DEMOGRAPHIC RESEARCH
A peer-reviewed, open-access journal of population sciences

DEMOGRAPHIC RESEARCH

VOLUME 43, ARTICLE 48, PAGES 1413–1428
PUBLISHED 2 DECEMBER 2020
https://www.demographic-research.org/Volumes/Vol43/48/
DOI: 10.4054/DemRes.2020.43.48

Descriptive Finding

The spatial diffusion of nonmarital cohabitation in Belgium over 25 years: Geographic proximity and urban hierarchy

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Demographic Research: Volume 43, Article 48
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Abstract

BACKGROUND
Previous studies have shown that nonmarital cohabitation is socially diffused. However, to our knowledge, no studies exist on spatial aspects of the diffusion. This article examines the spatial diffusion process of nonmarital cohabitation in Belgium.

OBJECTIVE
This study aims to answer the following questions: What is the spatial diffusion pattern of nonmarital cohabitation in Belgium? In which areas did nonmarital cohabitation increase first, and which areas are resistant to this demographic change? How has this diffusion taken place geographically?

METHODS
We use data from the Belgian National Register, which makes it possible to achieve analysis at a detailed geographical level (the municipality) and covering a long period of time (1991–2015). We use diachronic cartography to reveal the spatial patterns of diffusion of nonmarital cohabitation in Belgium.

RESULTS
We observed that spatial diffusion of nonmarital cohabitation in Belgium is similar to the spread pattern of fertility decline in the first demographic transition. This observed spatial pattern suggests to some degree that this process may have occurred by geographic proximity and through the urban hierarchy.

CONTRIBUTION
The article highlights the importance of investigating nonmarital cohabitation from a spatial and temporal perspective. It describes the spatial pattern of the spread of nonmarital cohabitation in Belgium. To our knowledge, this has never been done before

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in the existing literature on nonmarital cohabitation. The results highlight a possible diffusion through the urban hierarchy, even if the influence of contextual conditions on diffusion within municipalities cannot be excluded. Our results, although descriptive, could have important implications for future statistical modelling of the diffusion process.

1. Introduction

In the early 1970s important sociodemographic changes took place in several European countries. These included a declining interest in marriage, an increasing diversification in union formation and an increase in union dissolution, delayed motherhood, and persistent subreplacement fertility. The theoretical framework of the second demographic transition (SDT) was developed in the 1980s to describe and explain these different transformations (Van de Kaa and Lesthaeghe 1986). Having attracted much discussion and criticism, the SDT has now been the subject of a very broad theoretical and empirical literature (Zaidi and Morgan 2017). Nevertheless, few studies have taken a spatiotemporal approach to the SDT to look into how these demographic behaviours of the 1970s have been propagated in space over time (Bleha and Ďurček 2019; Caltabiano et al. 2019; Kurek 2011; Valkonen et al. 2008; Vitali, Aassve, and Lappegård 2015). Moreover, while several aspects of the SDT have been studied from a spatial diffusion perspective (single-parent families, nonmarital births, divorce, etc.), this has not been the case for nonmarital cohabitation.

Nonetheless there are indications that the spatial diffusion process is applicable to this type of union. Cohabiting without being married can be considered a demographic behaviour that spreads like voluntary birth control during the historical decline in fertility (Casterline 2001). Studies have shown that nonmarital cohabitation is "contagious" (Nazio 2008:162), since its propagation in a population takes place through social diffusion; that is, it spreads through social interaction (Guetto et al. 2016; Di Giulio and Rosina 2007; Nazio and Blossfeld 2003). An innovation that spreads through social interaction is spread in space (Hägerstrand 1967). The literature generally distinguishes two ways in which innovation spreads in space (Saint-Julien 2007): through propagation diffusion by geographic proximity, and through hierarchical diffusion, with the urban hierarchy constituting a diffusion channel. In particular, innovation generally spreads from large urban centres to small towns. To our knowledge, no paper has examined how the spatial diffusion of nonmarital cohabitation occurs. This is surprising, since nonmarital cohabitation is a very important dimension of the SDT and it marks a break with traditional family models in which marriage is an obligatory prerequisite for a couple to cohabit in the same dwelling.

