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Foreign Scholars in a Polish "silicon valley". Publicly accessible data on Krakow as a higher education and research centre

Abstract. The aim of this article is to present information available in the public domain on the foreigners employed by institutions of higher education in Krakow, Poland as of 2015. We intend to show the countries of origin, age, academic position, scientific disciplines, career course, migration history, as well as research and educational activity of the scholars in question. The paper is a follow-up to the study presenting an empirical analysis of the official national database provided by the Polish Ministry of Science and Higher Education at the end of 2012. The analysis of the 2012 database dealt with the situation across the whole country, while this paper concentrates on Krakow, one of the most important centres of higher education, research and high-tech industry in Poland, one of the Polish "silicon valleys."

Keywords: high-skill migration and innovation, foreign scholars in Krakow, the Polish academic system

Zagraniczni uczeni w polskiej „dolinie krzemowej". Publicznie dostępne dane na temat cudzoziemców w Krakowie jako ośrodku naukowym

Abstrakt. Celem tego artykułu jest przedstawienie informacji dostępnych w domenie publicznej na temat cudzoziemców zatrudnionych w wyższych uczelniach Krakowa w roku 2015. Przedstawiamy dane na temat ich kraju pochodzenia, wieku, zajmowanego stanowiska akademickiego, dyscypliny naukowej, przebiegu kariery naukowej, historii migracji, a także działalności badawczej i edukacyjnej. Artykuł ten nawiązuje do naszego studium, prezentującego empiryczną analizę oficjalnej krajowej bazy danych, udostępnionej przez Ministerstwo Nauki i Szkolnictwa Wyższego w końcu roku 2012. Nasza analiza tamtej bazy danych odnosiła się do sytuacji w całym kraju, podczas gdy niniejszy artykuł korzysta z innych źródeł i koncentruje się na Krakowie, jednym z najważniejszych polskich centrów szkolnictwa wyższego, badań naukowych oraz przemysłu zaawansowanych technologii, a więc na jednej z polskich „dolin krzemowych".

Słowa kluczowe: migracje pracowników wysoko wykwalifikowanych, innowacje, zagraniczni uczeni w Krakowie, polski system akademicki

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"Silicon Valley" and the aim of this article

The aim of this article is to present information available in the public domain on the foreigners employed by institutions of higher education in Krakow, southern Poland, in 2015.[1] We intend to show the countries of origin, age, academic position, scientific disciplines, career course, migration history, as well as research and educational activity of the scholars in question. In a sense, it is a follow-up to an article presenting an empirical analysis of the official national database provided by the Polish Ministry of Science and Higher Education (henceforth "the Ministry") at the end of 2012. The Ministry obtained the information on foreign scholars from individual Polish institutions of research and higher education and then aggregated it (Mucha and Łuczaj 2013; Mucha and Łuczaj 2014a). The Polish universities do not belong to the global elite of academia;[2] however, neither do Polish banks, manufacturing companies, etc. Nevertheless, Poland, as a member of the EU, is becoming an increasingly important host country for many migrants.

The analysis of the 2012 database dealt with the situation across the whole country, while this analysis concentrates on Krakow (the capital of the Malopolskie Region), one of the most important (as we will show below) centres of higher education, research and high-tech industry in Poland, one of the Polish "silicon valleys."

Foreigners have been a crucial element of many academic systems for centuries. According to Paweł Kaczmarczyk and Marek Okólski, in 2001 (eleven years earlier than the above mentioned Polish national database was compiled), in the ten leading countries of Europe and the US, the proportion of foreigners in academia was as follows: Switzerland – 13.0%; the US – 8.9%; United Kingdom – 5.9%; Norway – 4.3%; Belgium – 3.3%; Austria – 3.0%; France – 2.8%; Germany – 2.8%; the Netherlands – 1.6% and in Italy – 0.3% (2005: 51, Table 8). In the US (the most extensively studied country), foreigners are mainly employed in the most prestigious research universities, primarily in departments of science and engineering. In some of these disciplines, every third newly employed scientist is a foreigner, mostly now coming from China (22%), India (9.4%), South Korea (9.3%), Japan (5.4%), Germany (5%) and Canada (4.5%) (Kim, Wolf-Wendel and Twombly 2011, 721).

For us, "Silicon Valley" is a metaphor for a region with a concentration of research universities and high-tech industry which is unusual in a given country.[3] In the present paper, we do not deal with technological innovations and foreign

[1] For the analysis of various methodologies of research on foreigners in research and higher education see, eg., (Mucha and Łuczaj 2014b).

[2] See: http://www.timeshighereducation.co.uk/world-university-rankings/2013-14/world-ranking) [accessed 7th October 2013].

