STUDIA PRAWNO-EKONOMICZNE, T. CXXVIII, 2023
PL ISSN 0081-6841; e-ISSN 2450-8179 s. 117–138
https://doi.org/10.26485/SPE/2023/128/7

Sławomir PASTUSZKA*
https://orcid.org/0000-0003-3999-923X

REGIONAL DEMOGRAPHIC DIFFERENCES IN GERMANY

Abstract

Background: Spatial analysis of the main demographic processes in Germany.
Research purpose: Assessment of the population situation and its changes in the federal states of Germany from 2000–2020.
Methods: A literature review, descriptive statistics and taxonomy were used for the analysis.
Conclusions: There are large differences between the Länder in terms of demographics and the directions and intensity of their changes. Hamburg, Berlin and the highly developed western Länder (Bavaria, Baden-Württemberg and Hesse) with diversified economic structures are in the most favourable demographic situation. This was primarily due to the intensive influx of immigrants, which increased the number of inhabitants and maintained a low level of old age. Among the western Länder, unfavourable demographic changes are found in Saarland, whose economy is dominated by heavy industry. The biggest demographic problems are faced by the eastern Länder with the lowest economic potential, i.e., Saxony-Anhalt and Thuringia, which are not only depopulating the fastest but are also ageing. Therefore, the development distance that separates them from the richest Länder is likely to increase.

Keywords: demographic situation, federal states of Germany, regional analyses.

JEL classification: J10, J11, J18, J19

1. Introduction

Numerous countries in Europe are struggling with unfavourable demographic changes.[1] Negative birth rates go hand in hand with increased average life expectancy, while the elderly population and the percentage of senior citizens in the general population are growing.[2] These processes vary in intensity.

* Jan Kochanowski University of Kielce, Faculty of Law and Social Science, Faculty of Natural Sciences; e-mail: slawomir.pastuszka@ujk.edu.pl

1 *EU population in 2020: almost 448 million*, Eurostat. News Release, No. 111/2020.

2 *Report on the Impact of Demographic Change*, European Commission 2020.

Germany and Italy, for instance, saw their populations increase solely as a result of inflows of migrants. In contrast, the populations of Poland, Portugal, and the Baltic States decreased due to a continuing negative migration balance. Similar conclusions can be drawn from an report conducted Netherlands Interdisciplinary Demographic Institute (NIDI) within the framework of the ESPON (European spatial Planning Observation Network) Programme.[3] This study points out that the percentage of young people in the general population is declining in Europe as a result of persistently low birth rates for more than forty years and a distinctly increasing proportion of elderly people. In addition to an ageing population, important demographic concerns include declining native populations, an increasing proportion of single people, and migration flows. Academics and experts have demonstrated that outflows of people lead to depopulation, unfavourable changes in the structure of many populations, lower demand for goods and services, and consequently, the creation of a population barrier to growth.[4]

Differences in demographic changes will contribute to the growth of regional inequalities in countries' economic development, negatively impacting the social sphere and political and territorial integrity. Germany is facing such a problem due to the clearly visible economic differences between the federal states of the eastern and western parts of the country.

The primary objective of the study is to assess the demographic situation of all German federal states and to identify the changes that occurred between 2000 and 2020. The following research questions are addressed:

– What is the demographic situation of particular federal states?
– Which states are experiencing either demographic improvement or decline, and in which aspects?

The paper consists of four parts. First, it outlines the key factors of demographic changes, followed by detailed characteristics of individual states. It then discusses the research methods before presenting the empirical analysis and elaborating on the results.

---

[3] *Demographic and Migratory Flows affecting European Regions and Cities*, Final Report, ESPON & NIDI, 2010.

[4] **J.J. Hoekveld**, *Time-Space Relations and the Differences Between Shrinking Cities*, Built Environment 2012/38 (2), pp. 179–195; *The 2021 Ageing Report. Economic & Budgetary Projections for the EU Member States* (*2019–2070*), Institutional Paper 148, European Commission, Luxembourg 2021.

2. Factors of demographic change in the light of previous research

Demographic changes are driven by complex and mutually reinforcing cultural, economic, political and geographical causes. Even as late as the mid-20th century, households with four or more children were common in Europe, particularly in rural areas and in working-class families. Nowadays, the typical family model has a single child, with two being less frequent.[5] Families with higher education and living standards tend to have fewer children. A growing tendency among young people is to first reach a desired level of education and economic stability. Only then, usually after passing the age of 30, do they become parents. This phenomenon is referred to as postponement of childbearing.[6]

Migration of the population, mainly from villages to cities and from smaller towns to large metropolitan areas, plays an important role in demographic change. There is a noticeable general mobility of the population linked to education, increased job opportunities, more efficient connectivity and ease of relocation. Migration trends are essentially determined by the attractiveness of a region as a place to work and live. Migrants tend to relocate from the least economically developed countries and regions to the most developed ones. The inflow of migrants, who are usually young, compensates for low or negative birth rates. It decreases the statistical age of the population, mitigates the pace and scale of ageing, reduces labour shortages, and thus positively impacts the economic development prospects of a given country or region.

According to Adamson, the positive aspects of immigration are the immigrants' higher professional qualifications, their ability to adapt to the labour market, and their ability to assimilate and integrate with the local population.[7] In the opinion of the European Commission[8] and independent

---

[5] **A. Adsera**, *Changing fertility rates in developed countries. The impact of labor market institutions*, Journal of Population Economics 2004/17, pp. 17–43; **M.R. Testa**, *Childbearing preferences and family issues in Europe: evidence from the Eurobarometer 2006 survey*, Vienna Yearbook of Population Research 2007/1, pp. 357–379; The ESHRE Capri Workshop Group. *Female contraception over 40*, Human Reproduction Update 2009/15 (6), pp. 599–612.

[6] **F.C. Billari**, **A.C. Liefbroer**, **D. Philipov**, *The Postponement of Childbearing in Europe: Driving Forces and Implications*, Vienna Yearbook of Population Research 2006/4 (1), pp. 1–17.

[7] **F.B. Adamson**, *Crossing Borders: International Migration and National Security*, International Security 2006/31 (1), pp. 165–199.

