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Questioning relationships between socioeconomic and demographic factors in the light of characteristics of rural Wallonia during the 19th century

Questionner les relations entre aspects socioéconomiques et démographie à l'aune des particularités du milieu rural local wallon au 19^e siècle

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Traduction de Richard Hillman

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Questionner les relations entre aspects socioéconomiques et démographie à l'aune des particularités du milieu rural local wallon au 19^e siècle [fr]

Résumés

English Français

Although relationships between economic and demographic changes have often been debated, studies have long remained focused on urban and industrial areas. Converging evidence, however, suggests that early birth control emerged in rural Wallonia. The aim of this article is to examine the dynamic relationship between economic and demographic changes. We start from the theoretical assumption that regions where early birth control is observed are actually spaces where populations did not have alternative means of dealing with a rupture in the balance between resources and populations. Preliminary results seem to support the idea that the theoretical framework of “demographic regimes” provides an interesting perspective for analysing interactions between economic context and population dynamics. Low fertilities observed very early during the 19th century in the south of rural Wallonia would thus be the result of modified behaviours allowing populations to face precarious living conditions. Most of



the time, birth control took place in typical 19th-century crisis contexts. However, this demographic solution, which was probably initially intended to respond temporarily to a modification of the context, would have turned into a structural and inherent feature when birth control became generalised to all spaces and populations.

Si les relations entre économie et démographie ont été plusieurs fois discutées, elles sont longtemps restées focalisées sur les zones urbaines et industrielles. Or un faisceau de présomptions laisse penser que des prémices de contrôle des naissances sont apparus au sein du monde rural wallon. L'objectif de cet article vise à réinterroger cette dynamique entre économie et démographie, partant du postulat théorique que si des foyers précoces de contrôle de naissances sont détectés, il s'agit en réalité d'espaces où les populations ne disposent pas d'autres alternatives pour faire face à une rupture d'équilibre entre ressources et populations. Les résultats préliminaires présentés dans le cadre de cet article semblent soutenir l'idée que le cadre théorique des régimes démographiques apporte un regard intéressant pour l'analyse des interactions entre contexte économique et démographie. Les faibles fécondités observées très tôt durant le 19^e siècle dans l'Entre-Sambre-et-Meuse et en Ardenne namuroise seraient ainsi le résultat de comportements ajustés de la part des populations face à des conditions d'existence moins favorables. La plupart du temps, le déclin de la fécondité a bien eu lieu dans des contextes de crises typiques du 19^e siècle. Mais la réponse démographique, qui était au départ probablement destinée à répondre momentanément à une modification conjoncturelle du contexte, se serait transformée en une caractéristique structurelle et inhérente à ces espaces lorsque le mouvement de limitation des naissances s'est généralisé à l'ensemble des espaces et des populations.

Entrées d'index

Mots-clés : démographie, économie, fécondité, 19^e siècle, milieu rural, Belgique, Wallonie

Keywords: demography, economics, fertility, 19th century, rural area, Belgium, Wallonia

Texte intégral

Introduction

- 1 19th-century Wallonia is synonymous with major socio-economic evolutions, including industrialisation, urbanisation, the proletarianisation of labour and the development of education. These are accompanied by profound disruption in the demographic regimes, with the fall of mortality, the decline of fertility and indeed the increase in mobilities. If these demographic tendencies weigh heavily on evaluation of pre-transitional and transitional societies, they nevertheless intersect with periods of socio-economic, agricultural or industrial crises and episodes of famine or epidemics [Eggerickx, Brée & Bourguignon, 2016].
- 2 The changes occurring on the demographic level over the 19th century should be seen in the global context of demographic transition, reflecting, from the point of view of reproductive behaviour, the passage from an uncontrolled, or 'natural', birth-rate, broadly influenced by the social and cultural norms of the epoch, to a birth-rate that depends primarily on the control and choices of couples [Eggerickx *et al.*, 2016]. In the course of the 20th century, a particularly interesting current of thinking has emerged, essentially centred on the interactions between demography and economy, in which the notion of demographic regime is basic. Recast in terms of systemic theories, such thinking postulates that, for every population, the principal challenge consists in assuring an optimum balance between population and resources. Every disjunction between the two necessitates adaptations, especially in demographic behaviour in the face of socio-economic changes [Eggerickx, 2015; Schumacher, 2010]. In this framework, therefore, a 'demographic regime' is defined as a particular combination of demographic components (mortality, fertility, nuptiality, migrations), reflecting the features and constraints of a particular context, for the purpose of maintaining a balance between population and resources.¹ Decline in fertility is considered by these



theories as one of the solutions permitting recovery of a new equilibrium, but it is not the only one, and putting it into practice would depend on the availability of others.

3 It is in this theoretical framework that the present article positions itself, with the objective of analysing the potential interactions between demographic and socio-economic dynamics. The issue here is to analyse the components of two particular demographic regimes: on the one hand, that of Ardenne Namuroise and, on the other, that of Entre-Sambre-et-Meuse. We will be focusing essentially on the birth-rate component, since these two regions, while relatively similar in socio-economic terms, both rural and close geographically, present particular calendars of fertility decline. Generally speaking, they are notably distinguished by an earlier reduction in fertility than that observed in Belgium overall. But they are also distinguished from each other, the fertility decline in Entre-Sambre-et-Meuse coming still earlier than that in Ardenne. We propose the hypothesis that these divergences may be linked to different interactions between the demography and socio-economics of these local societies. Within this framework, we will systematically pay special attention to demographic indicators in times of crisis, with a view to determining to what degree the behaviour of the populations adapts, or does not, in the face of the accidents of history.

4 If the relations between economy and demography have often been discussed, the focus has long been on urban and industrial zones, perceived as the driving forces of change, in which the beginnings of transition are apparent [Eggerickx & Devos, 2014]. A number of suppositions, however, suggest that the first centres of fertility control were located in Entre-Sambre-et-Meuse in southern Wallonia [Eggerickx, 2004; Eggerickx & Bourguignon, 2015 (forthcoming)]. If it is confirmed that early models of transition have indeed been observed in some rural spaces, this will necessarily call in question the postulate of economic development as a prior condition of the 'modernisation' of demographic behaviour. That would lead us to hypothesise that recourse to fertility control is essentially a question of available strategies: in the absence of the possibility of migrating, diversifying economic activities and/or sources of revenue, improving agricultural techniques..., certain populations reduced the number of their progeny in order to restore the balance between populations and resources. This is the principle which, in the second half of the 20th century, was advanced by the systemic theories of fertility initiated by Dupâquier [1972], Davis [1963] and Friedlander [1969, 1983]. In addition to this theoretical consideration, the contributions of this article are also methodological. If numerous studies concentrate on the transitional period (1850 and after), completely obscuring the earlier period, even though changes can be perceived within it, the objective here is to manage to reconstitute annual series of demographic indicators for the whole of the 19th century. Another aim is to propose grouped indicators on a close geographic scale, by suggesting methodological refinements of the indicators classically brought to bear in studying fertility.

5 This article is divided into six sections. The first deals with the content of theories dealing with the decline of fertility, especially systemic theories that view the decline in fertility as one strategy among others employed by populations faced with an imbalance between populations and resources. The second section will be concerned with the methodological details underlying the analyses proposed. In the third section, we will briefly present the socio-demo-economic functioning of the spaces studied in the 19th century. The fourth section will be devoted to the presentation of results which bear on the interaction between context and demography. The fifth part will show how the theoretical framework of demographic systems can be mobilised to interpret the low birth-rates of the 19th century. Finally, in the context of discussion and conclusion, we will return to the methodological constraints which have marked out our analyses, notably because the approach to fertility adopted, at once spatially localised and extended in time, has implied a assemblage of methodological choices with consequences that are sometimes considerable.



