

# Regional and temporal changes in demand for geography teachers in Poland. Results of job advert tracking in the years 2019-2020

## Abstract

In the literature, analysing job adverts is considered to be a credible method for collecting data about the real demand for employees with higher education. Studies on the demand for teachers based on this data source have been conducted in many countries, but never in Poland. On this basis, the research objective was to identify regional and temporal changes in the demand for geography teachers. As part of the study we tracked all job adverts addressed to geography teachers which were published online over a period of nearly two years. It turned out there were 3,438 such job vacancies in Poland, which included part-time and full-time positions. The study results indicated vast temporal and regional differences in the demand for teachers, and also a clear imbalance in the demand for geographers between Warsaw – the capital city – and the rest of the country. It should be highlighted that both the methodology and the results presented in the paper are pioneering.

## Keywords

Content analysis • demand • geography teachers • labour market • job offer • Poland

## Introduction

Education should be a highly valued sector due to its significant impact on numerous aspects of social and economic life. First, human capital, technological advancement, living standard, and quality of life all hinge on the condition of the education sector (e.g., Santiago 2004; Barbieri et al. 2008; Bajerski 2011; Tracz 2013; Żaba 2016; Stromquist 2018; Wiggan et al. 2021). The key factor determining the quality of education is the teaching staff (Deptuła 2013; Boum 2016). It is therefore crucial to ensure that there are a sufficient number of specialists of appropriate quality in schools, i.e., teachers of specific subjects.

It is extremely difficult to provide educational services without access to a steady supply of teachers who can reduce the shortage of teachers (Lindqvist & Nordänger 2014). Therefore, the educational labour market and a stability in staff supply provide opportunities for both comprehensive and diverse academic studies, and implementation projects run by practitioners responsible for ensuring high quality education services (Loeb & Béteille 2008).

This literature review of international studies shows that teacher shortages have been reported since the middle of the 1980s. It had been predicted, even back then, that a scarcity of teachers would affect not only developing countries but also industrialised and highly developed regions. The predictions were right. In many countries the process of recruiting teachers has gradually become longer, and often fails, meaning, no teachers are found to fill vacancies (Lee 2020). This has applied to various levels of education and a range of school subjects. Currently the shortage of teachers is most acute in Africa: 71% of African countries suffer from a deficit in teaching staff. The issue also significantly affects Central and South America (40%). In Europe, there is a clear deficit in teachers in Belgium, Switzerland, the United Kingdom, Ireland, the Netherlands, Georgia, Germany, Luxembourg, and Slovakia (Coppe et al. 2021).

Danuta Piróg<sup>1,2</sup>, Adam Hibszer<sup>1</sup>

<sup>1</sup>Institute of Social and Economic Geography and Spatial Management, Faculty of Natural Sciences, University of Silesia in Katowice, Sosnowiec, Poland  
e-mail: adam.hibszer@us.edu.pl

<sup>2</sup>Institute of Geography, Department of Research in Geography Education, Pedagogical University, Kraków, Poland  
e-mail: danuta.pirog@up.krakow.pl

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The reasons for staff shortages differ regionally. In developing countries they have largely been due to general difficulties in accessing education and, consequently, there is an insufficient number of qualified teachers compared to demand (Jaramillo 2012; Key 2013). On the other hand, in Western Europe and the United States, fewer people have wanted to pursue a career in teaching due to unsatisfactory remuneration, low prestige, and the wide range of duties required (Luekens et al. 2004; Nagler et al. 2015; Dupriez et al. 2016). A more in-depth analysis has shown that the shortage applies primarily to teachers in science and foreign languages (Stromquist 2018).

For a few years also, Polish school principals and media outlets have reported that a shortage of staff has become an issue. In Poland, teaching qualifications are regulated by law, and statistics show that nearly all teachers hold higher education diplomas and teach subjects that correspond to their field of study (GUS 2018). However, the question as to whether there is a sufficient number of teachers in Poland remains unanswered. On the one hand, as many as 7.31 candidates, on average, applied for each teaching position in 2010 (Piróg 2012). The 2013 TALIS report (OECD 2014) and data on occupations that were in shortage, surplus, or balanced, indicated that teachers were among the balanced group. The exceptions in some regions were the special needs teachers and teachers of vocational subjects, who belonged to occupations in shortage (Barometr 2020). On the other hand, in recent years, school principals have raised the issue of staff shortages. Because there are no official statistics about the demand for teachers, there is no hard data on whether teachers are needed in the education sector, and if so, how many. In other words, the level of demand for geography teachers remains unknown. At the same time, academic research indicates a clear drop in the number of students who choose teaching majors (Piróg 2012) and take up employment in schools (Piróg 2018a). In

Poland as well as internationally, the teaching profession is not considered an attractive career choice by young people. A recent PISA study hinges on the assumption that a small number of young people want to become teachers, but that they give up these plans in adulthood (Neugebauer 2015; Goldhaber et al. 2019; Sikora 2021). For many of them, teaching is a temporary job and a stepping stone to a career in another profession (Harris 2020).<sup>1</sup>

