# Higher education as modulator of gender inequalities: evidence of the Spanish case*

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**ABSTRACT**

Raising educational levels may help to reduce inequalities between men and women in certain social and economic aspects. Using statistics for Spain, we analyse labour market behaviours such as the rates of activity and unemployment by sex according to the educational level. The results reveal that the differences between men and women decrease as the educational level increases. In particular, the modulator effect of education is very important at the higher level, where differences in labour market behaviour between men and women with a university education almost disappear, except in terms of salaries. Nevertheless, it can be seen that the current economic crisis has reduced the modulator role of education in gender differences in Spain.

**JEL Classification**: J24, J16

**Key words**: education, labour market, inequality and gender

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## 1. Introduction

The decisions that individuals make about the educational level that they reach are considered as human capital investment decisions (Becker 1962) and traditionally are analysed as a process in which a series of monetary and non-monetary resources are committed in order to obtain a future yield. The benefits are classified, likewise, into monetary and non-monetary. Both have been analysed in the economic literature and, especially, the monetary benefits have been estimated with precision (Hanushek and Welch 2006; Hanushek, Machin, and Woessmann 2011).

Economists and sociologists have always indicated in their studies that the social return to higher education may exceed the private return (Moretti 2004) because it is clear that higher education makes a decisive contribution in many socioeconomic arenas. Recognition of this influence has prompted numerous studies (Drucker and Golstein, 2007) to analyse, and in some cases quantify, the economic and social contributions of higher education graduates in several OECD countries. The non-monetary benefits of education are also varied and include widely differing contexts (McMahon 2009) and, though they are more difficult to evaluate, it is possible to estimate their value to society. The report of the OECD (2001) and other studies (Willis 1986; Heckman, Lochner and Todd 2005; Behrman and Stacey 1997; Lochner 2011) have contributed evidence of the favourable consequences of education on well-being, health or social cohesion. Thus, people who attain higher levels of education have better health. Education also helps to improve children's quality of life, the conservation of the environment, generates more civic behaviours among the population, drives enterprise and civic participation, and increases social capital.

Additionally, the literature finds a positive relationship between greater education of the individual and greater activity, occupation and income (OECD 2009). For example, with the growth of the university-educated population comes an increase in the number of employed persons, as university graduates have higher rates of activity and employment, lower rates of unemployment and shorter periods of unemployment than the average for the active population. University graduates are

also more productive workers due to their superior skills, and earn higher salaries than people with lower educational levels.

The increase of working-age population with higher education generates two economic effects in an economy. On the one hand, there are the positive effects of human capital on participation and employment rates (Pastor et al. 2007) because university education increases occupation, since university graduates present a higher activity rate and a lower unemployment rate than the average for the total population. On the other hand, the greater human capital of university graduates and their higher productivity[1] is remunerated by firms with higher salaries than those for average workers, which in addition increase more throughout their working life than those of workers without university education. These two effects occur for both men and women with higher education and show non-monetary social and private benefits of higher education that are difficult to quantify precisely due to lack of information and estimation problems.

The central idea of the paper is that education, and in particular higher education, exercises an important modulator effect on inequalities between men and women in certain economic and social spheres. The literature focuses on educational differences by gender but says little about differences in activity and unemployment by gender of the higher education graduates. To our knowledge, the literature has not addressed the study of the modulation effects of higher education in the differences of the behaviour of men and women in the labour market. There are only a few reports on this issue. For example, a report from the OECD (2012) states that greater educational equality does not guarantee equality in labour market outcomes, because if workplace culture penalises women it will be difficult for them to realise their full potential in paid work. The book of Tembon and Fort (2008) is based on the research conducted in a variety of countries to establish that educating girls is one of the most cost-effective ways of spurring economic development. Like the limited literature available, the work will focus on showing that female education is positively correlated with increased economic productivity, more robust labour markets, higher earnings, and improved societal health and well-being. However, nothing is said about the equalizing effects of higher education between men and women in the labour market of developed countries.

[Table 1 about here]

The readers may get a better vision of the problem if something is said about the expansion of the years of study and the evolution of the share of the working age population with university studies in Spain, comparing the evolution in Spain with

other European Union countries. Table 1 shows that 24.2% of the Spanish population in 2010 has reached tertiary studies as highest level of education. This value is above the value of countries like France, Germany or Italy, although it is below the value of Denmark, Netherlands, United Kingdom and Belgium, with a 27.3% in the latest. It might be underlined that the growth in people with tertiary studies in Spain has been the most significant of all these countries, reaching 16.8 percentage points, followed by France with 11.1 percentage points.

In Spain the boom in higher education has been concentrated among women, such that today as in most higher-income countries, more women than men have complete tertiary education.[2] Considering the average years of total schooling, Table 1 shows that Spain is at the bottom in the ranking, with 10.3 years of studies, only above Italy (9.6). Nevertheless, the growth of Spain in this variable from 1990 until 2010 is one of the highest (3.3 years of increment). Only Germany leads Spain with 3.8 years of increment in the years of studies. Table 1 also shows the progress in the working age population with tertiary education. In Spain, 36.3% of the working age population had tertiary education, only 3.6 percentage points below Belgium, the country with the highest percentage. Countries such as Denmark, France, Germany, Italy and Netherlands show lower values. The growth in Spain has been, again, one of the highest among the countries considered.

Thus, this paper focuses on the non-monetary effect of investments in education in Spain, the modulation of gender inequalities, i.e. the positive effect of education on equality of opportunities between men and women, and the reduction of sex discrimination in employment. Results indicate that the increase in the number of years of education achieved by women causes an evolution in their employment behaviour tending to equalise it with that of men. In statistical terms, men and women with a university education tend to be indistinguishable by their behaviour in the labour market. That is to say that the rates of activity and employment of university-educated men and women show a less differentiated profile, and the probabilities of occupation are greater. However, the modulator effect of education does not extend to salary incomes, where the differences between men and women are more persistent, due almost certainly to institutional and social factors that maintain situations of salary discrimination (Villar 2010) and limit the contribution of a university education to the reduction of sex differences in employment incomes.

The paper is organised as follows. Section 2 analyses inequality in relation to employment activity and unemployment, and Section 3 studies the salary inequalities between men and women. Section 4 presents the conclusions.

## 2. Inequality in relation to employment

Since 1980 an increase can be noted in women's employment activity in Spain which, as in other industrialised countries, has been attributed to factors like increased education leading to an increase in women's potential incomes (Bover and Arellano 1995). This section analyses the tendency towards equality in employment participation decisions between men and women as the level of formal education increases. Likewise, we attempt to measure the effect of the increase in educational level on the reduction of the difference between the unemployment rates of men and of women. The procedure consists of analysing activity rates and unemployment rates by educational level and by sex.

Figure 1A shows the growth of the activity rate in the period between 1995 and 2012, especially high in the case of women. However, in the female activity rate the differences between educational levels are very substantial. Thus, among the population with primary or lower level education the female activity rate is half that of males and experiences a much smaller reduction (3 percentage points as against 20 percentage points of the male activity rate) during the period analysed. In any case, the activity rate experiences reductions only among the population with primary or lower level education. The graphs show that, as the educational level increases, the gender differences in the activity rate are reduced, in the case of a university education (see Figure 1D) becoming nil between men and women from 2009.

[Figure 1 about here]

[Figure 2 about here]

Figure 2 presents the differences between the activity rates of men and women for six educational levels. The differences are represented as the area between the two lines for each age of men and women. The graphs show that the area reduces as the educational level of the population increases (the vertical distance also reduces as the age of the group analysed increases). In Figure 2F it can be seen that university-educated women less than 28 years old show a higher activity rate than men. From this age onwards, men's activity rate is higher than women's, showing the influence in women's labour market participation during the period when families have children and these live at home, though the difference is less than at the other educational levels. Consequently, the employment participation profiles

throughout the life cycle of men and women with university education show the least difference observed among all the educational groups analysed, being indistinguishable at the beginning and end of their working life.

