

Regional Differentiation in the Development of French Towns—Quantitative Analysis

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Abstract

*The 20th and 21st centuries are the periods of urbanization. In 2008, for the first time the world's urban population exceeded 50%. This process is driven mainly by technological, economic and social changes. In the case of Europe, "metropolitan Europe" has already become a commonly used name. However, the question arises as to whether the processes of urbanization take place with the same intensity throughout Europe and if there are any regional differences in these changes. This paper attempts to present regional differences in the development of cities in France. As an indicator of development the changes of city population have been adopted. The analysis was based on the number of urban population in France in the years 1965–2007. The analysis of these changes was carried out in relation to various administrative units: regions, departments, units and urban agglomerations (*unité urbaine*). After analysing the changes of the degree of urbanization of regions an attempt was made to create a model of urban development in various regions of France and, on this basis, forecast their future growth. Finally, selected indicators of socio-economic changes have been compared with the rate of urban population changes. This has been aimed at verifying the influence of individual factors on contemporary processes of urbanization.*

Introduction

The 20th and 21st centuries are the periods marked by rapid urbanization. In 2008, urban inhabitants worldwide first amounted to more than 50% of the total population. The process is driven predominantly by contemporary technological, economic, demographic and social changes. Another factor facilitating it is globalization, which acts as a catalyst in relation to the aforementioned movements. The process of urbanization is especially apparent in economically well-developed regions where the majority of inhabitants reside in urban areas. In the case of Europe, the so-called European Pentagon (Capello et al. 2008)—the area between London, Paris, Hamburg, Munich and Milan—has already been commonly dubbed 'the European metropolis'. However, questions arise as to whether the urbanization processes throughout Europe are equally intense and if there are any regional differences among them.

On the basis of the above assumptions, this paper attempts to present regional differences in the development of French cities and towns. The change in a town's population has been adopted as an indication of development (Chodyński 2007). The analysis is based on the statistics of French urban population, covering the following years: 1965, 1968, 1975, 1982, 1987, 1992, 1999, 2002, 2006 and 2007. The data are derived from the electronic documents of the National Institute for Statistics and Economic Studies (INSEE). In this paper, special attention was paid to the contemporary changes since 1999. It has to be stated that the number of cities in that period changed; therefore, in order to maintain the continuity of analysis, the list of cities as of 1999 was used and for other years the data pertained to communes adjoined to cities. The analysis of town population changes was carried out for different administrative units: regions, departments, agglomerations and the so-called urban units (*unité urbaine*). After the changes in population numbers and the level of regional urbanization were studied, an attempt to create a model of urban development for different French regions was made. On the basis of that, a prognosis of their future development was established. Finally, the selected socio-economic indicators were compared to the pace of the

changes in urban populations. The purpose was to verify the impact of each factor on contemporary urbanization processes.

In France, the delimitation of urban units is based upon the density of housing and the number of inhabitants. According to the adopted criterion, a town is formed by a commune or a group of communes with at least 2 000⁽¹⁾ inhabitants and dense housing (buildings are no more than 200 metres apart).² Communes where 50% of the population reside in urban areas are also treated as urban units (*unité urbaine*), regardless of the total population of a commune (in 2007, there were two such communes).

1 Urbanization in France

Currently, in France there are 2 293 urban units, 2 233 of which are located in metropolitan France including the island of Corsica. Since the late 19th century, when town borders were established depending on urban population, the number and size of cities have been subject to constant changes. A good instance of these are the recent changes as a result of which the borders of some urban units have been considerably extended; these were, among others, the cases of Marseille, Aix-en-Provence, Lyon, Bordeaux, Grenoble and Rouen. Other alterations included the reduction of urban areas by mean of establishing independent units on their territories, as it was in the cases of Valenciennes, Metz or Nancy. As pointed out in the introduction, these changes were not taken into account and the analysis of the developmental pace was based on the state of the French cities as of 1999.

In the period of 1962–2007, the urban population increased from 33,3 million to 46,1 million people (fig. 1A). At the same time, the percentage of urban residents in the total population rose from 71% to over 76%.³ The greatest increase in urban population was observed until the mid-1970s, when the rate of urbanization reached 76,30%. After that, it remained on the level of 75% until the end of the century. In 2006, the percentage of urban residents rose to 76,36%; nevertheless, a downward trend in the rate of urbanization has been observed in the recent years. Approximately half of the urban population is gathered in cities with more than 200 thousand residents, whereas 30% of the French urban population reside in cities with over a million inhabitants. At the same time, the residents of towns with a population of about 10 thousand amount to less than 10% of the French urban population (fig. 1B).

The increase in the percentage of urban population was observed predominantly in major cities with more than one million residents and in the cities within the range of 500 thousand to

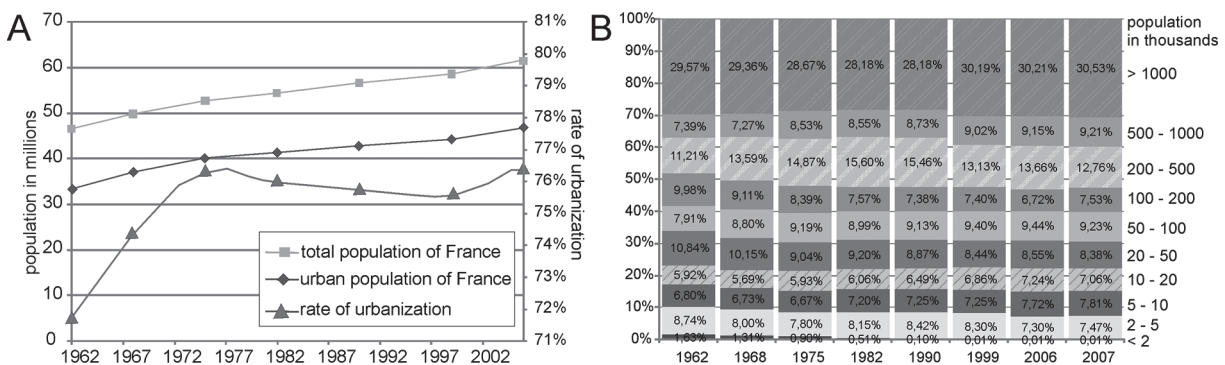


Fig. 1. The change in the French urban population in the period of 1962–2007

Source: Own work based on the INSEE data

1. [In the journal (in both Polish and English texts) European practice of number notation is followed that is, 36 333,33 (European style) = 36 333.33 (Canadian style) = 36,333.33 (US and British style). Furthermore in the International System of Units (SI units), fixed spaces rather than commas are used to mark off groups of three digits, both to the left and to the right of the decimal point.]

2. Institut national de la statistique et des études économiques, [[:]] <http://www.insee.fr/fr/methodes/> (accessed 2010.10.03).

3. The people residing in urban and suburban areas amount to more than 80% of the total population in France.

1 million people (fig. 2). Until the 1980s, a considerable increase in the urban population percentage was noted in the case of cities with between 200 to 500 thousand residents; nevertheless, the level came into a standstill in the 1990s. The most significant decrease was the case in the minor towns with up to 2000 inhabitants. The rate of population changes also dropped in the towns with 10 to 20 thousand residents; although it was a slower decrease. In the remaining town types, the number of citizens slowly increased. Taking the change of the Lorenz curve under scrutiny, one can observe that no significant change in the concentration of population occurred and the changes were predominantly related to the population decrease in smaller towns (fig. 3).

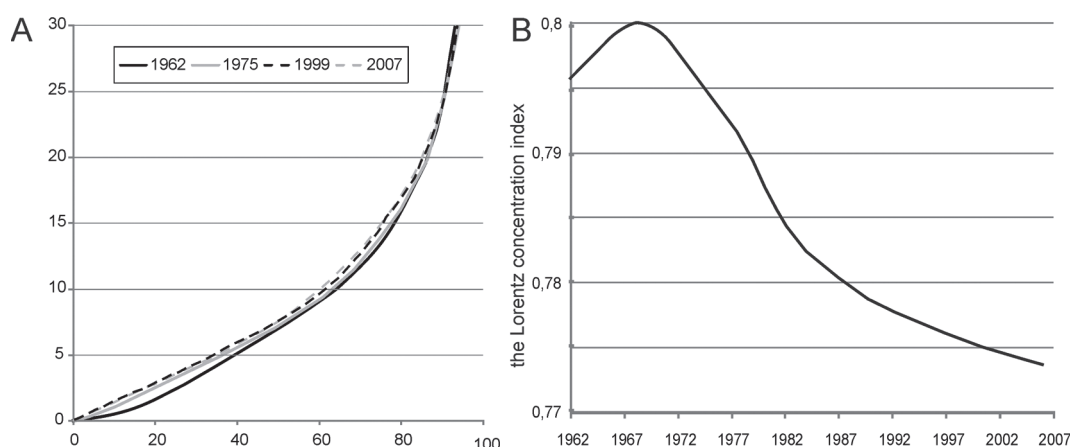


Fig. 2. The Lorenz curve (A) and the Lorenz concentration index (B) for the population of French cities and towns

