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Poland: An Abundance of Doctoral Students But a Scarcity of Doctorates

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Introduction

The massification of doctoral studies in Poland has not led to an equivalent increase in doctoral degrees. While the number of doctoral students increased steadily through the 1990s and 2000s, the number of doctorates awarded did not follow suit. Many students entered doctoral programs, but only a minority were ever awarded the degree, as most either dropped out or completed the program but did not defend their dissertation. This disparity between entrants and doctoral degrees awarded is central to understanding the emergent tensions around doctoral education in the Polish context. Based on international comparative statistics, the current intake of 43,000 doctoral students (OECD 2017; GUS 2017) combines overproduction of doctoral students and a scarcity of doctorates.

Traditionally, as in other European systems, the number of doctoral students in Poland was low, and completion rates were high. Doctorates were awarded either on completion of a highly competitive program with a limited number of available places and defense of a dissertation or by such defense while already employed as an assistant in that institution. The proportion of new entrants to the academic profession through doctoral studies and assistantships varied over time; at present, a doctoral degree is required for all new academic posts. Prior to 1989, the higher education system was elitist and competitive; the number of academics increased slowly, from 22,523 in 1965 to 61,400 in 1989—an almost threefold increase within a quarter of a century. During that period, 1,700 to 3,700 doctoral degrees were awarded annually. After 1989, the delayed massification of higher education changed the education landscape beyond recognition. By 2016, there were four times as many students and sixteen times as many doctoral students, but the number of academics only increased by about 50% (Białecki and Dąbrowa-Szefler 2009; Siemieńska and Walczak 2012). In other words, this dramatic expansion in student numbers (which stopped in 2006; see Kwiek

2013; Kwiek and Szadkowski 2018) was not accompanied by a corresponding expansion of the academic profession.

One consequence of this disparity was that academic employment opportunities for new doctoral graduates shrank in the post-1989 period, and this largely serves to explain why the increasing number of doctoral students did not lead to a proportionate increase in doctorates awarded. Because the chances of academic employment were very low, the motivation to pursue or complete a doctoral degree was also low.

Prior to the end of Communist rule in 1989, the basic rationale behind doctoral education was to provide highly trained personnel to higher education institutions. From 1989, doctoral education was extended to those who wished to continue in higher education, without considering academic jobs. These new third-cycle students (as they were termed, following the Bologna Process) qualified for a number of benefits such as non-repayable scholarships and healthcare provision. The traditional rationale of intensive training in research and research methods for a small number of future academics was turned upside down, and in most academic fields and institutions, the traditional Humboldtian bond between pupil and master was broken. Among the exceptions were some research-intensive faculties in elite universities, especially in the hard sciences. Massified, underfunded, organisationally uncoordinated—and most of all, perhaps, devoid of a clear purpose—doctoral education has drifted into the unknown, and most doctoral students now combine doctoral studies with non-academic work rather than being socialized to academic norms.

This drift can be explained by a combination of several factors; perhaps the most important of these was a failure to understand why the country needed doctoral studies on such a massive scale. It was also unclear what kind of professional life doctoral students might pursue if (as was already clear by about 2005) they were unlikely to secure academic jobs. Until recently, there was little debate about these issues, either in the public domain or among political parties. Now, after two decades of failure, the new law of July 2018 introduces fundamental changes, including a focus on research-intensive institutions and scholarships only for those enrolled in newly created doctoral schools.

Doctoral education and society

The status of doctoral students in the higher education sector is unclear (Szadkowski 2014), as is the status of doctoral education in society. Are doctoral studies expected to produce national elites, or are they merely expanding the pool of highly qualified personnel in the labor market? Are universities more interested in the quantity or the quality of doctoral studies and, by extension, of doctoral degrees? When the Bologna Process was introduced, about a decade and a half ago, the traditionally elite status of doctoral studies disappeared with massification, as they became largely non-selective. In Poland, the whole system of doctoral education had traditionally focused on

producing future university professors; with massification, the question was where these future university professors were to be employed. In terms of non-academic employment for doctoral graduates, there is a vast difference between the needs of industry (where those with degrees in technical disciplines might find employment) and of business enterprises and public administration (for those with degrees in social sciences and economics).

Given the scarcity of new academic posts and the large number of doctoral students, the decision not to complete one's studies or to engage in research activities can be seen as a rational strategy at the individual level. If only about 10% of this population can reasonably expect to find employment in the academic sector, there seems little point in pursuing an education that prioritizes academic research and publications. Ninety percent of doctoral students will never find their way to higher education employment. In a heavily declining higher education system (Kwiek 2013), with decreasing numbers of students and academics, the pool of new academic posts is very limited. In the last decade, the number of students declined by about one third for purely demographic reasons, and the number of academics, with a delay, followed suit. This disinterest in academic employment among doctoral students was matched by the frustration of doctoral supervisors, who saw no point in supervising students who showed little interest in research. However, the new law of 2018 may bring much-needed change if skillfully implemented and backed by new funding for doctoral schools.

