The Spatial Heterogeneity of the Determinants of Divorce in Belgium (1968-2015)

Background

In the mid-1960s, many countries in Europe, particularly Western Europe experienced changes in family behaviours. These changes included the decline in the traditional institution of marriage, a significant increase in the age at first marriage, a growing prevalence of individuals living alone and cohabiting without marriage, a rise in parenthood among cohabiting couples, higher divorce rates, delayed parenthood, and an overall postponement of childbearing. These trends collectively contribute to a structural shift towards sub-replacement fertility levels. The second demographic transition (SDT) theory explains each of the family changes (Lesthaeghe & Van de Kaa, 1986). They attribute the changes to the shift in individual values and posits that secularised, urbanised and highly educated populations were the first to adopt these changes. The SDT had faced criticism (Zaidi & Morgan, 2017) and several theories like the New Home Economics (Becker, 1981), Pattern of Disadvantage (Perelli-Harris et al., 2010) and Gender Revolution (McDonald, 2000) evolved to explain these family changes. Each of these theories emphasize different factors: cultural change for the Second Demographic Transition, women's labour market participation for the Gender Revolution, and economic insecurity for Globalisation Theory. Family changes thus result from a complex interplay of these factors—economic shifts, cultural transformations, educational developments, and evolving social norms—rather than a single cause.

The differences and similarities in behavioural outcomes, such as family formation patterns, marriage rates, and fertility rates, were observed not only across Europe but also within individual countries. This indicates that the evolution of family changes in Europe is not random; rather, it follows a distinct spatial pattern shaped by cultural, economic, and social factors (Klüsener et al., 2013). While examining the cultural path-dependency and spatial patterns of the First and Second Demographic Transitions in Belgium, France, and Switzerland, a similar spatial pattern was observed between the two in these countries (Lesthaeghe & Neels, 2002). Earlier studies have shown that family changes in Europe follow spatial diffusion through geographical proximity and hierarchical diffusion (Doignon, 2021), but most of these studies focus on cohabitation and non-marital births (Vitali et al., 2015). A geographical approach to family change, which examines where these changes begin, which factors affect the family changes, offers a comprehensive way to challenge and refine existing theories. However, this approach is rarely found in the literature related to family changes.

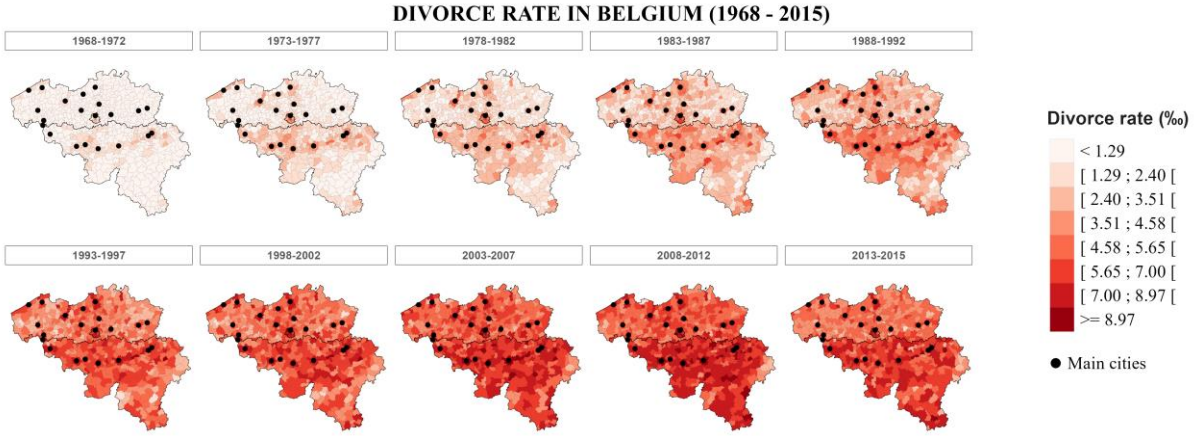
One of the most important consequences of these family changes is the weakening of unions, marked by an increase in divorce and separation (Kulu, 2012). Increasingly frequent divorces/separations carries substantial financial, social, and emotional costs (Mulder & Malmberg, 2011). The increase in divorce rates in Western Europe has already been extensively studied (Jalovaara, 2002). While previous studies on divorce proneness have primarily examined individual and couple-level socio-economic or relational factors (Jalovaara, 2002; Raeymaeckers et al., 2006; Snoeckx et al., 2006), but very few studies have examined the spatial diffusion of divorce. Studies on divorce from the demographic approach are rare and those on spatial dimension are non-existent. Thus, we aim to fill this gap, by analysing the evolution of spatial distribution of divorce and explore the spatial dynamics of the macro level determinants of divorce since 1968. In order to fulfil our objective, we choose Belgium. Divorce was a rare phenomenon in Belgium in the 19th century and most of the 20th century. However after 1975, the divorce rate in Belgium rose to about 4%, making Belgium as one of the European country with highest divorce rate (Doignon et al., 2022). Moreover, Belgium's history is characterised by remarkable different regional developments, consisting of a conservative Northern (Flanders) and a secularised Southern part (Wallonia and Brussels) with different spheres of influence. The regional difference in divorce in Belgium can be linked to the cultural and socio-economic factors related to each region.

