

Dorota Maria KAŁUŻA-KOPIAS,\* Agnieszka PALMA\*\*

## THE IMPACT OF MIGRATION ON THE SIZE AND STRUCTURE OF POPULATIONS IN BIG CITIES

### WPLYW MIGRACJI NA LICZBĘ I STRUKTURĘ LUDNOŚCI WIELKICH MIAST

NR DOI: 10.25167/sm.1260

**ABSTRACT:** The commencement of the 21<sup>st</sup> century was marked by a greater intensity of depopulation processes in Poland. From the demographic perspective, a decline in the population number is an outcome of the interaction of two factors: a negative natural increase and a negative balance of migration that may work separately or in tandem. When the level of the natural increase falls, migration, especially its balance, gains importance as a factor influencing the population size. In the early 21<sup>st</sup> century, population flows played a significant role in the growth of the populations in Warsaw, Krakow, and Wrocław, whereas Poznań and Łódź saw an accelerated population loss. The purpose of the study was to assess the direct impact of migration on the growth of populations in big Polish cities, as well as its indirect impact revealing itself through increased birth rates from migrants. The analysis spans the years 2002-2017 and uses data from publications of the Central Statistical Office (Demographic Yearbooks) and from the *Demografia* database (<http://demografia.stat.gov.pl/bazademografia/>).

**KEY WORDS:** migrations, large cities, demography

**ABSTRAKT:** Początek XXI wieku charakteryzuje się większą intensywnością procesów wyludniania w Polsce. Z perspektywy demograficznej spadek liczby ludności jest wynikiem interakcji dwóch czynników: ujemnego przyrostu naturalnego i ujemnego salda migracji, które mogą działać osobno lub razem. Kiedy poziom przyrostu naturalnego jest bliski wartości lub ujemny, migracje zyskują na znaczeniu jako czynnik wpływający na wielkość populacji. Na początku XXI wieku przepływy ludności odgrywały znaczącą rolę we wzroście populacji w Warszawie, Krakowie i Wrocławiu, ale w Poznaniu i Łodzi przyspieszyły utratę mieszkańców. Celem badania była ocena bezpośredniego wpływu migracji na wzrost liczby ludności w dużych polskich miastach, a także jej pośredniego wpływu ujawniającego się poprzez wzrost liczby urodzeń wśród migrantów. Analiza obejmuje lata 2002–2017 i wykorzystuje dane z publikacji Głównego Urzędu Statystycznego (Roczniki demograficzne) oraz z bazy danych Demografia (<http://demografia.stat.gov.pl/bazademografia/>).

**SŁOWA KLUCZOWE:** migracje, wielkie miasta, demografia

---

\* Uniwersytet Łódzki, Wydział Ekonomiczno-Socjologiczny, ul. Polskiej Organizacji Wojskowej 3/5, 90-255 Łódź, e-mail: [dkaluza@uni.lodz.pl](mailto:dkaluza@uni.lodz.pl)

\*\* Uniwersytet Łódzki, Wydział Ekonomiczno-Socjologiczny, ul. Polskiej Organizacji Wojskowej 3/5, 90-255 Łódź, e-mail: [apalma@uni.lodz.pl](mailto:apalma@uni.lodz.pl)

## Introduction

In the early 21<sup>st</sup> century, the size and changes in populations living in big Polish cities started to be increasingly and significantly influenced by migrations. The demographic phenomenon of migration is a challenge posed to researchers for several reasons. Firstly, it is more complex compared with mortality and fertility. Secondly, the official resident registers have a limited use as a source of statistics on annual population flows, because many migrants either do not bother to register their residence with the authorities or do this long after they have arrived. Because of the fallibility of migration statistics, the indicators derived from them only show general migration trends in particular years or periods.