Organization, procedures, funding, and internationalization

While doctoral students are predominantly enrolled in higher education institutions (which account for 94.23% of candidates), data from 2016 indicate that some can also be found in the Polish Academy of Sciences (4.72%) and research institutes (0.95%). All higher education institutions (including those specializing in one discipline such as agriculture, economics, education, or medicine and including universities of technology) offer doctoral programs. About half of these students (48.25%) are enrolled in universities and about one fifth (18.05%) in universities of technology. In organizational terms, doctoral education is provided at faculty level. Faculties are the main organizational units within academic institutions; in most cases, they comprise several departments and are headed by a dean. In 2018, almost 90% of about 1,000 faculties (880) were eligible to provide doctoral education (POLON 2018). Doctoral education is located almost exclusively in the public sector: the number of doctoral students (and doctoral degrees awarded) in the private sector is marginal. In 2016, the private sector accounted for just 3,418 doctoral students (7.9%), and only 122 doctoral degrees (2.8%) and 17 Habilitation degrees (0.9%) were awarded (GUS 2017). The demand-driven nature of the private sector largely accounts for this low level of participation (Kwiek 2018b; Antonowicz et al. 2018).

Doctoral education is currently provided through a combination of structured teaching (lectures, classes, laboratory hours) at faculty level and individual collaboration with main and additional academic supervisors. The main supervisor is responsible for the

student's academic development and progress. In 2016, almost 90% of doctoral students failed to specify their dissertation themes and titles, which are required for the so-termed opening procedure. The number of doctoral students who passed the opening procedure is very low (5, 209 of 43,181 doctoral students, or just 12.1%), and in all other cases, official supervisors have not been assigned.

The criteria for doctoral program providers are strictly defined; according to the *Law on Higher Education* (LHE 2011), only those organizational units of higher education institutions authorized to confer the academic degree of PhD in at least two different disciplines may provide doctoral programs in those disciplines. In practice, only faculties or departments that employ at least eight full-time senior academics in a given discipline may confer doctoral degrees.

Entry to doctoral studies is offered to selected top graduates as a continuation of studies at a masters' level. There is a required minimum average mark (usually 4.0 on the Polish scale, where 2.0 is a fail and the maximum is 5.0). Because the number of candidates usually exceeds places available, oral entrance exams are commonplace. Exams are organized by admission committees comprising professors of the given faculty, who evaluate candidates partly on the basis of their academic accomplishments to date and partly on their project proposals.

Doctoral studies take four years, and scholarships may be provided for up to that duration. Most universities will agree to extend the period of study by one year, with all privileges maintained (including coverage of costs for the doctorate defense procedure, which must be paid by all part-time candidates or those not enrolled in a doctoral program), but with no scholarship. Doctoral programs may be full-time or part-time. In public higher education institutions, no tuition fees are charged for full-time programs, but there may be fees for part-time studies (especially in law, business, and economics).

Although the present chapter addresses doctoral education, it is important not to disregard the specific structure of academic degrees in Poland. One feature that the Polish higher education system shares with countries such as Switzerland, France, Germany, Finland, Russia, and Austria is the postdoctoral degree (or habilitation), which can be granted by about two-thirds (647) of all Polish faculties (POLON 2018), faculties being lower-level organizational units of higher education institutions. While a doctoral degree opens the door to junior positions, the habilitation degree is the first step in a senior academic career. The powerful gatekeeper status of the habilitation degree as a prerequisite for university professorship and ultimately full professorship means that the doctoral degree becomes less important; it is merely the entry ticket on the long road to academic seniority.

The changing proportion of doctoral students to degrees awarded has important policy implications. Other than Russia, Poland is the largest producer of doctorates in Central and Eastern Europe; in 2016, there were 43,181 Polish doctoral students, and 5,999 doctoral degrees were awarded. Since the collapse of communism in 1989, about

117,000 new doctorates have been awarded. The number of habilitations have been much smaller as they are awarded to those already employed in the academic sector (in 2016 for instance, 1,848 habilitations were awarded). While the number of doctoral students grew by roughly a factor of 10 between 1990 and 2000, and a factor of about 16 to 2016, the number of doctorates awarded in the same period increased by no more than a factor of 2 or 3, depending on the year. The period of greatest expansion was the 1990s, when the number of doctoral students increased from 2,695 in 1990 to a total of 25,622 by 2000. Following an increase to 37,492 in the next decade (to 2010), the number has remained in the 40,000–43,000 range for the last three years (Table 1).