The differences in the unemployment rates by gender according to educational level are analysed using the same procedure as for activity rates. Figure 3 shows the countercyclical character of the unemployment rate in each of the groups analysed according to the level of education. However, the graphs show the existence of large differences: there are substantial gaps between men and women and also between educational levels. Thus, the population with the lowest level of education suffers to a greater extent the problem of unemployment, the unemployment rate gradually reducing as the population's educational level increases. With regard to the gender gap, a clear decreasing trend is observed during the period 1995-2012. Starting with a difference in the unemployment rate between women and men of 13 percentage points, from 2009 the gap practically disappears, due fundamentally to the massive destruction of jobs in sectors of mainly male employment (construction).

[Figure 3 about here]

[Figure 4 about here]

Figure 4 analyses the unemployment rate by ages, sex and educational level. Figure 4F presents very small differences between men and women with university education for all age groups and, additionally, shows that these men and women of any age have the lowest unemployment of all the educational levels considered. That is to say that increased education reduces the differences in the unemployment rates of men and women, but also permits greater social integration by decreasing unemployment irrespective of the sex of the individual. We can also appreciate how the sensibility to the economic cycle is lower as the educational level increases. In other words, if we draw the Okun[3] curve (Okun 1962) for the educational levels considered, it shows less slope when the educational level is higher. Once again we observe the intense positive effect of university education on the reduction of inequalities between men and women.

Using the conventional model of Heckman (1979), and with data from the 2012 Survey of Active Population in Spain, Table 2 presents the difference in the probability that a woman with different levels of education will (a) participate in the labour market, (b) be employed and (c) have a permanent contract, compared to a man with the same personal and social characteristics (The results of probit

estimations for the three situations are detailed in the Appendix, Tables A, B and C).

Table 2 shows that the increased educational level ensures a reduction in the difference between women's probability of activity and that of men in the same conditions. Women with the lowest educational level present a smaller difference in the probability of being active (approximately 10 percentage points) than that of women with a university education. However, no clear reduction is observed in the difference in probability of employment of women from that of men in the same condition, as women with low educational levels present similar differences in the probability of being employed to those of women with university levels of education. Likewise, the increase in educational level does not seem to positively reduce the difference in probability of obtaining a permanent contract compared with that of men.

[Table 2 about here]

[Figure 5 about here]

In consequence, the increased educational level of women in Spain acts as a modulator of the gender inequalities in the labour market in two aspects: labour participation (greater social cohesion) and, to a lesser extent, unemployment (less social exclusion). Figure 5 shows the contribution of a university education to the reduction of inequalities between men and women in the labour market. Among the university-educated population, the difference between men and women in the percentage employed is 2 percentage points, whereas it reaches 15 percentage points among the population without a university education. As well as a higher percentage of unemployed among the population without a university education, we also observe that the gender difference is greater, though in this case, it is because more than 50% of the women are inactive; the highest percentage of unemployed corresponds to men. In the case of the population with university education, a very similar percentage of unemployed by sex is observed, the small percentage difference being favourable to men. Thus, while approximately 83% of university-educated men and women are active, with no difference according to sex, between men and women without a university education there is a difference of 19 percentage points in the activity rate, unfavourable to the women.

## 3. Salary inequality

The differences in salaries between men and women are analysed in this section with data from Spain's Salary Structure Survey, a quadrennial survey available since 1995, developed in the EU framework by the National Statistics Institute of Spain, in order to analyse wage structure and distribution. The sectors excluded in this survey are (1) agriculture, livestock and fisheries, (2) electricity, gas, steam and air conditioning supply. In the sample we do not consider the construction sector because of its erratic behaviour (Spanish specific fact) and the civil servants sector is not distributed by branches, it is included in the "Public Administration" sector (see Appendix, Table D). We have worked only with data on full time salaried workers, and the total gross annual wage in our sample is 22,124 euros in 2010 (28,876 euros in the public administration).

The monetary return on education is estimated by the traditional Mincer equation:

$$lnW = \beta_0 + \beta_1 EDUC + \beta_2 exp + \beta_3 exp^2 + \beta_4 sex + \beta_5 estrat + \beta_6 CNAE + \varepsilon$$

where the dependent variable ($W$) is the logarithm of annual earnings, and the explanatory variables[4] include dummy variables (0,1) for the educational levels achieved, experience and experience squared, calculated from the potential experience, dummy variable for sex, for the number of employees in the firm and, finally, for activity sectors (See Appendix, Table D for complete results of the econometric estimation of the Mincer equation). Thus, the private monetary return from progressing from compulsory secondary education to a degree would be:

$$Return_{Second-Degree} = \frac{\beta_{Degree}}{17-8}$$

Table 3 presents the results of the estimations made. The first group of results refers to the Spanish population, while the second refers to the foreign population residing in Spain. Within each group three estimations were made, the first for the whole sample, and the remaining two for the samples of men and women respectively. The smallest differences of return between men and women are observed at the pre-university level and at the two levels of university education, the gender gap even disappearing completely among graduates. The return on education is substantially less for foreigners resident in Spain than for the population of Spanish nationality. The greatest difference between the returns on education according to nationality is found among individuals with pre-university

education, and the least among university graduates. Foreign women present returns clearly below those of the national population.

[Table 3 about here]

Lower returns on education for Spanish women than those for men indicate that the proportional increase in salary income among women on reaching a higher educational level (compared to the educational level of the reference individual) is lower than that for men. Salary profiles throughout a working life allow more precise comparisons of gender differences to be made. In this case, we have estimated, in accordance with the following functional form:

$$lnW = \beta_0 + \beta_1 Age + \beta_2 Age^2 + \varepsilon \ ,$$

six salary income profiles for each of the educational levels considered in this article for men and women.

[Figure 6 about here]

[Figure 7 about here]

In summary form, the comparison of the pairs of profiles appearing in Figure 6 indicates that: (1) as the educational level increases, so do annual earnings; (2) annual earnings increase with age up to a maximum and from that point onwards begin to fall slightly; (3) men's earnings are systematically higher than women's; and (4) the annual earnings differences between men and women reduce in the course of a working lifetime as the educational level increases. Therefore, the difference in the return per year of studies between the total samples of men and women is 19.39% unfavourable for women (see Table D). This unfavourable difference in the return per year of studies for women compared to men is also listed for all levels of study and does not disappear when the level of education increases (see Table 3, Table D, and Figure 6). Therefore, this would be a failure in the modulatory effects of education on the differences between men and women.

As in other studies that report estimates of the "college premium" for higher education graduates across successive cohorts from large cross-section datasets in a period when the higher education participation rate increased dramatically (Walker and Zhu 2008), our paper finds the same wage differences among education levels and also confirms the fact that there is no significant fall for men

and women regarding income inequality among higher educated workers. Thus, Figure 6F permits us to appreciate that women have a "glass ceiling" in their salary incomes whereas university-educated men do not suffer this upper limit (De la Rica, Dolado and Llorens 2008). The differential observed between men and women with university education seems to be due to the fact that women are concentrated in occupations where the average remuneration is lower, or in other words, may be because men with university education occupy categories with higher salary remuneration than those occupied by women with university education. Thus, the study of Blau and Kahn (2000) indicates that -besides gender specific factors- the discrimination, the overall wage structure and the rewards for skills and employment in particular sectors, importantly influence the gender pay gap.

Studies that examine the effects of increasing the level of education of the population have a common idea: increasing the supply of highly educated workers reduces income inequality over time (Goldin and Katz 2009). However, Figure 7 presents the evolution of the annual earnings ratio between men and women over their lifetimes according to the educational level reached. The income inequality between men and women with university education is observed to be the lowest of all the educational levels. Furthermore, although the trend over a lifetime is for income differences between men and women to increase at all educational levels, the gender difference remains constant among the population with university education over 40 years of age.

## 4. Conclusions

This paper aims to offer empirical evidence of the importance of university education as a factor reducing the inequalities between men and women in the labour market. University education has a modulating effect on gender inequalities in labour activity, occupation, and the probability of suffering unemployment situations. University education generates an equalising effect on the behaviour of men and women in the labour market, and thus also has a positive effect on a more equalitarian division of domestic labour between men and women.

