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Theme: Urban Demography

# **The end of urban sprawl?**

## **A Swiss assessment from 1966 to 2018**

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### **Abstract**

In high-income countries in the second half of the 20th Century, internal migration redistributed population from congested city centers into the sparsely populated outskirts, raising challenges to environmental health and the conservation of biodiversity. Focusing on Switzerland, we evaluate whether this process of periurbanisation came to a halt. We expect decline in internal migration and changing geographic patterns, with a renewed attractiveness of central city areas (i.e. re-urbanisation). Relying on data from censuses, registers and surveys, we analyse migration across consistently defined rural areas and urban density zones in 79 agglomerations between 1966 and 2018. In addition to the description of trends and the geography of migration rates, we investigate sociodemographic differentials in net and directional flows by density zone, using time series model with agglomeration fixed effects. This provides insights into the diffusion of, and the motives for, different mobility patterns. Preliminary results show that, although the intensity of migration declined in the total population, the rate increased among the 25-64 years old in part because of the societal diffusion of tertiary education. The re-urbanisation process, observed in some agglomerations around 2000, appears to be a passing phase. The bolder process of periurbanisation extended recently beyond current agglomeration borders.

### **Introduction**

Population movements within countries (hereafter referred to as internal migration) play a crucial role in the redistribution of demographic and economic potential across space, especially in contemporary contexts of low fertility. The dominant pattern of internal migration in high-income countries in the second half of the 20<sup>th</sup> Century redistributed population from congested city centers into the sparsely populated outskirts – a process referred to as periurbanisation. This spatial extension of urban agglomerations poses challenges to environmental health (through increased traffic, air and noise pollution, heat island effects, etc.) and the conservation of biodiversity. Despite the importance of internal migration for sustainable development, it remains crucially understudied. We question whether the process of periurbanisation came to a halt by investigating trends and spatial patterns of migration with reference to the urbanization process over the period 1966-2018 in Switzerland.

We address two major questions arising from recent research that challenged established models of internal migration and urbanization. First, we question whether the

intensity of internal migration has declined in Switzerland. Second, we investigate whether the geographic pattern of migration has switched from the process of periurbanisation to a move back to inner city areas (i.e. re-urbanization). This analysis contributes to the existing literature in at least two ways. We provide a geographically detailed and longitudinal perspective over the past 50 years, using an internationally comparable classification of the rural-urban continuum of space and spatial delimitations of 79 urban agglomerations that are consistent over time. This detailed long-term perspective enables us to understand better the temporary changes in migration patterns within the context of bolder evolutions taking place. Second, we show how new behaviors of spatial relocation diffuse across the urban hierarchy, the urban-rural continuum and the social strata over time. We expect an increasing diversification of urban migration patterns, leading to important reciprocal in- and outflows at the local level. Rather than driving demographic growth in agglomerations, internal migration thus increasingly recomposes the populations in the different urban zones.

### **Theoretical considerations & recent evidence**

The hypotheses of a mobility transition (Skeldon, 1990; Zelinsky, 1971) and differential urbanization (Champion, 2001; Geyer & Kontuly, 1993) propose a patterned spatio-temporal diffusion and changing motives of migration during the transformation from a predominantly rural to an essentially urban and developed society. In early stages, the rising economic center – the primate city – pulls migrants looking for new income opportunities. With the regional diffusion of development, subnational income disparities attenuate, redirecting migrants towards lower-ranked cities, thereby diversifying the city hierarchy. When the society is predominantly urban, rural-to-urban migration diminishes. Inter-city and within-city movements are then expected to dominate internal migration.

As massive migration into cities led to urban and industrial congestion effects in central areas, jobs have been delocalized outward and people followed this move, thereby spatially extending the urban borders (a process referred to as suburbanization). With the shift from an industrial to a post-industrial economy starting in the 1960s, the development of transport and communication technologies reduced the significance of distance to the workplace as a residential determinant. Environmental amenities in less congested and more natural settings became important motivations for migration. This led to a second phase of urban sprawl into formerly rural areas located on the more distant urban periphery; a process referred to as peri- or counter-urbanization (Champion, 1989). This changing geography of migration over the stages of urbanization – from centripetal flows into city centers to centrifugal ones towards the cities' outskirts – has been confirmed by recent cross-sectional data (Charles-Edwards et al., 2017; Rees et al., 2017; Rodriguez-Vignoli, 2017).