Table 1. Number of doctoral students and doctorates awarded in Poland 1990–2016.

Year	Total	Full-time	Part-time	Doctorates awarded
1990	2,695	1,926	769	2,324
1995	10,482	6,779	3,703	2,300
2000	25,622	18,882	6,740	4,400
2005	32,725	23,169	9,556	5,917
2010	37,492	27,066	10,426	4,815
2015	43,177	37,101	6,076	5,956
2016	43,181	37,548	5,633	5,999

Source: author's analysis based on GUS (Central Statistical Office) data.

These data can be analyzed along several dimensions, including academic field, institutional type, gender, and regional concentration. While the number of male doctoral students increased by 5,445 in the period 2000–2016, the number of females increased by almost double that figure (12,548), and this is a strong trend. While a majority of doctoral students in 2000 were male (55.44%), they were in the minority (44.95%) by 2016. This change may be attributed to the decreasing attractiveness of the academic profession (Kwiek 2017), especially in the context of low entry salaries in the higher education sector in Poland and elsewhere and relatively low salaries for senior academics (Kwiek 2019; Yudkevich et al. 2015). Poland clearly represents the feminization of academe, which may further diminish its financial attractiveness, as a growing number of women enter doctoral studies and move on to junior positions in higher education.

While the growth of doctoral education in the university sector has been remarkable, it has been less dramatic in universities of technology (focused on both teaching and research). For the period studied, the number of doctoral students increased by 61.24% in universities and by just 27.02% in universities of technology. This in part explains the increasing numbers of female doctoral students, as new opportunities have appeared predominantly in the university sector, where females account for two-thirds of all students at masters level (67.19%) in 2016. It is hardly surprising, then, that the number of female doctoral students in universities increased by about 5,000 (79.06%) in the period 2000–2016.

In 2016, there were 8,106 humanities doctoral students and 4,674 in the social sciences. With 3,728 in economics and 3,860 in law, the total in soft fields was 20,368 (47.17%)—in other words, about half of all doctoral students in that year were enrolled in fields unrelated to STEM (science, technology, engineering, and mathematics). The proportion of women is higher in these non-STEM fields, totaling 62.05% in the humanities, 62.84% in social sciences, 51.52% in economics, and 54.72% in law—well above the proportion of female students in the doctoral population as a whole. The number of doctoral students in technical sciences is widely considered too low at 15.75% (6,802), including 36.64% of females. In international terms, STEM fields are underrepresented in Polish doctoral education while non-STEM fields are overrepresented (see Table 2).

In terms of regional concentration, 40.93% of doctoral students are located in Warsaw and Cracow, the two largest academic centers. A further 38.70% are located in five smaller academic centers. Warsaw's dominance is strong, with one in four doctoral students in Poland enrolled in Warsaw-based institutions. Similarly, one third of research funding from the National Research Council or NCN goes to the two national flagship universities (the University of Warsaw and the Jagiellonian University in Cracow) (see Kwiek 2018b).

Table 2. Number of doctoral students by major academic field (2016) (based on the Polish classification of academic teaching fields)

	Total		**Doctoral students**			
			Full-time		**Part-time**	
	Total	**Female**	**Total**	**Female**	**Total**	**Female**
Total	43,181	23,772	37,548	20,931	5,633	2,841
Humanities	8,106	5,030	7,811	4,815	295	215
Religious studies	1,720	422	1,492	395	228	27
Social sciences	4,674	2,937	3,900	2,585	774	352
Economics	3,728	1,921	2,444	1,295	1,284	626
Law	3,860	2,112	1,724	891	2,136	1,221
Mathematics	541	144	537	142	4	2
Physics	1,202	471	1,192	468	10	3
Chemistry	1,763	1,160	1,755	1,155	8	5
Biology	1,991	1,381	1,991	1,381	0	0
Earth sciences	946	497	939	494	7	3
Technical sciences	6,802	2,492	6,543	2,448	259	44
Agriculture	1,585	1,066	1,492	1,017	93	49
Forestry	178	65	106	48	72	17
Medicine	3,183	2,143	2,967	2,022	216	121
Health sciences	677	557	639	529	38	28

Source: author's analysis based on GUS (Central Statistical Office) data (2017).

