

Population Age Structures in Switzerland from a Sub-Country Perspective

Jean-Marie Le Goff

University of Lausanne, Institute of Social Sciences and Lives Center

Introduction

In this presentation, we propose establishing a typology of the age structure of the 2,131 Swiss municipalities as of the end of 2024. There are several reasons to develop an interest in age structures at the sub-country level. The first is related to the specific facilities that municipalities must develop according to the age structure of their population, such as nurseries, schools, housing, retirement homes, as well as funeral services and cemeteries (Le Goff & Ramseyer, n.d.; Siegel, 2001; Wilson, 2016). A second reason concerns environmental, climatic, and epidemiological risks, which are likely to have varying degrees of impact on populations depending on their age structure (Klinenberg, 2015; Striessnig et al., 2019). Additionally, the age structure of a community can impact intergenerational ties. Switzerland is a particularly interesting country to study from the perspective of its diverse age pyramids, due to the highly decentralized nature of its political powers, which can be exercised at the federal, cantonal, or municipal levels.

From a strictly demographic perspective, age pyramids, whether global or local, depend on population dynamics, including births, deaths, and internal and external migration. Some of these dynamics may have very ancient origins. Like many European countries, Switzerland experienced rural depopulation from the end of the 19th century onwards, particularly in the most mountainous municipalities, which became a cause for concern for the public authorities from the 1920s onwards (BFS, 1929; Lorenzetti, 2018). However, since the 1990s, the country has also witnessed a shift away from city centers to the suburbs, which can be attributed to the housing shortage in cities and the rise in homeownership ((Charton & Wanner, 2001; Wanner, 2017). These peripheralization movements are often driven by families with young children or those planning to have children in the near future. This peripheralization movement can have a significant impact on the age pyramid of a municipality when it creates a new residential neighborhood (Le Goff & Ramseyer, 2025). Added to these internal dynamics, there is a very high level of immigration of foreign workers since the end of World War II, who are becoming increasingly skilled ((Lerch & Wanner, 2025). Immigration largely explains the increase in the Swiss population since 2000, which rose from nearly 7.3 million to just over 9 million in 2024 in a context where birth and death rates were roughly balanced.

Our working hypothesis is that age pyramids at the municipal level reflect these different population movements.

Methodology

We dispose of age structure data of the permanent resident population in Switzerland for each of the 2,121 municipalities in Switzerland as of December 31, 2024 (OFS, 2025). For the moment, we do not distinguish between the gender or nationality of inhabitants of municipalities. First, we calculate the cumulative age distributions for each municipality. Then we calculate the deciles and interdecile ranges of these age structures. An interdecile range measures the age difference between the x^{th} decile and the $x+1^{\text{th}}$ decile of the population. The first decile range is defined as the range between 0 years and the first decile. The last interdecile range is not computed as we do not have the age structure after 100 years.

Secondly, the first nine interdecile ranges are taken into account for a principal component analysis (PCA) in view of data reduction and to obtain variables that are not correlated with each other. The first six dimensions of the PCA, which explain a significant part of the variance in the interdecile ranges associated with each municipality, are thus taken into account. These six dimensions are used to construct a typology of the age structures of the municipalities. The clustering method used is the high-dimensional data clustering method (HDDC) (Bergé et al., 2012). This mixture model approach has the advantage of assigning a probability of membership to each municipality for each of the defined clusters. We will consider that a municipality with a probability higher than 90% of belonging to a cluster will reflect the ideal age structure type of this cluster.

Results

The computation of interquartile ranges, PCA, and clustering resulted in the definition of seven clusters of municipalities according to their age structure (Table 1). Of the 2,131 municipalities, 499 are associated with a probability greater than or equal to 90% in one of these clusters (Table 1). The populations of these municipalities are summarized by cluster, with Figure 1 showing their age pyramids. Figure 2 illustrates the probability that each Swiss municipality belongs to one of these seven clusters.