The effects of higher education discussed in the paper are important and although it is difficult to make a quantitative assessment, especially in monetary terms, they must be taken into account in decisions on investment in higher education. This paper contributes to the discussion of the social effects of education, highlighting that the implications of the modulatory role of university education in certain social

inequalities are important for social policy. Thus, if these effects represent non-monetary social benefits, they must all be taken into account when calculating the impacts of the activity of universities in society and when considering the increase of social return on investment in higher education.

As the educational level increases, the differences in activity rates by sex are observed to reduce, the difference between men and women with university educations being nil. Also, the problems of unemployment are less acute among the population with a higher educational level, though in this case, the equalisation of the unemployment rate may be due basically to the fact that the destruction of employment has been concentrated mostly on the male population that was occupied in the sector most affected by the current economic crisis (construction).

The data indicate that the increase in women's average educational level has not been enough to close the annual earnings gap between men and women. It is beyond doubt that the increased educational level generates monetary returns that as the educational level rises are more equal between men and women. However, the discrimination and segregation of the labour market determine that the contribution of a university education to an equalisation of salary incomes between men and women is not so significant. Women seem to face a salary incomes curve bounded by a glass ceiling that does not appear in the case of men.

The results obtained in our paper confirm the findings of different studies in OECD countries on the social effects of the increased level of education of the population. Higher education would be recognized as a key tool for social problems due to its contribution to the reduction of gender inequalities.

The approach proposed in this paper shows how important it is to pay attention to a broader range of university education contributions, and try to quantify them reasonably, since in today's society what we measure typically affects what we think or even, sometimes what appears not to be measured. In that sense, focusing only on the immediate and obvious effects of higher education, for example, wages or the unemployment rate of recent higher education graduates, underestimates their total benefits to individuals and society. Also, monetary measures of the impacts of higher education in society underestimate the positive effects that university activities have for citizens, as some of them are not monetary but yet important. The university policy must take into account both the social and private returns, and therefore also the monetary effects.

In summary, the findings presented in this paper allow to notice that the contribution of higher education goes beyond what occurs in the economy. The contribution of higher education is very positive in relevant areas of social welfare, for example, reducing labour and social inequalities between men and women. We recommend further future research in this direction: the analysis of how higher education can help reduce other inequalities such as racial, ethnic, class, or nativity inequalities.

**NOTES:**

[1] There is evidence (Acemoglu and Autor 2010) to show that higher levels of human capital in economies cause intensive technological progress in human capital that favours increased productivity.

[2] Becker, Hubbard and Murphy (2010) present a model that explains the increase in higher education, particularly among women, in terms of a market for college graduates in which the supply of college graduates is function of the distribution of the costs and benefits of higher education across individuals, but it appears that differences in the total costs of college for women and men, primarily due to differences in the distributions of non-cognitive skills for women and men, explain the overtaking of men by women in higher education. Similarly, Jacob (2002) finds that higher non-cognitive skills and college premiums among women account for nearly 90 percent of the gender gap in higher education.

[3] In economics Okun's law is an empirically observed relationship between an economy's unemployment rate and its gross national product growth.

[4] The reference categories are as follows: For educational level, primary education; for sex, male; for size of firm, from 1 to 49 workers; for the firm's sector of activity, commerce. The years of education, necessary for calculating potential experience, are imputed as follows: No education and primary education, 4.5 years; Compulsory secondary Education, 8 years; Pre-university education, 12 years; Medium grade vocational training, 10 years; Higher grade vocational training, 12 years; University Diploma, 15 years; University Degree, 17 years.

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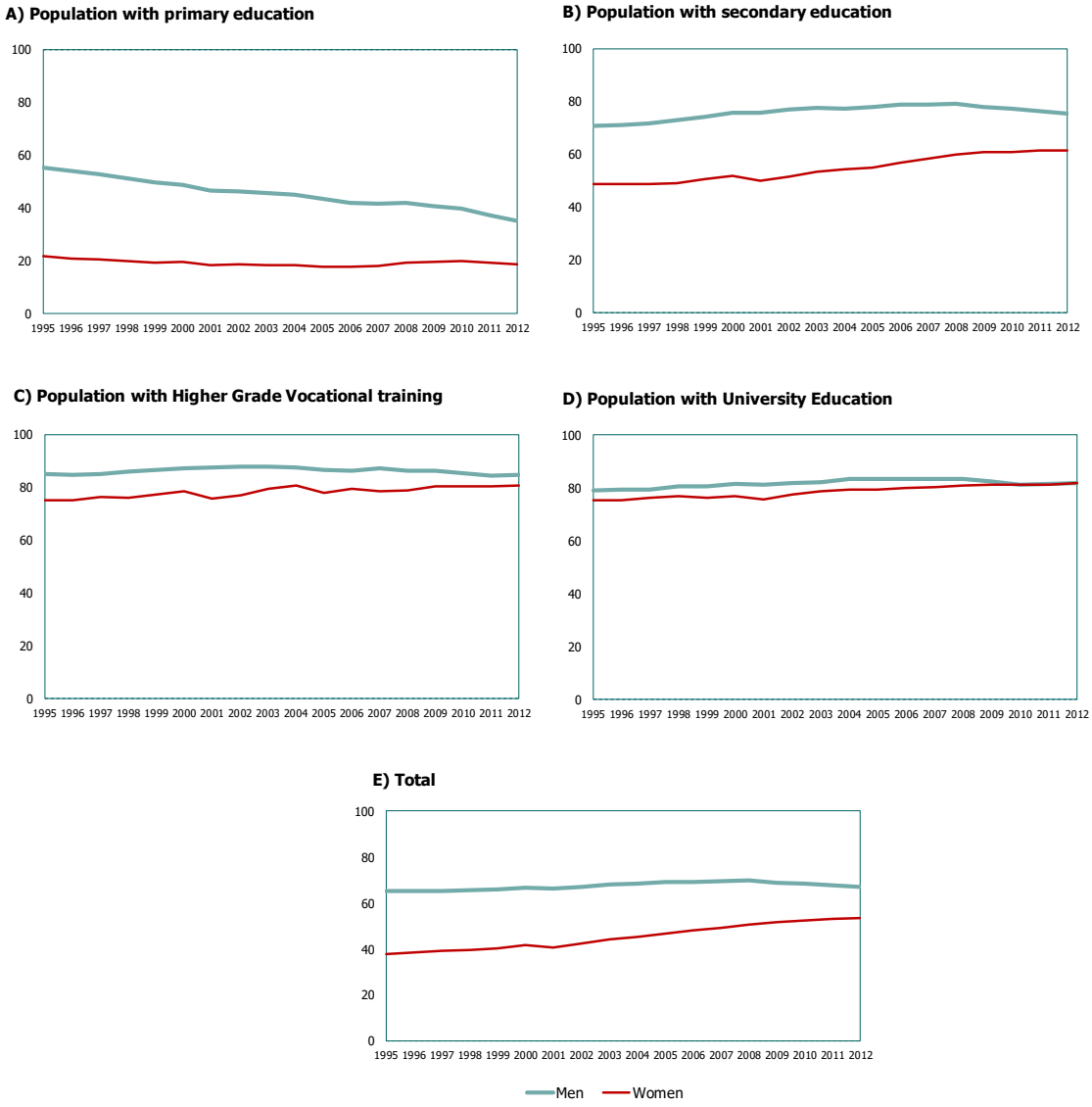
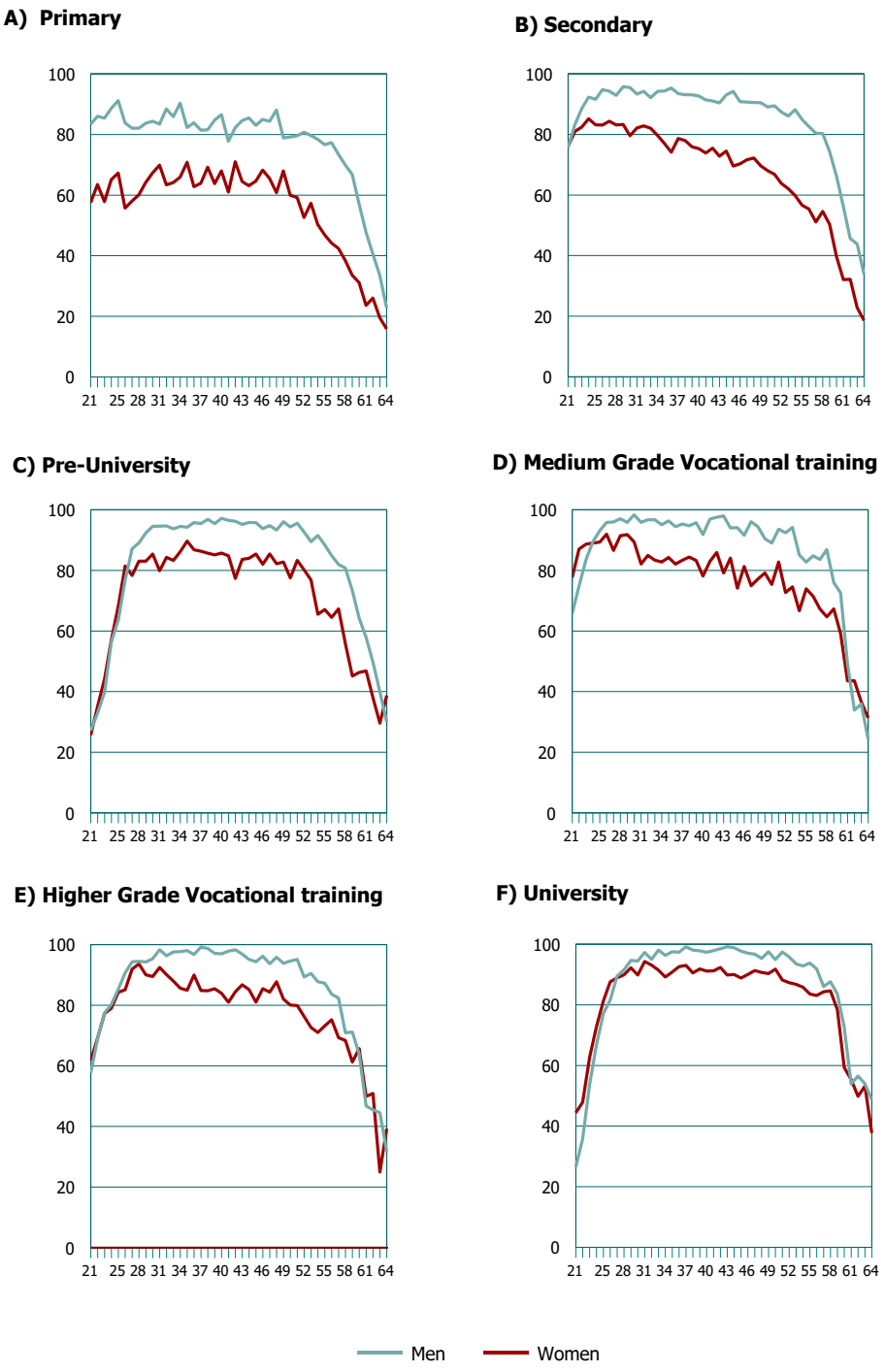
**Figure 1. Evolution of the activity rate by educational level and sex. Spain. 1995-2012**