The distribution of doctorates by academic field reveals the tension between high numbers of doctoral students and low numbers of doctorates awarded. In 2016, the

largest number of doctorates was awarded in medicine and technical sciences, followed by humanities and social sciences. In all other fields, the number was considerably smaller. In the case of habilitations, these four fields also dominated, accounting for 51.35% of all Polish postdoctoral degrees. Of 5,999 doctorates awarded in 2016, 91.13% were awarded by higher education institutions (predominantly universities and universities of technology), with 4.96% (297) awarded by the various institutes of the Polish Academy of Sciences, 3.23% (194) by research institutes, and 0.68% (41) by ecclesiastical higher education institutions (GUS 2017).

It is expected from October 2019 onwards, the newly created doctoral schools required by the new law will lead to further regional concentration. The data for 2000–2016 show that the academic peripheries (in terms of the 16 Polish administrative units) have not been developing as rapidly as Warsaw and Cracow, and in some cases, the number of doctoral students in 2016 was the same as in 2000. Detailed analysis of the regional concentration of doctoral students over time confirms the skewed pattern of expansion, in which the two major academic centers differ substantially from the rest of the country, making them natural candidates for flagship status as "research universities" under the 2018 law (Kwiek 2018a).

Doctoral studies are funded from the public budget (and are included in ministerial subsidies for teaching), and from fees (for part-timers in the public sector and for all doctoral students in the private sector). There is a separate funding stream for doctoral studies in both sectors and funding is included in general financial support for students. In 2016, about 40% of doctoral students received financial support—one in five (19.99%) doctoral scholarships and one in five (21.20%) social scholarships or need-based support related to family income (GUS 2017, 158–9).

The number of international students enrolled in doctoral studies in Poland is the lowest across all OECD countries; in 2015, it was 1.9% (OECD average = 25.7%; EU22 average = 21.7%). In Europe, only Hungary (7.2%), Latvia (8.8%), Slovenia (8.5%), and Germany (9.1%) had a share of international students lower than 10% (OECD 2017, 300). This is perhaps the most worrying indicator, suggesting that the Polish doctoral system as a whole is uncompetitive and unable to attract international talent. Despite its relatively large size, the system is focused almost exclusively on Polish students, predominantly using the Polish language for instruction.

Doctoral education: An international comparative perspective

To assess Poland's international standing in this context, the most meaningful comparison is with other OECD economies (OECD 2017). The number of doctorate holders in Poland's working age population (aged 25–64) is one of the lowest in Europe at less than five per thousand, similar to postcommunist countries such as Russia, Estonia, Slovakia, and Latvia, as well as Portugal and Italy. In contrast, ten OECD countries achieve figures of ten or more per thousand (OECD 2015, 102).

Polish doctoral recipients are relatively young, with a median age at graduation of 32 years—one of the lowest in the OECD area. Cross-disciplinary differences are relatively small, with a median age of 31 in the natural and agricultural sciences and 33 in the medical sciences and humanities. In Europe, the median age is lower only in the Netherlands and Switzerland (29 to 31), and it is higher in all other countries (OECD 2010). The typical age of entry to doctoral education in Poland (at 24–26) is among the lowest in the OECD area (OECD 2017, 420). The age structure of Polish doctoral holders indicates that they are a relatively homogeneous population group, with the highest share below 45 years old (68.7%; 70.8% for women). This is the highest rate across all OECD countries, with most European countries at 40–50%.

In Poland, the structure of doctorate holders by employment sector differs radically from all other countries for which data are available. The most recent data (2016; GUS 2017) show that 213,971 people in the Polish labor force are involved in research and development, and 87,027 of these hold doctoral degrees. Using the OECD classification of research and development personnel, 87.39% of Polish doctoral holders are employed in the higher education sector (including the Polish Academy of Sciences), with 8.71% in the business enterprise sector and 3.90% in the government and private non-commercial sectors combined (GUS 2017, 42). Poland is one of several countries in which business enterprise sector accounts for less than 10% of the pool of doctorate holders. The picture that emerges is that Polish higher education and science system produces doctorate recipients for academia—and keeps them there.

Distribution of doctorates awarded

In the Polish context, only one in four doctoral students are ultimately awarded a doctoral degree (NIK 2015, 6). It follows that the processes affecting the distribution of doctoral education differ from those that determine the distribution of doctorates. The emergent tensions reveal the fundamental difference between the changing higher education system in terms of teaching (where the Bologna Process places doctoral education) and research (where doctorates awarded belong). In Poland, there is the further difference of national statistics, as fields of study used to report doctoral student numbers differ from those used to report doctorates awarded.

