Bologna Process and its impact on Spanish graduates employability: good news yet to come

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Abstract
This research assesses Bologna Process's success to achieve its main objective of enhancing employability among Spanish university graduates who completed their degree during the 2013-2014 Academic Year. The outcomes indicate that the education obtained under the Bologna Process does not either enhance their employability versus pre-Bologna university plan or the probability of employment, while negatively influences the quality of the job by turning it more unstable and poorly paid. Education assessment analysis by the graduates indicates that Bologna Process students do not believe that their education either boosts their probability of employment or significatively impact on their wages. The lack of financing tools and the absence of coordination among universities when it comes to implementing Bologna Process may explain this temporary lack of results.

Keywords: Bologna Process; employment; stable employment; wages

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1. Introduction.

Parallel to the massive quantitative expansion of higher education around the world, there has been extensive debate about what role(s) higher education should play in the increasing international competition and efforts for economic growth (Nelson and Sandberg, 2017). Developed countries and, particularly the European Union (EU), have regarded higher education as the enabling tool to evolve to an innovative knowledge-based society as the key to economic growth, employment and social cohesion (Wiepcke, 2009; European Commission, 2020). For such reason, European governments have been implementing education policies that have changed University targets. Universities have moved from making decisions to meeting social needs in the 1960s-1970s, to emphasizing the outputs instead of the inputs in the 1980s, as a way to meet "market" needs (Prokou, 2008).

Since the beginning of this century, EU policies have been designed to boost the relationship between higher education and the world of work by making efforts to increase the employability of graduates. Employability has been one of the main goals to be achieved with the creation of the European Higher Education Area (EHEA) in 1999, based on the Bologna Declaration. Therefore, one of the goals of the Bologna Process was specifically defined as "to promote European citizens employability and the international competitiveness of the European higher education system".

There are many definitions of employability, some of them are misleading, others too narrow. Regardless the definition of employability and who establishes the skills and abilities students should be educated at, either universities or employers, what is relevant is to assess Bologna Process efficacy in terms of employability (Angeloni, 2019). The

European Commission, European Education and Culture Executive Agency (EACEA) and Eurydice (2018), define three indicators to assess graduates' labour market situation in EHEA: unemployment rates, income levels, and qualification mismatch. These indicators have been used to provide a descriptive assessment on to what extent the Bologna Process has reached its objective, by comparing the three above referred indicators between the group of workers educated under the Bologna Process and the group of workers educated under pre-Bologna university plans. An example of this type of analysis is Schomburg and Teichler (2011) research, which gathers analyses of graduate employability from 10 European countries between 2007 and 2010. However, the lack of harmonization when designing countries' surveys, together with the remarkable differences among national higher education systems, may make it very difficult to reach broad conclusions.

However, apart from the descriptive analysis, what is important is to assess whether graduates' employability may be explained, wholly or partly, by changes taking place in EHEA after the Bologna Declaration. Causal evidence regarding the effects of the Bologna Process on labour market outcomes, however, is very limited (Kroher et al., 2021). For example, Garra (2013) analyses the reform effects on the college wage premium for a sample of Portuguese workers in order to observe individuals before and after the Bologna reform implementation. The results indicate that female graduates, whose courses were affected by the Bologna reform, have their wages 2.5 % - 3 % higher than wages in the control group (pre-Bologna graduates). The full and male models do not show any impact on college wages. Nevertheless, these interpretations must consider the limitations of the difference-in-differences strategy. For Italy, Bosio and Leonardi (2011) find that the reform increases significantly the relative employment of male

graduates, and they observe a significant effect on the quality of employment, because post-reform graduates have a significantly lower wage premium compared to pre-reform graduates, and also a lower probability of having a permanent job (only in case of men). For Slovenia, Farcnik and Domadenik (2012) compare the early career outcomes of Bologna graduates with the pre-Bologna graduates. The authors find a statistically significant negative effect on the probability of been employed compared to counterparts who finished pre-Bologna programmes. For Russia, Avdeev (2020) finds no effect of the Bologna reform on the wages and employment probabilities of university graduates.

Therefore, given the lack of papers evaluating the effects of the Bologna Process on labour market returns, this research aims at providing some empirical evidence on Bologna Process effectiveness on its objective to enhance university graduates employability. Specifically, the evaluation will be based on two basic questions: does Bologna Process training make it more probable for university graduates to get a job? Are these jobs higher quality ones? This is the reason why the Spanish case will be studied from the data provided by the 2019 Survey on the Labour Insertion of University Graduates that gathers information on the labour insertion of university graduates who got the degree during the 2013-2014 Academic Year. This research presents three innovating contributions. First of all, it is the first analysis of the effects of the Bologna Process reforms on Spanish graduates employability. Secondly, and given that Bologna Process capacity to enhance graduates' employability is subject to the fit between the educational background and the job (Groseman et al., 2017), this research shall assess whether the reforms introduced by the Bologna Process have enhanced the fit between skills and abilities demanded by the labour market and the ones obtained at university, and to what extent it could have influenced graduates' employability. Thirdly, it analyses

the decomposition of wage differences between Bologna students and pre-Bologna students using the Oaxaca-Blinder method. The aim is to state clear whether wage differences are related to differences in personal and job characteristics, or, on the other hand, related to differences in the university education obtained by each group of workers.

This research is structured as follows. The second section briefly reviews the changes introduced in university programmes by the Bologna reform. The third section describes the database used in the empiric study. Sections four and five estimate Bologna Process effects on university graduates' employability. Finally, section six shows the conclusions.