[3] In reality, this region of higher education institutions and high-tech business belongs to Santa Clara Valley, San Francisco Bay Area and southern parts of the East Bay in California.

innovators, but with foreigners in academia (research and teaching). Our metaphor seems to be apt in this respect. Returning to the US: "Since the 1970s, Silicon Valley and Route 128 have attracted international attention as the world's leading centers of technological innovation. Both regions had common origins in university-based research (…). However, after years of economic turmoil, Silicon Valley has prevailed (…). There is a much larger concentration of foreign-born engineers and scientists in Silicon Valley than in Route 128 (…). This difference seems to be the result of two factors: the existence of a larger immigrant pool in Silicon Valley and the operation of an industrial system in this region that is more open to migrants" (Alacron 1999, 1384–1385). In this context, we would like to look at the immigrant scholars (scientists) who work in Krakow. This is only a "first approximation" of the topic since the methodology we are employing and the range of the phenomena do not allow us to present any strong conclusions.

Immigration, cultural diversity and innovations

It is not only Rafael Alacron who believes that high-skilled immigration (brain-circulation) contributes to the prosperity of a region. Immigration is also considered one of the foundations of a creative milieu. According to Charles Landry and Franco Bianchini, settled "immigrants are outsiders and insiders at the same time. Because of their backgrounds, they have different ways of looking at problems and different priorities. This can give a creative impulse to a city" (1995, 23; see also 24–25). In her analysis of "global cities," Saskia Sassen analyses capital mobility and labor market formation. She states that "the employment of immigrant workers, from highly trained personnel to unskilled laborers, may appear (…) as a functional equivalent to the mobility of capital; (…) the economic restructuring associated with the current phase of capital mobility has (…) generated a demand for specific high-level skills that can be met by workers from anywhere, as long as they have the required education" (1991, 32).

Richard Florida, who is interested in various aspects of creative communities, stresses the fact that a "large number of studies point to the role of immigrants in economic development" (2002, 252). However, in his opinion, immigration is associated with high-tech industry, but is not necessarily very strongly associated with innovation as such. Andreas Damelang and Anette Hass, ten years later, were even more positive about the advantages of migration and diversity on the one hand and regional growth (however, they paid attention to the costs of regional diversity as well). Drawing upon their own research and that of others (including Florida's), they were of the opinion that "migration triggers cultural diversity in the host region. In turn, cultural diversity affects the host region positively. (…) Different cultural groups provide different skills and services with positive impacts on regional growth and income. (…) Innovations are more likely to occur

in a culturally diverse environment because of different sets of knowledge and abilities" (2012, 363).

There is a vast literature on the involvement of national and regional authorities' policies intended to attract highly skilled immigrants and to encourage the return of those who have emigrated. Since we are interested in this paper in cities and regions rather than larger nation-states, let us concentrate for a moment on one example. "Singapore tops the list of Asian countries in terms of deliberate, broadly scoped measures to woo (and retain) global talent, not only through immigration, labor augmentation and permanent residency policies (…)" (Yeoh and Eng 2008, 237).

Poland and local "silicon valleys"

In Poland, in 2015, there are 520 institutions of higher education: 141 public schools and 379 non-public schools (see polon.nauka.gov.pl, accessed 25 July 2015).[4] In July 2015, these employed 101,590 scientific workers (most of them academic teachers; see polon.nauka.gov.pl, accessed 25 July 2015). On 30 November 2014, there were 1,469,386 higher education students in Poland (www.stat.gov.pl, accessed 25 July 2015). Among the public schools, there are 59 "academic schools" (with full academic privileges): 18 "universities," 18 "technical universities," five "pedagogical universities," six "agricultural and natural science universities," five "universities of economics", six "academies of physical education" and one "theological university" (see:www.nauka.gov.pl, accessed 25 July 2015).

According to the most prestigious 2015 ranking of institutions of higher education in Poland (The Perspektywy Ranking),[5] among the top 50 (out of ninety) analyzed schools there are 10 institutions from Warsaw and five each from Krakow, Poznan and Wroclaw. Most of the high-tech companies operating in Poland have their headquarters in these cities. Therefore, we can call them, metaphorically, Polish "silicon valleys." The Jagiellonian University in Krakow is ranked first in the country, the AGH University of Science and Technology is sixth, Cracow University of Technology thirty-eighth, the University of Agriculture in Krakow thirty-ninth and Cracow University of Economics forty-seventh (see:www.perspektywy.pl/RSW 2015, accessed 25 July 2015). The Pedagogical University of Cracow, in which we are also interested, is ranked between the 51st and 60th positions. In this article, we refer to these six universities only.