A glance at theories dealing with the interrelation of socio-economy and fertility²

- 6 Since the 19th century, there has been an abundant literature composed of theories attempting to explain the reasons for the decline in fertility. The 20th century has notably been dominated by the emergence of classic theories of demographic transition [Vilquin, 2006]. Widely accepted, these theories present economic development as a necessary condition of demographic change. They have nevertheless been attacked for failing to explain the early decline in fertility either in a France presenting the image of a country still overwhelmingly rural, agricultural and barely industrialised at the end of the 18th century, or, later, in England and Wales, the first bastions of industrialisation, but lagging behind with respect to fertility transition [Leboutte, 1995]. This link between economic development and demography has been called in question, based on the conclusions of the work of the Princeton school, which has placed greater emphasis on ideological-cultural explanations [Tabutin, 1985; Eggerickx *et al.*, 2016; Brée, 2016] and viewed the decline in fertility '*comme un processus de type innovation-diffusion*' (as a process of the innovation-diffusion type) [Schumacher, 2010, p. 71]. The decline in fertility is supposed to have been propagated in very different economic spaces, but simultaneously in the same cultural universes [Eggerickx *et al.*, 2016, p. 50; Brée, 2016, p. 20]. It is therefore more in terms of processes of individual emancipation or resistance to change that one must interpret the rhythms and spatial differences associated with fertility decline, even if it is still admitted that economic development can favour the intervention of couples in controlling fertility [Tabutin, 1985].
- 7 In Belgium, R. Lesthaeghe [1977] has traced the tendencies in fertility decline on the scale of regions, provinces and districts. He has also explained the lag in time between Wallonia and Flanders,³ chiefly with reference to interactions between socio-cultural and economic factors. The socio-economic structures, progressively modified by industrialisation and urbanisation, partly account for these lags [Lesthaeghe, 1977]. But the regional discrepancy is also the consequence of ideologico-cultural divergencies: Wallonia was more rapidly de-Christianised, making it a territory open to new ideas [Lesthaeghe, 1977; Eggerickx *et al.*, 2016]. Added to that is the existence of a linguistic barrier capable of obstructing the diffusion of innovative behaviour with respect to fertility control [Lesthaeghe, 1977].
- 8 We will not take up these classic theories in greater detail. In their time, they were innovative, furnishing an overall theoretical framework but less able to explain local particularities [Eggerickx *et al.*, 2016]. Special attention will be accorded, however, to systemic theories whose object concerns the interaction between demographic components, but also between demographic components and socio-economic context. The decline in fertility is there considered from the point of view of a process of adaptation to socio-economic constraints [Eggerickx, 2015; Schumacher, 2010]. Demographic transition thus represents more than a rupture between two regimes, one with high and the other with low birth-rate and mortality [Eggerickx, 2015], concentrated in urban and industrial zones [Eggerickx & Devos, 2014]. Also at issue is an episode of intense demographic growth which put pressure on existing structures and led to the adjustment of demographic behaviour [Eggerickx, 2015; Wilson & Airey, 1999; Wilson, 2013].

The homeostatic and self-regulating principle of *ancien régime* societies



For *ancien régime* societies, the principle of self-regulation has often served as a basis for analysing demographic systems [Livi Bacci, 1999; Eggerickx *et al.*, 2016]. This

approach is inspired by the Malthusian principle that populations and resources evolve according to different tendencies [Smith, 2007]. The main challenge then consists in maintaining an equilibrium between the two in order to assure the survival of populations. For this purpose, different combinations exist, employing one or more demographic components, according to the constraints imposed by the socio-economic context [Eggerickx, 2015]. In the period, it was therefore not rare for different demographic systems to coexist, whose characteristics varied according to specific local conditions [Eggerickx *et al.*, 2016].

- 10 According to J. Dupâquier [1972], in ancient societies, the regulatory role depended in the first place on nuptiality, the veritable cornerstone of complex systems characterised by the interaction of economy, society and demography [Eggerickx, 2015, p. 120]. Over the short term, demographic systems feature a very high degree of variability, to which populations attempt to adjust themselves by means of corrective strategies [Dupâquier, 1972; Smith, 2007; Smith, 1992; Eggerickx *et al.*, 2016]. It is notably by way of the age of marriage and frequency of marriages that fluctuations in the death-rate are balanced [Smith, 1992, p. 178; Smith, 2007]. Three fundamental rules governed marriage behaviour in older societies: prohibition of pregnancies outside marriage, prohibition of cohabitation outside marriage, and prohibition of marriage without a household establishment [Dupâquier, 1972, p. 201]. The occurrence of deaths entailed the liberation of enterprises, hence opportunities for young men to set themselves up in autonomous households; a mortality crisis was consequently accompanied by a lowering of the marriage age and an increase in the birth-rate to compensate for the losses due to a period of crisis [Leridon, 2014, p. 37]. Unmarried persons thus constituted '*une réserve considérable de reproduction et d'expansion démographique*' (a considerable reserve of reproduction and demographic expansion) [Dupâquier, 1972, p. 202], while crisis constituted, at the time '*un phénomène exogène qui déclenche dans le système démographique des réactions compensatoires de nature endogène*' (an exogenous phenomenon triggering compensatory reactions of an endogenous kind within the demographic system). [Bideau, 1983, p. 1041].

- 11 Basing himself on the self-regulating model of Dupâquier [1972], Braudel [1990] judges that the survival of a population depends on maintaining a minimum level of longevity [Braudel, 1990, p. 61]. The problem arises when this equilibrium between population and longevity is disrupted. In the face of population increase, a number of solutions exist: the primary ones are 'natural' economic solutions, including clearing techniques for extending arable surfaces, the introduction of new crops to increase production, and the development of cash-crops [Braudel, 1990]. 'Artificial' resources may also be employed, such as exchanges '*créateurs de surplus*' (surplus-creating), transportation and the development of rural industry [Braudel, 1990, p. 62]. Finally, it happens that populations self-adapt by raising the age of marriage (with a predictable effect on fertility); by contrast, the emigration of populations carries little weight with F. Braudel [1990], who perceives the comings and goings of populations as '*des ballons d'oxygène pour les communautés d'origine : le départ parce qu'il diminue le nombre de bouches à nourrir, le retour parce qu'il apporte l'argent économisé, nécessaire aux impôts, aux achats indispensables, à la remise en marches des lilliputiennes entreprises agricoles*' (bottles of oxygen for the communities of origin: the departure because it decreases the number of mouths to feed, the return because it contributes the money saved, which is necessary for taxes, for indispensable purchases, for the re-invigoration of minuscule agricultural enterprises) [Braudel, 1990, p. 63]. With such a collection of responses, he positions himself in a perspective on demographic change more Boserupian (tension provokes the development of innovations) than Malthusian (centred on the decline of the human population) [Eggerickx *et al.*, 2016; Eggerickx, 2015].



Theories of multiphasic responses

12 On the model of the self-regulating principle of Dupâquier [1972], the theory of multiphasic responses insists on the interaction between demographic components and perceives demographic change as a response to a tension [Schumacher, 2010; Davis, 1963; Friedlander, 1969, 1983]. By Davis [1963], decline in mortality is perceived as the driving force of change, which has entailed a rapid and intense growth in populations since the end of the 18th century [Davis, 1963; Schumacher, 2010]. Faced with this, populations are supposed to have adapted their behaviour by having recourse to a multitude of responses, traditional⁴ or modern,⁵ including a lowering of fertility [Davis, 1963; Schumacher, 2010; Eggerickx, 2015]. The lag between the declines in mortality and fertility is extremely variable and involves levels of population growth that are sometimes very different. According to Davis [1963], this discrepancy is a function of the availability and the efficacy of alternatives to the decline in fertility [Davis, 1963, p. 354; Alter, Oris & Neven, 2010]. Contrary to the homeostatic principle of Dupâquier [1972], for Davis [1963] migrations form an integral part of the alternatives in the face of population growth, especially those taking place from rural to urban and industrial settings. They would account for the supposed 'lateness' of most rural zones in the process of fertility decline. '(...) *le départ des jeunes ruraux vers les bassins industriels ou les agglomérations soulageait les campagnes alors que les citadins n'avaient d'autres opportunités consistantes de mobilité que sociale, fondée sur l'amélioration de leur capital humain, peu compatible avec la compétition pour les ressources parentales au sein de fratries surabondantes. Les populations urbaines auraient donc été contraintes de "moderniser" leurs comportements reproducteurs plus tôt que les populations rurales* (the departure of young people from the country to the industrial or urban centres provided relief for the rural areas, while the city-dwellers had no other practical means of mobility except socially, based on the improvement of their human capital, as was scarcely compatible with competition for parental resources within large families. The urban populations were therefore compelled to "modernise" their reproductive behaviour sooner than the rural populations.) (Davis, 1963, 358)' [Alter *et al.*, 2010, p. 492].

13 Friedlander [1969, 1983] has insisted a number of times on the interrelation between demographic components, postulating that tensions exist (including population growth) which give rise to responses of various kinds. For him, emigration – if it is compatible with the characteristics of societies – would be one response to population growth, together with decline in fertility [Moore, 1945 cited by Friedlander, 1969]. Moreover, he views change from a wide angle, not only in demographic terms: improvement in agricultural techniques may entail a manpower surplus and become a source of tension if the local economy does not succeed in absorbing this surplus [Friedlander, 1983]. The same applies to measures concerning access to education or the employment of children in urban/industrial milieux [Friedlander, 1983]. Faced with such changes, populations would adjust their behaviour, notably in terms of nuptiality, migrations and fertility [Friedlander, 1983]. Responses may also be non-demographic, of a socio-economic kind (for example, through the diversification of professional activities) [Friedlander, 1983]. Recourse to one or more types of responses depends on the opportunities available [Friedlander, 1983]. Such an approach is innovative, with all the components of the demographic dynamic playing a regulatory role in the face of a tension [Eggerickx, 2015]. Moreover, this approach '*accepte la pluralité des processus transitionnels et requalifie positivement les retardataires*' (accepts the multiplicity of transitional processes and attributes a positive aspect to late-comers) [Alter *et al.*, 2010, p. 493]. This amounts to a new way of looking at demographic transition, which is now approached from a multiple angle and henceforth perceived, not as a simple ensemble of sequences of a decline in mortality, then of fertility, but as an ensemble of combinations of possible responses chosen by populations according to the opportunities and structure of the society [Livi Bacci, 1999; Schumacher, 2010; Eggerickx, 2015].