2. Bologna declaration and the transformation of Spanish university system.

The publication of Royal Decree (RD) 1393/2007, of 29th October, meant the beginning of the implementation of the Bologna Process in Spain. Before the 2007 reform, the official degree system pursuant to Organic Law 11/1983 of the University Reform (LRU), included three-year degrees (diploma, engineering and architectural technology), called first cycle or short cycle, and five-year degrees (Bachelor's degree), with some specific degrees (including medicine, engineering and architecture) that took six years to complete. These two last ones were called second cycle or long cycle.

Royal Decree 1393/2007 established that degree and master programmes should be arranged for the purposes of ensuring a generalist Degree education, and that Master contents should be oriented to a greater specialization. As far as the average length of such studies is concerned, it was stated that Degree should include 240 credits (divided into 4 years). However, Royal Decree 43/2015 introduced a substantial modification, when opening the possibility of three-year university degrees with 180-240 credits. On

the other hand, students are entitled to study a one or two year-Master (60 or 120 credits) after having completed the Degree. Finally, completing Master studies allows students to access Doctorate studies, whose duration is between 3 to 5 years.

3. Database

The 2019 Survey on the Labour Insertion of University Graduates (EILU-19), carried out by the National Statistics Institute (INE), is aimed at getting to know different aspects related to the transition from the university to the labour market of university students graduated in the 2013-2014 Academic Year. The sample was finally made up of 31,651 university graduates from all Spanish universities, both graduates under Bologna Process or graduates under previous university programmes. As the Bologna Process was progressively being implemented from the 2008-2009 Academic Year, students following pre-Bologna programs and Bologna students co-existed and studied together until the 2016-2017 Academic Year.

Table 1 shows the descriptive statistics that allow obtaining a basic image of the sample's composition. 60% completed their studies under the Bologna Process, whereas 40% did it according to pre-Bologna university programmes. That is, the survey shows quite a balance distribution between Bologna and pre-Bologna students. This, together with the fact that both groups of students finished their university studies at the same time (2013-2014 academic year), are two sample features that favour the econometric and statistical analysis of data, as, on the one hand, the sample does not present a significant bias to a given predetermined university programme, so it does not influence the interpretation of the outcomes; on the other hand, as graduates do not finish their university education in different years, it is not necessary to define econometric tools to measure the effect of

possible changes in the economic cycle or potential labour legislation changes related to the employability of both groups.

TABLE 1

In the distribution by sex, 39% of Bologna students were men, compared to 48% of pre-Bologna students. Such percentage gap is the result of the progressive enrolment of women in university studies since the 80s, which is reflected more in the most recent university programmes.

Bologna graduates are two years younger because degrees take less years (four years) than common degrees prior to Bologna Process (5-year Bachelor Degrees). That is, all surveyed students graduated in the 2013-2014 Academic year, although Bologna students enrolled later than pre-Bologna ones.

Most students carried out their studies at public universities (the percentage has steadied around 84% during the last decade). In relation to the fields of knowledge, Bologna students have proved a greater interest in Social and Legal Sciences, while the number of Engineering and Architecture graduates has decreased (see Canal (2021), for a further explanation on the loss of relevance of technical studies in Spain within this century). Humanities and Sciences have continued being chosen among graduates, while Health Sciences have outweighed their presence.

As far as further university education is concerned, a lower percentage of Bologna students have done other degrees (6 percentage points less). On the other hand, following

the structural changes brought about by Bologna Process, more than 50% of Bologna graduates have carried out master studies versus 39% of pre-Bologna graduates. Doctorate studies clearly represent a marginal percentage in any case.

In relation to the transition to the labour market, there are no differences depending of the graduates' university programmes, regarding employment, unemployment and inactivity rates almost identical for both groups of students. The only difference is found in employment stability, as 61% of pre-Bologna students have a permanent job, versus 55% of Bologna students.

Regarding wage levels, participants to EILU-19 answered about their current net wages in 2019. The information, unlike typical labour market surveys, is divided into intervals (Table 2). Data seem to indicate that workers educated under the Bologna Process earn lower wages than those under previous university plans.

TABLE 2

Finally, in relation to the fit between the educational background and the job, different types of fit can be distinguished (Grosemans et al., 2017):

- vertical fit, that can be described as the extent to which the level of education corresponds to the education level required for the job.
- horizontal fit, which indicates the degree of fit between the study discipline and the job.
- competence fit, which reflects the gap between what education delivers and what employers want.

Table 3 shows the percentage of workers within each earnings interval according to the fit between higher education background and the job.

TABLE 3

As it can be seen in Table 3, the prediction stated in the theory is met, as if workers regard the obtained qualification level as unsuitable for the job, if the required field of knowledge for a job does not match the education completed, or if the job does not allow applying the knowledge acquired during the university studies, workers will systematically receive lower wages. This means, an unsuitable fit between higher education background and the job means lower wages than the ones corresponding to a more suitable job choice to the education obtained.

4. Bologna Process and employability: a quantitative assessment

According to the university programmes stated in Table 1, graduates distribution among employed, unemployed and inactive seems to indicate that university programmes do not vary the probability of employment. As it was stated in the introduction, descriptive indicators such as the unemployment rate, are not enough to assess Bologna Process objectives, as causality must be assessed. For such reason, in order to estimate whether the Bologna Process might have had an influence on obtaining a job or not, we calculate the probability of employment following Farcnik and Domadenik (2012)

$$\Pr(y = 1|X) = \Phi(X\beta) \tag{1}$$

where the dependent variable (employment) is a binary random variable described by $y = (0,1)$, where $y = 1$ indicates employment and $y = 0$ indicates unemployment. Independent variables X_i are vector covariates of personal characteristics and education characteristics; Φ is the standard cumulative normal probability distribution; and $X\beta$ is called the probit score or index. We use a probit model to calculate the probability of employment.

