the contrary, it boosted industrial prosperity and progress through developing the necessary manpower. After a long period between 1850 and 1875 of nearly full employment and of slow increases in the general well being, the economic crisis endangered the still precarious progress that was achieved by an increasingly large part of the population. And, this improvement could only be guaranteed by adopting a new strategy: the implementation of a voluntary and direct control of births within marriage. Therefore, the industrial crisis starting in 1873 would have triggered irreversible fertility decline. This hypothesis - with some variants - was recently exposed by R. Leboutte (1988) and M. Poulain (1996). However, H. Denis (1899-1900) had already established this relationship between well being and the descent of fertility and birth rates before.

determine whether in-migrant and sedentary families have a different fertility behaviour, and on the other, if they can be considered as instigators of the irreversible fertility descent which occurred between 1870 and 1880.

1. TRACKING DOWN MORE THAN 2,000 FAMILIES IN THE POPULATION REGISTERS

This analysis of industrial areas in the Charleroi region is exclusively based on data from the population registers. We do not intend to reconstruct exhaustively different communes, but rather to collect a sample of families belonging to several generations. In other words, our aim is not so much to build a representative sample of the families of particular communes, but to find an optimal comparability between generations. The sample is specifically adapted to the problem: *did sedentary and migrant families of different generations have a different fertility behaviour during the economic crisis of 1873-1892?*

1.1. Identifying generations

The birth decline in the Charleroi basin began from the 1870's onwards, that is during the great economic depression that shook the industrial world from 1873 to 1892. Within industrial communes, we selected those generations whose reproductive life was situated either before or (partially or totally) during the crisis period. The generations chosen have the following characteristics:

1. The female generation born between 1823-1832. Most of their reproductive period was over before 1873. Therefore, their fertility behaviour was not affected by the crisis.

2. The female generation born between 1833-1842. The most fertile part of their reproductive life was situated before the crisis.

3. The female generation born between 1843-1852. Their reproductive period was situated nearly entirely during the crisis.

4. The female generation born between 1853-1862. The most fertile part of their life was situated during the crisis.

1.2. Sedentary and migrant people: definition and limits

We differentiate the behaviour of sedentary and in-migrant couples for each generation. Sedentary couples are those of which both members were born in commune A and never left it before the end of the woman's reproductive period. Migrants can be divided into two categories:

1. at least one member of the couple was not born in a commune of the industrial area of Charleroi and the date of marriage was approximately the

same as that of the in-migration to one of the communes under study.³ Marriage and family formation frequently happened simultaneous to or immediately after in-migration (Kolmann, 1971; Blanchet and Kessler, 1992). Their migration to industrial cities could be both an answer to social and economic pressures (unemployment, poverty...) and to demographic ones (the impossibility to form a family due to living conditions in the area of origin).

2. at least one member of the couple was not born in a commune of the industrial area of Charleroi and in-migration took place at least five years before the marriage. These are couples who had been living in an industrial context for some time and for whom the demographic pressure was less strong than for the former group.

The industrial area under study consists of the old communes⁴ of Charleroi, Châtelet, Châtelaineau, Couillet, Damprémy, Gilly, Jumet, Lodelinsart, Marcinelle, Monceau-sur-Sambre, Montignies-sur-Sambre, Ransart and Roux. These entities are nowadays part of the communes of Charleroi and Châtelet which form a homogenous territorial, social and economic area. Any person who was born and continued to live in one of the 13 communes of the industrial basin of Charleroi will be considered as sedentary. Therefore, only people born and coming from a commune outside this area will be defined as in-migrants. In consequence, the definition of in-migrant is based on the element of distance and in the majority of cases this implies different living circumstances.

1.3. Selection criteria

Families have been followed through the population registers of the commune in which they lived during the wife's reproductive period, that is from age 15 to 50. Only first marriages have been retained and couples were none of the members died or out-migrated before the end of the woman's reproductive period. Families leaving their commune of residence and coming back later have not been taken into consideration, since we do not have any evidence of children born and died outside the commune under study.

Only families who finished their reproductive life are part of the sample.⁵ We have also favoured homogeneity in calculations, as certain indicators essential for understanding mechanisms preceding fertility decline rely on data from the entire female reproductive cycle. This is the case, for instance, for

³. In-migration happens prior to or five years after the marriage.

⁴. Before the fusion of 1977.

the mean age at last birth and the length of birth intervals. Therefore we only take into consideration the stable population of industrial cities: native sedentary families and in-migrant families who did not move after in-migration. In consequence, we do not take into account the unstable part of the workforce characterised by frequent migration, i.e. which participated in population 'turn-over'. However, this population has also contributed to the fertility of the industrial area under study. In other words, the fertility of our sample only represents part of the fertility of these areas. Therefore, the behaviour of these families is not *a priori* strictly representative. But we can assume that their reproductive behaviour was the most 'affected' since they had been exposed to social, economic and environmental constraints during a maximum length of time.

Our sample consists of 2,000 families, which translates into 500 families per generation. The four generations approximately have the same number of sedentary and migrant couples. The latter group is composed of recent and older migrants in equal quantities. Therefore, generations are strictly comparable. Censuses indicate that between 1880 and 1910 about 50 per cent of the urban population was non-native. All data from the population registers have been evenly balanced in order to prevent over- or under-registration of a street or neighbourhood.

1.4. The sample

We should remind that our objective is not to study fertility in a particular commune but to analyse possible modifications in the reproductive behaviour of married women belonging to different successive and strictly comparable generations that were or not affected by the great economic depression of 1873-1892. Yet, we cannot leave aside the delicate problem of representativity of the families included in the sample.

