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20 Years of Empirical Evidence on Student Enrolment, Study Success
and Labour Market Outcomes

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Did the “Bologna Process” Achieve its Goals? 20 Years of Empirical Evidence on Student Enrolment, Study Success and Labour Market Outcomes*

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Abstract

In 1999, the “Bologna Process” was initiated to improve higher education enrolment, study success and students’ employability across Europe, mainly by introducing the two-cycle degree structure of Bachelor (BA) and Master (MA). More than 20 years later, we examine whether these goals were met by reviewing quantitative articles from sociology and economics. We find that the literature is surprisingly small, selective, and ambiguous. While enrolment seems to have increased in countries implementing the reform more quickly, the evidence on study success is mixed and hardly available regarding student mobility. The results on employment outcomes are more consistent, with BA graduates having lower labour market returns than graduates with MA or traditional degrees. Altogether, studies often do not allow for causal conclusions and only provide a fragmented picture, which makes evidence-based adjustments in reform implementation difficult. This calls for further research using better data, more state-of-the-art methods and deeper theoretical reasoning.

Keywords: universities, education, employment, inequality, economics, sociology

JEL classification: I23, I28, Z13

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1. Introduction

In 1999, 29 European countries joined forces to create the European Higher Education Area (EHEA) for promoting students' mobility and employability and for increasing the competitiveness of higher education systems in Europe as common goals (Bologna Declaration, 1999). This so-called Bologna Process initiated a large variety of national higher education reforms in the participating member states. Most likely, the most prominent reform was the implementation of the two-cycle system of consecutive bachelor's (BA) and master's (MA) degrees (Bologna Declaration, 1999). Among the 49 countries currently participating in the EHEA, approximately 20 had organized their higher education system as a single-cycle system before the reform, and substantial reforms became necessary (European Commission/EACEA/Eurydice, 2018). In the other countries, adjustments of different intensities had to be imposed. In the follow-up conferences taking place every two years since 1999, the EHEA has continuously gained new members and refined its goals. The Ministerial Conference Bergen 2005, for example, for the first time emphasized the "*social dimension*" of the Bologna Process with the commitment to make "*quality higher education equally accessible to all, and stress the need for appropriate conditions for students so that they can complete their studies without obstacles related to their social and economic background*" (Bergen Communiqué, 2005, p. 4). Thus, increasing higher education enrolment and successful study completion for all groups of students irrespective of their socioeconomic background became important goals next to students' mobility and employability.

More than two decades after the start of the Bologna Process, we want to analyse the extent to which these goals have actually been achieved. We therefore review the literature from the social sciences on the consequences of the Bologna Process in three main areas: first, enrolment in higher education, second, study success and student mobility, and third, labour market outcomes. Whenever possible, we address whether the potential consequences of the reform served to reduce or increase social inequalities in higher education, mainly related to students' parental background. Our focus is on quantitative empirical studies published in sociology and economics, since both disciplines address the same outcomes of the Bologna Process but differ in their methodological perspective. While sociological studies mainly describe possible associations for large groups of students and graduates and often relate the findings to social inequalities, economic studies more closely scrutinize causal effects by quasi-experimental designs, often restricting their attention to particular groups of students or specific reform periods. By combining both disciplinary perspectives, we expect to give a broader picture of the Bologna Process and its consequences for education and employment outcomes.

We identify 40 empirical studies listed in the Web of Science and the IDEAS database based on Research Papers in Economics (RePEc)¹ that deal with selected aspects and questions related to our three main topics: higher education enrolment, study success and employment outcomes. Our literature review indicates that reform effects on these three objectives of the EHEA have been identified only for a small number of countries (Italy and Germany in particular) – if at all. For the majority of countries, there is no evidence on the impacts (at least none published internationally). Moreover, we find that only very few effects of the Bologna Process hold in different country contexts and thus might be generalizable. In addition, we obtain ambiguous results on many outcomes from different studies and/or countries. Thus, quantitative empirical evidence on the impacts of the Bologna Process on its main targets remains surprisingly scarce.

Overall, the lack of empirical evidence makes a comprehensive (and conclusive) evaluation of the consequences of the Bologna Process for individual education and employment outcomes very difficult. This implies, first, that policy-makers are not able to base wide-ranging decisions in the implementation or in the adaptations and augmentations of the reform on hard scientific evidence. Second, there is a need for a much stronger and systematized investigation and evaluation of the direct and indirect effects to ensure that the EHEA framework – in place for all member countries – can achieve the intended effects or at least does not lead to contrary developments, harming the affected persons at worst. Third, more, better quality and internationally comparable data for all member countries are strongly required. Finally, based on that, better identification of causal mechanisms and a broader application of state-of-the-art empirical methods are needed to understand the underlying mechanisms of effective and ineffective aspects of the reform process.

The remainder of the paper is organized as follows: We start by explaining the implementation of the Bologna Process (Section 2). We review some metadata on the research on the Bologna Process in Section 3 and introduce the sample of empirical studies analysed for this review. We present the available empirical evidence on the three major aspects in Section 4. The final section provides our conclusion.

2. The Implementation of the Bologna Process

The reform agenda of the Bologna Process can be seen as a “moving target” (Kehm *et al.*, 2009), as it has continuously gained members (currently 49, see Table 1) and has revised and refined its goals during the follow-up conferences every two years (Kehm, 2010). Currently, three key commitments are at the centre of the EHEA: 1) the implementation of the two-cycle degree system², 2) recognition of qualifications, and 3) quality assurance. In addition, there are three

priorities of the Bologna Process: 1) learning and teaching, 2) social inclusion, and 3) employability (European Commission/EACEA/Eurydice, 2018).

The implementation process varied strongly across countries due to the large number of involved actors and goals, combined with the *de facto* voluntary commitments and limited political authority of the EHEA. Some countries are still far from fulfilling their commitments, while others have made considerable progress in implementing the necessary reforms (“*two speed Bologna*”, see Bergan and Deca, 2018). In particular, the goals that aim at structural reforms of higher education systems and that matter strongly from a national perspective were the most successful (Papatsiba, 2006). This includes, for instance, the implementation of the two-cycle system, which represents the trademark of the Bologna Process. According to the implementation report from 2018 (European Commission/EACEA/Eurydice, 2018), the two-cycle degree system is currently the dominant model in the EHEA. However, there are still remarkable differences between countries in terms of the length of cycles and related credit points, as implemented by the European Credit Transfer System (ECTS) (see Table 1). For instance, while the majority of countries have set a length of three years and a workload of 180 ECTS credits for a first degree, approximately one-third offer predominantly first-cycle programmes with 240 ECTS credits lasting for four years. In the second cycle, the most common duration is two years with a workload of 120 ECTS credits, but other models with fewer ECTS credits (60–75 or 90, lasting for one to one-and-a-half years) are also present (European Commission/EACEA/Eurydice, 2018).

In addition, the implementation process was very heterogeneous due to the variety of pre-reform systems. Some countries, such as the United Kingdom (UK), Spain, Norway, or the former Yugoslavian states, already had a certain form of a two-cycle system prior to the Bologna Process, which is why only small adaptations of the pre-reform systems were required. Other countries, such as Germany, Italy, Portugal, or Switzerland, had single-cycle pre-reform systems and therefore had to undertake major reforms to implement the new standards (Eurydice, 2010). While Italy and Portugal adopted the two-cycle system very rapidly within one to three academic years, the implementation process in Germany or Switzerland extended over a longer period and was not completely finished by 2010 (see Table 1).

[Insert Table 1 here]

Alongside the implementation of the two-cycle system, member countries committed to adopting the ECTS, Diploma Supplement and national qualification frameworks. Although the adoption of these measures lagged behind for a long time, most countries have implemented these measures.

Nevertheless, some countries (e.g. France, Greece, Ireland, or the UK) have still not adopted the Diploma Supplement or do not issue it automatically after graduation. Moreover, while the current implementation report attests improvements in the recognition of qualifications and quality assurance, the variety of two-cycle systems and non-adopted Bologna tools still complicate the recognition of degrees across borders. Finally, most of the quality assurance is carried out by national accreditation agencies, which limits the exact comparability of the content and the degrees of higher education systems (European Commission/EACEA/Eurydice, 2018).

Overall, despite the common goals of the Bologna Process, the speed and scope of the implementation of reforms varied strongly across member states. Accordingly, the necessity to monitor and evaluate the reform process itself as well as its possible consequences also took place under very heterogeneous preconditions.

3. Research on the Bologna Process and the Selection of Studies

During the last 20 years since the start of the process, numerous scientific studies have investigated various aspects of the reform process. A search for “*Bologna Process*” and “*Bologna reform*” revealed 769 articles listed in the Web of Science and 93 working papers listed in the IDEAS database based on RePEc as of the end of 2020 (see Figure 1). Since peaking in 2015, the research interest seems to be slightly declining.

[Insert Figure 1 here]

In most of these studies, the Bologna Process is either not the focus of the analysis, or the interest concerns governance processes, the institutional implementation of the Bologna reforms and the accompanying changes in teaching and evaluation. In contrast, evidence on the effect of the Bologna Process on individual education and employment outcomes remains surprisingly scarce. Therefore, we focus our review on quantitative-empirical studies scrutinizing how the Bologna Process affected higher education enrolment, study success, labour market returns and related social inequalities. To minimize selection bias and gain a high level of consistency, we include only articles listed in the Social Science Citation Index (SSCI) of the Web of Science or in English-written discussion papers issued by universities or research institutes (which are a common form of dissemination in economics). This results in 40 international studies from eight countries forming the basis of our analysis; some studies, however, consider more than one outcome of interest.

