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TÍTOL: RETURNS TO HIGHER EDUCATION

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ABSTRACT

In today's fast-paced world, education is more demanded than ever due to the increasingly competitive world. Returns to higher education is a topic that has been under research for many decades. This paper is aimed not only to understand the returns to higher education in Spain but also the difference between these returns. In the first section of this paper, a survey using non-random sampling has been conducted. It has been addressed to Spanish workers in order to understand the differences between Spanish employees with and without Bachelor. All in one, the survey points out that college graduates are more content with both their personal life and job. In the second section of the paper, descriptive analysis has been conducted to understand the difference between graduate returns focused on gender and field of study by region. Some Autonomous Communities appear to have a larger gender pay disparity than others, such as Catalunya and Castilla y León. Inversely, other regions, such as Extremadura, seem to show lower gender disparity. Furthermore, different field of study is rewarded differently among regions. An econometric model was developed in the final section of the paper. It aims to analyze the relationship between salary and several independent variables on a national scale using a multiple regression model. The findings support earlier research indicating men earn more than women. Workers who studied in a private university or remotely are observed to have higher salaries in comparison to those who studied at a public university or in-person, respectively. Experience also has a positive impact on salary. Finally, some fields of study seem to be more lucrative than others. Engineers and architects seem to earn the greatest salaries on average, followed by individuals in the field of Health Science. Graduates in the Science sector earn the least, followed by those in the Arts and Humanities. Finally, graduates in the field of Social Science and Law are positioned in the middle of the above-mentioned groups of workers.

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INTRODUCTION

One of the essential factors that determine how individuals and civilizations evolve is education. Education is considered one of the most important investments to thrive as a nation. It does not only provide general knowledge but enriches culture and improves health and the economy. That is one of the reasons why, parents, generation after generation, want their kids to prepare themselves for a fast-changing world through education.

In 2021 the Organization for Economic Co-operation and Development (OECD) average percentage of the population between 25 and 64 years old with tertiary education was 41,1%, while it was 40,7% in Spain (Instituto Nacional de Evaluación Educativa). Moreover, if we compare the proportion of Spain with the one of UE22 (which was 38,3 % in 2021), it can be seen how the tertiary educated population in Spain falls into a similar position to the countries that form the OECD (Appendix 1) and UE22 (Appendix 2).
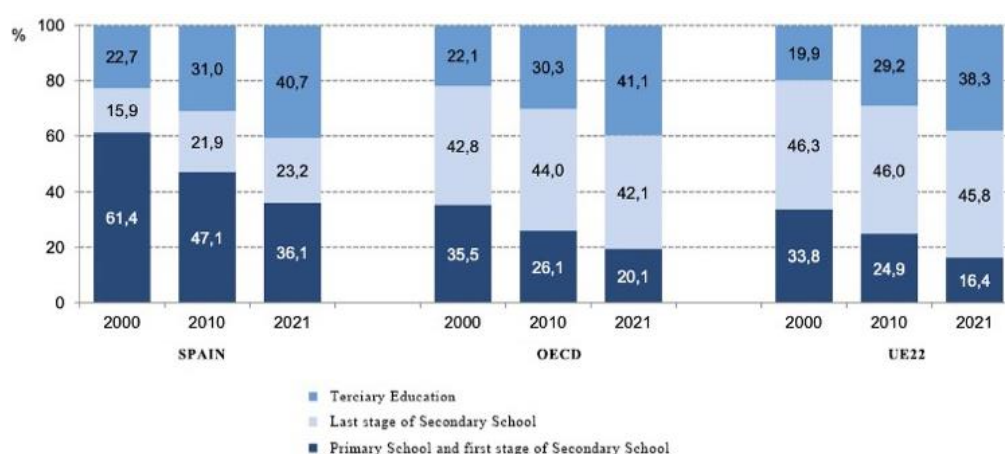
Figure 1: Evolution of studies held by adults (25-64 years old).[1]

Following the evolution of this proportion of educated people in Spain, it increased by 8,3 percentage points from 2000 to 2010 and by 9,7 pp from 2010 to 2021. The

[1] Note. Adapted from *Panorama de la educación 2022. Indicadores de la OCDE* (p. 17), Instituto Nacional de Evaluación Educativa, 2022. Ministerio de Educación y Formación Profesional (https://sede.educacion.gob.es/publiventa/descarga.action?f_codigo_agc=24121). In the public domain.

evolution points out the increasing trend of the Spanish population enrolling in tertiary education.

Tertiary education can be classified into four different subgroups: short-cycle tertiary education, Bachelor, Master, or PhD. If considering the different types of tertiary education and comparing the different countries in the graph, it can be noticed that many differences arise. In some countries, as is the case of Spain, the percentage of people holding short-cycle tertiary education reaches 12,4%. This number is high when compared with the average of the OECD (7,1%) or the UE22 (4,8%). In this paper, the return to higher education is going to focus on the Bachelor's level: thus, 11,1 % of the Spanish population between 24 and 65 years corresponds to this level. This proportion can be perceived as small if compared with other countries such as Ireland, the United States, or the United Kingdom, where this proportion lies between 25 to 29%. There could be plenty of reasons behind that, for instance, the higher proportion of the Spanish population holding short-cycle tertiary education or Master's compared to other countries.

Figure 2: Distribution of level of studies achieved by adult population (25-64 years old).[2]

Tertiary education in Spain is not mandatory. If one decides to attend college or not varies across individuals. Each one compares the different perceptions of the benefits

and costs associated to attend university and balances them to make a decision (Carneiro et al., 2010). When it is perceived that the returns of going for higher education exceed its costs, one must bear in mind that for being accepted into college, one must go through a competitive process. Admission decisions at Spanish universities are based on high school (Bachillerat[3]) grades, Selectivitat (national exams to enter university), and different tests depending on the undergraduate program that one wants to take part in. After taking the exams and getting a grade up to 14, each student applies for their preferences. Each Bachelor in each university has its own minimum grade to be accepted and it varies widely depending on the type of Bachelor, type of university, and Autonomous Community.

Therefore, studying the benefits that higher education brings to the population is crucial to understand the increasing attendance, effort, and money invested to reach this level.

The return to higher education is a topic that has been under research for decades by many different authors. For that matter, this paper is aimed to estimate the benefits of attending university in Spain. This paper not only investigates the returns to higher education but also studies the differences in these returns. Returns that schooling provides are not homogenous and vary depending on many variables such as gender, experience, field of study, or type of university attended. Moreover, the differences in these returns also vary depending on the region where the employee is working.

These benefits will be classified as non-pecuniary and pecuniary, which refer to non-money-related benefits and money-linked benefits, respectively. In the first group, a survey is going to be conducted. Here, we intend to understand the differences between college graduates and non-university attendees in terms of job benefits such as flexible schedules, remote work opportunities, and personal circumstances such as smoking or drinking habits, amongst other factors. When focusing on pecuniary effects, we are going to focus on college graduates' differences. We are going to run a multiple regression model to try to understand how independent variables such as, for instance: gender, field of study, experience, or type of university, affect the wage earned by those who graduated from college. As we are interested in the returns to higher education in

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[3] Note. Bachillerat is the last stage of non-mandatory Secondary School. It is comprised of two courses from which students can choose various modalities. Furthermore, Bachillerat is one of the paths to access Tertiary Education.

the area of Spain, only people who work here are being considered. Disparities between Autonomous Communities have also been explored, with a focus on gender and field of study through descriptive statistics.

The paper is structured as follows. First, we review literature written by other authors to understand their studies and conclusions. Next, we are going to start with the non-empirical part of the paper: we focus on the non-pecuniary benefits by conducting a survey of workers based in Spain to have some preliminary insights. Following, we concentrate on monetary benefits, specifically salary. In this part of the paper, we are going to have two different approaches. On the one hand, we are going to do a descriptive analysis to examine the differences between salary with a strong emphasis on gender and field of study among the different Autonomous Communities that form Spain. On the other hand, we are going to build an econometric model aiming to determine the effect of different independent variables on our dependent variable (Salary). These independent variables are gender, type of university (private or public, in-person or remote), a proxy for experience and field of study. For this, we are going to detail the dataset used along with the methodology, the regression model created, and present the major results. This part corresponds to the empirical evidence in our paper. In the last section, we provide some conclusions and leave room for further research.

LITERATURE REVIEW

In previous literature, holding a bachelor's degree has been linked to jobs with better returns. These returns can be either pecuniary, which is based on a monetary form, or non-pecuniary, which are other factors that cannot be measured in monetary terms, such as flexible schedules or access to health insurance.