In this article we attempt to fill this gap by investigating the spatial diffusion of nonmarital cohabitation in Belgium, one of the countries where the SDT was first identified. Belgium became an important case study for the SDT due to its spatial aspects, among others (Lesthaeghe and Lopez-Gay 2013; Lesthaeghe and Neels 2002), although not in terms of nonmarital cohabitation. In particular, no diachronic maps have been produced to describe the different stages of the spatial diffusion of nonmarital cohabitation. This study has two objectives: first, to look for evidence in favour of propagation diffusion in nonmarital cohabitation in Belgium, and second, to describe the spatial pattern of the process, i.e., to identify areas where nonmarital cohabitation was already non-negligible at the beginning of the observation period, the trajectories of spatial diffusion, and the areas that are more resistant to change.

2. Data and methods

For this study we used data from the Belgian National Register. This centralised population register provides continuous and exhaustive registration of information on individual residents: date of birth and dates of all demographic events, sex, marital status, places of residence, nationality, household status, and position in the household.

This data source has several advantages. The first is the high quality of the data it produces (Poulain and Herm 2013). The second is the long-term coverage and the annual frequency of the data. Officially created in 1985, the National Register provides data from 1991 onwards. It therefore makes it possible to now study the Belgian population exhaustively and annually over a quarter of a century. The third advantage is the availability of data at the municipality level, the local geographical level required for accurate identification of spatial diffusion, which clearly distinguishes between urban and rural areas. These three characteristics make the National Register the best data source for studying the spatial diffusion of demographic behaviour in Belgium. Indeed, based on this data source, it is possible to spatially analyse a phenomenon both at the local geographical level (municipality) and in very fine temporal detail (annual).

Our analysis is at the household level rather than the individual level. To study nonmarital cohabitation we use the LIPRO household typology, created in 1991 by the Netherlands Interdisciplinary Demographic Institute (NIDI). This typology defines eight types of household (Lodewijckx and Deboosere 2008): one-person, married couple without children, married couple with children, single-parent family, unmarried couple without children, unmarried couple with children, collective household, and other household.

By distinguishing married couples from unmarried couples, we are able to obtain an indicator of nonmarital cohabitation in Belgium. We chose to calculate the proportion of

cohabiting unmarried couples among cohabiting couples (married and unmarried) whose household reference person is between 15 and 44 years old. We did not calculate the proportion of cohabiting unmarried couples among all households because it would be biased by the change in the proportion of other types of household, such as single-parent or one-person households. In addition, we limited the calculation of our indicator to households whose reference person was aged 15 to 44 years because this is an age group frequently used in the literature to measure nonmarital cohabitation with cross-sectional data (Gassen and Perelli-Harris 2015; Heuveline and Timberlake 2004; Kennedy and Bumpass 2008). As the age structure of the municipalities affects the spatial pattern, we have chosen to age-standardize all the cross-sectional indicators, using the Belgium population in 2003 (the middle date of the observation period) as the reference population (Wunsch 2001).

To highlight the spatial pattern of the diffusion of nonmarital cohabitation in Belgium, we mapped our indicator at the Belgian municipality level. We aggregated the municipalities of the Brussels-Capital Region so that its area would be comparable to that of the other large Belgian cities, which are composed of a single municipality. Indeed, with 19 municipalities, the spatial detail of the Brussels-Capital Region would allow an intraurban analysis; however, this is not the geographical scale chosen for this article. Our result is a series of diachronic maps, with one map for every three years, thus producing 10 maps between 1991 and 2015. Traditional data sources generally do not allow for the observation of a phenomenon both at a detailed geographical level and at short time intervals. This is certainly true for nonmarital cohabitation, which is generally measured from census data, allowing for its evolution to be monitored approximately every 10 years for most countries. From this point of view, the Belgian National Register is an exceptional source.