*However, there are indications for a potential slowing down of periurbanisation in highly urbanized settings.* First, the intensity of internal migration has surprisingly declined in many countries across the world since 1980 (Cooke 2012; Bell et al., 2018; Kalemba et al. 2020). Second, central areas of urban agglomerations experienced renewed population growth since the turn of the 21st century in a number of European countries (Kabish and Haase 2011, Salvati et al. 2019, Dembski et al. 2019, Halbac-Cotoara-Zamfir et al. 2020). Although this process of re-urbanization has been related in Switzerland to rising migration from the cities' outskirts into their central areas in 1996-2000 (Rerat 2011), this may just be a passing phase. After a period of re-urbanisation in Germany around 2000, the process of periurbanisation indeed resumed due to the rising housing costs in city centers (Sander 2014; Stawarz et al. 2020).

Furthermore, in Western European countries the impact of internal migration on population redistribution recently became limited because reciprocal in- and out-flows equalize each other at the subnational level (Rowe et al. 2019). This points to a

differentiation in the spatial patterns of migration according to individuals' resources and their stage reached in the life-course. One may expect that adolescents and young adults move into economic hubs for educational and career development purposes, that parents look for child-friendly environments in the periphery, and that retirees head towards natural amenities alongside lower housing costs. In other words, central areas of agglomerations constitute elevator regions (Fielding 1992) for young adults, helping them to acquire the resources to find a high quality residence environment at affordable costs in later stages of the life course. Individuals with more skills, better pay and higher professional status also migrate more than the lower social strata (Carnazzi Weber 2005; Charton & Wanner 2001; Bernard & Bell 2018; Zufferey 2020). Education raises aspirations and increases financial resources to overcome the barriers to mobility (Sjaadt 1962, DeHaas, 2010) – including high urban housing costs.

The aim of this communication is to evaluate whether a potential decline in internal migration and a change in its geographic pattern has led to the end of periurbanisation in Switzerland. While the highly skilled individuals (and families) were the vanguard groups in the process of urban sprawl (Rerat 2012), we question whether they also initiated a potential “move back to the city”. More generally, we analyze sociodemographic differentials in the spatial patterns of migration across rural areas, agglomerations and their density zones in order to understand better the dynamics of population redistribution and conceive future developments.

## **Data & Methods**

We rely on individual-level data from the census 1970, 1980, 1990 and 2000, and the population register 2015-2018, which provide information on migration status, place of origin and destination, and education for the entire population of Switzerland. As individuals' educational attainment is not known in the register, we further mobilize the pooled waves of the structural survey 2015-2018 (SE, sampled from the register). Based on information about migrant transitions (i.e. the comparison of an individual's place of residence at the time of data collection with the self-declared place of residence five years earlier), we analyse migration matrices for the five-year periods 1966-70, 1976-80, 1986-90, 1996-2000, as well as for an average five-year period between 2010 and 2018 (this averaging aims at limiting uncertainty in the estimates from the SE).

We harmonized the administrative structure of the Swiss territory over the five decades, taking into account the administrative regrouping and/or splitting of municipalities, as well as exchanges of territory between them, as reported by the Swiss Federal Statistical Office (SFSO) (BFS, 2021). Municipalities were then regrouped into urban agglomerations, as defined by the SFSO based on geolocalized data (such as the continuity and form of the built-up area, population density, and the scale of over-night stays and commuting to the agglomeration's central municipality, which is represented by an official city – i.e. a municipality with at least 10,000 inhabitants; BFS, 2012). Within urban agglomerations, we further disaggregate space in three population-density classes to represent the urban-rural continuum, using the Eurostat definition (2011). (In the final version of the communication, concentric rings of rural territory around agglomerations will also be defined, in order to provide an even finer classification of the urban-rural continuum.) The spatial structure of agglomerations and their constituting zones as of 2018 is applied to the data for earlier years. In other words, we control for the rural-urban reclassification of municipalities since 1966 in order to focus on migratory dynamics across consistently defined areas over time.