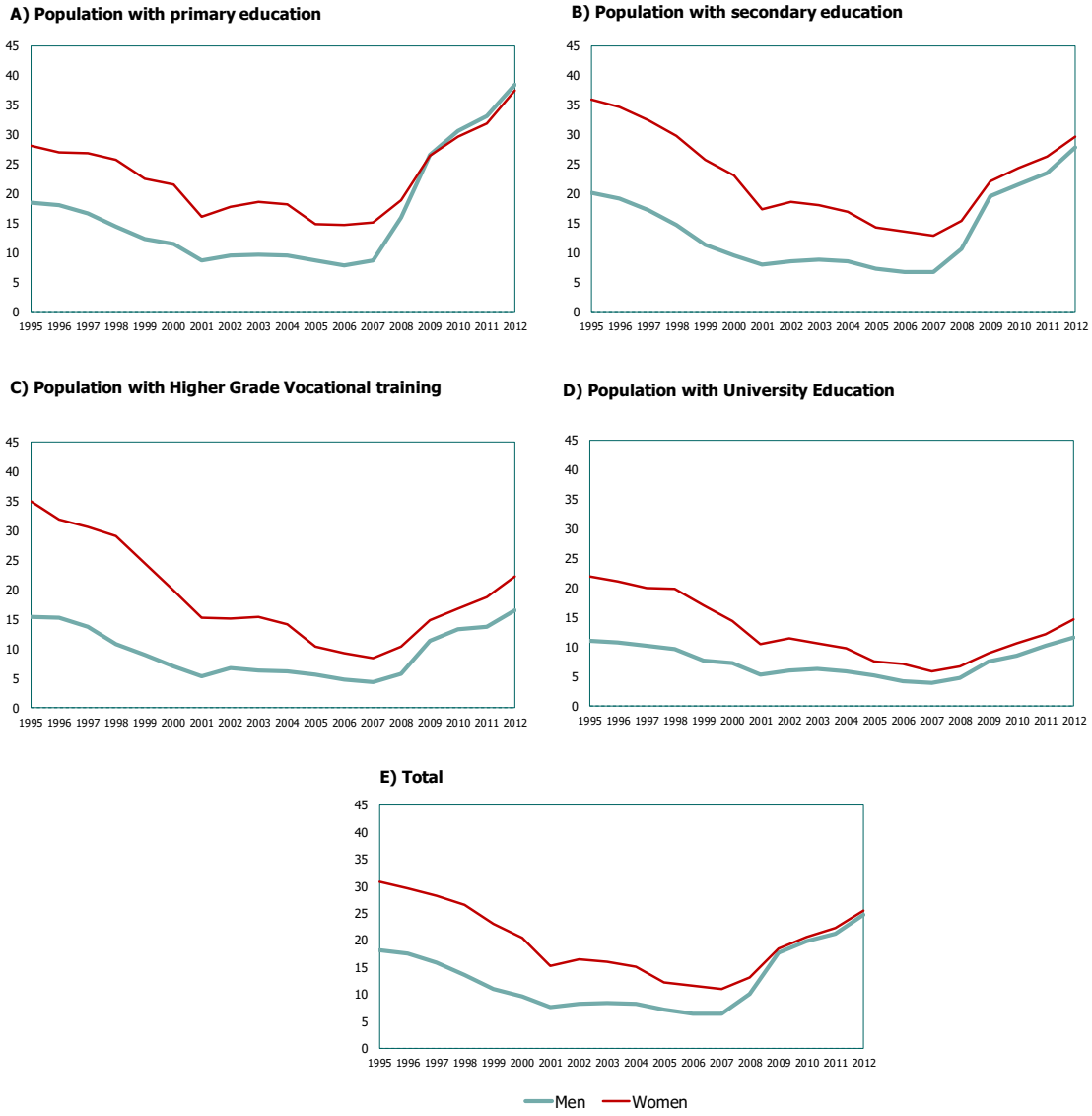

*Source:* INE and own preparation.

