The Spatial Pattern of Family Changes in Switzerland over the Last Half Century

Background

In the 1970s, many countries in Europe experienced significant demographic changes, including sustained sub-replacement fertility, delayed marriage and parenthood, and a rise in cohabitation and non-marital births. To explain these changes, Lesthaeghe and Van de Kaa developed the Second Demographic Transition (SDT) theory in 1986 (Lesthaeghe & Van de Kaa, 1986). The SDT posits that, unlike the First Demographic Transition, which focused on declining mortality and fertility rates, this new phase includes a cultural shift towards diverse family structures, lower fertility, and the pursuit of individual preferences. Several other theories were developed like the *Pattern of Disadvantage*, which claims that the rise in non-marital cohabitation and decline in marriage are driven by poverty rather than cultural shifts (Perelli-Harris et al., 2010). Some of the other theories include the economically inspired theories like the *New Home Economics* (Becker, 1981) the theories focusing on the shifts in gender relations, such as the Gender Revolution (McDonald, 2000), theories that place cultural change at the centre of their explanation (Thornton, 2005). These demographic changes originate from innovative regions (forerunners) and diffuse spatially thus showing spatial continuity (Lesthaeghe & Neels, 2002). However, the spatial dimension of these changes is certainly one of the least studied, especially studies with a spatio-temporal approach. Studies have explained the spatiotemporal variation in family changes across Europe explaining variation not only exists between countries but also within countries as well (Klüsener et al., 2013). Thus, family changes in Europe do not show a random distribution, but is often structured by a process of spatial diffusion, as in Norway (Vitali et al., 2015) and France (Doignon, 2021).

In this article, we aim to analyse the spatial pattern of family changes in Switzerland for the last 50 years (1969-2023). The selected family changes include non-marital births, nuptiality, divorce, age at first marriage and age at birth. We also aim to compare the spatial pattern of these changes, i.e. whether all the changes follow a similar pattern or there are some variations in the spatial pattern of these changes. Switzerland is an ideal study area for exploring the spatial patterns of all family changes. Switzerland is characterised by linguistic and political-religious divisions, which provide a unique opportunity to analyze the family in a culturally and socio-economically diverse society. With four major linguistic regions (German, French, Italian, Romanche) and three religious poles (Catholic, Protestant, Freethinker), Switzerland's heterogeneity makes it an ideal case for understanding how family dynamics, such as fertility, marriage, and cohabitation, evolve in relation to cultural and ideological factors. In an article exploring the spatial continuity from the first to the second demographic transition in Switzerland show that the demographic indicators always exhibit a positive correlation with Protestantism, early secularisation, a rejection of local particularism and a stronger stress on female autonomy (Lesthaeghe & Neels, 2002). However, following the patterns influenced by cultural ideas, the French-speaking cantons led the way during the First Demographic Transition (FDT), while several German-speaking cantons have since taken the lead during the Second Demographic Transition (SDT). Thus, we see a variation in spatial continuity of demographic innovations. Additionally, the data available for Switzerland make it possible to study the family changes both at a local geographical level and over a period of almost half a century (since 1969). It allows us to include the beginning of the diffusion of the family changes in this country, which is rare in spatio-temporal studies of family changes.

Data and Methods

We use Civil Registry data from 1969 to 2023 to examine the spatial diffusion of family changes in Switzerland. The Civil Registry provides a robust and valuable data source for studying demographic trends, characterized by high quality, extensive longitudinal coverage, and annual frequency. A key advantage of these data is their availability at a granular geographical scale (municipalities), allowing for precise analysis of demographic shifts and trends across varied spatial contexts and enabling the detailed tracking of the spatial diffusion of demographic behaviours.