Table 1: Distribution of Swiss municipalities according to clusters (in %)

	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5	Cluster 6	Cluster 7	n
All commune. Proba max. Belonging	32.5	23.2	3.9	11	5.4	19.6	4.3	2131

to a cluster								
Communes with a probability to belong to a cluster >=90%	10.6	11.8	6.4	9.2	8.0	42.3	11.6	499

The first and second clusters comprise municipalities whose age pyramids are the most similar to that of the whole of Switzerland. These municipalities are located on the plateau (Geneva-Bern-Zurich-St. Gallen axis, between the Alps and the Jura). The first cluster also includes several municipalities in Valais, as well as the most urbanized municipalities in Ticino, but few municipalities in the French-speaking cantons of Geneva and Vaud. This cluster includes peripheral municipalities. The baby boom generations are strongly represented, as are people aged 35 to 45 and their children aged 5 to 15. The second cluster, including peripheral municipalities in the cantons of Geneva and Vaud, as well as several cantons in eastern Switzerland, is characterized by an age pyramid in which people aged 35 to 45 and their children are more numerous in proportion in comparison with the age pyramids of the municipalities belonging to the first cluster. However, both clusters show a dip in the number of people aged 20 to 25, who have probably left their parents' homes, particularly to pursue their studies. These two clusters account for half of all municipalities (Table 1).

The third cluster comprises municipalities with a “Christmas tree”-shaped age pyramid, characterized by a scarcity of children and adolescents, and a predominance of young people aged between 25 and 35. There are a few such municipalities, but they include three of Switzerland's major cities, Lausanne, Basel, and Zurich, which are also university cities.

The fourth cluster includes municipalities located in western and eastern Switzerland. The pyramid associated with this cluster is quite unusual, showing more equal proportions across age groups, but with a high proportion of young people aged 20 to 25.

The fifth cluster comprises very localized municipalities located near Geneva. They are characterized by an age structure with a significant proportion of people aged 45 to 55, as well as a significant proportion of people aged 10 to 20, who are likely to be the children of the previous group. However, these structures are also characterized by a low proportion of people aged 20 to 40 and children under 10, suggesting a significant influx of immigration in these municipalities in the 2000s, but not in the 2010s.

The sixth cluster comprises mainly mountain communities in southern and northern Switzerland whose age structure is marked by an aging population, with young people having emigrated from these communities.

The seventh cluster comprises a small number of communities in Italian-speaking Switzerland, whose age structure is characterized by even more pronounced aging than that of the communities in the previous cluster.

Conclusion and outlook

Our approach allows us to identify different age structures in Switzerland that are highly regionalized. However, these age structures depend on demographic dynamics that still require clarification.

References

- Bergé, L., Bouveyron, C., & Girard, S. (2012). HDclassif: An R Package for Model-Based Clustering and Discriminant Analysis of High-Dimensional Data. *Journal of Statistical Software*, 46, 1–29. <https://doi.org/10.18637/jss.v046.i06>
- BFS. (1929). *Le Dépeuplement des hautes vallées de la Suisse*,.
- Charton, L., & Wanner, P. (2001). *Migrations internes et changements familiaux en Suisse: Analyse du module “mobilité” de l’enquête suisse sur la population active de 1998*. Office fédéral de la statistique.
- Klinenberg, E. (2015). *Heat Wave: A Social Autopsy of Disaster in Chicago* (W. a N. Preface, Ed.). University of Chicago Press. <https://press.uchicago.edu/ucp/books/book/chicago/H/bo20809880.html>
- Le Goff, J.-M., & Ramseyer, N. (n.d.). *Projections démographiques de la population de Plan-les-Ouates à l’horizon 2050. Conséquences sur l’occupation du cimetière communal*. Université de Lausanne.
- Lerch, M., & Wanner, P. (2025). Rising International Migration of the Highly Skilled Transforms Demographic and Geographic Patterns of Flows in High-Income Countries: The Case of Switzerland 1966–2019. *International Migration*, 63(4), e70057. <https://doi.org/10.1111/imig.70057>
- Lorenzetti, L. (2018). Enquêtes rurales et politiques de la montagne en Suisse, 1918-1945: Entre modernisation et idéologie ruraliste. *Histoire & Sociétés Rurales*, 49(1), 131–157. <https://doi.org/10.3917/hsr.049.0131>
- OFS. (2025, August 27). *Population résidante permanente et non permanente selon les niveaux géographiques institutionnels, la nationalité (catégorie), le lieu de naissance, le sexe et la classe d’âge, 2010-2019—2010-2019 | Données—Tableau*. Office fédéral de la statistique. <https://www.bfs.admin.ch/asset/fr/36021749>
- Siegel, J. (2001). *Applied Demography*. <https://shop.elsevier.com/books/applied-demography/siegel/978-0-08-049924-6>
- Striessnig, E., Gao, J., O’Neill, B. C., & Jiang, L. (2019). Empirically based spatial projections of US population age structure consistent with the shared socioeconomic pathways. *Environmental Research Letters*, 14(11), 114038. <https://doi.org/10.1088/1748-9326/ab4a3a>
- Wanner, P. (2017). *Quitter son lieu de vie pour des raisons économiques?*
- Wilson, T. (2016). Visualising the demographic factors which shape population age structure. *Demographic Research*, 35, 867–890. <https://doi.org/10.4054/DemRes.2016.35.29>