From 'mass poverty' to 'relative mass abundance'⁶

- 14 Every population is motivated by a common objective, namely to maintain an equilibrium between populations and resources. Behind this Malthusian objective figure, in systemic theories, the notions of crisis, tension and rupture, which intervene to disrupt local functioning. If the economy-demography relation has been widely studied, its meaning is still debated. On the Belgian scale, H. Denis [1897] was one of the first to connect economy, nuptiality and fertility and to perceive the effects of the economic crisis of the end of the 19th century. According to him, the trends in births and marriages are indissociable from the unfavourable economic conditions of the time [Denis, 1897, p. 8]. The prosperous pre-crisis period was accompanied by a rise in salaries, a higher standard of living and a will to maintain it [Denis, 1897, p. 11]. The crisis then occurred with the effect of disrupting habitual practices, notably with regard to fertility. He thereby emphasises the fear of populations during crises to see their gains dispersed; in the end, they will finish by adapting their behaviour and reducing their fertility [Eggerickx *et al.*, 2016]. Julin and Lesoir [1943] subscribed to this postulate, connecting economic fluctuations with variations in nuptiality and birth-rates.
- 15 Over the years from 1980 to 1990, R. Leboutte [1991] updated the theory of H. Denis: the decline in birth-rate observed from the end of the 19th century is placed in a fluid socio-economic and cultural context whereby a '*période de relative abondance de masse*' (period of relative mass abundance) follows a previous period of '*pauvreté de masse*' (mass poverty) [Leboutte, 1991, p. 299]. In Belgium, this transition, occurring from 1860 to 1900, initially took place in a context of overall improvement in the standard of living and was at the origin of new habits of living, consuming and saving, as well as '*le relâchement de l'accommodation à la pauvreté de masse*' (softening of acceptance of mass poverty) [Leboutte, 1991, p. 296]. There followed a period of deep economic depression, with the effect of throwing into disarray the new habits of consumption the populations had acquired. If those had not been solidly anchored, they would have been rapidly abandoned, but now they called in question modes of functioning for which the populations had developed a certain taste [Eggerickx *et al.*, 2016]. Limiting births then appeared a possible means of attempting to hold onto their gains [Leboutte, 1991]. In parallel, a change in mentality, a distancing with respect to institutionalised religion, would have been indispensable to legitimising the will to limit births [Leboutte, 1991, p. 299]. Starting in 1890, the standard of living had therefore returned to its normal post-crisis level, but nuptiality and the birth-rate had continued their decline. The occurrence of a crisis does not completely explain the general tendency of fertility decline, but it may be considered as a triggering factor: at a certain point, populations were compelled to reconsider the number of their offspring in order to adapt to economic circumstances, and, in doing so, they acquired ways of living which they preferred to preserve over the long term. The crisis of the end of the 19th century does not account for the decline in fertility, which spread to the whole of Belgium at the same point; it may simply have anticipated or precipitated a fundamental movement which had long been in preparation.

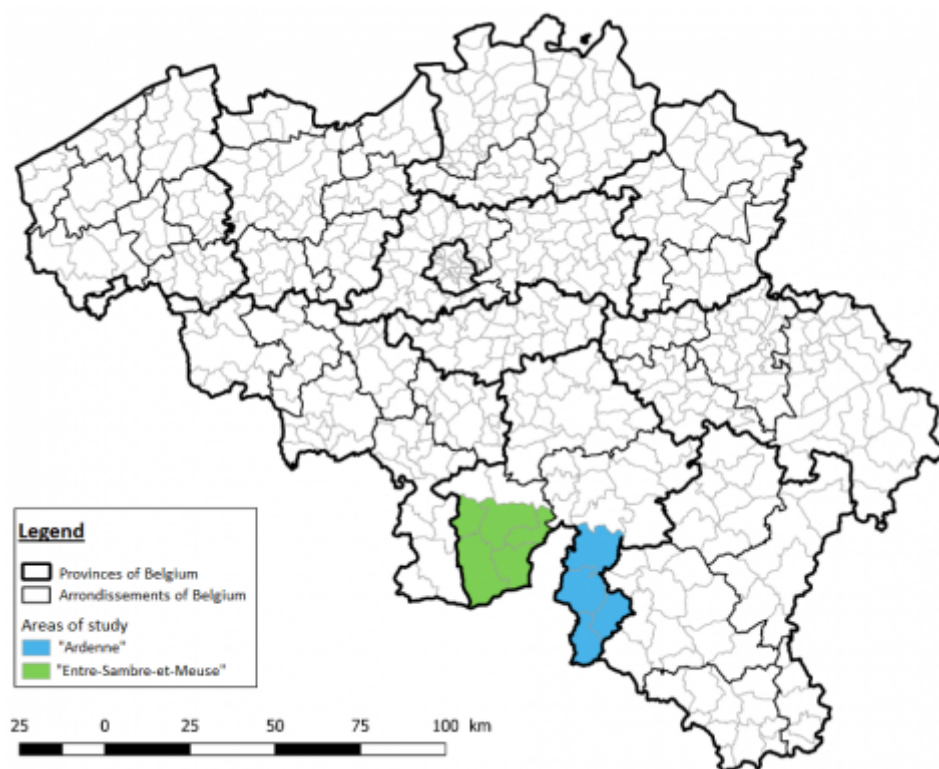
Data and methods

- 16 The literature abounds in theories dealing with the potential relation between economy and demography. The objective of this article consists rather in analysing the possible interactions between contexts and demography. The idea is especially to observe if, and in what measure, socio-economic fluctuations have had an effect on the demographic behaviour of population and in certain cases may have precipitated the decline in fertility. These analyses will concern two typically rural regions of southern Wallonia (Figure 1),⁷ Entre-Sambre-et-Meuse and Ardenne Namuroise. These two



spaces, geographically close and socio-economically similar [Eggerickx & Bourguignon, 2015 (forthcoming)], have been selected for their calendars of fertility decline, which are distinctive and notably early, in relation to the situation observed nationally.

Figure 1. Position of the zones under study



[N.B.: this map depicts the borders of the existing communes, which do not correspond exactly to the limits of the former ones as considered in the framework of this article]

17 Since the 19th century, Belgium has been equipped with an arsenal of statistical tools which make it possible to analyse demographic behaviour with a time-depth of several decades. Within this article, the data deployed are drawn from multiple sources, notably the *Mouvement de la population et de l'état civil*, which records the annual number of births, marriages and deaths for each entity for the periods 1841-1849 and 1852-1910. In order to cover the whole of the 19th century, we have also compiled the annual number of births, marriages and deaths on the basis of public records.^{8,9}

18 A large portion of the population figures likewise come from the Statistics of Population Movement of the civil registry, but also from the population censuses carried out at regular intervals since 1846. These figures are available, however, only from 1831; in order not to obscure the first part of the 19th century, we have used the figures from previous censuses (year VIII of the republic,¹⁰ 1806, 1816, 1818, 1820 and 1830), which S. Vrielinck [2000] has compiled for the whole of the sections of Belgian communes. For each interval between censuses covering the period 1800-1830, the annual figures have subsequently been interpolated in linear fashion.

19 From the point of view of methods, the concern is to reconstitute the demographic regimes of the communes of interest to us for the period of the 19th century – this for the purpose of identifying how the socio-economic context affected demographic behaviour, or did not, in the framework of (pre)transitional rural societies. In addition to using the crude figures classically employed in demography, we will also bring to bear the general fertility indexes established by Coale and Watkins [1986] and the estimations of the conjunctural indicators of fertility. Considering the local dimension of these analyses, the reconstitution of indexes on this narrow scale depends on a series of hypotheses which we will discuss below.

20 Classically, the crude figures derive from relating the annual number of demographic events (births, marriages, deaths) to the actual total of the population observed at mid-period. Provided that one possesses the number of births, marriages and deaths, as well

as the actual state of the population, these indicators are easily accessible. They give the first indexes of the evolution of birth-rate, nuptiality and mortality. Yet in relating the number of demographic events to the totality of the population (that is, not only that portion exposed to the risk of experiencing the event), the evolutions of these crude figures may not only indicate a simple change in the demographic dynamic: they are, in fact, sensitive to the structure by age of the populations concerned, something which sometimes interferes with analysis of the evolutions.

$$TBNat = \frac{\sum \text{Birth} (t)}{(Pop(t) + Pop(t+1))/2} \quad TBNupt = \frac{\sum \text{Weddings} (t)}{(Pop(t) + Pop(t+1))/2} \quad TBMort = \frac{\sum \text{Death} (t)}{(Pop(t) + Pop(t+1))/2}$$

- 21 To free ourselves from these effects of structure, we have recourse, for fertility, to the general fertility index (I_f) of Coale and Watkins [1986]. This constitutes a standardised indicator of fertility, which illustrates '*la part que représenteraient les naissances, observées dans la population étudiée, dans une population de même structure dont la fécondité serait celle des Hutterites*' (the part which would be represented by the births observed in the population studied, in a population having the same structure, whose fertility would be that of the Hutterites) [Sardon, 1995, p. 170].

$$I_f = \frac{\sum_{x=15}^{49} f_x * F_x}{\sum_{x=15}^{49} h_x * F_x}$$

$$I_f = \frac{\sum N(t)}{\sum_{x=15}^{49} (h_x * F_{\%x} * \frac{Pop(t) + Pop(t+1)}{2})}$$

Where f_x is the fertility rate by age group, F_x the number of women by age group and h_x the fertility rates of the Hutterites.