To understand spatial diffusion from maps, it is necessary to determine the number of classes and their boundaries. We opted for a common discretisation of values, i.e., the same discretisation for each map. Since the distribution of nonmarital cohabitation rates is uniform, we use the method of discretisation by equal amplitude classes (Béguin and Pumain 2017).

Belgium is a federal country, consisting of three regions: Brussels-Capital, Flanders, and Wallonia. To make it easier to read the maps, we used a black line to highlight the linguistic border between the Flemish-speaking area (i.e., Flanders) and the French-speaking area (Wallonia), indicated by several studies as a barrier to the spread of fertility behaviours during the fertility transition (Costa 2015; Lesthaeghe 1977) and also during the SDT (Lesthaeghe and Lopez-Gay 2013). The linguistic border reflects cultural differences between the two parts of Belgium. While mapping makes it easy to assess propagation diffusion, it is less straightforward for hierarchical diffusion. To achieve this, we depict the urban hierarchy of municipalities with more than 50,000 inhabitants in

2015, distinguishing between two levels: those with more than 100,000 inhabitants (main city) and those with between 50,000 and 100,000 inhabitants (secondary city), represented respectively by a circle and a smaller square (see Figure 1).

Figure 1: Location map

Note: The identification of the urban hierarchy is based on population in 2015.

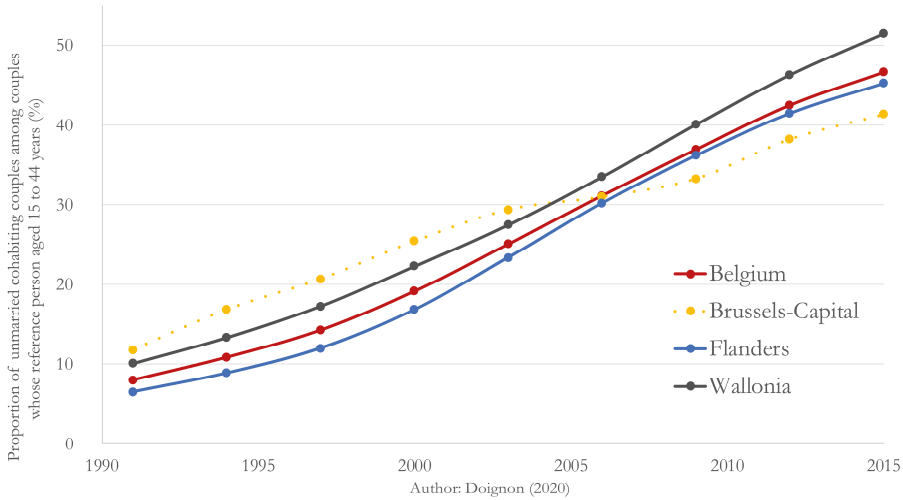
3. Results

Based on National Register data, we display the evolution of nonmarital cohabitation in Belgium (see Figure 2). In 1991 the prevalence of this demographic behaviour was low (less than 10%). This is consistent with previous literature showing that the rise of nonmarital cohabitation started later in Belgium than in other European countries (such as France, for example: Corijn 2014; Kalmijn 2007; Kiernan 2004). However, according to our data, the level reached almost 50% in 2015 – a very rapid transition, since it took place over less than 25 years.

In order to compare Belgium to other European countries, we analyse European Social Survey data. Adopting the same definition of nonmarital cohabitation, our elaboration of 2016 ESS data shows that nearly 43% of respondents report living together outside marriage. According to these data, Belgium is among the 10 European countries with the highest levels of nonmarital cohabitation, less than Iceland and Norway (more than 50%), Estonia and Slovenia (50%), and Sweden and Portugal (46%), but more than Finland (42%), the United Kingdom (38%), and France (37%).

Although all Belgian municipalities are experiencing this increase, Figure 2 shows that Wallonia is ahead of Flanders. The Brussels-Capital Region has a particular profile. It was ahead of all other regions from 1991 to 2003. The increase in nonmarital cohabitation slowed between 2003 and 2009 but continued to rise thereafter, while remaining at a lower level than in Flanders or Wallonia.