**Figure 2. Activity rate by educational level, age and sex. Spain. 2012**



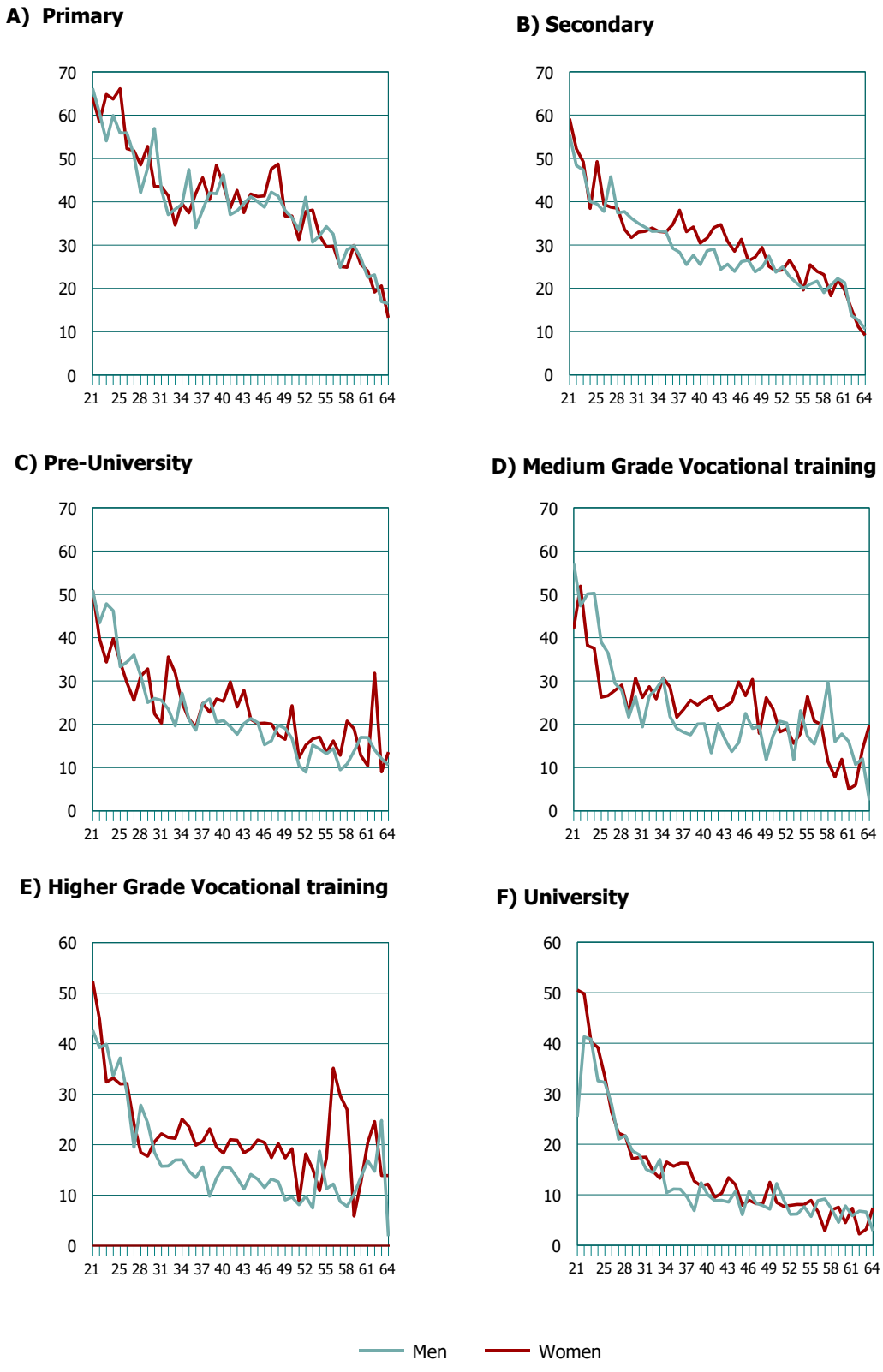

*Source:* INE and own preparation.

**Figure 3. Evolution of the unemployment rate by educational level and sex. Spain. 1995-2012**



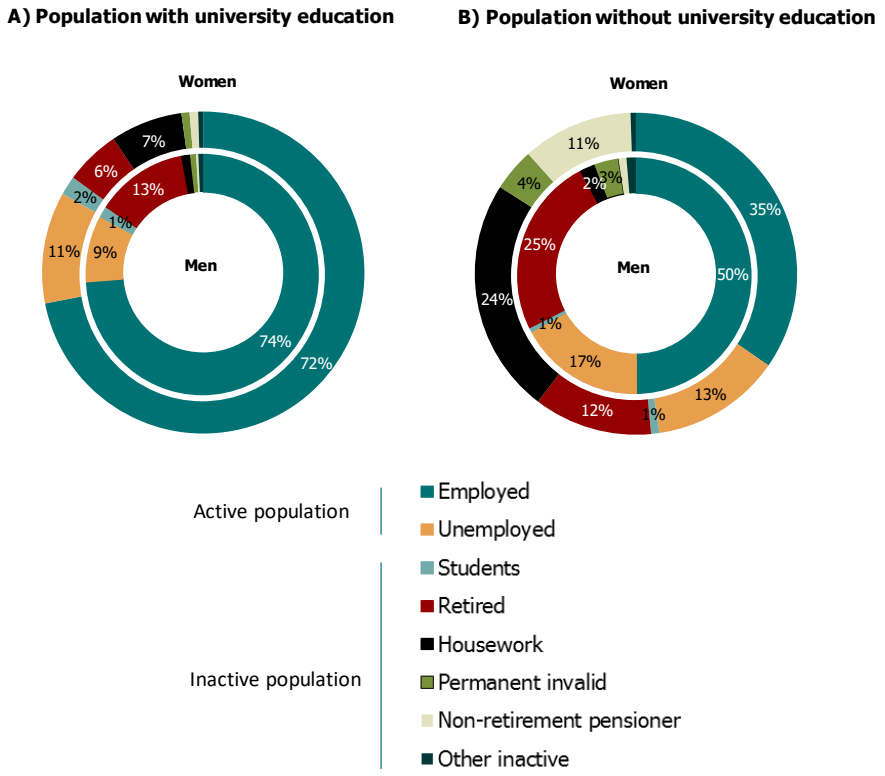

*Source:* INE and own preparation.

**Figure 4. Unemployment rate by educational level, age and sex. Spain. 2012**



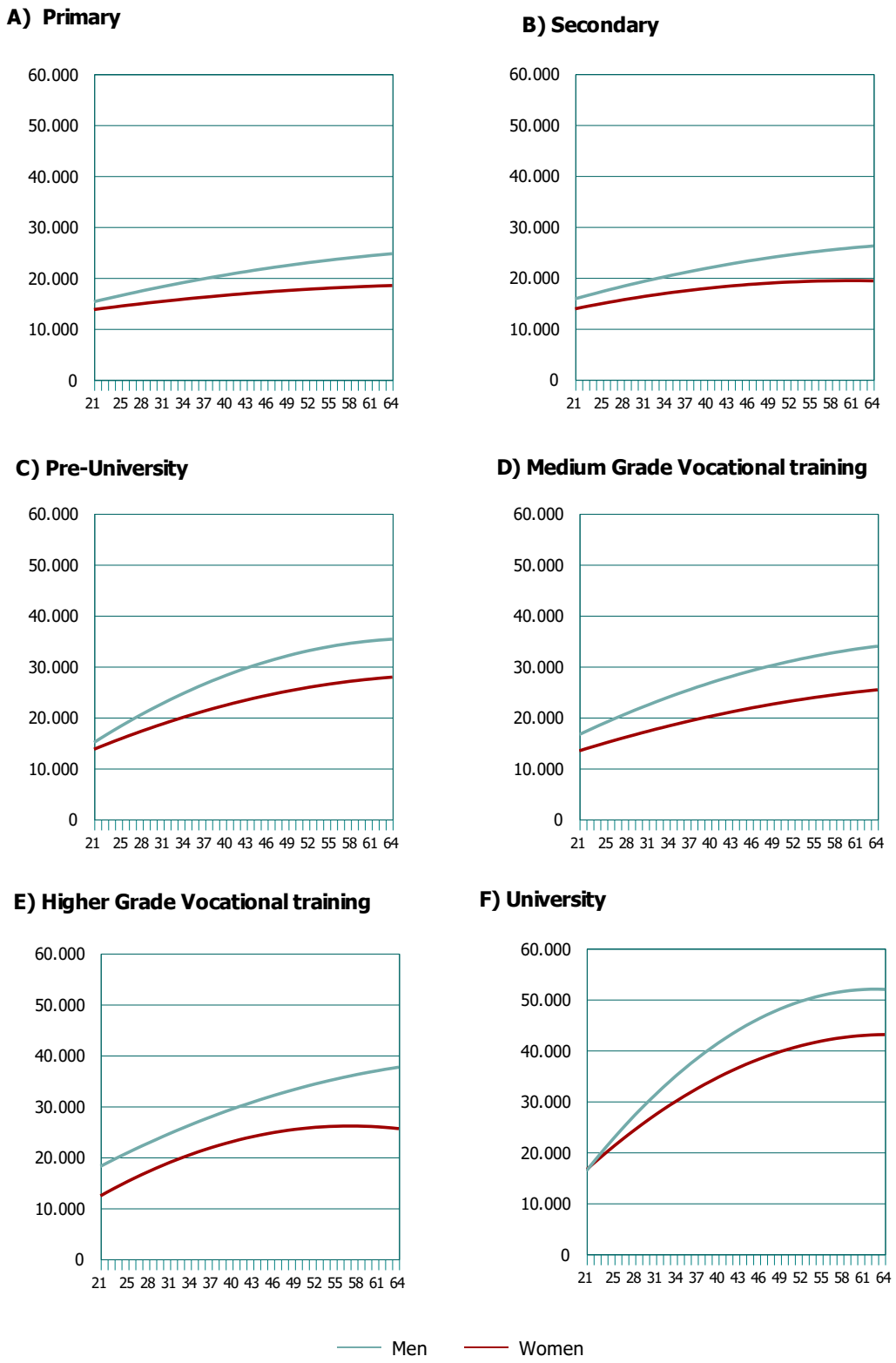

*Source:* INE and own preparation.