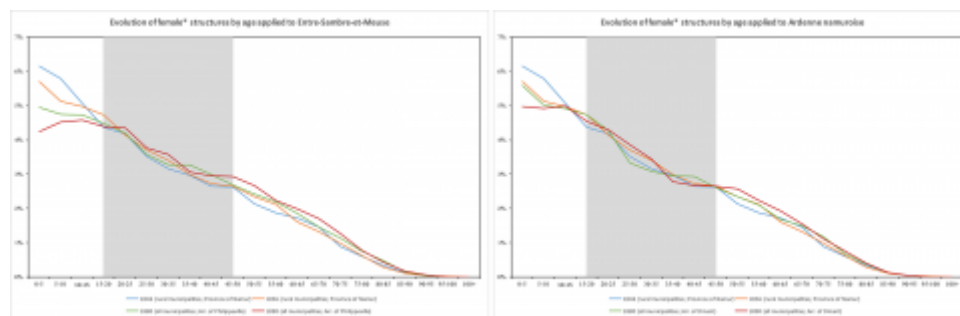
Where $N(t)$ represents the number of births observed during year t , h_x the fertility rate of the Hutterites, $F_{\%x}$ the proportion of women of age x among the total population (both sexes) and the actual population (observed at times t and $t+1$) (both sexes)

- 22 Theoretically, the calculation of this indicator is relatively simply; practically, it requires data more complex than those required by the crude birth-rates, especially when the objective is to possess a long temporal series available on a local scale. Calculating this indicator on the scale of our two regions implies knowing the fertility rates by age, as well as the annual number of women by age groups. Now, for the 19th century, we possess, at best, the annual number of births observed (which corresponds to our numerator¹¹) for the two regions, the fertility rate of the Hutterites, and here and there, at the dates of the population censuses, the number of women by age group, but only at the level of provinces (for the years 1846 and 1856) or districts (for the years 1880 and 1890). As T. Eggerickx [2004] and R. Costa [2015] have suggested, estimates of the index I_f will nevertheless be established for the whole of the 19th century for the two regions under study. These will be based on the hypothesis that the structure by age observed at the provincial or district level is identical to that observed on the finer local scale. We postulate, moreover, that the evolutions of these structures by age in the course of the 19th century are marginal (especially at the ages of reproduction) (Figure 2), and that the structures observed in 1846, 1856, 1880 and 1890 are representative of all the annual structures observed between 1800 and 1910. Thus, to estimate the number of women by age group (F_x) on the scale of the two regions, and therefore the index I_f , we deduct it from the provincial structure of the rural communes in 1846 for the period prior to 1847, from the provincial structure of the rural communes in 1846 for the period 1847-1856, from the structure of the districts¹² concerned in 1880 for the



period 1857-1880, and finally from the structure in 1890 of the same districts for the period 1881-1910.

Figure 2. Evolution of female structures by age (all civil registry categories) applied to Entre-Sambre-et-Meuse and Ardenne Namuroise.



* Proportions expressed in relation to the actual total of population (both sexes combined)

Sources: Censuses of population, 1846, 1856, 1880 and 1890

- 23 Interpretation of index I_f is hardly simple, since the scale is difficult to interpret: it corresponds to the ratio between the fertility observed and the fertility expected under natural conditions.¹³ On the basis of index I_f , it is possible to estimate the conjunctural index of fertility, which is more intuitive, since it involves the number of children per woman. The latter is estimated by multiplying the index I_f by the conjunctural fertility index of the Hutterites, namely 12.44 children per woman [Sardon, 1995].

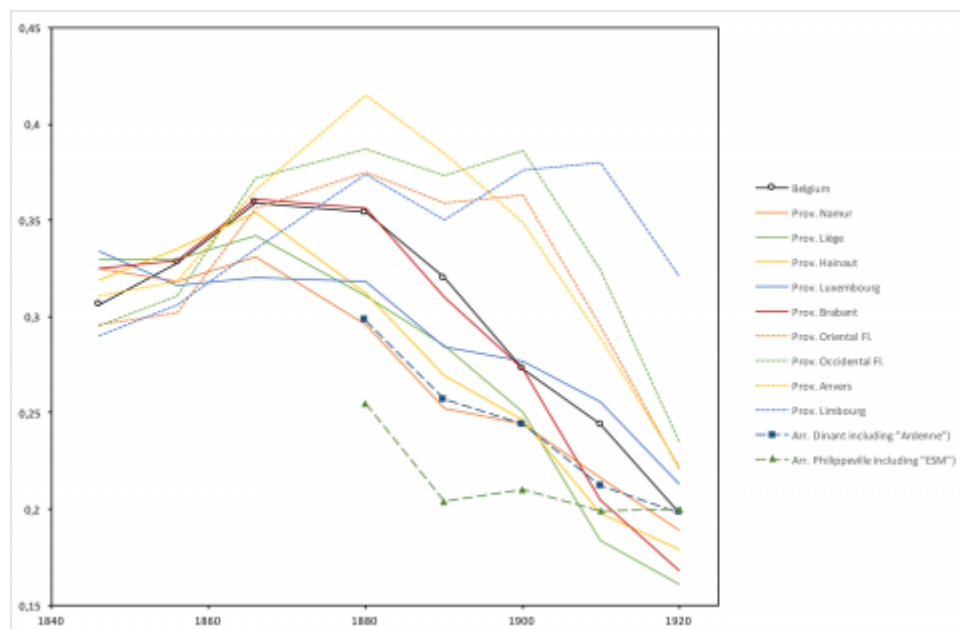
$$ICF(t) = I_f(t) * ICF_{hutterites}(t) = I_f(t) * 12,44$$

Ardenne and Entre-Sambre-et-Meuse in the 19th century

- 24 In Belgium, in-depth studies dealing with the decline in fertility in the 19th century are not rare. Often, they take it upon themselves to propose a general framework on a global scale; this is the case with the studies issued from the Princeton project [Coale & Watkins, 1986], including the monograph of Lesthaeghe [1977], which stands as a work of reference for the Belgian situation. Lesthaeghe [1977] notably confirms the precedence of the decline of fertility in certain spaces. In general, the decline in fertility comes early in Wallonia, especially in the districts of Dinant et Philippeville,¹⁴ where, in 1880, the indexes of general fertility are at lower levels than those of other provinces of the country.

Figure 3. Evolution of the synthetic indexes of general fertility (I_f) for Belgium, by province and for some districts.



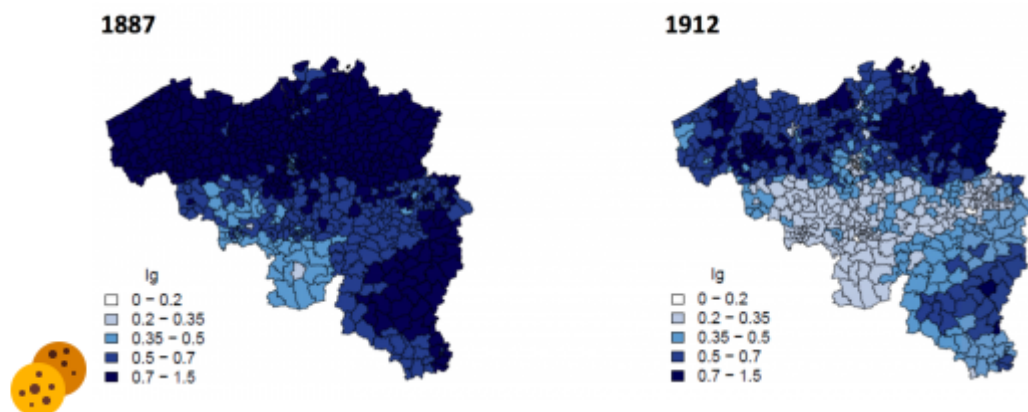


Sources: graph derived from data published in Coale et Watkins [1986, pp. 81-84] and Lesthaeghe [1977].

25 Other authors have opted for in-depth studies of a more limited geographical framework; this is the case with more recent researches carried out in the four corners of Belgium, notably in Entre-Sambre-et-Meuse [Poulain, 1996], in the former industrial basins of Chareloi [Eggerickx, 2004] and also in several urban or rural communities in Flandre Oriental [Matthys, 2012], the region around Namur [Debuisson, 2015], Herve and eastern Ardenne [Neven, 2003], Verviers [Alter, 1988] and Huy [Oris, 1991]. The case of certain *namuroises* communes of Entre-Sambre-et-Meuse and Ardenne contributes a complementary perspective: these are spaces relatively unexplored, whereas a combination of presumptions indicates that early changes were observed there from the first half of the 19th century, when the transition in fertility in Belgium was still not even in its hesitant beginnings. The few studies which have been published so far most often deal with the post-1880 years; ours will focus on the whole of the 19th century, so as to take into account the changes which intervened earlier in these regions.