Source: Own work based on the INSEE data

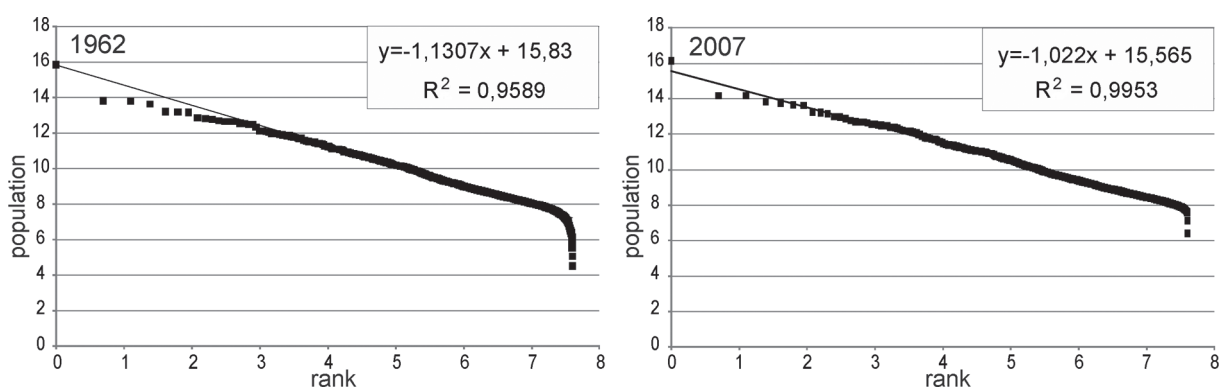


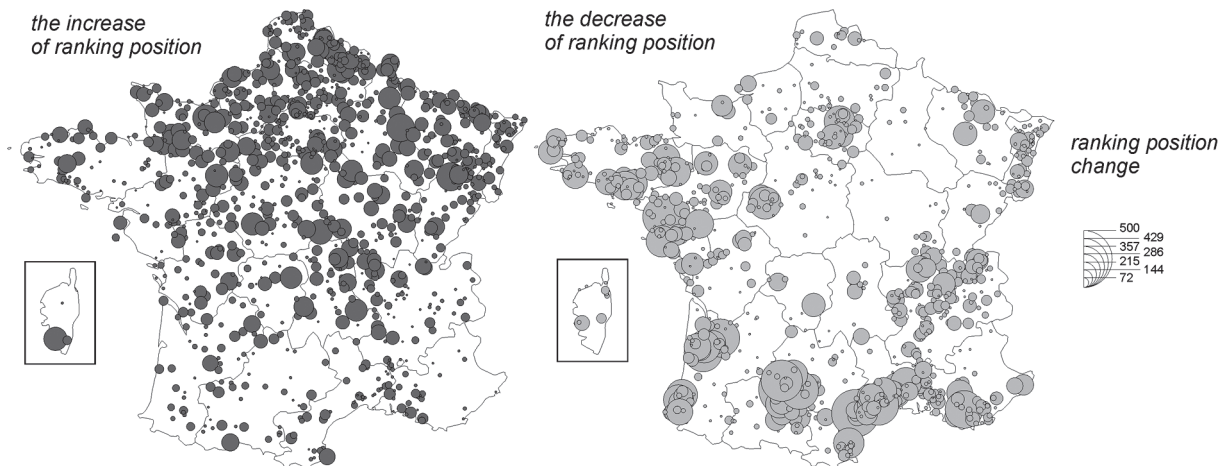
Fig. 3. The Zipfian distribution for the population of French cities and towns

Source: Own work based on the INSEE data

The intensity of population changes in each of the town size ranges varied in different periods. Comparing the standardised values of the increases in population in relation to the initial year, one can observe that the overlap in the direction of changes was the case for three periods: 1962 to 1975, 1975 to 1990 and 1990 to 2007. The general conclusion is that towns with 2 to 10 thousand as well as 200 to 500 inhabitants were the ones to develop most significantly as compared to their original count. The highest decrease or the slowest rate of increase were the case in towns with populations of 10 to 20 thousand and 50 to 100 thousand as well as the smallest towns with no more than 2000 residents and the largest ones—over one million.

These changes brought about the decrease in the concentration of the population in French cities and towns. That is illustrated by the Lorenz curve and the Zipfian distribution, which takes the ranking of cities and towns into consideration (Jażdżewska 2008) (fig. 2 and 3). Both of them indicate changes the smallest towns underwent as opposed to the essentially unaltered structure of the largest cities in the studied period. None of the twelve largest cities of France moved in the ranking by more than 10 positions for the period under investigation.

Taking into account the spatial distribution of the French towns ranking changes in the period of 1999–2007, one can observe that the towns which go up the classification are located mainly in the North-East of France (fig. 4). The greatest increase was noted for small towns between 2 and 5 thousand residents in the regions of Lorraine, Champagne, Normandy and Burgundy. These areas are located on the borders of the zone affected by Paris. The ranks dropped also for the smallest towns. The most significant decrease was the case in the southern and western regions. The ranking positions also declined in the case of the towns neighbouring the large agglomerations of Paris, Nancy, Lyon and Marseille.



Tab. 4. The population ranking position changes of French cities and towns in the period of 1999–2007
Source: Own work based on the INSEE data

Comparing the magnitude of ranking changes the French towns in general and middle-sized cities underwent, one can observe that both the improvement and the decline of the ranking position are recorded mainly in the case of towns with no more than 10 thousand residents. The extent of change is inversely proportional to the town's population—the greater the decline in the population numbers, the bigger the change. There were no population ranking position changes in the case of urban centres with more than 20 thousand residents (fig. 5).

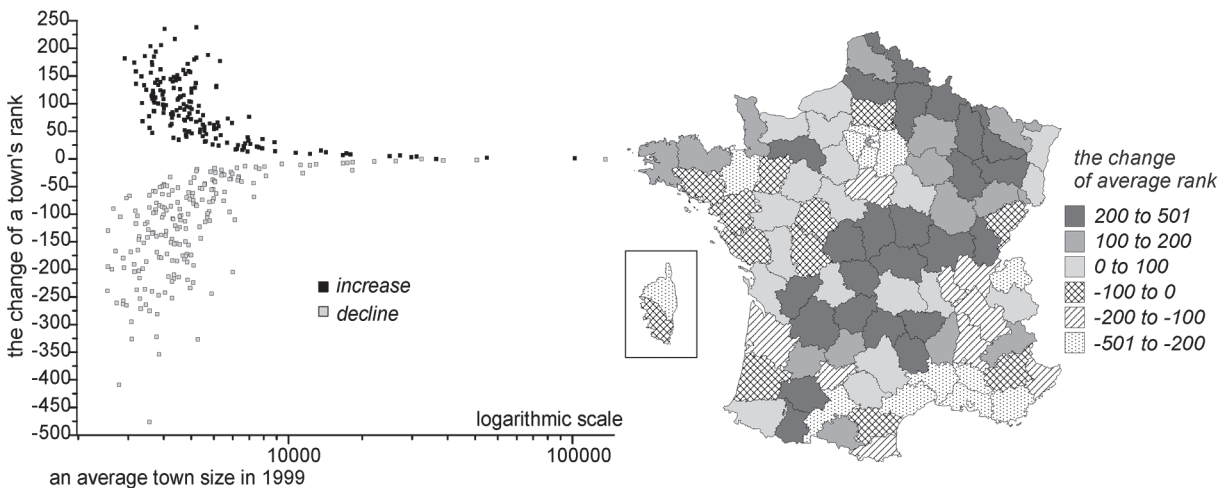


Fig. 5. The average population ranking changes in France in the period of 1999–2007

Source: Own work based on the INSEE data

Investigating the changes the populations of French towns underwent, one has to take into consideration the factors affecting the aforementioned processes. Comparing the birth rate and migration balance in the period of 1999–2006, one can observe significant differences depending on the studied area (fig. 6). Immigration has a major influence on the increase in the suburban

and rural populations of France. It is a result of a common suburbanization process. An additional factor affecting the growing significance of migration for the increase of rural populations may be the ageing of the society, due to which the number of births in rural areas decreases. The increase in the significance of the birth rate was noted for suburban areas and city centres (where the migration balance index was negative). In relation to the population growth rate one can observe that populations grew most significantly in suburban and rural areas, whereas in comparison to the period of 1982–1999, the increase can be observed for the suburban areas. As a result of these processes, in 2006 approximately 80% of the society lived in urban and suburban areas, which amounted to about 40% of the total area of France (fig. 6 B1, B2).

In relation to the regional differences in the population number changes for French cities and towns, the Ile-de-France region is visibly dominant, providing accommodation to approximately 23% of French urban residents (fig. 6C). It is followed by the most well-developed regions of France, namely Rhône-Alpes (10%), Provence-Alpes-Côte d'Azur and Nord-Pas-de-Calais (9%). These regions accommodate 50% of the French urban population and this remains on a virtually unaltered level. The least significant portions of the urban population are recorded on Corsica and in the mountain regions of the Massif Central, the Jura Mountains and the Ardennes.