While the rise in the number of doctoral students can be linked to financial mechanisms (i.e., more doctoral students per institution means higher public subsidies), the rise in the number of doctorates awarded can be linked to internal academic promotion procedures among other factors—for instance, doctoral supervision as a formal requirement in applying for full professorships. While doctoral education is therefore undertaken for reasons other than the award of a doctorate (e.g., to prolong the period of study), doctorates awarded signal a new stage, leading predominantly to employment in the academic sector. Measuring the changing distribution of doctorates awarded over time by academic field reveals shifts in the academic sector better than changes in doctoral education, as a high proportion of doctoral students are academically inactive. More doctorates are reported in academic fields that either afford more employment opportunities in the academic sector or—as

in medicine and law—lead to new opportunities in non-academic professional sectors of the economy.

From a historical perspective, the number of doctorates (and habilitations) awarded was relatively stable in the period 1970–1990 (i.e., prior to regime change), with stable gender distribution of both degrees. The female share of doctoral degrees was about one third (27–32%), and the share of female habilitations was about one fifth (20–21%).

It is useful to view doctorates and habilitations in the context of academic careers and how they relate to age. In the last half-century, the average age range for doctorates was 30–35 years; over the last 15 years, this has remained stable at 32–33 years. In the case of habilitations, the average age increased until 2008, peaking at 47 and then decreasing slowly to about 45 in 2016 (Figure 1). What is especially important in both academic and policy contexts is the time lapse between the two degrees. In the 1980s, this averaged 7–9 years, increasing in the mid-1990s to an average of 12–13 years, where it remains today.

In 2016, the average age for habilitations (45) and the average time between the two degrees (12 years) (see Figure 1) means that academic careers at junior level are very long when compared to other countries. As mentioned earlier, the second degree is just an entry ticket to academic seniority, the full ticket being full professorship, reached on average when academics are in their 50s. In the case of the postdoctoral degree, the age factor has major policy implications, and its possible abolition has been at the center of reform debate over the last quarter of a century.

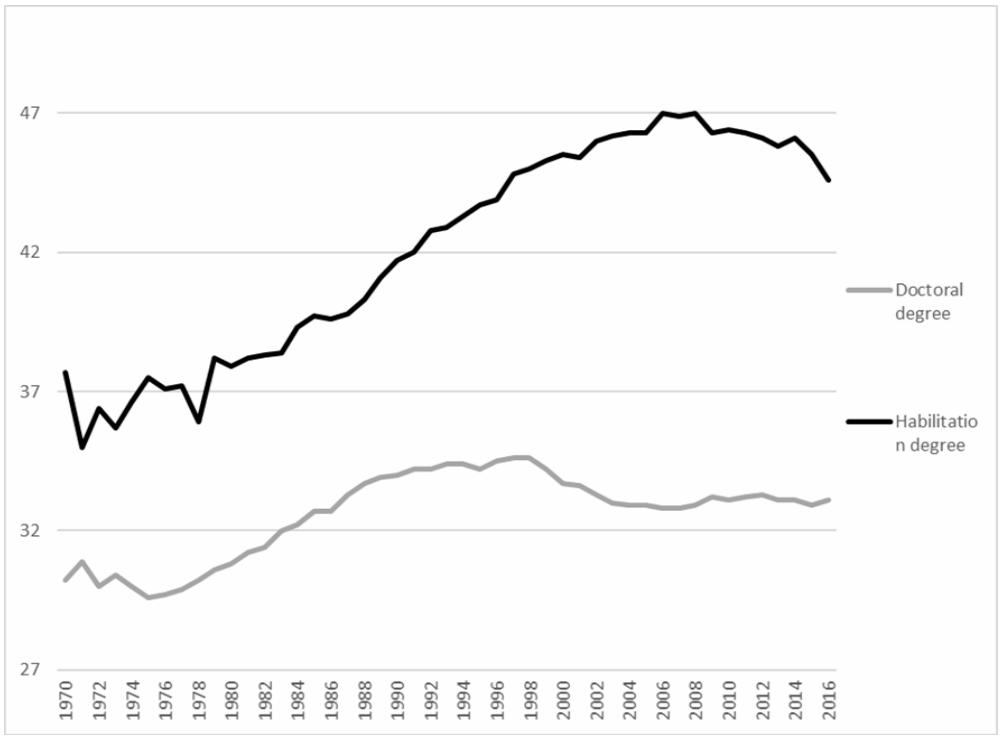

Figure 1. Mean age for award of doctoral and habilitation degrees (1970–2016) for academics employed in Polish higher education institutions at November 2017.

Source: author's analysis based on data from the OPI (2017) dataset.