The study was undertaken to assess the direct impact of migrations on population sizes in the biggest Polish cities, as well as their indirect impact that reveals itself through positive net migration rates for younger migrants leading to higher birth rates in the future. The choice of cities for the study is not accidental, as they give a slightly different picture of population development and migration than smaller cities and villages.

The analysis spans the years 2002-2017, with 2002 adopted as the starting point because the National Census of Population and Housing which was conducted then, provided a full insight into population flows in Poland in the early 21<sup>st</sup> century. Additionally, the Polish Central Statistical Office (GUS) did not publish reports on external migrations in Poland in 2015. Therefore, one of the simplest and most common ways to bypass this problem is to replace the missing data with the average value. Their size was estimated as an average from the 2014 and 2016 data.

All the data used in the present study were sourced from GUS publications (*Demographic Yearbooks*) and the *Demografia* database (<http://demografia.stat.gov.pl/bazademografia/>).

## The quality of the migration data

The Polish statistical practice defines a migrant as someone who crosses the administrative limits of their current home town, municipality, or state to find another permanent residence elsewhere. A change in the residency status from temporary to permanent can be deemed migration if the person applying for it has a permanent address in another town, municipality, or state, as opposed to a change of address within the same administrative unit. Short tourist trips and business trips do not meet the demographic definition of migration, either. Therefore, in a very broad sense, migration is a physical movement of population involving a permanent or temporary change of residence.

The main source of migration statistics in Poland is the resident registers. The registers are part of the national population register and contain information on all individuals who are taking permanent residence or temporary residence exceeding 3 months in the area or who are leaving it by virtue of an administrative decision. Since

2006, the scope of the PESEL<sup>1</sup> data on permanent internal migrants has been extended to provide information on their previous and present address, date when registered, gender, age, and marital status.

The Polish resident registration system has frequently been changed and modified over the time of its operation. Before the end of the 1980s, the system of compulsory resident registration was a relatively reliable source of statistics about internal migrations, although many authors were critical about their quality, notwithstanding the ongoing efforts to improve the techniques for data collecting and analysis. The shortcomings of official statistics have been highlighted by authors such as M. Latuch (1985, 1992, 1996), Rykiel (1986), and M. Kędełski (1990).

The quality of official migration statistics has considerably deteriorated following the relaxation of the resident registration law in the 1990s. Theoretically, the numbers of past and presents addresses should be the same, but in reality, they can be significantly different (Jończy, 2008; Śleszyński 2011). Korceli has observed (1997) that the numbers of in-migrants are particularly underestimated in the biggest cities and their suburban areas, where many new residents fail to register themselves with the authorities. In 2010, a proposal was put forward to abolish the compulsory registration of residents, but it was not made into law. The argument against scrapping it was that authorities needed residents' addresses to carry out their constitutional and statutory tasks and responsibilities on behalf of citizens. The law that currently regulates the registration of residence and migration issues is the Act of 1 March 2018 amending the Act on Registration of Population (Dz.U. 2018 poz. 696). The compulsory registration of residents also occurs in other EU countries, such as Finland, Austria, Croatia, the UK, Latvia, Denmark, Belgium, Sweden, Spain, Italy, and Germany.

While the residence registers are not a perfect source of information, they are still used as a key source of information on migrations because of the continuity and up-to-datedness of their data.

## **The changing numbers of inhabitants in the biggest Polish cities**

Over the 20<sup>th</sup> century, all five cities considered in this study increased their populations: Wrocław by about one-third, Łódź and Warsaw almost threefold, Poznań fivefold, and Krakow sixfold (Gawryszewski, 2005). Generally, the main determinants behind growths and drops in the size of a population occupying some area are a natural increase (the difference between the numbers of births and deaths) and a migration balance (the difference between the number of people who come to live in the area and the number of those who leave it to live elsewhere). The population size can also change as a result of administrative decisions. A relevant example is the resolutions of big municipalities

---

<sup>1</sup> Another component of the national population register.

resulting in the inclusion of their suburban areas into the city limits. The demographic impacts of changes to units' administrative limits should be considered by researchers as ignoring them may distort the results of analyses.