26 The study of Costa [2015] positions itself as an intermediate approach because it proposes a global study of the fertility transition on the scale of Belgium, even while privileging an extremely fine geographic granularity, based on the former communes. In 1887, the decline in fertility seems to be well underway for a group of communes in Wallonia, especially those – some rural, others more industrialised – situated in the south in the provinces of Hainaut and Namur along the French frontier [Costa, 2015]. By 1912, the decline has continued in these communes but has also more become more or less generalised in all the communes of the realm, with some remaining broadly in advance and others lagging behind in the transition process.

Figure 4. Index of fertility (legitimate births) in former Belgian communes for the years 1887 and 1912.



Source: Costa [2015, p. 94]

- 27 The districts of Philippeville and Dinant stand out from numerous other points of view and are characterised in the 19th century by a situation generally more favourable than in the realm as a whole. Besides the low fertility level and early participation in the process of transition, these spaces are characterised by a pronounced reduction in mortality, with a distinct advantage for the district of Dinant (+ 5,7 years of life-expectancy compared with Belgium as a whole) and a still greater one for Philippeville (+ 7,7 years). The discrepancies are similar for infant and juvenile mortality.
- 28 In the 19th century, modes of demographic behaviour were still strongly influenced by the religious, cultural and familial affiliations of individuals. For religious reasons, in particular, all celebration was forbidden during periods of penitence, when abstinence was the rule. In the Catholic societies, this was reflected in a diminished frequency of marriages during the periods of Lent and Advent, and inversely in the societies where the process of secularisation was underway. In order to measure this phenomenon, Lesthaeghe [1991] has developed the indicator *Marriages in Lent and Advent* (MLA), which records the portion of marriages observed in March and in December with a coefficient of 2/12. The value of 1000 signifies that as many marriages were observed during the periods of Lent and Advent as during the other months of the year. The further the value is below 1000, the more the religious prohibition was respected. From this point of view, the districts of Dinant and Philippeville do not present behaviour very different from that observed on the national scale. Of the two spaces, the district of Philippeville is that which presents the higher value. But by comparison with others, the transgression of the prohibition remains more marginal there [Eggerickx *et al.*, 2016].
- 29 These spaces, (almost) exclusively rural, are also distinguished from a socio-economic point of view, with a rate of literacy markedly higher than at the national level. On the other hand, what clearly distinguishes the district of Dinant from that of Philippeville, is the sectors occupied by the populations. Essentially agricultural, the district of Dinant is typically composed of entities where the portion of the population involved in the pursuits of farming, cattle raising and forestry are predominant and where the farmers are very often the owners of large operations [Eggerickx *et al.*, 2016]. On the Philippeville side, the populations are more involved than in Ardenne in the industrial sector.

Tableau 1. Socio-demographic indicators relating to the districts of Dinant and Philippeville and to the kingdom as a whole.

Indicators [source]	District of Dinant	District of Philippeville	Belgium
Life-expectancy at birth (1889-92) [1,3]	51.4 ans	53.4 ans	45.7 ans
Infant mortality (1889-92) [1,3]	115‰	98‰	160‰
Juvenile mortality (1889-92) [1,3]	53‰	43‰	96‰
% Urban population (communes ≥ 5.000 hab.) (1866) [1]	7.6%	0.0%	35.8%
Control of morality MLA [3]	338	404	387
Literacy rate (1890) [1]	76.9%	79.5%	62.4%
% Industry (1900) [1]	29.1%	40.1%	42.0%
% Agriculture (1900) [1]	30.4%	22.7%	24.0%
Farms < 50 ares (1846) [2]	27.7%	33.6%	43.2%
Farms > 2 ha (1846) [2]	37.1%	34.0%	30.1%
% Owners (1846) [2]	62.6%	53.7%	35.1%

[1] Population census; [2] Agricultural census [3] Civil registry statistics

Source: figures taken from the article of Eggerickx et Bourguignon [2015 (forthcoming)].

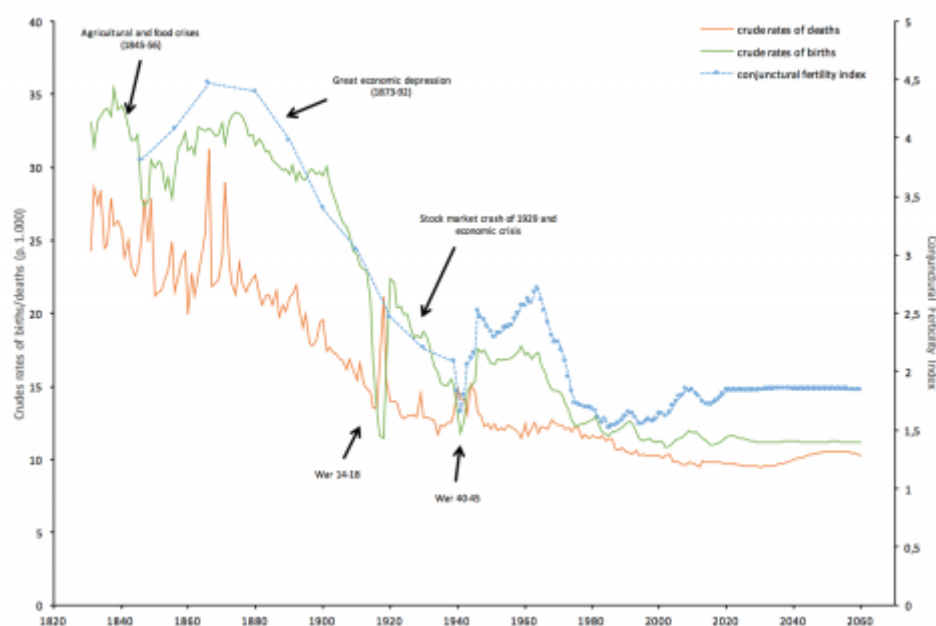
What empirical proofs of interactions between context and demography?

30 On the scale of pre-industrial Belgium, and of Europe more largely, the empirical effects of economic crises or crises of subsistence have already been discussed [for example, Eggerickx *et al.*, 2016; Alter, Oris & Neven, 2007; Van Poppel & Nelissen, 1999; Devos, 1999]. The analyses are sometimes very old¹⁵ and show the interest which demographer-historians have had in this relation.

31 Dealing with the case of Belgium in particular, Eggerickx *et al.* [2016] have analysed the interrelation between fertility and economy and shown (Figure 5) that for the first part of the 19th century, and up until about 1875, the birth-rate remained relatively stable, except at certain periods when it was temporarily disrupted by episodes of crisis (notably during the food crises of 1845-56). Inversely, the period of intense industrialisation from 1846 to 1866 entailed a recovery in the birth-rate, on the order of 4.5 children per woman, which stabilises subsequently until the 1880s.

32 The decisive fall in the birth-rate in Belgium overall begins in the 1870s, accompanying the economic and industrial crisis which afflicted the country for more than twenty years [Eggerickx *et al.*, 2016]. There then followed a brief period of birth-rate stability, which no doubt involved a desire on the part of couples to control their fertility, as well as a catching-up with respect to marriages and births postponed during the previous years of crises. But from the beginning of the 20th century, the decline in fertility was renewed, accentuated by the accidents of history, such as the two world wars and the economic crash of the 1930s [Eggerickx *et al.*, 2016].

Figure 5. Evolution of the crude rates of births and deaths and of the conjunctural fertility index in Belgium.



Sources: DGS, Federal Office of Planning, *Mouvement de la population et de l'état civil* Eggerickx *et al.* [2016, p. 48]

33 Over several years, a number of studies have been conducted, sometimes on a very local scale, which highlight the mechanisms of adjustment in marriage age and fertility levels in the face of contextual events affecting the economic and/or health environment. Vandenbroeke [1977] has carried out an in-depth demographic study of



the provinces of Flandre and Brabant. He has shown that for the period 1630-1900, the average age of first marriage is estimated at 27 years but undergoes significant periodic variations, which he attributes to temporary fluctuations in the mortality rate. Until the mid-18th century, crises in mortality are generally followed by a relaxing of the Malthusian brake. The system then gives way to increasingly restrictive nuptial behaviour, with a notable acceleration in the increase in first-marriage age following the French regime, a tendency which reaches its highest levels during the decade of the 1850s [Vandenbroeke, 1977, p. 10].