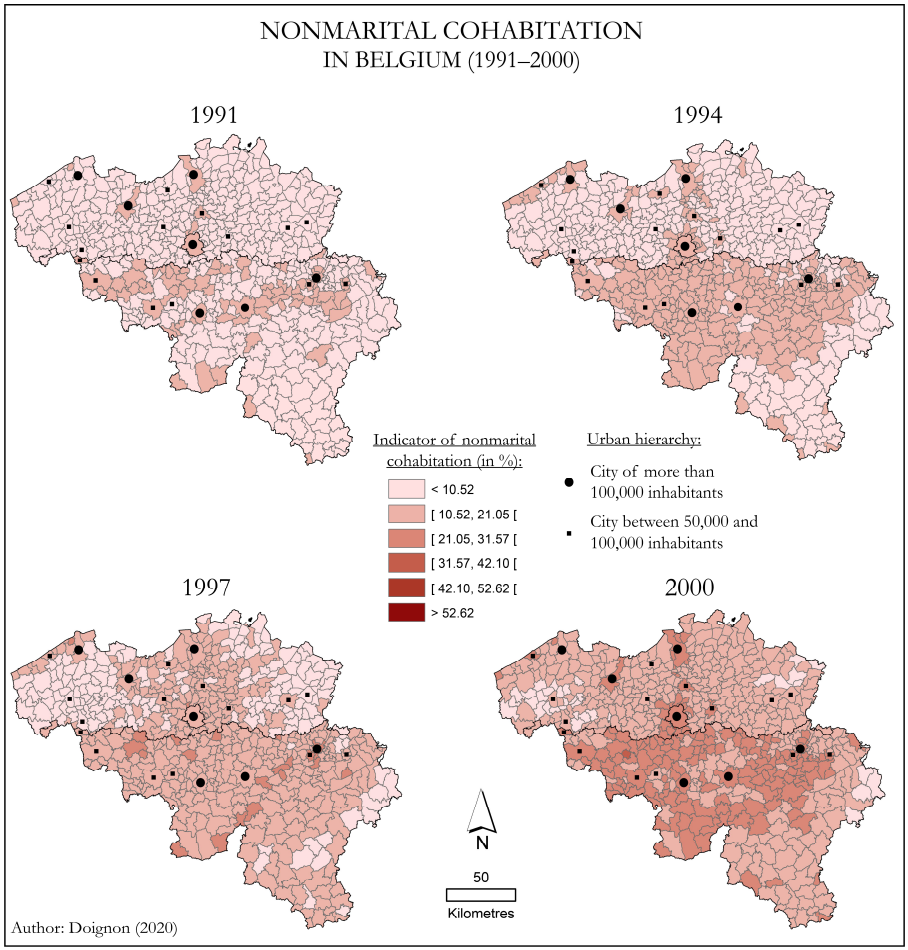
Figure 2: Nonmarital cohabitation in Belgium (1991–2015)



Note: The indicator is age-standardized using the Belgian population in 2003 as reference population.
Source: Belgian National Register.

Using maps, we analyse how nonmarital cohabitation has evolved in the Belgian territory (see Figure 3 and Figure 4). In 1991, nonmarital cohabitation was a minority behaviour in the vast majority of municipalities. However, some municipalities already had a relatively high prevalence, mainly northern Wallonia and some Walloon industrial cities. In Flanders, the same levels were only observed in Antwerp, Ghent, Mechelen, and some coastal municipalities (Figure 3).

Figure 3: Nonmarital cohabitation in Belgium (1991–2000)



Note: The identification of the urban hierarchy is based on population in 2015.
Source: Belgian National Register.