Because families included in our sample have to comply with the mentioned criteria, there are several biases with regard to the population of reproductive

⁵. Population registers refer to relatively short periods of observation, a mean of 10 years. Therefore, they only present incomplete life histories. The complete reconstruction of fertility of couples implies an observation period of thirty years; this implies couples have to be followed through two or three consecutive registers. Given the amount of registers and their increase from one period to another, matching registers can be considered a disproportionate task (Alter, 1988). From our point of view, the best solution is to work with a sample of families which is representative of the population under study or which is adapted to the specific problem under analysis.

age in our communes. Only those couples that could be followed throughout the entire female reproductive life (between ages 15 to 50) and of which none of the two partners exit observation, have been retained. Therefore, we do not include families that out-migrate nor those that commute, a typical phenomenon of industrial cities. We have also left aside remarried people and families of which one of the two partners died during the wife's reproductive life. Only illegitimate births that were 'legalised' by the mother's first marriage have been taken into account. Therefore, all factors susceptible of disturbing fertility have been left aside. In other words, it is most probable that the fertility of women included in the sample is higher than that of the total population. What is the extent of this bias?

The sample is composed of 11,000 births. What does this figure represent in regard to the total number of births registered in the vital statistics? As our sample has been conceived from a longitudinal perspective we have to compare the results with cross-sectional data for the period 1873-1877 for which we have the total number of births by women between ages 15 to 50. Our sample only picks up 17 per cent of the total number of births in this period. Since we know that we have sampled nearly all births in stable families we can argue that the mobile population of industrial areas and, what is more relevant, its contribution to the total number of births is very important. This does not necessarily mean that results from our sample are not representative for the total population because the fertility of the stable population could be comparable to that of the mobile population.

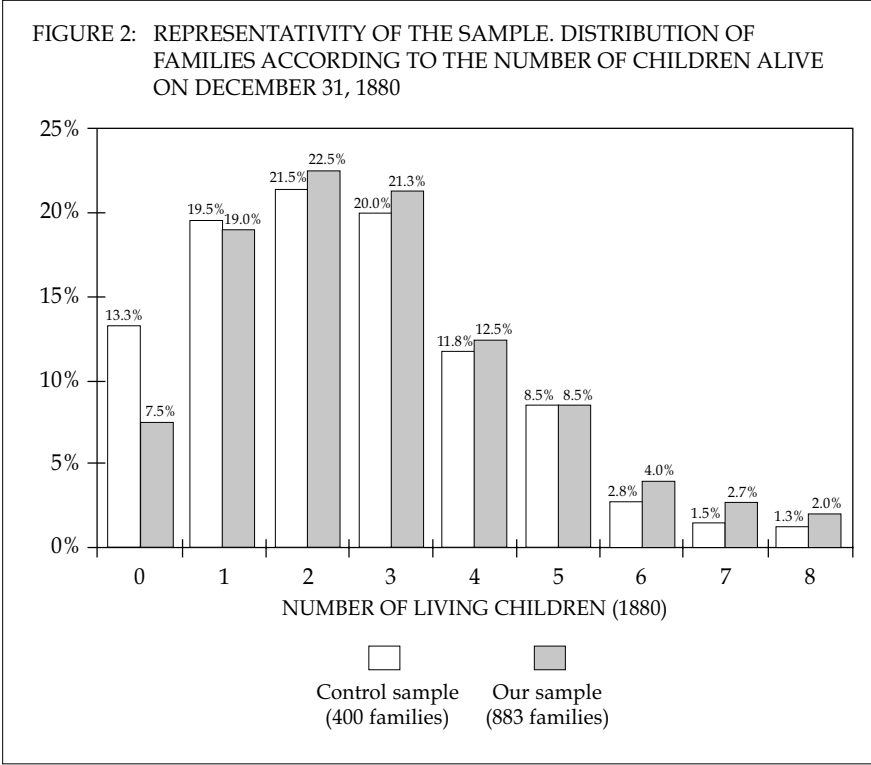
Between 1878 and 1882 the index of marital fertility (I_g) in industrial communes was 0.579. That is 58 per cent of the fertility of the Hutterites who had a mean of 12.4 children. We obtain the total volume of legitimate children in our four communes by multiplying the latter by the value of our I_g . We obtain 7.2 children per woman against 8.4 for our sample. We overestimated the fertility, however, the gap between the sample and the total population is not enormous.

We also checked whether our sample is representative by studying the distribution of families whose children still lived on December 31, 1880. We have randomly selected⁶ 400 families from the population register of the commune of Gilly during the period 1880-1890. These families had to respond to one of the above mentioned selection criteria and had to be married couples where the wife was between 14 and 40 years. We observed family composition

⁶ All population registers (27 in total) for the period 1880-1890 were revised. A family was extracted every 10 pages.

at the end of the year 1880 and, since it is cross-sectional, only children that were alive at that date were taken into account. We applied the same procedure for our sample. Families that married after December 31, 1880 as well as those in which the wife was older than 40 at the reference date, were eliminated. We obtained a comparative basis of 883 families.

Results of the comparison can be found in figure 2 and confirm that our sample is representative. Differences for families with more than one child were about 1 per cent irrespective of the number of children alive. Deviation is therefore negligible, even if we take into account that larger families are proportionally better represented in our sample. Only childless families stand out because they are strongly underrepresented in our sample. It is normal since the tendency of childless couples to out-migrate is much higher than that of families with children (Pasleau, 1993). In summary, the controlling sample of 400 families had an average of 2.5 children per married couple against 2.8 in our sample.



2. SEDENTARY AND MIGRANT PEOPLE: INNOVATORS OR IMITATORS? THE STATE OF THE ART

2.1. Migrants-sedentaries: an abandoned dichotomy in fertility studies

The intensification of migratory movements is one of the main characteristics of European demography of the last two centuries and an essential agent of the urbanisation process. Migration is not new, but its frequency and its intensity increased during the nineteenth century (Jackson and Moch, 1989; Moch, 1986). Towns, industrial cities and villages were in permanent contact, perpetually blending, through migrations.

What are the interactions between the demographic transition and migratory movements? In general, they are not clearly defined and therefore left aside. For M. Termote (1995, 324),

“Cette négligence de la migration se manifeste également dans la théorie de la transition, qui, en se limitant à la fécondité et à la mortalité, suppose en fait un monde aspatial [...]. Il peut sembler pour le moins négligent de faire une telle hypothèse dans le cadre d’une théorie qui prétend rendre compte de l’évolution du comportement démographique d’une société en pleine mutation économique, en pleine ‘modernisation’, caractérisée par une urbanisation rapide et un exode rural important, souvent couplés à une forte migration internationale”.