The relatively small number of studies is probably due to the challenges faced by empirical research on these topics. First, suitable data covering a time span long enough for investigating possible changes in higher education enrolment, study success, or graduate labour market outcomes (e.g. by student and graduate surveys) have become available only recently or are still lacking. Second, the gradual implementation of the Bologna reforms in some countries (e.g. lasting in Germany for more than ten years) complicates a straightforward research design to identify causal effects of the reform process. Third, the variety of parallel reforms that took place in the higher education systems or the labour markets of many countries as well as fundamental changes linked to higher education expansion confound the identification of causal effects.

Figure 2 depicts the distribution of topics by country (Panel A) and the shares of causal and descriptive studies by country (Panel B) as well as by topic (Panel C). The first graph shows that except for labour market returns, which have been considered in studies for seven out of eight countries, the other outcomes have been analysed in an even more limited sample. Evidence on enrolment is available for Italy, Germany, and Portugal, while study success has been studied for Italy, Germany, Switzerland, and Spain. Distinguishing studies by descriptive or causal evidence further confirms that most of the evidence is provided for Italy and Germany. While causal results can be found for all topics considered (Panel C), it stems from four countries only – again dominated by evidence from Italy and Germany.

[Insert Figure 2 here]

In the following, we review the related literature according to the three outcomes defined. Wherever possible, we address whether the potential consequences of the reform serve to reduce or increase social inequalities in higher education, mainly related to students' parental background. For each aspect, we first give a descriptive overview of relevant aggregate data for major European countries, namely, France, Germany, Italy, Portugal, Spain and the UK.

4. Empirical Evidence on the Consequences of the Bologna Process

4.1 Enrolment in Higher Education

The Bologna reform aimed at increasing the share of individuals participating in higher education and at the same time generating equal opportunities for all eligible students to participate irrespective of their socioeconomic background. Throughout Europe, participation in higher education expanded considerably after the beginning of the process, yet the extent and timing of

expansion varied considerably (see Appendix Figure A-1). In Germany, only 18% of the population aged 20 to 24 years was enrolled in tertiary education programmes in 1998. The rates were similarly low in the UK, while France (30%) and Spain (29%) had substantially higher shares. Since 1998, all countries have experienced an increase in higher education participation. Growth was most pronounced in Germany and Spain, where higher education participation rose by twelve percentage points until 2018, followed by Italy and Portugal (+9–10 percentage points). In contrast, higher education expansion in France and the UK proceeded more moderately but was still substantive (+6–7 percentage points).

This first short overview indicates that countries implementing more fundamental reforms in the course of the Bologna Process, such as Germany, Italy and Portugal, also experienced a stronger increase in higher education participation. This poses the question of how much of this increase is attributable to the Bologna Process or whether it just resulted from the overall trend of higher education expansion. In the following, we focus on these three countries, the only ones for which systematic empirical evidence exists: Italy, Germany, and Portugal.

Panel A of Table 2 displays studies dealing with changes in enrolment before and after the Bologna reform. Regarding theoretical considerations, most studies use some kind of rational choice framework. On the one hand, this comes in the form of the human capital approach (e.g. Schulz, 1961; Becker, 1964), viewing education quite stylized as an economic investment likely to provide returns later in life exceeding the associated costs. On the other hand, researchers refer to more recent sociological approaches developed for understanding educational choices (e.g. Erikson and Jonsson, 1996; Breen and Goldthorpe, 1997) originating in the concept of bounded rationality (Simon, 1957). From both perspectives, rational students invest in higher education as long as the (expected) benefits of this investment are higher than its (assumed) costs. In the course of the Bologna Process, these costs are likely to decrease if the introduction of the two-cycle degree structure leads to a shorter duration of studies, at least for the first degree. Consequently, more students eligible for higher education are likely to enrol, resulting in increased enrolment rates. Moreover, groups of students that are particularly cost-sensitive, such as students from lower socioeconomic backgrounds, now consider higher education instead of alternative education pathways, which should result in lower social inequalities.

Empirically, these theoretical predictions on the effect of the Bologna Process on higher education enrolment are only partly confirmed. An overall increase in enrolment was found in countries where the implementation of the two-cycle degree structure took place rather rapidly within one

to three years, such as in Italy or Portugal. In Italy, the change from a single-cycle to a two-cycle degree system was adopted simultaneously by most higher education institutions in the academic year 2001/2002. Beforehand, enrolment rates were rather low and highly correlated with students' socioeconomic background (Di Pietro and Cutillo, 2008; Brunori *et al.*, 2012). Studies evaluating the effect of the Bologna Process either descriptively or causally find a large expansion of higher education participation, with the numbers of first-year students increasing significantly after the introduction of the two-cycle degree structure (Di Pietro and Cutillo, 2008; Cappellari and Lucifora, 2009; Argentin and Triventi, 2011; Di Pietro, 2012; Bondonio and Berton, 2018). For example, Bondonio and Berton (2018) report an increase in the growth of first-year enrolments by 15 to 17 percentage points compared to the situation before and without the reform. Cappellari and Lucifora (2009) obtain similar results and report an increase in enrolment probability of 15% compared to the situation with the one-cycle degree structure. Di Pietro (2012) confirms this positive and significant effect of the Bologna reform, albeit reporting smaller effects of 7 to 8 percentage points due to a different identification strategy, which controls for other factors that also affected the enrolment decision before and after the reform.

Altogether, the existing empirical evidence paints a clear picture for Italy, confirming the theoretically predicted positive effect of the Bologna Process on higher education enrolment. The available results are similar for Portugal, where the full implementation of the Bologna reform had to be achieved rather quickly within the two years after 2006/07, and 43% of all study programmes had already changed to the new degrees in the first year (Cardoso *et al.*, 2008). The two studies comparing the enrolment rates of BA programmes to those of traditional degree programmes also find a positive effect on the demand for BA courses (Cardoso *et al.*, 2008; Portela *et al.*, 2009). Again, a rapid implementation of the reforms seems to come along with the intended positive effects on higher education enrolment.

[Insert Table 2 here]

However, in contrast to Italy and Portugal, the change from a one-cycle to a two-cycle degree structure had no clearly defined deadline in Germany. Generally, German higher education institutions were supposed to implement the new degree structure by 2010, but each single institution (and in many cases even each single department) could decide by itself when and how to introduce BA and MA degrees. Methodologically, the consequences of such a heterogeneous change impose a challenge for evaluation, which is probably the reason why only a few empirical studies actually do so. The two available studies focusing on higher education enrolment find no

differences due to the reform (Horstschräer and Sprietsma, 2015; Neugebauer, 2015). Horstschräer and Sprietsma (2015), for example, do not find any differences in the overall numbers of first-year students, yet the effects differ across fields of study (negative effects in electrical and mechanical engineering and positive effects in language and literature departments as well as in computer sciences departments).

Taking a closer look at social inequalities, the shorter duration of BA degrees should reduce costs and allow more individuals from disadvantaged families to enrol in higher education. However, across countries, the empirical evidence on social inequalities is rather mixed. For Italy, some studies find that more students from socially disadvantaged families participate in higher education after the reform (Cappellari and Lucifora, 2009; Di Pietro, 2012; Bondonio and Berton, 2018), while another study obtains rather negligible changes in access to higher education in terms of (in-)equality (Argentin and Triventi, 2011). Looking at horizontal inequalities, Triventi *et al.* (2017) show a rapid increase in social inequalities in the choice of field of study before and after the implementation of the Bologna reform. In their analyses, the field of study correlates with occupational value and leads to increasing inequalities in the labour market. The lower enrolment probability of individuals with lower social origin could result from a stronger sensitivity to changes in university costs and quality (Pigini and Staffolani, 2016). Therefore, Argentin and Triventi (2011) conclude that if social inequalities in enrolment declined as a consequence of the Bologna Process, these effects were probably only temporary and mostly limited to specific social groups. There is only one study for Germany, and the findings point towards the opposite direction. Neugebauer (2015) finds that the share of students from lower socioeconomic backgrounds was slightly but not significantly lower after the implementation of the two-cycle degree structure, thus indicating no effect of the Bologna reform on social inequalities.

Interestingly, further studies – again exclusively on Germany and Italy – indicate that the implementation of the two-cycle degree structure even generates new forms of social inequalities during the transition to MA programmes (see Table 2, Panel B). BA graduates of lower social origin attend an MA degree programme less often than those from more privileged families (Auspurg and Hinz, 2011; Lörz *et al.*, 2015; Neugebauer *et al.*, 2016). For example, Neugebauer *et al.* (2016) indicate a reduction of five percentage points in the share of MA graduates from less-educated families with the introduction of the two-cycle degree structure. These socioeconomic differences in the transition rates are partially explained by better financial support from parents, more advantageous previous education biographies, higher academic ability, and lower cost sensitivity of students from upper socioeconomic backgrounds (Lörz *et al.*, 2015; Neugebauer *et*

al., 2016). In addition, the field of study and type of higher education institution partly explain the lower transition rates of students from lower socioeconomic backgrounds (Auspurg and Hinz, 2011; Neugebauer *et al.*, 2016). In contrast to the situation in Germany, Argentin and Triventi (2011) find only a small influence of the family background on the probability of continuing with an MA degree, yet the effect is in the same direction. Further or even Europe-wide evidence on the social origin of students and enrolment is, to the best of our knowledge, not available.

In summary, existing empirical evidence on the effect of the Bologna Process on higher enrolment seems to depend not only on individual cost-benefit considerations but also on the institutional background against which such considerations take place. Only rather rapid changes from a single-cycle to a two-cycle degree structure, such as in Italy and Portugal, come along with increased enrolment, while rather slow implementation processes, such as in Germany, do not have the intended effect. However, due to the low number of investigated countries, further studies focusing on rapid or slow implementation processes (see Table 1) should validate these findings. The available evidence on social inequality points towards unintended consequences of the Bologna Process, namely, that the introduction of the two-cycle degree structure increases rather than decreases social inequalities in higher education participation. Contrary to the intentions of the reform, individuals from socially vulnerable families are still disadvantaged because the two-tier structure seems to create new inequalities in the higher education system.