Education is essential to benefit from scientific progress and develop as advanced societies. Nevertheless, education in Spain was not always mandatory. It was in 1990 when the *Ley de Ordenación General del Sistema Educativo (LOGSE)* was enacted, stating that education was mandatory and financed by the state for everyone until turning sixteen years old. Even though tertiary education is still not mandatory, the benefits from education are more noticeable currently than many years ago: the simple reason behind it, before 1850 only a few corresponded to educated people (Easterlin, 1981).

As stated before, we have different types of benefits, but one of the most noticeable returns to higher education is the salary. People with a Bachelor's degree or above make significantly more money than individuals with only a high school education (Brand and Xie, 2010; Tamborini et al., 2015a; Torche, 2011). But the returns to higher education are not homogeneous and scholars have offered many explanations. Many researchers have concluded that the choice of major is directly related to future earnings, being engineering and business the majors whose holders earn significantly higher salaries than the average (Berger, 1988; James et al., 1989; Rumberger, 1984). Other studies believe that graduates in Medicine, Economics, Law, and Math, in addition to the ones stated above, earn significantly more than the national average (Britton et al., 2016).

But the field of study is not the only factor that plays an important role when determining these benefits: different countries lead to different returns on education (Psacharopoulos, 1981). Only in the societies with the lowest levels of education is there a statistically meaningful positive correlation between education and growth, while it slows growth for those with high levels of knowledge (Krueger & Lindahl, 2001).

It is also important to say that students who graduated from selective colleges may benefit from wage premiums. The reason behind that is not the institution itself, but the ability and skills that the undergraduates needed to be admitted into that competitive high education organization (Brand and Halaby, 2006; Dale and Krueger, 2002). Other scholars back up selective college students' above-average skills by demonstrating that choosing a selective university enhances the probability of obtaining a degree in four years by approximately five percentage points (Smith, 2013). Nonetheless, other research conducted in the United States and the United Kingdom revealed that the prestige of the institution did not affect the salary premium (Long, 2008; Walker & Zhu, 2018).

Even though exists a positive correlation between university and salary, it does not affect gender in the same way. The college wage premium has a statistically significant favorable impact on men. For women, this impact is considerably smaller. Accordingly, it must be concluded that when deciding if to attend university or not, the wage premium is more a decision-maker factor for men rather than for women (Averette & Burton, 1996). These differences in wage start at labor market entry and tend to be persistent during workers' employment history (Tamborini et al., 2015b). Some articles suggest that the gender pay disparity might be explained by the fact that men are more likely than women to enter fields of study with a higher wage premium (Davies and Guppy, 1997). Furthermore, some researchers have found that this income disparity is widened for women who leave the labor force to care for their families (Courtioux & Lignon, 2016).

Bachelor's graduates also enjoy non-pecuniary benefits. Compared to employment available to non-college graduates, jobs held by those with more education provide a stronger sense of accomplishment, more independence and chances for innovation, and more social connections (Oreopoulos & Salvanes, 2011). Moreover, a study conducted in South Korea shows that graduates not only enjoy the mentioned benefits but those who have attended a 4-year college increase the probability of being married and pleased with their current life and company and decrease the probability of smoking (Kim, 2021). Overall, college graduates and their children are more likely to be

healthier than less educated individuals; as a result, adult mortality is lowered with education (Deaton & Paxson, 2001).

Aside from the above-mentioned positive aspects, education also reduces criminal behavior. This helps cut spending on police and courts while also reducing direct harm to victims of criminal acts (Lochner & Moretti, 2004). All of this contributes to a more peaceful and calm humankind.

Studies by other authors are essential for comprehending the research topic and knowing what to expect in our research paper. Along the following pages, we are going to examine how the results of this paper resemble other author's results or how far away are they from each other.

NON-PECUNIARY BENEFITS

In the first part of the paper, we have decided to conduct a survey. This survey is addressed to current or previous workers in the Spanish area. For this matter, out of the 240 people who answered the survey (N = 240), 3 of them have not been considered since they are not working in Spain. Therefore, our sample is conformed of 237 respondents. It is important to mention that the employees who answered, are living in the whole area of Spain, nevertheless, it may be the case that more respondents are from the Autonomous Community of Catalunya.

The aim is to try to understand some qualitative data that cannot be found in databases given by the government and have some first insights about the perceptions that workers in Spain have towards their job and personal life.

The respondents correspond to the so-called non-random sampling: they have been selected based on convenience, just supported by the fact that was easier to reach known people who would answer the survey. Therefore, we cannot make statistical inferences about the group that answered. Moreover, the sample is too small to draw conclusions. Despite the limitations, it can give us some ideas of the benefits of higher education.

To understand better the results, let's start analyzing the demographics of the sample.

Out of the 237 respondents, 59,07 % are formed by females while 40,93% correspond to males. This proportion is reasonable since it is difficult to have a sample that is exactly half women and half men. If we look deeper, we can say that 95,78% of the sample are Spanish while only 4,22% have a different nationality. Therefore, since the number of non-Spanish respondents is tremendously small, we cannot draw any hypothesis about the differences in nationalities.

40,93% 59,07%

■ Female ■ Male
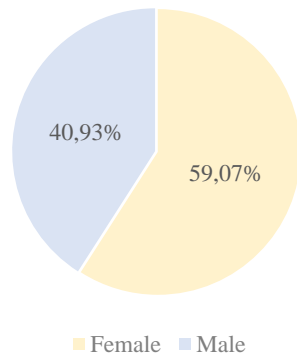
Figure 3: Distribution by gender.

4,22%

95,78%

■ Spanish ■ Other
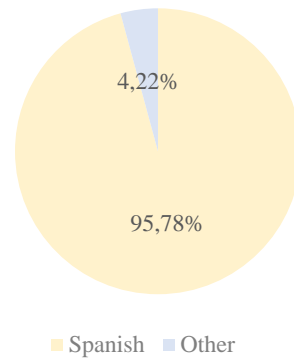
Figure 4: Distribution by nationality.

26,58%

73,42%

■ University ■ Non-college attendants
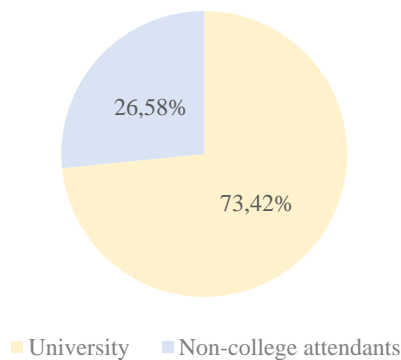
Figure 5: Distribution by the level of studies held.

If talking about the education that one has, it can be said that 73,42% of the sample are college graduates while only 26,58% do not hold a Bachelor. On the one hand, we can see in the following figure the level of education of people who have not graduated from university:

Figure 6: Non-college graduates' level of studies.

On the other hand, out of the Bachelor holders, we can see in the following figure the field of their studies:

Figure 7: College graduates' field of study.

Once we are familiarized with the demographics of the sample, we can start making hypotheses based on the respondents' answers. From here on, we are going to consider two different groups: the first group consists of college graduates (respondents who graduated from university), and the second group is made up of respondents who have not graduated from college. In the graph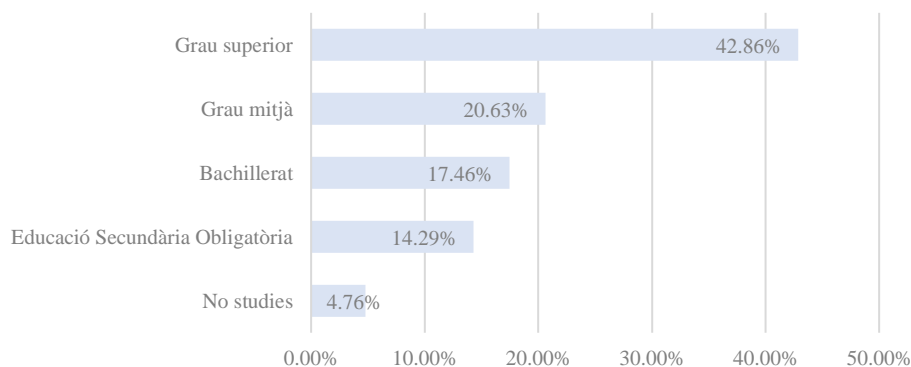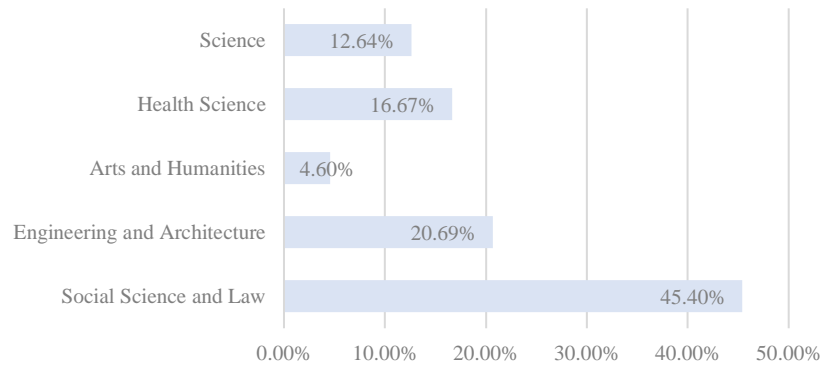ics where we can notice two colors, the blue bars represent the first group, while the yellow bars represent the latter group.