34 In parallel to the demographic regulator which is nuptiality, some studies have shown the importance of migrations¹⁶ in easing the demographic pressure observed at certain periods. Prior to 1850, in the former pre-industrial demographic regimes of Ardenne orientale and Pays de Herve, variations and differentials in fertility are chiefly explained by episodes of epidemics and economic crises [Alter *et al.*, 2007]. The poorest segments of these societies, characterised by low fertility levels, were also more vulnerable to variations in prices [Alter *et al.*, 2007, p. 155]. But after 1850, the socio-economic situation markedly progressed with the improvement in the economic conditions of the period, thanks to the industrialisation of the cities, which drew more and more individuals from the rural areas [Alter *et al.*, 2007, p. 155]. Nevertheless, the logic of the Malthusian brake on nuptiality was not abandoned; it now served more the economic interest of the populations (with the objection of accumulating wealth), whereas previously the issue was assuring their survival [Alter *et al.*, 2007, p. 155].

35 On the local level, the overall natural demographic component was restored for nearly the whole of the 19th century (Figure 6). The communes of Entre-Sambre-et-Meuse (ESM) seem to have been precursors in the fertility decline, beginning around the years 1820-1830. The crude birth-rate changed from slightly above 30 ‰ towards 1825 to less than 20 ‰ at the end of the 19th century – a level which, according to Chesnais [1986], would have indicated controlled fertility. In Ardenne, the decline is not as clear-cut. The decrease in births does not really get underway until the 1850s. If the calendars of fertility decline present divergences between the two spaces, they are nevertheless in advance of the national level. At certain periods, however, the decline slowed or accelerated. During the 1840s and 1880s, the birth-rate literally plunged, when serious food and economic crises were raging (1845-1856 and 1873-1892, respectively). These episodes were followed by a stabilisation of the decline (indeed, by a rebound of fertility in Ardenne), including (among other periods) around 1850 and from 1890 to 1900, which correspond to periods of post-crisis economic recovery [Bruneel, Daelemans, Dorban & Vandenbroeke, 1987; Eggerickx & Bourguignon, 2015 (forthcoming)]. In the 19th century, the fluctuations in the demographic components of the former regimes are significant; some would even speak of '*démographie en accordéon*' (accordion demography) [Bruneel *et al.*, 1989; Eggerickx, 2015; Eggerickx & Bourguignon, 2015 (forthcoming)]. In Ardenne, the alternation between decline and rebound of fertility is very pronounced; the episodes of crisis appear distinctly on the curve of crude birth-rates, with consecutive increases during the later years. In ESM, this 'accordion' birth-rate is less visible, probably less sensitive to the conjunctures of the age. Certain authors have sometimes questioned this characteristic from the point of view of modernity, indeed of a progressive independence of socio-economic and demographic components [Eggerickx, 2004; Eggerickx *et al.*, 2016].

36 In the course of the 19th century, the changes in terms of mortality are less spectacular in Ardenne and in ESM, the decline being already well underway since the 1820s. The variable fortunes of economic and health history had an effect on the mortality of the 19th and 20th centuries. But their impact nevertheless seems to have diminished over time, with the annual oscillations less and less marked and becoming virtually inexistant during the second half of the 19th century. Only the cholera epidemic of 1866 remains highly visible in terms of mortality on the Belgian scale, as does that of smallpox in 1871, which is perceptible on the national scale and on that of the two spaces under study.¹⁷



37 With a mortality already in full decline at the beginning of the 19th century and a birth-rate initiating its fall in Ardenne and ESM, the result is a natural growth in the population in full transition. In ESM, it rapidly achieves levels exceptionally low for the epoch (on the order of 2 or 3 ‰ in the midst of economic depression), with a mortality and a birth-rate that evolve in parallel. In Ardenne, the drop is a little less rapid, because of a mortality in decline but a birth-rate of uncertain tendency until the mid-19th century. The natural growth is maintained in this fashion until 1860, then begins its decline, returning nearly to the levels observed in ESM at the beginning of the 20th century. These evolutions contrast sharply with those observed at the national level: the rate of population growth increases until the end of the 19th century, when it will again cross the threshold of 10‰.

38 With respect to nuptiality, the tendencies appear less distinct between the two spaces. No downward or upward tendency is evident in the 19th century. Some fluctuations are observable, however, in relation to the socio-economic evolutions of the period. Effects of the conjuncture on nuptiality are generally to be expected, in that fertility in marriage is largely uncontrolled and the principal factor of demographic adjustment in former demographic regimes was matrimonial practices. Thus, failing levels of subsistence necessary to create one's own household, postponement of marriages to more advanced ages and definitive unmarried status were still widespread in the 19th century [Bourguignon, 2019]. In the 18th and 19th centuries, the ages of marriage were relatively late in Belgium (between 27 and 29 years), and the proportion of unmarried women 50 years old was fairly high (between 15 and 20%) [Eggerickx *et al.*, 2016]. According to the economic conjuncture, marriage age presents significant variations essentially linked to the evolutions of mortality. The experiences of Flandre and Brabant notably show a diminution of the marriage age from the second half of the 17th century, following on from episodes of excessive mortality linked to the great epidemics of plague and dysentery and to the price fluctuations observed at this epoch [Vandenbroeke, 1977]. In the 18th century, the tendency was reversed, given the acceleration of population growth, with matrimonial behaviour becoming progressively more restrictive than previously [Vandenbroeke, 1977; Eggerickx *et al.*, 2016, p. 60]. Initial analyses performed on the basis of population censuses for the districts corresponding to ESM and Ardenne show that subsequently, the brake on marriage was progressively loosened (with marriage again becoming a more and more universal state and taking place at younger and younger ages), in parallel with the diminution of the number of children per woman [Bourguignon, 2019].

Figure 6. Evolution of the crude rates of mortality, births, natural growth and nuptiality (p. 1.000) in Ardenne Namuroise, Entre-Sambre-et-Meuse, and Belgium, annual rates and moving averages over 5 years.



Sources: Civil Registries, statistics published by *Mouvement de la population et de l'état civil*, Vrielinck [2000], population censuses.

- 39 Less subject to the effects of population structures, the index of general fertility and the conjunctural index of fertility evolve in conformity to the crude birth-rates: precedence and linearity of the decline in Entre-Sambre-et-Meuse, an uncertain tendency during the first half of the 19th century in Ardenne, followed by an irreversible decline beginning in the years 1850-60. Whatever the indicator, one identifies the phases of slowing down and acceleration of the process over the course of the 19th century (identical to those recorded with the help of the curves of crude rates), accompanying the economic and medical conjunctures of the epoch.

Figure 7. Evolution of the estimations of the index of general fertility and the conjunctural index of fertility (number of children per woman) in Ardenne Namuroise and Entre-Sambre-et-Meuse, annual rates (moving averages over 5 years).



Sources: Civil Registries, statistics published by *Mouvement de la population et de l'état civil*, Vrielinck [2000], population censuses; author's calculations.

Inset: The indexes of Dupâquier for detecting crises? The results are uncertain...

The index of Dans les années 1970, une méthode avait été mise au point par Dupâquier [1979] pour identifier des périodes de crise de mortalité et en évaluer l'intensité. Dans sa formule initiale, l'indicateur correspond à la différence entre le nombre de décès observé durant l'année t et la moyenne des décès observés durant les 10 années antérieures à l'année t , le tout pondéré par l'écart-type des décès observés durant ces mêmes 10 années antérieures.

Plusieurs tests ont été effectués pour l'ESM et l'Ardenne namuroise (avec parfois des ajustements de la formule de départ pour essayer de répondre aux principales critiques de l'indicateur – voir, par exemple, Chevet [1993] ou Debuisson [2015]).

Si les résultats sont plus difficiles à lire, ils montrent néanmoins des variations annuelles non linéaires dans la survenue des événements démographiques tels que les décès, les mariages ou les naissances. Les situations que l'on devrait considérer comme des épisodes de crise de mortalité sont peu nombreuses si l'on s'en tient à l'indicateur de Dupâquier. La seule « crise », commune aux deux espaces et d'intensité moyenne ou forte, se serait produite en 1871, probablement en lien avec l'épidémie de variole qui a sévit plus globalement au niveau national. De manière plus générale, l'instabilité des courbes durant la première moitié du 19e siècle témoigne des aléas imprévisibles hors de la portée humaine (épidémies, conditions climatiques, famines...). Mais progressivement l'avancée dans le 19e siècle est accompagnée d'une disparition progressive des épisodes répétés de crise de mortalité, à l'instar de ce que M. Debuisson [2015] a observé pour quelques communes namuroises.



Dupâquier was initially intended as a means of evaluating the intensity of crises of mortality. Equivalent analyses have been produced for birth-rate and nuptiality, in order to be able to measure the influence of the context (in the broad sense) on deaths, but also on marriages and births. With respect to birth-rate, fairly clear parallels appear with the observations established by means of the classic indicators of fertility (see above). Episodes of lower birth-rates are detected during the decades of the 1840s, 1860s, 1870s and 1880s, severely affected by episodes of crisis, while during the 1850s and from 1890 to 1900, the birth-rate is instead in a situation of excess. With regard to nuptiality, the tendencies are less evident and fluctuate more from one year to another. Some episodes of higher-than-normal nuptiality may be identified, notably during the 1850s and from 1890 to 1900.