Many international rankings are published, but usually only the University of Warsaw and the Jagiellonian University are included (typically in the fourth hundreds, out of the about 500 institutions included). There is one exception, though.

[4] For the analysis of the Polish system of higher education, see, eg, Mucha and Łuczaj 2014a.

[5] The "Perspektywy" monthly publishes three rankings of schools annually: "Ranking of academic institutions," "Ranking of non-public institutions granting master's degrees," "Ranking of schools of applied sciences and Public Schools of Applied Sciences" (PWSZ). The PWSZs are a specific type of schools of applied sciences.

The Webometrics Ranking of the World's Universities[6] is a ranking based on the online presence of a university (in fact, this is a similar methodology to the one we use in this paper). According to the authors of the report we refer to: "As other rankings focused only on a few relevant aspects, specially research results, web indicators based ranking reflects better the whole picture, as many other activities of professors and researchers are showed by their web presence." In this ranking, the positions of six universities, which have been analyzed by us in this paper, were very different. In the 2015 edition, the highest place was occupied by the Jagiellonian University, classified as 285th out of 11,992 institutions around the world (see Table 1). The AGH University of Science and Technology was lower, in 388th place, but none of the remaining universities we are interested in gained a position higher than 1000th. We believe this could be an (albeit imperfect) indicator of the international recognition of their research potential and also of their attractiveness for foreign scholars. This confirms at least our intuition that the Jagiellonian University and the AGH University of Science and Technology are far more prestigious than the others (which obviously does not necessarily mean that the other universities have a low standard of research and teaching).

Table 1. The Webometrics Ranking of the World's Universities and the number of foreign scholars

Institution	The Webometrics Ranking of the World's Universities	Number of foreign scholars (online analysis 2015)	Number of foreign scholars (Ministry data 2012)
Jagiellonian University	285	41	71
AGH University of Science and Technology	388	23	25
Cracow University of Technology	1167	6	6
University of Agriculture in Krakow	3120	3	7
Pedagogical University of Cracow	3312	11	21
Cracow University of Economics	6138	1	5

Source: http://www.webometrics.info/en/Europe/Poland [accessed: 19/08/2015].

[6] See: http://www.webometrics.info/en/Europe/Poland [accessed: 19/08/2015].

Foreign academics in Poland. The 2012 ministerial database[7]

According to the formally unpublished report issued by the Ministry (see: SIoSW 2012; see also: Frascati 2010), 1,887 foreigners were employed in academic positions in Poland, on 21 November 2012 (hereafter "foreign academics"). They constituted 1.9% of all academics working in the country. If we compared the Polish data of 2012 with the above quoted global data of 2001, we would place Poland in ninth position as regards the percentage of foreign academics, ahead of the Netherlands and Italy.[8] In 2012 foreign academics worked in 270 public and non-public schools (and research institutes). At the time, there were, 470 institutions of higher education: 132 public and 338 non-public. Therefore, 58% of all Polish schools employed foreign academics.

The data contained in the SIoSW do not tell us anything about the motivations of foreigners who came to Poland, about their opinions on the Polish legal system (in regard to the employment of aliens, to the visa system, etc.), on the Polish academic system, on the Polish research libraries and laboratories, on the *tacit* knowledge to be gained, on the attractiveness of living in Polish cities, on the openness of Poles to others, on the family they brought (or not) with them, on their ethnic communities in Poland or the lack of them, on their religious life, etc. These important issues must be studied with completely different databases and methodological instruments.

The ministerial database contains the list of schools. It breaks down the set of foreigners who worked in them into various categories. In the following, we will briefly refer to a) country of origin, b) public and non-public schools, and c) academic disciplines.

Foreign academics usually came to Poland from one of the seven neighbouring countries (in decreasing order: Ukraine, Slovakia, Germany, Belarus, Russia, Czech Republic, and Lithuania). In eight and ninth positions are the US and the UK. The immigrants from the latter countries are the scholars for whom, supposedly, English, the global language of the world of science, is the mother tongue.

There were clear differences between the public and non-public schools regarding the numbers of foreigners employed. At least one foreigner worked in each public institution and in each non-public one, but there is a difference when we compare the numbers and not only proportions. In public institutions, there were 1,378 foreigners while in non-public ones only 509. In the first twenty schools

[7] „System informacji o szkolnictwie wyższym" stan danych na dzień 21.11.2012 r. ("Information system on higher education, as of 21st November 2012"; a file obtained from the Ministry of Science and Higher Education in Poland; quoted further as SIoSW 2012). The data set was collected by the Department of Strategy of the Ministry with the assistance of the POL-ON computing system. According to this Information, on this particular day 97,876 academics (researchers and academic teachers) worked in Poland. We appreciate the help of Mr. Andrzej Kurkiewicz, Director of the Department. In this section, we draw upon Mucha and Łuczaj 2014a.