Five alternative models are proposed. First, the university programme is the unique explanatory variable included in model I (Bologna Process=1 if the interviewed is a Bologna student; Bologna Process=0 if he/she is a pre-Bologna student). Model II adds a set of variables related to individual's characteristics. Model III adds a set of variables which show the specific type of training reached by the individual. Finally, models IV and V divide the sample by gender for the purposes of checking whether the university plan may affect men (model IV) and women (model V) in a different way.

TABLE 4

The estimate results of Models I, II and III stated in Table 4 confirm that studying under the Bologna Process does not significantly affect the probability of employment. That is, the labour market cannot spot university programme-related differences among students that might lead to prefer ones to others. Bosio and Leonardi (2011) consider that Bologna Process reforms might lead to two opposite effects on the probability of employment. On the one hand, new graduates would have to replace graduates under the pre-Bologna university programmes, which would positively affect the probability of employment. On the other hand, as the total number of graduates increases, the

probability of employment for all of them decreases, regardless the university programme. In this case, Bosio and Leonardi (2011) found a clear and final positive effect in case of men and a weak one in case of women, while Farcnik and Domadenik (2012) found a final negative one. This research seems to show that the two aforementioned effects are invalidated, so that the net effect of the Bologna Process reform is inexistent.

On the other hand, the fact that the probability of employment increases among men (models II and III), strengthens the interest for a separate sample analysis by gender. However, the results obtained from model IV and V estimates do not show a significant impact of the university plan on sample subgroups. As for the rest of variables, and in line with Canal and Rodríguez (2019), to study at a public university reduces the probability of employment; the field of knowledge has a significant effect (it specially increases the chances among those studying Engineering and Architecture); and an additional degree or a master shall increase the chances of being employed. The negative effect of doctorate studies must be related to the number of years it takes a student to complete this education level, thus probably limiting the options of accepting some interesting job proposals during such an intensive educational process. Besides, sample data collection (year 2019) was carried out just when those 2014 graduates who decided to do a doctorate had finished it so. Therefore, they hardly had time to look for a job.

It must be considered that the probability of being employed was estimated at a given time, in this case, in 2019. However, it also interesting to know whether the university study plan could have had some impact on the time needed to find a job. The Kaplan-Meier estimator (Kaplan and Meier, 1958) is used to estimate the survival function. In this case, survival means remaining unemployed after completing university studies. The

visual representation of this function is usually called the Kaplan-Meier curve (Figure 1), and it shows the probability of being unemployed at a certain time interval.

FIGURE 1

This figure shows that following the Bologna Process does not imply such a significant incidence: those individuals who have studied under pre-Bologna university plans exit unemployment faster, no matter the time interval, but without significant differences. The only time interval with such a great difference is number 4 (from 6 months to 1 year).

Nevertheless, as it was stated in the introduction, it is quite interesting to assess whether university students see that the educational changes derived from the implementation of the Bologna Process have influenced their transition to the labour market. To classify the necessary learning outcomes for the transition from higher education to the labour market, the content-clustered framework of Young and Chapman (2010) will be used. In their framework, five clusters are described as competences: basic competences (1), business competences (2), conceptual competences (3), people competences (4), and personal competences (5). EILU-19 requests those participants who claim to have a job, to assess several competences which may have played a role when getting a job, ranking from 1=None; 2=A little; 3=Something; 4=A lot; 5=Quite a lot[1]. The survey has gathered information about these groups proposed by Young and Chapman (2010), except for the fifth one (personal competences). For the purposes of completing the analysis, a new variable has been defined, *learning*, calculated as the arithmetic average of the answers to the competences for each individual. Cronbach's Alpha was used to validate the average. This coefficient determines the internal consistency of the scale by analysing the

correlation between its constituent variables. The value obtained was 0.80 for Bologna students, and 0.77 for pre-Bologna students, which are considered acceptable by the literature (Rosenthal et al., 2000).

TABLE 5

Table 5 shows average values for each competence calculated based on the answers provided by the participants. Great similarities between both university groups are observed, both in the individual analysis of competences and as a whole through the *learning* variable. That is, it seems that university graduates understand that the labour market does not distinguish between the skills and competences obtained under the Bologna Process or under pre-Bologna university programmes, when it comes to find a job. Therefore, these do not significatively influence on their chances of getting a job. This result is in line with those showed in Table 4, and reinforces the idea that the Bologna Process has not brought about significant changes to university graduates' education processes such as providing them with new or improved competences, which could make it easier for them to transit to the labour market.

5. Bologna Process and employability: qualitative assessment

Bologna Process reforms have put great emphasis on graduates' employment, but this quantitative goal could reduce the incentive of universities to focus more on the quality of jobs of their graduates rather than on the number of their graduates in the labour market (Angeloni, 2019). In terms of research goals: Do Bologna students obtain higher quality jobs?   It is hard to measure the overall quality of jobs. The literature has identified some key dimensions including employment security, job autonomy, task discretion, control,

variety of work, earnings, fringe benefits, opportunities for training programmes and career development (Angeloni, 2019). In this study, only two of those dimensions were used to assess job quality. It is proposed to estimate, on the one hand, if the Bologna Process could have had a positive effect on getting a permanent job (good job) versus a temporary job (bad job), and, on the other hand, if Bologna Process has allowed university graduates to earn higher wages as compared to graduates educated under pre-Bologna programmes. Examples of research using these two quality employment indicators among university graduates are to be found in Garra (2013), Farcnik and Domadenik (2012), Bosio and Leonardi (2011), Schomburg and Teichler (2011), and Ertl (2013).

