

POLYNET Action 1.1

Commuting & the definition of functional urban regions



Northern Switzerland

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Commuting & the Definition of Functional Urban Regions

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1. Introduction

The spatial expansion of economic networks over recent decades has led to the formation of Metropolitan regions in Switzerland as in other countries. Following analysis of the Swiss census of 1990 the Swiss Federal Statistical Office defined a new spatial category of five metropolitan areas: Basle, Berne, Geneva-Lausanne, Ticino and Zürich. According to this definition a metropolitan area consists of a core agglomeration and a group of further agglomerations with a commuter proportion in the core agglomeration of at least 8.3%.

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With the 'European Metropolitan Region of North Switzerland' studied in this analysis, a further step is taken, considering all concentrations of settlement in the densely-populated triangle between Basle, Lucerne and St. Gallen as parts of a system operating with metropolitan functions. Metropolitan functions are high-value, specialised services supplying a wide geographical area, which unite the area into a functional network (Behrendt, Kruse 2001). The providers of such services are concentrated in the agglomerations of a metropolitan region. The most important eight agglomerations of the European Metropolitan Region of North Switzerland have been chosen for the purposes of this analysis. These are shown in Fig. 2 and will be referred to below as FURs (functional urban regions). The designations FUR and agglomeration are used synonymously.

The geographic category of European Metropolitan Region, defined less by physical networks (e.g. commuter figures) than by virtual economic and commercial chains, has still not found its expression in the official regional and spatial development policies of Switzerland.

The national regional policy, introduced in explicit form in the 1960s, has, until a few years ago, concentrated on strengthening peripheral regions with weak development and structures, above all in the Alps and Jura regions. A restructuring of regional policies was not undertaken until towards the end of the 1990s, with the fundamental thrust of solving redistribution objectives through growth objectives. Thus the economic significance of the urban areas for the whole of Switzerland began to assume a position closer to the central focus.

A parallel development took place in the national planning and land use policies. The basic intention of the Swiss planning system, with its laws developed in the 1970s, was the economic use of land and protection of rural areas against uncontrolled urban spread. In the 'Outlines for Spatial Planning in Switzerland' ('Grundzüge der Raumordnung Schweiz' (Bundesamt für Raumplanung, 1996)), drawn up in 1996 by the Federal government, the strategic emphasis was shifted from negative planning to the targeted promotion of desirable planning processes. Accordingly, the four strategies are: organising urban zones, strengthening rural zones, protecting areas of natural and landscape importance and integrating Switzerland into Europe.

It is particularly noteworthy that urban areas are recognised as units and should be actively developed. In view of the strong federal divisions of Switzerland, this is an important step in the direction of an agglomeration policy for the Federal government. Such a policy has not existed until now, as agglomerations were hitherto considered by the Federal government as groups of individual local government units, and thus not as distinct bodies. Not even the local authority of Zürich could officially negotiate with the Federal government, in contrast to the cantons, some of which represent only a fraction of the population of Zürich. The coordination of the agglomeration development was therefore until recently exclusively a matter for horizontal cooperation between the local government units and the cantons, which was problematic and could lead to conflicts.



Figure 1: Metropolitan Region Northern Switzerland

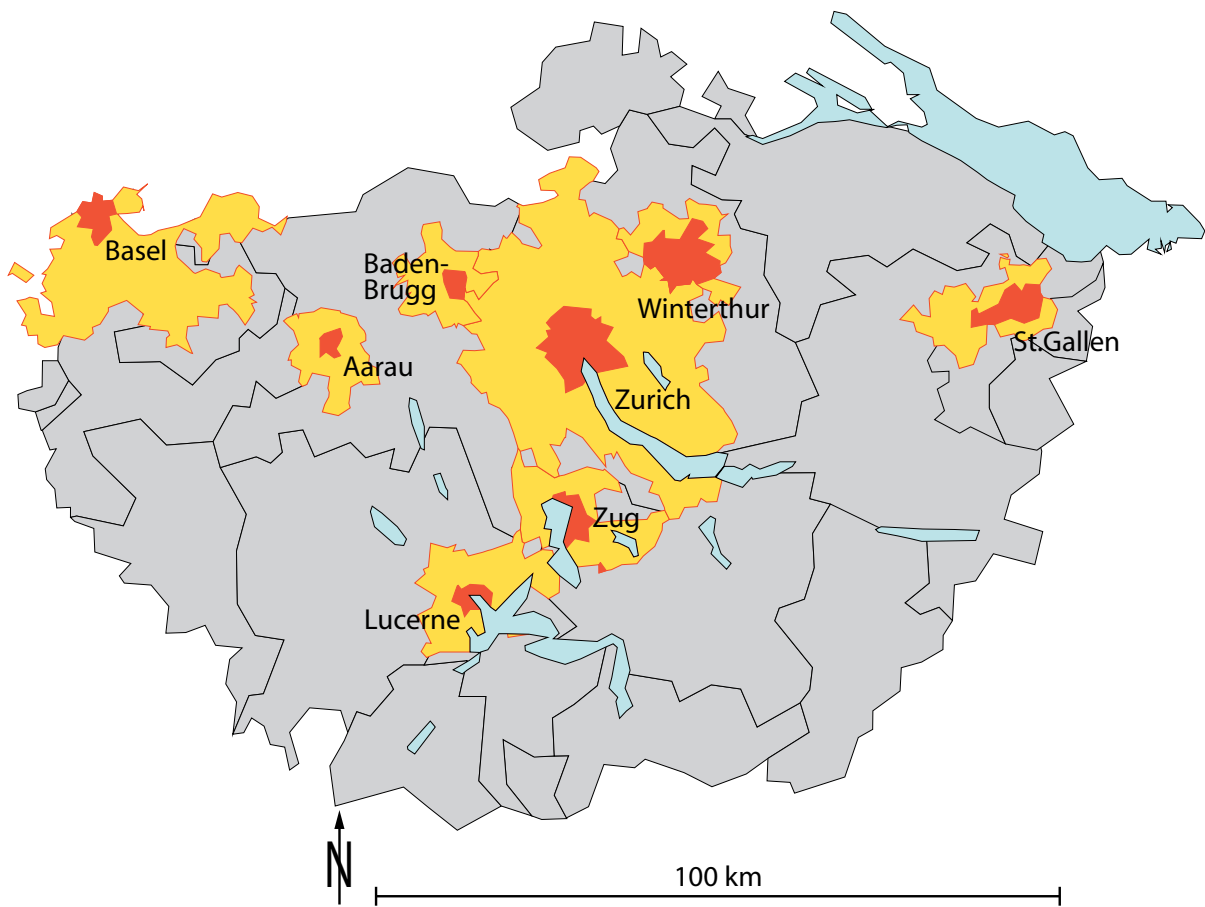


Figure 2: Metropolitan Region Northern Switzerland Functional Urban Regions (FURs)

2. Population

Over the course of the 20th century, the population of the whole of Switzerland has more than doubled to around 7.3 million in 2002. The biggest growth was between 1950 and 1970. Since the 1980s, immigration, rather than the birth rate has been the most significant population growth factor. The proportion of foreigners, 20.3% (2003) is very high in comparison with the rest of Europe, which may be explained inter alia by the restrictive naturalization policies. The demographic ageing process is similar in Switzerland to that of most other European countries. The proportion of the population aged over 64 was 15.5% in 2002 (5.8% in 1900), and the proportion of under-15s was 16.9% (31.0% in 1900). The proportion of elderly people is higher in the urban areas (i.e. parts of agglomerations) than in rural areas (i.e. not part of an agglomeration). Connected with this is the different household structure, with more households with children in rural areas than urban ones.