The key demographic indicators examined include the percentage of non-marital birth, nuptiality rate, divorce rate, and mean age at first marriage and mean age at birth. These indicators are calculated at the district level and the municipality level. Over the study period, administrative and territorial divisions have undergone changes; however, for consistency, the territorial breakdown of 2023, consisting of 143 districts and 2136 municipalities, is applied retroactively to all previous years. This approach ensures a constant territorial framework throughout the

study period, with the number of territorial units remaining stable. The annual data are aggregated into five-year intervals to limit the statistical noise, generating a dataset that spans eleven time-periods with some variations.

We adopt a dual approach to demonstrate the spatial diffusion process of family changes. First, we map the spatial patterns of each family change for each period at the municipal level. Given the large number of municipalities and the discrepancies observed in a few during the calculation of the indicators, we use the method of Stewart potential to spatially smooth the data for each time-period. This method provides a more continuous and robust representation of spatial dynamics, minimizing the impact of outliers in individual municipalities and improving the precision of the spatial pattern. Consequently, we generate eleven potential maps for each indicator, corresponding to each five-year period. These maps are standardized using a common discretization of values, enabling consistent comparative analysis across the different periods.

Second, we create synthesis maps that summarizes the spatial dynamics of each family change over the past fifty years. This is achieved by developing a typology of the evolution of family changes over time through hierarchical ascending clustering. The classification is based on the proportions of each family change across all the five-year periods from 1969 to 2023. This method groups territories that exhibit similar clusters over time, resulting in a typology of "typical clusters" in the evolution of family changes. Here we have used the district level data for clustering as there are too many municipalities in Switzerland and some municipalities show data discrepancy leading to statistical noise. Finally, we map this typology, producing synthesis maps that integrate the dimensions of space, time, and the thematic focus of the study (Doignon, 2021; Mathian & Sanders, 2014).