This negative statement is not so much about the role of migratory movements in urban growth nor their function as regulators but about the study of behavioural differences between sedentary and migrant populations. D. Morsa (1996, 191) deplores that:

“En ce domaine, le manque d’études de démographie historique urbaine cherchant à mettre en lumière les comportements respectifs de sous-populations est singulièrement préjudiciable. Que pouvons-nous dire en l’absence d’analyses différentielles ?”

The analysis of differential residential demographic behaviour cannot leave aside spatial mobility because it dictates the rise or decline in population numbers in these areas. Who are the migrants? Where do they come from? Is their fertility behaviour similar to that of the people in their former surroundings or is it more similar to that of their new place of residence? Is there such a thing as an adaptation period to urban behaviour and how long does it last? Have these people accelerated or, on the contrary, reduced the speed of urban fertility decline? What impact did they have on the reproductive behaviour of the places they left? These are a few of so many questions which we have just only started to answer (Poulain, 1990).

2.2. Are migrant and sedentary fertilities different?

The size of migration flows to cities, suburbs and industrial centres gives a good idea of the rate at which villages were abandoned during the nineteenth century. We can assume that migrants, who mostly came from rural areas, had a higher fertility level than native city-dwellers. However, studies on the port of Bremen and the cities of Geneva and Rouen invalidate this hypothesis. Migrant women of the 1820-1875 marriage generations of Bremen had a completed fertility slightly below those who were born there (4.3 children against 4.6) (Lee and Marschalck, 1996). Women who migrated to Geneva, where birth control did not exist, also had a lower fertility rate than natives (Perrenoud, 1990). Bardet (1990) noted similar results for eighteenth century Rouen. This does not necessarily imply that there was a bigger use of contraceptives among migrants nor that these were more easily convinced to use them.⁷ On the contrary, in Geneva and Rouen the initiative seem to have been taken by the locals. The case of Verviers confirms this tendency. G. Alter (1988) has shown significant differences in fertility behaviour between migrant and sedentary women born between 1826 and 1835. Sedentary couples had a much higher and clearer fertility control than migrants. Differences had also been found among the latter according to age at migration. Women who moved to Verviers before age 15 had a similar behaviour to that of sedentary women. The rest of the migrants, on the other hand, had a non-Malthusian behaviour. However, in a recent study on the nineteenth century industrial city of Tilleur M.Oris (1996) states that from 1866 onwards migrants were the first to leave the malthusian check of late marriage and use birth control.

Most studies show that migrants, whether initiators or imitators, very rapidly adopted urban behaviour. In big cities where people, ideas and commodities circulated ever more rapidly, acculturation and adoption to the new norms was very quick.

One of the main questions is related to the selectivity process (Jackson and Moch, 1989). Is the migrant population a group in its own right and, if it is, what are the characteristics which differentiate them from sedentary people? The demographic and social characteristics of migrants are generally well known,⁸ but can vary according to the situation. Female migration is especially focused on administrative and commercial centres and places with employment in the domestic service (Morsa, 1996). Men, on the other hand, migrate

⁷. Mean age at marriage was generally higher for migrants than for sedentary people. The period of adaptation to the new place of residence can lengthen the interval before or between births and therefore influence completed fertility.

⁸. See for example Leboutte (1988), Pasleau (1993).

to industrial cities. Moreover, even if migratory movements are generally carried out by young and single people, 'hesbignonne' migration towards Wisconsin was above all a family movement of young adults, children and older people (Eggerickx, 1987; Eggerickx and Poulain, 1995).

It is however more difficult to define the psychological characteristics of this population. How do they pick up novelties and innovations? How do they face the 'shock' of their move to a strange area? Are they innovators, pioneers, or do they tend to be conservative due to their frequently rural origin? These questions are important when analysing and interpreting migrant and sedentary demographic behaviour. M. Livi-Bacci (1977) partially explained the nineteenth and twentieth centuries Italian urban fertility by the selective character of migration. The latter might specifically affect less or infertile couples who have less difficulties in fitting into urban areas than larger families. According to J.-P. Bardet (1990), migrants have a very specific view on contraception. Therefore, migration would have helped to lower urban fertility levels or would at least have stopped them rising. On the other hand, the study of A. Bideau (1990, 103) on out-migration in the valley of Valserine at the beginning of the twentieth century, stated that there was no "[...]sélection particulière de la population migrante parmi la population de départ".

Supposing that migrants are more adventurous, enterprising and receptive to innovation than sedentary people does not imply they would have a higher propensity to use more radical contraceptive methods in similar conditions. Moreover, factors like the environment in which migrants are received, the pressures they are exposed to, the degree of urbanization in the place of arrival must also be taken into account. J. Ganiage's (1988, 168) study of the eighteenth century rural Beauvaisis shows, despite the limited number of cases on which it is based, that the behaviour of migrant families is different from that of sedentary couples as "[...] déplacements d'un village à l'autre n'impliquaient pas un changement de mode d'existence". The comparison of marital fertility levels and tendencies between industrial Walloon cities and communes in the suburbs of Brussels, two different models that have largely benefited from migration, is also instructive. Industrial cities have much higher fertility rates than the suburbs. The industrial centres, which frequently arose in the countryside far from traditional cities, were populated by a relatively homogeneous group of people coming from rural areas (Roncayolo, 1983). The migrant who arrived in these cities was faced with an environment that encouraged fertility because children's work was an extra financial aid (Eggerickx, 1995). Moreover, in the industrial region of Rhineland-Westphalia, the first generations of migrants of rural areas brought high fertility levels and therefore delayed the demographic revolution (Kolmann, 1971). On the other hand, the more heterogeneous population of the suburbs which was in more frequent contact with

the city was able to accustom more quickly and adopt the urban fertility model more rapidly. This urban 'outgrowth' was not only fed by rural exodus but by populations which had been expelled from saturated urban centres (Eggerickx, 1995).