Regional demographic differences are manifest in Switzerland between rural areas (in particular the Alps and Jura) and urban areas, and slightly less marked between the linguistic and cultural regions (German Switzerland, Romandie, Ticino, Catholic and Protestant areas). However, the small size of Switzerland and low proportion of isolated regions means that excessively strict regionalisation does not exist. Depending on interpretation, three to seven major conurbation regions can be identified for Switzerland, involving the majority of the country. Small individual peripheral areas only remain in the Alps, the Jura region and the central plateau. One of these major conurbation regions the European Metropolitan Region of North Switzerland is considered in this study.

Around 3.7 million people live in this Metropolitan region, around 2.8 million (over 75%) of whom live in FURs, i.e. the urban areas. Around 2.0 million people live in the eight FURs of this Metropolitan region investigated for Polynet, with the remaining 0.8 million distributed among smaller FURs and isolated towns. The agglomeration of Zürich has a dominant role. Around one in ten of the population of the Metropolitan Region live in the city of Zürich; around one in three in the whole agglomeration. Zürich is the only FUR in Switzerland with a population over one million. Behind Zürich is the FUR of Basle, in which one in eight live in the Metropolitan Region. In Lucerne, the third largest FUR, only one in twenty live in the Metropolitan Region of North Switzerland. The rank-size structure of the eight FURs under investigation is shown in Fig. 11.

The most significant development in the spatial distribution of the population over recent decades, and there is little difference here between the Metropolitan Region of North Switzerland and the other conurbation regions of the western industrial states, has been suburbanization. The core cities lost a considerable amount of population, while the outer districts, at first closest to the centres, but then increasingly further away, grew hugely and rapidly. As the jobs remained to a large extent in the city centres, agglomeration belts grew, expanding ever further into the surrounding areas. The agglomerations of Switzerland were delimited by an official list of criteria by the Swiss Federal Statistical Office, according to which the agglomeration of Zürich comprised 80 municipal districts in 1980, while in 2000 it was 132. The agglomeration of Basel comprised 26 municipal districts in 1980, with 66 in 2000.

However, the agglomerations are merely a statistical delimitation. The processes of urbanisation extend beyond these limits and increasingly include areas, once strongly rural in character, between the agglomerations. In this context we speak of periurbanisation. In the whole of the Swiss central plateau there are only very few regions outside the agglomerations which do not show a marked population growth with simultaneous massive reduction in the numbers employed in the primary sector. In the 1990s the population figures increased in the rural areas even more markedly than in the urban areas. Numerous experts therefore warn against urban sprawl and urbanisation of the whole of the central plateau between Lake Constance and Lake Geneva.

A comparison of the population developments between the eight FURs in the Polynet study shows quite an even distribution (see Fig. 4). Zürich, by far the biggest agglomeration, shows a proportionately similar growth to that of smaller agglomerations such as Aarau and Baden or the medium-sized agglomeration of Lucerne. Clearly the highest growth figures are for the agglomeration of Zug. This benefits from its proximity to Zürich and offers an attractive employment market and low taxes. Zug therefore attracts numerous people from the rest of Switzerland. In contrast, the agglomeration of Basle has low relative population increases. It should be mentioned that Basle is a tri-national