[8] *The 2021 Ageing Report…*

experts,[9] the outflow of (mostly young) people in the context of declining birth rates leads to a shrinking labour force and further accelerates the ageing of the population. For this reason, emigration countries and regions are experiencing rising expenditures on medical care and social assistance and a worsening ratio of government budget revenues to social expenditure.

Germany is one of the world's most important immigration countries. Since as far back as 1950, the Federal Republic of Germany has recorded a strong influx of immigrants from European and non-European countries, mainly for economic, humanitarian, and educational reasons.[10] Data from the Federal Institute for Population Research show that the largest influx of foreigners (1.14 million people) was recorded in 2015, which was caused by immigration from Syria, Afghanistan, Iraq, and to a much lesser extent, from Africa. At the end of 2019, around five million citizens of other EU member states lived in Germany. About the same number of people were from third countries with residence permits or who were staying illegally.[11] The main directions of migration in recent decades have been flows from the north to the south and from the east to the west of the country. According to Mai, the influx of immigrants has a strong positive impact on the population's size and age structure, but it is not enough to replace children not born in Germany.[12]

Immigrants have an undeniable impact on slowing down the ageing rate of immigration areas. In the regions of influx, there is also an increase in the percentage of people with a migrant background. Thus, changes in the ethnic and religious composition of the inhabitants, referred to by Coleman as the "third demographic transition", are occurring faster there.[13] They result from the differences in the fertility rate of the local population and foreigners and from homogamy, i.e. marital migrations aimed at reuniting immigrants and their future spouses from their country of origin.

---

[9] **H. Weber**, *Could Immigration Prevent Population Decline? The Demographic Prospects of Germany Revisited*, Comparative Population Studies 2015/40/2, pp. 165–190; **F. Kluge**, **J. Goldstein**, **T. Vogt**, *Transfers in an Aging European Union*, Journal of the Economics of Ageing 2019/13, pp. 45–54.

[10] **J**. **Oltimer**, **V. Hanewinkel**, *Geschichte der Migration nach und aus Deutschland*, https://www.bpb.de/themen/migration-integration/laenderprofile/deutschland/341068/geschichte-der-migration-nach-und-aus-deutschland/; accessed 31.05.2023.

[11] *Demographics facts of and trends in Germany*, 2010–2020, Federal Institute for Population Research, 18 March 2021, pp. 38–42.

[12] **R**. **Mai**, *Demographic change in Germany*, European View 2008/7, pp. 287–296.

[13] **D. Coleman**, *Immigration and Ethnic Change in Low-Fertility Countries*: *A Third Demographic Transition*, Population and Development Review 2006/32/3, pp. 401–446.

Despite the great importance of immigration in maintaining positive demographic trends in Germany, according to a 2016 demographic strategy, model calculations indicate that the shrinking and ageing of the population is irreversible.[14] Across Germany, by 2035, a decline in the working-age population of 7 to 11% is to be expected. In the eastern states, the decline may be as much as 12 to 15%. Only in the city-states will the number of people aged 20 to 66 remain largely constant.[15] The ageing of the German population, together with the rising costs of medical services, according to experts, will pose a serious threat to future financing of healthcare, which will result in an increase in per capita spending in the German health insurance system.[16]

Recognizing the unfavourable effects of demographic changes on the development of Germany, the federal government set four goals:[17]

1. Recognize and seize the opportunities of living longer for people of all ages and in every area of life, from family to education, employment and commitment to health;
2. Increase growth and ensure prosperity by creating conditions for better use of local labour, research and innovation potential, and increased immigration of skilled workers;
3. Maintain and strengthen social justice and cohesion by organising insurance systems and providing key services in regions and communities;
4. Balance public budgets and adapt social insurance systems and public services to changing conditions and needs.

3. German federal states – a general overview

The federal states of Germany, also referred to as Länder, constitute the highest administrative division in Germany, only secondary to the general national level. There are sixteen federated states, ten of which are located in the former

[14] Every Age Counts. The further development of the Federal Government's demographic strategy, Bundesministerium des Innern, 4 January 2016.

[15] Ausblick auf die Bevölkerungsentwicklung in Deutschland und den Bundesländern nach dem Corona-Jahr 2020. Erste mittelfristige Bevölkerungsvorausberechnung 2021 bis 2035, Destatis 2021.

[16] **F**. **Breyer**, *Demografie, medizinischer Fortschritt und Ausgabenentwicklung im Gesundheitswesen (Ageing, medical progress and the growth of healthcare expenditure)*, E Der Urologe 2013/52 (6), pp. 777–784; **S. Felder**, *Gesundheitsausgaben und demografischer Wandel*, Bundesgesundheitsbl 2012/55, pp. 614–623; **S**. **Nowossadeck**, *Demografischer Wandel, Pflegebedürftige und der künftige Bedarf an Pflegekräften*, Bundesgesundheitsbl 2013/56, pp. 1040–1047.

[17] Demography report, Bundesministerium des Innern, 5 November 2011.

Federal Republic of Germany (West Germany – darker shaded areas in the Map 1) and six that were historically part of the German Democratic Republic (East Germany).

MAP 1: *Division of Germany into federal states*

S o u r c e: own elaboration.

The states differ in terms of area occupied, population and economic development.[18] In terms of size, Bavaria is the largest, followed by Lower Saxony, Baden-Württemberg, and North Rhine-Westphalia. The smallest are the federal city-states ("Stadtstaaten"), which include Bremen, Hamburg, and Berlin (see Table 1). They are also the most densely populated. Berlin has more than 4,000 people per square kilometre, Hamburg has 2,400, and Bremen has 1,600. In terms of population size, North Rhine-Westphalia comes first, followed by Bavaria, Baden-Württemberg, and Lower Saxony.