Real or perceived opportunities, restrictions imposed at the place of arrival and migrant selectivity are some of the factors that can justify differences and similarities among these two sub-populations. The responses of migrants likely to influence family construction and the number of descendants are not well known. These subjects have hardly been investigated, at least for Western European internal migration (Moch, 1986). The difficulty in finding the ideology behind and the unity in fertility behaviour is probably due to the multiple types of migration – definitive, seasonal, weekly or daily migration, long and short distance moves,... – as much as to the diversity and the absence of a clear pattern of attraction and repulsion forces that condition most of the migratory movements. To these factors, we should add the conditions in which migrants are received. *“Les problèmes liés à l’insertion, finalement, touchent autant à l’emploi qu’à l’habitat, aux habitudes qu’aux filières d’accueil et nécessitent la prise en compte de la pluralité des cultures urbaines et la compréhension de l’espace vécu”* (Piette and Ratcliffe, 1993).

3. ANALYSIS OF THE REPRODUCTIVE BEHAVIOUR OF MIGRANT AND SEDENTARY FAMILIES IN THE INDUSTRIAL AREA OF CHARLEROI

3.1. Fertility reduction

Does the fertility of sedentary couples living in the industrial area of Charleroi differ from that of migrant families? Purely on the basis of the total marital fertility rate we can not answer this question (table 1). However, we can see that the indicator is lowest for the former, except for the 1823-1832 generation. Moreover, the average number of children is slightly lower for recent migrants than for those who arrived earlier. This difference can be due to the period of adaptation needed by the newly arrived, while in-migrants who have been there for a longer period of time are already integrated.

If we only take into account total fertility rates, there is hardly any difference between the level and the evolution of fertility of sedentary and migrant families. It allows us to eliminate the bias that our sample, composed of migrant and sedentary families in equal numbers, could have created. Subsequently, we analyse fertility rates by age groups, and more specifically, by measuring the relative weight of fertility of women over 30 compared to the fertility of

TABLE 1 EVOLUTION OF TOTAL MARITAL FERTILITY RATES
(ABOVE AGE 20) ACCORDING TO FAMILY ORIGIN
(NUMBER OF CHILDREN)

<i>Generations</i>	<i>Total</i>	<i>Sedentaries</i>	<i>Total</i>	<i>Migrants Old</i>	<i>Recent</i>
1823-1832	7.7	7.9	7.5	7.7	7.4
1833-1842	7.2	6.9	7.5	7.5	7.6
1843-1852	6.1	6.0	6.2	6.3	6.1
1853-1862	4.8	4.8	4.9	5.1	4.8
1823-1842	7.5	7.4	7.5	7.6	7.5
1843-1862	5.5	5.4	5.5	5.7	5.5

women over 20 (table 2). Indeed, the change in fertility patterns can be mainly seen above age 30 (Knodel, 1981). The weaker the relative part, the stronger the decrease of fertility rates above age 30 and the clearer the existence of voluntary control. However, this percentage remained nearly stable for the first two generations of migrants and was only reduced by 3 per cent in sedentary couples. The level of this indicator decreased between the second and third generations confirming the expansion of voluntary birth control among both migrants and sedentary couples. The general fertility decline seems to have started with the generations born after 1840 that developed most of their fertile life during the 1873-1892 industrial crisis. R. Leboutte (1988, 373) reaches a similar conclusion in his thesis on the industrial basins around Liege: *“La réduction volontaire des naissances s’impose chez les couples mariés en 1860-1869, donc qui ont pris la décision de limiter leur descendance une dizaine d’années plus tard, vers 1870-1879 [...]. Cette décision intervient donc en pleine dépression économique”*.

TABLE 2 IMPORTANCE OF VOLUNTARY BIRTH CONTROL ABOVE AGE 30:
($\sum TX \geq 30$ YEARS OLD / $\sum TX \geq 20$ YEARS OLD)*100

Generations	Total	Sedentaries	Migrants		
			Total	Old	Recent
1823-1832	45.8%	45.9%	45.8%	47.2%	44.4%
1833-1842	44.2%	42.8%	45.5%	46.3%	44.8%
1843-1852	34.7%	33.1%	36.3%	37.8%	34.8%
1853-1862	27.3%	26.5%	28.2%	26.5%	30.2%
1823-1842	45.1%	44.5%	45.8%	46.7%	44.6%
1843-1862	31.5%	30.1%	32.9%	32.8%	32.9%

These analyses show that differences between sedentary and migrant groups are relatively small. Is this tendency confirmed by fertility regulation?

3.2. Stopping behaviour

In ‘pre-transitional’ societies, where *a priori*, couples have no intention to limit births, nuptiality norms are the main demographic regulators and fertility is largely uncontrolled. Celibacy and late marriage were the key factors of the ancient demographic regime. This mechanism did only affect the first birth as it was postponed by late marriage. Hence fertility did not depend as much on individual decisions but on physiological factors. Marital behaviour was dictated by institutions and social practices. All societies are submitted to fertility restrictions (Gélis, 1984). The fertility transition mainly implies the transition from a society where fertility is socially controlled to a society based on individual choice (Wrigley, 1987).

These two fertility regimes have been summarised in terms of ‘natural fertility’ and ‘controlled fertility’. Though this distinction, introduced by L. Henry, has been frequently criticised, it is a useful model that distinguishes two types of behaviour (Van de Walle, 1988). Nevertheless, the difference between the two fertility regimes is mainly based on the presence or absence of a family project⁹ and on the hypothesis that stopping behaviour is the only way of consciously controlling fertility. “*Toute autre forme de régulation de la fécondité,*

⁹. We implicitly suppose that couples cannot plan to have high fertility.

telle que l'espacement volontaire des naissances, l'abstinence, les normes sociales relatives à l'âge, l'allaitement, sont supposées produites par le milieu social, et non sujettes à un choix personnel ou une intention délibérée. Elles relèvent donc de la fécondité naturelle" (Perrenoud, 1988, 59). However, how should we determine which of these 'alternative means' of birth regulation are related to physiological factors, to social norms and to individual choice? As E. Van de Walle (1989) states "[...] *la coexistence de comportements d'espacement avec des comportements de limitation et d'arrêt, est probablement plus fréquente parmi des populations en voie de transition qu'on ne l'avait d'abord pensé.*"

As proposed by J. Knodel (1987), completed fertility of a group of married women can be expressed as a simple function including the three main ways in which birth can be controlled:

- the time between marriage and first birth, which is expressed by the mean age at first birth;
- Birth spacing, estimated by the mean duration of birth intervals;
- Stopping behaviour measured by the mean age at last birth.