Data and Methods

The Belgian National Register data, available since 1968, allows for the study of spatial heterogeneity in divorce rates over the past 50 years. To analyse the factors influencing divorce at the local level, we constructed a unique municipal-level database by compiling data from multiple scattered sources. This process was complicated by varying data formats, changes in municipal boundaries, and inconsistent data collection cycles. To address these challenges, we harmonized the data for 589 municipalities using a matching

Variable	Indicator	Data sources
Non-marital births	Share of non-marital births (%)	Civil registry/National Register
Secularisation index	Share of the votes for the Socialist, Communist and Liberal parties in parliamentary elections (%)	Federal Public Service of the Interior (IBZ)
Urbanisation	Population density = number of inhabitants / area	Population censuses/National Register
Population with higher education	Share of the population aged 15 and older who achieved high education (%)	Population censuses
Unemployment	Share of the unemployed men aged 15-64 (%)	National Employment Office (ONEM)
Population structure	Population aged 65 and older / population aged 15-64 (%)	Population censuses/National Register
Sex-ratio of labour market participation	Economic activity rate of women (15-64) / Economic activity rate of men (15-64)	Population censuses
Foreign population	Share of the population without Belgian nationality (%)	Population censuses/National Register

table and standardized the variables into five-year periods through interpolation and aggregation. This resulted in a rare spatio-temporal dataset that facilitates a comprehensive analysis of the spatial heterogeneity in divorce rates across Belgium.

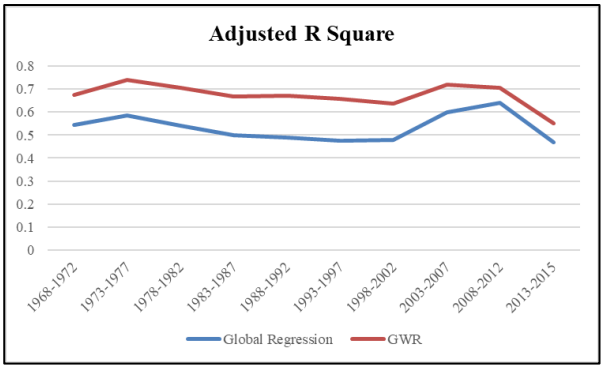


The divorce rate in Belgium was around 0.8% in 1968-1972, which rose to about 6.4% in 2008-12, and further declined to 5.6% in 2013-15. The spatial distribution of divorce rate for Belgium from 1968 to 2015 reveals a gradual increase in divorce rates over time, with significant spatial variations across municipalities. In the initial periods (1968-1972 and 1973-1977), divorce rates are generally low across most of Belgium (less than 2.4%). Higher divorce rates are observed in the Brussels agglomeration and in a few municipalities, particularly in the central and southern parts i.e. in the French Speaking Wallonia region particularly around the major cities. From 1978 to 1992, there is a noticeable increase in divorce rates across the country. The maps from 1978-1982 and 1983-1987 show more municipalities in the French speaking Wallonia part showing a higher divorce rate and an increase is also seen in the West Flanders region. By 1998-2002, the spatial diffusion of high divorce rates (5.65% and above) is evident in most parts of the country, especially in the north and central regions. The highest divorce rates (7% and above) appear more frequently from 2003 onwards, spreading widely across both urban and rural areas. In the final periods (2008-2012 and 2013-2015), divorce rates become uniformly high across most municipalities, indicating that high divorce rates have become a widespread phenomenon. However, higher rates is observed in Wallonia compared to the Flanders.

The descriptive maps reveal the spatial diffusion of divorce in Belgium, with an initial increase observed in forerunner municipalities, followed by a rise in surrounding areas. However, these maps alone do not provide insights into the local factors influencing divorce rates. To address this, we applied Geographically Weighted Regression (GWR) across ten time-periods to analyse the spatially varying relationships between divorce rates and selected independent variables at the municipal level. GWR is a powerful tool for investigating spatial non-stationarity, allowing us to explore how the effects of predictor variables on divorce rates differ across space. Unlike global regression models, which assume that relationships between variables are constant across space, GWR accounts for spatial heterogeneity by estimating separate regression coefficients for each location. This localized approach provides nuanced insights into the spatial variability of relationships, reflecting regional differences in social, economic, and cultural factors that may influence divorce rates. The GWR model uses a kernel-based weighting approach to create local spatial weights, giving more importance to nearby observations and thus capturing the local context more accurately. The significance of GWR lies in its ability to provide region-specific regression outputs, revealing localized effects of predictors such as unemployment, secularization, or socioeconomic status on divorce rates. This approach enables researchers to identify regions where certain factors are more influential, thereby offering a more precise understanding of the spatial dynamics of divorce.