We are going to start by drawing some hypotheses about the personal life of the respondents. This includes habits such as drinking and smoking, marital status, and personal satisfaction related to their private life.

24,71% of graduates from university consider themselves cigarette consumers, compared to 33,87% of not graduates. Both groups are very similar in terms of the frequency of smoking, half consider that they smoke occasionally while the other half consider that they smoke frequently. Nevertheless, it looks like non-bachelor holders of our sample have more probability of smoking.
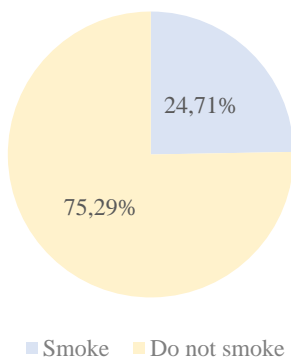
Figure 8: College graduates' smoking habits.
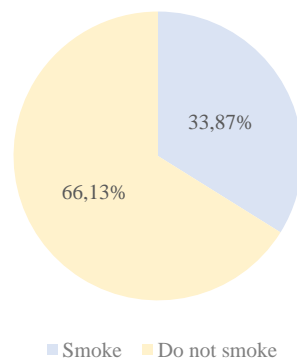
Figure 9: Non-graduates' smoking habits.

Following the same lines, 85,06% of the graduate workers state that they consume alcohol: 85,81% do it occasionally and 14,19% frequently. Conversely, 93,55% of the non-graduates express that they are alcohol consumers: 87,93% do it occasionally and only 12,07% do it frequently. Again, everything points out that non-bachelor holders of our sample drink alcohol with a higher probability.
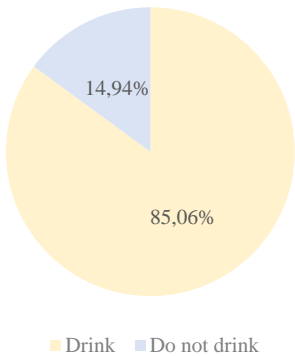
Figure 10: College graduates' drinking habits.
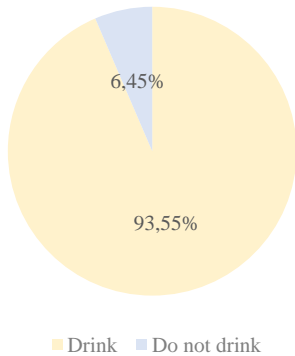
Figure 11: Non-graduates' drinking habits.
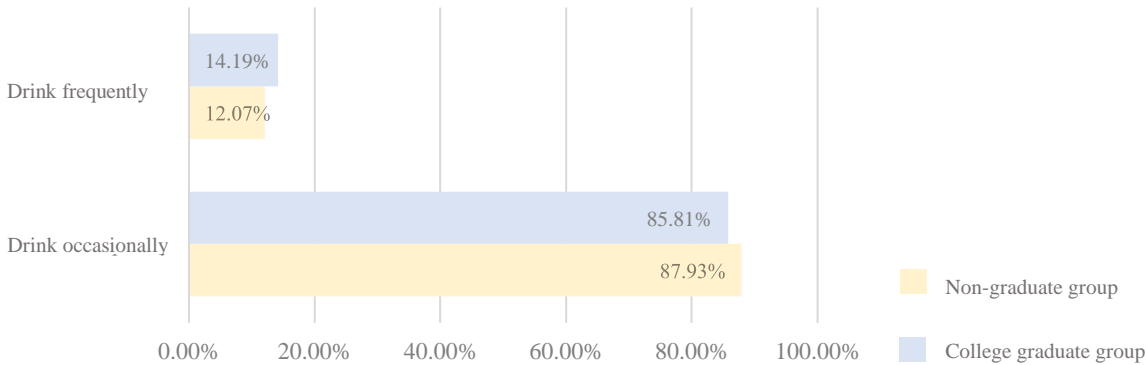
Figure 12: Frequency of drinking distribution.

When analyzing the marital status, only respondents with a minimum age of thirty years old have been considered. This is simply because in 2021 in Spain, according to Instituto Nacional de Estadística (INE), the average age to get married was 36,7 years old for women and 39,5 years old for men. We can see that, in our sample, we observe that bachelor holders are married in 52,04% of the cases, while non-bachelor holders are married in 49,18% of the cases. Therefore, it appears that bachelor graduates are married more frequently.
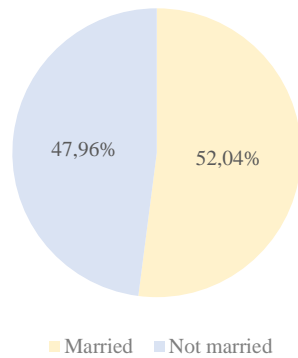
Figure 13: College graduates' marital status.   Figure 14: Non-graduates' marital status.
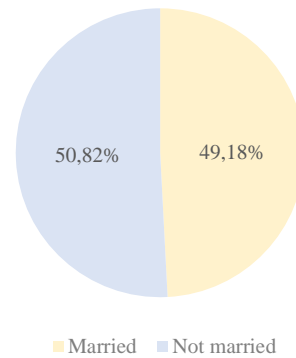
The survey was also asking a more general question about personal life welfare: 87,36% of the graduate respondents are satisfied with their personal life or would change a few things. The non-graduate respondents obtained a similar percentage but with a slight negative difference of 3,49%, therefore, non-college attendants seem to be happy with their private life in 83,87% of the cases.
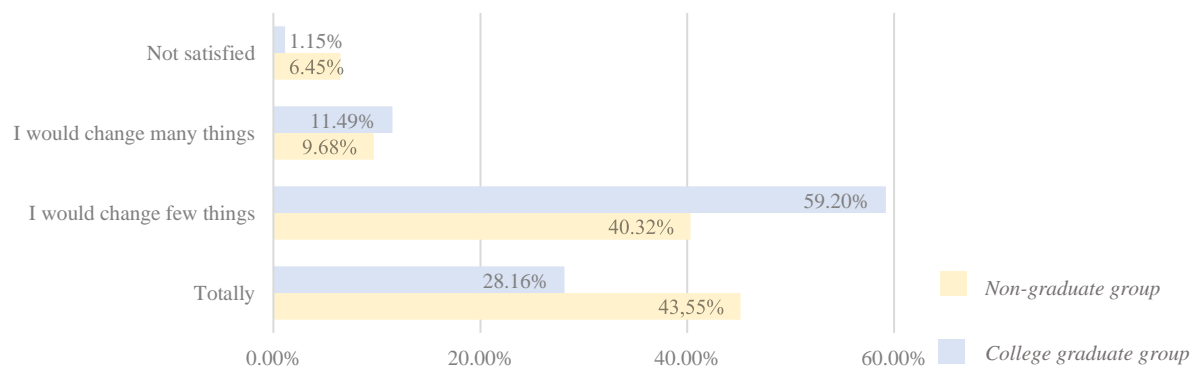
Figure 15: Personal life satisfaction distribution.

This last part of the survey is focused on the relation between the respondents and their jobs: facilities in finding jobs, non-pecuniary benefits, and satisfaction.

It was asked in the survey if they are currently working: 90,80% of the bachelor holders were working at the moment of answering the survey, compared to 88,71% of the non-graduate respondents. This difference is small, but it seems that there are more facilities to find a job holding a university degree.

9,20%

90,80%
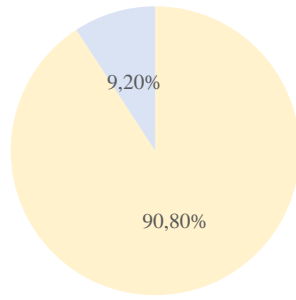
■ Currently working ■ Not working

Figure 16: College graduate employment situation.

11,29%

88,71%
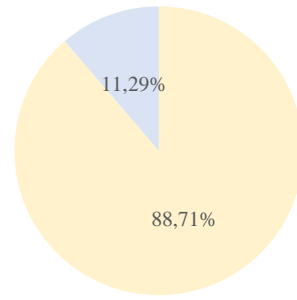
■ Currently working ■ Not working

Figure 17: Non-graduate employment situation.