[8] However, we do not know how many countries were researched and how many of them would be placed in that table ahead of Poland.

employing foreigners (in the order of the number of foreigners), there were only two non-public schools, in positions seventeen and eighteen. However, we must remember that in Poland public schools are nearly always larger than the non-public ones. Among these first twenty schools, there were two institutions from Krakow: the Jagiellonian University (no. 3) and AGH University (no. 16).

From the point of view of the regional distribution of schools employing foreign scholars, the largest category are schools in the Mazowsze Region (26%) in central Poland, which results from the fact that Warsaw, its largest city, dominates the Polish academic system. Next are the Silesian Region (10% of schools) in south-western Poland, Wielkopolskie (with Poznan) and Dolnoslaskie with Wroclaw (each – 8%). The Malopolskie Region, where Krakow is located, was behind the above mentioned regions. This is an interesting situation from the point of view of our "silicon valleys" metaphor: obviously Warsaw, but also Krakow, Poznan and Wroclaw could be considered "silicon valleys" in this respect, but not the region in which Krakow is located. The picture changes when we consider the numbers of individual foreigners working in schools in each of the regions. The Mazowsze Region was still the leader with 397 foreign academics, but the Malopolskie (with Krakow) followed in second place here, however, with the number of immigrant academics smaller than half of that of Mazowsze (182). Next were Slaskie (167), Wielkopolskie (158), Dolnoslaskie (126) and others.

The ministerial SIoSW database contains a breakdown of the set of foreign academics into 38 academic disciplines. The largest numbers of foreigners worked in the field of humanities (365), technical sciences (166) and economics (139). Being aware of the "risk" of such a procedure, we have aggregated the disciplines into two large categories: "social sciences and humanities" and "exact, natural and technical sciences." From among 1,887 immigrant academics, 629 specialized in social sciences and humanities and 426 in the other large field. The Ministry did not provide information about the specialty of 832 academics.

The 2012 Perspektywy-Rzeczpospolita Ranking of academic schools listed 88 public and non-public institutions. Among these, in only 11 schools was there no single immigrant academic. These were mostly medical universities (5), but there were also two Roman Catholic schools located in Krakow (The John Paul II Papal University and the "Ignatianum Academy" – School of Philosophy and Education).

Higher education in Krakow and characteristics of the sample

Altogether, there are 28 institutions of higher education in Krakow, among them 10 public schools (see: www.krakow.dlastudenta.pl, accessed 25 July 2015).[9]

[9] In addition to the six schools listed above, University of Physical Education and the (non-public, Roman Catholic) Papal University (UPJPII) are located between positions 61 and 70, (non-public) Andrzej Frycz Modrzewski Krakow University as well as (non-public Roman Catholic) Ignatianum Academy are to be found in

In our study,[10] we were interested in the largest six public academic schools in Krakow: the Jagiellonian University, AGH University of Science and Technology, Cracow University of Technology, University of Agriculture in Krakow, Cracow University of Economics and Pedagogical University of Cracow.

We only referred to publicly accessible information. Our first source were the official websites of these schools (and, in particular, the faculty rosters) and the second source was the Google engine, mainly Google Scholar. Following one of the widely used methods for identification of foreign scholars, presented in Mucha and Luczaj 2014b, we looked in the rosters for combinations of (stereotypically) non-Polish first names and family names. Then, we looked for their resumes (if available), information on the courses these scholars taught, language in which they taught, their publications, etc. In Poland it is not easy to find the information we were looking for using this methodology which had proved to be more successful in other countries. Therefore, there were a lot of problems with the identification of foreigners and then with access to their resumes, etc.

Foreign academics in Krakow and their characteristics

The official 2012 database administered by the Polish Ministry of Science and Higher Education provides us with some background information about foreign scholars from Krakow. We should keep in mind, however, that this data cannot be directly compared with our results as it refers to 2012, whereas in this article we are referring to 2015. Nevertheless, those numbers should be at least partially similar, as we have not observed any significant events which might have affected those numbers between 2012 and 2015.

When we take into account the six universities in question, we can learn from the 2012 Ministry database that they employed 135 foreigners: 41 professors, 31 PhDs and 63 scholars without any academic degree. The majority of them come from Central or Eastern Europe (57%), one-third from Western Europe or the USA (33%) and the remaining come from other, usually Asian, countries (10%).[11] The most represented nation of origin here (it is also the case on a national level) were Ukrainians (18 people, 16%). Second, unlike in the case of the national database, were Italians (10 people, 9%).

positions 80+. To sum up, 10 (out of 28) schools, including three non-public, are listed in the ranking of the best academic schools in Poland.