Preliminary Findings

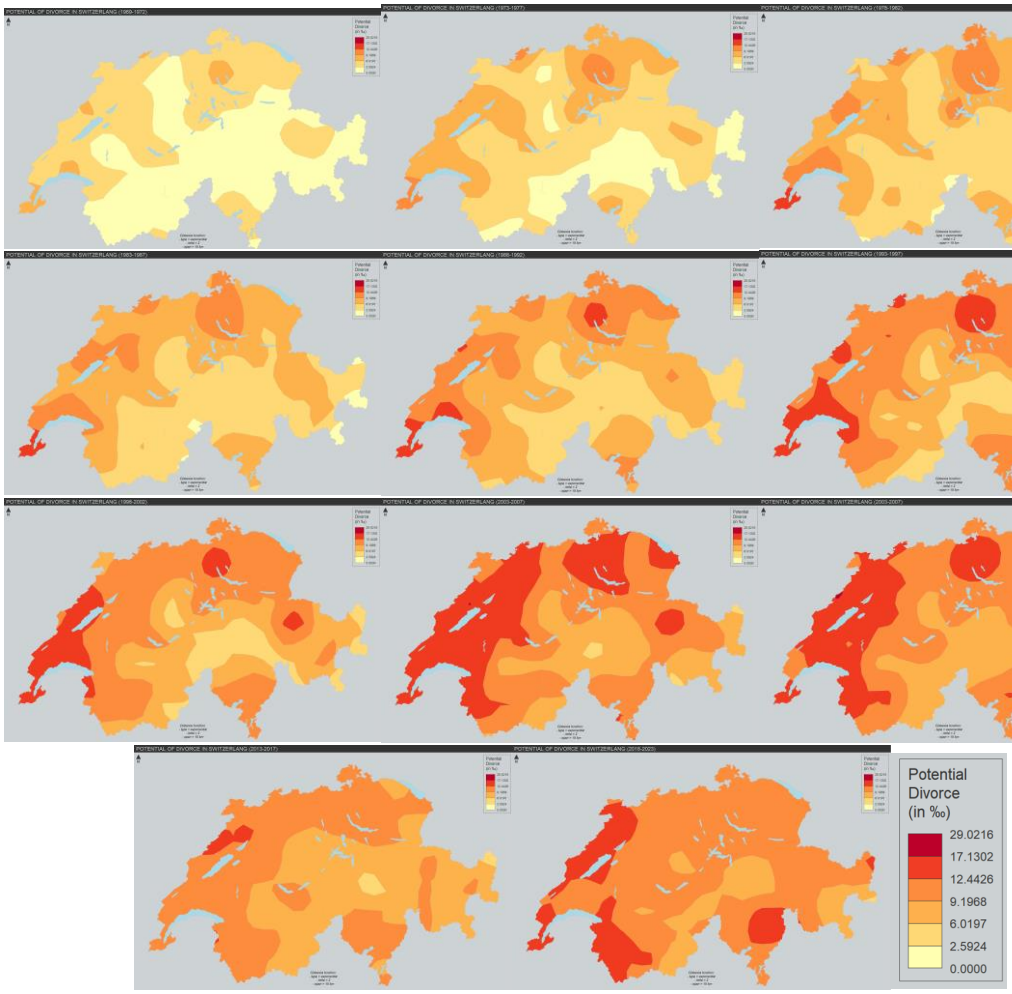

Fig 1: Potential Maps for Divorce Rate (1969-2023) in Switzerland

The non-marital birth rate in Switzerland increased from 4% in 1969-1972 to 9% in 1998-2002, and further to 26% in 2018-2021. Concurrently, nuptiality rates declined from 6.94 person per 1000 population in 1969-1972 to 4.28 persons per 1000 population in 2018-2023. Divorce rates rose from 0.75 per 1000 population in 1969-1972

to 2.37 person per 1000 population in 2003-2007, before decreasing to 1.88 person per 1000 population in 2018-2023. The mean age of women at childbirth increased from 27.0 years in 1969-1972 to 32.21 years in 2018-2023, while the mean age at first marriage rose from 23.86 years to 31.43 years over the same periods. However, the onset of these family changes varied regionally. For example, the increase in non-marital births began earlier in the French-speaking regions of Switzerland and in urbanized areas (Wanner & Fei, 2004). The potential maps for divorce (Fig 1) for 1969-2023 shows difference in evolution of divorce in different regions. This raises the question of whether all family changes followed similar regional patterns or if there were variations in their spatial diffusion. To investigate this, we constructed synthesis maps that illustrate the spatial distribution of each family change, integrating the three dimensions: space, time, and theme.

To do this, we develop a typology of clusters in the evolution of the family changes using a hierarchical ascending clustering based on the values for each period for each territory. We obtain a typology based on seven typical clusters (fig 2), which we classify according to the period at which each of the family changes began to increase. For instance, based on the hierarchical clustering of non-marital births, cluster no. 3 concerned districts could be called the forerunners as these regions registered the highest increase among all regions until 2007. While mapping, we see that these regions included urban cities like Geneva in the French speaking part, Zurich and Chur in the German-speaking region. As is indicated by clusters 4 and 7, the French-speaking part of the country were ahead in the increase in non- marital births compared to the German-speaking region. Until 1997, apart from regions represented by clusters 3 and 7, all showed an increase in non-marital births at more or less the same rate, i.e. less than 10%, all the regions showed a constant increase, but post that period regions indicated by cluster 4 and 5 showed a rapid increase over-passing the forerunner regions.