TABLE 1: *Basic data on the federal states of Germany (as of 2020)*

Federal states	Area [km^2]	Number of inhabitants [millions]	GDP per capita [€ millions]	GDP per capita in relation to the national average
Germany	**357.582**	**83.155**	**40.088**	–
Baden-Württemberg	35.748	11.103	45.108	112.5
Bavaria	70.542	13.140	46.498	116.0
Berlin	891	3.664	42.221	105.3
Brandenburg	29.654	2.531	29.282	73.0
Bremen	420	0.680	46.469	115.9
Hamburg	755	1.852	64.022	159.7
Hessen	21.116	6.293	44.750	111.6
Lower Saxony	47.710	8.003	37.005	92.3
Mecklenburg-Vorpommern	23.293	1.610	28.590	71.3
North Rhine-Westphalia	34.112	17.925	38.876	97.0
Rhineland-Palatinate	19.858	4.098	34.673	86.5
Saarland	2.571	0.983	34.125	85.1
Saxony	18.450	4.056	30.903	77.1
Saxony-Anhalt	20.454	2.180	28.652	71.5
Schleswig-Holstein	15.804	2.910	33.452	83.4
Thuringia	16.202	2.120	28.953	72.2

S o u r c e: own elaboration based on Destatis data Startseite – Statistisches Bundesamt (destatis.de).

[18] **S. Pastuszka**, *Regiony problemowe we Włoszech, w Niemczech i w Polsce oraz uwarunkowania ich rozwoju*, Uniwersytet Jana Kochanowskiego, Kielce 2019.

The least populated states are Bremen and Saarland, and the least densely populated are Mecklenburg-Vorpommern (69 people per square kilometre) and Brandenburg (84).

Hamburg is the wealthiest state, with a GDP per capita in 2020 that exceeded €64,000, nearly 160% of the national average. It is Germany's largest commercial port and also a major economic centre with the presence of shipbuilding, engineering, electronics and automotive industries. The states whose GDP per capita was higher than the national average also include Bavaria, Bremen, Baden-Württemberg, Hessen, and Berlin. Bremen is an important naval port, a major logistics hub, as well as a shipbuilding centre. Bavaria and Baden-Württemberg are home to a number of globally recognised corporations, such as BMW, Audi, MAN SE, Siemens AG, Daimler AG, Porsche AG, Bosh GmbH, and the Airbus Group, as well as MTU Aero Engines, a manufacturer of aircraft and tank engines. Hessen boasts a strong presence of chemical, pharmaceutical and engineering industries, as well as transport services, with Germany's largest airport in Frankfurt am Main, and financial services provided by numerous banks, including the European Central Bank, Deutsche Bank and Commerzbank.

Berlin is Germany's largest city by area and population. In addition to being the country's political centre, it is also an important scientific, cultural and economic hub. North Rhine-Westphalia remains a solid economy, despite its slower-than-national average growth rate over the past 20 years. It is classified as one of the most industrialised states, home to some of the world's largest chemical companies.

Among the weakest economically are the East German states, where GDP per capita is below €30,000, i.e., Mecklenburg-Vorpommern, Saxony-Anhalt, Thuringia, and Brandenburg. Compared to the country as a whole, these regions are marked by low labour productivity, primarily due to the unfavourable structure of the economy. This is particularly true in Mecklenburg-Vorpommern, which has the highest share of employment in agriculture and the lowest in industry and construction.

4. Study methods and measurement indicators

The study of the federal states' demographic landscape employed data on population, fertility, birth rate, migration balance, and demographic ageing. They were retrieved for 2000–2020 from the Eurostat and Destatis databases.

The selected variables were synthesized into a single taxonomic measure of the demographic situation. The stimulants of the synthetic measure are fertility rates, natural increase, and net migration, while demographic old age is a destimulant. These variables were made comparable by standardising (normalising) them, i.e. reducing their values to a range between 0 and 1. A value of 1 means that the j-th variable in the i-th federal states in year t has the maximum value among all the observations included in the analysis. In contrast, when it is 0, the j-th variable in the i-the federal state in year t has the minimum value among all the observations in the sample. The stimulants were standardised using the following equation:[19]

$$s_{ijt} = \frac{x_{ijt} - \min\left(x_{ijt}\right)}{\max\left(x_{ijt}\right) - \min\left(x_{ijt}\right)}, \tag{1}$$

while the destimulant was standardised using the following equation:

$$s_{ijt} = \frac{\max\left(x_{ijt}\right) - x_{ijt}}{\max\left(x_{ijt}\right) - \min\left(x_{ijt}\right)} \tag{2}$$

where:
s_{ijt} – the standardised value of the j-th attribute in the i-th state in year t;
x_{ijt} – the value of the j-th attribute in the i-th state in year t;
max (x_{ijt}) – maximum value of the j-th attribute in the analysed years and group of federal states;
min (x_{ijt}) – minimum value of the j-th attribute in the analysed years and group of federal states.

In the next stage, taxonomic development indexes for individual federal states were constructed using the formula for distance in Euclidean space:

$$d_{it} = \sqrt{\frac{\sum_{j=1}^{n}(1 - s_{ijt})^2}{n}} \tag{3}$$

where:
d_{it} – the value of the synthetic development index in the i-th state in year t;
n – the number of diagnostic variables.

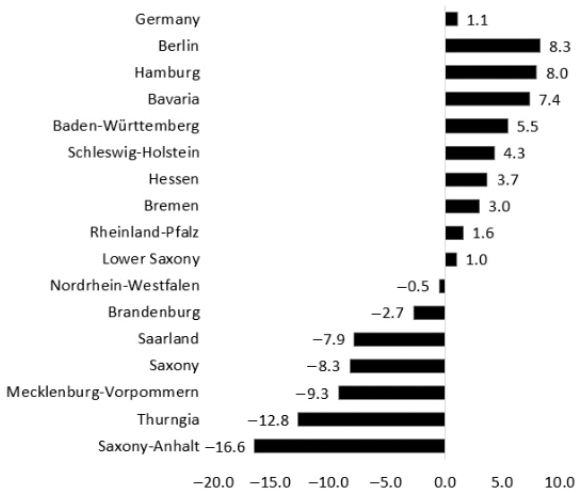
[19] **Ł. Jabłoński**, **T. Tokarski**, *Taksonomiczne wskaźniki przestrzennego rozwoju powiatów*, Studia Prawno-Ekonomiczne 2010/81, pp. 261–289.