[10] Here "Foreigners in Higher Education in Kraków", or FHEK.

[11] As we have noted elsewhere (Mucha and Luczaj 2013) the database contains some missing values (in this case 23 out of 135 scholars come from unknown country/countries) and there is also a group of foreigners marked as "Poles" (formerly foreign individuals who obtained Polish citizenship). We excluded the first group and included "Poles" in the "Central and Eastern Europe" category. Excluding formerly foreign individuals, the respective percentages look as follows: 45% (Central and Eastern Europe), 42% (Western Europe and USA) and 13% (rest of the world). Here we can again observe that the majority of scholars come from Eastern Europe but the difference between East and West is not significant.

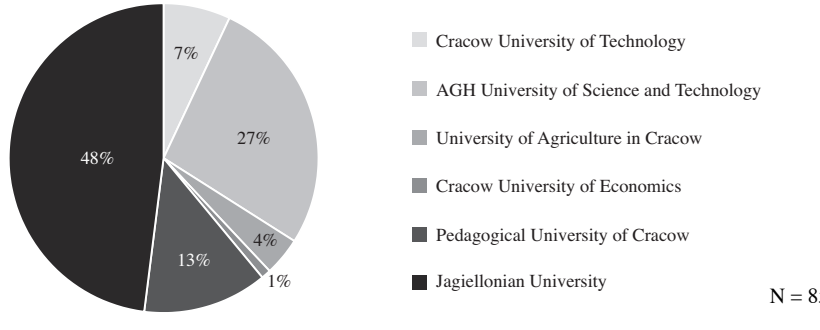
In the entire Malopolskie Voivodeship (region) there was 18 universities and other academic institutions that employed foreign faculty members and most of these (13) were located in Krakow. In the city of Krakow there were 155 foreign scholars and in other cities only 27. This also means that six universities, which we have analyzed, employ approximately 87% of foreigners in the entire city. The remaining individuals were employed at:

1. Academy of Music in Kraków (1 foreign scholar)
2. The Niewodniczanski Institute of Nuclear Physics, Polish Academy of Sciences (3)
3. Andrzej Frycz Modrzewski Krakow University (6)
4. Cracow School of Health Promotion (1)
5. Ludwik Solski Academy for the Dramatic Arts (2)
6. Tischner European University (4)
7. The School of Banking and Management (3).

Demographic data

Based on publically accessible Internet content we were able to identify only 85 scholars.[12] Nearly half of these were employed by the Jagiellonian University (48%), more than one fourth by the AGH University of Science and Technology (27%). The remaining scholars worked at the Pedagogical University of Cracow (13%), Cracow University of Technology (7%), University of Agriculture in Krakow (4%) and Cracow University of Economics (1%). The vast majority of scholars whom we have identified were employed only by a single university – no "second job" was listed (82.4%).

Chart 1. Foreign Scholars by Institution



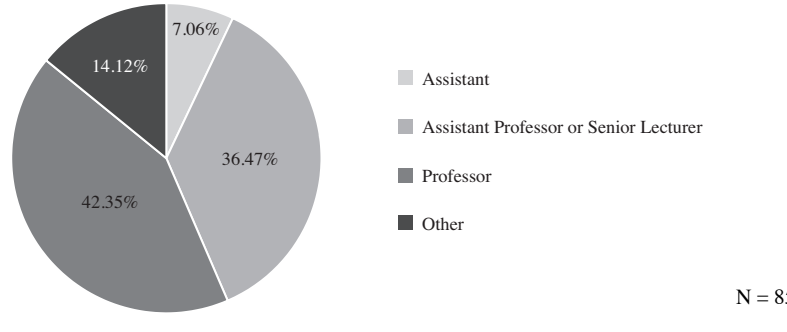
Source: Foreigners in Higher Education Institutions in Krakow (FHEK) Study.

[12] We appreciate the hard work of Łukasz Gałczyński, Wojciech Kobylański Kamila Molga, Elżbieta Murias, Magdalena Płuska and Katrina Pawuś who have helped us to collect this data.

There were more men (69.4%) than women (30.4) in our sample. Overrepresentation of men was barely surprising, though. Every kind of metrics related to Polish science shows that women are still statistically underrepresented in this field. It is estimated that 60% of all academics in Poland are men (Młodożeniec and Knapińska 2013, 48) but this disparity increases the higher the academic position. In the case of PhDs with habilitation the disparity is bigger (68% and 32%), and it is the biggest in the case of professors (79% and 21%). By the same token in our sample, when we take into account only those individuals with habilitation and professors, overrepresentation of men also increases. The men-women ratio is 80.4 to 19.6 and when we take into account only professors it increases further to 90 to 10. We can conclude then that gender structure of foreign faculty members (from Krakow) resembles the structure of Polish faculty membership (as known based on the above quoted nation-wide research).