Moreover, there are no systemic analyses of supply and demand in the education sector in Poland (EACEA 2013). Some approximate and non-quantitative data about the situation of teachers in the labour market is published in reports in *Barometr*. However, the reports do not examine the demand for teachers of specific subjects (Barometr 2020). Valuable data about the current employment situation of geographers are available as a payable data base, collected in SIO (the Education Information System), which has data on the number, regional distribution, and qualifications of people already working as geographers. However, the data does not provide information about the real demand for teachers as expressed in specific job offers. Meanwhile, if the demand for teachers for specific subjects is not tracked, it is not possible to 'diagnose' or prevent staff-related problems in the education labour market. Such preventative measures include the following steps: a) accurate diagnosis of current demand; b) forecasts regarding how many teachers will be needed in schools in the coming years and where (based on the current demand, and on demographic data about teachers and students); and c) taking targeted measures based on the above to mitigate the adverse educational and social effects of possible shortages. Such a mode of action, i.e., a rapid response to prevent or at least reduce the effects of staff shortages, is particularly needed in the so-called socially sensitive sector of the labour market. Besides education, socially sensitive sectors include healthcare and social security services (Santiago 2004; Hillion 2018). Despite its major importance and the impact that this information can have on the real demand for teachers of specific subjects (including geography), to date, the issue has not been investigated by academics.

In the literature, it is considered that the most reliable and effective way of identifying the size and the special diversity of employers' needs is to use information from online job advertisements. They are exhaustive, current, free of charge and non-reactive, easy to access, relatively standardized, and readily available. Compared to the point-in-time snapshots provided by survey-based labour market data, which rely on random sampling, these data provide information about the changes in demand for specific outcomes over time and space, and, thus, about the changing nature of the market. This makes online advertisements the best source of knowledge about employers' actual (i.e. not declarative) demand for certain job positions, including the education sector (Boselli et al. 2018; Deming & Kahn 2017; Darabi et al. 2018).

This paper therefore outlines the results of an analysis of the demand for geography teachers based on nationwide primary data: job postings published online. The objective of the research was to identify the size of regional and temporal changes in demand for geography teachers in the labour market in Poland. To achieve the research objective we utilised the contents of all job adverts addressed to geography teachers published over a period of 21 months.

### Theoretical framework

Job matching theory is a labour market theory that focuses on the relevance of information about the size and structure of supply and demand for employees. It is based on search and matching theory (Sattinger 1993; Mortensen & Pissarides 1994). In line

with this theory, the quality of a job match is the degree of fit between the number and type of employees sought-after by employers, and jobseekers. An effective match can happen when the requirements of the buyer (the employer) are well communicated and known to those people interested in fulfilling them – the supplier/jobseeker.

Fundamental to the search and matching theory is the assumption that in the labour market there is an asymmetry of information between these two groups of stakeholders. Potential employees do not know what specialists are currently in demand (Uwizeyemungu et al. 2020; Jovanovic 1979); and employers can encounter difficulties in finding candidates who are trained and experienced enough to take on the duties foreseen for a given position. Consequently, only some candidates find employment and not all vacancies are filled (Camevale et al. 2014). By reducing this asymmetry we can bring both jobseekers and employers closer to achieving their goals. This is possible only with reliable and accurate information about, among others, the structure of demand, which applies equally to the demand for geography teachers (e.g., Tomlinson 2008).

### Sources and methods

As indicated in the literature review, the only highly credible method of finding out how many more geography teachers are needed in education are online job advertisements. Job postings published online account for at least 70% of all vacancies where higher education is required (Camevale et al. 2014). Moreover, in Poland, all public schools (which provide 86.6% of all teaching positions, with the remaining teachers working in private schools) are obliged to publish job vacancies on the official websites of their local boards of education, and on the education department websites of towns and cities. Hence, these advertisements can be regarded as an exhaustive source of information about the demand for geography teachers in schools (Piróg & Hibszer 2020). The online job advertisements for teachers published on the above mentioned websites are an easily accessible, free of charge database of information on employer demand for staff in education which is updated daily. In the case of advertisements for teachers, such job postings need to include information on the location, position, working time (part time/full time), and the type of contract. In Poland, they do not include information on remuneration due to the fact that salaries in the public sector are regulated by law. In other words teachers with the same position are offered equal pay for a standard full-time payment (FTE) employment period.

Therefore, to collect data on the actual demand of employers for geography specialists, we used all job postings placed online over a period of 21 months: from the 1 February 2019 to the 31 October 2020. We selected this period due to the organisation of the school calendar in Poland. In February, schools have a two-week winter holiday break. Some teachers change jobs around this time and principals urgently look for staff and publish job vacancies. However, the greatest reshuffling of staff takes place before the start of the new school year in September and then it gradually eases off during the second month of school in October. We opted for this double time interval in order to have the opportunity to compare data from the same period for two consecutive years.