Moving to the non-pecuniary benefits, we are going to focus on two: remote working and a flexible schedule. Starting with the possibility of working from home, we can say that 52,87% of the graduates of our sample can work from home if they want to, while only 46,77% of the non-graduates can. Moreover, 63,79% of graduates enjoy the benefit of a flexible schedule (having flexible starting and finishing hours), while only 58,06% of the non-graduates enjoy it. It looks like the Bachelor graduates are the ones that benefit the most from the mentioned benefits. This can be seen in the following figure, where, as before, the yellow bars represent the group that does not have graduated from university and the blue represents the college graduates:
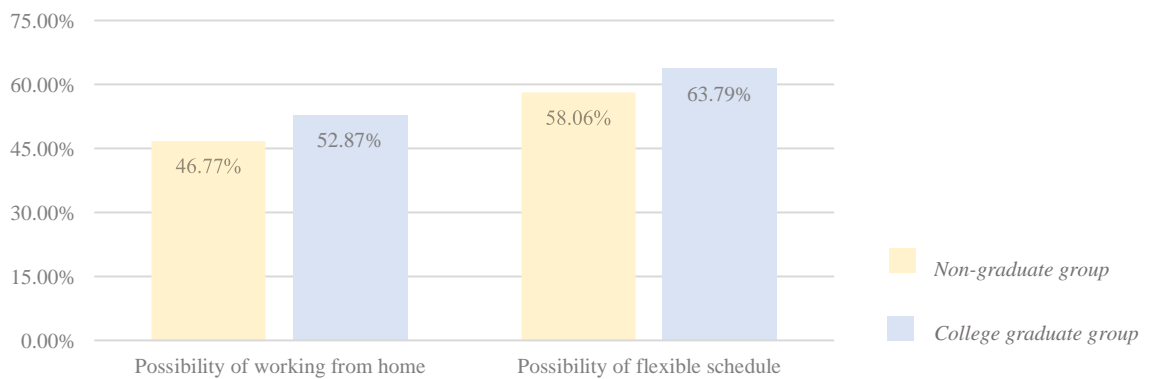
Figure 18: Non-pecuniary job benefits distribution.

Lastly, when talking about job satisfaction we find similarities: we observe that 75,87% of the graduates of our sample are satisfied with their current job or would change almost anything, compared to the 74,60% of the satisfied non-graduates. The difference is negligible, but once more, the Bachelor holder group appear to be more content with

their job. Furthermore, we can see the job satisfaction distribution in the following figure:
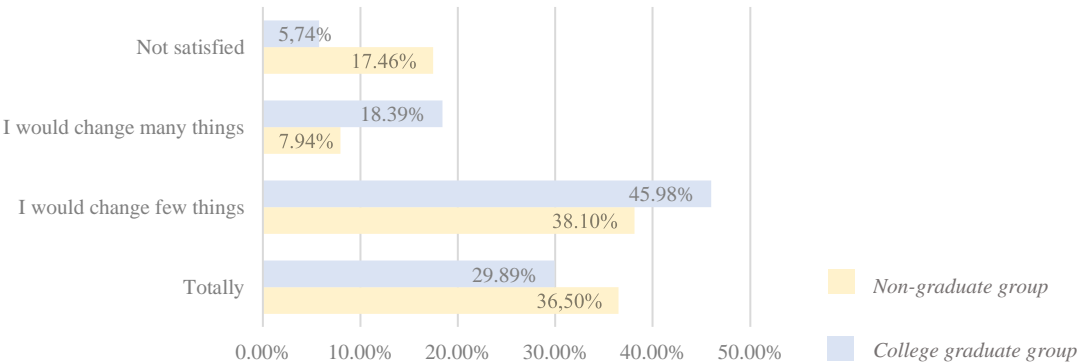
Figure 19: Job satisfaction distribution.

Recapitulating, it looks like college graduates of our sample do not only do it better in their professional life but also in their personal life. Bachelor's holders seem to find easier a job, with non-pecuniary benefits such as a flexible schedule and the possibility of working from home and they are more satisfied with their job. Moreover, it appears that the chances of getting married increase and that they have healthier habits such as smoking and drinking less: a more fulfilled personal life in general.

Once again, due to the small sample and probably biased nature of it, there are limitations in place which do not allow us to make any strong conclusion, we can just draw some hypotheses and have some insights.

PECUNIARY BENEFITS

Descriptive statistics: differences between Autonomous Communities

Spain is a big country with a lot of differences between regions. The country is made up of seventeen Autonomous Communities: Andalucía, Aragón, Principado de Asturias, Illes Balears, Canarias, Cantabria, Castilla - La Mancha, Castilla y León, Catalunya, Comunitat Valenciana, Extremadura, Galicia, Comunidad de Madrid, región de Murcia, comunidad Foral de Navarra, País Vasco and La Rioja.

The differences not only lay in the different governments of each region but also in their culture, gastronomy, and even language. Even though Spain is an extensive country in terms of land, its population density is not homogeneous, citizens are condensed in some regions as the ones on the east coast such as Catalunya and Comunitat Valenciana, Andalucía and Comunidad de Madrid, where the capital of the country is located (Madrid). For this matter, in this second part of the paper, we want to address the different opportunities that a worker in Spain would have in the different Autonomous Communities: differences in regions by gender and field of study have been analyzed. Unluckily, there was not enough data to create an econometric model, this is the reason behind the use of descriptive statistics.

Differences by gender

As is well known, it exists a gender gap between the salary that men and women earn performing the same job (Francesconi & Parey, 2018). The difference in average salary between men and women also varies depending on the Autonomous Community where the worker is employed. In order to see this difference in gender in the different regions, we have computed the average salary that a man and a woman earn in each region for the years 2009 to 2016[4] controlling for years after graduation, as a proxy for experience. This computation allowed us to calculate the average difference in gender salary by subtracting the average salary of women from the average salary of men. After that, two

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[4] Data that has been used is from 2009-2010, 2012-2013, 2013-2014, 2014-2015, and 2015-2016 courses.

ranking with the highest and lowest gender disparity has been created taking into account the proxy of experience:

1	Catalunya	2.399,542
2	Murcia (región de)	2.308,612
3	Castilla y León	2.280,804
4	Andalucía	2.139,982
5	Asturias (Principado de)	1.876,02
	Spain	**1.871,886**
6	Balears (Illes)	1.754,9
7	Madrid (Comunidad de)	1.686,002
8	Cantabria	1.648,982
9	Comunitat Valenciana	1.400,462
10	Galicia	1.340,832
11	Aragón	1.260,78
12	Castilla - La Mancha	1.074,536
13	País Vasco	1.066,94
14	Navarra (Comunidad Foral de)	982,24
15	Canarias	925,582
16	Rioja (La)	534,756
17	Extremadura	136,96

Table 1: Gender pay disparity one year after graduation.

1	Madrid (Comunidad de)	3.553,804
2	Castilla y León	3.317,912
3	Catalunya	3.255,486
	Spain	**2.754,202**
4	Asturias (Principado de)	2.521,296
5	Murcia (región de)	2.452,684
6	Andalucía	2.238,282
7	Cantabria	2.156,61
8	Galicia	2.130,128
9	Aragón	1.960,088
10	Navarra (Comunidad Foral de)	1.939,36
11	Rioja (La)	1.840,116
12	País Vasco	1.793,538
13	Comunitat Valenciana	1.777,8
14	Balears (Illes)	1.656,606
15	Castilla - La Mancha	1.489,936
16	Canarias	1.477,972
17	Extremadura	854,366

Table 2: Gender pay disparity four years after graduation.

When considering the gender pay disparity of workers with one year of experience, it can be seen that the national average is 1.871,886 € in favor of men. Catalunya is positioned first in the ranking with a gender inequality of 2.399,542 € per year, followed by region de Murcia (2.308,612 € per year) and Castilla y León (2.280,804€). Conversely, the Autonomous Communities where this gender disparity is the lowest are Extremadura (136,96 € per year), La Rioja (534,756 € per year), and Canarias (925,582 € per year).

If we consider this average difference in salary by gender of workers with four years of experience, the national average increases significantly to 2.754,202 € per year (approximately a 47% increase). This points out the increase in gender disparity when increasing the experience (years after graduation). In this case, the ranking starts with Comunidad de Madrid with a gender disparity of 3.553,804 € per year, followed by Castilla y León (3.317,912 € per year) and Catalunya (3.255,486 € per year). On the other hand, Extremadura (854,366 € per year), Canarias (1.477,972 € per year) and

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Castilla – La Mancha (1.489,936 € per year) are the regions with the lower difference between men's and women's average pay.

1	Rioja (La)	23.493,44
2	Castilla y León	22.549,44
3	Balears (Illes)	20.974,65
4	Catalunya	20.914,55
5	Madrid (Comunidad de)	20.664,89
6	Murcia (región de)	20.504,71
7	País Vasco	20.446,89
	Spain	**20.376,54**
8	Castilla - La Mancha	19.730,49
9	Aragón	19.037,74
10	Comunitat Valenciana	18.979,00
11	Cantabria	18.742,04
12	Canarias	18.598,50
13	Navarra (Comunidad Foral de)	18.471,62
14	Asturias (Principado de)	18.214,34
15	Extremadura	18.114,62
16	Andalucía	17.577,62
17	Galicia	17.179,20

Table 3: Women's average salary one year after graduation.