5. Empirical analysis

5.1. Population size and dynamics

In 2020, Germany's population exceeded 83,155,000, an increase of 895,400 people, or 1.1 per cent, compared to 2000. Population increases were recorded in nine states, with Bavaria (almost 910,000 people) and Baden-Württemberg (578,600) at the top. Expressed as a percentage, the largest population increases were found in Berlin and Hamburg (see Fig. 1).

FIGURE 1: *Population change between 2000 and 2020, in %*



S o u r c e: own elaboration based on Eurostat data (Database – Eurostat (europa.eu)).

Seven federal states saw a decrease in their populations, with the largest declines in Saxony-Anhalt (16.6%, i.e. 434,600 people), Thuringia (12.8%, i.e. 311,000 people), Mecklenburg-Vorpommern (9.3%, i.e. 165,000 people) and Saxony (8.3%, i.e. 368,000 people). In particular, the demographic loss has affected towns with poor access to larger urban centres and small towns whose economies have been mainly dependent on declining mining and heavy industry.[20] As estimated by Destatis, these unfavourable demographic trends will intensify in the coming decades.[21]

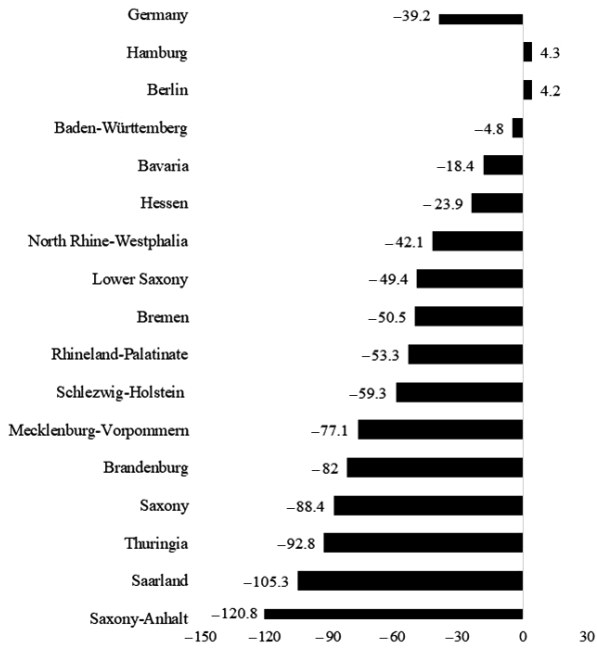
[20] *Older People in Germany and the EU*, Federal Statistical Office, Wiesbaden 2016.

[21] The largest percentage decrease in population by 2060 compared to 2022 is forecast for Saxony-Anhalt, followed by Thuringia, Mecklenburg-Vorpommern and Saarland.

5.2. Natural population change

Birth rate is the main factor behind population changes. Between 2000 and 2020, Germany recorded a negative birth rate, both on a national scale and in the majority of federal states. Saxony-Anhalt suffered the most, with an average loss of 120.8 individuals per 1,000 people. Saarland, Thuringia, and Saxony also recorded high natural attrition (see Fig. 2). Berlin and Hamburg recorded positive, albeit modest, population growth, with a higher birth-to-death ratio in Berlin since 2007 and in Hamburg since 2010.

FIGURE 2: *Total rate of natural change of population between 2000 and 2020*



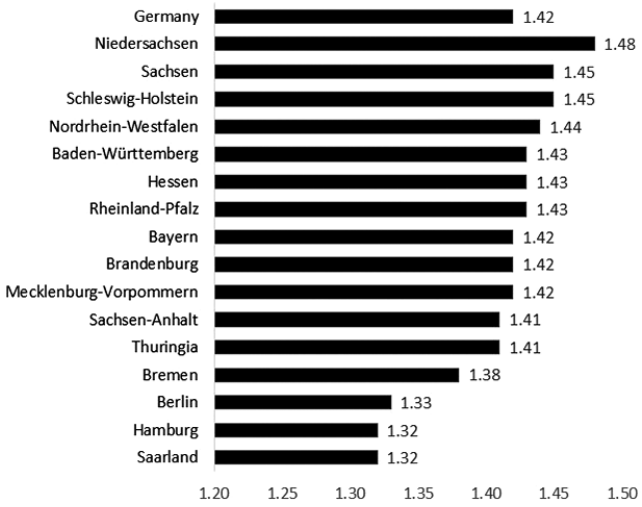
S o u r c e: own elaboration based on Destatis data (Database – Eurostat (europa.eu)).

The natural increase is mainly determined by the fertility rate, the minimum of which is 2.1 to maintain population size. Luy and Pötzsch demonstrated that the ratio in Germany has remained low over a long time, with an average annual

Bevölkerungsvorausberechnung, Destatis. Künftige Bevölkerungsentwicklung in Deutschland – Statistisches Bundesamt (destatis.de).

rate of 1.42 between 2000 and 2020.[22] In all federal states, it was well below the levels needed for generational replacement (see Fig. 3).

FIGURE 3: *Average fertility rate between 2000 and 2020*



Source: own elaboration based on Destatis data (Statistisches Bundesamt Deutschland – GENESIS-Online: Statistics (destatis.de)).

This leads to an increase in the percentage of elderly people and a decrease in the share of people at the age of reproductive capacity in the population, and consequently, a decreasing number of births.