4.2 Study Success: Student Retention and Dropout, Grading and International Mobility

The introduction of the two-cycle degree structure was accompanied by the implementation of the Diploma Supplement and the ECTS to enhance the quality of higher education and to increase the comparability and transferability of degrees across participating countries (Bergen Communique, 2005). Moreover, a 2015 report from the European Commission pointed out that reducing dropout and increasing completion rates are key to the Europe 2020 goal of at least 40% of 30- to 34-year-olds having completed higher education (Vossensteyn *et al.*, 2015). Therefore, another strand of the literature investigates the effects of the Bologna reform on the course of study, mainly focusing on student retention and dropout, which is the main focus in the following. Only a few studies investigate the impacts on student performance and international student mobility (see Table 3).

4.2.1 Student Retention and Student Dropouts

According to the main report on dropout and completion in higher education in Europe (Vossensteyn *et al.*, 2015), completion rates across Europe vary between 53% and 83% in 2005

and 2011, with France and Germany closer to the upper bound and the UK and Portugal closer to the average (see Appendix Figure A-2). However, due to different calculation methods and national contexts, these numbers are only comparable to a limited extent.

Studies scrutinizing the effects of the Bologna Process on student retention and dropout rates use different measures for assessing the impacts (see Table 3, Panel A). Some studies focus on the time until graduation and compare the newly introduced short BA degrees to the longer pre-reform degrees by relating the actual time until graduation to the standard study duration. Studies examining student dropout either measure dropout directly or use nonretention rates as a proxy for dropout due to data limitations, which reflects the share of students who decide to not continue in a certain major (major change, institution change, or dropout). Regarding the theoretical foundation, most studies do not apply a specific theoretical framework but make passing references to the human capital approach, if theory is referred to at all. Rather, they discuss possible effects against the background of the reforms undertaken. For example, Lerche (2016) argues that the clear structure of the new degree programmes helps students navigate through their studies and focus on what is relevant, which may reduce the duration until graduation as well as dropout rates. However, the stricter examination regulations of the new degrees and the larger number of examinations increase the pressure to perform, which may result in higher dropout rates.

Empirical evidence on how the Bologna Process affects student retention and dropout mainly exists for Germany and Italy, with one further study on Switzerland. Two studies for Germany investigate the time until graduation by comparing pre- and post-reform degrees (Lerche, 2016; Hahm and Kluve, 2019). Both find that the probability of graduating within planned instructional time is higher for students of BA degrees than for students of traditional degrees. For example, Hahm and Kluve (2019) report effects between plus ten and 18 percentage points, dependent on the estimation method. Studies for Italy also point towards positive effects of the Bologna Process on the time until graduation and student retention (Bondonio and Berton, 2018; Chies *et al.*, 2019). Bondonio and Berton (2018), for example, find large positive effects on the two-year retention rate (+30 percentage points) and on the probability of on-time graduation (+6–18 percentage points). Both Italian studies attribute the reduction in dropouts to the shorter study duration, providing a strong incentive to graduate.

The available findings on student dropout draw a more mixed picture. They suggest that the Bologna Process did not change dropout rates in general but only for selected groups of students. For Germany, Horstschräer und Sprietsma (2015) do not find generally lower dropout rates after

the introduction of BA degrees but report some heterogeneity with respect to the field of study, with higher dropout rates in biology and lower dropout rates in business administration, English and German language and literature. Relatedly, Enzi and Siegler (2016) find no overall reform effects on student dropout but reduced dropout probability for high-achieving students (-10%). Only one study finds the expected beneficial effect of the Bologna Process on student dropout, yet only for one large German university (Lerche, 2016). For Italy, more descriptive evidence by D'Hombres (2007) and Di Pietro and Cutillo (2008) indicates that the Bologna reform decreased dropout rates, while Cappellari and Lucifora (2009) find no overall effect of the Bologna reform on dropout rates. Nevertheless, they show reduced dropout rates for high-achieving students. Finally, a study for Switzerland does not find a significant reduction in dropout rates for subjects and universities that moved to the BA-MA system (Wolter *et al.*, 2014). How social inequalities in dropout risks changed in the course of the Bologna Process has been analysed thus far solely for Italy by Argentin and Triventi (2011). They find no clear time trend, yet their results indicate that dropout risks decreased between 2001 and 2004, albeit only for students with upper secondary and tertiary parental education backgrounds.

Overall, the Bologna reform effectively increased the probability of graduating on time, and there seems to be no general decrease in dropout rates but rather beneficial effects for particular subjects and selected groups of students. Generally, as is the case for higher education enrolment, the effects of the reform are mostly studied for countries with major changes in the higher education system.

4.2.2 *Grading and Performance*

There is even less evidence on the impact of the Bologna Process on the grading and performance of students than on on-time graduation and student dropout (see Table 3, Panel B). The available studies again refer mostly to Germany, except one for Switzerland and one for Spain. Just as is the case for student retention and dropout, theoretical considerations are mainly passing references to the human capital framework. Hahm and Kluve (2019), for example, argue that a shorter study duration of six semesters in newly established BA courses reduces students' direct and indirect investment costs, which may reduce the pressure to work while studying, allow more students to focus on their academic obligations, and thus positively affect their educational outcomes.

For Germany, three studies focus on the effects of the Bologna Process on grading, but their results are not conclusive. Hahm and Kluve (2019) report that the Bologna Process substantially worsened final grades. They conclude that the introduction of the BA degree system probably increased

performance pressure due to the higher number of exams and the contribution of all (or most) exams to the final grade. Looking at grades in a specific business class, Ostermaier *et al.* (2013) show similar tendencies of decreased student performance. In contrast, Mühlenweg (2010) does not find final grade differences between traditional degree and BA students, yet she had to rely on a small sample size. Rather, BA students reported higher satisfaction with teaching, study programme organization, and personal situation. In a similar vein, Schaeper (2009) shows that the new BA programmes provide better conditions for developing key competencies than the pre-reform programmes. A couple of descriptive small-case studies further look at changes in graduates' skill acquisition before and after the reform. Analyses for a single programme at a Swiss university reveal that graduates' skills match professional requirements better than before the reform (Hansmann *et al.*, 2019). For Spain, Fernandez-Sainz *et al.* (2016) report no general effects on final grades but positive effects on the acquisition of systemic and interpersonal skills and on student satisfaction. However, this study is also based on a small sample of students enrolled in specific courses at a single university, which limits external validity.

Overall, there is no clear evidence available that the Bologna Process led to significant changes in grades due to the introduction of the new degree programmes. Rather, it seems that it positively affected more qualitative aspects of learning in higher education, be it in terms of satisfaction with teaching, study programme organization and the personal situation, students' workload or the acquisition of particular skill profiles.

4.2.3 *International Student Mobility*

The promotion of international student mobility by overcoming obstacles to the effective exercise of free movement between countries is a further key goal of the Bologna Process (Bologna Declaration, 1999). However, hardly any empirical studies thus far have investigated whether the reform actually changed student mobility patterns (see Table 3, Panel C). This is surprising, given that international student mobility has been a major aim of the reform process since the beginning. On the other hand, empirically identifying the effect of the Bologna Process is rather difficult since international student mobility was already an important aim of higher education policy beforehand and was institutionally implemented in formal exchange programmes, such as ERASMUS (Teichler, 2019). To the best of our knowledge, only five studies investigate changes in international student mobility in the course of the Bologna Process, two for Germany, one for Spain and two comparing several European countries (Finger, 2011; Vögtle and Fulge, 2013; Enzi and Siegler, 2016; Vögtle and Windzio, 2016; Rincón and Barrutia, 2017), even though there are

many more studies that examine international student mobility per se and its social selectivity (e.g. Lörz *et al.*, 2016; Netz and Finger, 2016).

Theoretically, international student mobility is explained in these studies using human capital theory or rational choice theory, according to which rational individuals weigh anticipated benefits and costs when deciding whether to be internationally mobile or not. Another perspective argues that international student mobility is driven primarily by the diffusion of cultural values rather than rational choices (Vögtle and Windzio, 2016). Taking both perspectives into account, Vögtle and Windzio (2016) assume that the Bologna Process corresponds with a comparatively high level of ties between countries with regard to student mobility. Participation in the Bologna Process has furthered these mobility-based relations over time. The authors compare international student mobility at the macro level by contrasting members and nonmembers of the Bologna Process. The results imply that the Bologna Process had a positive impact on student mobility patterns, yet the strongest effect is that of common borders, which points to the importance of spatial proximity. Similarly, Vögtle and Fulge (2013) find increased outward mobility once a country joins the Bologna Process. With regard to Spanish universities, Rincón and Barrutia (2017) report higher international demand for higher education programmes after the Bologna reform. In contrast, Enzi and Siegler (2016) investigate whether the introduction of the new degree structure increased international student mobility at the individual level, but they do not find any significant effect in their analyses for Germany. Looking additionally at social inequality, Finger (2011) points out that the correlation between social origin and student mobility has rather increased after the reform. Overall, even though international student mobility is one of the major goals of the Bologna reform, an encompassing empirical investigation of its effect has yet to be conducted.

[Insert Table 3 here]

4.3 Labour Market Returns of Higher Education Graduates

Finally, the Bologna Process aimed to increase the employability of higher education graduates in Europe as a core purpose. Across the EU-15 countries, current labour market conditions are better than they were before the start of the Bologna Process (1998), when youth unemployment rates were 19% (see Appendix Figure A-3). However, labour market conditions worsened temporally in many countries after the financial crisis in 2008/2009 but recovered again in the second decade of the Bologna Process. In addition, there is substantial labour market heterogeneity between countries. Southern European countries, such as Italy or Spain, still possess high levels of youth unemployment that are almost at the same level as in 1998. This also holds for France, although

to a more moderate extent. In contrast, despite considerably lower levels initially, Germany's youth unemployment rate improved even further and reached a record low in 2018 (6%).