In the sample years 2002-2017, Warsaw was the only city where a change of administrative borders had a marked effect on the number of inhabitants. In 2002, the town of Wesoła became a new quarter of the capital city, increasing its population by 18,000. The extension of the areas administered by Poznań (2005) and Krakow (2013) increased their populations by only 50 and 129 inhabitants, respectively.<sup>2</sup>

As for general population trends, Warsaw and Krakow had population increases in all the years under analysis, Łódź and Poznań experienced population declines, and as regards Wrocław – the number of its inhabitants fluctuated within a narrow range (Figure 1).

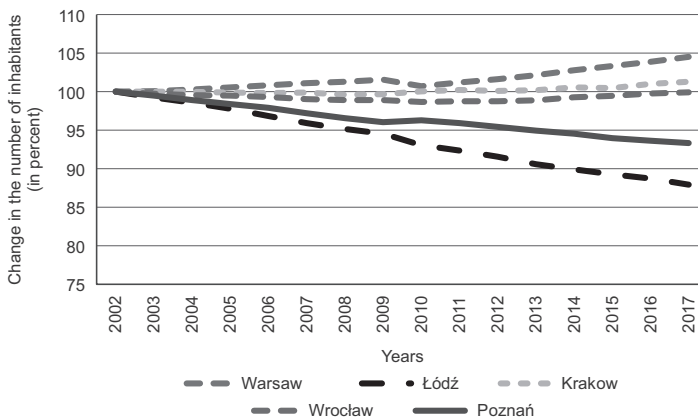


Fig. 1. Changes in the population size in the largest Polish cities, 2002-2017 (2002 = 100)

Source: Based on the CSO's Demography Database.

From 2002 to 2017, Warsaw and Krakow increased their populations by 4.5% and 1.3%, respectively, while Łódź and Poznań experienced population losses reaching as much as 12% and 6.4%, respectively. In absolute terms, Łódź lost more than 91,000 inhabitants and Poznań slightly over 35,000, whereas Wrocław, Krakow, and Warsaw gained 6,000, 20,000, and over 104,000 new inhabitants, respectively (Table 1).

In the last years of the analysis, the population declines accelerated in Łódź and Poznań (Figure 2), but while in Poznań the main cause was outmigration, Łódź was more affected by a negative natural increase. Migrations in the years 2002-2017 reduced Poznań's population by a total of almost 36,000. At the same time, the city gained 517

<sup>2</sup> GUS, 2005, 2014, *Powierzchnia i ludność w przekroju terytorialnym*

Table 1

Cumulative population changes in the biggest Polish cities between 2002 and 2017 (persons)

City	Natural increase	Total net migration	Real increase
Łódź	-68,683	-22,320	-91,003
Krakow	2,823	17,215	20,038
Poznań	517	-35,562	-35,045
Warsaw	-5,174	109,283	104,109
Wrocław	-8,136	14,229	6,093

Source: based on data available in CSO Demography Database

new inhabitants as a result of a positive natural increase (Table 1). In Łódź, the cumulative population loss due to migrations and a negative natural increase was ca. 22,000 and almost 69,000, respectively. As for Wrocław, the natural increase had a stronger but diminishing effect on the size of its population compared with migrations. The city's positive actual increase after 2008 was mainly due to positive net migration, which in total added more 14,000 new residents to its population (Figure 2), more than offsetting population loss due to negative natural increase (< 8,000).

The main reason for the actual population growth in Warsaw and Krakow was in-migration, which increased their populations by a total of ca. 109,000 and 14,000, respectively. In the capital city, the 15-year natural increase was negative (-5,000), whereas in Krakow it was positive (nearly 3,000). In the last years of the analysis, migration gained importance as the determinant of actual population increases. The main cause of population gains in Krakow, Warsaw, and Wrocław in 2017 was positive net migration rates. The single cause of population decline in Poznań was the city's negative migration balance. Łódź was the only of the five cities where the depopulation effect of migrations was weaker than that of negative natural increase that accounted for 80% of the population decline in the city.