The mean number of births can be calculated by dividing the time elapsed between the mean age at last and first birth (that is the duration of the reproductive period) by the mean duration of birth intervals. Taking into account that we do not consider the time elapsed before first birth we should add 1 to the formula. Therefore,

$$N_i = 1 + \left(\frac{ADN - APN}{L_i} \right)$$

with:

- N_i , the mean number of deliveries per woman;
- ADN, mean age at last birth;
- APN, mean age at first birth;
- L_i , duration of birth intervals among women who have had at least two intervals.

In relation to the equation proposed by J. Knodel (1987) we preferred not to take into consideration the duration of the last interval in mean duration of intervals (L_i). Indeed, the lengthening of the last interval can reflect the unsuccessful will to stop having children rather than a real desire to delay the last birth. Moreover, this interval is the longest and is shortened as family size increases. In other words, its weight in the mean number of intervals will be higher as large families become rare. It is possible to modify the formula proposed by J. Knodel and isolate the impact of the duration of the last birth

interval on the evolution of marital fertility. It is only necessary to subtract the duration of the last interval to that of the reproductive period (ADN-APN). We can equally convert the mean number of deliveries into the mean number of children by adding to the final expression a proportion 'j' of multiple deliveries which was calculated for the four generations as a whole. In this case, the proportion is of 107.5 multiple deliveries per 10,000 deliveries. In Belgium the proportion was 96 for the period 1841-1848 and 107 for the period 1880-1910 (Tabutin, 1977).

The new formula is:

$$N_i = 2 + \left(\left(\frac{ADN - APN - D_i}{L_i} \right) \times (1 + j) \right)$$

with:

- N_i , the mean number of deliveries per woman;
- ADN, mean age at last birth;
- APN, mean age at first birth;
- D_i , duration of the last interval between births;
- L_i , duration of birth intervals among women who have had at least two intervals;
- j , proportion of multiple births among all births;
- we add 2 to the final result to take into account the interval between marriage and the first birth and that between the two last births.

How can we measure the importance of each of these three ways of birth control? We take as standard reference the first generation (1823-1832) and the value of their four parameters. We systematically change the value of a single parameter of the equation (leaving the rest unchanged), measuring in this way the effect it will have on N_i . For instance, for the first generation $N_i = 6$ children, that is $N_i = ((38.5-24.8-3.5)/2.6)+2,0108$. If we substitute the mean age at last birth by that of the second generation, that is 37.2 years, the value of N_i will be 5.5 children. In other words, the decrease of the mean age at the last birth would have lowered the mean number of children by 8 per cent ($5.5/6.0 = 0.92$). A similar analysis was done for the rest of the generations and parameters. The results can be found in table 3.

We have taken as reference the 1823-1832 generation and the value of its parameters, both for migrants and sedentary people. Results are clear (table 3). The decline of marital fertility in every sub-population is due to stopping behaviour, shown by the decrease of the mean age at last birth. This strategy is decisive for sedentary couples of the 1833-1842 generation but less important for migrants of the same generation. In the latter case it does not counterbalance the decline in the mean age at first birth nor the diminution of the

duration of birth intervals. These results also apply to the next generations and show the diminished impact of stopping behaviour on migrants' completed fertility. However, these two factors have little effect on the synthetic fertility indicators of sedentary women.¹⁰

What conclusions can we draw from the comparative analysis of the reproductive behaviour of sedentary and migrant families in the industrial basin of Charleroi? Differences in fertility intensity and calendar between these sub-populations are relatively small. Though, certain indicators show that those who started birth control were the sedentary couples of the 1833-1842 generation, the main conclusion is that, despite the fact that one of the groups might have started slightly before or after, the fertility intensity of migrant and sedentary generations born after 1843 is comparable. This confirms the capacity of migrants to adapt and the predominance of the reproductive behaviour of the place of arrival.¹¹ The following analyses should be enough to confirm this preliminary conclusion.

4. FERTILITY BEHAVIOUR OF MIGRANTS ACCORDING TO PLACE OF BIRTH, MIGRATORY TRAJECTORY AND PATTERNS OF MARRIAGE

4.1. Fertility behaviour by place of origin

Where do these migrants come from? Short distance migration of workers is one of the main historical demographic characteristics of industrial cities (Eggerickx, 1998; Leboutte, 1997). Does this apply to our sample? In our case, the area of recruitment is clearly large. However, we should not forget that people from the communes which nowadays are part of Charleroi or Châtelet are considered sedentary. Very short distance movements – less than 10 km – are marginal. More than half of the migrants were born in a commune situated further than 20 km from the industrial area of Charleroi: 57 per cent for the 1823-1832 generation, 68 per cent for the 1833-1842 generation and 70 per cent for the generations born after 1843. There is no neighbourhood migration and therefore most migrants are not familiar with their new place of residence. On the other hand, the area of recruitment is relatively small. However, the median distance increases by several kilometres between the first two generations and the proportion of migrants born further than 40 kilometres in-

^{10.} A more detailed analysis of these behaviours can be found in Eggerickx (1998).

^{11.} We can also suppose that these migrants have been selected and that they would have also been precursors of fertility decline in their places of origin.