The job advertisements were downloaded from selected websites. These were 10 commercial websites with job advertisements, and 36 websites for boards of education, employment offices, and public information bulletins. All the websites were open-access and all interested parties could use them free of charge. It is worth highlighting that in Poland, school principals have the obligation to inform the boards of education (which are government agencies at the voivodeship level) about

<sup>1</sup>The 2018 TALIS report does not include data from Poland (OECD 2018).

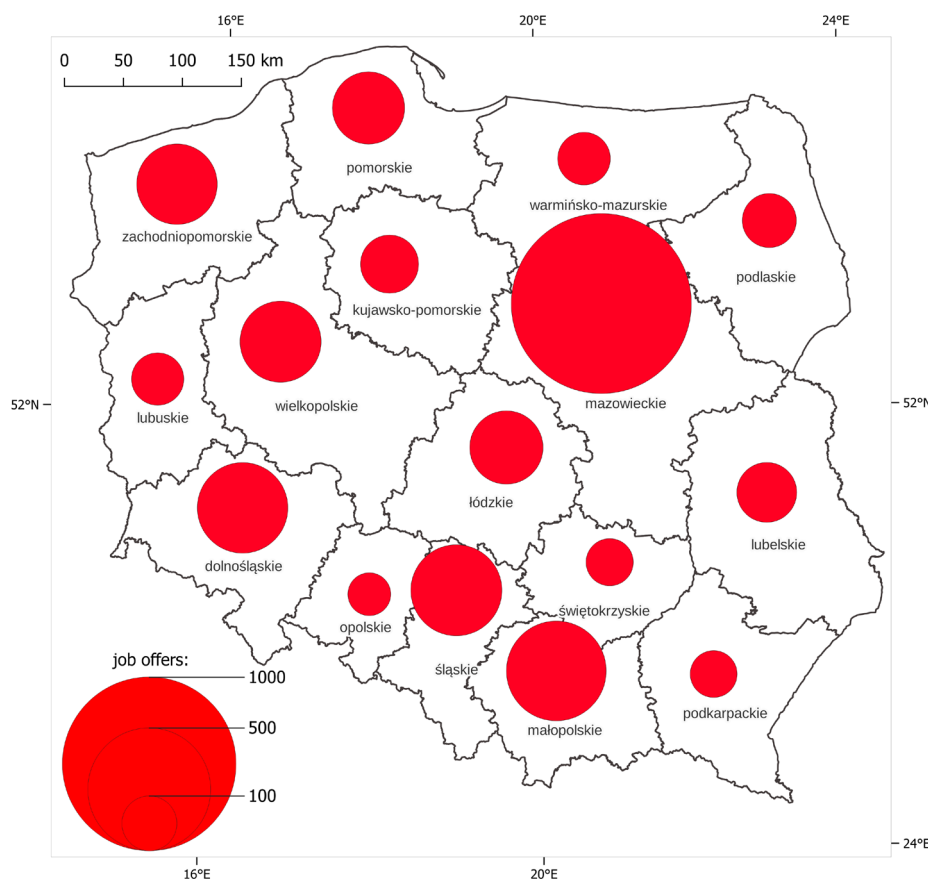


Figure 1. Number of job offers for geography teachers by voivodeship  
Source: own study

vacancies for teachers. Boards of education have the right to review the decisions of principals regarding employing teachers who do not fulfil all the requirements. Some schools (mainly private) use commercial websites to advertise, hoping to reach potential candidates who are ready to take on teaching positions in their schools.

The list included all websites where public school principals are obliged to post job vacancies. The postings were downloaded on the first working day in each given week. Each time, the data was verified to avoid duplication and then entered into the database. Following this protocol, we entered 3,438 postings addressed to geography teachers into the database. Next, we added TERYT<sup>2</sup> numbers to the dataset, which allowed us to establish the precise locations of the vacancies using cartographic data. From the full text of the postings, using the data mining module in Statistica software, we extracted the fragments related to the location of the job, advert publication date, and working time. The collected and prepared data was subject to standard spatial and temporal analyses.

## Results

### Demand for geography teachers in different regions

The regional distribution of job postings for geography teachers in Poland is highly diverse. When broken down for each

<sup>2</sup>TERYT is a Polish official register of territorial division used, among others, for statistical purposes.

voivodeship, a clear leader in terms of the number of adverts by schools for geographers was Mazowieckie voivodeship. In this region over 1,000 vacancies were posted, which amounted to more than 30% of all adverts of this type. Małopolskie voivodeship ranked second with 330 job postings. Next on the list were Śląskie, Dolnośląskie, Wielkopolskie, and Zachodniopomorskie voivodeships with more than 200 job adverts. The fewest jobs for geography teachers (less than 100 over the two year period) were posted in Podlaskie, Warmińsko-Mazurskie, Lubuskie, Świętokrzyskie, and Podkarpackie voivodeships. Opolskie voivodeship came last with only 61 job adverts (see Figure 1).