## Large cities and migrations from 2002 to 2017

Let us now take a closer look at the population flows in the largest Polish cities between 2002 and 2017. As it was mentioned earlier, Łódź and Poznań had persistently negative migration balances over the period of the analysis, whereas in Warsaw, Krakow and Poznań the net migration rates were positive.

The impact of internal migrations on the population sizes in the five cities turned out much stronger compared with external migrations (Table 2). The highest rate of population growth due to internal migrations occurred in Warsaw that had an average annual net migration gain of 4 persons per 1,000, compared with 1.7 in Krakow, and 2.4 in Wrocław. Poznań and Łódź had net migration losses of 3 and almost 2 persons per year, respectively.

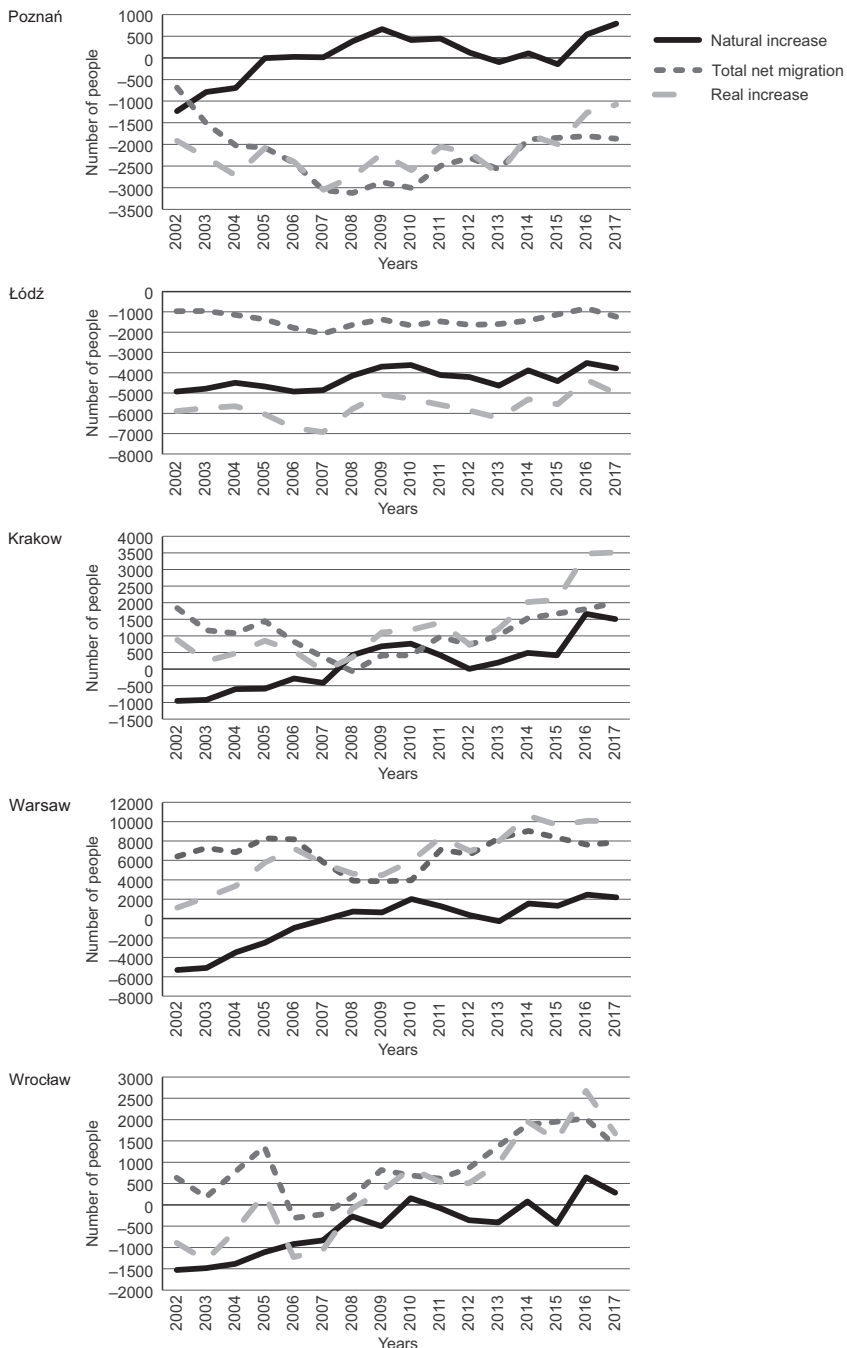


Fig. 2. Population change in the biggest Polish cities by cause, 2002-2017

Source: based on data from the CSO Demography Database

Table 2

Average annual levels of internal and external migration in the biggest Polish cities, 2002-2017

City	External migration			Internal migration			Per 1,000 of population	
	Persons						External migration balance	Internal migration balance
	immigration	emigration	saldo	inflow	outflow	balance		
Łódź	146	318	-172	3,845	5,051	-1,206	-0.2	-1.6
Krakow	485	268	217	6,933	5,842	1,091	0.5	1.7
Poznań	114	326	-212	5,619	7,319	-1,700	-0.4	-3.1
Warsaw	631	387	244	20,177	13,496	6,681	0.2	3.9
Wrocław	489	420	69	6,772	5,318	1,454	0.2	2.4

Source: based on data from the CSO Demography Database

Given that the large cities have always drawn young people like a magnet (Kałuża-Kopias 2010a, 2010b, 2014), it is hardly surprising that in all sampled years all the five cities noted positive net migration rates for people aged 20-29, even Łódź and Poznań that had negative cumulative migration balances (the highest rates occurred in Warsaw and the lowest in Łódź; Table 3). In the case of large cities, the population gain in this age group