**Figure 5. Population by relation to activity, sex and educational level. Spain. 2012**



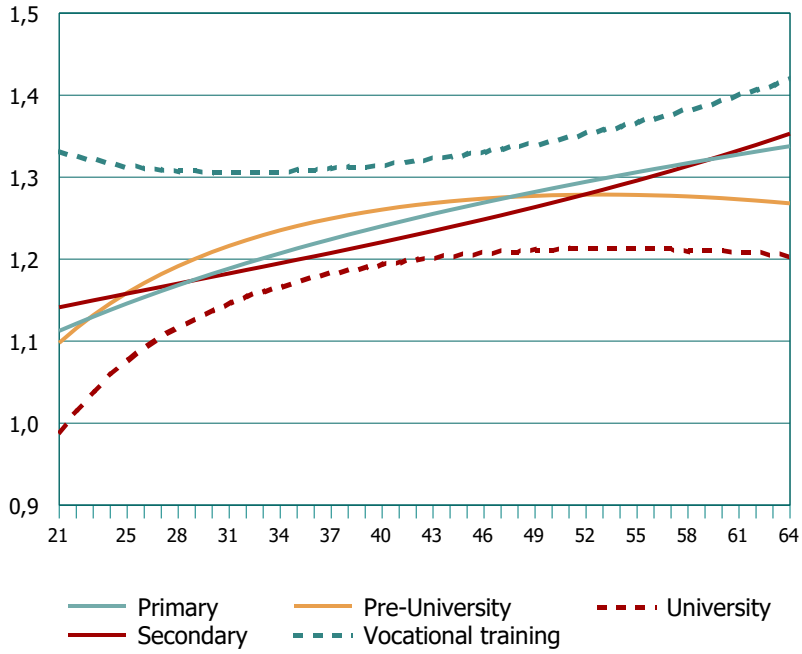

*Source:* INE and own preparation.

**Figure 6. Annual earnings by educational level, age and sex. Spain. 2010**




*Source:* INE and own preparation.

**Figure 7. Annual earnings by educational level and age. Men over women ratio. Spain. 2010**




*Source:* INE and own preparation.

## Table 1. Educational attainment for total population in Spain and other EU countries

**Percentage of population whose highest level of education attained is tertiary**

| Year | Denmark | France | Germany | Belgium | Italy | Netherlands | Spain | United Kingdom |
|---|---|---|---|---|---|---|---|---|
| 1990 | 14,5 | 11,9 | 12,8 | 18,2 | 6,1 | 16,7 | 7,4 | 15,4 |
| 1995 | 17,6 | 14,9 | 15,6 | 21,2 | 7,7 | 19,3 | 14,0 | 18,8 |
| 2000 | 20,5 | 17,8 | 17,4 | 22,8 | 8,3 | 19,7 | 18,2 | 21,6 |
| 2005 | 24,0 | 18,6 | 18,0 | 24,5 | 9,1 | 22,6 | 22,3 | 23,1 |
| 2010 | 24,8 | 23,0 | 21,5 | 27,3 | 11,1 | 25,8 | 24,2 | 25,5 |

*Source:* Barro and Lee (2014)

**Average years of total schooling**

| Year | Denmark | France | Germany | Belgium | Italy | Netherlands | Spain | United Kingdom |
|---|---|---|---|---|---|---|---|---|
| 1990 | 9,4 | 7,7 | 8,6 | 9,4 | 7,7 | 10,3 | 7,0 | 9,1 |
| 1995 | 10,0 | 8,8 | 9,4 | 10,0 | 8,3 | 10,6 | 8,1 | 9,4 |
| 2000 | 10,8 | 9,8 | 10,1 | 10,3 | 8,8 | 10,8 | 8,9 | 9,9 |
| 2005 | 11,1 | 10,1 | 11,7 | 10,6 | 9,2 | 10,8 | 10,1 | 11,1 |
| 2010 | 11,3 | 10,7 | 12,4 | 10,7 | 9,6 | 11,4 | 10,3 | 12,2 |

*Source:* Barro and Lee (2014)

**Share of working age population with tertiary education**

| Year | Denmark | France | Germany | Belgium | Italy | Netherlands | Spain | United Kingdom |
|---|---|---|---|---|---|---|---|---|
| 1995 | 25,6 | 20,4 | 22,5 | 28,2 | 9,1 | *na* | 20,4 | 22,4 |
| 2000 | 24,0 | 24,0 | 23,5 | 32,0 | 11,3 | 24,0 | 26,7 | 26,0 |
| 2005 | 31,9 | 27,9 | 24,4 | 35,3 | 14,3 | 29,7 | 31,7 | 29,9 |
| 2010 | 30,3 | 31,7 | 26,3 | 38,9 | 17,0 | 31,4 | 33,5 | 35,6 |
| 2013 | 32,4 | 35,1 | 28,2 | 39,8 | 18,5 | 32,8 | 36,3 | 39,4 |

*Source:* Eurostat

**Table 2. Difference in probability between men and women. Spain. 2012**

| | Be active | Be employed | Have permanent contracts |
|---|---|---|---|
| Primary | -14,0 | -7,0 | 0,0 |
| Lower secondary | -19,1 | -2,3 | -1,6 |
| Upper secondary | -11,7 | -4,5 | -2,8 |
| Higher Grade Vocational | -9,5 | -4,3 | -4,3 |
| University | -4,4 | -5,1 | -3,7 |

*Source:* INE and own preparation.

**Table 3. Educational monetary returns. Spain. 2010**

| | National population | | | Foreign population | | |
|---|---|---|---|---|---|---|
| | Total | Men | Women | Total | Men | Women |
| Secondary | 1,86 | 2,01 | 1,67 | 0,93 | 2,30 | -1,28 |
| Pre-University | 4,00 | 4,17 | 3,76 | 1,34 | 1,66 | 0,83 |
| Medium Grade Vocational training | 3,99 | 4,48 | 3,36 | 2,32 | 3,88 | 0,02 |
| Higher Grade Vocational training | 4,51 | 4,83 | 3,98 | 3,19 | 3,84 | 2,26 |
| First cycle university degree | 5,68 | 5,69 | 5,50 | 4,27 | 4,46 | 3,79 |
| Second cycle university degree | 6,41 | 6,38 | 6,37 | 5,68 | 6,12 | 5,05 |

*Source:* INE and own preparation.