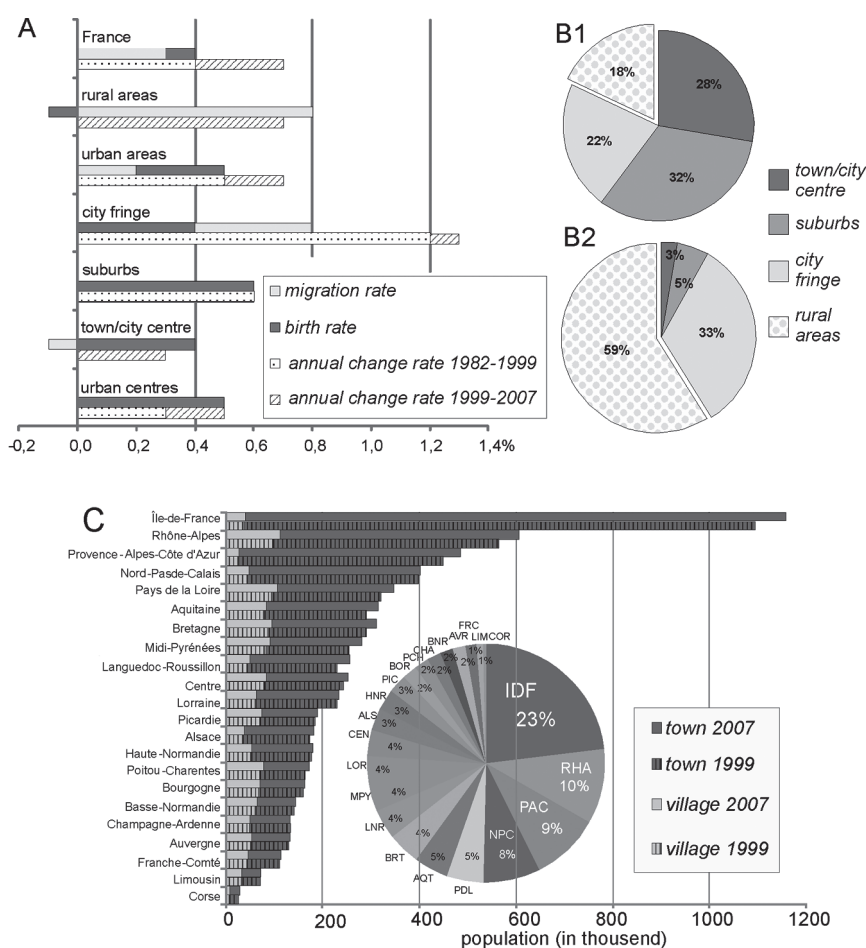


Fig. 6. The annual rate of demographic index changes in France (A) and the percentage of population (B1) and area (B2) in 2006. The population count in French regions and the regional percentage in the total French urban population in 2006 (C)

Source: Own work based on the INSEE data

In terms of location, most towns are concentrated in the southern regions: Aquitaine, Midi-Pyrénées, Rhône-Alpes as well as in the North of France—in Lorraine and Picardy (fig. 7). The fewest towns are located in the Mediterranean regions (Corsica, Provence and Languedoc) as well as in the Massif Central regions. On the other hand, taking into consideration the change in the average size of French towns in the period of 1999–2006, one can observe that the southern

towns on Corsica, in Languedoc and Midi-Pyrénées clearly dominate (growth by more than 10%). Generally, it can be stated that the towns which developed in size most significantly were located in southern and western regions, whereas in northern and eastern regions, towns grew by merely about 2%, which was the smallest increase (fig. 8). The decrease in the average town size was recorded only in the Champagne-Ardenne region ($-0,21\%$), whereas the industrially well-developed region of Nord-Pas-de-Calais grew by a mere $0,63\%$. The central regions from Ile-de-France also underwent an insignificant increase in size ($5,9\%$).

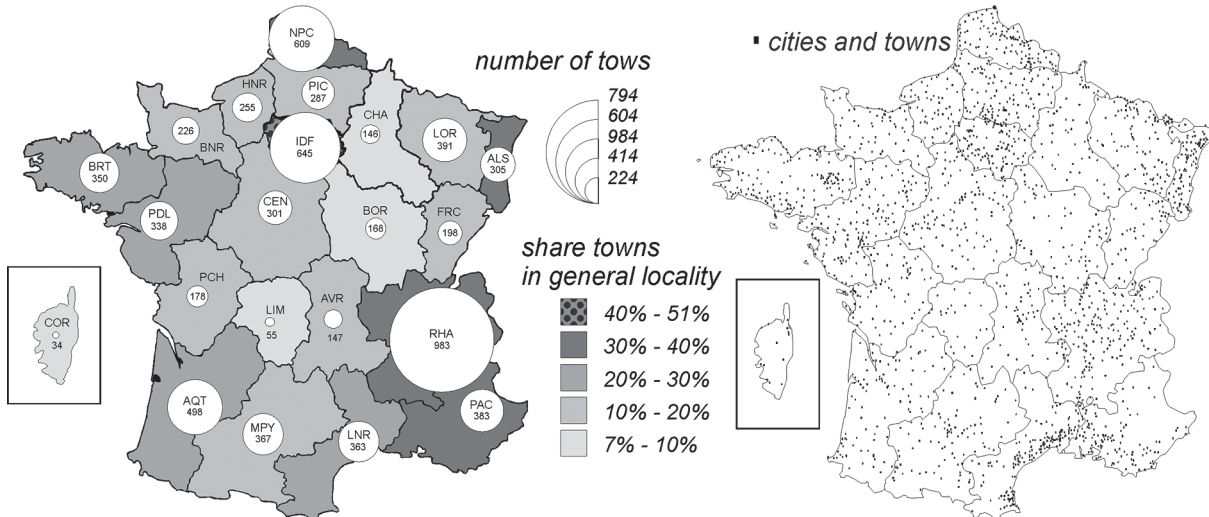


Fig. 7. The number of French cities and towns in 1999

Source: Own work based on the INSEE data

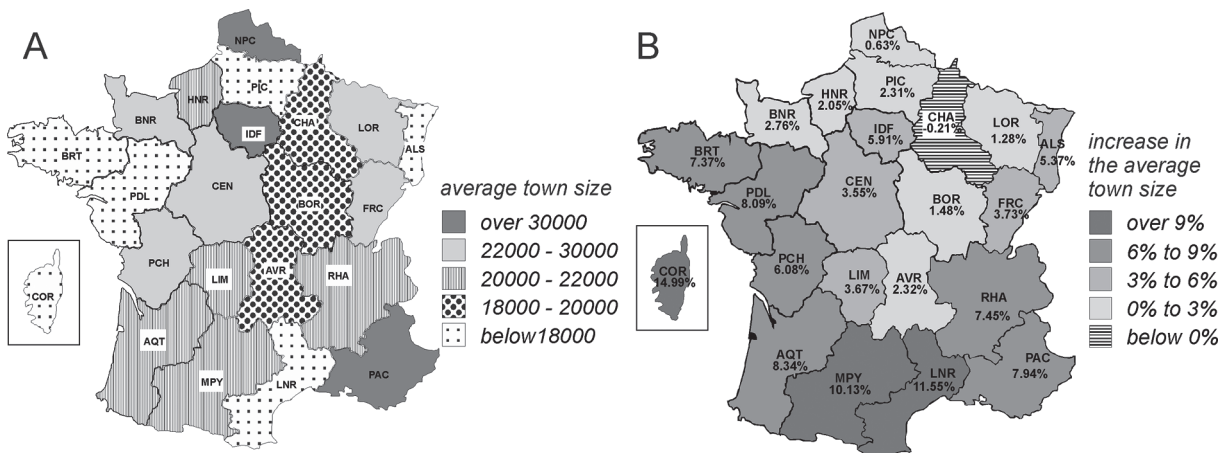


Fig. 8. The average size of French cities and towns by region in 2006 (A) and the changes of mid-sized French towns in the period 1999–2006 (B)

Source: Own work based on the INSEE data

Generally one can claim that the growth of towns is not dependent on their previous size while it is affected by the location and economic conditions. Despite the lingering domination in the population count of the Paris region as well as the most economically well-developed North, Provence and Rhône-Alpes regions, one can observe an increase in the significance of the southern regions, including Midi-Pyrénées, Aquitaine, Corsica and Languedoc. An instance of those changes is the order switch in the town ranking by size. Until the 1980s, the second position in the average town size ranking was held by the North region. Currently, the Rhône-Alpes region, characterized by continuous rapid development in the size of the towns, is in that position.

These changes are bound to produce consequences connected with both global changes in economic structure and factors related to the innovation and knowledge-based economy. The north-eastern regions of France (Nord-Pas-de-Calais, Picardy, Champagne-Ardenne, Lorraine and

Upper Normandy) are traditional industrial regions based mainly on heavy industry (Dorocki 2008b), whereas southern regions, including Rhône-Alpes or Midi-Pyrénées, are science and research-oriented areas of high-tech industry dominance (Dorocki and Jenner 2009; Dorocki 2008a). These regions are characterized by high R&D investment expenditures. Moreover, the highest number of innovative enterprises (*Societe Innovante*) and the so-called competitiveness poles (*pôles de compétitivité*) are located in these regions. An additional element occurring commonly in those regions are foreign investments generating new jobs, mainly in industry (Dorocki 2011).

In 1999, the highest rate of urbanization excluding the Paris region (96,5%) was obtained in south-eastern regions (Rhône-Alpes, Provence and Languedoc—over 80%) and Nord-Pas-de-Calais (88,6%) (fig. 13). In Alsace, Lorraine and Aquitaine the indicator exceeded 70%. The lowest rate of urbanization was obtained in the regions of Massif Central as well as Burgundy and Lower Normandy (around 50–60%).