5.1. Job stability

As it was stated when describing database (Table 1), Bologna students have less stable jobs. In order to analyse whether this is the consequence of the education obtained according to the university program, the probit model used for estimating the probability of employment will be applied in order to estimate the probability of getting a permanent job as an employee**.** Given that this estimate will only take into account employees, the dependent variable takes value 1 if the employee has a permanent contract, and 0 if the employee has a temporary one. We will estimate five models, where the first three ones coinciding with those proposed for estimating the probability of employment. Now, models four and five correspond to the sample split into employees educated under the Bologna Process (model IV) and pre-Bologna university programmes (model V). The reason for this is that, as only employees are included now, it is possible to include the variable *learning* in the estimate, thus assessing to what extent the education acquired according to the university plan may have influenced the fact of getting a permanent contract.

The outcomes of the probit model (Table 6) show that studying under the Bologna Process reduces the probability of getting a permanent contract. That is, studying under the Bologna Process seems to be a barrier when looking for a quality job, understood in terms of stable employment[2]. This result is in line with that one obtained in Bosio and Leonardi (2011) analysis in case of men.

TABLE 6

On the other hand, a satisfactory assessment of the education acquired (*learning* variable in Model III) positively influences the probability of getting a permanent contract, as expected. However, when splitting the sample depending on the university programme (models IV and V), no differences related to the marginal effect of this variable are observed, thus indicating that the education received under the Bologna Process does not mean an advantage over other pre-Bologna university programmes. This outcome is in line with the one stated when commenting on Table 4: education changes introduced by the Bologna Process do not seem to improve graduates' working expectations.

5.2. Wages

Wages are one of the most common tool to measure professional success among those who have found a job (Monks, 2000; Shwed and Shavit, 2006; Brunello and Cappellari, 2008; Birch et al., 2009; Triventi and Trivellato, 2012). It does not only indicate worker's welfare state, but also job quality (Angeloni, 2019).

Following the comments when describing the sample, data seem to indicate that workers educated under the Bologna Process earn lower wages than those under pre-Bologna

university programmes. However, it is necessary to carry out a wages estimate to measure the statistical significance of Bologna Process impact on wages. A traditional wage equation like Mincer (1958) type will be estimated:

$$LnW = \beta X + \alpha \lambda + u \tag{2}$$

where *LnW* is the net monthly earnings logarithm, *X* is the vector related to worker's characteristics and those of his firm; λ is a dichotomous variable that takes value 1 if the student has been educated under the Bologna Process and 0 if he was educated under pre-Bologna university programmes; and *u* stands for the error assumed to be independently distributed following a 0 average and σ_u^2 variance

As wage information is given in intervals, we will use the interval estimate method where the dependent variable for an individual *i* is placed within a given interval (Stewart,1983). If the wage of an individual *i* is placed in interval k_i

$$A_{k-1} \leq LnW \leq A_k \tag{3}$$

where A_{k-1} and A_k are interval's upper and lower limits respectively, the likelihood function of the observed sample is

$$L = \sum_{k=1}^{K} \sum_{i \in k} \log \left[F\left(\frac{A_k - X_i \beta_i}{\sigma} \right) - F\left(\frac{A_{k-1} - X_i \beta_i}{\sigma} \right) \right] \tag{4}$$

where *K* is the number of observed wage intervals and *F* is the accumulative distribution function. The maximization of *L* allows obtaining consistent estimations for β and σ.

As it happened in previous analysis on the probability of employment, six models are proposed to estimate university programme impact on wages formation. Model I only introduces the university programme as an explanatory variable (Bologna Process=1 if the interviewed is a Bologna student; Bologna Process=0 if he/she is a pre-Bologna student). Model II adds variables related to the characteristics of individuals, and model III adds variables related to individual's education. This model III has also included a group of variables which are not present in employment probits, and which try to bring about the impact of the fit between higher education background and work on wages. Model IV adds variables related to the contract type, while models V and VI split the sample into workers educated under the Bologna Process and pre-Bologna university programmes in order to assess whether the fit between higher education background and work can affect wages in a different manner depending on the university programmes.

Estimates in Table 7 show a categorical outcome as far as Bologna Process impact on workers' wages: it has a negative and significant impact, no matter the model estimated. That is, studying under the Bologna Process means that workers get less remunerated jobs compared to those graduates under pre-Bologna university programmes[3]. This result is in line with that obtained by Bosio and Leonardi (2011) for the Italian case, while Garra (2013) shows a positive effect in case of women.

If we take Model IV as reference, as far the variables that approximate education are concerned, it proves that having studied at a public university implies earning lower

wages as compared to private universities. This result is in line with that obtained by Canal and Rodríguez (2020). The field of knowledge has a significant impact on wages (Humanities as reference), as well as having carried out part of the studies at foreign universities or studied other degrees.

TABLE 7

Those variables that approximate the fit between educational background and job become particularly relevant. Therefore, the fact that the required qualification level for a given job is higher than the one obtained at University (underqualified worker) allows the worker to access better remunerated jobs, while overqualification has a negative impact on wages; the fact that the field of knowledge of worker's education does not match the one required by the job, does have a negative impact on wages; likewise, to believe that the knowledge acquired at university can be used in the job has a positive and significant impact on wages. In short, the fit between the job and the education obtained guarantees earning higher wages, either under Bologna Process (model V) or under pre-Bologna university programmes (model VI). Besides, no significant differences are observed in the magnitude of the effect of these variables between both groups of workers.

Therefore, studying under Bologna Process seemed to have a negative impact on wages. However, the joint estimate does not allow evaluating the magnitude of this effect and contains some statistical problems that may affect the quality of the results (see Davia and Hernanz, 2004). In order to solve these methodological problems, an estimate method was proposed in which the sample was divided according to the type of university programme, to ensure that the behaviour of wages could be analysed separately for both

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groups of individuals. The two equations to estimate according to the variables included in model IV (Table 7), were:

$$LnW_{pb} = X_{pb}\beta_{pb} + u_{pb} \qquad (5)$$

$$LnW_b = X_b\beta_b + u_b \qquad (6)$$

where subscripts *pb* and *b* identify those workers who studied following pre-Bologna or Bologna university programme, respectively.