Approach to demographic regimes as an explanatory framework for the interactions between context and demography

- 40 At this stage, and taking into account the indicators brought to bear, it is still premature to conclude that the demographic components of the populations are exclusively the result of deliberate strategies on the part of couples for anticipating, deferring, even cancelling a marriage or a birth. Nevertheless, a series of indexes suggest that the rural world was probably neither homogeneous, conservative, nor resistant to change [Eggerickx & Bourguignon, 2015 (forthcoming)]. On the contrary, it was characterised by a diversity of situations, notably concerning fertility decline, sometimes with a very notable precocity in certain spaces such as Entre-Sambre-et-Meuse and, to a lesser extent, Ardenne.
- 41 Most often, the fertility declines observed in the rural world are generally interpreted as the result of a process of diffusion of innovation, of transmission of innovative modes of behaviour, which first emerged within urban and industrial populations and the socio-economically privileged elites, then were propagated among rural groups and the more disadvantaged social classes [Lesthaeghe, 1977; Schumacher, 2010; Costa, 2015]. Sometimes, the empirical results have supported these diffusionist theories. This is notably the case with the study of H. Damas (1964), as cited by Eggerickx [2004, p. 123], who postulates that *'cette région de l'Entre-Sambre-et-Meuse aurait été contaminée par le modèle français, où rappelons-le, la restriction volontaire des naissances s'est amorcée avec près d'un siècle d'avance sur les autres pays de l'Europe occidentale'* (this region of Entre-Sambre-et-Meuse was likely contaminated by the model of France, where, let us remember, the deliberate reduction of births began more than a century in advance of the other countries of western Europe'. This is also the case with the study of Debuissou [2015, p. 481] regarding the case of Rienne, a locality in the Ardenne in the extreme south of the province of Namur, which, having experienced a precocious fertility transition, is said to have been influenced at once culturally and economically by its French neighbour and to have inherited its Malthusian practices of limiting births. One question nevertheless remains unsettled: why would French influence explain the low fertilities observed very early in the 19th century in Entre-Sambre-et-Meuse, when, in other border spaces, fertility was maintained much longer at much higher levels [Eggerickx & Bourguignon, 2015 (forthcoming)]? Moreover, if a process of diffusion was at work, one would necessarily expect the decline in fertility to spread subsequently to regions neighbouring those of the south of the province of Namur; now, this is not at all the case [Eggerickx, 2004; Eggerickx & Bourguignon, 2015 (forthcoming)].



42 Other studies have given more weight to the approach through demographic regimes to explain the substantial gaps in fertility declines that exist between certain zones of Wallonia. According to Poulain [1996], for example, the advance observed in Entre-Sambre-et-Meuse would have resulted simply from the adoption by the populations of strategies of adaptation of their demographic behaviour in the face of the socio-economic constraints of the epoch. During the years 1820-1830, the progressive disappearances of the mines, furnaces, forges, and metal works very much present in that region, and of their associated activities, would have led to numerous adjustments among the populations concerned [Poulain, 1996]. Certain inhabitants emigrated from these spaces, become nearly rural again, to establish themselves in spaces newly industrialised, more profitable and providing greater revenues [Poulain, 1996]. Others, by contrast, preferred to remain in the village, even if they had to make do with a smaller agricultural plot, more and more divided [Poulain, 1996]. They were progressively obliged to revise their aspirations to fertility downwards, given the relocation of a sector which was the source at once of employment and of revenues [Poulain, 1996].

43 In a larger perspective, we therefore propose the hypothesis that the low fertilities observed very early in the 19th century in Entre-Sambre-et-Meuse and Ardenne are the result of behaviours of adaptation in the face of constraints linked to contexts and to the availability, or unavailability, of alternatives to fertility control. This is the idea which underlies those systemic theories according to which populations continually adjust their demographic behaviour to the conditions of existence prevailing at the moment. If the birth-rate diminished rapidly in these regions, this would be because of the absence of alternatives for coping with a less prosperous socio-economic situation, such as emigration to urban or industrial spaces with possible outlets for absorbing the surplus of manpower present in the places of origin, or again diversification and accumulation of economic activities and of sources of household revenues. The populations in question thus found themselves 'caught in the trap' in the face of unfavourable socio-economic conditions and would have been led to limit their fertility, notably by putting off births until a more propitious moment, by means of a strategy for halting fertility, or, more pre-emptively, by delaying marriage or settling for definitive celibacy. Elsewhere, where the fertility transition came later, this would have been simply because the populations had the possibility of recourse to other strategies for facing a change in their socio-economic habits.

Discussions and conclusions

44 This article brings together some preliminary results of a broader study centred on the demographic systems of the pre-modern era, particularly those typical of the milieu of rural Wallonia, whose demographic transition in some cases began very early, in the first half of the 19th century. At this stage, it is far from possible to propose a clear and precise response with regard to the question of interrelations between contexts (understood in the broad sense) and demographic components. The first results, however, make it possible to insist on different points. The theoretical framework of demographic regimes contributes an interesting perspective with regard to analysing the interactions between context and demography. Notably, it allows us to propose possible explanations for the decline in fertility which occurs at different moments in spaces nevertheless geographically close and sometimes close even socio-economically. The 19th century is a period of profound changes, which enormously affect the socio-economic structures of the age. At certain periods, the episodes of crisis could play a major role in the demographic transition, even to the point of leading the populations to revise their demographic behaviour to adjust it to the new constraints. These episodes will thus sometimes have played the role of 'detonator', sometimes amplified tendencies which had been initiated some time previously [Eggerickx *et al.*, 2016].



Indeed, in the case of Entre-Sambre-et-Meuse and Ardenne, the response constituted by the decline in fertility took place in the contexts of crises typical of the 19th century. The response, which at the beginning was destined to respond momentarily to a conjunctural modification of the context, would thus have been transformed into a structural characteristic inherent to those spaces, when the movement of limiting births was finally generalised to the populations as a whole [Eggerickx, 2004, p. 472].

45 These initial results still remain conditional, since demonstration of the existence of such strategies of adaptation must be based on more complex analyses (taking account particularly of the calendrical dimension of nuptiality and nativity), and not only on a simple examination of tendencies of intensity. Of course, prudence is also in order when it comes to determining the direction of the relation between the context and the demographic components: this is probably a question of an interrelation, with each mutually influencing the other, rather than of a simple relation of cause and effect, whereby the demographic components are envisaged only in terms of the consequences of the global context. In older societies, the demographic components are broadly influenced by the characteristics of local economic conditions, with a clear 'Malthusian' objective of maintaining an equilibrium, however precarious, between the two [Eggerickx *et al.*, 2016]. According to Dupâquier [1972], the self-regulating mechanism functions by way of the component of nuptiality: a less certain, or more fragile, economic period would bring with it a rise in the age of marriage and the frequency of definitive single status. According to Davis [1963] and Friedlander [1969, 1983], migrations are added to the nuptial component to enlarge the range of reactions in the face of a crisis. It is the availability of these strategies that explains the possible lag of certain spaces with respect to the decline in fertility. This is also the reason why Alter *et al.* [2010] so insist on the unprecedented character that a local demographic transition may take on: henceforth, there is no longer a single model that will be followed by all regions and countries; the form of the transition and the rupture it will engender with the previous system are functions of the alternatives available. The Braudelian model goes a little further still, adding socio-economic solutions (accumulation of revenues, diversification of activities, etc.) as an alternative for responding to an imbalance between resources and populations [Braudel, 1990]. Evidently, therefore, the question is most likely one of an interaction between economy and demography, with the two mutually influencing each other.

46 Beyond these initial conclusions, the contributions of this article and the questions it raises are also, and especially, methodological. It focuses on the local level and attempts, on the basis of unpublished data and methods tested and proven on a wider geographical scale, to retrace the broad tendencies of mortality, nuptiality and fertility. If, using statistical instruments geo-localised and decentralised since the end of the 20th century, it is standard in Belgium to reconstitute the behaviour of populations on a scale as finely separated as the commune, this is far less the case for the 19th century. A lack of available data, however, is not the cause. But to go beyond the classic analyses of crude rates of births, nuptiality and mortality, more particular data are required, and are not always available at the local level of the commune or village of interest. In this framework, a series of hypotheses has been put in place that makes it possible to propose estimations of indicators of fertility more solid than the crude birth-rate and unaffected by the possible effects of structure. These hypotheses are probably not without consequences, but they constitute a good compromise between aggregated and disaggregated geographic measures.