Results

The adjusted R square value for each of the GWR varied from 0.55 to 0.74 indicating that the selected independent variables, i.e. secularisation index, male unemployment, ageing index, higher education, urbanisation, sex ratio of labour market participation and foreign population, explain 55% to 74% of the variation in divorce rate at the local level from 1968-2015.



Further, we mapped the local R^2 and the coefficient for each independent variable for each time-period. The local R-squared values showed substantial variation, ranging from 0.29 to 0.94, highlighting the spatial heterogeneity in how well the model explains divorce rates in different municipalities (Fig 3). Notably, for all periods, higher local R^2 values are consistently observed in and around the Brussels-Ghent and Antwerp agglomerations, suggesting that the explanatory power of the selected variables is stronger in these areas. Additionally, each period demonstrates a trend where the local R^2 values are generally higher in the Flemish-speaking Flanders region compared to the French-speaking Wallonia region. This spatial pattern indicates that the factors driving divorce rates may have distinct regional dynamics, with socioeconomic, cultural, and demographic influences potentially playing a more significant role in certain areas. By capturing these spatially varying relationships, the GWR approach provides a nuanced understanding of the factors influencing divorce rates across different regions and periods in Belgium.

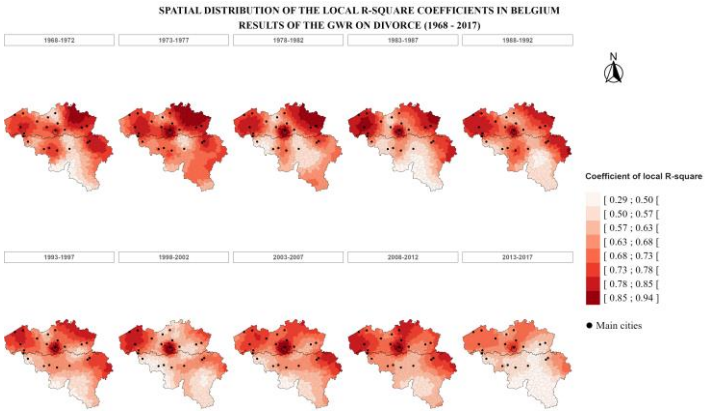


Figure 3: Spatial Distribution of Local R^2 in Belgium (1968-2015)

The maps for the coefficients for each independent variables show that each factor affected the divorce rate in each period in each municipality. For instance if we consider the secularisation index (Fig 4), in 1968-72, 1973-77, 1978-82 and 1983-87, we see that secularisation index is negatively associated with divorce rate, which indicates that a unit increase in secularization index (more catholic vote over communist, socialist, liberal and left wing votes) causes a decline in divorce rate. However, we find a positive association between secularization index and divorce rate in and around the Brussel agglomeration during 1968-72 and 1973-77. In 1988-92 and 1993-1997, a greater number of municipalities show a positive association between the two. Further, in 1998-2002 and 2002-07, we see more municipalities showing a positive association between secularisation index and divorce rate particularly in the French speaking Wallonia region. Since 2008-12, we see a sharp divide in the association between secularisation and divorce rate along the Wallonia and Flanders border, with a positive association between the two in the Southern part and a negative association in the northern part.