through net migration may have three causes. Firstly, large cities are academic centres that have on offer a wide range of educational opportunities for young people, many of whom, having found life partners and jobs, stay in the cities where they studied. Secondly, there are frequent cases of young people moving to large cities to get married. Thirdly, the fast-expanding services sectors in large cities offer better career opportunities. That migration intensity and the size of the labour market are related to each other has been demonstrated by the National Census of Population 2011. According to its findings, for people living in regions with relatively tight labour markets job-finding problems are the main reason to consider migration. High wages and low unemployment rates in the five cities make them attractive migration destinations to potential migrants, offering them a chance to improve their life situation.

As a result of the positive net migration rates in the age group 20-29 years in all the five cities, and in Warsaw, Wrocław, and Krakow also in the age group 30-34 years, the numbers of potential mothers increased (Table 4), the most in Warsaw (by 82,000). In Łódź, migrations only increased the number of women aged 20-29 years but insufficiently to compensate for the total decline in the number of women of childbearing age.

The annually increasing number of potential mothers contributed to more births so that between 2002 and 2017 it exceeded 283,000 in Warsaw and in Wrocław approached 95,000 (Table 5). Assuming for simplicity that the age-specific birth rates are the same for female in-migrants and 'native' women, we can try to estimate the (hypothetical) numbers of births that each of the large cities may have owed to the former.

According to Table 5, Warsaw thus gained 8,000 additional births and Łódź around 1,000 (Table 5).<sup>3</sup> In percentage terms, migration contributed to 1.1% of the cumulative number of births in Łódź to nearly 6% in Krakow and Wrocław.