47 The methodological issues underlying this article remain subject to discussion and in this context constitute a real challenge. From a number of perspectives, they may be improved, especially because they bear exclusively on the intensity of fertility and not at all on the calendrical dimension. Now, when faced with a crisis, couples may decide to reduce the number of their offspring definitively (as will have an impact on the intensity of fertility), but also to defer a birth until a period more propitious (and, in this context, too, it is necessary to take account of the calendrical aspects of fertility). There exists real vagueness, moreover, concerning the quality of the data and the definitions used



for the events studied. At many points, we have observed that the available data refer, depending on the year, to actual or hypothetical events, to actual or hypothetical populations. Even if such variations raise questions in terms of methodological rigour, the effect of these changes of definition on the results is no doubt negligible,¹⁸ given the relatively sedentary character of the populations. The same is true of the definition of the events observed, especially regarding what constitutes a birth, a death, and above all a child without life or still-born. Whereas at certain periods the still-born babies are not included among the deaths or births, at others, they are counted only among the deaths. And this undoubtedly entails somewhat more important methodological issues, since the occurrence of such an event is certainly not independent of the economic or medical context of the epoch.¹⁹

48 Besides the methodological work concerning demographic indicators and the definitions of the events studied, it would also be appropriate further to pursue the work of contextualisation of mortality in the 19th century, notably by consulting the local historical literature, grey literature, or the reports of provincial medical commissions in order to detect and identify crises sometimes highly localised in time or in space. Some authors lay great stress on the localised character of certain episodes of crises [Lebrun, 1980; Neven, 2003], which, 'drowned' in a larger geographic or temporal aggregate, pass completely unperceived, whereas in their time they were capable of causing serious consequences for the populations concerned.

49 At this stage of the analyses, numerous questions still remain unanswered. The results presented here remain restricted to the aggregated scale of the populations taken as a whole, based on average behaviour, whereby individual particularities and socio-economic disparities are completely obscured in favour of an analysis dealing with local spaces. Now, it is taken for granted today that fertility control was initiated by a few couples, then progressively generalised to the whole of the population; this is the basic postulate underlying diffusionist approaches to birth control [Eggerickx, 2015; Costa, 2015; Bardet, 1990; Dribe et al., 2017]. Along the same lines, it would be interesting to develop the relation between context and demography, taking into account individual characteristics which might permit identification of the most vulnerable groups in the face of economic or health disruptions. As such, individual analyses, notably centred on the life-histories of individuals, would be interesting in more than one respect. They would undoubtedly nourish debates already initiated, and might be productive of new teachings with regard to (dis)continuities of behaviour between social groups or generations, or even within the same family lines.

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Annexe

Details of the data required for calculation of the indicators

Indicators	Information required	Sources	Spatial granularity
Crude rates of births, nuptiality and mortality	Births, marriages and deaths	1803-1840 : Civil registries 1841-1849 : Published statistics 1851-1856 : Civil registries 1856-1910 : Published statistics	Former communes
	Population figures	1800-1831 : population censuses [Vrielinck, 2000] with linear interpolation for the periods between censuses 1831-1910 : Published statistics	Former communes
Index I_f	Births	See above	Former communes
	Hutterite fertility	Coale et Watkins [1986]	/
	Proportions of women by age group	Population censuses of 1846, 1856, 1880 and 1890	Provinces (1846-56) and districts (1880-90)
	Population figures	See above	Former communes
ICF	If	See above	Former communes
	ICF Hutterites	Coale et Watkins [1986]	/
Indexes of Dupâquier	Crude rates of mortality, births and nuptiality	See above	Former communes

Notes

1 This definition is inspired by those proposed and discussed by Livi Bacci [1999], Etchelecou [1994], Véron [2000], Eggerickx [2015] and Debuissou [2015].

2 This theoretical point is broadly inspired by the synthetic article dealing with demographic regimes of T. Eggerickx [2015], that dealing with relations between fertility transition and economic evolutions from the 18th to the 21st centuries written by T. Eggerickx, S. Brée and M. Bourguignon [2016], and the book of R. Schumacher [2010] concerning the demographic structures and behaviours of Geneva in the 19th century.

3 In Wallonia, fertility began to diminish almost thirty years before it did so in Flanders.



4 Delay in marriage age, increase in the frequency of definitive single status...

5 Abortions, contraceptive methods, internal migrations, international migrations...

6 Expressions derived from the text of Leboutte [1991], reappropriating the theory formulated by Denis [1897].

7 These two regions together comprise a hundred former communal sections.

8 These data were collected previously by the members of the Centre for Demographic Research, notably Thierry Eggerickx and Marc Debuissou.

9 Recourse to diverse sources can involve changes in the definitions of the events recorded; we will return to this point below.

10 Year VIII of the republic extends from 23 september 1799 to 22 september 1800.

11 Our numerator corresponds more precisely, for an annual datum, to the average of births observed during the year x and the two bracketing years to minimise the effect of the small numbers frequent on that fine spatial scale..

12 Without distinction here between rural and urban communes; the total structures of the districts are used.

13 The Hutterites are used here as a point of reference to define natural fertility, not controlled by couples.

14 Including respectively the communities selected in Ardenne and Entre-Sambre-et-Meuse.

15 From the period 1940-50, Jean Meuvret is probably among the first to have explored the effects of subsistence crises, notably in France, during the 17th and 18th centuries [Séguy & Théré, 2016].

16 This dimension will not be incorporated in the framework of the analyses presented in this article.

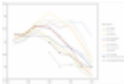
17 The nature of the peaks, highly localised in time, observed during the first half of the 19th century is significant. It deserves to be examined in depth with archival support, notably the reports of the provincial medical commissions which record epidemics, influenzas and severe winters at the level of the communes.

18 Tests have been conducted for the years during which deaths (events most concerned by definitions of fact or law) were published (1843, 1845, 1848); for the provinces of Namur and Luxembourg, the variations of the crude rates of mortality remain extremely slight, whether one takes into account one statistic or the other, and are included for these three years between 0,1 et 0,3‰.

19 In-depth studies of infant mortality during the 19th and 20th centuries have been conducted; between 1841 and the eve of the First World War, the mortinatalité, that is, the rate of deaths observed before or during childbirth and concerning babies considered viable [Masuy-Stroobant, 2010, p. 630], was still estimated at more than 30 per 1000 births [Masuy-Stroobant, 2010].

Table des illustrations

	Titre	Figure 1. Position of the zones under study
	Légende	[N.B.: this map depicts the borders of the existing communes, which do not correspond exactly to the limits of the former ones as considered in the framework of this article]
	URL	http://journals.openedition.org/eps/docannexe/image/12194/img-1.png
	Fichier	image/png, 289k
	URL	http://journals.openedition.org/eps/docannexe/image/12194/img-2.png
	Fichier	image/png, 9,2k
	URL	http://journals.openedition.org/eps/docannexe/image/12194/img-3.png
	Fichier	image/png, 9,4k
	Titre	Figure 2. Evolution of female structures by age (all civil registry categories) applied to Entre-Sambre-et-Meuse and Ardenne Namuroise.
	Légende	* Proportions expressed in relation to the actual total of population (both sexes combined)
	Crédits	Sources: Censuses of population, 1846, 1856, 1880 and 1890
	URL	http://journals.openedition.org/eps/docannexe/image/12194/img-4.png
	Fichier	image/png, 84k
	URL	http://journals.openedition.org/eps/docannexe/image/12194/img-5.png
	Fichier	image/png, 3,7k
	Titre	Figure 3. Evolution of the synthetic indexes of general fertility (If) for Belgium, by province and for some districts.

	Crédits	Sources: graph derived from data published in Coale et Watkins [1986, pp. 81-84] and Lesthaeghe [1977].
	URL	http://journals.openedition.org/eps/docannexe/image/12194/img-6.png
	Fichier	image/png, 63k
	Titre	Figure 4. Index of fertility (legitimate births) in former Belgian communes for the years 1997 and 1912.
	Crédits	Source: Costa [2015, p. 94]
	URL	http://journals.openedition.org/eps/docannexe/image/12194/img-7.png
	Fichier	image/png, 822k
	Titre	Figure 5. Evolution of the crude rates of births and deaths and of the conjunctural fertility index in Belgium.
	Crédits	Sources: DGS, Federal Office of Planning, <i>Mouvement de la population et de l'état civil</i> Eggerickx et al. [2016, p. 48]
	URL	http://journals.openedition.org/eps/docannexe/image/12194/img-8.png
	Fichier	image/png, 79k
	Titre	Figure 6. Evolution of the crude rates of mortality, births, natural growth and nuptiality (p. 1.000) in Ardenne Namuroise, Entre-Sambre-et-Meuse, and Belgium, annual rates and moving averages over 5 years.
	Crédits	Sources: Civil Registries, statistics published by <i>Mouvement de la population et de l'état civil</i> , Vrielinck [2000], population censuses.
	URL	http://journals.openedition.org/eps/docannexe/image/12194/img-9.png
	Fichier	image/png, 180k
	Titre	Figure 7. Evolution of the estimations of the index of general fertility and the conjunctural index of fertility (number of children per woman) in Ardenne Namuroise and Entre-Sambre-et-Meuse, annual rates (moving averages over 5 years).
	Crédits	Sources: Civil Registries, statistics published by <i>Mouvement de la population et de l'état civil</i> , Vrielinck [2000], population censuses; author's calculations.
	URL	http://journals.openedition.org/eps/docannexe/image/12194/img-10.png
	Fichier	image/png, 22k

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