Table 8 shows the estimated values of the net monthly earnings logarithm[4]. The results show a difference of 0.075 points in the estimated values (1.02%), in favour of workers studying under pre-Bologna university programmes.

TABLE 8

A breakdown of wage differences was carried out using the Blinder-Oaxaca method (Oaxaca 1973a, 1973b), based on the estimates of equations (5) and (6). This way, the impact of the university programmes on wages could be assessed more accurately. Differences could be split into two components:

A: Differences due to different worker characteristics; different education characteristics (university and no university); different fit between the obtained university education and the one required for the job; and different job characteristics (endowments).
B: Differences due to pay structure (rewards). In this analysis, B should stand for extra wages related to, on the one hand, worker unobserved characteristics that employers

linked to worker's university programmes, and ,on the other hand, to the presence of some different job demand conditions for each university programme.

There are fundamentally two ways to calculate these components, depending on whether the coefficient structure corresponding to pre-Bologna or Bologna is used. In other words, depending on whether the wages of workers are evaluated in a scenario where there is either only Bologna Process or only pre-Bologna university programmes available. This research has chosen Bologna Process coefficient structure (equation (3)), because Bologna Process was predominant among Spanish university graduates when the survey was carried out (62.4%, according to the Ministry of Universities), and because the pre-Bologna university plan was about to finish at the time the survey was carried out. Therefore, the number of graduates following pre-Bologna university programmes did not reach 0.5% in 2017. So, we carry out the decomposition based on the following equation:

$$Ln\overline{W}_{pb} - Ln\overline{W}_b = \underbrace{\beta_{pb}(\overline{X}_{pb} - \overline{X}_b)}_{A} + \underbrace{\overline{X}_b(\beta_{pb} - \beta_b)}_{B} \tag{7}$$

where $Ln\overline{W}_{pb}$ and $Ln\overline{W}_b$ are the average (log) net monthly wage for both types of students; $\overline{X}_{pb}$ and $\overline{X}_b$ are vectors of mean values for variables representing workers' and firms' characteristics; and β_{pb} and β_b are vectors of estimated coefficients (see an example of the application of this methodology to university education performance in Canal and Rodríguez (2020)).

The Oaxaca breakdown shown in Table 9 confirmed the previous results. Students' characteristics do not seem to mostly generate wage differences between both groups.

Particularly, these characteristics only account for 36% of the total differences. The remaining difference of the estimated wages (around 64%) is mainly explained due to differences in the assessment of worker's characteristics performed by the labour market, which favours workers educated under pre-Bologna university programmes, as it is stated in Table 9[5]. Given that the student did not choose to follow the Bologna Process (which could have caused a self-selection bias), but it was something brought about by the application of regulations, there are no reasons indeed to understand that wage differences are mainly determined by differences in the characteristics of both groups of workers. Therefore, it is logical to think that the differences of the estimated wages are mainly explained because of those differences in the assessment of worker's characteristics performed by the labour market.

TABLE 9

In order to better understand the reasons for this wage difference in favour of pre-Bologna students, Table 10 details the contribution (endowments plus rewards) of the four groups of variables included in wage equations (2) and (3).

TABLE 10

As this table shows[6], personal characteristics tend to narrow wage differences around 50%. Among these, the age is the most influencing one. Likewise, suitability between the studies and the education required for the job, tend to narrow those wage differences by 22% (besides, the suitability between education level, field of knowledge and the use of such knowledge in the job, influence to the same extent). However, adding up both effects

is not enough to eliminate the differences. Job characteristics tend to widen wages differences in favour of pre-Bologna students by 27% (in this respect, working in the service sector exercises a more relevant influence). Anyway, it is student's university and no university education characteristics that surely influence wage differences in favour of pre-Bologna students widening such by 145%. In relation to education characteristics, having studied at a public university and, specifically, in the field of Engineering and Architecture and Health Sciences dramatically widens wage differences in favour of pre-Bologna students.

6. Conclusions

The European Commission has expressed their interest in the assessment of Bologna Process oobjetives (European Commission, EACEA and Eurydice, 2015, 2018, 2020) using descriptive indicators. However, as point out Kroher et *al.* (2021), causal evidence regarding the effects of the Bologna Process on labour market outcomes is very limited. For such reason, the current research remarkably contributes to assessing Bologna Process, as it uses econometrics to identify Bologna Process causal effect on university student employability, both from a quantitative and qualitative point of view.

The outcome of this research seems to indicate that the reforms implemented by the Bologna Process in 2007 have not had a significant effect on graduates' employability compared to those educated under pre-Bologna university programmes, in the Spanish case. Particularly, the application of the Bologna Process has neither enhanced the probability of employment, nor speeded up exiting unemployment. On the other hand, it slightly worsens wages as the labour market poorly assesses university education under

the Bologna Process. Lastly, it increases the probability of graduates to have a temporary contract.

Those changes in the Spanish university teaching system have not caused an improvement of students' education compared to previous university programmes. This can be inferred from the assessment the labour market carries out in terms of employability. The labour market indeed perceives that shortening the length of the most popular university degrees in the pre-Bologna university programmes (5-year Bachelor's degree) to 4-year Degrees implies a decrease in education quality.