TABLE 3 IMPACT OF EACH METHOD OF BIRTH CONTROL ON THE MARITAL FERTILITY DECLINE AMONG SEDENTARY AND MIGRANT COUPLES

Population	Generations	Age at last birth (age)	Age at first birth (age)	Mean interval between births (year)	Last interval between births	Mean number of children
Sedentaries	1823-1832	38.6	24.1	2.5	3.5	6.4
	1833-1842	36.6	23.6	2.4	3.8	5.8
	1843-1852	34.4	23.5	2.5	3.9	4.8
	1853-1862	31.7	23.4	2.5	3.8	3.8
<i>Impact of the different parameters in relation to the first generation (%)</i>						
	1833-1842	-12.5	3.1	1.7	-1.7	-9.4
	1843-1852	-26.2	3.8	-0.3	-2.4	-25.2
	1853-1862	-43.1	4.4	-0.3	-1.7	-40.7
Migrants	1823-1832	38.3	25.5	2.6	3.4	5.6
	1833-1842	38.0	24.3	2.5	3.4	6.1
	1843-1852	35.0	24.0	2.4	3.8	5.0
	1853-1862	32.1	23.7	2.4	3.6	4.0
<i>Impact of the different parameters in relation to the first generation (%)</i>						
	1833-1842	-2.0	8.2	2.0	-0.4	7.7
	1843-1852	-22.5	10.2	5.3	-2.9	-9.9
	1853-1862	-42.2	12.3	5.9	-1.6	-25.6
Ancient migrants	1823-1832	39.0	25.0	2.8	3.5	5.8
	1833-1842	38.3	23.9	2.6	3.5	6.1
	1843-1852	35.3	23.8	2.4	4.1	5.1
	1853-1862	32.2	23.4	2.5	3.5	4.2
<i>Impact of the different parameters in relation to the first generation (%)</i>						
	1833-1842	-4.4	6.9	3.0	-0.5	5.0
	1843-1852	-23.0	7.5	9.6	-3.9	-9.8
	1853-1862	-42.3	10.0	7.4	-0.1	-25.0
Recent migrants	1823-1832	37.6	26.0	2.5	3.3	5.4
	1833-1842	37.7	24.8	2.5	3.3	5.9
	1843-1852	34.7	24.2	2.4	3.5	4.9
	1853-1862	32.0	24.1	2.3	3.8	3.8
<i>Impact of the different parameters in relation to the first generation (%)</i>						
	1833-1842	0.8	9.0	1.0	-0.2	10.5
	1843-1852	-21.8	13.5	1.5	-1.8	-8.5
	1853-1862	-42.0	14.3	4.6	-3.6	-26.8
Total	1823-1832	38.5	24.8	2.6	3.5	6.0
	1833-1842	37.2	24.0	2.5	3.6	5.9
	1843-1852	34.6	23.7	2.5	3.9	4.9
	1853-1862	31.9	23.6	2.5	3.7	3.9
<i>Impact of the different parameters in relation to the first generation (%)</i>						
	1833-1842	-8.4	5.2	1.9	-1.1	-2.5
	1843-1852	-25.3	7.1	2.7	-2.6	-18.0
	1853-1862	-42.8	7.8	2.4	-1.6	-34.1

creases for the last generations. Hence there is no important difference between mean and median distances between the place of birth of old and recent migrants nor according to region of birth.¹²

Is this type of mobility different from that in other industrial basins? Is recruitment at longer distances due to the selective character of our sample? Our migrants reside in the commune of arrival for at least the duration of the wife's reproductive period. Therefore, this kind of move especially concerns couples coming from further away, people who were uprooted by the move. Because they are not in a familiar place, they may desire to fix their place of residence with greater strength, since we know that they systematically want to build a family, another factor helping to create roots (Jackson and Moch, 1989; Bourdelais and Demonet, 1993).

The expansion of the recruitment area implies that there is a high diversity of regions and, in consequence, of localities of origin. Three quarters of Belgian arrondissements are affected, to a higher or lower extent. There is, however, a clear hierarchy of the main places of out-migration throughout generations. For instance, 31 per cent of in-migrants of the first generation come from the arrondissement of Charleroi, closely followed by the arrondissement of Nivelles (25 per cent), and Soignies (10 per cent), Namur (5 per cent) and Mons (4.5 per cent). Flemish arrondissements are responsible for 10 per cent while the region of Brussels, as we know it today, hardly sent any. This hierarchy is more or less stable for the other generations. However, for the second generation Nivelles, with more than 40 per cent of the migrants, becomes a more important place of origin than Charleroi. Thus, Walloon Brabant becomes the main place of emigration. This proportion weakens for the more recent generations, though no other region takes a predominant place. Other characteristics are the lesser importance of the arrondissement of Charleroi, though still at second position, the stability of Soignies and the Flemish region as a whole, each around 10 per cent and the increase of the arrondissement of Namur. Finally regions like Limburg, West Flanders, the north of East Flanders and the provinces of Antwerp, Liège and the Ardennes of Namur and Luxemburg do hardly appear.

¹² Our sample does not hold any biases in relation to behavioural differences according to distance or according to the migrant's origin.

¹³ The small numbers introduce doubt in the reliability of the results. However, homogeneity between variation coefficients and the low dispersion of results between the two groups are favourable factors.

Is fertility behaviour different according to the geographical origin of the migrant? There is really not much difference¹³ (table 4). Flemish natives of the 1823-1842 generation do have a delay in respect to other migrants and sedentary couples. However, differences for the next generation are non-existent. Migrants from this region control their fertility about ten years before it spread throughout the north of the country (Lesthaeghe, 1977). Given the precocity of the fertility decline in the industrial arrondissement of Charleroi, the same can be said for migrants coming from the Walloon Brabant, the arrondissements of Soignies, Ath... Therefore, the main determinant of fertility behaviour is the living conditions, in its wider meaning, in the place of arrival rather than the geographical and cultural origin.