# APPENDIX

## Table A. Probit estimation to be active. Spain. 2012

**A) Primary**

| | | Coefficient | Marginal effect |
|---|---|---|---|
| Ref: Man | Woman | -0,4705 *** | -0,1399 |
| Ref: 16-24 | 25-34 | 0,8553 *** | 0,3064 |
| | 35-44 | 0,8721 *** | 0,3120 |
| | 45-54 | 0,8288 *** | 0,2911 |
| | Over 54 | -0,8686 *** | -0,2859 |
| Ref: Foreign | National | -0,3872 *** | -0,1259 |
| | Constant | 0,2842 *** | |
| N | | 179.143 | |
| Log Pseudolikelihood | | -17.721.843 | |

**B) Lower secondary**

| | | Coefficient | Marginal effect |
|---|---|---|---|
| Ref: Man | Woman | -0,5604 *** | -0,1911 |
| Ref: 16-24 | 25-34 | 1,4824 *** | 0,3481 |
| | 35-44 | 1,3194 *** | 0,3405 |
| | 45-54 | 1,1171 *** | 0,2999 |
| | Over 54 | -0,0782 *** | -0,0269 |
| Ref: Foreign | National | -0,1908 *** | -0,0621 |
| | Constant | 0,1837 *** | |
| N | | 150.223 | |
| Log Pseudolikelihood | | -19.392.154 | |

**C) Upper secondary**

| | | Coefficient | Marginal effect |
|---|---|---|---|
| Ref: Man | Woman | -0,3676 *** | -0,1170 |
| Ref: 16-24 | 25-34 | 1,4881 *** | 0,3302 |
| | 35-44 | 1,6215 *** | 0,3579 |
| | 45-54 | 1,4207 *** | 0,3151 |
| | Over 54 | 0,0681 *** | 0,0215 |
| Ref: Foreign | National | -0,1758 *** | -0,0540 |
| | Constant | 0,0103 *** | |
| N | | 108.851 | |
| Log Pseudolikelihood | | -14.551.763 | |

**D) Higher Grage Vocational**

| | | Coefficient | Marginal effect |
|---|---|---|---|
| Ref: Man | Woman | -0,4328 *** | -0,0950 |
| Ref: 16-24 | 25-34 | 0,8729 *** | 0,1507 |
| | 35-44 | 0,8484 *** | 0,1527 |
| | 45-54 | 0,6279 *** | 0,1062 |
| | Over 54 | -0,9506 *** | -0,2776 |
| Ref: Foreign | National | 0,1728 *** | 0,0396 |
| | Constant | 0,6300 *** | |
| N | | 41.998 | |
| Log Pseudolikelihood | | -4.160.177 | |

**E) University**

| | | Coefficient | Marginal effect |
|---|---|---|---|
| Ref: Man | Woman | -0,2053 *** | -0,0438 |
| Ref: 16-24 | 25-34 | 1,1598 *** | 0,1851 |
| | 35-44 | 1,4061 *** | 0,2281 |
| | 45-54 | 1,2371 *** | 0,1762 |
| | Over 54 | -0,3405 *** | -0,0820 |
| Ref: Foreign | National | 0,2907 *** | 0,0708 |
| | Constant | 0,0589 | |
| N | | 95.260 | |
| Log Pseudolikelihood | | -9.888.255 | |

***, **, *:significant to 1%, 5% y 10%, respectively

*Source: INE and own preparation*

## Table B. Probit estimation to be employed. Spain. 2012

**A) Primary**

| | | Coefficient | Marginal effect |
|---|---|---|---|
| Ref: Man | Woman | -0,2025 *** | -0,0703 |
| Ref: 16-24 | 25-34 | 0,8436 *** | 0,3230 |
| | 35-44 | 0,9564 *** | 0,3652 |
| | 45-54 | 0,9698 *** | 0,3684 |
| | Over 54 | 0,3921 *** | 0,1278 |
| Ref: Foreign | National | 0,0745 *** | 0,0253 |
| | Constant | -0,9764 *** | |
| N | | 179.143 | |
| Log Pseudolikelihood | | -25.000.000 | |

**B) Lower secondary**

| | | Coefficient | Marginal effect |
|---|---|---|---|
| Ref: Man | Woman | -0,0647 *** | -0,0230 |
| Ref: 16-24 | 25-34 | 0,5026 *** | 0,1625 |
| | 35-44 | 0,6790 *** | 0,2151 |
| | 45-54 | 0,8035 *** | 0,2468 |
| | Over 54 | 1,0090 *** | 0,2919 |
| Ref: Foreign | National | 0,1092 *** | 0,0396 |
| | Constant | -0,2181 *** | |
| N | | 150.223 | |
| Log Pseudolikelihood | | -35.900.000 | |

**C) Upper secondary**

| | | Coefficient | Marginal effect |
|---|---|---|---|
| Ref: Man | Woman | -0,1252 *** | -0,0451 |
| Ref: 16-24 | 25-34 | 0,9393 *** | 0,2844 |
| | 35-44 | 1,1254 *** | 0,3311 |
| | 45-54 | 1,1914 *** | 0,3360 |
| | Over 54 | 0,9989 *** | 0,2908 |
| Ref: Foreign | National | 0,3309 *** | 0,1240 |
| | Constant | -0,6300 *** | |
| N | | 108.851 | |
| Log Pseudolikelihood | | -26.200.000 | |

**D) Higher Grage Vocational**

| | | Coefficient | Marginal effect |
|---|---|---|---|
| Ref: Man | Woman | -0,1665 *** | -0,0429 |
| Ref: 16-24 | 25-34 | 0,4645 *** | 0,1073 |
| | 35-44 | 0,6550 *** | 0,1487 |
| | 45-54 | 0,7801 *** | 0,1550 |
| | Over 54 | 0,8502 *** | 0,1550 |
| Ref: Foreign | National | 0,5170 *** | 0,1568 |
| | Constant | -0,0546 *** | |
| N | | 41.998 | |
| Log Pseudolikelihood | | -8.695.157 | |

**E) University**

| | | Coefficient | Marginal effect |
|---|---|---|---|
| Ref: Man | Woman | -0,1571 *** | -0,0506 |
| Ref: 16-24 | 25-34 | 1,0457 *** | 0,2761 |
| | 35-44 | 1,3793 *** | 0,3546 |
| | 45-54 | 1,4291 *** | 0,3217 |
| | Over 54 | 0,3618 *** | 0,1082 |
| Ref: Foreign | National | 0,3589 *** | 0,1256 |
| | Constant | -0,6284 | |
| N | | 95.260 | |
| Log Pseudolikelihood | | -18.200.000 | |

***, **, *:significant to 1%, 5% y 10%, respectively

*Source: INE and own preparation*

## Table C. Probit estimation to have permanent contracts. Spain. 2012

**A) Primary**

| | | Coefficient | Marginal effect |
|---|---|---|---|
| Ref: Man | Woman | 0,0072 *** | 0,0024 |
| Ref: 16-24 | 25-34 | 0,5017 *** | 0,1491 |
| | 35-44 | 0,6539 *** | 0,1899 |
| | 45-54 | 0,8753 *** | 0,2552 |
| | Over 54 | 1,2803 *** | 0,3634 |
| Ref: Foreign | National | 0,2754 *** | 0,0960 |
| | Constant | 0,4959 *** | |
| N | | 17.472 | |
| Log Pseudolikelihood | | -3.002.471 | |

**B) Lower secondary**

| | | Coefficient | Marginal effect |
|---|---|---|---|
| Ref: Man | Woman | 0,0486 *** | -0,0159 |
| Ref: 16-24 | 25-34 | 0,5273 *** | 0,1557 |
| | 35-44 | 0,7370 *** | 0,2144 |
| | 45-54 | 0,9694 *** | 0,2642 |
| | Over 54 | 1,2959 *** | 0,2739 |
| Ref: Foreign | National | 0,3591 *** | 0,1259 |
| | Constant | 0,4162 *** | |
| N | | 51.733 | |
| Log Pseudolikelihood | | -7.970.295 | |

**C) Upper secondary**

| | | Coefficient | Marginal effect |
|---|---|---|---|
| Ref: Man | Woman | -0,0951 *** | -0,0281 |
| Ref: 16-24 | 25-34 | 0,8755 *** | 0,2170 |
| | 35-44 | 1,1246 *** | 0,2742 |
| | 45-54 | 1,3975 *** | 0,3014 |
| | Over 54 | 1,6495 *** | 0,2571 |
| Ref: Foreign | National | 0,5302 *** | 0,1741 |
| | Constant | -0,7037 *** | |
| N | | 45.701 | |
| Log Pseudolikelihood | | -6.819.200 | |