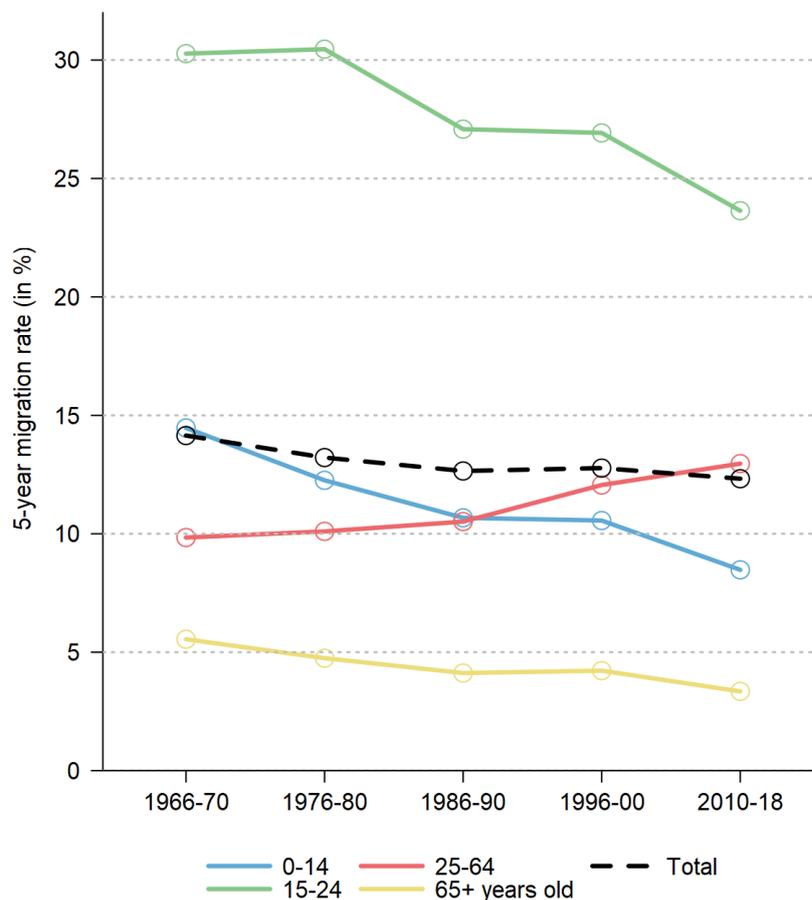
As a proxy for social status, we use the level of completed education, distinguishing (1) the primary level including individuals with at best a compulsory school diploma (9 years of schooling), (2) the secondary level containing persons with a professional training or a high school diploma, and (3) the tertiary level including those with a university degree.

Due to limitations in the comparability of the data over time, we study educational differentials only among the working age population aged between 25 and 64 years. The analysis relies on descriptive statistics, cartographic and regression methods applied to net and directional migration rates for 126 distinct agglomeration density zones and the rural territory.

### First preliminary results

Figure 1 shows the trend in overall internal migration across rural-agglomeration borders, from one agglomeration to another, and between density zones within agglomerations. The five-year rate of migration of the total population declined between 1966-70 and 2010-18, but only slowly from 14% to 12%.

*Figure 1: Migration rate across the city hierarchy and rural urban continuum, by age group, Switzerland 1966-2018.*

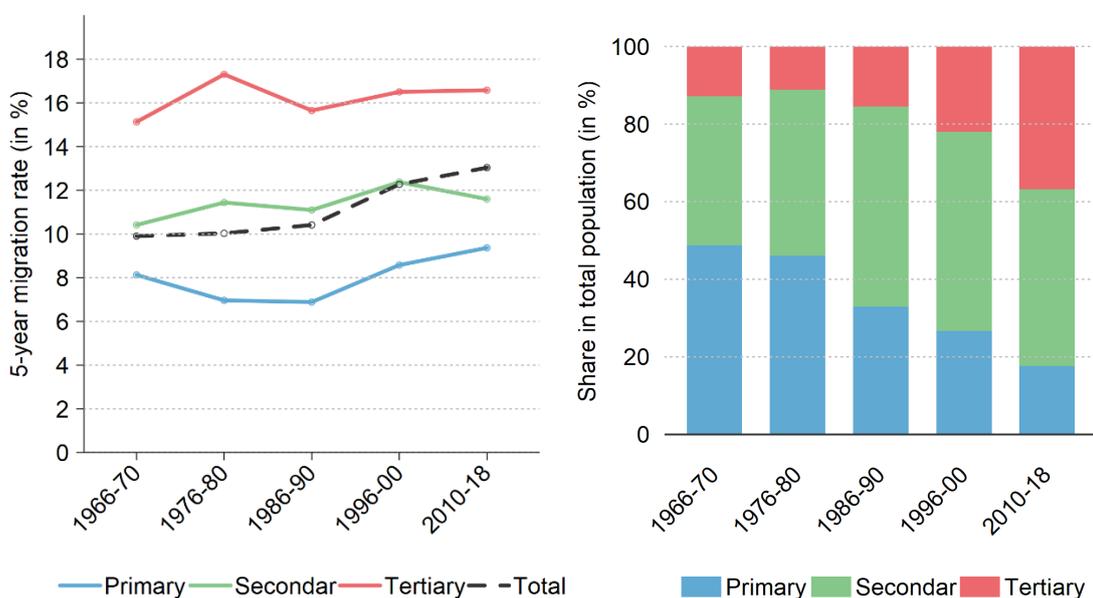


Sources: Population Censuses 1970, 1980, 1990, 2000, Population Register and Structural Survey 2015-18.