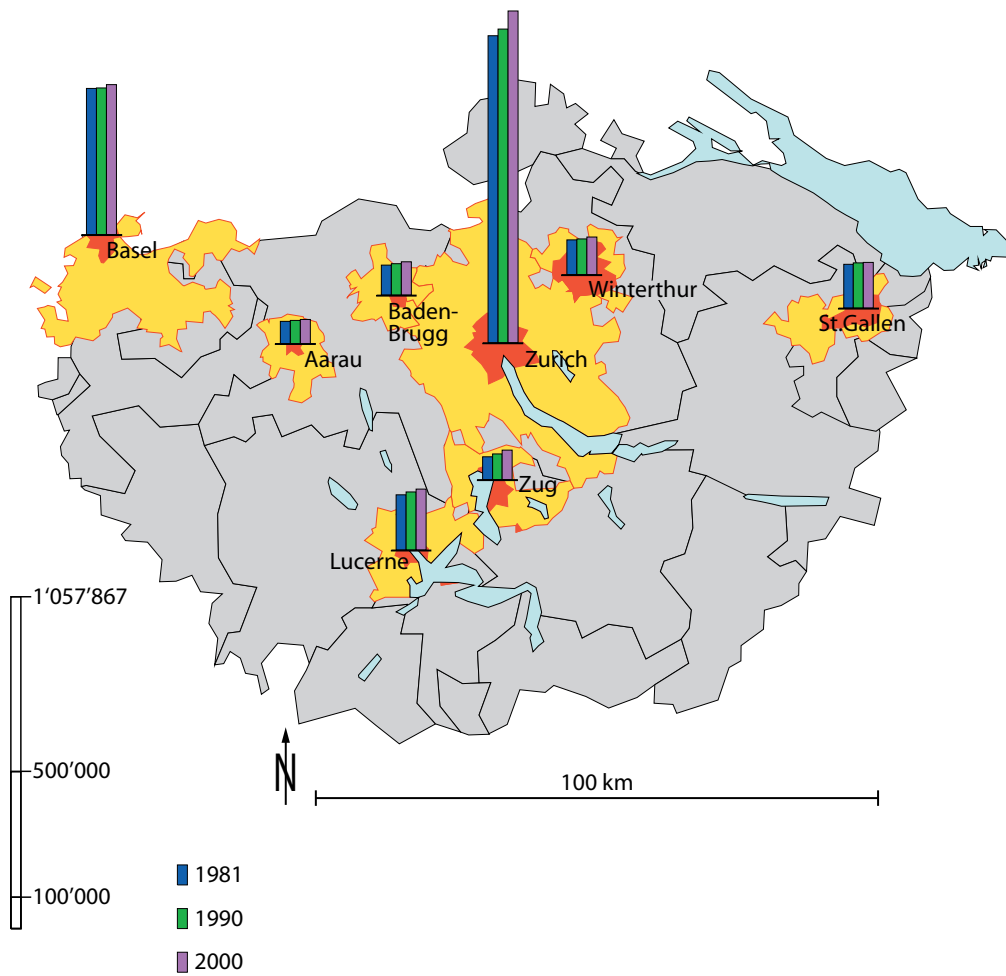


Figure 3: Population 1981, 1990, 2000

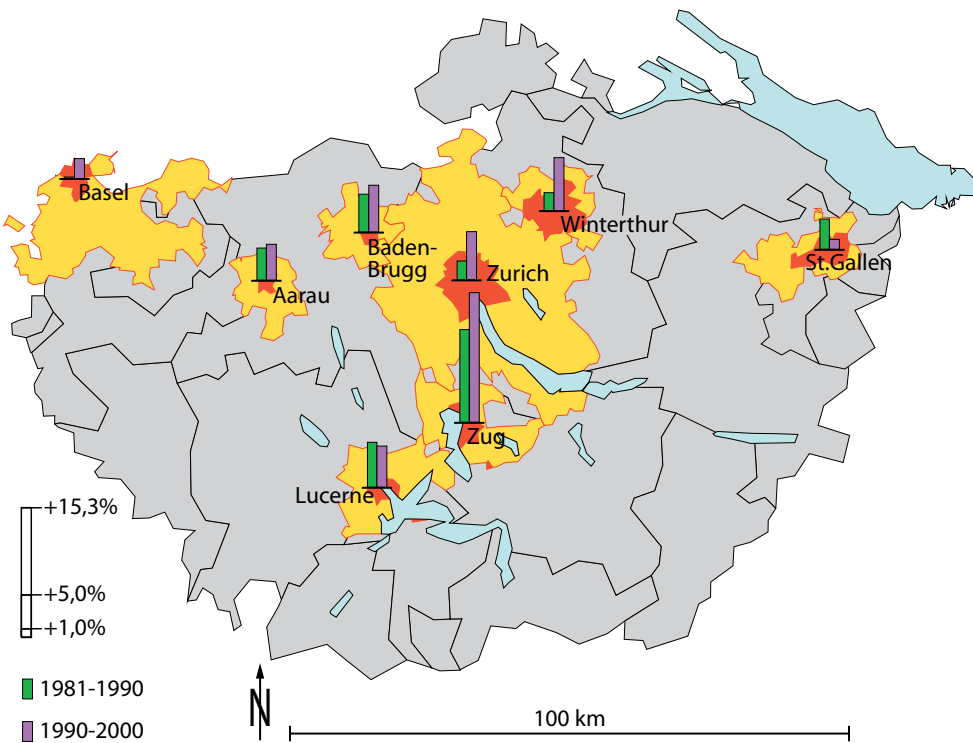


Figure 4: Population Change 1981-2000

agglomeration (divided between Switzerland, Germany and France), but only the Swiss part is under consideration here.

Within the FURs it is apparent that the core cities have lost population between 1981 and 2000, with the exception of Winterthur, Zug and Baden. The agglomerations as a whole have grown, only due to gains in the suburban local authority areas, recently above all due to the districts on the furthest peripheries of the agglomerations. Here, the agglomerations are spilling out into the periurban areas which consist of small municipal districts, mainly with very high growth rates. Numerous municipalities are located on the boundaries between the agglomerations, which leads to new evaluations of the population data allocating certain municipalities to other agglomerations, or merging agglomerations.

In view of the strong federal nature of Switzerland, and the high degree of sovereignty of the cantons, it is potentially explosive that, with the exception of Zug, Baden and Winterthur, all the FURs being studied extend beyond canton boundaries. The agglomeration of Zürich is divided between three cantons (Zürich, Schwyz and Aargau), and the agglomeration of Basle between four cantons (Basel Stadt, Basel Landschaft, Aargau, Solothurn) and, as stated, over three countries.

The processes of suburbanisation and periurbanisation entrain some further problems. As it is above all families with higher incomes who move from the core cities to the surrounding districts, the core cities lose their tax revenue capacity, while at the same time the proportion of persons receiving benefits increases. In addition, the ever-increasing distances between home and workplace lead to increases in traffic, in particular in the employment centres, which must largely bear the increased transport costs themselves.

3. Employment

In Switzerland, as in the other western industrial countries, there was a far-reaching change in economic structure in the second half of the 20th century. In 1960, 14.5% of those of working age were still employed in the primary sector (agriculture), and 46.5% in the secondary sector (industry), while in 2002 this was just 4.1% and 25.1% respectively. In contrast, the proportion of those employed in the tertiary (service) sector increased from 39.0% in 1960 to 70.8% in 2002. However, there are also contrary developments within the tertiary sector. The sectors of trade, repairs and hospitality show declining figures, those of public administration, and the credit and insurance industries low growth, and those of education, health and social security, information technology, research and development show strong growth. The increased employment figures are above all due to more women entering employment in recent decades.

In the secondary sector in Switzerland, according to the employment figures, the following sectors are currently the most significant: construction (293,000), electrical and light engineering (133,000), mechanical engineering (105,000) and the metalworking industry (99,000). In the tertiary sector it is the following sectors: repairs of consumer goods and trade (650,000), company-related services (486,000), health and social security (461,000), education (274,000), transport and communications (272,000), hospitality (241,000) and credit and insurance industries (220,000).

In comparison with the rest of Europe, Switzerland has very low unemployment figures (unemployment rate in 2002: 2.9%) and a high employment rate. The latter can be explained by the fact that Switzerland has the second-highest rate in Europe for part-time employment and also the second-highest rate of employees over 50. In addition, working hours and wages and salaries are above average.

Considering the spatial distribution of the economic sectors, it becomes apparent that industries have the highest proportion of employees in areas near to the biggest agglomerations and rural areas, while the service sector has high employment figures spread evenly across Switzerland. However, if the service sectors are differentiated on the basis of their value creation, there is a clear urban-rural contrast. The sectors with strong value creation, like company-oriented finance and consultancy, or research and development businesses, are concentrated in the major centres. On the other hand, the dominant sectors in the rural regions are those with less value creation, like the personal and social service sectors. The high proportion of the service sector in numerous Alpine regions, for example, can be