It turned out that it is very difficult to determine the age of foreign scholars based solely on Internet content. We have found relevant information for only about 17 out of 85 identified scholars. In those cases, the average age was 56 (the median equals the mean). This tentative result may be treated as an indicator of a situation in which it is rather experienced scholars who decide to settle in Krakow or who are invited to settle in Krakow. In this context, Poland seems to be interesting rather for (and/or interested rather in) people with established publication records and perhaps equally stable personal situations (as the sociology of the life course would prompt, see: Mayer 2003). This is also visible when we take into account academic positions occupied by foreign scholars. In 42% of cases they were professors. The next 36% occupied less prestigious positions as associate professors or senior lecturers. Only 7% percent of scholars in our sample were employed as teaching and research assistants (in 14% of cases it was impossible to determine a position or the positions were described in a way which made them hard to be coded, e.g. a "lecturer").

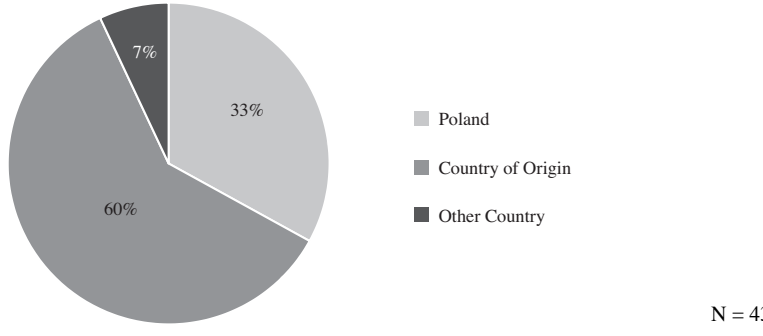
Chart 2. Academic Position



Source: FHEK Study.

On average, a foreign scholar has worked in Poland for 13 years.[13] Another interesting figure is the year in which a member of our sample obtained his or her PhD. On average, this happened 17 years ago, so it was well before they came to Poland.[14] This is interesting from the point of view of life trajectory. Unlike scholars who migrate to other developed countries and get their PhD there (as we believe is the case in the US and Western Europe[15]), the case of Poland was different. Indeed, 60% of scholars whom we identified obtained their PhDs in their country of origin, 33% in Poland and the remaining 7% in other countries.[16]

Chart 3. Country where the PhD was obtained



Source: FHEK Study.

Also, when we consider academic degrees and titles, it is evident that experienced foreign researchers and academic teachers constituted the majority of our sample (see: Chart 4). When we combine full professors and PhDs with the habilitation degree, it turns out that they outnumber the average faculty members, who hold "only" a PhD degree. Meanwhile in Poland there are approximately 3.5 times more PhDs than academics with the habilitation degree (including professors) (Młodożeniec and Knapińska 2013, 48).

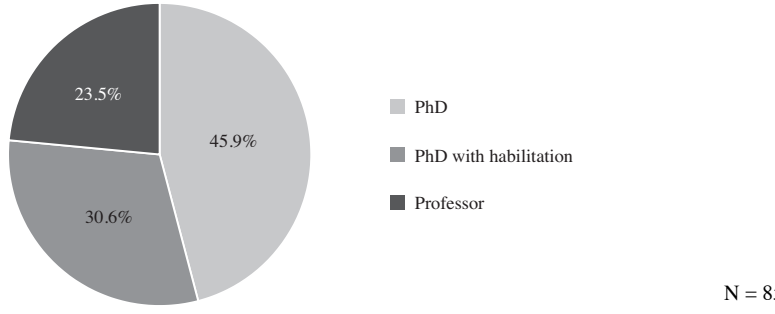
[13] Based on 34 observations and 51 missing values.

[14] Based on 41 observations and 44 missing values.

[15] Based on literature (see, e.g., Ackers and Gill 2008) it seems that scholars emigrating from Poland and other Central and Eastern European Countries are rather young and in the first stages of their academic careers.

[16] Based on 43 observations and 42 missing values.