Table 3

Average annual migration balances in the biggest Polish cities by age group, 2002-2017

City	Age group		
	Per 1,000 inhabitants of a given age		
	20-24 years	25-29 years	30-34 years
Łódź	3.5	5.7	-2.6
Krakow	7.2	21.8	7.8
Poznań	6.3	16.4	-3.0
Warsaw	12.7	31.2	14.8
Wrocław	9.9	27.6	9.3

Source: based on data from the CSO Demography Database

Table 4

Cumulative balances of female migrants of childbearing age, 2002-2017 (persons)

Age group	Łódź	Krakow	Poznań	Warsaw	Wrocław
15-19	-387	257	-958	1,007	-543
20-24	2,325	8,815	2,774	14,749	4,017
25-29	3,708	26,758	7,117	44,546	12,251
30-34	-1,491	10,362	-1,870	2,633	2,626
35-39	-1,995	925	-2,697	3,265	-1,536
40-44	-1,412	-679	-1,822	-326	-1,339
45-49	-1,131	-1,302	-1,677	-1,440	-1,039
Total	-383	45,136	868	82,434	14,437

Source: based on data from the CSO Demography Database

Table 5

Hypothetical cumulative birth rate increase in 2002-2017 resulting from migration

Age group	Łódź	Krakow	Poznań	Warsaw	Wrocław
15-19	-63	117	20	-91	20
20-24	922	2,270	1,274	762	2,051
25-29	201	2,618	1,772	3,525	2,733

<sup>3</sup> The calculations are only presented for illustrative purposes, as the actual fertility of migrant mothers is not known.



Table 5 contd.

Age group	Łódź	Krakow	Poznań	Warsaw	Wrocław
30-34	72	1,428	524	3,278	632
35-39	28	126	-94	860	-28
40-44	-51	-38	-13	23	-85
45-49	-2	1	-11	-12	-6
Total	1,107	6,522	3,472	8,345	5,317
Cumulative number of births, years 2002-2017	97,005	116,808	90,074	283,032	94,847
Numbers of births attributable to migrant mothers, 2002-2017 (%)	1.1	5.6	3.9	2.9	5.6

Source: based on data available in CSO Demography Database

## Conclusion

The early 21<sup>st</sup> century witnessed a rise in the importance of migrations as a factor shaping the size and structure of populations in big Polish cities. The growth of populations in Krakow, Warsaw, and Wrocław was mainly due to positive net migration rates in the cities, whereas in Poznań migration was the main cause of the dwindling number of its inhabitants. Łódź was an exception in that the size of its population was mainly determined by a natural increase and not by migrations.

Big cities have their unique characteristics, which result from different economic development strategies and demographic and political events that drove their evolution in the 20<sup>th</sup> century. The analysis of the socio-economic processes in Poland also shows that after 1990 large urban units such as Krakow, Poznań, Warsaw and Wrocław have been developing at a faster rate than smaller localities. Good business conditions and a high standard of living in big cities naturally attract migrants who in making migration-related decisions consider economic circumstances, including the labour market situation (Kałuża-Kopias 2010a, 2014; Zbierska, Zydróż, Szczepański 2015).

The growth potential of Łódź ranks it behind Warsaw, Krakow, Poznań, and Wrocław. The population decline in the city between 2002 and 2017 was faster and deeper compared with the other cities. Łódź received few migrants, so its long-term gain from new inhabitants, especially young people who could increase its reproductive capacity, was also very limited. In Poznań, the main reason for population loss was the outflow of inhabitants. While Poznań was not the only city affected by out-migration, what made it different from the other units was the strength of suburbanisation trends – more people than elsewhere sought new homes in the contiguous suburban communities (Gołata 2015; Gałka, Warych-Juras, 2011).

Krakow was less affected by a natural decrease compared with the other cities because of the relatively greater fertility and the better age structure of its female popula-

tion, as well as due to a much higher migration gain that partly offset population loss. Wrocław was the only city where the size of the population practically did not change because population gain from migration fully compensated for the natural population decrease. The highest migration gain and population growth in Warsaw confirmed its greatest power to attract migrants (Kałuża-Kopias 2014; Śleszyński 2015).