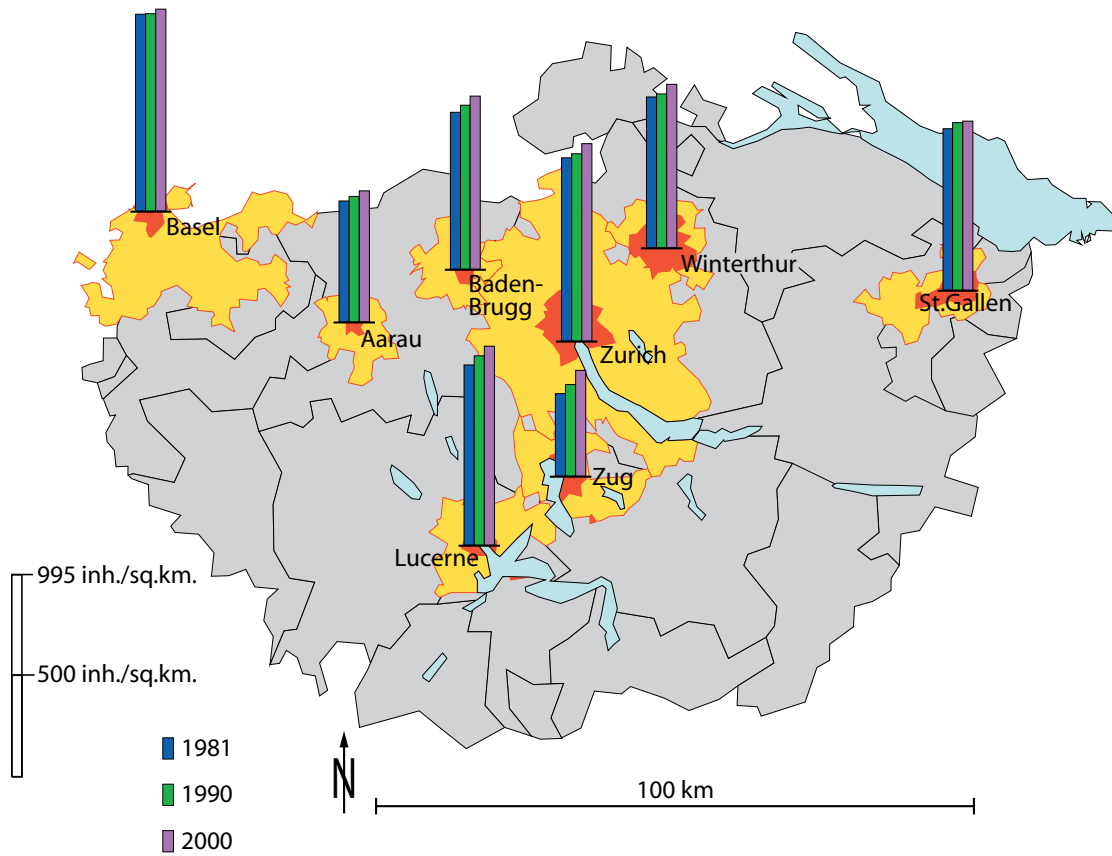


Figure 5: FUR Population Density, 1981, 1990, 2000

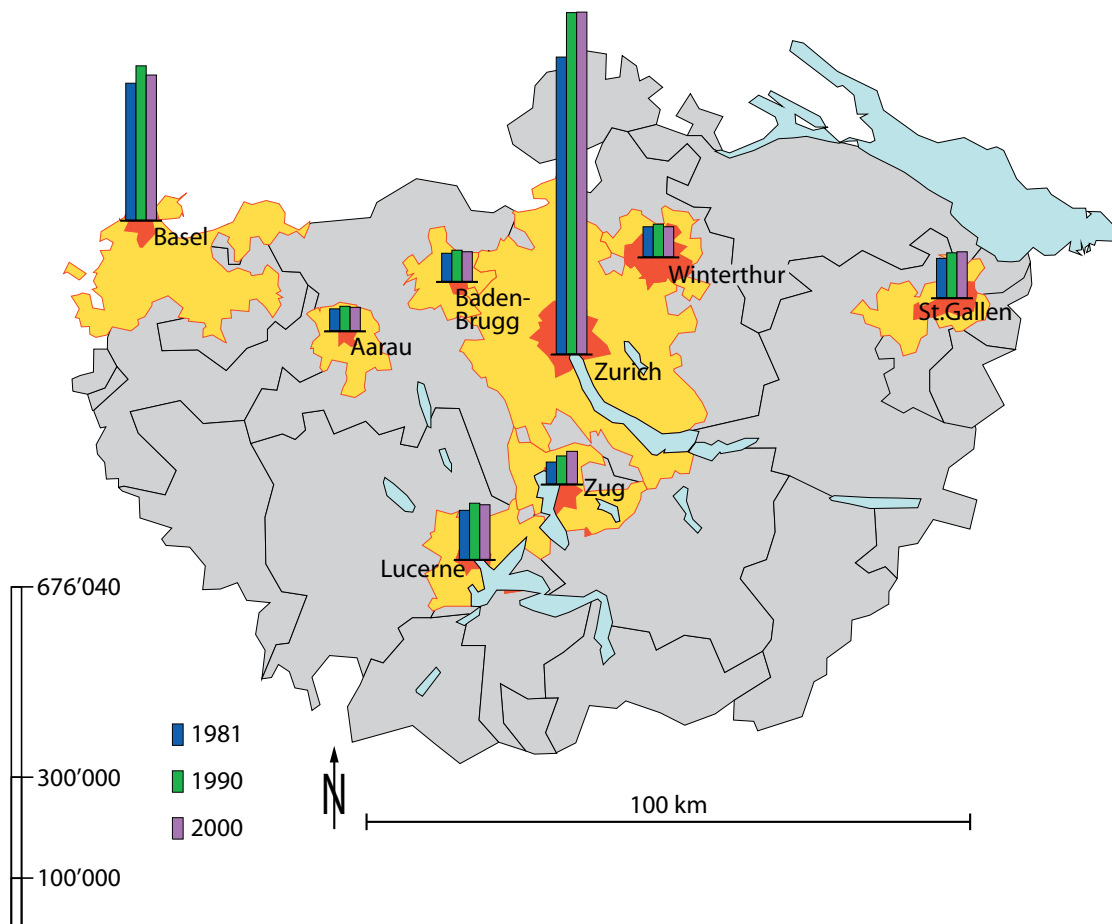


Figure 6: Employment, 1981, 1990, 2000

traced back to the significance of tourism there.

In the FURs of the European Metropolitan Region of Zürich, the development of the employee numbers in the 1980s and 1990s has two different aspects (see Fig. 7). While in the 1980s all eight of the FURs being examined showed clear growth, in the 1990s, five of the eight FURs saw a decline. A strong growth in employment numbers, even in the 1990s, was only experienced by the agglomeration of Zug, primarily due to the extremely favourable framework conditions for legal entities due to its proximity to Zürich. Low growth was experienced by the agglomerations of Zürich and St Gallen. The employment figures shrunk considerably in Winterthur, where the secondary sector was particularly dominant until into the 1990s (in particular mechanical engineering), and where the reduction in the sectors affected was not sufficiently compensated for by growth in the tertiary sector. A similar situation exists in Baden (electrical industry) and Basle (chemical and pharmaceutical industry).

The unemployment rate of 2.2% in the Metropolitan Region of North Switzerland in 2002 was a little lower than in the rest of Switzerland, where it was approx. 3.1%. A relatively clear contrast is apparent between German Switzerland and the Romance-speaking cantons, but above all between rural and urban cantons. The unemployment figures are particularly low in the rural areas of central Switzerland (e.g. canton of Uri: 0.7%) and East Switzerland (e.g. Appenzell Innerrhoden: 0.8%). The highest unemployment rate in the country is the canton of Geneva at 5.1%, the highest unemployment rates in the Metropolitan Region of North Switzerland are the cantons of Zürich and Basle City at 3.0%. Within the canton of Zürich there is a clear division between the core cities and inner agglomeration rings, with higher unemployment rates, and the outer agglomeration rings and rural areas with very low unemployment rates.

At 5.2%, the employment figures grew between 1998 and 2001 in the Metropolitan Region of North Switzerland slightly more than in the rest of Switzerland where they were 4.5%. The most sustained growth was in the urban regions and those near towns and cities, while the rural areas tended to show lower growth figures or even reductions (canton of Uri: -0.7%).

Considering the growth rates in the strong value creation sectors, there is also an urban-rural downward gradient with high growth in urban regions and those close to towns and cities, and low growth or losses in rural-peripheral areas. This shows that highly-qualified jobs are still increasingly concentrated in the major urban centres and their immediate surroundings, while in peripheral regions only a certain quantity of such jobs are available. The frequent consequence of this is migration of qualified workers from peripheral regions. The situation is less problematic for those regions which are within commuting distance of the important centres, as they are attractive as residential areas and consequently have increasing population figures. Considering the increasing commuter figures (see Fig. 10), this is very often the case. However there are still a few areas, in particular in the Alps and foothills, which succeed neither in creating highly-qualified jobs nor in being viewed as attractive places to live. Here there is the risk of population decrease due to young, well-educated people moving away with the associated negative consequences for social structures in the affected regions.

The possible further continued division between work and home (and leisure), with the resultant problems, and dealings with the economically endangered peripheral regions presents two challenges for Swiss spatial development policies, which, despite their contrasting nature have the same underlying causes, changes to the economic structure.