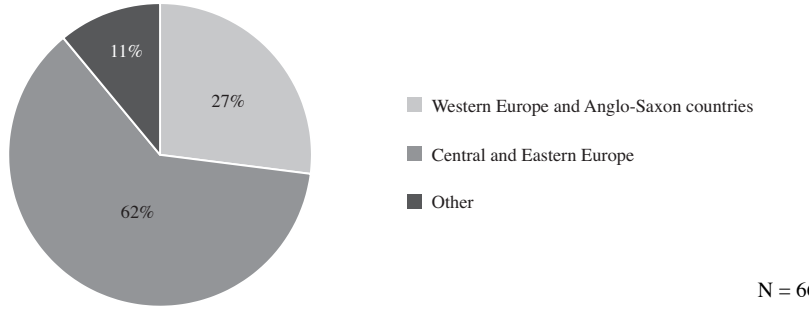
Chart 4. Academic Title



Source: FHEK Study.

From the sending country perspective, it seems interesting that the majority of scholars we found came from Central or Eastern Europe (62%), and almost one-third came from Western Europe[17] or Anglo-Saxon countries located oversees. Only 11% came from different, mostly Asian, countries. This might be a sign that Poland is still unpopular in the Western world, but it is far more attractive for people from the former Soviet Bloc countries. This hypothesis needs, obviously, further investigation.

Chart 5. Country of Origin



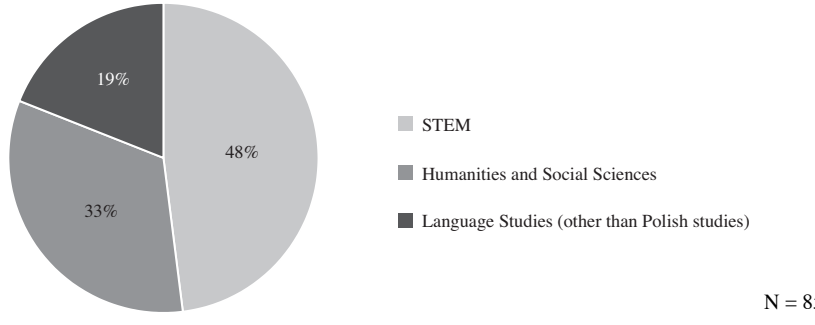
Source: FHEK Study.

We were also interested in the areas of specialization. We divided all the academic disciplines into three broad fields. The first was STEM (science, technology,

[17] Despite the fact that the former German Democratic Republic was a part of the Eastern Bloc, for methodological reasons we decided to treat it as a part of the Western world now. In our opinion, it would be difficult to assess which German scholars came from the West and which from the East. Moreover, 25 years after German reunification the differences between those two parts have decreased (although they are still visible).

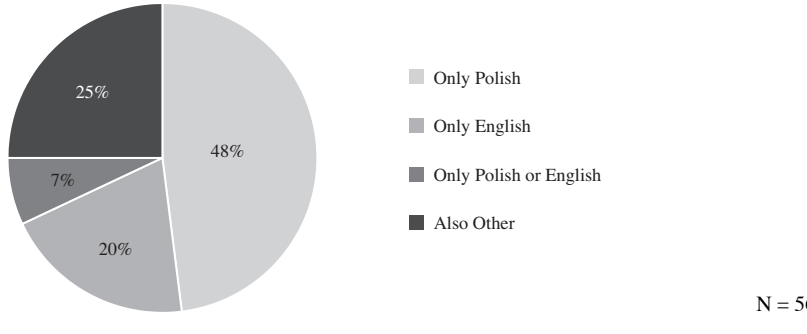
engineering and mathematics), the second – HSS (humanities and social sciences) and the last LS (language studies, but other than Polish studies). According to this categorization, 48% of respondents fall into the first (STEM) category and the remaining 52% were broadly understood humanists (HSS and LS). The latter group consisted of humanists and social scientists (33%) but nearly one fifth (19%) of all foreign scholars in our sample were involved in language studies. They were probably employed to teach Polish students foreign languages, i.e. the teachers' mother tongues. This is clearly visible when we examine the list of languages of instruction of the courses taught by foreign scholars in Krakow. Although nearly a half of them used only Polish language, it is worth noticing that as many as 25% also taught in languages other than Polish (local language in Krakow) and English (which can be referred to as a modern lingua franca in academia).

Chart 6. Academic Discipline



Source: FHEK Study.

Chart 7. Language of Instruction



Source: FHEK Study.

Unfortunately, it is hard to find some information on the Internet. Apart from basic personal data (e.g. spouse, marital status, children), we were unable to find information about career history, e.g. previous employers in Poland or study visits and internships abroad. It was also impossible to find any information about awards and prizes, or positions in science administration and scientific organizations, both Polish, foreign and international.