The lack of financing to approach the required changes (technical ones related to new technologies, classroom layout for smaller groups, hiring more teachers/professors to lighten teaching and provide them with more free time for research activities, financing students' mobility, teachers' training in new technologies and languages, setting up entities to liaise with companies to define the skills demanded by the labour market, etc.) is to be found as the origin of most reasons why Bologna Process has been a failure. If we see the data provided by World Bank in 2006, the year prior to the implementation of the Bologna Process in Spain, government expenditure per tertiary student (% of GDP per capita) was 23% (a percentage lower than, for example, that of Germany, France, the UK or Ireland, and just 1 percentage point over Italy), thus increasing the percentage to 28.6% in 2009. From that moment, as the number of students educated following the Bologna Process was increasing, and, accordingly, were those financing needs, we could see a continuous decrease of public expenditure per student, which reached 21.8% in 2016 (latest data provided).

Besides, as Spain is a country divided into Autonomous Communities, these manage their own university budge following different criteria based on the region's own features and according to their regional GDP, the number of students and teachers, etc., thus contributing to dismantling national university policies (Toledo, 2015).

Following the foregoing comment, poor financing is not the only aspect to be considered, but also the lack of a homogenous education policy at national level when implementing Bologna Process, which has reduced its efficacy. Policy competences in terms of higher education have been transferred to the 17 Spanish Autonomous Communities, which are developing local education strategies that do not really match the increasing market competitiveness (Canal, 2021). According to De la Torre et *al*. (2018), the Spanish adaptation to Bologna Process reflects such atomisation: it was a voluntary process involving universities with heterogeneous strategic objectives. Each university has its own strengths, weaknesses, opportunities and threats, and no single recipe is valid for all universities (De la Torre and Pérez-Esparrells, 2019).

One of the consequences of this atomisation has been the generation of a university system that is too "compartmentalized" in terms of degrees and specialities, which makes it difficult to revisit university programmes and adapt degrees to Bologna Process (Toledo, 2015). The autonomous structure of Spanish University has prompted the creation of new degrees for decades, due to a financing based on student's quantity criteria (not teaching quality), which has led to an internal competition among Autonomous Communities to offer that specific product that could attract the highest possible number of clients-students (Canal, 2021). This has also internally put some pressure on the University in itself, which can regard new degrees as power tools for and in its university

policy (Toledo, 2015). In this sense, Ruiz-Gallardo and Castaño (2008) consider it necessary to reduce the number of degrees and harmonise them according to the European ones. Following the outcomes obtained herein, such degree restructuring has neither been carried out, nor the criterion defined in the Bologna Process been followed, where curricula design by competences must have the purpose of enabling graduates to optimise their education for better employability.

TABLES

Table 1. Descriptive statistics according to the university programme.
Mean values indicate percentages, except for age (years)

	Bologna		pre-Bologna	
	Mean	Stand. Dev.	Mean	Stand. Dev.
Male	0.39	0.489	0.48	0.500
Age in 2019	31.50	7.047	33.52	6.922
Spanish	0.99	0.111	0.99	0.094
Public university	0.81	0.392	0.92	0.277
Humanities	0.10	0.299	0.10	0.302
Social and legal Sciences	0.50	0.500	0.39	0.488
Sciences	0.08	0.271	0.10	0.299
Engineering and Architecture	0.15	0.362	0.30	0.458
Health Sciences	0.16	0.370	0.11	0.310
Other degrees	0.21	0.409	0.27	0.443
Master	0.53	0.499	0.39	0.487
Doctorate	0.02	0.127	0.01	0.117
Employed	0.86	0.351	0.86	0.349
Permanent job*	0.55	0.497	0.61	0.488
Unemployed	0.08	0.270	0.07	0.261
Inactive	0.06	0.246	0.07	0.252
No. observations	19,123		12,528	

* No. Observations: Bologna (16,372), pre-Bologna (10,752)
Source: EILU-2019

Table 2. Current net monthly earnings (percentage of workers in each interval)

	Bologna	pre-Bologna
Less than €700	7.11	5.97
Between €700 and €999	10.26	8.52
Between €1,000 and €1,499	32.94	30.30
Between €1,500 and €1,999	31.01	28.20
Between €2,000 and €2,499	11.71	15.07
Between €2,500 and €2,999	3.77	5.85
From €3,000 onwards	3.21	6.09

Source: EILU-2019

Table 3. Wages distribution according to the fit between higher education background and work.

	Required Qualification level (vertical fit)			Required field of knowledge (horizontal fit)			Knowledge is used (competence fit)	
	Overqualified	Suitable	Underqualified	Equal	Similar	Different	Yes	No
Less than €700	32.0%	28.1%	32.0%	28.4%	30.5%	36.6%	29.7%	37.2%
Between €700 and 999	21.8%	23.1%	21.8%	20.8%	24.1%	26.4%	23.2%	26.1%
Between €1,000 and 1,499	27.8%	28.2%	27.8%	27.7%	28.5%	25.0%	28.0%	25.4%
Between €1,500 and 1,999	12.5%	15.7%	12.5%	17.3%	12.7%	9.0%	14.2%	8.3%
Between €2,000 and 2,499	3.6%	3.4%	3.6%	4.2%	2.9%	1.8%	3.3%	1.8%
Between €2,500 and 2,999	1.2%	0.8%	1.2%	0.8%	0.8%	0.6%	0.8%	0.5%
From €3,000 onwards	1.1%	0.8%	1.1%	0.9%	0.7%	0.7%	0.7%	0.6%