Figure 1: Age pyramid according to clusters

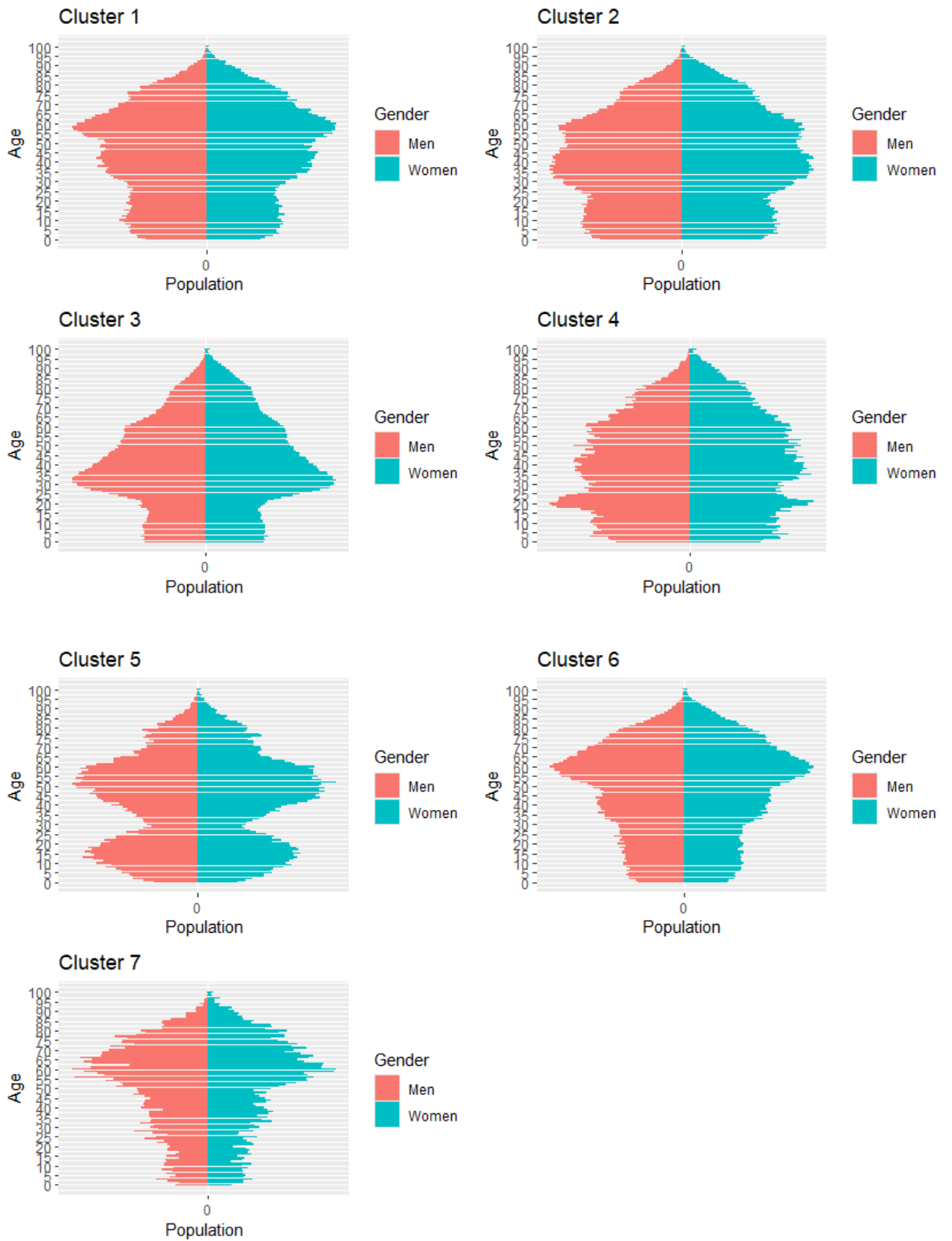
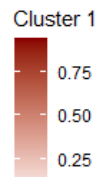
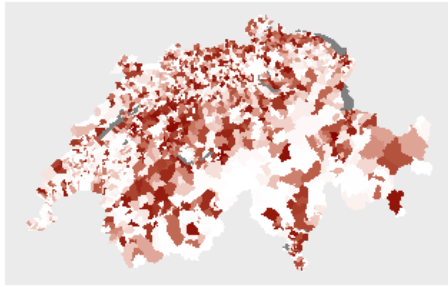
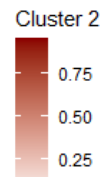
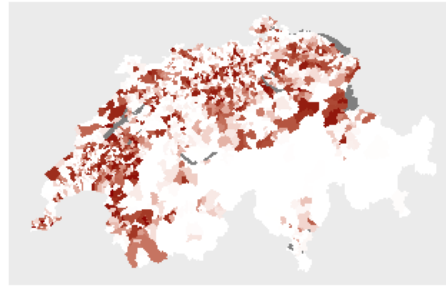