In 1994, nonmarital cohabitation spread to the whole of the northern half of Wallonia. There is a very clear differentiation between Wallonia and Flanders. Indeed, in Flanders, spatial diffusion took place only in the coastal region and around the Brussels and Antwerp agglomerations (Figure 3). Note that although the administrative region encompassed by the Brussels agglomeration is in Flemish territory, the large majority of its population is French-speaking. In addition, the proportion of French speakers in the

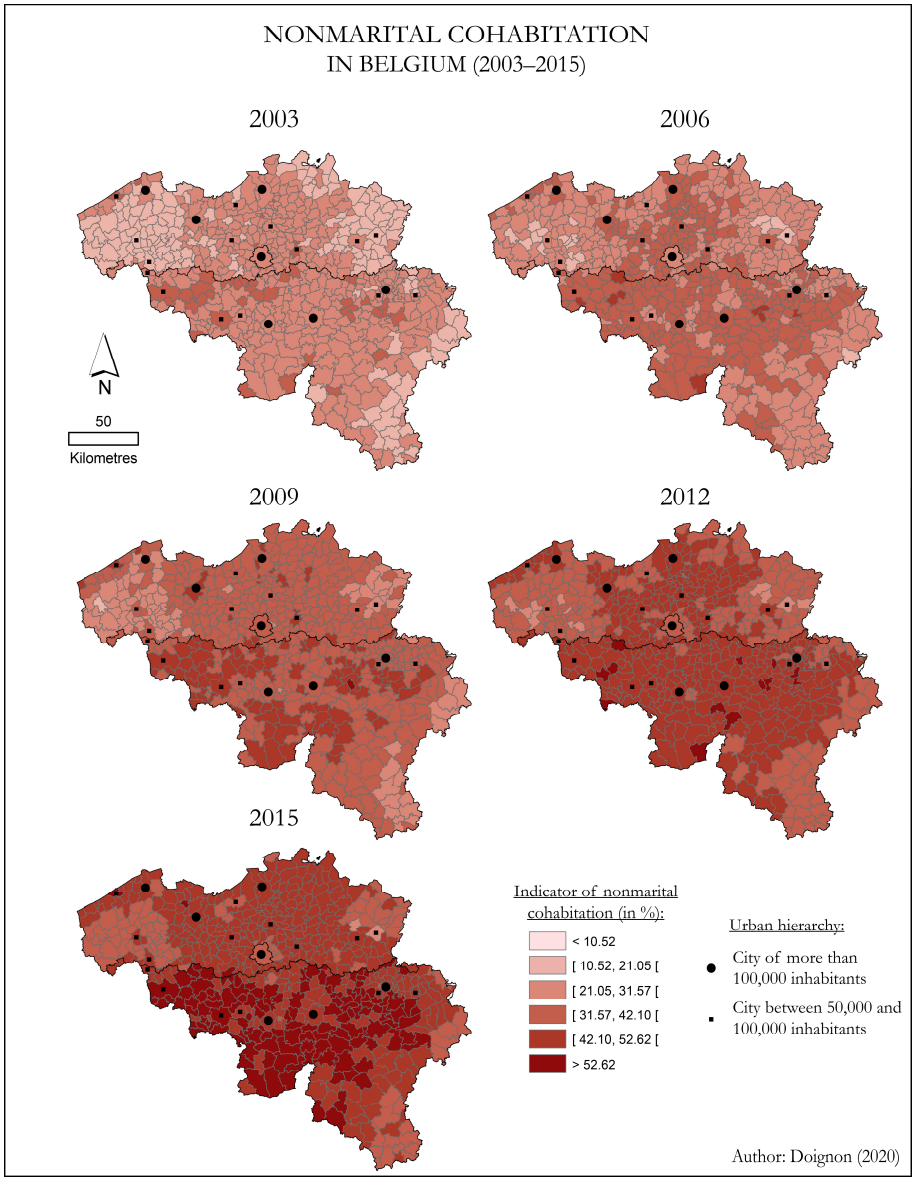
area around Brussels is very high, with its municipalities offering 'language facilities' or bilingual services. Elsewhere in Flanders the process is much more limited than in Wallonia since the increase in nonmarital cohabitation is limited to a few cities (Antwerp, Ghent, Bruges, Ostend, Mechelen, Leuven, Sint-Niklaas). The linguistic boundary therefore seems to constitute a barrier to spatial diffusion.