Recent figures indicate that throughout Europe, higher education graduates have considerably better employment prospects than degree holders from lower educational levels. Higher education attainment boosts employment chances, reduces workers' likelihood of working part-time and strongly decreases the risk of being unemployed (OECD, 2020). Moreover, higher educational attainment comes along with increasing monetary rewards (OECD, 2020). Private internal rates of return to tertiary education (compared to upper secondary education) range between seven and 18% in major European countries (see Appendix Figure A-4). However, this earnings advantage for highly educated workers varies considerably by level of tertiary attainment. In most European countries, workers with an MA or traditional degree earn more than those with a BA degree, who in turn earn more than those with a short-cycle tertiary degree or vocational education and training (OECD, 2020).

Despite this consistent aggregate evidence, few studies thus far have investigated whether reforms at the university level lead to changing returns to higher education.³ Accordingly, the question is whether the labour market returns of higher education graduates have changed in the course of the Bologna Process, particularly due to the implementation of the two-tier degree structure (see Table 4). In sociology, there is a rather comprehensive literature providing descriptive evidence on labour market outcomes by comparing pre- and post-Bologna cohorts while controlling for selected observable characteristics. These studies rely mostly on graduate surveys and to a lesser extent on cross-sectional labour force surveys (see Table 4). Compared to the papers claiming causality with no or little reference to theory, theoretical contributions are placed relatively prominently in these descriptive studies. However, they largely follow common arguments from the two "big" perspectives: "human capital approach" vs. "signalling theory". The theories employed provide explanations for certain aspects of the labour market returns of university graduates, but there is no conclusive and comprehensive model. Thus, a rather eclectic approach to theories seems to prevail, preventing substantial contributions to the broader literature.

Regarding employment, a couple of studies reveal that BA graduates have lower employment probabilities (Sciulli and Signorelli, 2011; Farčnik and Domadenik, 2012; Angeloni, 2019), higher unemployment risks (Neugebauer and Weiss, 2018) and lower chances for permanent or adequate jobs than MA or pre-reform graduates (Angeloni, 2019; Suleman and Figueiredo, 2020). For Germany, however, this holds only for BA graduates from universities but not for BA graduates

from universities of applied sciences. Neugebauer and Weiss (2018) interpret this finding as an indication of a higher practical orientation and closer university-employer links at universities of applied sciences. Relatedly, for five Central and Eastern European countries, Noelke *et al.* (2012) find that MA degree holders achieve higher occupational positions than those with BA degrees, yet this effect varies with the occupational specificity of the respective higher education system. A further study by Deželan *et al.* (2014) analyses the education-job matching of university graduates: Bologna programmes led to a weaker matching quality for graduates than non-Bologna programmes.

Turning to the wage effects, most studies commonly find that BA degree holders earn considerably less than holders of MA or traditional degrees. This result has been established in a variety of country contexts, e.g. the Czech Republic (Raudenská and Mysíková, 2020), Germany (Neugebauer and Weiss, 2018), Portugal (Suleman and Figueiredo, 2020), and Switzerland (Glauser *et al.*, 2019). For instance, Glauser *et al.* (2019) show that returns to BA degrees in Switzerland differ widely between subsequent cohorts, while returns to MA degrees are quite stable over time. The authors therefore interpret the BA degree as a noisy signal to which firms adjust over time with increasing experience with BA graduates.

Causal evidence based on strong identification approaches regarding the effects of the Bologna Process on labour market outcomes, however, is very limited thus far. To the best of our knowledge, there are only two studies using causal methods commonly adopted in economics for estimating the Bologna reform effects on labour market returns. For Italy, Bosio and Leonardi (2011) identify increased employment probabilities of graduates but a reduced college wage premium due to the reform. The authors explain this finding by the higher supply of university graduates in the course of the reform, putting downward pressure on wages.⁴ For Russia, Avdeev (2020) finds no effect of the Bologna reform on the wages and employment probabilities of university graduates. This may indicate that the reform only abolished some specific courses irrelevant to labour market success.

Within the scope of the reviewed literature, there is only a single study looking at the reproduction of social inequalities in labour market returns in the course of the Bologna Process. For Italy, Argentin and Triventi (2011) find small effects of parental background on the risk of job instability. Overall, their results indicate a slight reduction in the role of social origin in the transition to the labour market, which does not seem to be connected to the Bologna Process.

Summarizing the findings on labour market outcomes, there is a strong consensus regarding a clear-cut hierarchy in the returns to different higher education degrees. Across countries, BA degree holders face worse labour market prospects – be it in terms of permanent or adequate employment, unemployment risk or wages – than graduates holding MA or traditional degrees. While this differentiation in labour market outcomes is expected and can be easily explained by human capital theory, there is much less consensus about whether this is actually related to the Bologna Process. Three studies from three different contexts provide mixed results. Two of them originate from countries with a sharp implementation of the reform; this allows identifying causal effects using a difference-in-differences design (see Table 4). All studies rely on conventional methods for evaluation and focus on average effects. However, they do not provide a comprehensive analysis trying to understand the underlying mechanisms. Therefore, more research is needed to clarify the ambiguity in the results and to understand under which circumstances and methodologies the reform is effective or not effective. In addition, primarily due to data limitations, little is known about the long-term development of labour market outcomes, including job or skill matching, task performance, job mobility, the relevance of on-the-job training, and job satisfaction.

[Insert Table 4 here]

5. Conclusion

The Bologna Process has initiated a large variety of higher education reforms in 49 participating countries since its inauguration more than 20 years ago. Oriented on the common goal of an EHEA to facilitate student mobility and ensure appropriate and equal study conditions, these reforms aimed at improving the employability of graduates and the competitiveness of higher education systems in the participating countries. In this paper, we reviewed the relevant quantitative empirical literature from sociology and economics analysing the effects of the Bologna Process on enrolment in higher education, study success, and labour market outcomes. These three aspects were chosen because they represent outcomes most closely related to the overall goals.

Our review shows that the empirical evidence available relates to only a small number of countries. Not surprisingly, in these countries, the Bologna Process implied strong reforms of the higher education systems. Nevertheless, the available literature still represents a wide array of reform adaptations in different contexts due to the country-specific implementations of the process. For that reason, reviewing the literature unveils some findings of the Bologna Process that hold in different environments and may be interpreted as general and robust. However, it also unveils ambiguous

results on similar outcomes, where effects are mixed in the available studies and underlying mechanisms or reasons cannot be identified generally.

Starting with the effect on student enrolment in higher education, the empirical evidence can confirm the theoretical predictions only partly. Positive effects have been identified in countries that moved rapidly from a single-cycle to a two-cycle degree system but not for countries with a rather slow implementation process. The evidence on social inequalities points to effects contrary to the objectives, as the two-cycle system tends to increase social inequalities by creating new inequalities within higher education.

The picture drawn by studies analysing questions of study success is mixed. While there is rather conclusive evidence for positive effects on the probability of graduating (on time), most studies find no significant reform effects on the dropout rate, although it seems to be beneficial for certain socioeconomic groups. Except in one study, there were also no significant changes in grading, but students tended to benefit from more satisfactory study conditions. Hardly any evidence is available on the effects on student mobility. This is quite surprising given the overall goal of an EHEA, of which mobility between countries is a fundamental part.

Last, the third aspect of our review – the labour market effects – has been investigated surprisingly little given the large number of persons affected in the member states. Studies from both sociology and economics find that BA graduates face worse labour market prospects in terms of permanent or adequate employment, have higher unemployment risks and earn – not surprisingly – considerably less than MA graduates and/or graduates with traditional degrees. However, robust and significant causal evidence is limited, and the studies provide ambiguous results. These may reflect labour market heterogeneity across participating countries in the EHEA but may also be due to deviations from the commonly defined goals in country-specific implementation.

Despite extensive literature investigating various aspects of the reforms, the evidence on effects and consequences is surprisingly small, selective, and – at least for some aspects – ambiguous. Thus far, reform effects on the three major objectives of the EHEA considered in this review have been identified in only a small number of countries (Italy and Germany in particular), if at all. Moreover, given the age of the available studies, they tend to reflect a short-lived fashion rather than an established self-standing field of research. The three challenges mentioned – 1) lack of suitable data, 2) the gradual and diverse implementation of the reforms, and 3) various confounding and parallel reforms in single countries – may explain the situation to a certain extent. Nevertheless, this reasoning is unsatisfying. It reflects a fundamental failure in establishing the

necessary evaluation culture. Given the substantial changes in the higher education systems, the large number of persons affected (in particular, students, lecturers and researchers) and the associated long-run effects for economies and societies, this revealed lack of systematic evidence and, more importantly, the lack of a research infrastructure to evaluate the impacts raise serious concerns.

First, this implies that policy-makers were not able to base wide-ranging decisions in the implementation or in the adaptations and augmentations of the reform on hard scientific evidence about the corresponding impacts. Theoretical predictions alone in very heterogeneous institutional settings remain speculative without empirical proof. To date, the potential heterogeneous effects of different (higher education and labour market) institutions, different socioeconomic compositions, different budgetary constraints, and/or different cultural specifics on the impacts are unknown and not researched. Moreover, for most countries, there is no evidence on the impacts (at least none published internationally) beyond the achievement of reform targets regularly monitored in the various national implementation reports. All changes and reforms therefore may be “flying blind” in that sense, with unintended effects that may last for decades.