Adolescents aged 15 to 24 experienced the strongest decline from 30% to 23%, which can be related to the decentralization of the higher-level education infrastructure reducing student migrations, and to the postponement of crucial life course transitions such as the first marriage and first birth. Yet this age group remains by far the most migratory. Family migration is also on the decline, as evinced by the falling rate among young children under 15 years of age. Retirees move less over time, too.

However, internal migration actually increased in the working age population (25 to 64 years), especially from the mid-1980s on. Behavioral changes and the structural recomposition of this population according to educational attainment explain this trend. As shown in Figure 2, all educational groups experienced a rising migration rate over time. Furthermore, the tertiary educated population not only move more than the lower skilled groups, but are also increasingly represented in the working age population – from only 13% in 1966-70 to 39% in 2010-18, when the lowest skilled group represented only 19% (down from 48%). The diffusion of higher-level education played a crucial role in pushing up internal migration in the working age population, thereby attenuating the declining trend in the total population.

Figure 2: Education-specific net migration rates across the city hierarchy and rural-urban continuum, as well as population distribution by education, 25-64 years old population of Switzerland, 1966-2018.



Sources: Population Censuses 1970, 1980, 1990, 2000, Population Register and Structural Survey 2015-18.

To gain a first understanding of longitudinal migration profiles of urban density zones in the 79 agglomerations and the rural territory of Switzerland, the Figure 3 maps their net migration rates in 1996-70, 1996-00 and 2010-18.

In the 1960s, the still massive rural-to-urban movements coexisted with the emergence of periurbanisation in Zürich and Basel: in these two largest cities of Switzerland, central areas experienced a negative migration balance, which contrasts with the migratory gains in the surrounding and less densely populated urban zones. This process of urban sprawl diffused down the city hierarchy to almost all cities until the late 1980s, while the migratory losses in rural areas slowed down.

In 1996-2000, however, the central areas of a number of agglomerations (i.e. Zürich, and several others in the French-speaking West and the Italian-speaking South of Switzerland) indeed reveal a slightly positive net migration alongside sustained gains in the urban periphery. But this “move back to the city” was only short-lived. In 2010-18, all central areas of agglomerations had again negative migration balances, especially in the West and South of the country. In Zürich, the migratory losses now concern almost all agglomeration zones. Net migration remained positive only in the extreme fringes of the agglomeration. The migration rate also became positive in rural areas for the first time since 1966. Thus, recent periurbanisation takes place outside of the agglomeration and

further extends its spatial delimitation. (We plan to differentiate the rural areas located on the fringes of agglomerations from the remaining rural territory of Switzerland in order to provide a spatially more nuanced picture of this recent sprawl beyond current agglomeration borders).