5.3. Migration flows

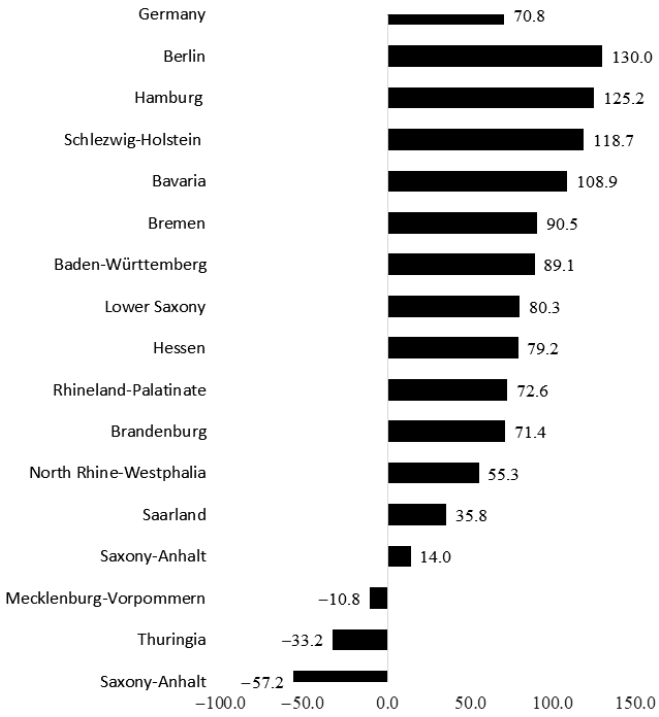
Given the negative birth rate, the recorded population growth was driven by the positive migration balance, which has persisted for several decades. This was highlighted by Destatis, which noted that without the influx of migrants, Germany's population would have been declining since as far back as 1972.[23] Between 2000 and 2020, the total migration balance was 5.8 million people, accounting for almost 70.8 people per 1,000 inhabitants. It demonstrated strong regional variations. A positive ratio of the cumulative migration rate has been

[22] **M. Luy**, **O. Pötzsch**, *Estimates of the tempo-adjusted total fertility rate in Western and Eastern Germany*, *1955–2008*, Comparative Population Studies 2010/35 (3), pp. 605–636.

[23] 2020 voraussichtlich kein Bevölkerungswachstum, Destatis.

recorded in 13 federal states. It was the highest in Berlin, despite a negative migration balance in 2020 due to the aftermath of restrictions related to the SARS-CoV-2 pandemic[24] (see Fig. 4).

FIGURE 4: *Total rate of net migration for 2000–2020*



S o u r c e: own elaboration based on Destatis data (Database – Eurostat (europa.eu)).

A high net migration rate is also recorded in Hamburg, Schleswig-Holstein, Bavaria, Bremen, Baden-Württemberg, Lower Saxony, and Hessen, i.e. federal states with metropolitan centres with an attractive labour market and good access to high-ranking infrastructure, e.g., airports, motorways, fast trains, and broadband Internet.[25] There, the inflow of people, who are usually

[24] Restrictions on movement, as well as the operation of businesses, mainly in the service sector, resulted in many people, particularly migrants, being deprived of either part or all of their income. Seeking to trim the cost of living, they often chose to return to their home countries.

[25] **A.K. Orth**, **H. Bardt**, *Folgt die Bevölkerung der Beschäftigung oder die Beschäftigung der Bevölkerung? – Schrumpfende Boomregionen in Deutschland*, in: *Das neue Wachstum der Städte.*

active economically, helps improve the demographic structure, mitigate labour shortages, reduce labour costs, increase demand for goods and services, and increase economic potential. Foreigners were predominant among the migrant population, accounting for 19.6% of Berlin's inhabitants in 2020, and they were usually younger than the local population.[26]

Saxony-Anhalt, Thuringia, and Mecklenburg-Vorpommern recorded a negative total migration balance, mainly due to the intensive internal outflow of people to the western states and a modest external inflow of foreigners.[27] According to Pastuszka and Szczepaniak, the inhabitants of those regions, mostly young people, have migrated to find better employment opportunities or avoid unemployment. They mostly moved to neighbouring, wealthier western states, e.g. from Saxony-Anhalt to Lower Saxony, from Mecklenburg-Vorpommern to Schleswig-Holstein, and from Thuringia to Bavaria.[28]

5.4. Demographic ageing

The demographic ageing level reflects the ageing index, measured by the number of people aged 65 and over per 100 people in the 0–14 age group.[29] A high level indicates an increased degree of demographic ageing.

Between 2000 and 2020, an increase in the old age index was recorded in all federal states, but with varying intensities. The highest dynamics in this period and the highest level in 2020 were recorded in Saxony-Anhalt and Thuringia (see Table 2).

Ist Schrumpfung jetzt abgesagt?, BBSR: Berlin, Germany, Nr. 01/2020, pp. 25–35; **N. Sander**, *Internal Migration in Germany*, *1995–2010*: *New Insights into East-West Migration and Reurbanisation*, Comparative Population Studies 2014/39/2, pp. 217–246.

[26] Destatis, *Foreign population on 31 December 2020*, *by Land*, Foreign population by Land – German Federal Statistical Office (destatis.de).

[27] Outflows were greater than inflows in these states between 2000 and 2013, and since 2014 this trend has been reversed.

[28] **S. Pastuszka**, **D. Szczepaniak**, *Migracje wewnętrzne w Niemczech i ich determinanty*, Studia Prawno-Ekonomiczne 2019/113, pp. 221–242.

[29] **H. d'Albis**, **F. Collard**, *Age Groups and the Measure of Population Aging*, Demographic Research 2013/29, pp. 617–640.

TABLE 2: *Demographic ageing index*

Federal state	2000	2020	Change 2000–2020, in %
Germany	103.5	158.8	53.4
Baden-Württemberg	92.2	145.0	57.3
Bavaria	97.1	149.7	54.2
Berlin	103.0	135.8	31.9
Bremen	129.0	154.4	19.7
Brandenburg	105.4	187.7	78.1
Lower Saxony	99.5	161.2	62.1
Hamburg	123.5	127.1	2.9
Hessen	104.8	148.8	42.1
Mecklenburg-Vorpommern	99.9	197.7	97.8
Rhineland-Palatinate	103.9	163.2	57.1
North Rhine-Westphalia	101.7	152.4	49.9
Saxony	138.7	198.1	42.8
Saxony-Anhalt	125.4	218.6	74.3
Saarland	118.7	197.6	66.6
Schleswig-Holstein	101.9	173.3	70.0
Thuringia	120.8	205.5	70.2

S o u r c e: own elaboration based on Destatis data (Database – Eurostat (europa.eu)).