An even greater diversity in the number of jobs offered can be seen when the adverts in specific municipalities were analysed. An important finding was that almost 70% of municipalities did not have any jobs for geography teachers. Only in 752 municipalities out of a total of 2,477 published relevant job vacancies. In each voivodeship there was at least one municipality with a minimum of five jobs for geography teachers. In total there were 119 such municipalities. The largest number of municipalities with multiple job offers were found in Mazowieckie, Małopolskie, Śląskie, Zachodniopomorskie, and Wielkopolskie voivodeships (see Figure 2). Most job offers were located in the largest cities, i.e., the capitals of voivodeships. Out of the top twenty municipalities with twenty or more vacancies for geographers only five were not voivodeship capitals.

When data from the municipalities was analysed it was evident that 213 municipalities offered jobs for geography

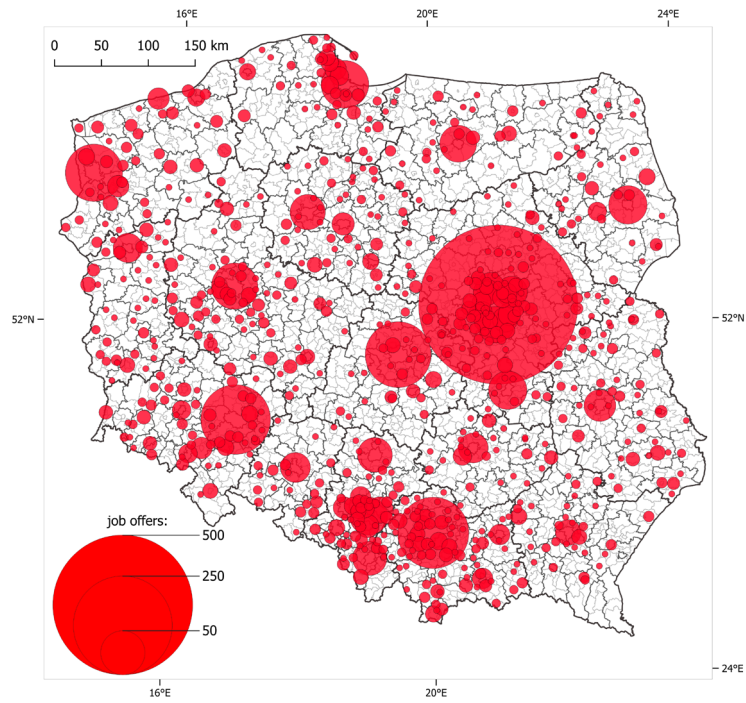


Figure 2. Number of job offers for geography teachers by municipality  
Source: own study

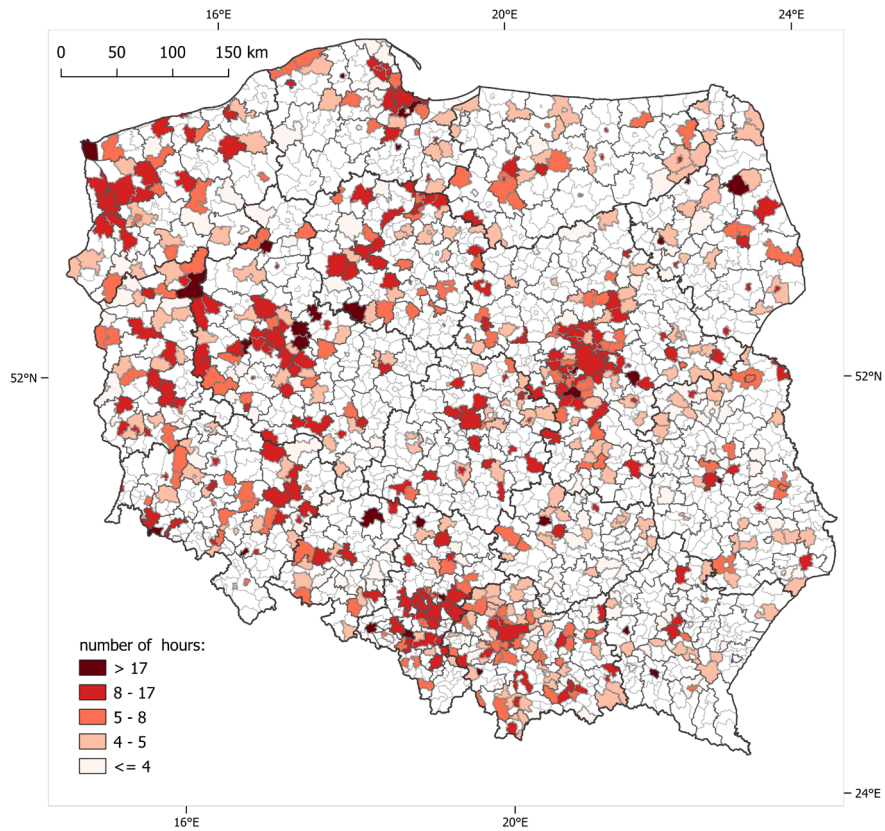


Figure 3. Average number of working hours offered to geography teachers, by municipality  
Source: own study