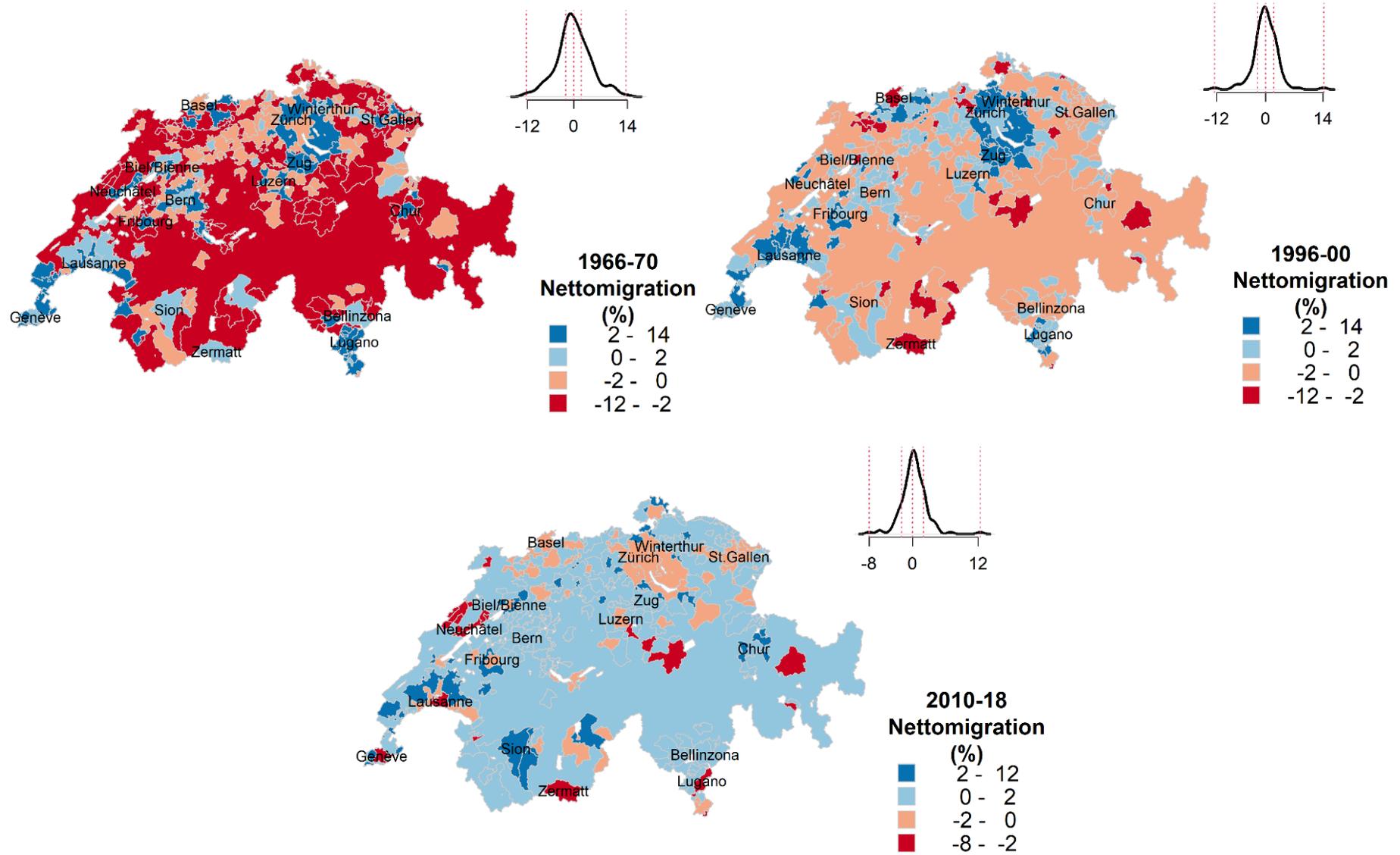
The maps for the three educational attainment groups of the working age population (not shown) further reveal that this spatial eviction from the entire agglomeration of Zurich concerns mainly the middle skilled strata. The concentric urban zones closer to the city center continue to count more arrivals than departures among the highest and the lowest skilled population strata. Furthermore, net migration rates of adolescents (aged 15 to 24) in central areas of agglomerations remain strongly positive throughout the observation period, whereas both the rural areas and the urban periphery constantly lose migrants.

## **Outlook**

Preliminary results show that, the intensity of internal migration indeed declined in Switzerland, but not among the 25-64 years old group, in part because of the societal diffusion of tertiary education. The re-urbanisation process observed in some agglomerations around 2000 also appears to be a passing phase. The bolder process of periurbanisation continued recently beyond current agglomeration borders.

This is work in progress. We will further compare the trends in national-level migration rates from rural areas into agglomerations, with those between and within agglomerations. The structure of directional migratory exchanges between the different urban density and rural zones will also be described over time at the national level, using circular migration plots. The final version of the communication will further include results and predicted trends from time-series regression models of net and directional migration flows in urban density and rural zones, with the following explanatory variables: the city hierarchy, demographic and educational profiles of the population, and agglomeration fixed effect to control for unobserved particularities of cities. This will provide insights into the spatial and sociodemographic diffusion of changing and diversifying migration patterns, as well as into their various motivations, over the process of urbanization.

Figure 3: Net migration rate in the agglomeration density zones and rural Switzerland, 1966-2018



Sources: Population Censuses 1970, 1980, 1990, 2000 and Population Register 2015-18. Rural zones will be further differentiated to provide a finer-grained picture of the recent periurbanisation.

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