During the period studied (1990–2016), the number of doctorates awarded annually increased by 158% (from 2,324 to 5,999), with 92,993 new doctorates awarded since 2000. This increase is not impressive when compared to the fourfold increase in the number of students and the huge increase in the number of doctoral students (x 16) in the same period. Rather, the limited expansion of doctorates during the period 1990–2016 reflects the limited growth of the academic profession (Kwiek 2015b; Kwiek 2017). There is a clear connection here; while doctoral education witnessed phenomenal growth (as did higher education in general), the growth in doctorates awarded reflects the emergent opportunities in the academic sector. From a European perspective, employment opportunities for doctoral holders are almost exclusively academic. As the academic sector was not growing sufficiently fast, the growth in the number of doctorates was modest. During the expansion period of doctoral education (2000–2016), the number of doctorates was stable at about 5,000-6,000 per year.

What has changed fundamentally during this time, however, is the gender composition of doctorate holders, with a gradually increasing share of female doctorates. While 31% of doctorates in 1990 were awarded to females, the percentage rose after a decade of change—to 42% in 2000, and to 53% by 2010. From a gender perspective, the turning point was 2008 when, for the first time in the history of Polish science, the number of female doctorates exceeded the number of male doctorates (Table 3).

The female-to-male (FM) ratio is a useful tool for studying gender differentiation in doctorates (and habilitations), revealing dramatic changes in the gender composition of doctorates in Poland. This ratio was 0.45 in 1990; it increased steadily, reaching 1.00 in 2008 (a turning point, with an equal number of male and female doctorates) and 1.13 in 2016 (Figure 2). While doctorates may be awarded to non-academics, the postdoctoral degree is awarded almost exclusively to academics; in other words, the changing gender composition of the habilitation degree over time highlights changes within the academic profession.

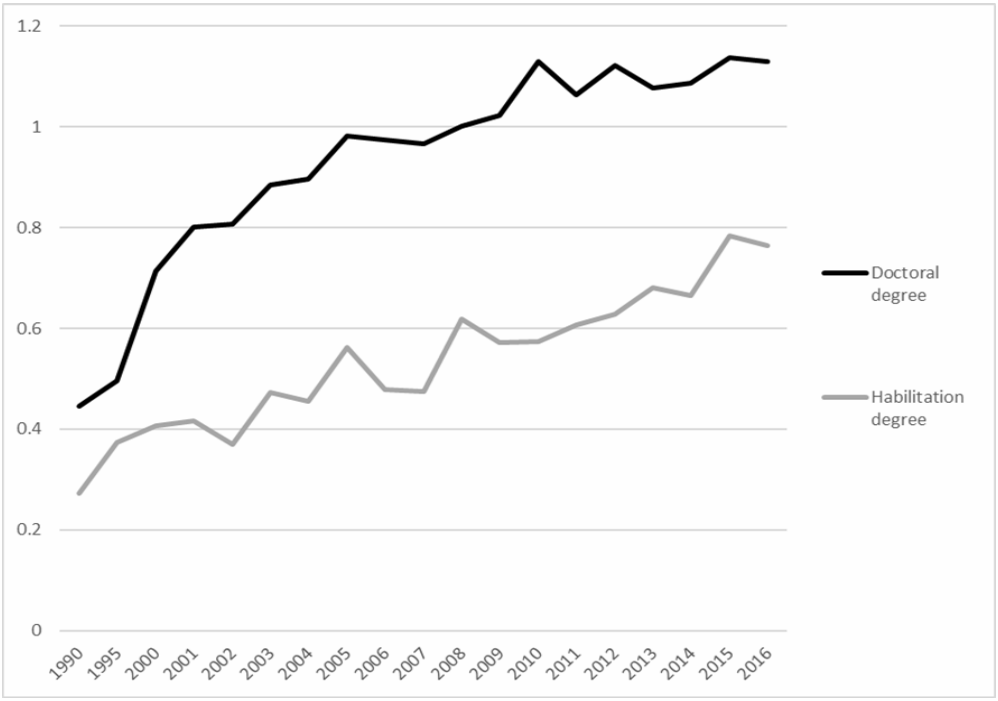

Figure 2. Female-to-male (FM) ratio of doctorates and habilitations awarded, 1990–2006. Source: author's analysis based on data from OPI (2017).

The FM ratio for doctorates differs considerably from the FM ratio for habilitations, although both show a substantial increase in female degrees. In the case of the habilitation degree, the gender factor is very clear; in the same period (1990–2016), the FM ratio increased from 0.27 in 1990 to 0.41 in 2000, to 0.57 in 2010, reaching 0.77 in 2016. The gender gap is also evident in the number of habilitations awarded (1,047 males and 801 females in 2016; see Table 3). While the share of female doctorates increased from 31% in 1990 to 53% in 2016, the share of female habilitations increased from 21% to 44% in the same period. One further dynamic not addressed here is the slowly changing low share of female professorships over time.