A high demographic old age and above-average growth rate were also recorded in the other eastern states, i.e., Saxony and Mecklenburg-Vorpommern. Destatis identified the following rural peripheral areas, as well as small and medium-sized cities, as being the most disadvantaged in this regard: Görlitz, Plauen and Zwickau. They are simultaneously becoming rapidly depopulated.[30]

The state of Saarland, located in the west of the country, has the highest ageing rate. It is not attractive for people seeking better working and living conditions, as its economy has so far been dominated by traditional, declining industries (e.g., mining and steelmaking), which are less important to the economy these days. It is a situation that will essentially determine the natural process of demographic dynamics, where the number of deaths will be permanently higher than the number of births. It will also bring about

[30] *Older People in Germany and the EU*, Statistisches Bundesamt, Wiesbaden 2016.

negative economic and social consequences. In the opinion of many experts, the direct effect of ageing will be a reduction in potential labour resources, the professional, sectoral, and territorial flexibility of the workforce, and a decrease in the innovativeness of the economy.[31] Another important economic consequence of ageing will be a decrease in the demand for consumer goods and tax revenues to the budget, with a simultaneous increase in public spending to maintain the pension system, medical care, and care for the elderly.

Hamburg and Berlin recorded the most favourable old-age/working-age dependency ratio. Due to the greater availability of diverse jobs, universities, and schools, both cities attract a large number of young people, students or workers with their families. Bavaria, Baden-Württemberg, and Hessen also had a ratio higher than the national average.

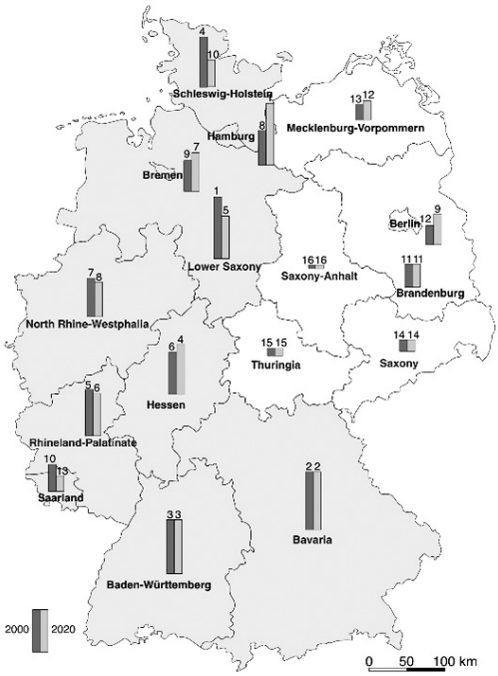
5.5. Demographic situation – synthetic measure

In view of the fact that the factors analysed (birth rate, migration rate, fertility rate and demographic ageing rate) affect the overall demographic condition in different ways, their combined importance was determined by applying a synthetic index of the demographic situation. More favourable demographic circumstances are denoted by a lower value of the index.

In 2000, the best demographic situation was found in Lower Saxony, Bavaria, Baden-Württemberg and Schleswig-Holstein. All eastern states were at the opposite extreme, with the direst situation in Saxony-Anhalt (see Map 2).

[31] **J. Feyrer**, *Demographics and productivity*, The Review of Economics and Statistics 2007/89 (1), pp. 100–109; **A. Börsch-Supan**, *The economic impact of demography change in Germany*, Geographische Rundschau 2008/59 (2), pp. 48–52; **F. Breyer**, **N. Lorenz**, *The "red herring" after 20 years: Ageing and health care expenditures*, European Journal of Health Economics 2021/22, pp. 661–667; **D. Reher**, *Economic and social implications of the demographic transition*, in: **R. Lee**, **D.S. Reher** (eds.), *Demographic Transition and Its Consequences*, A supplement to vol. 37 of Population and Development Review, The Population Council, New York 2011, pp. 11–33; **D. Heady**, **A. Hodge**, *The effect of population growth on economic growth*: *A meta-regression analysis of the macro-economic literature*, Population and Development Review 2009/35, pp. 221–248; **K.N. Eggleston**, **A. Mukherjee**, *Financing longevity*: *The economics of pensions, health, and long-term care*: *Introduction to the special issue*, Journal of the Economics of Ageing 2019/13, pp. 1–6.

MAP 2: *Position in the synthetic demographic index in 2000 and 2020*



S o u r c e: own calculations.

In 2020, five federal states showed improvement, five deteriorated, and six showed no change. Hamburg recorded the greatest progress, up seven places (from 8th to 1st), followed by two more Länder cities: Berlin moved up three positions (from 12th to 9th), and Bremen moved up two.[32] This is clear evidence of the concentration of population and directions of migration to large urban centres with the diversity and attractiveness of available jobs and living conditions.

Hessen, which is not a city-state, but one of the most urbanized and industrialized German federal states, also moved up two places. Mecklenburg-Vorpommern moved up one position, the only eastern federal state, which resulted from the loss of the previous position by the Saarland.

[32] Berlin's taxonomy index value would be much more favourable were it not for the negative migration balance in 2020.

The indicator of the demographic situation deteriorated in the next four western Länder, mainly due to the high negative natural increase not compensated by the influx of immigrants: in Schleswig-Holstein by six places, Lower Saxony by four places, and by one place in Rhineland-Palatinate and North Rhine-Westphalia.

Bavaria and Baden-Württemberg maintained their leading positions in the ranking because historically, compared to other Länder, they record a small natural decline, a high positive migration balance, and thus a low degree of demographic old age.

Invariably, since 2000, the last places in the ranking have been occupied by three eastern federal states: Saxony-Anhalt, Thuringia and Saxony. Since Germany's reunification, the inhabitants of the eastern part of the country have been migrating to the western federal states, resulting in the highest negative values of the migration balance and a natural increase rate in the country, as well as a high demographic old age index.

6. Conclusions

The analysis showed large differences between the Länder of Germany in the directions and intensity of demographic processes. Migration flows have been a key factor in demographic changes in Germany as a whole and in individual Länder. The beneficiaries of these flows of both external and internal German immigration are Berlin, as the country's capital, and the economically strong western federal states, with the exception of Saarland. These processes ensure the growth of the population there, especially in big cities and their suburbs, and help maintain a relatively favourable age structure.