The situation was better in the case of the lists of publications. We found such a list in 81.2% of cases. Moreover, it was possible to assess the number of publications and their relevance thanks to databases such as "Publish or Perish." We used the latter, as it is one of the most commonly recognized sources of science metrics in Poland. According to these data, a foreign scholar from our sample had, on average, 30 publications, which translated into 322 citations. The mean H-index was 3.99. It is worth noticing, though, that some scholars with outstanding performance inflated this number. For instance, we have found three individuals who have published respectively 729, 430 and 148 articles and whose H-index was 55, 26 and 39. At the same time, the median number of publications in the sample is 8, for citations it is 6, and H-index it is 2. The difference between the median value and the mean clearly shows that those extreme values skew the overall result. According to the ranking of Polish universities prepared by the Polityka magazine (Gil 2013),[18] until the end of 2012 the average Polish publication was cited 5 times and the number of citations was higher for leading universities. A publication produced in the leading institution, the University of Warsaw, had 15 citations on average. Our study shows very similar results. The mean is 4.3 for scholars with at least one publication recognized by "Publish or Perish" (N = 70). This means that foreign scholars employed in those institutions did not differ significantly from their Polish colleagues. Below we placed a detailed comparison between all publications from a given university and publications produced by foreign scholars only. Although these should not be treated as hard data (because citation indexes are never accurate[19]), we find it interesting and useful as a general indicator of the trend which we have just highlighted.

[18] Additional information can be found here: http://rankingi.ia.uz.zgora.pl/rankingi-2013/ranking-tabela/ [accessed: 19/08/2015].

[19] Moreover, in our own estimations we used the "Publish or Perish" program, whereas Polityka's estimation is based on the Web of Science. It should also be noted that there is a difference in the scope of these two estimations. We focused on the period until June 2015, whereas in the second case the analysis was focused on the period before 2013.

Table 2. Number of citations per publication

Institution	Citations per publication (Polityka ranking 2013)	Citations per foreign scholar's publication
Pedagogical University of Cracow	12.5	2.63
Jagiellonian University	11.2	5.41
AGH University of Science and Technology	7.3	3.11
University of Agriculture in Krakow	6.1	0.70
Cracow University of Technology	5.8	0.73
Cracow University of Economics	4.7	n/a[20]

Source: FHEK Study.

Conclusions

The Internet content analysis of university websites enabled us to discuss common data patterns and draw some suggestions for further research. In our opinion, the most important are the following. It turned out that foreign faculty members in Krakow resemble their Polish counterparts at least from the gender and research results perspective. Most of the foreigners in Polish academia come from Central and Eastern Europe which probably means that Poland in general and Krakow (judged to be one of the most attractive Polish academic centers) in particular is still unpopular among international Western scholars. Moreover, we paid attention to the fact that foreign scholars in Krakow are rather mature, which is good from the point of view of their knowledge and experience but has an obvious drawback: Krakow does not attract young scholars, who would like to develop their research and teaching skills here.

It is also worth referring again to the official 2012 Ministry database. According to this, there are 135 foreign scholars at the 6 universities which we have analyzed. The Internet content analysis helped us to identify only 85 scholars. This means that our method might be slightly less effective than the official data analysis, at least in terms of the quantity of cases. It is, however, far more efficient and precise in terms of data diversity. In some points (e.g. country of origin, distribution of foreign scholars across different universities in Krakow) these two data sets were aligned enough to conclude that they may serve as complementary sources of knowledge. Both are skewed and incomplete but at the same time both allow us to

[20] There was only one observation.

understand better the phenomenon of scientific migration to Poland. It should be strongly emphasized, however, that although this kind of data seems to be reliable it should be treated critically as only tentative information about foreign scholars. It is highly recommended that they should be verified by other means. When we invited foreign scholars as interviewees for the next stage of our research project, it turned out that some individuals were no longer employed in Krakow.

Even though the online content analysis is more in-depth than the analysis of the existing official statistics, it is also crucial to point out that some information is simply unavailable online. This is the case for private data in the first place. Content analysis cannot help to answer any question related to the family life and relatives of a foreign scholar, or even also academic diasporas, ethnic communities and networks, etc. Such questions might be interesting in the context of migration history and trajectories, as we recognize that international migration is a complex process rooted not only in the academic or economic social field, but also strongly connected with interpersonal relationships. Moreover, based on the Internet content analysis it is impossible to discuss issues such as previous employers in Poland, prizes and honors, study visits and internships abroad or data related to positions in scientific organizations (both Polish and international).

In a subsequent step (in progress) of our research project about foreign migrants to Poland we will carry out a series of qualitative in-depth interviews with scholars whom we have identified online, according to the scheme presented in this paper (see also: Mucha and Luczaj 2013; Mucha and Luczaj 2014a; 2014b). The qualitative data will allow us to analyze other contexts of the situation of foreign scholars and obtain data which is unavailable in the public domain.

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