Second, a much stronger and systematized investigation and evaluation of the direct and indirect effects is urgently needed if the goal of the EHEA is to be taken seriously. This is the only way to ensure that the general framework in place for all members of the EHEA can achieve the intended effects or at least does not lead to contrary developments, harming the affected persons at worst. Referring to selective evidence – available only for specific contexts, groups, or countries – may lead to biased or misplaced implications when (re)designing policies. The summarized results, in particular those on social inequalities and labour market outcomes, clearly emphasize that not everything that was well intended was also well done. Evidence-based policy-making requires a solid and state-of-the-art evaluation of the direct and indirect impacts of the reforms. That this is not the case is particularly surprising given the clear emphasis on (measurable) objectives.

To provide science-based evidence for these first two implications, the third implication is the requirement of more, better-quality and internationally comparable data. In the first step, dataset linkages (e.g. graduate surveys and labour market data) should be intensified and complemented by standardized Europe-wide surveys. Here, the data from the Programme for the International Assessment of Adult Competencies (PIAAC) or the Eurostudent data beginning in 1997 may be explored and potentially linked/merged to further sources of information. In addition, it seems sensible to link economic and sociological research more closely with regard to the Bologna

Process. Sociology conducts many of its own surveys, while economics integrates further (administrative) data. Further disciplines of the social science may also contribute.

These data are a precondition for, fourth, better identification of causal mechanisms and a broader application of state-of-the-art empirical methods to understand the underlying mechanisms of effective and ineffective aspects of the reform channelling the impacts. Relatedly, there is great potential for cross-country studies on impacts. These may use the variation across member countries for identification and will provide key information that is unavailable thus far. Attempts in this direction should help develop stronger theoretical contributions, taking the specifics and further objectives of Europe-wide reforms into account. This is a prerequisite for breaking down the observed methodological and theoretical narrowing in the literature, allowing for more robust, policy-relevant results and implications.

The importance and scope of the reform suggest that the related research would have established an independent research field. Despite its high relevance and the moving target, such a development has not occurred even more than 20 years after the start of the reform.

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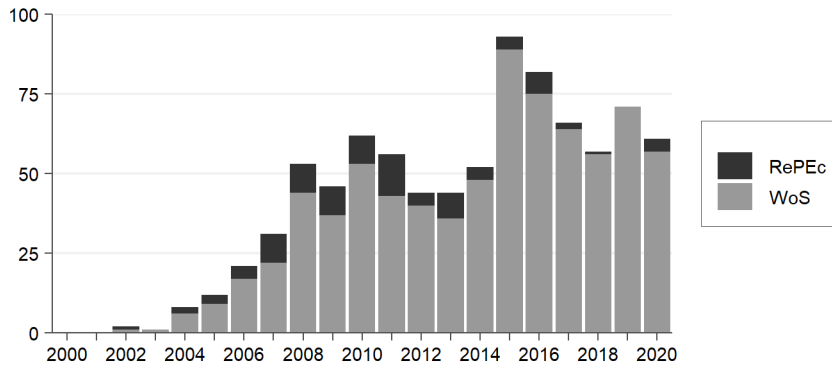
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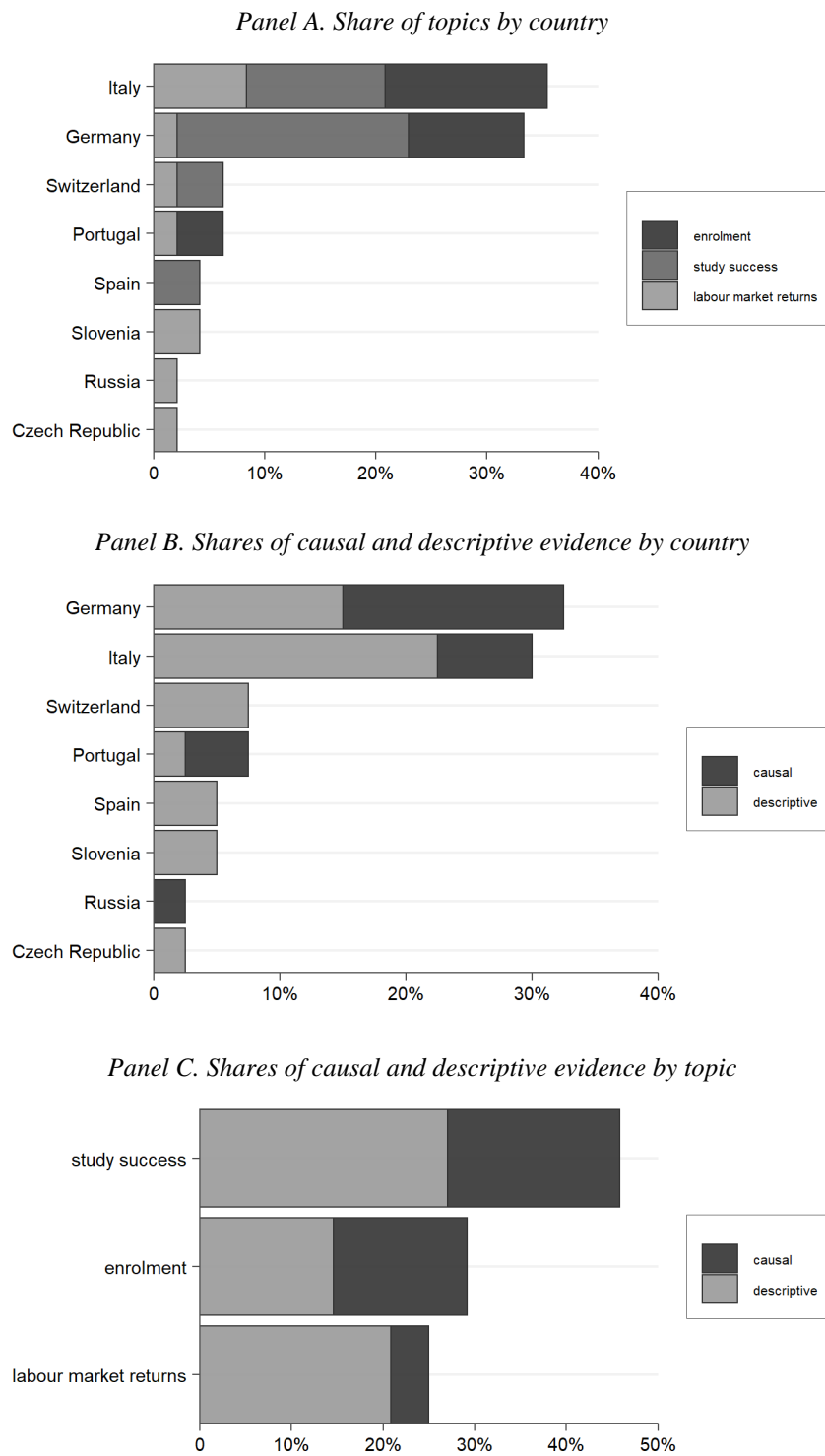
Figures and Tables

Figure 1 Number of articles listed in the Web of Science (WoS) and number of working papers listed in the RePEc database related to the Bologna Process per year



Source: Own illustration based on a search for “Bologna Process” and “Bologna reform” in the Core Collection of the WoS database and in the IDEAS database based on RePEc. The numbers for the WoS only include “articles”, the numbers for RePEc only “working papers”. Access date: January 2021 (WoS), September 2021 (RePEc).

Figure 2 Overview of the sample of empirical studies analysed for this review



Notes: Countries, topics and types were assigned by the authors. Multiple assignments possible. Three studies focusing on several countries not shown in the country differentiation. N = 40.

Source: Own illustration based on the selection of empirical studies analysed for this review (see text for details).

Table 1 Implementation of the two-cycle degree system in EHEA member countries

Country	EHEA member since	Main implementation	Pre-reform system	Post-reform system
Albania	2003	2005/06	two cycle	3+(1.5–2) years
Andorra	2003	~2004+	single cycle	3+2 years
Armenia	2005	2004/05–2010	two cycle	4+2 years
Austria	1999	2000/01+	single cycle	3+2 years
Azerbaijan	2005	n.a.	single cycle	4+2 years
Belarus	2015	n.a.	n.a.	n.a.
Belgium – Flemish Community	1999	2004/05–2007/08	single cycle	3+(1–2) years
Belgium – French Community	1999	2004/05–2007/08	single cycle	3+2 years
Bosnia and Herzegovina	2003	2003/04–2010	two cycle	(3–4)+ (1–2) years
Bulgaria	1999	no/minor changes	two cycle	4+1 years
Croatia	2001	2005/06	single cycle	3+2 years
Cyprus	2001	no/minor changes	two cycle	4+1 years
Czech Republic	1999	~2000–2004/05	two cycle	3+2 years
Denmark	1999	[1993]–2003	two cycle	(3–3.5)+2 years
Estonia	1999	2002/03	single cycle	3+2 years
Finland	1999	2005–2008	single cycle	(3–4)+2 years
France	1999	2006–2010	two cycle	3+2 years
Georgia	2005	no/minor changes	two cycle	4+2 years
Germany	1999	~2002–2010	single cycle	3+2 years
Greece	1999	no/minor changes	two cycle	4+(1.5–2) years
Holy See	2003	no/minor changes	two cycle	3+2 years
Hungary	1999	2005–2006	single cycle	(3–3.5)+2 years
Iceland	1999	no/minor changes	two cycle	3+2 years
Ireland	1999	no/minor changes	two cycle	(3–4)+1.5 years
Italy	1999	2001/02	single cycle	3+2 years
Kazakhstan	2010	[2001]	n.a.	4+(1–2) years
Latvia	1999	[~1990s]–2001	two cycle	(3–4)+(1–2) years
Liechtenstein	1999	n.a.	single cycle	3+2 years
Lithuania	1999	[1993]–2000	two cycle	(3–4)+2 years
Luxembourg	1999	2004+	single cycle	3+(1–2) years
Malta	1999	n.a.	two cycle	3+(1–2) years
Moldova	2005	2005/06	two cycle	(3–4)+(1.5–2) years
Montenegro	2003 (*)	n.a.	two cycle	3+2 years
Netherlands	1999	2002/03	single cycle	(3–4)+(1–2) years
North Macedonia	2003	2004/05	single cycle	4+1 years
Norway	1999	2002/03–2003/2004	two cycle	3+2 years
Poland	1999	2006/07–2007	two cycle	(3–3.5)+2 years
Portugal	1999	2006/07–2008/09	single cycle	3+2 years
Romania	1999	2005/06–2008	single cycle	(3–4)+2 years
Russian Federation	2003	~2009/10–2010/11	two cycle	4+2 years
San Marino	2020	n.a.	n.a.	n.a.
Serbia	2003 (*)	2006/07	two cycle	(3–4)+1 years
Slovak Republic	1999	no/minor changes	two cycle	3+2 years
Slovenia	1999	2004/05–2009/10	two cycle	3+2 years
Spain	1999	~2005/06–2008/09	two cycle	4+1 years