1	Navarra (Comunidad Foral de)	27.059,69
2	País Vasco	26.937,67
3	Catalunya	26.578,48
4	Rioja (La)	26.328,11
5	Madrid (Comunidad de)	25.838,37
6	Cantabria	25.544,9
7	Castilla y León	25.462,31
8	Balears (Illes)	25.249,62
	Spain	**25.083,17**
9	Aragón	24.514,44
10	Castilla - La Mancha	24.258,44
11	Asturias (Principado de)	23.911,56
12	Murcia (región de)	23.872,29
13	Comunitat Valenciana	23.801,94
14	Canarias	23.261,94
15	Andalucía	22.882,85
16	Extremadura	22.822,41
17	Galicia	22.761,09

Table 4: Women's average salary four years after graduation.

In the tables above we can see that the average salary of women at the national level is 20.376,54 euros per year with one year of experience and 25.083,17 euros per year for female with four years of experience. Women seem to earn the highest salaries in regions such as Catalunya, Comunidad de Madrid, and La Rioja. However, the lowest salaries for women seem to be earned in Galicia, Extremadura, and Andalucía.

1	Castilla y León	24.830,24		1	Catalunya	29.833,97
2	Rioja (La)	24.028,19		2	Madrid (Comunidad de)	29.392,17
3	Catalunya	23.314,09		3	Navarra (Comunidad Foral de)	28.999,05
4	Murcia (región de)	22.813,33		4	Castilla y León	28.780,22
5	Balears (Illes)	22.729,55		5	País Vasco	28.731,21
6	Madrid (Comunidad de)	22.350,90		6	Rioja (La)	28.168,23
	Spain	**22.248,43**			**Spain**	**27.837,37**
8	País Vasco	21.513,83		7	Cantabria	27.701,51
9	Castilla - La Mancha	20.805,03		8	Balears (Illes)	26.906,22
10	Cantabria	20.391,02		9	Aragón	26.474,53
11	Comunitat Valenciana	20.379,47		10	Asturias (Principado de)	26.432,86
12	Aragón	20.298,52		11	Murcia (región de)	26.324,98
13	Asturias (Principado de)	20.090,36		12	Castilla - La Mancha	25.748,38
14	Andalucía	19.717,60		13	Comunitat Valenciana	25.579,74
15	Canarias	19.524,08		14	Andalucía	25.121,14
16	Navarra (Comunidad Foral de)	19.453,86		15	Galicia	24.891,22
17	Galicia	18.520,03		16	Canarias	24.739,91
18	Extremadura	18.251,58		17	Extremadura	23.676,77

Table 5: Men's average salary one year after graduation.

Table 6: Men's average salary four years after graduation.

The average salary for men is 22.248,43 euros per year for workers with one year of experience, while it increases to 27.837,37 euros per year for men with four years of experience. The highest-paying regions for men seem to be Catalunya, Castilla y León, and Comunidad de Madrid. Inversely, Extremadura, Galicia, and Canarias appear to be the lowest-paying Autonomous Communities for men.

Differences by field of study

In this section of the paper, we will discuss the differences in regions based on the field of study. In this regard, we are comparing the average wage for workers in various fields of study in each Autonomous Community after one year of graduation.

1	Rioja (La)	24.011,408
2	Castilla y León	22.507,228
3	Catalunya	21.638,676
4	Murcia (región de)	20.875,062
	Spain	**20.682,12**
5	Madrid (Comunidad de)	20.558,886
6	País Vasco	20.268,526
7	Balears (Illes)	20.125,876
8	Castilla - La Mancha	19.452,086
9	Comunitat Valenciana	19.307,638
10	Aragón	18.673,174
11	Canarias	18.188,798
12	Andalucía	17.997,04
13	Navarra (Comunidad Foral de)	17.775,724
14	Cantabria	17.763,526
15	Asturias (Principado de)	17.635,07
16	Extremadura	17.574,004
17	Galicia	16.376,178

Table 7: Social Science and Law field average salary one year after graduation.

1	Castilla y León	25.204,214
2	Balears (Illes)	24.714,916
3	Catalunya	23.373,472
4	Murcia (región de)	23.318,486
5	Madrid (Comunidad de)	22.883,794
	Spain	**22.156,928**
6	País Vasco	21.525,648
7	Rioja (La)	21.255,066
8	Castilla - La Mancha	20.512,548
9	Cantabria	20.273,568
10	Aragón	20.159,81
11	Asturias (Principado de)	20.030,618
12	Andalucía	19.609,792
13	Comunitat Valenciana	19.432,444
14	Navarra (Comunidad Foral de)	19.429,948
15	Canarias	19.203,634
16	Galicia	18.642,568
17	Extremadura	17.942,86

Table 8: Engineering and Architecture field average salary one year after graduation.

In Spain, workers in the fields of Social Science and Law earn an average annual pay of 20.682,12 euros. La Rioja is the region where this type of worker seems to earn the most, namely 24.011,408 € per year. This region is followed by Castilla y León (22.507,228 € per year) and Catalunya (21.638,676 € per year). Conversely, the regions where they appear to earn the least are Galicia 16.376,178€ per year, Extremadura 17.574,004 € per year), and Principado de Asturias (17.635,07 € per year).

Engineers and architects earn 22.156,928 euros per year on average. In Autonomous Communities such as Castilla y León (25.204,214 € per year), Illes Balears (24.714,916 € per year), and Catalunya (23.373,472 € per year), these average pays rise. However, these salaries are also lower in regions such as Extremadura (17.942,86 € per year), Galicia (18.642,568 € per year), and Canarias (19.203,634 € per year).

	Arts and Humanities	
1	Rioja (La)	28.275,977
2	Extremadura	22.602,937
	Spain	**21.434,102**
3	Murcia (región de)	21.402,03
4	Aragón	21.374,01
5	Catalunya	20.840,736
6	País Vasco	20.525,14
7	Comunitat Valenciana	19.608,734
8	Balears (Illes)	19.508,185
9	Castilla - La Mancha	19.264,13
10	Madrid (Comunidad de)	18.876,416
11	Castilla y León	18.784,644
12	Andalucía	18.498,404
13	Galicia	16.479,67
14	Canarias	16.383,626
15	Asturias (Principado de)	-
15	Cantabria	-
15	Navarra (Comunidad Foral de)	-

Table 9: Arts and Humanities field average salary one year after graduation.

	Health Science	
1	Balears (Illes)	25.583,784
2	Rioja (La)	24.027,28
3	País Vasco	23.909,64
4	Castilla y León	23.110,136
5	Cantabria	22.839,07
6	Madrid (Comunidad de)	22.808,754
7	Catalunya	22.771,738
8	Comunitat Valenciana	22.768,078
	Spain	**22.352,566**
9	Asturias (Principado de)	22.309,878
10	Aragón	22.207,64
11	Castilla - La Mancha	21.911,296
12	Murcia (región de)	21.822,376
13	Navarra (Comunidad Foral de)	21.785,186
14	Canarias	21.756,132
15	Galicia	19.717,044
16	Andalucía	19.603,556
17	Extremadura	19.196,542

Table 10: Health Science field average salary one year after graduation.

If we concentrate on the Arts and Humanities, the average annual wage in Spain is 21.434,102 €. Only two Autonomous Communities outperform the national average: La Rioja (average salary of 28.275,977 € per year) and Extremadura (average salary of 22.602,937 € per year). Canarias (16.383,626 € per year), Galicia (16.479,67 € per year), and Andalucía (18.498,404 € per year) are the regions where workers are paid the least in the mentioned field. There is no data for the Principado de Asturias, Cantabria, or the Comunidad Foral de Navarra.

Workers in the field of Health Science earn an average salary of 22.352,566 € per year in Spain. Autonomous Communities such as Extremadura (19.196,542 € per year), Andalucía (19.603,556 € per year), and Galicia (19.717,044 € per year) are the regions with the lowest salary in the field. Nonetheless, salaries in Illes Balears can reach up to 25.583,784 € per year on average. Following the last-mentioned region, we can find Castilla y León, where employees earn 24.027,28 € per year, and País Vasco, where employees earn 23.909,64 € per year.

1	Castilla y León	18.453,012
	Spain	**17.821,17**
2	Catalunya	17.811,162
3	Madrid (Comunidad de)	17.692,436
4	Aragón	16.793,326
5	Comunitat Valenciana	16.532,1
6	Murcia (región de)	16.486,514
7	País Vasco	16.333,514
8	Andalucía	16.201,178
9	Extremadura	16.173,035
10	Canarias	15.942,49
11	Galicia	15.652,704
12	Castilla - La Mancha	15.321,653
13	Asturias (Principado de)	15.125,593
14	Balears (Illes)	-
14	Cantabria	-
14	Navarra (Comunidad Foral de)	-
14	Rioja (La)	-

Table 11: Science field average salary one year after graduation.