Taking under scrutiny the town population changes in the period of 1999–2006, one can observe a clear increase of urban population in the capital region and southern regions (fig. 9). Comparing the changes in urban population and the average change in relation to the population count as of 1999, it is clear that for a group of southern regions, namely Provence, Rhône-Alpes, Languedoc, Aquitaine and Midi-Pyrénées, the urban population growth was more significant than in the standard case. On the other hand, Nord-Pas-de-Calais, and less significantly Lorraine and Champagne-Ardenne, had poorer growth than it might have been predicted looking at their population potential as of 1999. Moreover, the northern regions located around the Paris region recorded a decline of the urban population, which in most of the cases reflected the regional depopulation tendency.

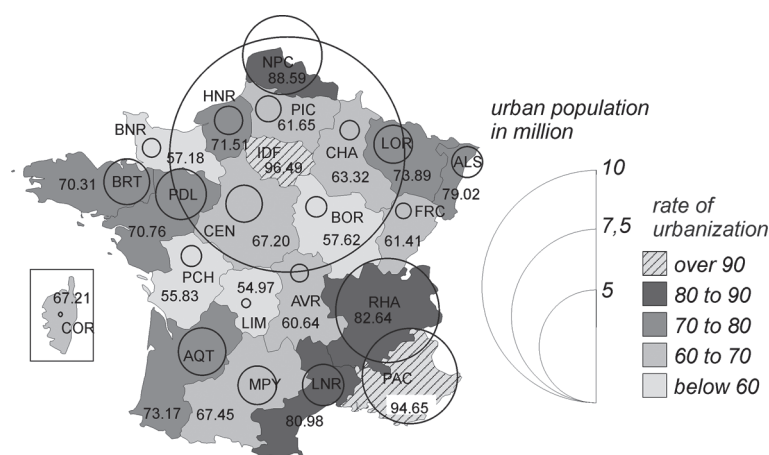


Fig. 9. The urban population (A) and the rate of urbanization (B) in French regions as of 1999

Source: Own work based on the INSEE data

In relation to the change in the degree of urbanization in French regions until 2006, the most significant growth as compared to the initial state was observed in the regions characterized by the lowest degree of urbanization. A peculiar fact is that urbanization grew by over 20% on Corsica, where the percentage of urban population was the lowest in 1999. What is more, other regions with low degrees of urbanization indicated a high growth of around 8–10% in the studied period (these regions were, among others, Limousin, Midi-Pyrénées, Centre and Brittany) (fig. 10). These are predominantly regions located in the West of France as well as in the center of the country. On the other hand, little growth or decline was observed in the most urbanized regions in the North and East of France, including among others: Ile-de-France, Franche-Comté, Upper Normandy, Provence and Alpes-Côte d'Azur. The process contributed to the lowering of the variation coefficient from 30 to 20%, especially in the 1960s and 70s, and maintained a slight downward trend in the following years. Identical regularities with more significant changes can be observed during a longer period. Similarly to the aforementioned cases, the most significant changes, which took place up through the 1980s, occurred in the regions characterized by the lowest degree of urbanization. Later on the rate of changes was slower (fig. 11).

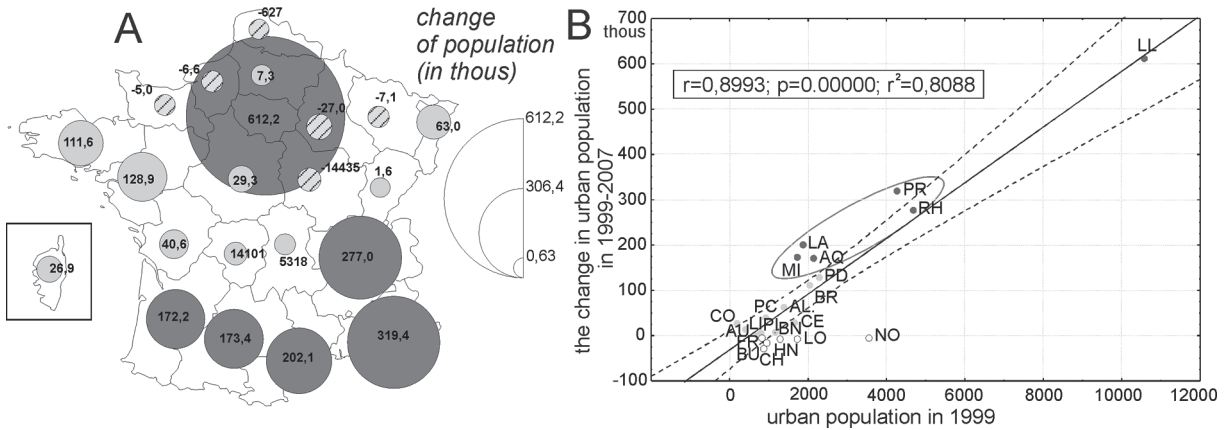


Fig. 10. The change in urban population (A) and the change in population count as compared to the state in 1999 (B) in the French regions of the period 1999–2007

Source: Own work based on the INSEE data

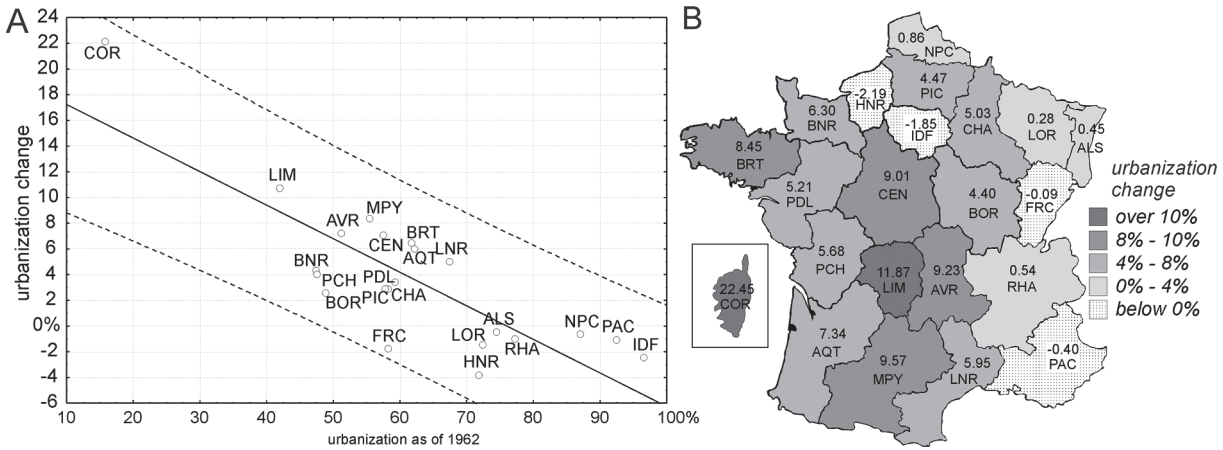


Fig. 11. The change in the rate of urbanization as compared to the state in 1999 (A) and the change in the population count (B) in French regions during the period of 1999–2007

Source: Own work based on the INSEE data

Moreover, comparing the rate of urbanization change in different departments, one can observe the same regularities as in the case of regions. The greatest increase in the urban population of 1999–2007 was recorded in southern and western departments. Extraordinarily high growth was observed in southern Mediterranean departments (Corsica included) and the departments located south of the Aquitaine Basin. High growth was also observed in the Atlantic departments of Landes, Gironde and Vendée. What is more, there was a significant increase in the departments located in the Northern Alps.

The decline of population count was recorded in the North, especially in the areas affected by the metropolis of Paris. Generally, it can be stated that the drop in population is the case in the regions affected by the capital but not in the metropolis itself (Dorocki 2008c). The clear increase in the urban population of south-western departments is especially apparent if you compare the standardized value of the urban population count change and the rate of urbanization (fig. 12). Comparing the standardized rate of the population count change in towns and villages in the period of 1999–2007 by department, one can observe that the departments located in the South-West of France, namely South Corsica, Upper Corsica, Upper Garonne, Hérault, Tarn-et-Garonne and Landes are characterized by a great increase in the urban population as compared to the average value and the rate of the increase in rural population.