Source: EILU-2019

Table 4. Probit regression models to estimate the probability of employment

	Model I Coef.		Model II Coef.		Model III Coef.		Model IV Coef.		Model V Coef.	
Constant	1.072	***	1.177	***	0.981	***	1.452	***	0.741	***
Bologna Process	-0.009		-0.005		0.010		-0.026		0.036	
Personal characteristics										
Man			0.122	***	0.066	***				
Age			-0.007	***	-0.009	***	-0.021	***	-0.001	
Spanish			0.022		-0.035		-0.125		0.020	
Disability			-0.430	***	-0.368	***	-0.565	***	-0.186	**
Married			0.229	***	0.180	***	0.551	***	0.007	
Other marital status			0.250	***	0.251	***	0.525	***	0.098	
University education										
Public university					-0.191	***	-0.105	***	-0.251	***
Sciences					0.336	***	0.391	***	0.304	***
Social Sciences					0.293	***	0.372	***	0.249	***
Engineering and Architecture					0.703	***	0.816	***	0.566	***
Health Sciences					0.697	***	0.715	***	0.679	***
Scholarship for excellence					0.089	**	-0.007		0.155	***
Part of studies abroad					0.048	**	0.016		0.068	***
Other degree studies					0.163	***	0.115	***	0.190	***
Other master studies					0.073	***	0.006		0.115	***
Other Doctorate studies					-0.147	**	-0.023		-0.246	***
Further education										
No. of languages					-0.001		-0.009		0.006	
Basic IT knowledge					0.099		0.021		0.145	
Trainee at companies					-0.067	***	-0.020		-0.102	***
Marginal Bologna Process effects	-0.001		-0.001		0.002		-0.005		0.008	
Log pseudolikelihood	-12,990.18		-12,910.27		-12,521.01		-4,931.04		-7,509.92	
No. of observations	31,651		31,651		31,651		13,595		18,056	

Reference: Single; Humanities. * significant at 10%; ** significant at 5%; *** significant at 1%.
Source: EILU-2019

Table 5. Exploring learning in the transition from higher education to the current job: determining factors to get the current job. Mean values.*

	Bologna	Pre-Bologna
Basic competences		
Speak languages	3.13	3.05
Knowledge or command of computer and ITCs	3.41	3.45
Business competences		
Theory knowledge	3.63	3.58
Practice skills	4.00	3.84
Conceptual competences		
Management, planning and entrepreneurship	3.98	3.92
Personal competences		
Social and personal competences: character, soft skills, communication, team work	4.27	4.19
Learn	*3.74*	*3.67*

*The scale is: 1=None; 2=A little; 3=Something; 4=A lot; 5=Quite a lot
Source: EILU-2019

Table 6. Probit regression models to estimate permanent employment probabilities

	Model I		Model II		Model III		Model IV		Model V	
	Coef.		Coef.		Coef.		Coef.		Coef.	
Constant	0.589	***	0.021		-0.174	*	-0.183		-0.274	
Bologna Process	-0.229	***	-0.165	***	-0.119	***				
Personal characteristics										
Man			0.260	***	0.183	***	0.189	***	0.159	***
Age			0.017	***	0.014	***	0.013	***	0.016	***
Spanish			-0.171	**	-0.215	***	-0.268	***	-0.112	
Disability			0.005		0.044		0.090		-0.077	
Married			0.237	**	0.212	***	0.208	***	0.216	***
Other marital status			0.111	*	0.135	**	0.164	**	0.062	
University education										
Public University					-0.104	***	-0.071	***	-0.303	***
Sciences					0.081	**	0.025		0.177	***
Social Sciences					0.320	***	0.278	***	0.432	***
Engineering and Architecture					0.571	***	0.561	***	0.625	***
Health Sciences					-0.060		-0.033		-0.100	
Scholarship for excellence					0.126	***	0.183	***	0.052	
Part of studies abroad					0.149	***	0.135	***	0.175	***
Other degree studies					0.011		-0.078	***	0.120	***
Other master studies					-0.095	***	-0.058	***	-0.190	***
Other Doctorate studies					-0.586	***	-0.511	***	-0.720	***
Further education										
No. of languages					-0.016		-0.006		-0.038	
Basic IT knowledge					-0.237	***	-0.263	***	-0.181	***
Trainee at companies					-0.057	***	-0.102	***	-0.019	
Education Assessment										
Learning					0.073	***	0.066	***	0.089	***
Marginal Bologna Process effects	-0.082	***	-0.058	***	-0.040	***				
Marginal Learning effects							0.024	***	0.027	***
Log pseudolikelihood	-14,541.28		-14,216.58		-13,757.84		-8,755.92		-4,950.38	
No. of Remarks	23,130		23,130		23,130		14,075		9,055	

Reference: Single; Humanities. * significant at 10%; ** significant at 5%; *** significant at 1%.
Source: EILU-2019

Table 7. Wage equation estimate. Dependent variable: net monthly earnings logarithm