Science is the final field that has been considered, with an average pay of 17.821,17 €
per year. Castilla y León, with an average wage of 18.453,012 € per year, is the only
region that outperforms the national average. Regions where the workers earn the least
are Principado de Asturias (15.125,593 € per year), Castilla – La Mancha (15.321,653 €
per year), and Galicia (15.652,704 € per year). No data has been found for Illes Balears,
Cantabria, Comunidad Foral de Navarra, and La Rioja.

Econometric model

Methodology and dataset

This final part corresponds to the empirical approach of the paper. The econometric model created pretends to analyze the relationship between the salary and different independent variables on the national level, and hence at the Spanish level. As a result, the following formula was used to generate the multiple regression model:

$$\widehat{Salary} = \widehat{\beta_0} + \widehat{\beta_1}Gender + \widehat{\beta_2}Private + \widehat{\beta_3}Presential + \widehat{\beta_4}Experience$$
$$+ \widehat{\beta_5}Engineering\_Architecture + \widehat{\beta_6}Arts\_Humanities + \widehat{\beta_7}Health\_Science$$
$$+ \widehat{\beta_8}Science + \widehat{\beta_9}Unemployment\_Rate$$

The independent variables that have been chosen are the following: first and foremost, we believe there is a gender disparity between men and women in favor of men, and hence this variable (Gender) is vital for our model (Appendix 3). This hypothesis is supported by other authors (Francesconi & Parey, 2018). Gender is a dummy variable taking a value of 0 when the individual is a woman and a value of 1 when the individual is a man.

Another key independent variable is experience (Experience); as we did not have the data about experience available, data about years after graduation have been used as a proxy of experience (Appendix 4). Most likely, workers with greater expertise in the tasks performed earn more.

We also wanted to address the public-private educational debate in Spain, therefore we establish an independent variable that addresses this issue (Private). It consists of a dummy variable that takes a value of 0 when the individual studied at a public university and takes a value of 1 when the individual attended a private university. The evolution of this variable can be seen in Appendix 5. We believe that students who attend private universities have higher wage premium after graduating (Brand and Halaby, 2006; Dale and Krueger, 2002).

Moreover, we were interested in the effect of studying remotely or attending university in-person, the variable (Presential) has also been considered (Appendix 6). This variable is a dummy variable that takes a value of 0 when the individual attended university in-

person and takes a value of 1 when the individual studied remotely. We believe that studying remotely leads to greater earnings since the student's autonomy allows them to gather experience while learning.

The field of study is the last variable that has been considered (Appendix 7). As a result, we have five distinct categories of employees: those working in Social Sciences and Law, Engineering and Architecture (Engineering_Architecture), Arts and Humanities (Arts_Humanities), Health Sciences (Health_Science), and Science (Science). Individuals who studied Social Sciences and Law correspond to the reference group, meaning that all mentioned variables are equal to 0. The four different independent variables are dummy variables: they take a value of 0 if the individual did not study in that field, and they take a value of 1 if the individual studied in the field. We believe there is some field of study that provides the individual with a higher salary than other fields. For instance, we suggest that individuals who studied engineering or architecture earn more than those who studied arts and humanities (Berger, 1988; James et al., 1989; Rumberger, 1984).

Apart from considering the mentioned variables, one control variable has been added to lower standard errors: unemployment rate (Unemployment_Rate). We believe that exists a negative correlation between the unemployment rate and salary.

Finally, in order to check if the results of the model are consistent, we conducted two different tests: the Breusch-Pagan test for heteroskedasticity and the VIF test, for multicollinearity. On the one hand, heteroskedasticity refers to a situation where the variability of the errors is not constant among the independent variables, which could bias the results. On the other hand, multicollinearity is referred to a situation in which two or more independent variables are highly correlated, thus, making it difficult to attribute the individual effect of one single independent variable to the dependent variable. Of course, this could create some issues such as unreliable coefficients estimates or high standard errors, for instance.

As in this part of the paper we are estimating the pecuniary benefits of high education in Spain, the data which has been used has been extracted from El Ministerio de Educación y Formación Profesional (MEFP), specifically from the Ministerio de

Universidades. These two ministries correspond to the department of the Spanish Government which is responsible for the execution of the National Education Policies in the country and the department which focuses only on universities, respectively. Furthermore, some data has been extracted from the Instituto Nacional de Estadística (INE), which is in charge of producing public statistics data.

The data used correspond to the periods between 2009-2010 to 2015-2016. No more recent data has been found on the official website of the Government of Spain. When analyzing the results, it must be contemplated that during this period the Spanish housing bubble was affecting the economy of the country, thus, the results can be biased.

Data for the control variable (Unemployment_Rate) was extracted by year from the Instituto Nacional de Estadistica (INE). The remaining data was organized by academic year, for instance, the 2015-2016 course. For that matter, the control variable has been calculated by taking the weighted average of the two years that comprised the academic year represented.

Results and discussion

It is important to note, that the model shown in the paper is not the first model created (See Appendix 8). Indeed, the Breusch-Pagan test revealed that heteroskedasticity was present in the initial model (see Appendix 9). Nevertheless, robust standard errors were used in order to deal with heteroskedasticity.

The following table displays the model's result using robust standard errors:

Number of observations	= 718
F (9,708)	= 260,65
Prob > F	= 0,0000
R-squared	= 0,7845

Salary

	Coef.		Robust Std. Err.	t	p-value
Gender	2.112,608	***	170,6249	12,38	0,000
Private	1.575,136	***	168,2754	9,36	0,000
Presential	7.114,325	***	183,8979	38,69	0,000
Experience	1.552,017	***	80,37649	19,31	0,000
Engineering_Architecture	2.504,222	***	214,7416	11,66	0,000
Arts_Humanities	-172,7883		237,917	-0,73	0,468
Health_Science	836,0753	**	309,1599	2,7	0,007
Science	-1.353,088	***	265,2531	-5,1	0,000
Unemployment_Rate	-0,721789		61,61011	-0,01	0,991

*** statistically significant at 1%   ** statistically significant at 5%   *statistically significant at 10%

Table 12: Econometric model results using robust standard errors.

$$\widehat{Salary} = 17.314,84 + 2.112,608 Gender + 1.575,136 Private + 7.114,325 Presential$$
$$+ 1.552,017 Experience + 2.504,222 Engineering\_Architecture$$
$$- 172,7883 Arts\_Humanities + 836,0753 Health\_Science - 1353,088 Science$$
$$- 0.721789 Unemployment\_Rate$$

As can be seen, R-squared is 0,7845, meaning that we are explaining 78,45% of the variability of Salary by using the following variables: gender, experience, field of study, and type of university (private or public, in-person or remote).

Before starting with the analysis, we need to understand whether an independent variable is statistically significant or not. We can say that an independent variable is statistically significant if the p-value is below 0.05, meaning that this independent variable has a significant effect on the dependent variable. Conversely, if the p-value is above 0.05, the independent variable is not statistically significant, and therefore, it might be that the observed relationship may be due to chance.

Starting with the analysis, we can say that a worker with all independent variables equal to zero makes 17.314,84 euros per year (before taxes). This corresponds to a female worker, who just graduated from an in-person public university with a degree in the field of Social Science and Law. Having this individual, we are going to understand how each independent variable affect this base salary.

As we thought, in Spain there still exists a gender pay disparity between men and women. Gender variable is statistically significant with a p-value of 0,000, meaning that we reject the null hypothesis that all coefficients are zero at 1%. Controlling for all the other variables, a man would earn 2.112,608 euros more per year than a woman keeping the other variables constant. This means that a male would be making 19.427,448 euros per year compared to the 17.314,84 euros per year that a female would earn.

Private variable is also statistically significant at 1% with a p-value of 0,000. As we believed, workers that studied in a private university earn on average 1.575,136 euros more per year than those who studied in a public one. But we do not know exactly the reason behind that: there could be other reasons such as family's background and, therefore, we cannot claim causality.

Furthermore, we can see a significant difference between those who studied remotely and those who studied in person. With a p-value of 0,000, variable Presential is statistically significant at 1%. Employees who studied remotely seem to earn, on average, around 7.114,325 euros per year more than those who went physically to university. Again, we could think that this result has not considered important factors. For instance, this big difference could be because people who studied remotely had more time to work and gain experience while studying, and of course, this could bias the results. Consequently, we cannot assert causality.