The reverse effects of migration occur in Länder that are less attractive in terms of working and living conditions. They are mainly the economically weaker eastern federal states. In these Länder, further depopulation of some areas should be taken into account, which will result in incomplete use of the existing technical and social infrastructure, lower economic activity and investment, lower income, and as a result, weakening of the socio-economic potential. Therefore, there is a real threat of an increasing divergence between the eastern and western parts of Germany.

Counteracting these unfavourable tendencies, or rather slowing them down, is impossible without a well-thought-out demographic policy in the eastern federal states. One priority should be to consistently strengthen the attractiveness of individual areas for the settlement of both economic migrants

and international students and to quickly assimilate them. It is also necessary to fully use the professional potential of the local population, in particular, women, economically inactive people and persons with disabilities.

The shaping of demographic processes should be associated with the country's spatial development policy, especially in the system of functional links between urban centres and their territorial base, so that they guarantee more fully accessible and higher quality public services in terms of transport accessibility, childcare at every stage of their development, health protection, education and extracurricular activities, and participation in cultural and sports activities.

Successfully implementing an appropriate migration policy and activating the reserves of the local population depends on social and cultural organizations, training institutions, employment offices, vocational counselling centres, universities, business people, and their willingness to cooperate with each other. However, creating the right conditions and ensuring cohesion of cooperation between these institutions should be the result of a rational, comprehensive and consistent public authority policy.

References

Adamson F.B., *Crossing Borders*: *International Migration and National Security*, International Security 2006/31 (1), pp. 165–199, https://doi.org/10.1162/isec.2006.31.1.165

Adsera A., *Changing fertility rates in developed countries*. *The impact of labor market institutions*, Journal of Population Economics 2004/17, pp. 17–43, https://doi.org/10.1007/s00148-003-0166-x

d'Albis H., **Collard F.**, *Age Groups and the Measure of Population Aging*, Demographic Research 2013/29, pp. 617–640, https://doi.org/10.4054/DemRes.2013.29.23

Billari C., **Liefbroer A.C.**, **Philipov D.**, *The Postponement of Childbearing in Europe: Driving Forces and Implications*, Vienna Yearbook of Population Research 2006/4 (1), pp. 1–17.

Birg H., *Der demografische Wandelals politische Herausforderung*, Onkologie 2009/32 (3), pp. 3–7.

Börsch-Supan A., *The economic impact of demography change in Germany*, Geographische Rundschau 2008/59 (2), pp. 48–52.

Breyer F., *Demografie, medizinischer Fortschritt und Ausgabenentwicklung im Gesundheitswesen*, Der Urologe 2013/52 (6), pp. 777–784, https://doi.org/10.1007/s00120-013-3177-6

Breyer F., **Lorenz N.**, *The "red herring" after 20 years: Ageing and health care expenditures*, European Journal of Health Economics 2021/22, pp. 661–667, https://doi.org/10.1007/s10198-020-01203-x

Coleman D., *Immigration and Ethnic Change in Low-Fertility Countries*: *A Third Demographic Transition*, Population and Development Review 2006/32/3, pp. 401–446.

Dinkel R.H., *Demographic aging in the old and new German states*, Geographische Rundschau 1997/49 (3), pp. 169–172.

Eggleston K.N., **Mukherjee A.**, *Financing longevity*: *The economics of pensions, health, and long-term care*: *Introduction to the special issue*, Journal of the Economics of Ageing 2019/13, pp. 1–6, https://doi.org/10.1016/j.jeoa.2018.10.001

The ESHRE Capri Workshop Group. Female contraception over 40. Human Reproduction Update 2009/15 (6), pp. 599–612, https://doi.org/10.1093/humupd/dmp020

ESPON & NIDI, *Demographic and Migratory Flows affecting European Regions and Cities*, Final Report, 2010.

European Commission. The 2021 Ageing Report. Economic & Budgetary Projections for the EU Member States (2019–2070), Institutional Paper 148, Luxembourg 2021.

Felder S., *Gesundheitsausgaben und demografischer_Wandel*, Bundesgesundheitsbl 2012/55, pp. 614–623, https://doi.org/10.1007/s00103-012-1469-4

Feyrer J., *Demographics and productivity*, The Review of Economics and Statistics 2007/89 (1), pp. 100–109, https://doi.org/10.1162/rest.89.1.100

Heady D., **Hodge A.**, *The effect of population growth on economic growth*: *A meta-regression analysis of the macro-economic literature*, Population and Development Review 2009/35, pp. 221–248, https://doi.org/10.1111/j.1728-4457.2009.00274.x

Hoekveld J.J., *Time-Space Relations and the Differences Between Shrinking Cities*, Built Environment 2012/38 (2), pp. 179–195. The 2021 Ageing Report. Economic & Budgetary Projections for the EU Member States (2019–2070), European Commission, Institutional Paper 148, May 2021.

Jabłoński Ł., **Tokarski T.**, *Taksonomiczne wskaźniki przestrzennego rozwoju powiatów*, Studia Prawno-Ekonomiczne 2010/81, s. 261–289.

Jurkowska B., *The Federal States of Germany – Analysis and Measurement of Development using Taxonomic Methods*, Oeconomia Copernicana 2014/5 (3), pp. 49–73, http://dx.doi.org/10.12775/OeC.2014.019

Kluge F., **Goldstein J.**, **Vogt T.**, *Transfers in an Aging European Union*, Journal of the Economics of Ageing 2019/13, pp. 45–54, https://doi.org/10.1016/J.JEOA.2018.07.004

Luy M., **Pötzsch O.**, *Estimates of the tempo-adjusted total fertility rate in Western and Eastern Germany*, *1955–2008*, Comparative Population Studies 2010/35 (3), pp. 605–636, https://doi.org/10.4232/10.CPoS-2010-14en

Mai R., *Demographic change in Germany*, European View 2008/7 (2), pp. 287–296, https://doi.org/10.1007/s12290-008-0048-4

Nowossadeck S., *Demografischer Wandel, Pflegebedürftige und der künftige Bedarf an Pflegekräften*, Bundesgesundheitsbl 2013/56, pp. 1040–1047, https://doi.org/10.1007/s00103-013-1742-1

Oltimer J., **Hanewinkel V.**, *Geschichte der Migration nach und aus Deutschland*, https://www.bpb.de/themen/migration-integration/laenderprofile/deutschland/341068/geschichte-der-migration-nach-und-aus-deutschland/; accessed 31.05.2023.