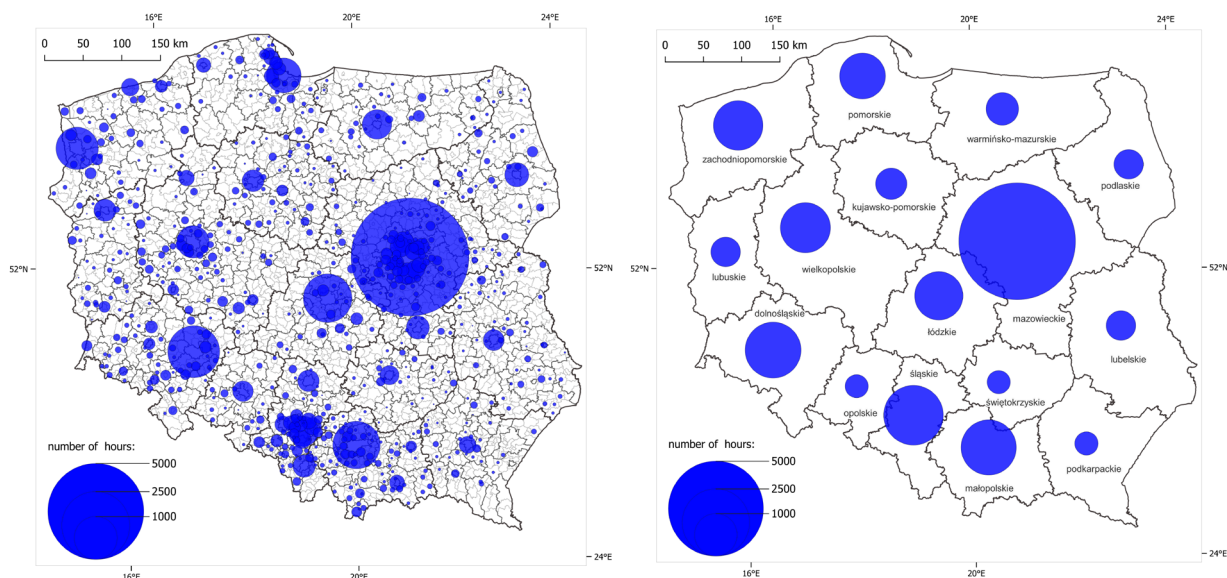


Figure 4. The total number of hours by voivodeship (right) and municipality (left)  
Source: own study

teachers with a working time of five hours per week. In 198 municipalities the working time ranged between nine and seventeen hours weekly, in 158 municipalities up to four hours, and in 145 municipalities the workload amounted to six to eight hours per week. Interestingly, all 742 municipalities offered part-time positions. Adverts from only 28 municipalities included full-time jobs. The spatial distribution of these vacancies was quite varied. In this case it is difficult to note any regional characteristics or trends (see Figure 3).<sup>3</sup>

Taking into account the total number of hours offered to geography teachers, we can spot significant regional variations in the number of unfilled hours both in municipalities and individual voivodeships. For the studied period, the most hours offered to geography teachers were available in the following voivodeships: Mazowieckie (over 11,000), Śląskie (over 2,900), Dolnośląskie and Małopolskie (over 2,500 each), and Wielkopolskie and Zachodniopomorskie (over 2,000 each). These voivodeships can be considered the areas with the most serious shortages of geography teachers. The lowest number of available hours for geography teachers was recorded in schools from three voivodeships from Eastern Poland, Podlaskie, Lubelskie, and Podkarpackie voivodeships, as well as three from Central and Western Poland, the Lubuskie, Świętokrzyskie and Opolskie voivodeships. The last two regions had the lowest figures, with only 440 unfilled hours each (see Figure 4a, b).

The study also revealed regional differences in demand for geographers from the perspective of remuneration, which is also clearly correlated with the number of hours worked. The most financially rewarding jobs addressed to geographers were advertised in Pomorskie, Mazowieckie, and Łódzkie as well as Wielkopolskie and Śląskie, with salaries reaching over 1,750 PLN per month (see Figure 5a, b). In this respect, huge regional variations were also observed at the level of municipalities. Only 170 municipalities (out of the total 752 which posted positions for geography teachers) offered remuneration higher than 2,000 PLN. The largest number of adverts (190) offered pay in the range of 750–900 PLN. Clearly, these were part-time positions (see Figure 5a, b).

<sup>3</sup>In Poland, a full-time teacher in a general subject (e.g. geography) has a workload of 18 teaching hours per week.

#### Demand for geography teachers over time

Job offers for geography teachers in Poland are published in line with a specific annual cycle (see Figure 6). Most adverts were posted during the summer holidays during July and August. For each of the summer months, both in 2019 and 2020, more than 300 adverts were published. The fewest vacancies appeared in March and November. This specific cycle is linked to the way the school year is organised. Before the start of the school year in September, new teachers are recruited to replace those who retired, went on sick leave, or changed jobs for various reasons.