It is predicted (GUS 2014) that with positive natural increases in the biggest Polish cities being gradually reduced by population ageing, the sizes of their populations will be predominantly shaped by migrations. The only two cities that will probably increase their populations are Warsaw and Krakow. As a result of the ongoing suburbanisation trends, more and more people will live in areas surrounding large cities (Liszewski 2010; Węclawowicz, Łotocka, Baucz, 2010; Winiarczyk-Rażniak, Raźniak 2012; Gałka, Kurek, Wójtowicz 2015). In consequence, large cities and their satellite communities will be perceived as coherent metropolitan areas. An apt illustration of the process is Poznań; it is predicted that the number of people living in the nearby rural district will increase from 359,600 in 2014 to 534,600 in 2050. As for Łódź, the population forecast for the city is rather gloomy: the number of its inhabitants is expected to fall below 70,000 (66,800) already in 2020. The main factor behind the population decline in Łódź and the region is attractive and easily reachable labour markets in Warsaw and Wrocław, attracting people living in the eastern and western parts of the region (Szukalski 2015).

## References

- Gałka J., Kurek S., Wójtowicz M., 2015, *Zmiany zaludnienia oraz struktur demograficznych mieszkańców Krakowa na tle Krakowskiego Obszaru Metropolitalnego w okresie transformacji*, [w:] red. M. Soja, A. Zborowski, *Miasto w badaniach geografów*, Wyd. Instytut Geografii i Gospodarki Przestrzennej Uniwersytetu Jagiellońskiego w Krakowie, pp. 29-42.
- Gałka, J., Warych-Juras, A. 2011, *Regionalne uwarunkowania suburbanizacji w Polsce*, [in:] J. Słodczyk (ed.), *Procesy suburbanizacji w wybranych miastach Polski*. *Studia Miejskie*, 3, 147–158.
- Gawrzeszewski A., 2005, *Ludność Polski w XX wieku*, Monografie no. 5, PAN IGiPZ, Warszawa.
- Główny Urząd Statystyczny (GUS) [2014], *Prognoza ludności na lata 2014-2050*, Warszawa, opracowanie dostępne na stronie: <http://stat.gov.pl/obszary-tematyczne/ludnosc/prognoza-tudnosc/prognoza-ludnosc-na-lata-2014-2050-opracowana-2014-r-,l,5.html> (12.09.2015).
- Gołata E., 2015, *Demograficzne uwarunkowania rozwoju miasta Poznania*, „Ruch Prawniczy, Ekonomiczny i Socjologiczny” Rok LXXVII – v. 1 – 2015.
- GUS 2014, *Prognoza ludności na lata 2014-2050*, Warszawa.
- Jończy R. 2008, *Zewnętrzne migracje ludności wiejskiej Opolszczyzny po wejściu Polski do Unii Europejskiej. Konsekwencje w kontekście sytuacji społeczno-demograficznej i regionalnego rynku pracy*, Wojewódzki Urząd Pracy w Opolu, Uniwersytet Ekonomiczny we Wrocławiu, Opole–Wrocław.
- Kałuża-Kopias 2010a, *Migracje wewnętrzne a poziom rozwoju społeczno-gospodarczego wybranych największych miast Polski*, „Acta Universitatis Lodzianensis. Folia Oeconomica”, 237, pp. 29-42.
- Kałuża-Kopias 2010b, *Migracje wewnętrzne w Łodzi na tle wybranych największych miast w Polsce*, „Acta Universitatis Lodzianensis. Folia Sociologica”, 35, pp. 199-217.
- Kałuża-Kopias 2014, *Atrakcyjność migracyjna wielkich miast – stan obecny i perspektywy*, „Problemy Polityki Społecznej. Studia i Dyskusje” no. 27(4) 2014, pp. 41–54.
- Kędełski M. 1990, *Fikcja demograficzna w Polsce i RFN (ze studiów nad migracjami zagranicznymi)*, [w:] „Studia Demograficzne”, no. 1(99).