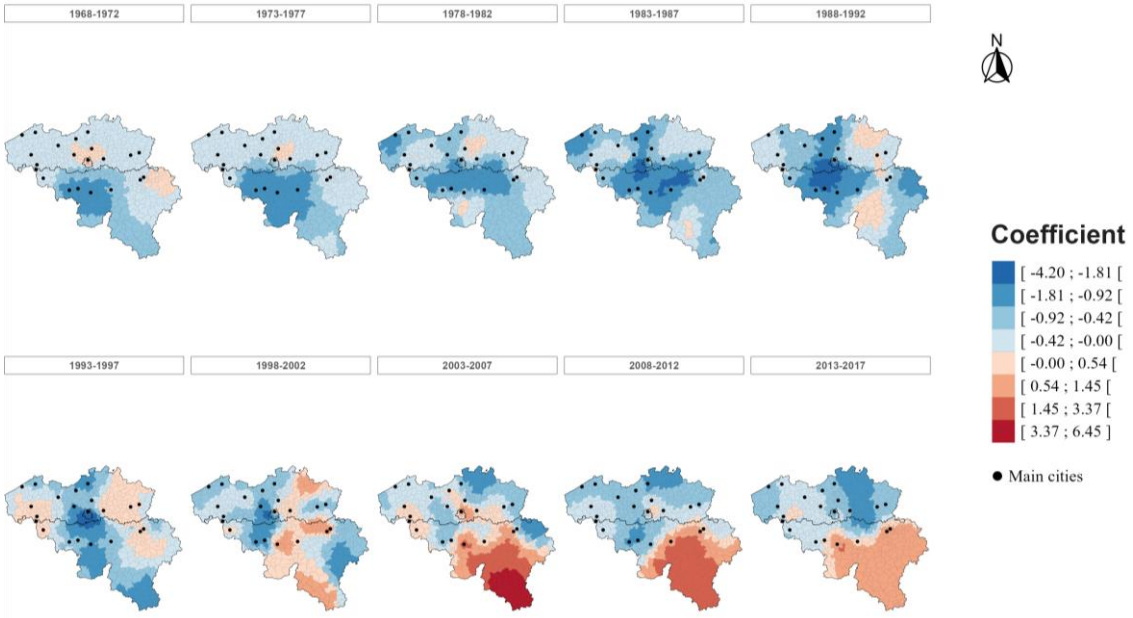


Fig 4: Spatial Distribution of Coefficient of Secularization in estimating Divorce in Belgium (1968-2015)

The association between unemployment and divorce rate is positive in almost all the municipalities, however we find a negative association between the two in the Brussel agglomeration in the initial period i.e. 1968-72 and 1973-77 (Fig. 5). However, the strongest positive association is observed in the period between 2008-12 and 2013-15.

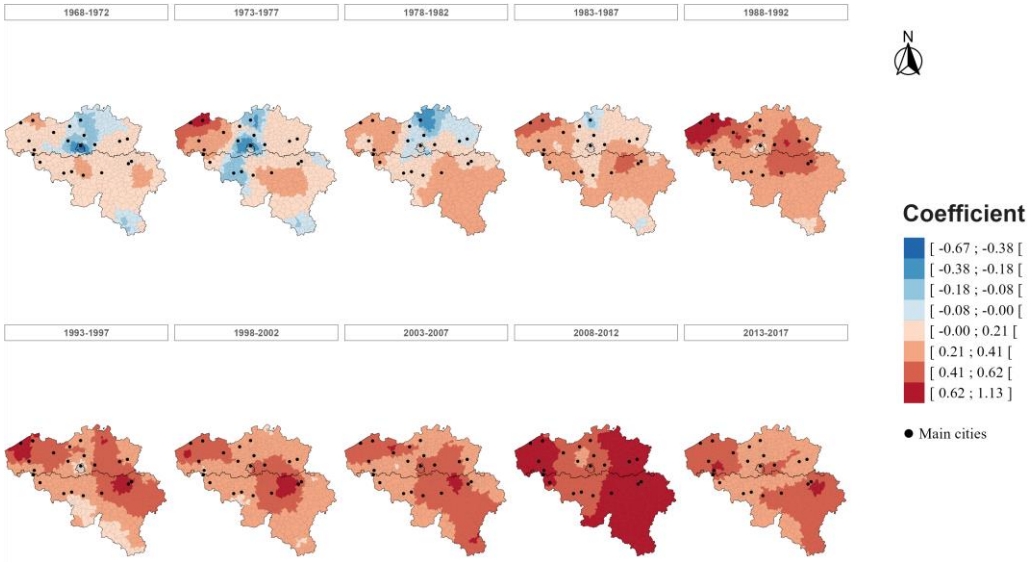


Fig 5: Spatial Distribution of Coefficient of Unemployment in estimating Divorce in Belgium (1968-2015)

Conclusion:

The present study explored the factors affecting family changes in Belgium since 1968 at the local level. Our findings support the Second Demographic Transition theory (Lesthaeghe & Van de Kaa, 1986), as we see a general positive association between secularisation and divorce however; it is in the most recent decades and particularly in the Southern French speaking Wallonia region. Moreover, strong evidence is found in the association between unemployment and divorce, thus favouring the Pattern of Disadvantage (Perelli-Harris et al., 2010). The spatial heterogeneity of divorce in Belgium highlights the importance of recognizing regional variations when applying demographic theories, such as the Second Demographic Transition (SDT) and the Pattern of Disadvantage. This suggests that these theories are not uniformly applicable across the country; instead, their relevance and explanatory power vary depending on local socio-economic, cultural, and historical contexts, underscoring the need for a more nuanced, region-specific understanding of family changes.

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