A detailed analysis of the changing composition of doctorates awarded in Poland over the last decade (2006–2016) reveals a stability in all major academic fields. While in some cases there is a slight decrease in the number of doctoral degrees awarded (e.g., biology, economics, physics, medical sciences, technical sciences), there are slight increases in others (e.g., chemistry) while others again show substantial increases although numbers remain low (e.g., law). The only academic field in which the number of degrees awarded exceeds 1,000 is humanities, with 1,349 degrees in 2016 (22.49%). This has important policy implications, as the state may decide to limit the number of places available in these fields through the new organizational mechanism of doctoral schools and the financial mechanism of doctoral scholarships for doctoral schools only.

Table 3. Number of doctorates and habilitations awarded by gender, 1990–2006.

	Doctorates						Habilitations					
	Total	**Male**	**Female**	**FM ratio**	**% male**	**% female**	**Total**	**Male**	**Female**	**FM ratio**	**% male**	**% female**
1990	2,324	1,607	717	0.45	69	31	973	765	208	0.27	79	21
1995	2,300	1,537	763	0.50	67	33	628	457	171	0.37	73	27
2000	4,400	2,568	1,832	0.71	58	42	829	589	240	0.41	71	29
2005	5,917	2,986	2,931	0.98	50	50	955	611	344	0.56	64	36
2010	4,815	2,260	2,555	1.13	47	53	960	610	350	0.57	64	36
2015	5,956	2,787	3,169	1.14	47	53	1,643	921	722	0.78	56	44
2016	5,999	2,817	3,182	1.13	47	53	1,848	1047	801	0.77	57	43

Source: author's analysis based on GUS (Central Statistical Office) data.

Reform debates: Academic degrees and academic careers

In terms of funding and governance, Polish universities remained largely unreformed until 2009–2012 (Kwiek 2016). Prior to 2009, the higher education system was governed by two laws: the 1990 Law granting academic freedom and institutional autonomy, and the 2005 Law, which sought to adapt the system as a whole to Bologna Process requirements (including the introduction of a three-cycle model of higher education studies). Throughout this period, however, the system was based on non-competitive funding modes and excessively powerful collegial governance (Kwiek 2015a). The previous wave of reforms (from 2009 to the present) aimed to re-institutionalize the research mission (Kwiek 2012) and to re-orient Polish universities toward research activities and closer cooperation with wider socio-economic interests. As of October 1, 2018, the new wave of reforms takes the same direction, with internationalization of research as one of its major goals (LHE 2018). (The reform rationale is explained in Antonowicz et al. 2017).

Doctoral education in Poland has attracted severe public and academic criticism since at least 2010, following Bologna-related changes in the law on higher education introduced in 2005. The major lines of criticism include lax selection criteria that allow the inflow of large numbers of doctoral students (selection and size); the declining quality of doctoral education and doctoral dissertations (quality); the narrow choice of courses for doctoral students (educational offerings); low doctoral scholarships (incentives); and the inability of Polish institutions to attract international doctoral students (internationalization).

As in a number of other European countries, the legal and academic status of doctoral students remains unclear; the key question is whether they are young academics (as was traditionally the case in Poland) or third-level students (in the spirit of the Bologna Process). The young academic/older student distinction has a number of practical implications, including access to national-level research funding and access to institution- and faculty-level research infrastructures. The lowest access to funding is

reported by doctoral students in the humanities and social sciences, with reports of no available funding by more than 40% of the former group and more than 35% of the latter (Bień 2016, 261). Reported reasons for pursuing doctoral studies are as follows: self-development (90%), influencing research in one's academic discipline (49.7%), professional career (40.3%), social advancement (28.9%), and access to scholarships (20%) (Bień 2016, 266).

In the debate around Polish higher education reforms from 1999 to 2018, three issues related to doctoral education figure prominently. First, how is doctoral education to be linked to the research status of degree-awarding institutions (or their academic units, predominantly faculties)—in other words, how can it be ensured that doctorates are produced only in research-intensive academic environments? Second, how can it be ensured that doctoral students are fully focused on their dissertation rather than on outside jobs? Finally, how can doctoral education be linked to the labor market and/or social needs. These three issues reflect the three major lines of criticism of doctoral education: the declining quality of doctoral dissertations, doctoral students' declining interest in research, and the mismatch between scientific fields in which dissertations are awarded and available employment opportunities inside and outside the university sector.

The new law on higher education advances a comprehensive solution to these three issues (LHE 2018; Antonowicz et al. 2017). From October 2019 onward, the right to award doctoral degrees will be granted only to institutions of at least middle ranking in the periodical national research assessment exercise known as the "national research evaluation" (Kulczycki 2017). In a national ranking system for 47 academic fields, only institutions with middle and high marks will be able to award doctoral degrees in a given academic field. The new requirement brings an end to the current situation, which grants this right to 88% of academic units.