Also in relation to the rate of population count changes in French towns, one can observe the renewal of the past patterns of the regional differences in the rate of changes. (fig. 13). One can clearly see the process of the decline in the rate of urban population growth along with the progressive tendency of urban depopulation. In the period of 1962–1982, the most significant increase was

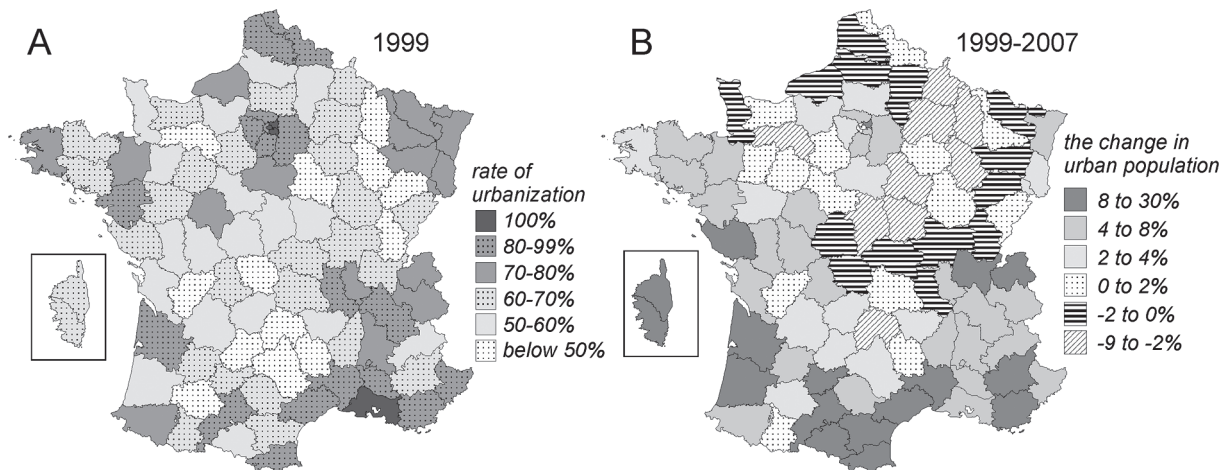


Fig. 12. The urbanization as of 1999 (A) and the changes in the population count in the French departments during the period of 1999–2007 (B)

Source: Own work based on the INSEE data

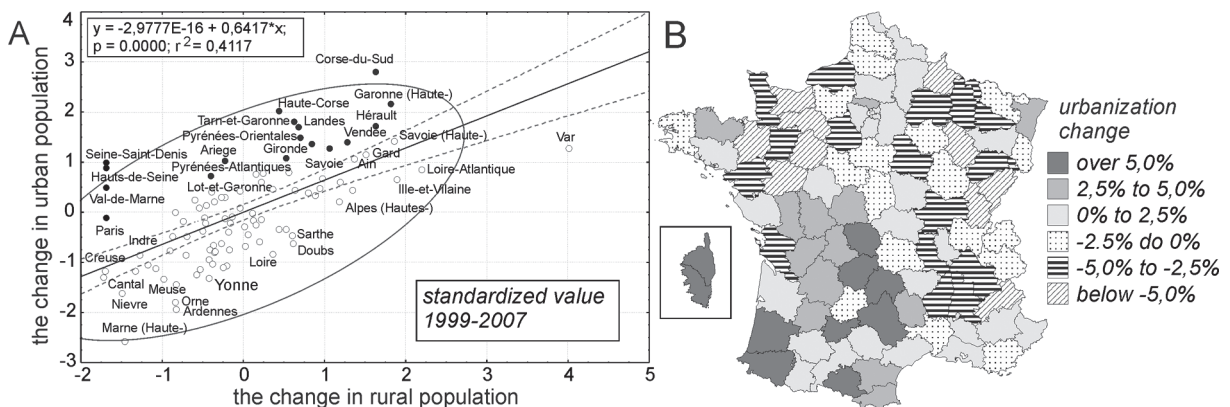


Fig. 13. The standardized values of the population count change in towns and villages by department as of 1999–2007 (A) and the change in standardized urbanization value by department as of 1999–2007 (B)

Source: Own work based on the INSEE data

recorded in the towns of the Paris region as well as in the South (the Mediterranean areas). What is more, the high increase occurred on Corsica, in the Lyon region as well as in the northern part of the Loire Valley region. During that very period, a slight decrease of population was recorded in single towns in the North-East of France from Picardy to Alsace. Drops were also noted in the towns located in the valley of Rhone, Massif Central and near western borders of Brittany. The lowest population growth was recorded in towns located in the area between the Forest of Argonne in the North and the Aquitaine Basin in the South.

In the following years until the end of the 20th century the highest increase was observed in Lyon and the cities located along the coast of the Mediterranean and around the city of Paris. Lower population count increases were recorded in the towns of Alsace, Brittany, around Toulouse and along the Atlantic coast. On the other hand, the population numbers dropped in the towns around France, excluding the Paris region, Provence and Alps, as well as on the base of the Armorican Peninsula and in Vendée. The greatest decrease was recorded in towns located on the area between Lorraine and Massif Central. The 21st century brought about the escalation of the town depopulation throughout France. The South of the country, especially the Mediterranean areas including Corsica, the Alpine areas as well as Toulouse and Bordeaux remain the centres of the most intensive urban population growth. Furthermore, the population growth in that period was recorded also in the towns of Alsace, the Paris agglomeration, as well as the western parts of the Rennes area and the Loire Valley.

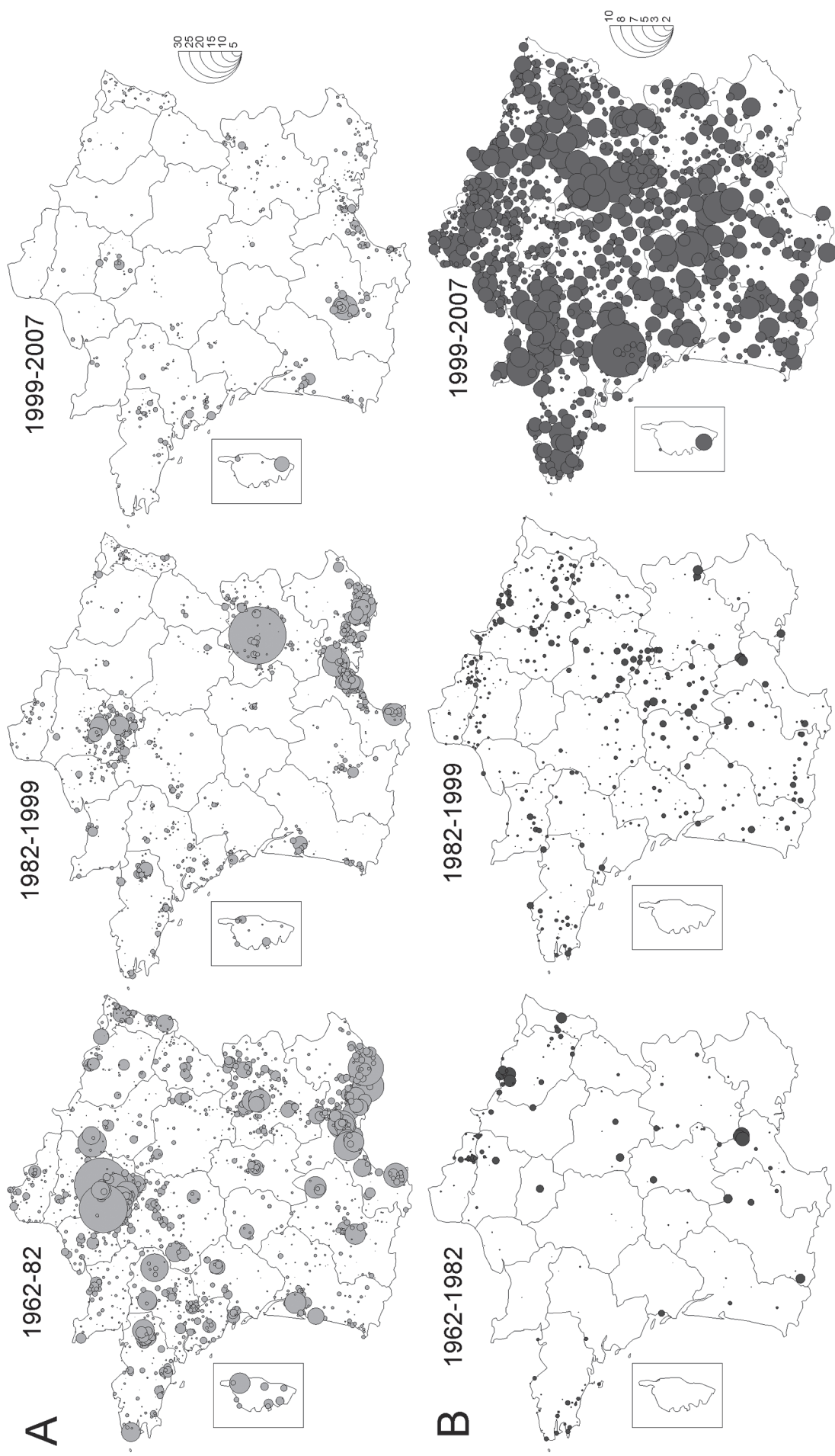


Fig. 14. The change in the urban population of France during the period of 1962-2007, (A) an increase, (B) a decline
Source: Own work based on the INSEE data

The correlations of the population count changes on different levels of administrative division indicate the confluence of the processes presented above, therefore in the further discussion of regional differences in the development of towns only the division into regions is referred to.

The original database providing the foundation for this analysis consists of French town population statistics covering the years between 1962 and 2007 (1962, 1998, 1975, 1982, 1990, 1999, 2006 and 2007). Moreover, a ‘centre of gravity’ for each region was established on the basis of the mean longitude and latitude of the towns and cities in a given region (the population of each town determined its weight). For the purposes of statistical modelling, an aggregate population count of a given region’s towns was formed employing a logarithmic function. Due to the irregularity of the population count changes before 1970, the initial year taken into account in the process of modelling was 1975. The following statistical model was matched to the towns in regions

$$\ln(\text{region's population}) = \text{region} + \text{year} + \text{region} \cdot \text{year}.$$

This model is based on the assumptions that the rate of population growth is exponential and that regions develop at different rates. Using this model, an annual percentage rate of growth was calculated for each region, the confidence interval being 95%. These rates were also established as relative changes, scaled in relation to the Paris region (Ile-de-France) (the assumed growth rate of this region was 100%). Moreover, a prognosis of the population in the years 2010, 2020, 2030, 2040 and 2050 was attempted (separately for towns in each region).