	Model I Coef.		Model II Coef.		Model III Coef.		Model IV Coef.		Model V Coef.		Model VI Coef.	
Constant	7.341	***	6.964	***	6.867	***	6.640	***	6.736	***	6.684	***
Bologna Process	-0.076	***	-0.047	***	-0.042	***	-0.061	***	-0.041	***	-0.078	***
Personal characteristics												
Man			0.143	***	0.111	***	0.097	***				
Age			0.007	***	0.007	***	0.002	***	0.002	*	0.001	
Spanish			0.050	**	0.045	**	0.025		-0.002		0.037	
Disability			-0.029		-0.014		-0.023		-0.029		-0.018	
Married			0.083	***	0.053	***	0.041	***	0.079	***	0.014	*
Other marital status			0.059	***	0.065	***	0.031	**	0.053	**	0.020	
University education												
Public University					-0.071	***	-0.044	***	-0.041	***	-0.046	***
Sciences					0.085	***	0.041	***	0.040	***	0.047	***
Social Sciences					0.106	***	0.069	***	0.084	***	0.064	***
Engineering and Architecture					0.250	***	0.166	***	0.178	***	0.154	***
Health Sciences					0.202	***	0.177	***	0.178	***	0.176	***
Scholarship for excellence					0.145	***	0.116	***	0.110	***	0.120	***
Part of studies abroad					0.078	***	0.039	***	0.034	***	0.042	***
Other degree studies					0.060	***	0.045	***	0.050	***	0.040	***
Other master studies					-0.005		0.004		-0.009		0.013	***
Other Doctorate studies					-0.014		-0.022		-0.016		-0.019	
Further education												
No. of languages					0.026	***	0.011	***	0.010	**	0.013	***
Intermediate-advanced IT knowledge					0.071	***	0.042	***	0.053	***	0.031	**
Trainee at companies					-0.031	***	-0.018	***	-0.004		-0.032	***
Fit between higher education background and job												
Underqualified					0.043	***	0.026	***	0.049	***	0.011	
Overqualified					-0.271	***	-0.195	***	-0.173	***	-0.210	***
Similar field of knowledge					-0.008		-0.033	***	-0.025	***	-0.037	***
Different field of knowledge					-0.026	***	-0.048	***	-0.046	***	-0.047	***
Use of acquired knowledge					0.012	***	0.011	***	0.013	**	0.009	***
Job characteristics												
Permanent contract							0.248	***	0.295	***	0.216	***
Temporary contract							0.115	***	0.121	***	0.104	***
Self-employed/entrepreneur							0.418	***	0.460	***	0.351	***
Family aid							-0.002		0.042		-0.031	
Seniority at work							0.009	***	0.009	***	0.008	***
c^2	185.89		1785.18		4527.57		15728.03		6512.61		8348.63	
Prob>c^2	0		0		0		0		0		0	
No. observations	26,292		26,292		26,292		26,292		11,433		14,859	

Reference: Single; Humanities; Internship contract; suitably qualified; same field of knowledge

Models IV, V and VI also include variables related to the sector, professional category, company size and Region of the job position.

* significant at 10%; ** significant at 5%; *** significant at 1%. Source: EILU-2019

Table 8. Estimated values for the logarithm of the net monthly earnings

	No. of remarks	Average	Normal Deviation	Min.	Max.
pre-Bologna	10,709	7.340	0.426	6.147	8.377
Bologna	16,308	7.266	0.399	6.247	8.343

Source: EILU-2019

Table 9. Breakdown of wage differences between pre-Bologna and Bologna graduates.

	Decomposition following Bologna Process coefficients
Endowments	0.027 (36%)
Rewards	0.048 (64%)
Total	0.075

Source: EILU-2019

Tabla10. Contribution of explanatory variables to wage difference between pre-Bologna and Bologna graduates.

Total difference	0.075
Contribution to total difference	
Personal characteristics	-0.037
Job characteristics	0.020
Education characteristics	0.109
Fit between higher education background and work	-0.017

Source: EILU-2019

Figures

Figure 1. Survival in unemployment. Kaplan-Meier estimates
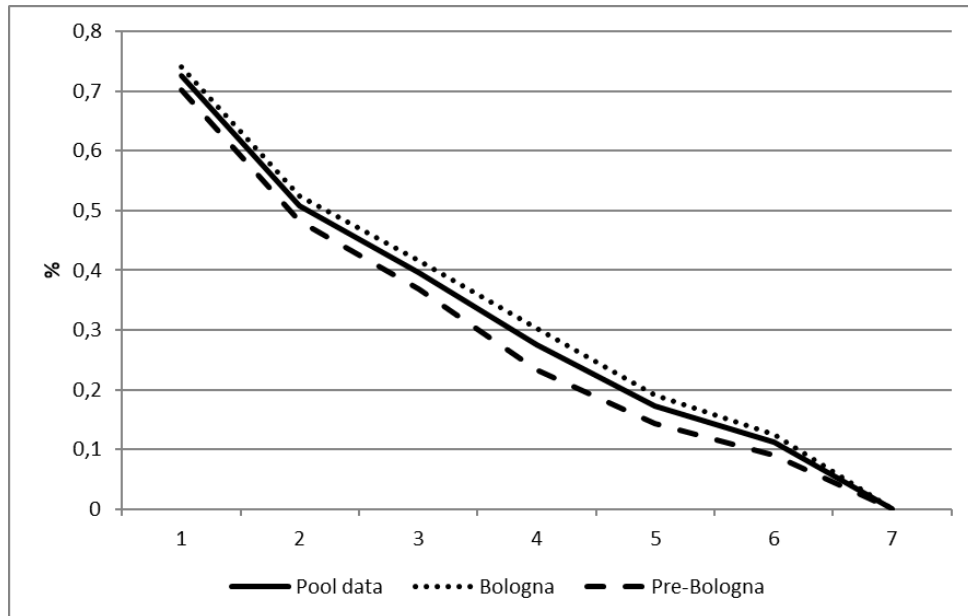
* 1: Students remained at least 6 months in the job they had while they were studying; 2: It took them at least 3 months to find a job; 3: It took them from 3 to 6 months to find a job; 4: It took them from 6 months to 1 year to find a job; 5: It took them from 1 year to 1 year and a half to find a job; 6: It took them from 1 year and a half to 2 years to find a job; 7: It took them more than 2 years to find a job.
Source: EILU-2019

Notes

1. In order to study the relationship between various ratings, Pearson correlation coefficients were calculated, and all coefficients were significant at 1% level.

2. No differences are found when estimating model III after having splitting the sample into men and women. The estimate is available to the reader.

3. As the sample is split into men and women, the negative impact of Bologna Process variable is kept when estimating model IV. The estimate is available to the reader.

4. The estimate is available to the reader

5. We must remember that some of the differences explained by coefficients may be due to characteristics which are no gathered by the variables (unobserved characteristics), and potential wrongful information collection.

6. The detailed information presented below is not stated in Table 10 due to the high number of variables required. However, it is available to the reader

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