4. Commuting

Commuter behaviour is closely connected with geographic population and employment developments. The high population growth in districts away from the centres, and the sustained, or in the case of company-oriented services, increasingly high, numbers of jobs in the central areas, indicate growing commuting distances. The 2000 census even led to the supposition that for the first time for decades there was not only an increase in commuting distances, but also in commuter journey times (Bundesamt für Statistik, 2002).

One in two Swiss workers goes to work by car or train, and three out of every ten kilometres travelled are journeys

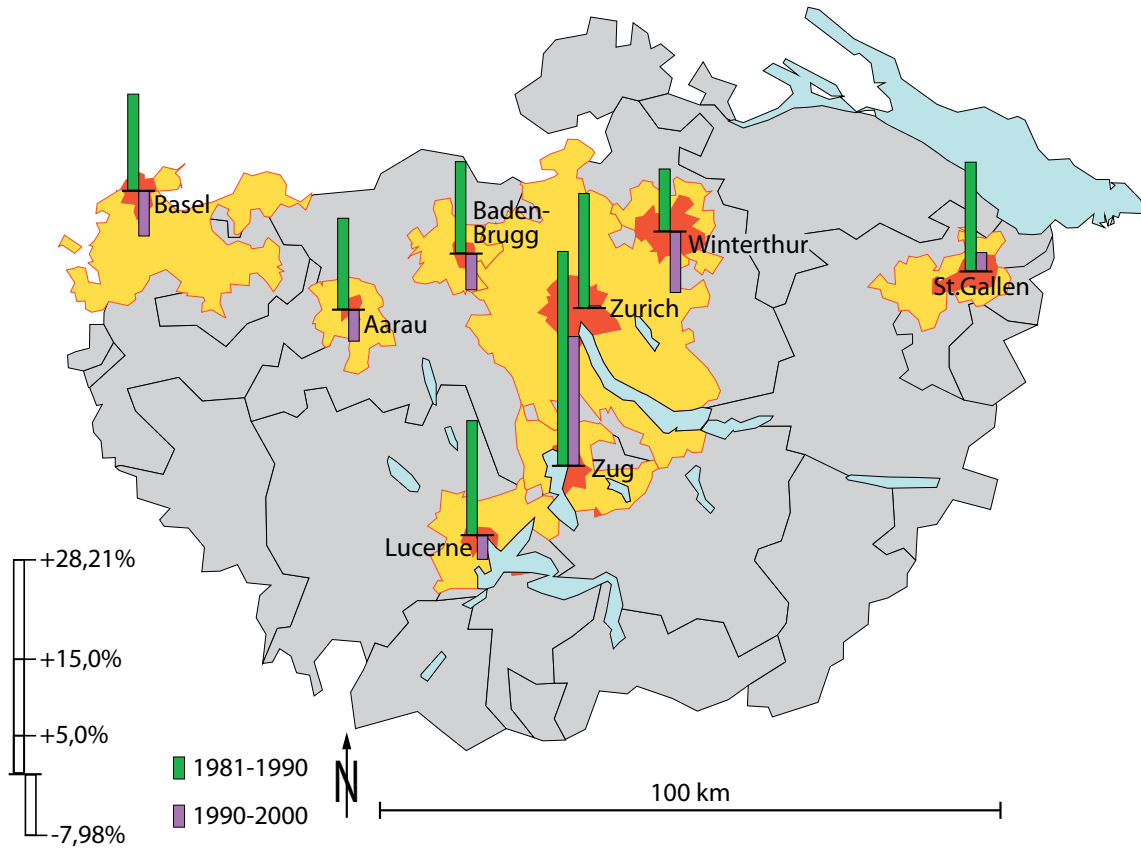


Figure 7: Employment Change, 1981-2000

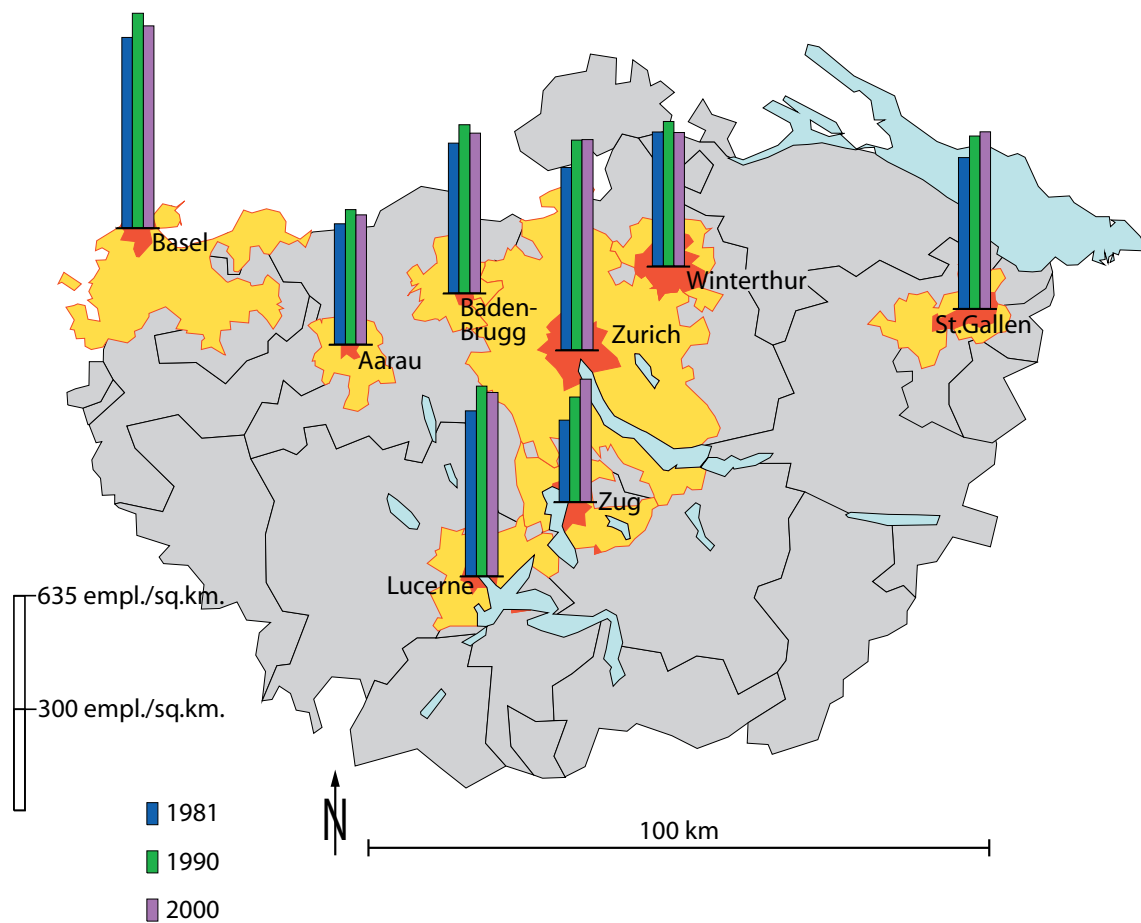


Figure 8: Employment Density 1981, 1990, 2000

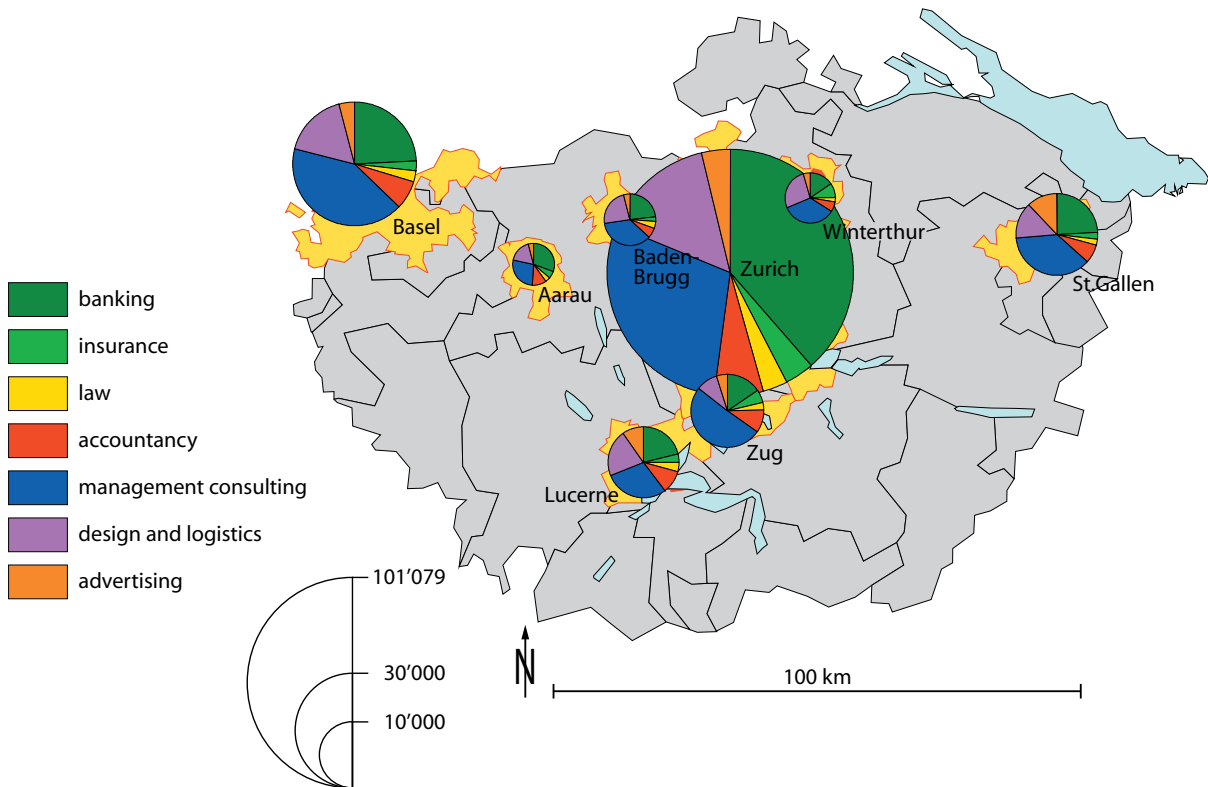


Figure 9: Employment Structure, 2000

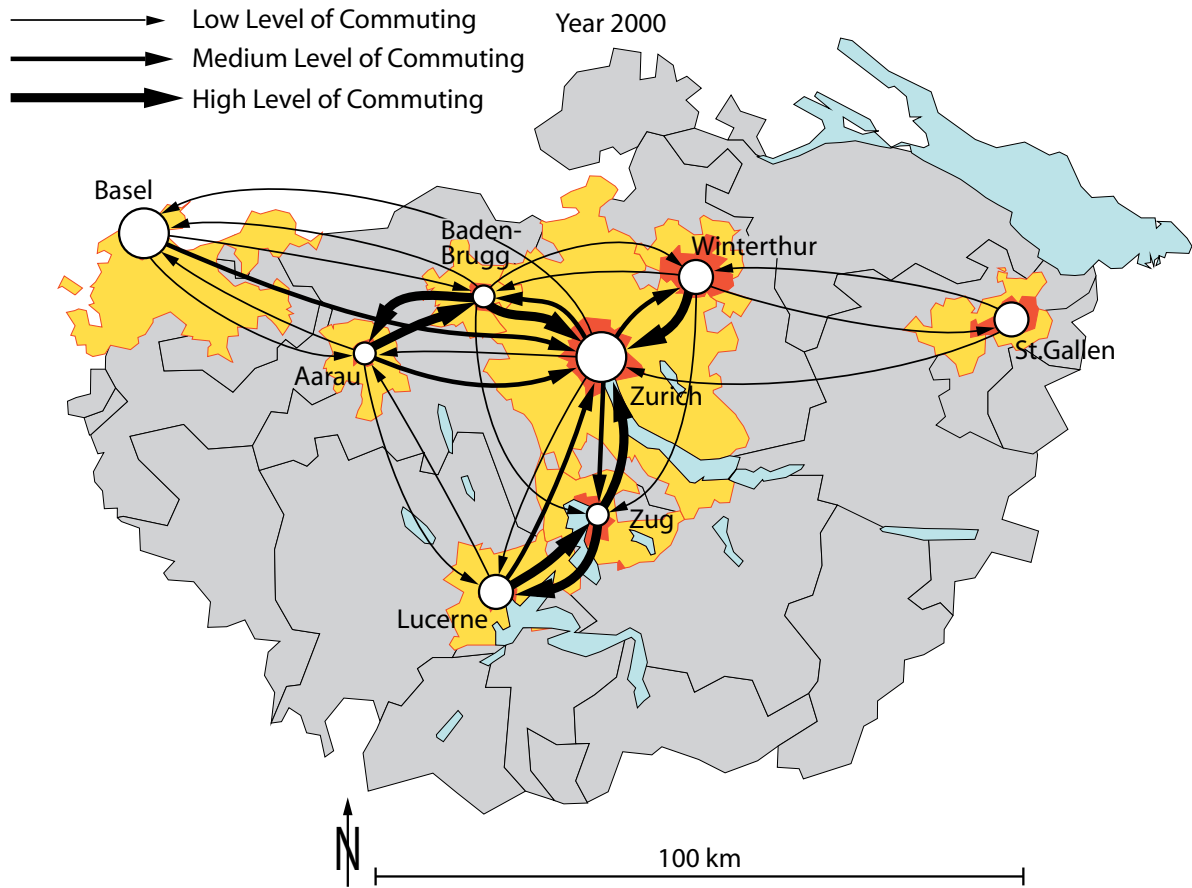


Figure 10: Commuter Flows, 2000

to work or educational establishments. Persons of working age travel on average almost 50 kilometres a day. The most frequently used mode of transport for commuting is, despite the well-developed Swiss public transport system, the car, used for over 43% of journeys to work. Second to this is journeys on foot, 33%, with public transport in just third place at 13.5%. There are both social differences (for example, there is a greater tendency for people in more senior managerial positions to go by car), and regional differences (in French and Italian-speaking Switzerland the importance of public transport is far lower than in German-speaking Switzerland) (Bolthausen, 2002).

The history of commuting began with the first mass production of cars, but it first became a mass phenomenon with the rapid increase in general affluence at the beginning of the 1960s. Since then the population figures for some suburban municipalities of Swiss cities have more than quadrupled. Now it is quite normal to live and work in different areas. In 1950 just one in seven left their home municipality for work, while it is now one in two. Several factors have contributed to this, for example the increasing readiness to change jobs, with quite a low level of residential mobility (Bolthausen, 2002). The latter is despite the fact that, at 35%, Switzerland has the lowest home ownership rate in Europe (Bundesamt für Statistik, 2004).