In order to investigate whether there is any spatial trend of population count changes in France (a differentiation of the scaled region development rate), two statistical techniques were used. For both of them, the geographical coordinates of the gravity centres calculated earlier were used as independent variables. As a non-parametric model, which allowed a preview of the general shape of prospective trends, the LOESS procedure (Cleveland, Devlin, and Grosse 1988) was used. The response surface regression model (Khuri 2006) served as a parametric model. In this part of the statistical analysis, the region of Corsica was excluded. The statistical calculations were processed in SAS 9.2 software, using the GENMOD, LOESS and RSREG procedures.⁴

Therefore, analysing the relative urban population growth in French regions one can observe that half of all units show a higher growth rate than the Paris region (fig. 15). The most significant growth in urban population was recorded on Corsica; it was followed by the Mediterranean regions of Provence-Alpes-Côte d’Azur and Languedoc-Roussillon. A smaller increase was recorded in the remaining southern regions of France, excluding those located in the Massif Central, as well as in western regions, from Centre to Brittany. The lowest development levels were reached in the most industrially well-developed regions of France: Lorraine, Nord-Pas-de-Calais, Champagne, Franche-Comté and Burgundy. Less significant increase in urban population count as compared to the Paris region was observed in the agricultural regions of the Massif Central and Poitou as well as Normandy.

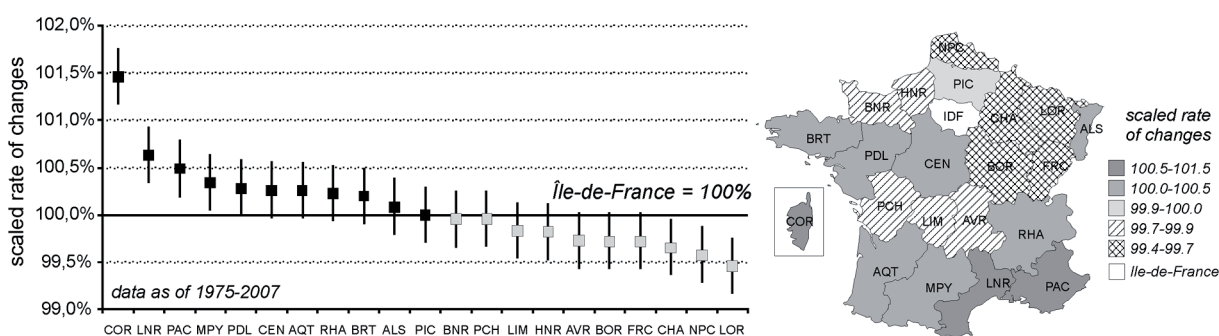


Fig. 15. The model urban population growth rate in French regions, years 1975 to 2007

Source: Own work based on the INSEE data

4. SAS OnlineDoc, [a:] <http://support.sas.com/documentation/92/index.html>.

On the basis of the adopted population growth model, an attempt to predict the regional urban population growth in the years 2010–2050 was made. Relying on the premise that the current rate of urban population growth is maintained, it is predicted that the urban population counts in French regions will have undergone only slight changes by the middle of the 21st century. Primacy will still be held by the Paris region. The urban population will be on the increase in Provence, which is bound to outrank Rhône-Alpes. The quick rate of growth characteristic of Corsican towns will also be maintained, as the logarithmic scale clearly indicates (fig. 16).

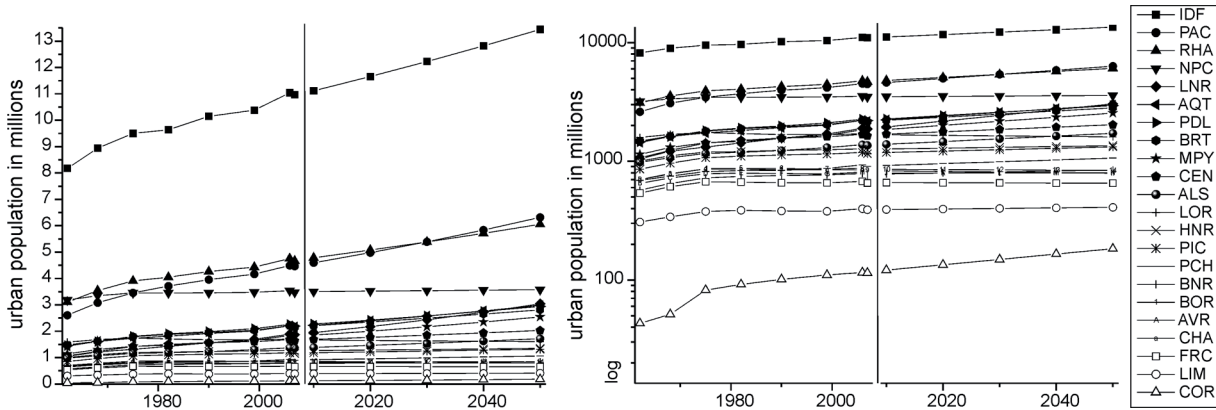


Fig. 16. The predicted changes of the population counts in French regions until 2050

Source: Own work based on the INSEE data

As far as the structure of French urban population before 2050 is concerned, the percentage provided by northern and eastern regions (for instance Nord-Pas-de-Calais, Alsace or Lorraine) is bound to decrease considerably (fig. 17). On the other hand, the percentage provided by southern regions, like Provence or Languedoc, and western ones, like the Loire Valley will rise. Nevertheless, one can presume that the general structure of the regional percentage distribution will be maintained.

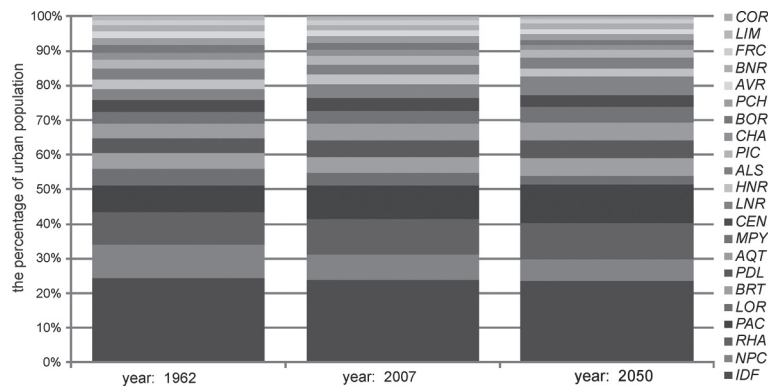


Fig. 17. The percentage of urban population in French regions in 1962, 2007 and 2050

Source: Own work based on the INSEE data

On the basis of demographic studies that attempted to predict population changes in French regions (De Beer et al. 2010; Brutel and Omalek 2003, 2002), the rate of urbanization was calculated for 2010 to 2050. Analysing the changes of the rate of urbanization, one can predict that the percentage of urban population in the regions of Ile-de-France and Provence-Alpes-Côte d'Azur will reach 100%, which means these regions may become the most urbanized ones, outranking even the capital region (fig. 18). Generally, the most significant increase in urbanization (over 20%) is predicted for the South of France (the regions located by the Mediterranean and along the Pyrenees) as well as for the West (Brittany, the Loire Valley and Aquitaine). The least significant growth is bound to occur in north-eastern regions (Champagne, Burgundy and Franche-Comté).

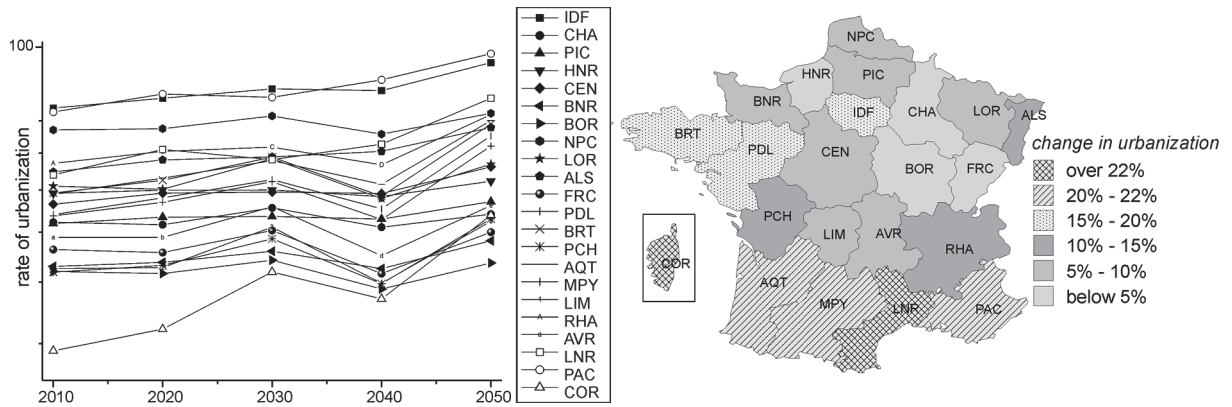


Fig. 18. The changes of the rate of urbanization in French regions in the period of 2010–2050

Source: own work based on the INSEE data

On the basis of the population count changes in French regions as of 1975–2008 scaled in relation to the Paris region, a spatial model of the urban population growth was prepared. This modelling relied on the town-related data including the centres of gravity based on the town size and their coordinates. In virtually every case there was an overlap between the centre of gravity and the capital of a region, being the largest town located within its area. The modelling was conducted in relation to continental France, Corsica excluded.