In 1997 a further increase in nonmarital cohabitation occurred in all parts of Wallonia except for the southeast. Liège was starting to show even higher levels (between 21.1% and 31.6%) than the others cities. In Flanders, nonmarital cohabitation began to spread in the Brussels–Ghent–Antwerp triangle. Three areas were clearly resistant to diffusion: the western part of Flanders, the eastern part of Flanders, and the eastern Ardennes (south-eastern part of Belgium), including the German-speaking area (Figure 3). These are areas where nonmarital cohabitation remains a minority behaviour. A similar resistance can be observed in three Flemish urban municipalities (Kortrijk, Roeselare, Genk), although nonmarital cohabitation has increased in all Belgian urban municipalities with more than 50,000 inhabitants. It is interesting to note that in these resistant areas, secularisation has historically been weaker and slower than in the rest of Belgium (Lesthaeghe and Lopez-Gay 2013; Lesthaeghe and Neels 2002).

In 2000, nonmarital cohabitation spread in Flanders beyond the Brussels–Ghent–Antwerp triangle and the resistance zones shrank. In addition, in some areas levels exceeded 21.1%: in the northern half of Wallonia, in the former industrial belt, and in the largest Belgian cities (Brussels agglomeration, Liège, Antwerp, Ghent, Namur, Charleroi, cf. Figure 3).

By 2003, all territories had seen their level of nonmarital cohabitation increase, and this was no longer largely a minority behaviour. After 2003, nonmarital cohabitation continued to increase across the country, though the pace varied across different territories (Figure 4). In any case, this evolution follows the main characteristics of the spatial pattern highlighted above. In 2015, the levels of nonmarital cohabitation reached by some municipalities were sometimes high. For example, in some Walloon municipalities half of cohabiting couples were not married (Figure 4).

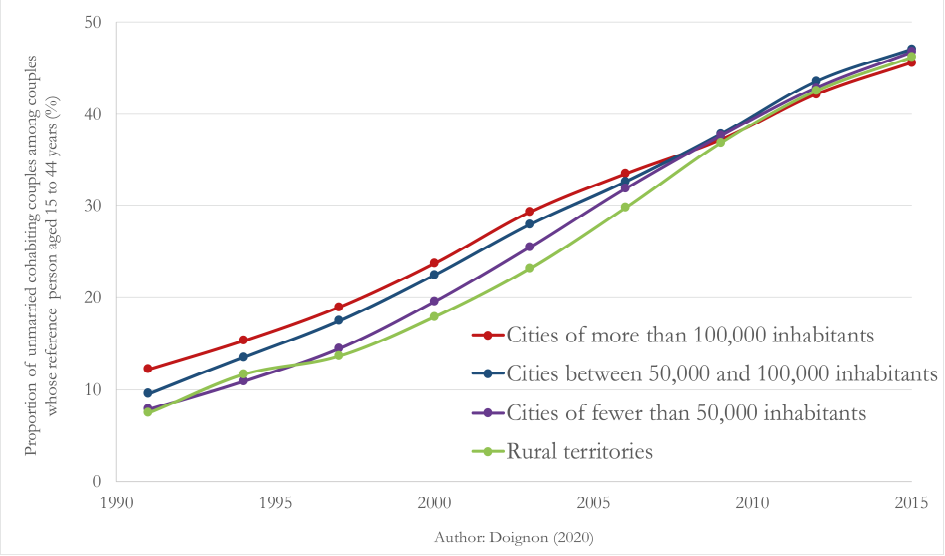
Figure 4: Nonmarital cohabitation in Belgium (2003–2015)



Note: The identification of the urban hierarchy is based on population in 2015.
Source: Belgian National Register.

The diffusion by geographic proximity seems to be accompanied by a hierarchical diffusion from large cities to smaller cities (see Figure 5). In particular, we show that not all urban territories are affected by diffusion at the same time: the main cities are affected earlier than secondary cities, and cities in resistant areas are further behind in comparison to other cities. Surprisingly, Figure 5 shows that in the period between 1991 and 1994 the proportion of nonmarital cohabitation increases more in rural territories than in small cities (less than 50,000 inhabitants).