Sweden	1999	2007	single cycle	3+2 years
Switzerland	1999	2004/05–2010	single cycle	3+(1.5–2) years
Turkey	2001	no/minor changes	two cycle	4+2 years
Ukraine	2005	no/minor changes	two cycle	4+1.5 years
United Kingdom	1999	no/minor changes	two cycle	n.a.
United Kingdom (Scotland)	1999	no/minor changes	two cycle	4+1.5 years

Notes: (*): joined as Serbia-Montenegro. ~: approximately; +: gradual implementation without clearly stated deadline; n.a.: not available; square brackets refer to the start of implementation before the Bologna Process. In the column “post-reform system”, only systems with a share of at least 30 percent of all programmes in the country considered are listed. Here, one year in the second cycle comprises 60 to 75 ECTS credits.

Source: Own illustration. Data source for the Bologna Process membership is EHEA (2021). Information on main implementation is collected from the national implementation reports listed at EHEA (2021), information on pre-reform system from Table 2-1 in Westerheijden *et al.* (2010), and information on the post-reform system from Figures 3.2 and 3.3 in European Commission/EACEA/Eurydice (2018).

Table 2 Overview of the literature on the effects of the Bologna Process on enrolment in higher education

Authors	Region	Data	Sample	Theory	Method	Findings
<i>Panel A. Enrolment</i>						
Horstschräer and Sprietsma (2015)	Germany	<u>administrative student data</u> nationwide	N = 10,219 <u>sample units</u> : departments <u>period</u> : 1998-2008	human capital theory	<u>causal</u> fixed-effects approach	<u>enrolment</u> : no overall effect, but heterogeneous effects by subjects
Neugebauer (2015)	Germany	<u>student survey</u> nationwide	N = 1,508 (*) <u>sample units</u> : study courses <u>period</u> : 1996-2009	human capital theory; rational choice theory	<u>causal</u> fixed-effects approach	<u>enrolment & social origin</u> : no effect on share of students from disadvantaged backgrounds
Argentin and Triventi (2011)	Italy	<u>school leaver survey</u> nationwide	N = 18,843-25,880 per cohort <u>sample units</u> : secondary school graduates <u>period</u> : 1995-2004 (4 cohorts)	rational choice theory	<u>descriptive</u> : cohort-comparison	<u>enrolment</u> : general increase; modest reduction in the effect of social origin
Bondonio and Berton (2018)	Italy	<u>administrative data</u> nationwide	N = 290 <u>sample units</u> : departments <u>period</u> : 1998/9-2004/5	(a)	<u>causal</u> difference-in-differences; matching	<u>enrolment change</u> : +15–17 p.p.
Brunori et al. (2012)	Italy	<u>school leaver survey</u> nationwide	N = 16,073-20,573 per cohort <u>sample units</u> : secondary school graduates <u>period</u> : 1995-2004 (4 cohorts)	(a)	<u>descriptive</u> before-after comparison	<u>enrolment & social origin</u> : positive effect
Cappellari and Lucifora (2009)	Italy	<u>school leaver survey</u> nationwide	N = 36,612 <u>sample units</u> : secondary school graduates <u>period</u> : 1998, 2001	human capital theory	<u>descriptive</u> before-after comparison	<u>enrolment probability</u> : +15%
Di Pietro and Cuttillo (2008)	Italy	<u>school leaver survey</u> nationwide	N = 16,098-19,996 per cohort <u>sample units</u> : secondary school graduates <u>period</u> : 1998-2004 (3 cohorts)	(a)	<u>descriptive</u> cohort-comparison; decomposition analysis	<u>enrolment rate</u> : increased
Di Pietro (2012)	Italy	<u>school leaver survey</u> nationwide	N = 70,392 <u>sample units</u> : secondary school graduates <u>period</u> : 1995-2004 (4 cohorts)	human capital theory	<u>causal</u> difference-in-differences	<u>enrolment probability</u> : +7–8% on students from disadvantaged backgrounds
Triventi et al. (2017)	Italy	<u>graduate survey</u> nationwide	N = 12,088-37,824 per cohort <u>sample units</u> : university graduates <u>period</u> : 1995-2008 (5 cohorts)	rational choice theory	<u>descriptive</u> cohort-comparison	<u>enrolment & social origin</u> : rapid increase in social inequalities in choice of field of study before and after the reform

Cardoso et al. (2008)	Portugal	<u>administrative data</u> <i>nationwide</i>	<u>N = (b)</u> <u>sample units:</u> programmes <u>period:</u> 2003/4 to 2006/7	(a)	<u>causal</u> fixed-effects approach	<u>demand for acad. programmes:</u> positive effect; heterogeneity by field of study
Portela et al. (2009)	Portugal	<u>administrative data</u> <i>nationwide</i>	<u>N = (b)</u> <u>sample units:</u> programmes <u>period:</u> 2003/4 to 2006/7	(a)	<u>causal</u> fixed-effects approach	<u>demand for acad. programmes:</u> positive effect; heterogeneity by field of study
<i>Panel B. BA-MA transition</i>						
Auspurg and Hinz (2011)	Germany	<u>graduate survey</u> <i>University of Konstanz</i>	<u>N = 697</u> <u>sample units:</u> BA graduates <u>period:</u> 2005/6-2007/8 (3 cohorts)	rational choice theory; conflict theory	<u>descriptive</u> cross-sectional comparison	<u>transition rate into MA:</u> +9 p.p. higher transition rate for graduates with well-educated parents
Lörz et al. (2015)	Germany	<u>school leaver survey</u> <i>nationwide</i>	<u>N = 1,822</u> <u>sample units:</u> BA graduates <u>period:</u> 2008	rational choice theory	<u>descriptive</u> cross-sectional comparison; decomposition	<u>transition rate into MA:</u> students from less privileged families with lower transition rates
Neugebauer et al. (2016)	Germany	<u>graduate survey</u> <i>nationwide</i>	<u>N = 1,730</u> <u>sample units:</u> study courses <u>period:</u> 2007-2014	(a)	<u>causal</u> fixed-effects approach	<u>MA graduation & social origin:</u> -5% on the share of MA graduates from less advantaged families

Notes: The sample size (N) is defined as the sample used for the reported analysis. For surveys, period refers to the graduation cohort. Regarding the method used, we report only the most advanced one. (a): no (clear) theoretical argument used. (b): no clear indication of the sample size. (*): based on data for 41,316 students from the waves 1997, 2000, 2003, 2006, and 2009.

Source: Own illustration.

Table 3 Overview of the literature on the effects of the Bologna Process on study success

Authors	Region	Data	Sample	Theory	Method	Findings
<i>Panel A. Student Retention and Dropout</i>						
Enzi and Siegler (2016)	Germany	<u>school leaver survey</u> <i>nationwide</i>	<u>N</u> = 1,626 <u>sample units</u> : BA and traditional degree students <u>period</u> : 2006 (*)	(a)	<u>causal</u> instrumental-variable approach	<u>dropout probability</u> : no overall effect, but negative effect high-achieving students (-10%)
Hahm and Kluge (2019)	Germany	<u>student survey</u> <i>HU Berlin</i>	<u>N</u> = 24,675 <u>sample units</u> : BA and Diploma students <u>period</u> : 1997-2011	human capital theory	<u>causal</u> instrumental-variable approach	<u>in-time graduation probability</u> : positive effect (+10 p.p.)
Horstschräer and Sprietsma (2015)	Germany	<u>administrative data</u> <i>nationwide</i>	<u>N</u> = 9,560 <u>sample units</u> : departments <u>period</u> : 1998-2008	human capital theory	<u>causal</u> fixed-effects approach	<u>dropout rate</u> : no effect, but heterogeneity by subjects
Lerche (2016)	Germany	<u>administrative data</u> <i>University of Göttingen</i>	<u>N</u> = 9,167 <u>sample units</u> : BA, traditional and teaching students <u>period</u> : 2003/4-2008	(a)	<u>descriptive</u> cross-sectional comparison	<u>in-time graduation probability</u> : +69% for BA students <u>dropout probability</u> : -15% for BA students
Argentin and Triventi (2011)	Italy	<u>school leaver survey</u> <i>nationwide</i>	<u>N</u> = 18,843-25,880 per cohort <u>sample units</u> : secondary school graduates <u>period</u> : 1995-2004 (4 cohorts)	rational choice theory	<u>descriptive</u> cohort-comparison	<u>dropouts & social inequality</u> : decrease for 1998 and 2001 cohort, but increase for 2004 cohort
Bondonio and Berton (2018)	Italy	<u>administrative data</u> <i>nationwide</i>	<u>N</u> = 290 <u>sample units</u> : departments <u>period</u> : 1998/9-2004/5	(a)	<u>causal</u> difference-in-differences; matching	<u>one-year retention rate</u> : no effect <u>two-year retention rate</u> : positive effect (+30 p.p.) <u>on-time-graduation rate</u> : positive effect (+6–18 p.p.)
Cappellari and Lucifora (2009)	Italy	<u>school leaver survey</u> <i>nationwide</i>	<u>N</u> = 16,651 <u>sample units</u> : secondary school graduates <u>period</u> : 1998 & 2001 (2 cohorts)	human capital theory	<u>descriptive</u> before-after comparison	<u>dropout rates</u> : no overall effect, but negative for high-achieving students
Chies et al. (2019)	Italy	<u>administrative data</u> <i>University of Trieste</i>	<u>N</u> = 25,866 <u>sample units</u> : students enrolled in 2000 <u>period</u> : 2000-2012	(a)	<u>descriptive</u> cross-sectional comparison; matching	<u>graduation probability</u> : positive effect only for last pre-treatment enrolment cohort