In the non-parametric model, the contour lines of the urban population changes take a parallel pattern, with the values of the population growth increasingly more significant the farther north the area was located (fig. 19). Meanwhile, the population growth on the level of Ile-de-France was achieved south of the Massif Central, where the urban population development is rapid (by around 2% more rapid than in the case of the Paris region). Judging by the contour lines of the changes in the rate of town growth, the slow rate in northern regions (in Nord-Pas-de-Calais and Champagne-Ardenne the rate of growth was lower than 4% as compared to the Paris region) is clearly visible. In general, the entire area in the North of France stretching to the Massif Central in the South has a slow rate of urban population growth. In relation to the parametric model, the contour lines are shaped concentrically, the centre being in Champagne and the values growing in the outside direction. The observed regularities indicate both the continuing, clear domination of Paris in the North of the country and the progressive development of the southern regions, which are a target of national and international migration.

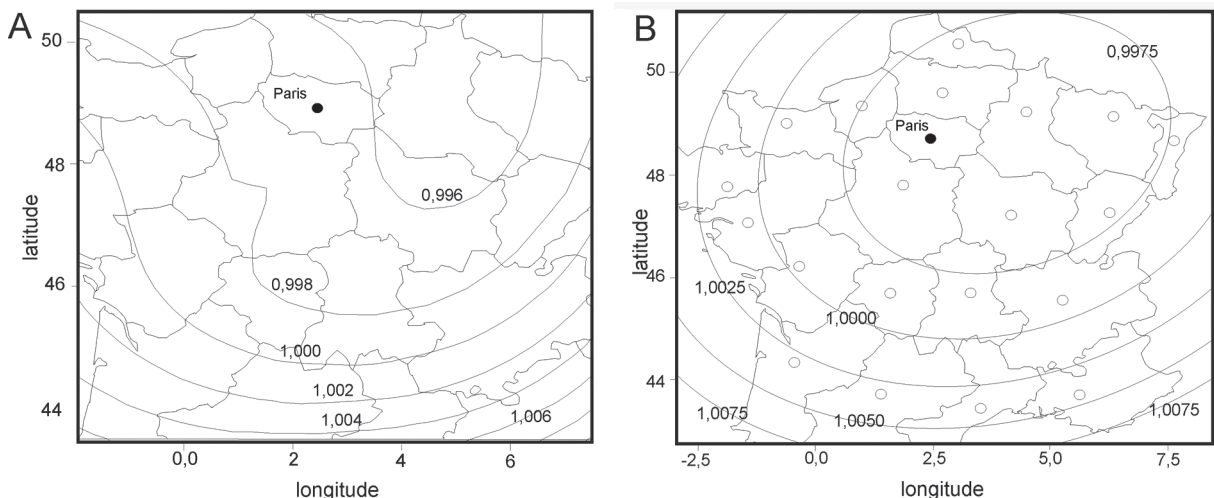


Fig. 19. The model of the urban population changes in the French regions of 1975–2007, (A) the non-parametric model and (B) the parametric model

Source: Own work based on the INSEE data

2 Socioeconomic diversity of France

Finally, an attempt to determine the causes of regional differences in the urban population growth rate in France was made. In order to do so, various data of French agglomerations were used, including: the number of companies and percentage of the employed in different branches of economy, the migration balance, the number of foreigners among the employed and the value of wealth on the basis of taxes paid.

Correlating different standardized coefficients for the development level of the French agglomerations and the rate of urban development growth, no statistically significant regularities could be observed. Therefore, it is impossible to unequivocally name the factors affecting the population changes in France; one can merely study the spatial distribution of the phenomena in question.

The function of a town based on the dominant form of business was adopted as the first factor. The coefficient was the percentage of the employed and the share of the number of companies in a given sector of a town's economy. Comparing the extent of population count changes and the changes in the share of companies and the employed, no clear correlations in the town structure patterns were observed. Nevertheless, it could be derived that the least significant growth of urban population took place in the regions which were industrialized and urbanized to the largest extent and for the longest period of time. These were northern and eastern regions. The exceptions were the regions of Paris and Lyon, although even in their cases the population growth was not on the highest level.

Taking into account the significance of the innovative, knowledge-based economy in modern-day economic development, the distribution of centres of the electronics industry (including computer science) as well as scientific and technical business was studied (fig. 20). In the case of the electronics industry, it was located in the towns in the North-East of France, where the industrialization is the most advanced; whereas scientific and technical business was centred around the largest urban agglomerations of France and in the South (the Mediterranean region) as well as in the West. This distribution is adequate to the regions with their urbanization level growing. It is especially visible in the case of the distribution of science and technology-related business. The high number of companies as compared to the number of the employed may be related to the nature of the R&D sector, which is characterized by low employment (Sjoholm and Lundin 2010). In the case of biotechnological companies, the average magnitude of those firms as of 2000 did not exceed the average employment of more than 50 people (Mangematin, Lemarié, and Catherine 2001).

Yet another studied factor that could affect the urban population size in France is migration (fig. 21). In the course of analysis, the interdepartmental migration balance of France in 2006 as well as the percentage of foreigners among the employed in French cities were investigated. Comparing the spatial distribution of the size balance, one can observe the coincidence of areas with positive migration balance and the town areas that have indicated a high increase in the urban population in the recent years. In spite of the fact that almost the entire northern part of the country is still affected by Paris, the migration balance for the majority of the Paris metropolis units is negative. What is more, the demographic prognosis indicate that not only southern but also western regions are bound to outrank Ile-de-France in terms of the migration balance. Additionally, the migration balance of the employed needs to be summed up with the migration balance of people over 60 years of age. In general, it can be assumed that the direction of migration is from the well-developed areas to the developing areas. Furthermore, the high migration balance is recorded in rural areas, where the urbanization-related factors and demographical factors related to birth rates overlap.

Another factor that could contribute to the urban population growth is international migration. Taking into consideration the spatial differences in the percentage of foreigners in the general number of the employed in French towns and cities, one can observe the concentration around the largest cities in France: Paris, Lyon or Marseille. In addition, the Mediterranean regions, Alsace, Lorraine and Normandy stand out. It seems that foreign immigrants are attracted predominantly by large and well-developed urban centres. In relation to the areas with a high rate of urbanization growth, one can observe a certain spatial regularity. It is especially visible in relation to the Mediterranean region. Nevertheless, as compared to national migration, international migration is most probably of less significance to the urbanization process.