Orth A.K., **Bardt H.**, *Folgt die Bevölkerung der Beschäftigung oder die Beschäftigung der Bevölkerung? – Schrumpfende Boomregionen in Deutschland*, in: *Das neue Wachstum der Städte. Ist Schrumpfung jetzt abgesagt?*, BBSR: Berlin, Germany, Nr. 01/2020, pp. 25–35.

Pastuszka S., *Regiony problemowe we Włoszech, w Niemczech i w Polsce oraz uwarunkowania ich rozwoju*, Uniwersytet Jana Kochanowskiego, Kielce 2019.

Pastuszka S., **Szczepaniak D.**, *Migracje wewnętrzne w Niemczech i ich determinanty*, Studia Prawno-Ekonomiczne 2019/113, pp. 221–242, http://dx.doi.org/10.26485/SPE/2019/113/13

Reher D., *Economic and social implications of the demographic transition*, in: R. Lee, D.S. Reher (eds.), *Demographic Transition and Its Consequences*, A supplement to vol. 37 of Population and Development Review, The Population Council, New York 2011, pp. 11–33.

Sander N., *Internal Migration in Germany*, *1995–2010*: *New Insights into East-West Migration and Reurbanisation*, Comparative Population Studies 2014/39/2, pp. 217–246.

Testa M.R., *Childbearing preferences and family issues in Europe*: *evidence from the Eurobarometer 2006 survey*, Vienna Yearbook of Population Research 2007/1, pp. 357–379, https://doi.org/10.1553/populationyearbook2007s357

Weber H., *Could Immigration Prevent Population Decline? The Demographic Prospects of Germany Revisited*, Comparative Population Studies 2015/40/2, pp. 165–190, https://doi.org/10.12765/CPOS-2015-051EN

Reports

Demography report, Bundesministerium des Innern, 5 November 2011. BMI – Homepage – Demography Report (bund.de); accessed 29.05.2023.

Destatis, *Bevölkerungsvorausberechnung*, *Künftige Bevölkerungsentwicklung in Deutschland – Statistisches Bundesamt* (destatis.de); accessed 10.04.2023.

Destatis, *Foreign population on 31 December 2020*, *by Land*. Foreign population by Land – German Federal Statistical Office (destatis.de); accessed 12.04.2023.

Destatis, 2016. *Older People in Germany and the EU*, Federal Statistical Office, Wiesbaden 2016. brochure-older-people-eu-0010021169004.pdf; accessed 11.05.2023.

Destatis, 2020 voraussichtlich kein Bevölkerungswachstum, 2020 voraussichtlich kein Bevölkerungswachstum – Statistisches Bundesamt (destatis.de); accessed 28.05.2023.

Destatis 2021. Ausblick auf die Bevölkerungsentwicklung in Deutschland und den Bundesländern nach dem Corona-Jahr 2020. Erste mittelfristige Bevölkerungsvorausberechnung 2021 bis 2035, https://www.destatis.de/DE/Themen/Gesellschaft-Umwelt/Bevoelkerung/Bevoelkerungsvorausberechnung/Publikationen/Downloads-Vorausberechnung/bevoelkerung-deutschland-2035-5124202219004.html; accessed 29.06.2023.

European Commission 2020. *Report on the Impact of Demographic Change*, demography_report_2020_n.pdf (europa.eu); accessed 26.05.2023.

European Commission 2021. The 2021 Ageing Report. Economic & Budgetary Projections for the EU Member States (2019–2070), Institutional Paper 148.

Eurostat, 2020. *EU population in 2020: almost 448 million*, Eurostat. News Release, No. 111, EU population in 2020: almost 448 million – Products Euro Indicators – Eurostat (europa.eu); accessed 11.01.2023.

Every Age Counts. The further development of the Federal Government's demographic strategy, Bundesministerium des Innern, 4 January 2016. Microsoft Word – 151027 ÜbersetzungsversionfürAgentur mit EPS-Import.docx (bund.de); accessed 28.05.2023.

Federal Institute for Population Research, Demographics facts of and trends in Germany, 2010–2020, 18 March 2021, https://www.bmi.bund.de/SharedDocs/downloads/EN/themen/demography/fakten-zur-demografischen-entwicklung-en.pdf;jsessionid=9E57292C0D16D778CC9C2DF7DCF7A9C4.1_cid287?__blob=publicationFile&v=1; accessed 29.05.2023.

Sławomir PASTUSZKA

REGIONALNE RÓŻNICE DEMOGRAFICZNE W NIEMCZECH

Abstrakt

Przedmiot badań: Analiza przestrzenna procesów demograficznych w Niemczech.
Cel badawczy: Ocena sytuacji ludnościowej i jej zmian w krajach związkowych Niemiec w latach 2000–2020.
Metoda badawcza: W analizie wykorzystano metody analizy literatury przedmiotu, statystyki opisowej i taksonomii.
Wyniki: Wykazano, że w najkorzystniejszej sytuacji demograficznej znajdują się Hamburg, Berlin oraz landy wysoko rozwinięte gospodarczo: Bawaria, Badenia-Wirtembergia i Hesja. Spośród landów zachodnich niekorzystna sytuacja demograficzna występuje tylko w kraju Saary, której gospodarka jest zdominowana przez przemysł ciężki. Z największymi problemami demograficznymi borykają słabe ekonomicznie wschodnie landy, zwłaszcza Saksonia-Anhalt i Turyngia, które nie tylko najszybciej się wyludniają, ale i starzeją. Z tego powodu prawdopodobnie zwiększy się dystans rozwojowy dzielący je od najbogatszych landów.

Słowa kluczowe: sytuacja demograficzna, kraje związkowe Niemiec, analizy regionalne.