In considering the Metropolitan Regions, the question arises as to whether they can be crystallised by specific commuting patterns. As Metropolitan Regions extend beyond the level of agglomerations (or FURs), combining several agglomerations into a single system, it makes sense to concentrate on commuting between agglomerations, and less on those within the individual agglomerations. Therefore the following study concerns commuter movements between the eight FURs of the polynet study.

Figure 10 shows the relevant commuter routes between the eight FURs, divided into three classes of intensity, that is the number of commuters compared with the number of jobs in the two linked FURs (commuting levels), with minor commuter routes not being shown. There is a clear increase between 1990 and 2000, on the one hand in intensity, and on the other hand in the number of commuter relationships. However these results must be considered more closely, above all with regard to the question of when a commuter relationship is 'relevant'.

What size ranges, specifically expressed, lie behind the commuter routes between the FURs? For the purposes of the analysis, for technical reasons and for reasons of greater clarity, only the ten largest municipal districts of the agglomerations in terms of population and jobs are included, and so the figures listed here relate only to the aggregated commuter journeys between these municipalities, for each FUR. In 1990 the spectrum ranges from 8,188 commuters (from Winterthur to Zürich) down to three commuters (from St. Gallen to Aarau), in 2000, from 12,476 commuters (from Winterthur to Zürich) down to seven (from Aarau to St. Gallen). The average number of movements between all eight agglomerations in 1990 was 618 commuters, in 2000 up to 930. There is therefore a clear increase in commuting between the agglomerations.

But what are the commuting patterns between the FURs? As already stated, Figure 10 indicates a general increase in the relevant commuter movements between the agglomerations. It is nevertheless clear that Zürich is still the dominant commuter destination. Even from the distant agglomerations of St. Gallen (1990: 888; 2000: 1374 commuters from the ten biggest municipalities) and Basle (1990: 1102; 2000: 1929 commuters from the ten biggest municipalities), the numbers of commuters to Zürich are considerably and clearly growing. As would be expected, the inward commuter numbers from the nearby agglomerations of Winterthur (described above), Zug (1990: 3273; 2000: 4812 commuters from the ten biggest municipalities) and Baden-Brugg (1990: 6610, 2000: 7286 commuters from the ten biggest municipalities) are especially high.

The absolute commuter figures between the remaining agglomerations are on the other hand generally low. In particular, the distant agglomerations have commuter figures hardly worthy of consideration. St. Gallen is only linked by significant commuter numbers to Winterthur and Zürich. But even some agglomerations that are within reasonable commuting distance of one another, sometimes have proportionally low commuter numbers in comparison with journeys to Zürich. One example of this is Aarau and Basle, both of which have stronger links with Zürich than with one another.

However, apart from this, neighbouring agglomerations are strongly networked with one another, as would be expected. In 2000, almost twice as many people, 4643 from the ten biggest municipalities, commuted to Zug as to Zürich. The networking between Aarau and Baden-Brugg is close, with the agglomeration of Baden-Brugg being more