**D) Higher Grage Vocational**

| | | Coefficient | Marginal effect |
|---|---|---|---|
| Ref: Man | Woman | -0,1584 *** | -0,0429 |
| Ref: 16-24 | 25-34 | 1,0320 *** | 0,2334 |
| | 35-44 | 1,3922 *** | 0,3122 |
| | 45-54 | 1,7359 *** | 0,2841 |
| | Over 54 | 1,9882 *** | 0,2140 |
| Ref: Foreign | National | 0,6495 *** | 0,2128 |
| | Constant | -0,9528 *** | |
| N | | 23.569 | |
| Log Pseudolikelihood | | -3.033.921 | |

**E) University**

| | | Coefficient | Marginal effect |
|---|---|---|---|
| Ref: Man | Woman | -0,1517 *** | -0,0373 |
| Ref: 16-24 | 25-34 | 1,0549 *** | 0,2087 |
| | 35-44 | 1,6899 *** | 0,3328 |
| | 45-54 | 2,0744 *** | 0,3034 |
| | Over 54 | 2,3214 *** | 0,2319 |
| Ref: Foreign | National | 0,4345 *** | 0,1262 |
| | Constant | -0,9591 | |
| N | | 57.244 | |
| Log Pseudolikelihood | | -7.152.429 | |

***, **, *:significant to 1%, 5% y 10%, respectively

*Source: INE and own preparation*

## Table D. Mincer equation. Spain. 2010

| Explanatory variables | | National population | | | Foreign population | | |
|---|---|---|---|---|---|---|---|
| | | Total | Men | Women | Total | Men | Women |
| Ref: Primary | Secondary | 0,0653 *** | 0,0704 *** | 0,0585 *** | 0,0325 ** | 0,0804 *** | -0,0449 ** |
| | | (0,00602) | (0,00764) | (0,00960) | (0,01603) | (0,02079) | (0,02275) |
| | Pre-University | 0,3001 *** | 0,3128 *** | 0,2823 *** | 0,1004 *** | 0,1247 *** | 0,0619 ** |
| | | (0,00809) | (0,01100) | (0,01196) | (0,02321) | (0,03280) | (0,03132) |
| | Medium Grade Vocational training | 0,2193 *** | 0,2463 *** | 0,1849 *** | 0,1278 *** | 0,2134 *** | 0,0014 |
| | | (0,00728) | (0,00991) | (0,01082) | (0,02974) | (0,04063) | (0,03401) |
| | Higher Grade Vocational training | 0,3380 *** | 0,3626 *** | 0,2983 *** | 0,2396 *** | 0,2877 *** | 0,1693 *** |
| | | (0,00779) | (0,01010) | (0,01224) | (0,05303) | (0,07665) | (0,06347) |
| | First cycle university degree | 0,5960 *** | 0,5972 *** | 0,5779 *** | 0,4483 *** | 0,4688 *** | 0,3975 *** |
| | | (0,00871) | (0,01284) | (0,01234) | (0,04177) | (0,05391) | (0,05942) |
| | Second cycle university degree | 0,8010 *** | 0,7976 *** | 0,7962 *** | 0,7101 *** | 0,7648 *** | 0,6312 *** |
| | | (0,00814) | (0,01078) | (0,01243) | (0,04439) | (0,06945) | (0,04103) |
| | Potential experience | 0,0285 *** | 0,0298 *** | 0,0270 *** | 0,0201 *** | 0,0230 *** | 0,0151 *** |
| | | (0,00071) | (0,00101) | (0,00093) | (0,00343) | (0,00478) | (0,00420) |
| | Potential experience$^2$ | -0,0003 *** | -0,0003 *** | -0,0004 *** | -0,0003 *** | -0,0004 *** | -0,0003 ** |
| | | (0,00001) | (0,00002) | (0,00002) | (0,00007) | (0,00009) | (0,00010) |
| Ref: Man | Woman | -0,1939 *** | | | -0,0915 *** | | |
| | | (0,00401) | | | (0,01508) | | |
| Ref: 1-49 workers | 50-199 workers | 0,1574 *** | 0,1651 *** | 0,1440 *** | 0,1290 *** | 0,1324 *** | 0,1231 *** |
| | | (0,00451) | (0,00569) | (0,00736) | (0,01425) | (0,01806) | (0,02145) |
| | Over 199 workers | 0,2589 *** | 0,2552 *** | 0,2645 *** | 0,1703 *** | 0,1961 *** | 0,1424 *** |
| | | (0,00414) | (0,00542) | (0,00643) | (0,01564) | (0,02159) | (0,02028) |
| Ref: Trade | Mining and quarrying | 0,2582 *** | 0,2361 *** | 0,5481 *** | 0,2464 *** | 0,2612 *** | 0,3331 *** |
| | | (0,04636) | (0,04794) | (0,20423) | (0,07510) | (0,08256) | (0,06672) |
| | Water supply | 0,1037 *** | 0,1021 *** | 0,0679 ** | 0,0757 ** | 0,0707 * | 0,1012 |
| | | (0,01224) | (0,01379) | (0,03063) | (0,03644) | (0,04200) | (0,09151) |
| | Manufacturing | 0,1054 *** | 0,1008 *** | 0,0952 *** | 0,1043 *** | 0,1227 *** | 0,0590 * |
| | | (0,00625) | (0,00842) | (0,00934) | (0,02213) | (0,02904) | (0,03069) |
| | Accommodation and food service activities | -0,0125 | -0,0400 * | 0,0194 | 0,0121 | -0,0028 | 0,0080 |
| | | (0,01401) | (0,02191) | (0,01647) | (0,02817) | (0,04311) | (0,03261) |
| | Transport and communication | 0,0694 *** | 0,0509 *** | 0,1104 *** | 0,0269 | 0,0505 | -0,0470 |
| | | (0,00899) | (0,01160) | (0,01429) | (0,03616) | (0,04471) | (0,05295) |
| | Insurance and financial activities | 0,2751 *** | 0,2823 *** | 0,2691 *** | 0,2444 *** | 0,2683 *** | 0,2235 *** |
| | | (0,00969) | (0,01323) | (0,01424) | (0,06441) | (0,09208) | (0,08165) |
| | Enterprises services | -0,0557 *** | -0,0663 *** | -0,0396 *** | -0,0805 *** | -0,0710 ** | -0,0957 *** |
| | | (0,00722) | (0,01017) | (0,01023) | (0,02326) | (0,03276) | (0,02997) |
| | Education | -0,0852 *** | -0,1690 *** | -0,0282 * | -0,0804 | -0,0606 | -0,1122 * |
| | | (0,01280) | (0,01958) | (0,01711) | (0,05740) | (0,09265) | (0,06505) |
| | Health | 0,0273 *** | -0,0077 | 0,0566 *** | -0,0729 ** | -0,0375 | -0,0784 ** |
| | | (0,00757) | (0,01268) | (0,00999) | (0,03038) | (0,06377) | (0,03454) |
| | Other services | -0,0972 *** | -0,0834 *** | -0,1001 *** | -0,1297 *** | -0,1326 *** | -0,1471 *** |
| | | (0,00935) | (0,01441) | (0,01228) | (0,02966) | (0,04396) | (0,03620) |
| | Public Administration (civil servants) | 0,0544 *** | 0,0448 *** | 0,0697 *** | -0,1107 | -0,0203 | -0,2259 * |
| | | (0,00831) | (0,01194) | (0,01150) | (0,07440) | (0,08013) | (0,12673) |
| | Constant | 9,2239 *** | 9,1944 *** | 9,1087 *** | 9,3495 *** | 9,2734 *** | 9,4016 *** |
| | | (0,01065) | (0,01444) | (0,01407) | (0,04500) | (0,06222) | (0,05289) |
| | N | 111.424 | 66.498 | 44.926 | 6.162 | 3.857 | 2.305 |
| | $R^2$ | 0,486 | 0,451 | 0,511 | 0,393 | 0,390 | 0,406 |
| | F | 1.867 | 994 | 910 | 59 | 41 | 29 |

***, **, *: significant to 1%, 5% y 10%, respectively. Standard errors in brackets

*Source:* Encuesta de Estructura Salarial 2010 and own preparation