When the number of jobs offered in specific voivodeships were compared, a similar pattern was observed. Even though the cycle was not identical for each voivodeship and there were significant differences in the number of jobs offered between voivodeships – for instance, in Mazowieckie and Lubelskie there was clearly a higher demand for teachers before the start of the new school year in September. Examples include Dolnośląskie, Śląskie, Łódzkie, and Małopolskie voivodeships. In some voivodeships (e.g., Lubelskie, Łódzkie, and Kujawsko-Pomorskie) the fluctuation in the number of adverts between consecutive summer months were much greater than, for example, Mazowieckie or Małopolskie voivodeships. This is because in Mazowieckie and Małopolskie regions the demand for geographers is spread over almost the entire year. In a few voivodeships (e.g., Świętokrzyskie, Warmińsko-Mazurskie, and Opolskie), only a small number of jobs were published during the school year, which suggests a relatively stable labour market for geography teachers (see Figure 7).

#### Conclusion and discussion

The conducted study indicated that over a period of 21 months the principals of Polish schools published 3,457 jobs addressed to geography teachers. Compared to the overall number of employed geographers, which amounted to 16,821 (MEiN data 2022), this figure shows the size of the real demand for teachers of geography.

The demand for geographers is not evenly distributed throughout Poland. Most job offers for geography teachers, almost one in three adverts, were published in Mazowieckie voivodeship. This uneven spatial distribution appeared to indicate

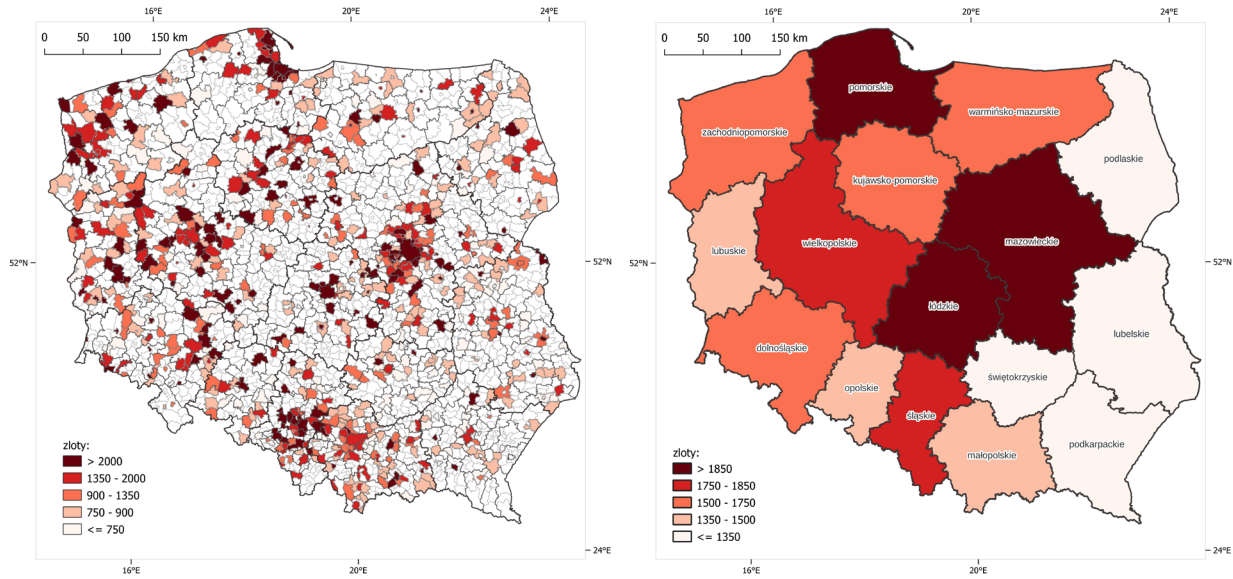


Figure 5. Average salary per month (in zloty) for teachers by voivodeship (right) and municipality (left)  
Source: own study