Experience, specifically years after graduation, also plays an important factor in explaining an individual's salary. The variable is statistically significant at 1%, with a p-value of 0,000. As we believed, workers with experience earn on average 1.552,017 euros more per year compared to those who just graduated.

When looking at the field of study, it is noticeable that variables Engineering_Architecture and Science are statistically significant at 1% (p-value is 0,000). Health_Science variable, even though the p-value is 0,007, still is statistically significant at 5%. Nevertheless, the Arts_Humanities variable has a p-value of 0.468. This means that we cannot reject the null hypothesis and, as a result, the variable is not statistically significant, which means that we cannot guarantee that it has a direct effect on the dependent variable. Once this has been said, we can say that those who studied

Engineering and Architecture, as well as those who studied Health Sciences, earn more than those who studied Social Sciences and Law. Conversely, those who studied in the field of Arts and Humanities and those who studied in the field of Science, earn less than the Social Sciences and Law workers. On the one hand, graduates in Engineering and Architecture earn the most, with an average income premium of 2.504,222 euros per year, followed by graduates in Health Sciences, with a wage premium of 836,0753 euros per year. On the other hand, Science ranks first among the lower-paid fields, with a drop of 1.353,088 euros per year compared to the fields of Social Sciences and Law, followed by Arts and Humanities, where graduates earn 172,7883 euros less per year. Again, be aware that the result for the Arts_Humanities variable is not statistically significant, and we cannot guarantee that this variable has a direct effect on the dependent variable Salary.

Apart from conducting the Breusch-Pagan test for heteroskedasticity, we also conducted a VIF test for multicollinearity. As can be seen, the VIF values of all the independent variables are lower than 5 and, therefore, we do not find multicollinearity in the model.

Variable	VIF
Unemployment_Rate	3,04
Arts_Humanities	1,55
Engineering_Architecture	1,54
Health_Science	1,50
Science	1,49
Presential	1,03
Private	1,03
Gender	1,00
Years	1,00
Mean VIF	1,54

Table 13: VIF test result for multicollinearity.

CONCLUSIONS

Education is not only key to individuals but also to societal development, progress, and success. It plays a vital role in shaping the human mind and personality and equips individuals with the necessary skills, knowledge, and values to succeed in life.

Education is in more demand than ever due to the increasingly competitive world. In today's fast-paced world, education is no longer an option but a necessity. With globalization and the rapid advancement of technology, the world has become more competitive than ever before. Employers are increasingly seeking individuals with specialized skills, knowledge, and advanced studies to meet the demands of the global marketplace. Education provides individuals with the required skills to compete effectively in the job market and thrive in their careers. One must continue learning and expanding their skills to remain relevant in the workforce as technology evolves and industries become more specialized.

Altogether, education provides individuals with the knowledge and skills they need to live fulfilled lives and contribute meaningfully to society. It encourages critical thinking, problem-solving, and creativity, all of which are necessary for personal and societal development. Due to the importance of education for the workforce and the economy of a country, this paper investigates the returns to higher education in Spain and its differences.

In the first practical section of this study, a survey was distributed to Spanish citizens in order to gain some preliminary insights and compare the responses of those with and without a Bachelor's degree. This is not empirical evidence in any case, since the sample (N = 240) is small to make strong conclusions. Nonetheless, in our sample, we observed that Spanish citizens with a four-year Bachelor's degree demonstrated benefits not only in their job satisfaction but also in their personal life. Bachelor holders seem to have better health habits such as drinking and smoking less frequently, seem to marry more frequently, and are, generally, more satisfied with their personal life. Aside from that, college graduates seem to enjoy job-related benefits such as the possibility of working remotely and a flexible schedule more frequently, seem to be employed with a higher percentage and, are more content with their job.

Once we obtained these first insights and were able to compare people with and without Bachelor's degree opinions, we wanted to study the differences between regions. Spain is an extensive country made up of 17 autonomous communities with significant differences. For this matter, in this second section of the paper, we wanted to address these differences based on gender and field of study by region. When addressing gender, we have two different approaches. In the first approach, we have compared the gender disparity in pay between men and women in different regions. Gender disparity increases when the proxy of experience broadens. Gender wage inequality seems to be higher than the national average in regions such as Catalunya and Castilla y León, but lower in some regions such as Extremadura. The second approach examines where each gender earns the most and least. In the case of women, earnings seem to be greater in Catalunya, Comunidad de Madrid, and La Rioja, but lower in Galicia, Extremadura, and Andalucía. Men, on the other hand, have a similar situation: the highest-paying occupations appear to be in Catalunya, Castilla y León, and Comunidad de Madrid, while the lowest-earning jobs appear to be in Extremadura and Canarias. When disparities per field of study are examined, it is clear that each field is rewarded differently in each autonomous community. Engineers and architects, as well as those in the Science field, seem to have the highest-paying jobs in Castilla y León. Inversely, they usually find the least-paying jobs in Extremadura and La Rioja, respectively. La Rioja is the region that seems to pay the most to individuals who work in the Arts and Humanities field, as well as those who work in the field of Social Science. However, Arts and Humanities appear to be underpaid in Navarra, and Social Science workers appear to be underpaid in Galicia. Finally, the field of Health Science seems to be well-paid in the Illes Balears but poorly paid in Extremadura.

In the last section of the paper, we wanted to address the differences between college graduates. For that matter, we created a database with data extracted from the Ministerio de Educación and Instituto Nacional de Estadística (INE) in order to run a regression model which could explain the contribution of some independent variables to the dependent variable, salary. The data corresponds to the period between 2009 and 2016, no more recent data was provided by the government. It seems to exist a gender pay disparity between men and women, specifically a difference of 2.112,608 euros more per year in favor of men. Studying in a private university also appears to bring higher salaries, on average 1.575,136 euros per year more compared to graduates who studied

in a public university. Moreover, it also seems to exist a difference between people who studied remotely and people who attended university in-person: graduates who studied remotely seem to earn, on average, 7.114,325 euros per year more than those who attended school in-person. Experience also has a positive impact on salary, approximately 1.552,017 euros more per year. Field of study was also considered when the model was designed: the highest-paid workers seem to be those in the field of Engineering and Architecture and those in the field of Health Science. Compared to those who studied in the field of Social Science and Law, engineers and architects earn on average 2.504,222 euros more per year, and workers in the Health Science field earn approximately 836,0753 euros more per year. Conversely, graduates in the field of Science seem to earn the least, specifically 1.353,088 euros per year compared to the fields of Social Sciences and Law, followed by graduates in the field of Arts and Humanities (172,7883 euros less per year). It is worth noting that the last variable, Arts_Humanities, is not statistically significant, thus we cannot find strong evidence that it has an effect on the dependent variable salary.

This paper highlights the advantages of attending university: higher education not only seems to provide job-related benefits, but it also boosts general personal satisfaction. Nonetheless, the returns to higher education are not homogeneous and vary greatly depending on factors such as gender, experience, university type, or field of study. Furthermore, geographical areas, in this case, Autonomous Communities, exhibit significant inequalities as well.

Unfortunately, the latest recent government data is from 2016. In further research, it would be beneficial to examine how COVID-19, the illness that paralyzed the world for several months, influences the return to higher education in the area of Spain. Aside from that, we think it would be interesting to see how other variables, such as nationality or a proxy for family background, for instance, would influence the outcome.

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APPENDICES

Appendix 1: OECD Member countries[5]

OECD Member countries					
Australia	Czech Republic	Hungary	Latvia	Poland	Türkiye
Austria	Denmark	Iceland	Lithuania	Portugal	United Kingdom
Belgium	Estonia	Ireland	Luxembourg	Slovak Republic	United States
Canada	Finland	Israel	Mexico	Slovenia	
Chile	France	Italy	Netherlands	Spain	
Colombia	Germany	Japan	New Zealand	Sweden	
Costa Rica	Greece	Korea	Norway	Switzerland	

Table 14: List of OECD Member countries.

Appendix 2: UE22 Member countries

UE22 Member countries					
Austria	Estonia	Greece	Latvia	Poland	Spain
Belgium	Finland	Hungary	Lithuania	Portugal	Sweden
Czech Republic	France	Ireland	Luxembourg	Slovak Republic	
Denmark	Germany	Italy	Netherlands	Slovenia	

Table 15: List of UE22 Member countries.