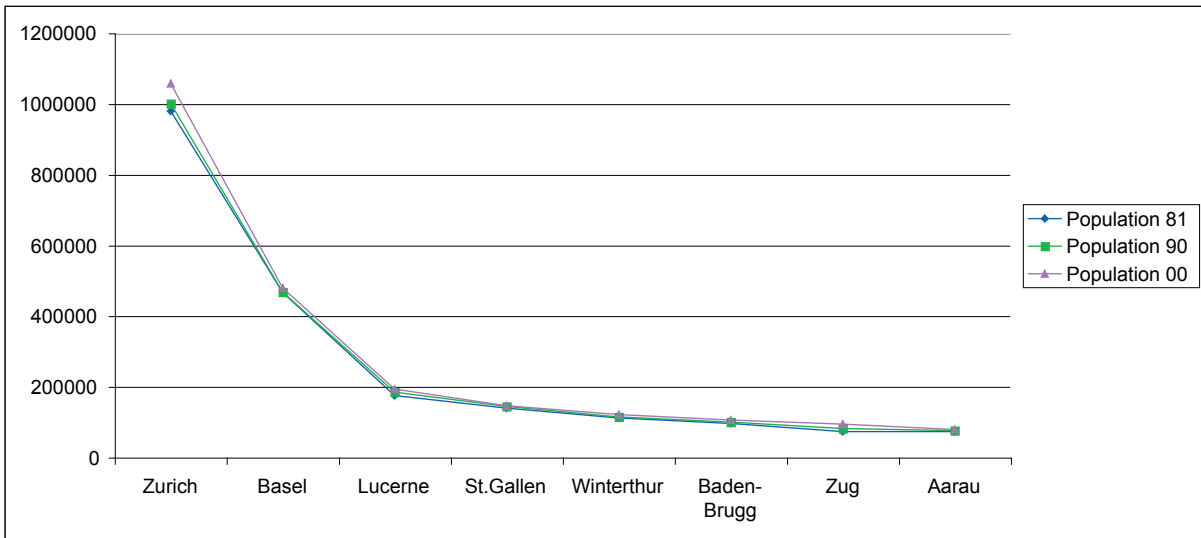


Figure 11: FURs Rank-Size Analysis, 1981-2000

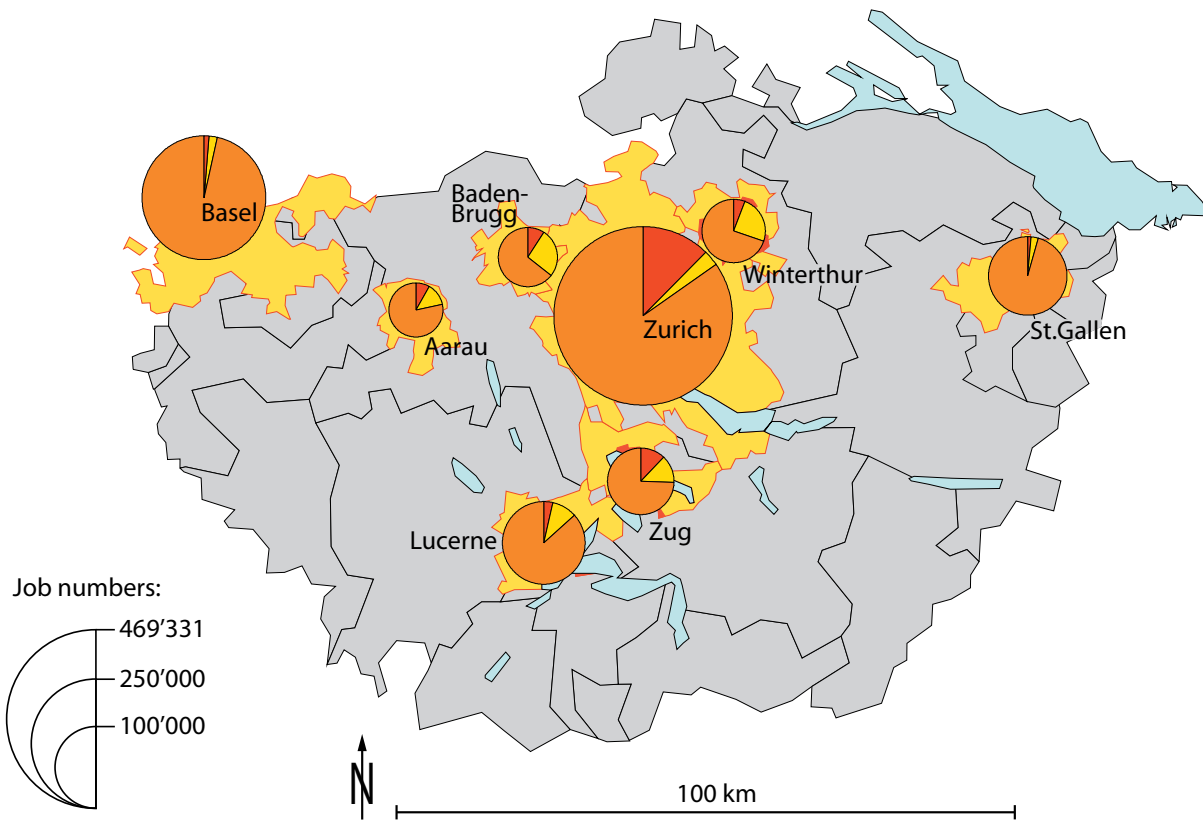


Figure 12: Self-Containment, 2000

important to Aarau than Zürich with regard to the number of jobs, but this is not the case the other way round.

Marked growth in commuting is recorded without exception for all FURs between 1990 and 2000. However it is difficult to draw conclusions from these figures about a polycentric development. Growth is very high in relative figures, but low in absolute figures. Thus the number of commuters from Lucerne to Aarau has almost tripled, but only from 39 to 109 persons. There is also the question as to whether the growth in commuter numbers is due to a polycentralisation of jobs, or to completely different factors (e.g. growing willingness of workers to commute). The commuter figures are therefore primarily useful for drawing up the first 'map' of the European Metropolitan Region of North Switzerland, but may not lead to early conclusions.

5. Measuring Polycentricity

The pattern of commuter journeys in the European Metropolitan Region of North Switzerland shows, as demonstrated in Section 4, only slight evidence of a polycentric development. Which other figures could help further in this? One possibility is the rank-size rule. Here, the FURs of the Metropolitan Region are listed firstly according to their population figures, with the population figure for the largest FUR divided by the rank number of the relevant FUR. In the case of an urban system which corresponds perfectly to the rank-size rule, the third largest FUR, for example, would have a third of the population of the largest, the seventh largest FUR a seventh of the population of the largest, etc.

In the European Metropolitan Region of North Switzerland this analysis shows that only Basle corresponds roughly to this rule, while the other FURs are partly too small. As the third-largest FUR, Lucerne should be almost twice as big according to the rule, and the situation is similar with the other FURs. This indicates a 'second-class citizenship' for polycentricity; in other words, if the analysis is carried out excluding Zürich and Basle, the other towns and cities are almost twice as big as would be expected under the rank-size rule, indicating high polycentricity. This method therefore indicates, albeit vaguely, that

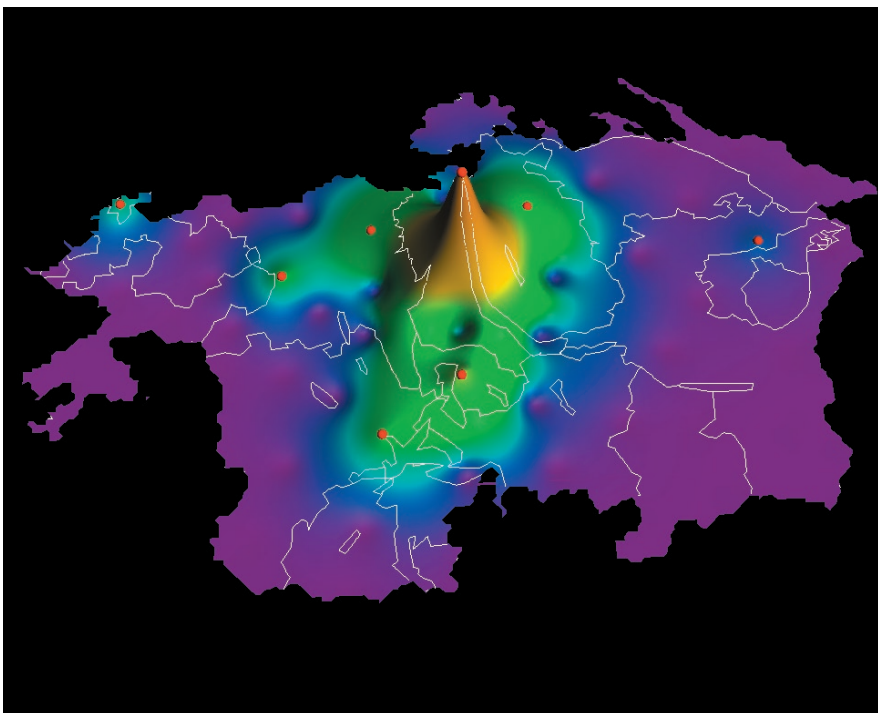


Figure 13: In-Commuting 1990/3D Surface Map

Basle-Zürich represents a polycentric main system, with the remaining FURs forming a polycentric subsystem.

It is also not possible to draw conclusions of developments towards stronger polycentricity from this analysis. In considering the dates 1980, 1990 and 2000, the average differences in actual population figures according to the rank-size rule lie between -32.3% and -33.3% , with no clear trend. A separate analysis of Zürich and Basel shows a doubling of the negative deviation from -4.6% in 1980 to -9.5% in 2000, that is, that Basle has grown insufficiently strongly in comparison with Zürich (here reference is once again

made to the fact that only the Swiss part of the essentially tri-national agglomeration of Basle was considered). A similar picture is formed from the separate analysis of the remaining six agglomerations, with these, as already mentioned, showing very strong positive deviation from the rank-size rule, thus clearly indicating polycentricity.

It must be added in respect of the rank-size rule that this was originally conceived for the analysis of national

urban systems. Critical examination should be made of whether it is also suitable for regions, that is sections of national states.

How has the relationship between the employees who commute between two FURs, and those who live and work in the same FUR, developed? Development in favour of commuting between the agglomerations would indicate growing polycentricity. Figure 12 actually shows such a development. The proportion of commuters out of the agglomeration of Zürich to the other eight agglomerations in the polynet study has increased since 1990 from 0.9% to 1.6%. Similar growth rates are shown by all FURs, while the proportion has not decreased in any of the cases. Across all the eight agglomerations, the proportion grew from 3.1% in 1990 to 4.7% in the year 2000.

However it is difficult to interpret what is the significance of this development for polycentricity. On the one hand, the growing commuter figures from the large, central agglomerations indicate a growing significance of the smaller, surrounding agglomerations; on the other hand, the proportion of outward commuters is growing significantly, including in the smaller agglomerations. In addition, the inward commuter figures show exactly the same developments as the outward commuters. Consequently, the proportion of persons who live and work in the same agglomerations has dropped everywhere. A statement that can be made with certainty is that all agglomerations have been drawn more strongly into a commuter system with the other agglomerations. However it is only possible to speculate on the role of the individual FURs in this system, on the basis of the commuter figures. Whether these figures actually conceal a trend towards increased polycentricity, will be considered and answered more specifically in Actions 1.2, 2.1 and 2.2.

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