Figure 5: The hierarchical diffusion of nonmarital cohabitation (1991–2015)



Note: The indicator is age-standardized using the Belgian population in 2003 as reference population. The identification of the urban hierarchy is based on population in 2015. For the distinction between cities of fewer than 50,000 inhabitants and rural areas see Luyten and Van Hecke (2007) and Van Hecke et al. (2009).
Source: Belgian National Register.

4. Discussion and conclusion

The results for Belgium are suggestive of a spatial diffusion by propagation and through urban hierarchy. Based on data from the Belgian National Register, we have been able to describe all the steps of this process with great precision. The maps of nonmarital cohabitation covering the period 1991–2015 are original, with no study having provided these before, especially in such geographical and temporal detail. It is possible to describe

quite clearly the spatial pattern of this diffusion. The precursor areas seem to be the cities (and their peripheries) of the former Walloon industrial belt, the Brussels agglomeration, and the large Flemish cities. Nevertheless, data series starting earlier than 1991 are needed in order to clearly identify the precursor territories. Nonmarital cohabitation appears to spread by geographic proximity from these areas to the northern half of Wallonia in the first instance. The linguistic border therefore constitutes a barrier to diffusion. After the northern half of Wallonia, the spatial diffusion extends to other territories: first, to the rest of Wallonia except the southeast, and in Flanders along the coast and in the Brussels–Ghent–Antwerp triangle; then in western and eastern parts of Flanders and east of the Ardennes (the south-eastern part of Belgium). The spatial pattern of this diffusion is broadly similar to the spatial pattern of the fertility decline in Belgium during the first demographic transition, demonstrated in several studies (e.g., Costa 2015; Lesthaeghe and Lopez-Gay 2013; Lesthaeghe and Neels 2002).

Our results are consistent with studies that claim that nonmarital cohabitation is "contagious" (Guetto et al. 2016; Di Giulio and Rosina 2007; Nazio and Blossfeld 2003; Nazio 2008). However, although it is likely that cohabitation is contagious to some degree, diffusion within municipalities might also depend on economic and social conditions (Cleland 2001). Our results might also suggest a specificity of the spatial diffusion of nonmarital cohabitation in Belgium: it is hierarchical in character, that is, it spreads from large cities to smaller ones. We also show that in the period between 1991 and 1994 the increase in nonmarital cohabitation was highest in rural areas. This specific aspect partially contradicts the hierarchical diffusion hypothesis, but overall the trends seem to confirm it. In conclusion, we found some evidence for both a propagation diffusion and a diffusion from large to smaller cities. Further analyses (not presented here) show that our results are robust when: (a) taking the 1990 level as the reference time point to observe changes in cohabitation in other years; (b) considering the age group 15–54 instead of 15–44; (c) taking another year of reference to determine the urban hierarchy; and (d) changing the number of classes from six to seven, or to five.

The fact that nonmarital cohabitation in Belgium seems to spread by geographic proximity and seems to diffuse hierarchically has important implications for future studies that might try to model the process. Propagation diffusion means that the nonmarital cohabitation levels of the areas are correlated, thus refuting the assumption of independence of observations in conventional regression models. In addition, if the urban network is a channel through which the behaviour spreads, the urban hierarchy must be explicitly incorporated into the statistical modelling of future analyses. In summary, further studies should use spatial models to account for the spatial dependency of the data and to incorporate the propagation effect, the urban hierarchy, and the compositional characteristics of areas (Anselin 1988; Elhorst 2010).

The process of spatial diffusion is not yet over, as there seems to be no saturation between 2012 and 2015: nonmarital cohabitation continues to increase in all municipalities. Further questions for future studies are whether the level of nonmarital cohabitation will stabilise, and if so at what level: Will nonmarital cohabitation reach the same level in all Belgian areas?

5. Acknowledgments

We thank Jean-Paul Sanderson, for the extraction of the data and for his advice on their use. We also thank anonymous reviewers, participants at the seminar *Midi de la Recherche* of the Centre for Demographic Research (UC Louvain), and participants at the *ARC workshop Family Transformations: Incentives and Norms* for their useful comments.

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