Figure 2: Probability of belonging to a cluster according to municipality

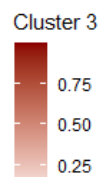
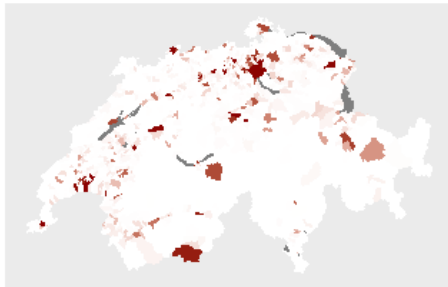
Cluster 1



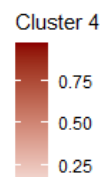
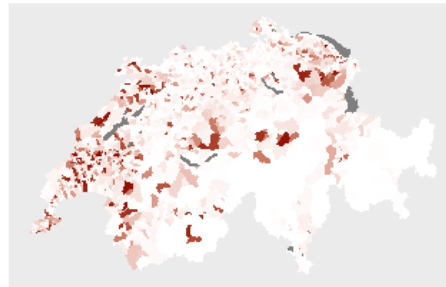
Cluster 2



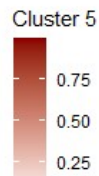
Cluster 3



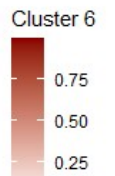
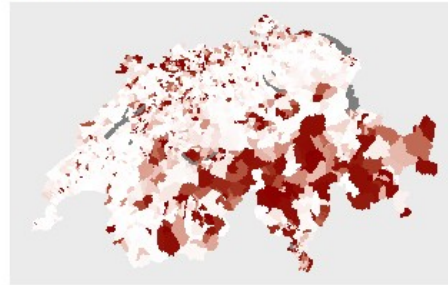
Cluster 4



Cluster 5



Cluster 6



Cluster 7