The new law on higher education introduces the concept of doctoral schools, located exclusively in institutions that are highly ranked for research performance. A new geography of doctoral education will gradually be introduced, with all full-time doctoral students concentrated in doctoral schools and a limited number of part-time doctoral students still scattered across the system. As mentioned earlier, all full-time students in doctoral schools will be entitled to relatively generous scholarships, which will be accompanied by a ban on non-academic outside work. The idea of these schools is to confine doctoral education to research-focused institutions and to keep doctoral students focused on their dissertation.

At the same time, Polish doctoral education has been experimenting with an entirely new type of doctorate: the so-called "implementation doctorate," which is similar to the professional doctorate. Although the number of new doctorates is limited (500 new doctoral students each year from 2017), it warrants mention as a new idea. Under this new ministerial scheme, doctoral students are entitled to receive a relatively generous doctoral scholarship as well as a salary from any enterprise that employs them. Doctoral education and dissertation will be undertaken in partnerships between higher

education institutions and enterprises. Only the highest ranking institutions (according to the national research exercise) are eligible to offer this new type of doctoral education. Agreements are signed between the Ministry, the higher education institution, and the enterprise, and dissertation themes are proposed by enterprise partners rather than by academic institutions or doctoral students. This measure addresses criticisms that doctoral education is unrelated to business sector needs. In the first round of the program in 2017, 54 institutions were awarded ministerial funding, including major universities of technology and several medical universities.

However, the debate around doctoral education has mostly concerned another issue: the complicated academic career structure in which three different degrees position academics within university authority and prestige systems. The doctoral degree marks entry to an academic career in the junior ranks; the postdoctoral degree (habilitation) marks entry to the lower senior ranks; and full professorship marks real academic seniority and the pinnacle of the academic profession (as in several other Central European systems). This system of three degrees has commonly been criticized by reform-minded academics and policymakers as obsolete, complicated and energy-wasting, as academics must struggle for degrees rather than solving academic problems and publishing research. The number of full professorships – based on individual research achievements assessed by the Central Committee fro Academic Degrees and Titles rather than academic posts granted by institutions as in most European systems – is small but not limited by the state or institutions; in 2016, there were 10,988 academics with the full professorship title (or 11.99 percent, GUS 2017).

Every round of debate about the complicated structure of academic degrees inevitably includes discussion of the role of the doctoral degree as academically weak—a necessary but somehow insignificant step on the ladder of academic prestige. By abolishing the title of full professor, or abolishing both full professorships and habilitations, the role of the doctoral degree in higher education and in the national system of science would be substantially strengthened. The key problem has always been the structural position of habilitation in the academic career; its abolition has always been linked to potentially increased requirements (and higher prestige) for the doctoral degree.

In the 2009–2012 wave of reforms, the role of the habilitation degree was fundamentally weakened, but the degree remained mandatory in the system. Under the new law of 2018, the habilitation degree becomes non-mandatory, and the requirements for all three degrees are internationalized, stipulating international publications and international research cooperation as entry requirements. From the perspective of doctoral education, its concentration in doctoral schools in the next few years represents a major change, and this is where major public research funding seems likely to be invested (Kwiek and Szadkowski 2018).

Conclusions and future challenges

Doctoral education in Poland is clearly in need of reform, as is the entire higher education sector. However, the feasibility and affordability of the current reforms remains unclear. During extensive preparations in 2016–2018, doctoral education and doctoral degrees were at the center of public and academic debate about organizational and financial changes to doctoral education. The outcome, however, is that doctoral schools are to be formed from scratch. The success of doctoral education reform will depend on the overall success of the imminent higher education reforms. The complicated structure of academic degrees in Poland, with doctorates, habilitations, and professorships awarded on the basis of research achievements, clearly needs to be simplified. However, abolition of the habilitation degree will entail higher academic status and more internationalized requirements for the doctoral degree, which is always at the center of the controversy around academic careers. Whatever the future structure of academic careers, it is essential to improve the quality of doctoral education and the quality of doctoral dissertations in the interests of international competitiveness. The ability to bring the "best and brightest" into doctoral education is one thing; the ability to retain them in the university sector after graduation is quite another. Both are key issues in enhancing the attractiveness of an academic career, and both require increased public funding, which has not so far been guaranteed in the current reform package. Initially, university governance reforms were supposed to be combined with increased, albeit selective, public funding. Currently, reforms are accelerating and the expectation is that public funding for both higher education and for academic research will be higher. In the center of the reform package there is a concept of competition: between research teams, academic units and institutions, with a new model of academic research assessment to be applied in 2021. The concept includes also new doctoral schools competing for public subsidies and top minds.

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