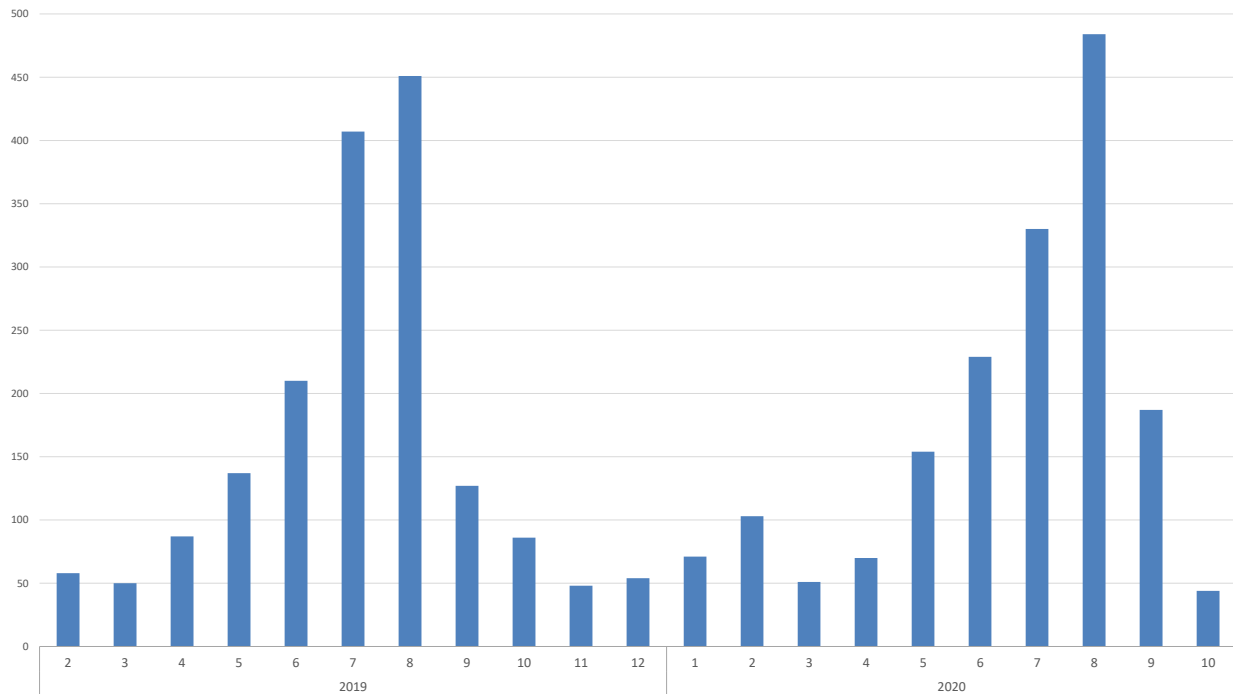


Figure 6. The number of job adverts for geography teachers in Poland (February 2019–October 2020)  
Source: own study

those regions where geography teachers were, or soon would be, in short supply. This fact should lead to reflection and discussion about the reasons for such a large discrepancy in the number of jobs offered in this voivodeship compared to other Polish regions. First, Mazowieckie voivodeship, due to its considerable size, has a large number of comprehensive schools, nearly 20,000 (GUS 2021), which constitutes nearly 13% of all comprehensive schools in Poland. Being a capital city, Warsaw has a large labour market with greater career opportunities. It is much easier for geography

graduates in Warsaw to find jobs outside of the education sector. Moreover, due to the considerably higher cost of living in the capital city, geography graduates often opt for better-paid jobs than the teaching positions offered by schools. Next on the list, with similar tendencies, although on a much smaller scale, were the following voivodeships: Małopolskie, Dolnośląskie, Wielkopolskie, and Zachodniopomorskie. In these voivodeships the number of jobs in the education sector was also high and the majority of job adverts offered positions in voivodeship capitals.

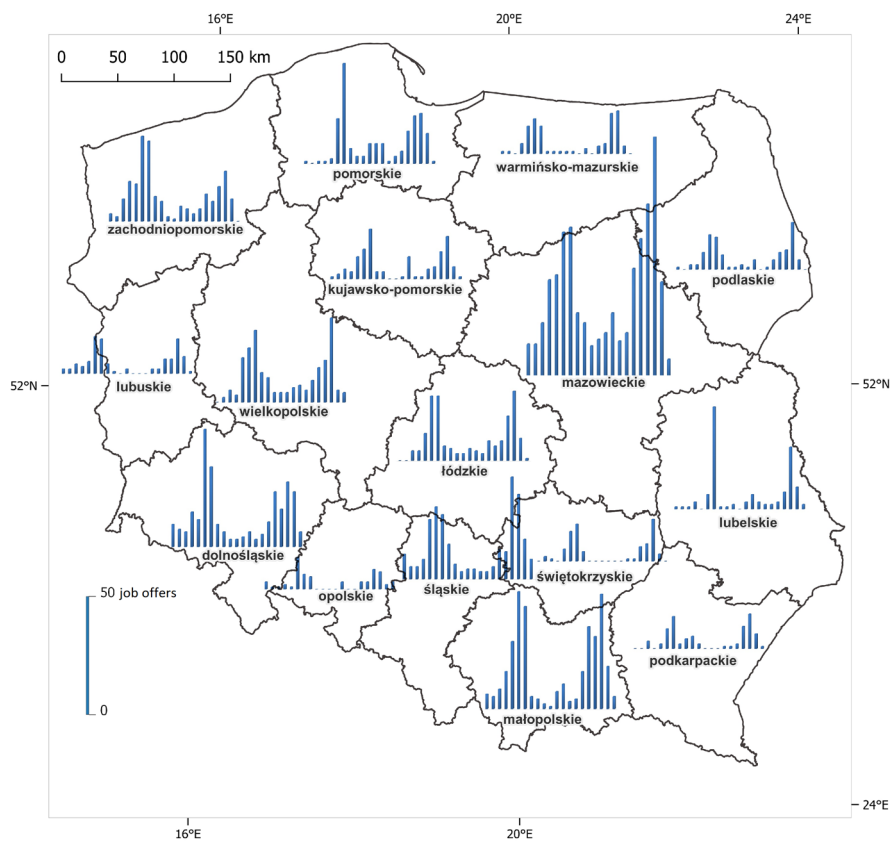


Figure 7. Fluctuations in the number of job offers for geography teachers by voivodeship  
Source: own study