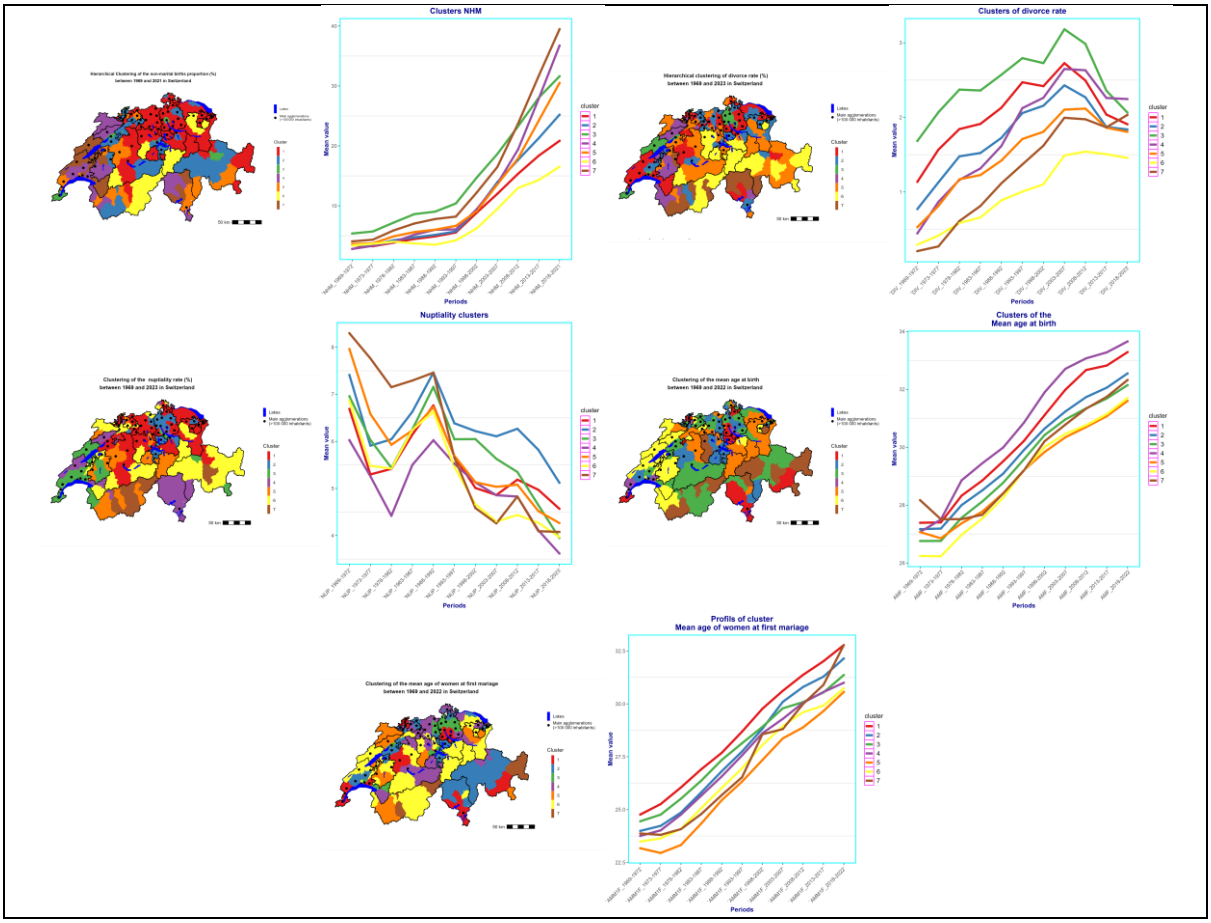

Fig 2: Hierarchical Clustering of Family Changes in Switzerland (1969-2003)

Considering nuptiality rate, we see that the nuptiality rate was lower in regions represented by cluster no 4 i.e. in French speaking region like Vaud and Neuchatel and in the Italian speaking region of Ticino. However, the highest decline in the nuptiality rate could be observed in the regions represented by clusters 7 and 3 i.e. the southern part (Valais region) and western part of the country bordering France respectively. However, if we consider regions

like Zurich and Bern the large cities, the nuptiality rate in these cities were initially lower than other parts but in the later period i.e. post 2007, these regions had a nuptiality rate higher than the other regions represented by clusters 3 and 6.

The cluster map for divorce rate shows that the divorce rate increased until 2007 and then showed a decline. The higher divorce rate was observed in and around the urban centres like Zurich, Geneva and Neuchatel. The forerunner in the increasing divorce rate was regions demarcated by clusters 3, 1 and 2. If we see the pattern of marriage and divorce, marriage was high in the initial phases i.e. 1977 and since then started showing a decline and region marked as trajectory 7 showed a sharp decline, similarly regions demarcated by trajectory 7 had the lowest divorce rate but also showed a sharp increase.