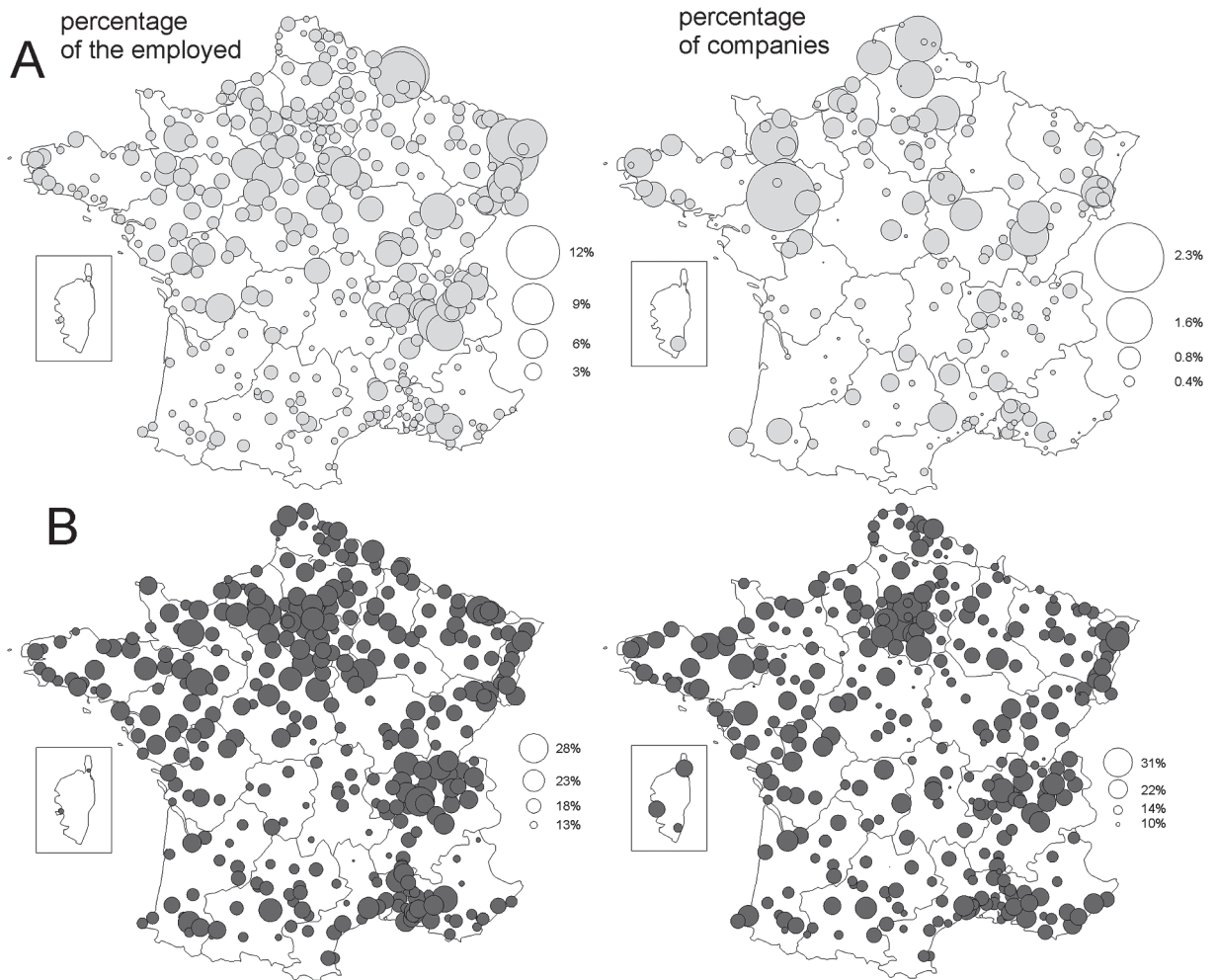


Fig. 20. The share of companies and the employed in the electronic industry (A) as well as scientific and technical business (B) in French regions as of 1999

Source: Own work based on the INSEE data

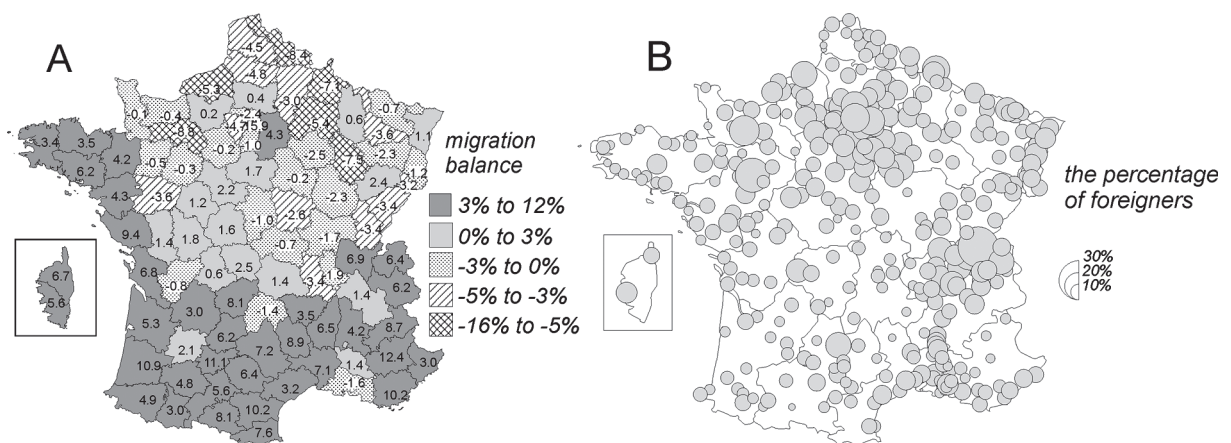
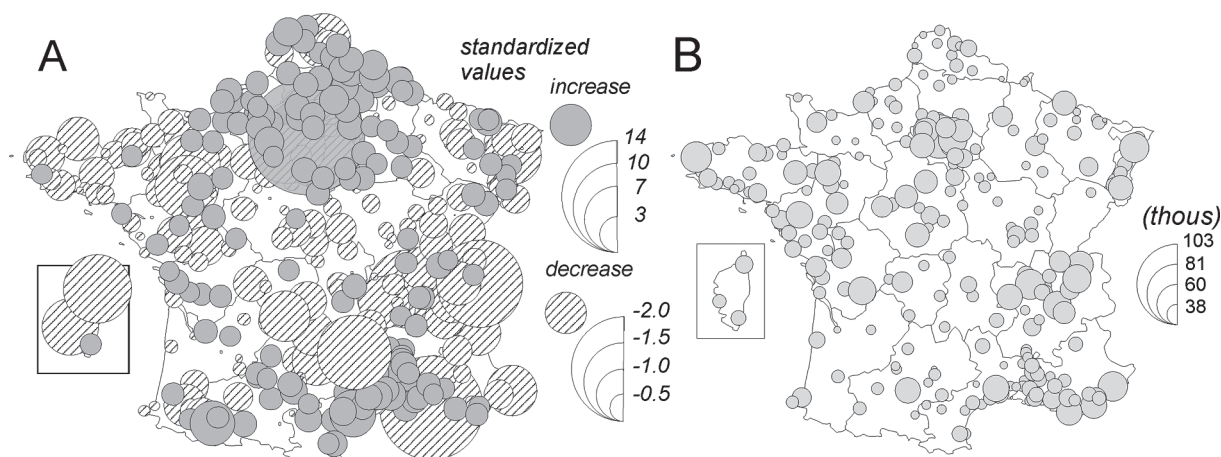


Fig. 21. The interdepartmental migration balance of the employed for the period of over 5 years in French towns by departments as of 2006 for 1000 employed (A) and the percentage of foreigners in the general number of the employed in French towns and cities as of 2006 r. (B)

Finally, the indicators pertaining to the general economic level were studied. In both cases, namely in unemployment in cities and towns, and in the amount of taxes paid some regional tendencies can be observed (fig. 22). Unemployment is of less significance in the South of France, especially on Corsica and in south-eastern regions, mainly Alpine ones. Other regions characterized

by low unemployment rate as compared to average values are the Paris region (the outlying areas of Paris) and the regions of the Loire Valley, Brittany and Alsace. Taking into account the wealth in the society, the Paris region (Champagne, Normandy and Picardy), the Mediterranean region and the cities and towns of the western regions stand out. As far as the relation between the level of economic activity and the rate of town development is concerned, it is hard to point to a direct correlation; yet, the data concerning the unemployment level indicate the increased activity of the South and the West of France, which are regions whose urban population is growing.



Source: Own work based on the INSEE data

Fig. 22. Standardized values of the percentage of the unemployed among French urban population in 2006 (A) and the average value of taxes paid (in Euros) per person in French cities and towns in 2006 (B)

Source: own work based on the INSEE data

Conclusions

All in all, it has to be stated that in France there is a regional differentiation between the development of cities and towns. In recent years, the greatest changes in urban populations have been observed in mid-sized towns. The most significant increases in population have been recorded in towns located in the South and West of France: these were the Mediterranean (mainly Corsican), Alpine and Atlantic areas as well as those lying south of the Massif Central. One can assume that the greatest population growth was the case as far as the regions with the lowest urbanization levels are concerned, an instance of which is Corsica. Regions with high and yet still rising urbanization levels are Provence and Languedoc, mainly Mediterranean regions and Rhône-Alpes. High ranking positions are held by the Paris region and Alsace as well. On the other hand, the decline of urbanization is apparent in the most industrialized regions of Nord-Pas-de-Calais, Champagne and Lorraine. This tendency was confirmed by the model of French urban population change regional trends which was created. The urbanization growth to the South of France shows a slight eastward and westward deviation. The prediction for the future is that the main regions of French urban population growth are to be southern regions, especially Provence-Alpes-Côte d'Azur, Rhône-Alpes and Languedoc-Roussillon. Also western regions, from Aquitaine and Midi-Pyrénées to Brittany, are characterized by a rapid rate of town growth as compared to other regions.

It has to be emphasized that despite the existing differences in the growth of various French towns, the regional structure related to their size-determined hierarchy does not undergo any major alterations. The dominance of large metropolises and agglomerations over developing outlying areas is still significant; what is more, no considerable changes of their structure in the foreseeable future are expected. However, these processes are bound to minimize the disproportion between the sizes of urban centres and regions. A characteristic process connected with those changes is the continuing depopulation of large cities and towns in the economically well-developed regions; in the case of France, it is the most intensive in the North and East.

Predominantly economic factors are believed to contribute to the regional differences in the urban population growth rate. Nevertheless, one cannot unequivocally determine the relation between economic development and urbanization growth. Yet, both the processes seem to occur harmoniously in France. It is especially visible in the workforce migration within France and the unemployment level. On the other hand, there are no clear links between the urban population growth and its functions as far as innovations are concerned. Nevertheless, as mentioned previously, one can expect that the nature of this type of business is not clearly related to population (employment) growth. The R&D sector based on small companies with low labour intensity affects quality much more than population growth.

Therefore, it has to be stated that regional differences in the development of French towns and cities are predominantly connected with regional and historical conditions related to the demographic transformations of cities and towns, national migration and urban cycles constituted of subsequent urbanization stages (among others, the intensification of the significance of suburban areas). Moreover, a relevant factor is the function of a town, mainly in relation to the depopulation of brownfield centres.⁵

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5. The aforementioned factors are in agreement with the content of Andrzej Zborowski's presentation at the *A 20th Century City—Problems, Opportunities, New Development Strategies* conference, Katowice, December 8–9th, 2008. The information he presented in his paper, “Shrinking Europe—demographic and social conditions of the development of European towns”, was used in this article.

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