The high number of available jobs in these cities is due to, on the one hand, a greater number of schools in voivodeship capitals, and, on the other, better opportunities for finding a job outside teaching compared to towns and villages. A notable example was Śląskie, the second most populated voivodeship in Poland. When it comes to the number of jobs published during the analysed period, it ranked third on the list, and its capital, Katowice, came sixth among the list of Polish cities with the most jobs for geographers. Moreover, a similar number of job adverts (over 30) was published in two other large cities in the Śląskie voivodeship, Częstochowa and Bielsko-Biała. These are both former capitals of voivodeships that are now part of Śląskie. Interestingly, five more towns and cities from the Metropolis GZM<sup>4</sup> were among the top rankings when it came to job offers for geography teachers. They were as follows: Sosnowiec, Tychy, Gliwice, Radzionków, and Chorzów. This is a unique situation, and can confirm the view that the number of available jobs, on the one hand, depends on the number of schools and students but, on the other, also depends on alternative career prospects for geography graduates, which are more readily available in sizable urban areas (in this case, the Metropolis GZM).

Conversely, it is probably the smaller number of schools that was the reason that fewer vacancies were posted in less populated voivodeships such as Podlaskie, Lubuskie, Podkarpackie, and Opolskie (Table 1).

The research results indicated that in the vast majority of Polish municipalities, in nearly 70%, there were no new jobs

for geography teachers within the studied period. It is worth considering the possible reasons for this situation. Further questions can be posed; for example, does this mean that in the majority of Polish municipalities the labour market for geography teachers is saturated? Or is it perhaps that geography in these municipalities is taught by non-geographers? Answering the above questions was beyond the scope of this study; however, in the face of the basic question: do we need more geography teachers in Poland and should we be training new ones, or is it a surplus occupation? it is worth looking for answers.

Having analysed job adverts over time, we observed changes in demand throughout the year, but also very intense efforts to find teaching staff during summer. Moreover, in most voivodeships these efforts had already started by the end of the school year, i.e., in May or June. In some voivodeships there was also a slight increase in the number of adverts published in January and February (during the mid-term break). This means that teachers leave (and need to be replaced) during the school year. This is an extremely unfavourable situation, primarily for the students whose teachers change in the middle of the year. The fact that vacancies are published during the school year implies that there are no geographers to teach the subject. School principals have reported in the media and during teacher training conferences that geography classes are either cancelled or taught by other teachers who act as temporary replacements. Unfortunately, there is a high probability that non-geographers are not qualified to teach geography.

The results of our study also indicate that the great majority of adverts are for part-time positions. The number of working hours offered suggests that, in the overwhelming majority of

<sup>4</sup>The Metropolis GZM is a metropolitan unit composed of 41 contiguous municipalities in the central part of the Śląskie voivodeship.

Table 1. Comprehensive schools by voivodeship during the school years 2019–2020 (excluding special needs schools)

No.	Voivodeship	Primary schools	Middle schools	Stage I sectoral vocational schools	General secondary schools	Technical secondary schools
	POLAND	13,546	25	1,283	3,323	1,851
1	Dolnośląskie	785	3	90	226	132
2	Kujawsko-Pomorskie	683	3	92	200	117
3	Lubelskie	923	0	72	193	135
4	Lubuskie	336	0	41	80	56
5	Łódzkie	837	5	70	225	120
6	Małopolskie	1,475	0	123	257	144
7	Mazowieckie	1,781	3	131	531	213
8	Opolskie	389	0	35	85	50
9	Podkarpackie	1,075	1	70	168	105
10	Podlaskie	400	0	37	100	57
11	Pomorskie	729	0	77	204	105
12	Śląskie	1,334	7	139	346	217
13	Świętokrzyskie	524	0	53	111	72
14	Warmińsko-Mazurskie	528	1	56	145	75
15	Wielkopolskie	1,243	1	130	299	156
16	Zachodniopomorskie	504	1	67	153	97

Source: GUS 2021

municipalities with jobs for geography teachers, principals are looking for teachers to work less than half-time (as many as 213 municipalities offered positions with five hours per week). These are not attractive offers for people who would like to stay in the teaching profession, because it means they need to pursue a patchwork career or become job hoppers to collect enough hours to have the equivalent of a full-time position (Piróg 2018b). Each of these career path models negatively affects both job satisfaction and quality of work. Consequently, it could happen that demand will be satisfied, but the quality of geography teaching will decline. It could also lead to a permanent shortage of teachers specialising in geography education, in particular in cities with better career prospects and higher costs of living. As a result, qualification requirements for teachers are lowered and teaching vacancies are filled with so called 'para teachers' (Chudgar et


al. 2014). The above scenarios are alarming and can impair the quality of educational services. Taking urgent decisions and measures to satisfy the demand for teachers (including geography teachers) with qualified specialists will become a key challenge both for central and regional authorities as well as for universities responsible for teacher education and training.

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#### ORCID

Danuta Piróg  <https://orcid.org/0000-0001-6735-4928>

Adam Hibszer  <https://orcid.org/0000-0002-1416-7464>

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