The mean age at first marriage showed an increase from 1969-2022. The forerunners in the increase were regions in cluster 1 and 3 i.e. Geneva and some regions north of Geneva, some parts of Bern, in and around Zurich and some parts in the south neighbouring Italy. The increase was then followed by regions demarcated by cluster 2, however, after 2002 these regions surpassed the regions marked by cluster 3, where the pace of increase slowed down. However, in regions like Valais, Vaud, Neuchatel, Jura and St Gallen, the increase in age at first marriage was lower throughout the diffusion process compared to other regions.

The hierarchical clustering of the mean age at birth indicates that regions identified by clusters 1 and 4 were the precursors in the increase in age at birth. In contrast, the increase was lowest in regions marked by clusters 5 and 6, primarily in the western and eastern parts of the country, bordering France and Austria.

Discussion and Conclusion

Switzerland's family demography has undergone significant changes over the past five decades, reflecting broader European trends but with unique spatial and temporal patterns. While the pace of these changes has been slower compared to countries like France, the diffusion of family changes in Switzerland shows notable regional variations influenced by its complex cultural and socio-economic landscape. The regions bordering France, particularly in the French-speaking areas, have consistently been at the forefront of these demographic shifts, such as the increase in non-marital births and the rise in the mean age at birth but later has been preceded by German speaking part of Switzerland in the diffusion process (Lesthaeghe & Neels, 2002). These patterns suggest that cultural proximity and socio-economic factors play a critical role in shaping family dynamics. Moreover, the similarities in the diffusion patterns of various family changes across Switzerland highlight the interconnectedness of these demographic processes.

References

Becker, G. S. (1981). A Treatise on the Family. *Population and Development Review*, *18*(3), 563.

Doignon, Y. (2021). Géographie d'un changement social. La diffusion spatiale des naissances hors mariage en France depuis un demi-siècle. *L'Espace Géographique*, *Tome 49*(3), 213–232. https://doi.org/10.3917/eg.493.0213

Klüsener, S., Perelli-Harris, B., & Sánchez Gassen, N. (2013). Spatial Aspects of the Rise of Nonmarital Fertility Across Europe Since 1960: The Role of States and Regions in Shaping Patterns of Change. *European Journal of Population / Revue Européenne de Démographie*, *29*(2), 137–165. https://doi.org/10.1007/s10680-012-9278-x

Lesthaeghe, R., & Neels, K. (2002). From the first to the second demographic transition: An interpretation of the spatial continuity of demographic innovation in France, Belgium and Switzerland. *European Journal of Population/Revue Européenne de Démographie*, *18*, 325–360.

Lesthaeghe, R., & Van de Kaa, D. J. (1986). Twee demografische transities. *Bevolking: Groei En Krimp*, *1986*, 9–24.

Mathian, H., & Sanders, L. (2014). *Spatio-temporal approaches: Geographic objects and change process*. John Wiley & Sons.

McDonald, P. (2000). Gender equity in theories of fertility transition. *Population and Development Review*, *26*(3), 427–439.

Perelli-Harris, B., Sigle-Rushton, W., Kreyenfeld, M., Lappegård, T., Keizer, R., & Berghammer, C. (2010). The educational gradient of childbearing within cohabitation in Europe. *Population and Development Review*, *36*(4), 775–801.

Thornton, A. (2005). *Reading history sideways: The fallacy and enduring impact of the developmental paradigm on family life*. University of Chicago Press.

Vitali, A., Aassve, A., & Lappegård, T. (2015). Diffusion of Childbearing Within Cohabitation. *Demography*, *52*(2), 355–377. https://doi.org/10.1007/s13524-015-0380-7

Wanner, P., & Fei, P. (2004). *Fécondité dans les communes de la Suisse, 1970-2000: nouvelles données et pistes d'interprétations*. Office fédéral de la statistique.