<i>Family Origin (place of birth)</i>	<i>Mean number of children</i>		<i>Age at last birth (years)</i>		<i>Age at first marriage (years)</i>		<i>Number of families</i>
	<i>Mean</i>	<i>Variation Coefficient</i>	<i>Mean</i>	<i>Variation Coefficient</i>	<i>Mean</i>	<i>Variation Coefficient</i>	
1823-1842							
Charleroi (arr.)	5.8	0.50	38.5	0.13	24.5	0.13	120
Nivelles (arr.)	5.8	0.49	37.8	0.14	24.9	0.13	167
Flanders	6.6	0.42	40.4	0.10	24.9	0.13	41
Ath, Mons, Soig. (arr.)	5.8	0.48	38.2	0.17	24.8	0.12	64
Other Wallonia + Bxl	5.9	0.56	37.0	0.16	23.3	0.13	53
Foreign countries	5.8	0.57	37.2	0.18	24.2	0.15	27
Migrants	5.9	0.50	38.1	0.14	24.6	0.13	472
Sedentaries	6.3	0.48	37.6	0.14	23.5	0.13	517
Total	6.1	0.49	37.8	0.14	24.0	0.13	989
1843-1862							
Charleroi (arr.)	4.2	0.70	33.5	0.18	23.2	0.13	94
Nivelles (arr.)	4.8	0.55	34.3	0.18	23.7	0.15	154
Flanders	4.9	0.53	33.9	0.19	24.0	0.13	60
Ath, Mons, Soig. (arr.)	4.3	0.60	33.7	0.15	23.7	0.12	72
Other Wallonia + Bxl	4.0	0.64	32.8	0.19	23.7	0.14	95
Foreign countries	4.7	0.67	32.0	0.19	23.1	0.12	27
Migrants	4.5	0.60	33.6	0.18	23.6	0.14	502
Sedentaries	4.5	0.60	33.3	0.17	23.0	0.14	517
Total	4.5	0.60	33.1	0.17	23.3	0.14	1019

4.2. Fertility behaviour according to migratory trajectory

Did these migrants arrive directly from the countryside where they were born, or did they pass through intermediate stages before settling down in their new place of arrival? Because there are no complete migratory biographies, the answer can only be partial. Moreover, the place of departure has only been recorded for recent migrants. In addition, when the place of departure is the same as that of birth we assume that they have never left. 'Migratory experience' is limited to migration from the place of birth to the commune of arrival.

Several studies have underlined the importance of step migration during the industrialisation process (Anderson, 1971; Darroch, 1981; Mac Quillan, 1983). This movement can be an important factor for integration in and adaptation to the industrial world and generated differences in behaviour between those who were and were not involved. 55 per cent of recent migrants of the first two generations migrated directly from their village of birth. The rest made at least one intermediate migration and, in the great majority of cases, to an industrial commune. The relationship is the opposite for the 1843-1862 generations, 60 per cent of recent migrants come from their place of birth. The 'acculturation' process was easier for the latter, whereas the shock was much stronger and the adaptation to the behaviour of the new environment more difficult for the 'generation of change', 1843-1862.

According to R. Leboutte's (1995) typology, migrations can be divided into circular migrations, movements between industrial communes, and those called 'progressive', that is from a low level to a higher level of urbanisation. Table 5 presents fertility indicators for two categories of recent migrants which we called 'direct migrants' and 'indirect migrants'. Results contradict the former hypothesis. Differences are small irrespective of the generation. Once fertility control starts, it affects everybody despite the initial delay of migrants coming directly from their place of birth.

4.3. Fertility behaviour according to marriage pattern

Mixed marriages are undoubtedly an important integration and adaptation instrument (Piette and Ratcliffe, 1993). What is the proportion of 'endogamous' marriages - those uniting two people of the same commune - and of 'exogamous ones' - those between a native and a non native? For each generation we distinguish three categories of migrant families: those where both partners are non native, those where only the wife is non-native and those where the husband is. We speak of mixed or exogamous marriages for the latter two

TABLE 5 MEAN NUMBER OF CHILDREN AND SOME CALENDAR INDICATORS ACCORDING TO DIFFERENT MIGRATORY TRAJECTORIES FOLLOWED BY RECENT MIGRANTS

Type recent migrant family	Completed fertility (number of children)		Age at last birth (years)		Age at first marriage (years)		Number of families
	Mean	Variation Coefficient	Mean	Variation Coefficient	Mean	Variation Coefficient	
1823-1842							
Direct migrants	5.5	0.50	37.9	0.14	24.9	0.13	126
Indirect migrants	5.8	0.50	37.3	0.16	24.9	0.13	106
Recent migrants	5.7	0.50	37.6	0.15	24.9	0.13	232
1843-1862							
Direct migrants	4.5	0.55	34.1	0.16	23.9	0.14	98
Indirect migrants	4.1	0.65	33.0	0.19	23.6	0.14	146
Recent migrants	4.3	0.61	33.4	0.18	23.7	0.14	244

categories because they concern a native and a non-native person. The first category can only be considered pseudo-endogamous since it concerns two non-native people who do not necessarily come from the same commune. Among migrants of all generations, 70 per cent of marriages were exogamous. Differences of this proportion between generations do not show any radical change. We should also underline other characteristics:

- 'pseudo-endogamous' marriages are more frequent among ancient migrants;
- non-native men mainly determine the status of the family, irrespective of the generation and of the migrant category.¹⁴

Non-native couples have a more conservative behaviour than exogamous couples. According to H.de Balzac or F.Le Play, endogamous marriages had serious archaic characteristics: "*Y correspond, d'après eux, une mentalité méfiante, un horizon culturel limité, une certaine absence d'ouverture sur la sociabilité ambiante [...]*" (Raison-Jourde, 1980, 153). However, indicators in table 6 show only small and insignificant differences irrespective of the status of the migrants. Once more, adaptation is nearly immediate for all groups of the 'generation of

¹⁴ As a comparison, in Paris at the beginning of the nineteenth century, there were two times as many marriages between male migrants and Parisians than between female migrants and Parisians (Piette and Ratcliffe, 1993).

change', 1843-1862. However, the diminution of the mean age at last birth between the two generations is less strong in couples where both members are non-natives.