Appendix 3: Evolution of salaries by gender
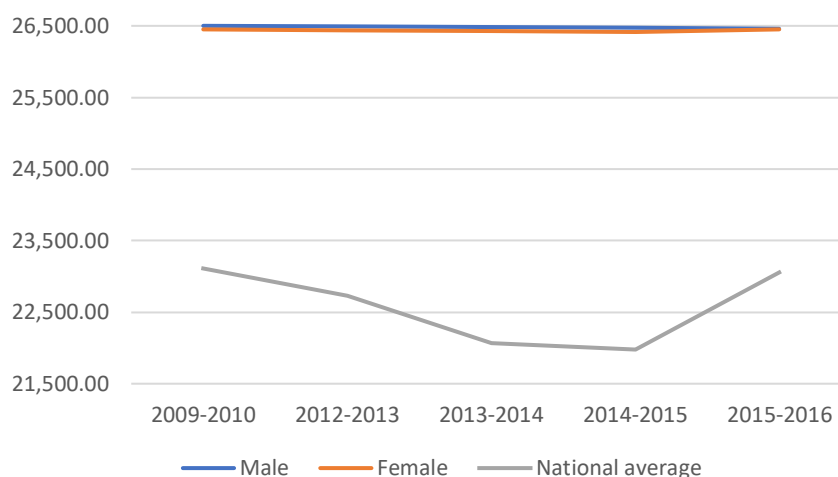

Figure 20: Evolution of salaries by gender.

Appendix 4: Evolution of salaries considering years after graduation

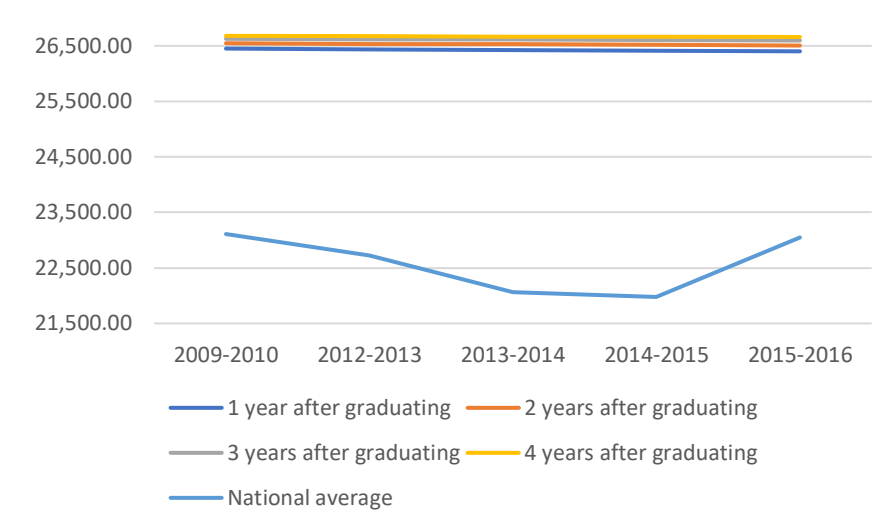

Figure 21: Evolution of salaries considering years after graduation.

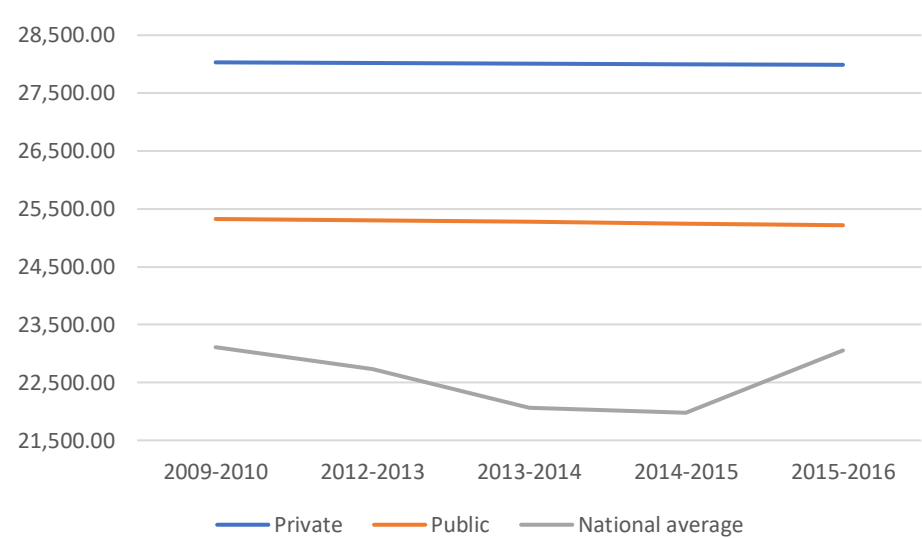## Appendix 5: Evolution of salaries by type of university (private vs. public)

Figure 22: Evolution of salaries by type of university (private vs. public).

Appendix 6: Evolution of salaries by type of university (in-person vs. remote)
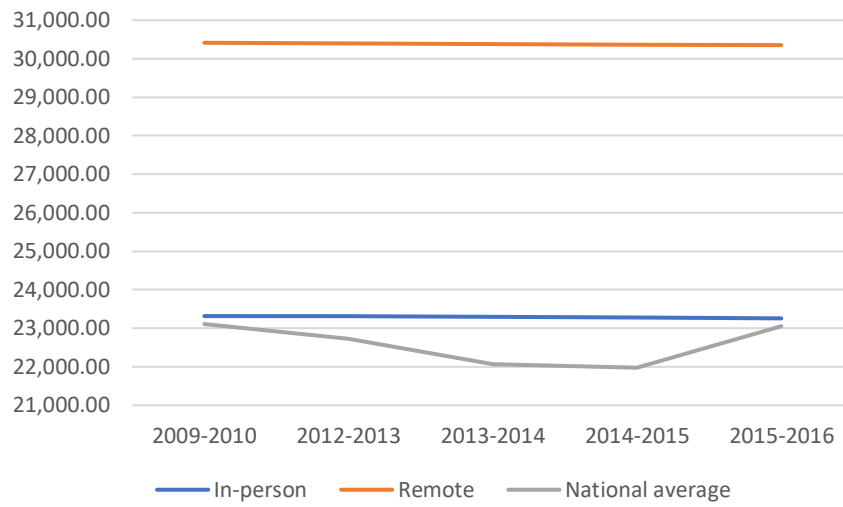

Figure 23: Evolution of salaries by type of university (in-person vs. remote).

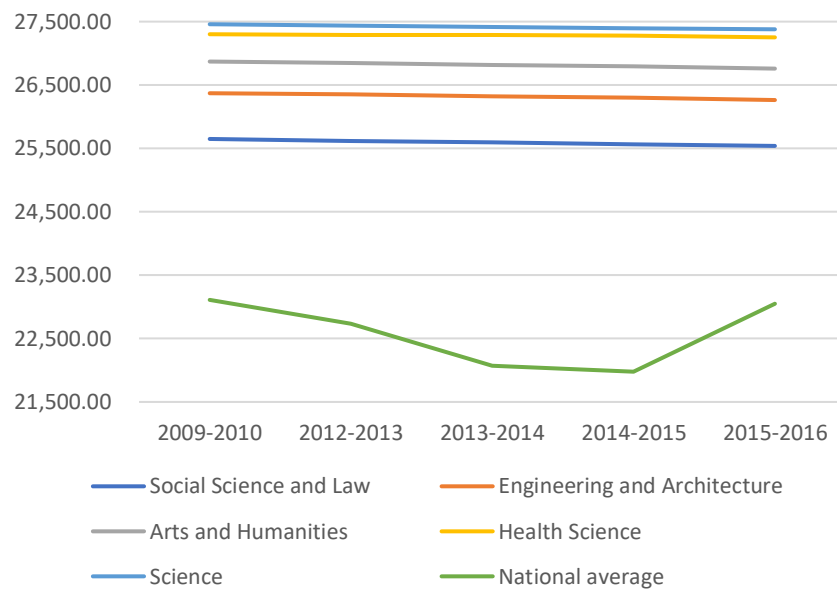## Appendix 7: Evolution of salaries by field of study

Figure 24: Evolution of salaries by field of study.

Appendix 8. Initial model with heteroskedasticity

Number of observations	= 718
F (9,708)	= 279,68
Prob > F	= 0,0000
R-squared	= 0,7805
Adj R-squared	= 0,777

Salary

	Coef.		Std. Err.	t	p-value
Gender	2.112,801	***	173,804	12,16	0,000
Private	1.574,041	***	176,1651	8,94	0,000
Presential	7.097,024	***	177,2942	40,03	0,000
Experience	1.550,910	***	77,63909	19,98	0,000
Engineering_Architecture	2.501,569	***	262,1724	9,54	0,000
Arts_Humanities	-173,5242		260,8582	-0,67	0,506
Health_Science	799,276	**	279,0799	2,86	0,004
Science	-1356,154	***	284,2129	-4,77	0,000
Unemployment_Rate	-40,66658		34,44374	-1,18	0,238

*** statistically significant at 1%   ** statistically significant at 5%   *statistically significant at 10%

Table 16: Initial econometric model results.

Appendix 9. Breusch-Pagan test for initial model

```
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
        Ho: Constant variance
        Variables: fitted values of num_Salary

        chi2(1)     =     4.88
        Prob > chi2 =   0.0271
```