- Korcelli P., 1997, *Alternatywne projekcje zmian demograficznych i migracji w aglomeracjach miejskich*, [in:] P. Korcelli (red.), *Agglomeracje miejskie w procesie transformacji: Zeszyty IGiPZ PAN 45*, IGiPZ PAN, Warszawa, pp. 5–22.
- Latuch M. 1985, *Demografia społeczno-ekonomiczna*, PWE, Warszawa.
- Latuch M. 1992, O rzetelną i pełniejszą informację o współczesnej emigracji ludności z Polski, „Wiadomości Statystyczne”, no. 8.
- Latuch M. 1996, Współczesna emigracja Polaków. Aspekty demograficzne i społeczno-ekonomiczne zewnętrznego procesu migracyjnego ludności Polski lat osiemdziesiątych XX wieku, [w:] „Monografie i Opracowania”, no. 410.
- Liszewski S., 2010, *Od Łódzkiego Zespołu Miejskiego po Łódzki Obszar Metropolitalny*, [w:] red. S. Liszewski, *Obszary metropolitalne we współczesnym środowisku geograficznym*, Nowa Era, Łódź, pp. 53–66.
- Marcinowicz, D., 2000, *Demograficzne źródła wzrostu ludności w strefie podmiejskiej wielkiego miasta, Studium Poznania, Biuletyn PAN. Komitet Przestrzennego Zagospodarowania Kraju*, 192, 291-309.
- Rykiel Z., 1986, *Ograniczenia meldunkowe jako bariery przestrzenne*, „Przegląd Geograficzny”, no. 3/58, 395–409.
- Szukalski P., 2015, *Demograficzno-społeczne konsekwencje depopulacji w województwie łódzkim*, „Problemy Społeczne, Polityka Społeczna w Regionie Łódzkim”, v. 15, Wyd. Regionalne Centrum Polityki Społecznej, pp. 2-20.
- Śleszyński P., 2011, *Oszacowanie rzeczywistej liczby ludności gmin województwa mazowieckiego z wykorzystaniem danych ZUS*, „Studia Demograficzne” 2(160) pp. 35-58.
- Śleszyński P., 2015, *Obszar Metropolitalny Warszawy a rozwój Mazowsza. Wybrane wyniki badań prowadzonych w projekcie „Trendy Rozwojowe Mazowsza”*, „Studia Regionalne i Lokalne”, no. 61, pp. 43-66.
- Węclawowicz, G., Łotocka, M., Baucz, A., 2010, *Rozwój miast w Polsce. Raport wprowadzający Ministerstwa Rozwoju Regionalnego, opracowany na potrzeby przygotowania przeglądu OECD Krajowej Polityki Miejskiej w Polsce*, Ministerstwo Rozwoju Regionalnego, Warszawa, [http://www.mrr.gov.pl/rozwoj-regionalny/polityka\\_regionalna/rozwoj\\_miast/strony/rozwoj\\_miast.aspx](http://www.mrr.gov.pl/rozwoj-regionalny/polityka_regionalna/rozwoj_miast/strony/rozwoj_miast.aspx): (22.08.2018).
- Winiarczyk-Rażniak A., Raźniak P., 2012, *Migracje wewnętrzne ludności w polskich obszarach metropolitalnych u progu XXI wieku*, Wydawnictwo Naukowe Uniwersytetu Pedagogicznego, Kraków
- Zbierska A., Zydrón A. Szczepański P. 2015, *Proces suburbanizacji a warunki życia mieszkańców podpoznańskich i podwrocławskich gmin*, „Studia i Prace Wydziału Nauk Ekonomicznych i Zarządzania no. 37, v. 3.