D'Hombres (2007)	Italy	<u>school leaver survey</u> <i>nationwide</i>	<u>N</u> = 21,676 <u>sample units</u> : secondary school graduates <u>period</u> : 1995-2001 (3 cohorts)	(a)		<u>descriptive</u> before-after-comparison; matching	<u>dropout probability</u> : negative effect (-4–6%)
Di Pietro and Cutillo (2008)	Italy	<u>school leaver survey</u> <i>nationwide</i>	<u>N</u> = 16,098-19,996 per cohort <u>sample units</u> : secondary school graduates <u>period</u> : 1995-2001 (3 cohorts)	(a)		<u>descriptive</u> cohort-comparison; decomposition analysis	<u>dropout probability</u> : lower for post-reform cohort
Wolter et al. (2014)	Switzerland	<u>administrative data</u> <i>nationwide</i>	<u>N</u> = 248,478 (pre-Bologna); 9,893 (post-Bologna) <u>sample units</u> : Licentiate and BA students <u>period</u> : 1975-2011	(a)		<u>descriptive</u> before-after-comparison	<u>dropout rates</u> : no change
<i>Panel B. Performance</i>							
Hahm and Kluge (2019)	Germany	<u>student survey</u> <i>HU Berlin</i>	<u>N</u> = 24,675 <u>sample units</u> : BA and Diploma students <u>period</u> : 1997-2011		human capital theory	<u>causal</u> instrumental-variable approach	<u>final grades</u> : worsened (+0.3 grade points)
Mühlenweg (2010)	Germany	<u>student survey</u> <i>nationwide</i>	<u>N</u> = 2,982 <u>sample units</u> : first-year BA and traditional degree students <u>period</u> : 2003/04 and 2006/07	(a)		<u>causal</u> fixed-effects approach	<u>students' satisfaction</u> : positive effects <u>final grades</u> : no effect
Ostermaier et al. (2013)	Germany	<u>administrative data</u> <i>University of Munich; specific course</i>	<u>N</u> = ~1,600 <u>sample units</u> : students of a specific business course <u>period</u> : 2006, 2008, 2010, 2012	(a)		<u>causal</u> difference-in-differences	<u>test scores</u> : negative effect <u>rate of failure</u> : positive effect
Schaeper (2009)	Germany	<u>graduate survey</u> <i>nationwide</i>	<u>N</u> = 5,369 <u>sample units</u> : BA and traditional degree graduates <u>period</u> : 2005		constructivist learning theories	<u>descriptive</u> cross-sectional comparison	<u>skill acquisition</u> : improvement in learning conditions for BA students
Fernandez-Sainz et al. (2016)	Spain	<u>student survey</u> <i>University of the Basque Country; specific course</i>	<u>N</u> = 1,276 <u>sample units</u> : students of a specific business course <u>period</u> : 2009/10-2010/11		self-developed theoretical framework	<u>descriptive</u> before-after comparison	<u>perceived skill acquisition</u> : positive effect <u>students' satisfaction</u> : positive effect <u>final grade</u> : no effect
Hansmann et al. (2019)	Switzerland	<u>graduate survey</u>	<u>N</u> = 194	(a)		<u>descriptive</u> before-after comparison	<u>skill acquisition</u> : Diploma < MA

		<i>ETH Zurich; specific field of study</i>	<u>sample units</u> : Diploma and MA graduates from Environmental Sciences <u>period</u> : 2006, 2010, 2012			
<i>Panel C. International Student Mobility</i>						
Vögtle and Fulge (2013)	OECD/BP member countries	<u>administrative data</u> <i>cross-country</i>	<u>N</u> = 387 (inbound); 382 (outbound) <u>sample units</u> : countries <u>period</u> : 2000-2010	(a)	<u>causal</u> fixed-effects approach	<u>inbound mobility</u> no effect <u>outbound mobility</u> positive effect
Vögtle and Windzio (2016)	OECD/BP member countries	<u>administrative data</u> <i>cross-country</i>	<u>N</u> = 41 <u>sample units</u> : countries <u>period</u> : 2000, 2004, 2009	human capital theory, world culture theory	<u>descriptive</u> cross-sectional comparison; social network analysis	<u>international student mobility</u> : positive and increasing effect on ties between countries in international student mobility network
Enzi and Siegler (2016)	Germany	<u>school leaver survey</u> <i>nationwide</i>	<u>N</u> = 1,626 <u>sample units</u> : BA and traditional degree students <u>period</u> : 2006	(a)	<u>causal</u> instrumental-variable approach	<u>students' mobility</u> : no effect
Finger (2011)	Germany	<u>student survey</u> <i>nationwide</i>	<u>N</u> = 12,058 (1997); 11,113 (2006) <u>sample units</u> : students <u>period</u> : 1997, 2006	rational choice theory; habitus theory	<u>descriptive</u> before-after comparison	<u>correlation social origin & mobility</u> increased inequality after the reform
Rincón and Barrutia (2017)	Spain	<u>administrative data</u> <i>nationwide</i>	<u>N</u> = (b) <u>sample units</u> : universities <u>period</u> : 2005/06; 2011/12	(a)	<u>descriptive</u> before-after comparison	<u>international student mobility</u> : higher international demand at Spanish universities after the reform

Notes: The sample size (N) is defined as the sample used for the reported analysis. For surveys, period refers to the graduation cohort. Regarding the method used, we report only the most advanced one. (a): no (clear) theoretical argument used. (b): no clear indication of the sample size. (*): secondary school graduation cohort from 2006, but enrolment between 2006/07-2007/08.

Source: Own illustration.

Table 4 Overview of the literature on the effects of the Bologna Process on labour market returns

Authors	Region	Data	Sample	Theory	Method	Findings
Noelke <i>et al.</i> (2012)	5 Central and Eastern European countries	<u>school leaver surveys</u> (*) <i>nationwide</i>	<u>N</u> = 441-6,455 per country <u>sample units</u> : labour market entrants aged 15-34 years <u>period</u> : 2000-2008 (various cohorts)	human capital theory; signalling theory	<u>descriptive</u> cross-sectional comparison	<u>occupational status</u> : VET < BA < MA <u>speed of labour market entry</u> : VET ≤ BA < MA
Raudenská and Mysíková (2020)	Czech Republic	<u>household survey</u> <i>nationwide</i>	<u>N</u> : 15,139-18,209 per cohort <u>sample units</u> : full-time employees aged 16–65 with at least upper secondary education <u>period</u> : 2010-2017 (8 cohorts)	human capital theory; signalling theory	<u>descriptive</u> cohort-comparison	<u>returns to tertiary education</u> : BA < MA
Neugebauer and Weiss (2018)	Germany	<u>household survey</u> <i>nationwide</i>	<u>N</u> = 31,559 <u>sample units</u> : 20- to 35-year-olds with higher education qualification and completed academic or vocational education <u>period</u> : 2010-2013	human capital theory, signalling theory	<u>descriptive</u> cross-sectional comparison	<u>earnings</u> : VET < BA < MA <u>unemployment risk</u> : MA, BA FH, VET < BA Uni
Angeloni (2019)	Italy	<u>graduate survey</u> : <i>nationwide; specific field of study</i>	<u>N</u> = 5,837 <u>sample units</u> : university graduates in business economics <u>period</u> : 2016	human capital theory	<u>descriptive</u> cross-sectional comparison	<u>employment probability</u> : BA < MA <u>job quality</u> : BA < MA
Argentin and Triventi (2011)	Italy	<u>graduate survey</u> <i>nationwide</i>	<u>N</u> = 13,511-26,570 per cohort <u>sample units</u> : university graduates <u>period</u> : 1992-2004 (5 cohorts)	(a)	<u>descriptive</u> cohort-comparison	<u>unstable jobs</u> : increase for 2001 and 2004 cohort
Bosio and Leonardi (2011)	Italy	<u>labour force survey</u> <i>nationwide</i>	<u>N</u> = 55,298 (graduates) and 319,910 (non-graduates) <u>sample units</u> : individuals aged 25-34 years without full-time students <u>period</u> : 1998-2007	(a)	<u>causal</u> instrumental-variable approach	<u>relative employment probability</u> : positive effect for men (+5–6%), negative effect for women in the south <u>college wage premium</u> : decrease for post-reform cohort (-7–8%)
Sciulli and Signorelli (2011)	Italy	<u>graduate survey matched with job centre data</u> <i>University of Perugia</i>	<u>N</u> : 9,642 <u>sample units</u> : university graduates with labour market entry in province of Perugia <u>period</u> : 2004-2009	(a)	<u>descriptive</u> cross-sectional comparison	<u>employment probability</u> : BA < pre-reform degree < MA