TABLE 6 MEAN NUMBER OF CHILDREN AND SOME CALENDAR INDICATORS ACCORDING TO ENDOGAMY (COUPLES) OR EXOGAMY (NON-NATIVE WIVES OR HUSBANDS) IN MIGRANT MARRIAGES

<i>Generations</i>	<i>Indicators</i>	<i>Non-native couples</i>	<i>Non-native wives</i>	<i>Non-native husbands</i>	<i>Migrant total</i>	<i>General total</i>
1823-1842	Mean number children	5.7	6.1	5.9	5.9	6.1
	Mean age at last birth	37.9	38.6	38.0	38.1	37.8
	Mean age at first marriage	24.9	24.2	24.6	24.6	24.0
	Mean age at first birth	25.3	24.5	24.9	24.9	24.3
	Number of cases	125	120	227	472	989
1843-1862	Mean number children	4.6	4.7	4.2	4.5	4.5
	Mean age at last birth	35.0	33.5	32.9	33.6	33.1
	Mean age at first marriage	23.9	23.3	23.6	23.6	24.3
	Mean age at first birth	24.0	23.5	24.0	23.9	23.6
	Number of cases	142	137	223	502	1019

CONCLUSIONS

The limitation of births in the industrial basin of Charleroi occurred during the 1873-1892 economic crisis. We observe a 20 per cent loss in births between the generation of 1833-1842 and that of 1843-1852. This decline intensified during the following generations. Family size was therefore also reduced. The average number of children per family dropped from slightly above 6 to slightly above 3 in less than the time elapsed between the 1823-1832 generation and the 1863-1872 generation.

Have certain 'sub-populations' taken the initiative in the control of marital fertility? Differences in fertility intensity and calendar between migrant and sedentary populations are minimal. Therefore we cannot identify one or the other as the precursor of change. For generations born after 1843 the limitation of births had the same intensity for migrant and sedentary couples. Moreover, integration in the industrial environment and the adaptation to reproductive behaviour of the new community was extremely rapid, irrespective of cultural or geographical origin, type of marriage or migratory trajectory. According to Rosental (1990), this is rupture migration with no references to the behaviour of the community of origin. With the 1843-1862 generation decline became

common in all groups. It is true that industrial cities are socially and professionally very homogenous. Migrant and native couples are exposed to the same environment, to the same social and economic pressures, to the same circumstances. It is therefore rather logical that responses are identical and nearly applied at the same time by both groups.

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**De vruchtbaarheidsdaling in het industriegebied van Charleroi tijdens de tweede helft van de 19de eeuw.
Vertonen sedentairen en migranten een gelijkaardig gedrag?**

THIERRY EGGERICKX

SAMENVATTING

De nataliteit van de industriële steden, nochtans heel hoog tijdens het grootste deel van de negentiende eeuw, kende een duidelijke daling vanaf 1872-1875. Het doel van deze bijdrage is de reproductiestrategieën van sedentaire en migrantenkoppels te vergelijken binnen het kader van de industriële crisis van het laatste kwart van de negentiende eeuw. Welk was het niveau van de vruchtbaarheid van deze twee groepen voor, tijdens en na de industriële crisis? Wie waren de voortrekkers van deze vruchtbaarheidsdaling: de sedentairen of de migranten? Waren de controlemechanismen (stop of spreiding van de geboorten, bijvoorbeeld) van deze groepen dezelfde? De belangrijkste resultaten van deze analyse, op basis van de reconstructie van het reproductiepatroon van meer dan 2.000 families, zijn de volgende:

- De verschillen tussen sedentairen en migranten zijn relatief klein. Niet-tegenstaande zijn er duidelijke aanwijzingen dat de voortrekkers van de vruchtbaarheidscontrole de sedentairen van de geboortecohorte 1833-1842 waren.

- Maar belangrijker is dat de vruchtbaarheidscontrole zich zowel bij sedentairen als bij migranten met dezelfde intensiteit ontwikkelde voor de generaties geboren na 1843, dus diegenen waarvan de reproductieperiode zich grotendeels tijdens de economische depressie situeerde. Het industriegebied van Charleroi was een homogeen socio-professionele samenleving. Migranten en sedentairen woonden in gelijkaardige omstandigheden en stonden onder dezelfde socio-economische druk. Het is dan ook logisch dat de demografische respons hierop vrijwel identiek en zonder grote vertraging was.

- Zowel voor migranten als sedentairen was de vruchtbaarheidsdaling het resultaat van een afrembeweging. Tussen de eerste en de laatste cohorte daalde de gemiddelde leeftijd bij de laatste geboorte van 39 naar 32 jaar.

Le déclin de la fécondité dans la région industrielle de Charleroi pendant la deuxième moitié du XIX^e siècle.

Les sédentaires et les migrants ont-ils un comportement différent?

THIERRY EGGERICKX

RÉSUMÉ

La natalité des cités industrielles, pourtant très élevée durant une grande partie du XIX^e siècle, accuse un recul net et décisif à partir de 1872-1875. L'objectif de cette contribution est de comparer les stratégies de reproduction adoptées par les couples de sédentaires et de migrants, dans le contexte de la crise industrielle du dernier quart du XIX^e siècle. Quel est le niveau de la fécondité de ces deux sous-populations avant, pendant et après la crise industrielle? Qui sont les précurseurs du déclin irréversible de la fécondité: les sédentaires ou les migrants? Et lorsque le déclin survient, les stratégies de limitation des naissances (contraception d'arrêt ou comportement d'espacement, par exemple) furent-elles identiques parmi les deux populations? Les principaux résultats de cette analyse, basée sur la reconstitution de la vie génésique de plus de 2.000 familles, sont les suivants :

- Les différences entre sédentaires et migrants sont relativement faibles. Néanmoins, l'accumulation d'indices convergents semble démontrer que ce sont les couples de sédentaires de la génération 1833-1842 qui se sont engagés les premiers dans la voie du contrôle volontaire des naissances.

- Mais, l'élément essentiel est que la limitation volontaire des naissances se développe sans ambiguïté et avec une intensité comparable, tant chez les sédentaires que chez les migrants, avec les générations nées après 1843, celles dont la vie génésique se déroule en grande partie durant la dépression économique. Les cités industrielles de la région de Charleroi constituent un milieu socioprofessionnel particulièrement homogène. Migrants ou autochtones sont globalement soumis au même environnement, aux mêmes contraintes socio-économiques et aux mêmes événements conjoncturels. Il est donc relativement logique que les réponses démographiques à ceux-ci soient identiques et appliquées sans grand délai chez les uns comme chez les autres.

- Pour les migrants comme pour les sédentaires, la diminution de la fécondité légitime procède avant tout d'une contraception d'arrêt. Entre les générations la plus ancienne et la plus récente, l'âge moyen à la dernière maternité a chuté de 39 à 32 ans.