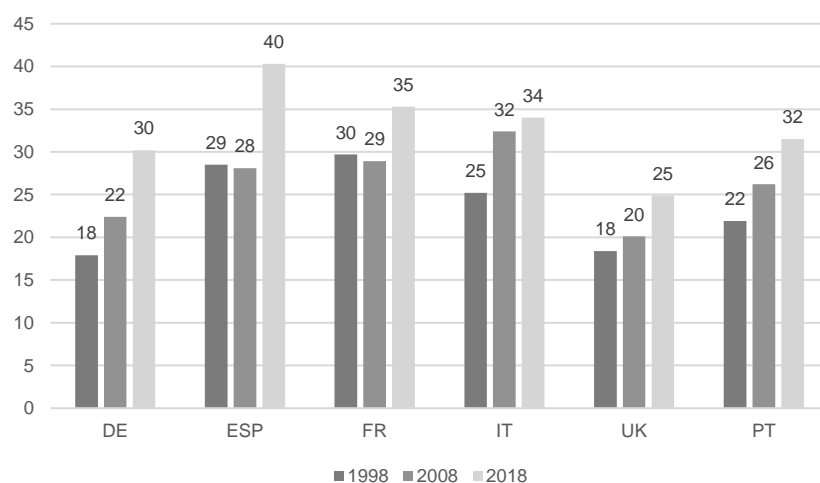
Suleman and Figueiredo (2020)	Portugal	<u>linked employer-employee data</u> <i>nationwide</i>	<u>N</u> : 25,913 <u>sample units</u> : BA and MA graduates employed in the private sector aged 21-24 years <u>period</u> : 2007, 2011	(a)	<u>descriptive</u> cross-sectional comparison	<u>job quality</u> : BA < MA (only 2011 cohort) <u>wages</u> : BA < MA (only 2011 cohort)
Avdeev (2020)	Russia	<u>graduate survey</u> <i>nationwide</i>	<u>N</u> = 11,332 (employment); 6,207 (wages) <u>sample units</u> : university graduates <u>period</u> : 2010-2015	human capital theory; signalling theory	<u>causal</u> difference-in-differences	<u>wages</u> : no effect <u>employment probability</u> : no effect
Deželan et al. (2014)	Slovenia	<u>graduate survey</u> <i>University of Ljubljana; specific field of study</i>	<u>N</u> = 635 <u>sample units</u> : university graduates in political science <u>period</u> : 2006-2011	human capital theory; assignment theory	<u>descriptive</u> cross-sectional comparison	<u>education-job match</u> : Bologna < non-Bologna programme
Farčnik and Domadenik (2012)	Slovenia	<u>graduate survey</u> <u>matched with employment history data</u> <i>nationwide</i>	<u>N</u> = 18,052 <u>sample units</u> : university graduates <u>period</u> : 2007-2009	(a)	<u>descriptive</u> cross-sectional comparison; matching	<u>employment probability</u> : negative effect
Glaser et al. (2019)	Switzerland	<u>graduate survey</u> <i>nationwide</i>	<u>N</u> = 13,149 (men); 13,102 (women) <u>sample units</u> : university graduates (<=35 years) <u>period</u> : 2006-2016 (6 cohorts)	signalling theory	<u>descriptive</u> cross-cohort comparison; Heckman selection correction	<u>wages</u> : BA (volatile) < MA

Notes: The sample size (N) is defined as the sample used for the reported analysis. For surveys, period refers to the graduation cohort. Regarding the method used, we report only the most advanced one. (a): no (clear) theoretical argument used. (*): life history study for the Czech Republic.

Source: Own illustration.

Appendix Figures and Tables

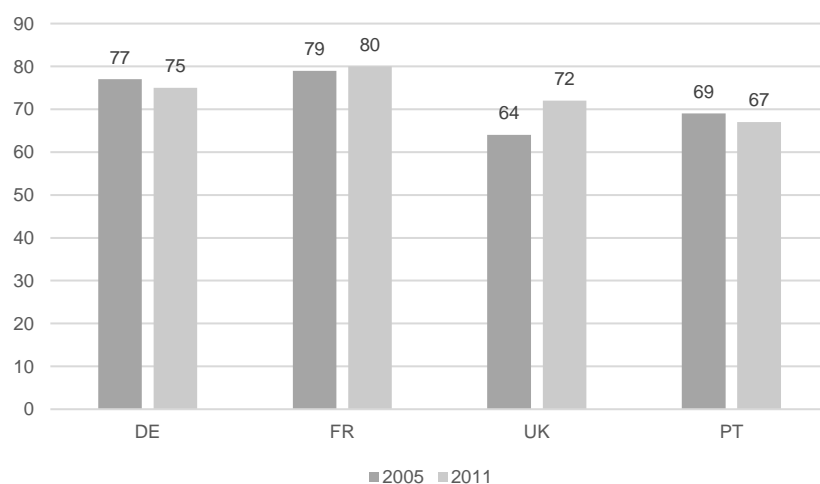
Figure A-1 Share of students in tertiary education aged 20 to 24 years of the population aged 20 to 24 years [%]



Notes: Tertiary education is defined as levels 5-6 (ISCED-97) for 1998 and 2008 and as levels 5-8 (ISCED-11) for 2018. For Germany, Italy, and the UK, the definition differs in some years.

Source: Own illustration based on data from Eurostat (2021b, 2021a).

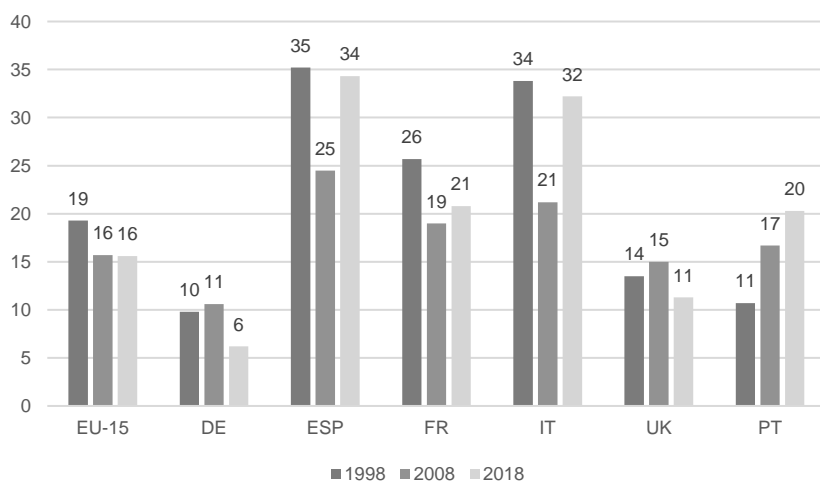
Figure A-2 Completion rates in tertiary education (first and second cycle) [%]



Notes: Comparability is limited due to different calculation methods and national contexts. No data available for Italy and Spain. The number for Germany in 2011 refers to tertiary-type A and B.

Source: Own illustration based on data reported in Vossensteyn *et al.* (2015, p. 31) and based on OECD, Education at a Glance 2008, Education at a Glance 2013.

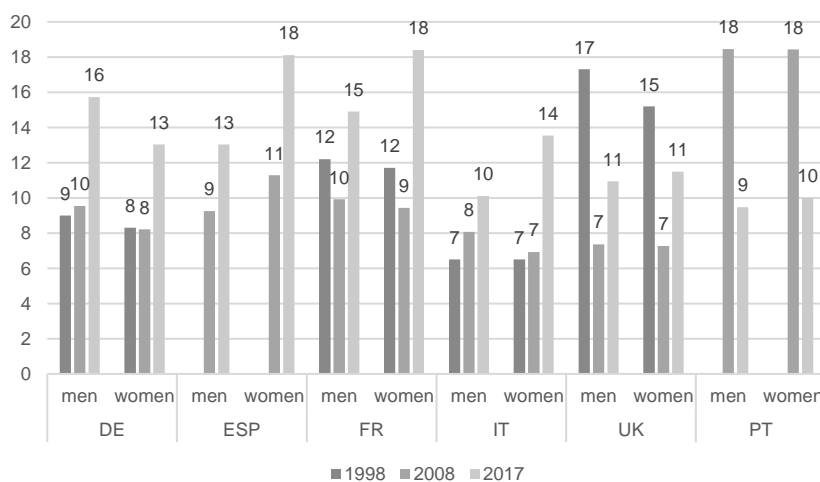
Figure A-3 Youth unemployment rate [%]



Notes: Unemployed persons aged 15 to 24 as share of the population in the labour force. The numbers for 1998 are mostly estimations by Eurostat. The number for France in 1998 refers to Metropolitan France alone.

Source: Own illustration based on data from Eurostat (2020).

Figure A-4 Internal rate of return to tertiary education [%]



Notes: As compared with a man/woman attaining upper secondary education, in equivalent USD converted using PPPs for GDP. No data available for Spain and Portugal in 1998.

Source: Own illustration based on data from OECD (2002, 2012, 2020).

Endnotes

¹ Research Papers in Economics (RePEc) is a collaborative bibliographic database that lists publications in economics and is particularly used for the dissemination of working papers.

² At the Ministerial Conference Berlin 2003, the doctoral level was included as a third cycle of the new degree system (Berlin Communiqué, 2003). However, since the purpose of this article is to look at the effects of the Bologna reform for the majority of students, we focus only on the first two cycles (BA & MA) and therefore refer to the “two-cycle system” throughout the paper.

³ As one of the exceptions, Arteaga (2018) investigates how human capital accumulation affects wages by exploiting a reform at a Colombian top university that reduced instruction time and coursework. She finds that the reform reduced graduate wages substantially and interprets the result as support for the human capital theory rather than signalling.

⁴ Potestio (2014) supports the previous findings by showing a delay in the labour market entry of university graduates after the Bologna reform in Italy.