GENDER DISCRIMINATION IN PROMOTION: THE CASE OF SPANISH LABOR MARKET

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Abstract

This paper tests the hypothesis that a *glass ceiling* phenomenon exists in the Spanish labor market -that as women rise in the professional hierarchy, they face increasing obstacles for promotion. Taking data from the Spanish Survey on Quality of Life at Work (ECVT) for 2001, a number of indicators were selected for promotion: “number of promotions”, “supervision levels”, “number of people supervised” and “net wage”.

The relative gaps were calculated for each of the intervals (categories) for these variables, in order of size, starting with the smallest. These measure the percentage by which women’s participation would have to increase in order to reach the level that would exist if there were no discrimination (the latter being calculated, in line with the Oaxaca decomposition, by evaluating women’s endowments in the model estimated for men, for whom it is assumed there is no gender discrimination). In order to calculate these relative gaps, for each of the indicators one model was estimated for women and one for men. The ordered probit model was used to calculate the probabilities (or theoretic frequencies) for the presence of women/men at each of the intervals considered. The results indicated that, in all cases, the relative gap tends to increase as the intervals rise. This might indicate the presence of a *glass ceiling* problem.

The paper has four sections. The first covers the existing literature on the glass ceiling phenomenon. The second examines the main characteristics of the data and shows some preliminary results. The third presents the ordered probit model used to estimate the women’s and men’s equations. The fourth shows the main results. The closing section gives some conclusions.

Keywords: Glass ceiling, gender discrimination, labor market

JEL Classification: J71, J24, K31

1. Introduction and background

Of the various social movements of the twentieth century, perhaps none can be compared to the women's movement in developed countries because it has spread to all areas of public life. According to data from the European Commission (1997), women account for all the growth in the working population in the European Union over the last twenty years. In the case of Spain, although the figure for employed women is about half that for men (39% and 62% respectively), about two million women have entered the labor market.

However, the well-established presence of women in the world of employment and their improved qualifications are not reflected in their careers as there is a marked imbalance in the professional development of the two sexes. Gender discrimination at work still exists and is especially clear in jobs involving a high level of responsibility and social esteem, only 3% of which are held by women.

Supply theories on the low numbers of women in management positions have mostly been based on human capital theory (Becker, 1964; Blau and Ferber, 1992), explaining the different levels of promotion for men and women by the lower educational level of women as well as their more limited professional experience because many voluntarily give up work to bring up their families and tend to be less committed to their jobs than men. Moreover, it used to be stated that women did not want stressful, competitive jobs, which also meant that they were less likely to be promoted than men. Other writers suggested that the gender-based socialization that takes place from childhood leads to the development of management characteristics in men but not in women (Henning and Jardim, 1977). Finally, it was maintained that lifestyle choices – with priority being given to the husband's career and to the family in preference to employment – also explained the differences between men and women at work (Markham, 1987). The neo-classical economists used the human capital theory to show that supply factors explain the low percentage of women in management positions, higher wages for men and greater responsibility and career possibilities for men. These supply theories have undoubtedly made an important contribution to our understanding of these differences but the facts show that they cannot fully explain the differences in promotion.

Longitudinal studies have been carried out (Olson and Frieze, 1987; Wallace, 1989) analyzing, for example, the professional careers of men and women with the same training (graduates with MBA). These have found that, in spite of having the same qualifications, the same professional ambitions, the same devotion to their jobs and assuming that at the start of their careers they all had similar status and salaries, the careers developed differently. The men were promoted faster and ended up at higher levels and with better pay than the women. The only possible explanation for these differences was, and is, what has been called the "glass ceiling".

This metaphor has been used by the media[1], public institutions and academic publications (Morrison et al,[2] 1987; Segerman-Peck, 1991; Powell, 1991; Davidson and Cooper, 1992)

[1] The term glass ceiling was popularized in a 1986 *Wall Street Journal* article describing the invisible barriers faced by women as they approach the top of the corporate hierarchy.

[2] One of the first authors to use this metaphor stated that the glass ceiling is "a transparent barrier that keeps women from rising above a certain level in corporations... It applies to women as a group who are kept from advancing higher because they are women."

to explain that there is a barrier of procedures, structures, power relations, beliefs, etc. that make it difficult for women to reach management positions. Qualified women can see further capabilities beyond this glass ceiling but cannot reach them because of the invisible barrier.

If we take the term literally, the glass ceiling implies the existence of a barrier that prevents women from moving upwards. Below it, women progress and are promoted, but above it promotion is impossible. However, most of the literature takes it to mean a situation in which women find themselves at an increasing disadvantage with regard to men as they rise in the organizational hierarchy (Baxter and Wright, 2000)[3]. Such authors consider that a specific pattern of disadvantage can be seen at the higher levels of the organizational hierarchy. The most literal sense considers that the glass ceiling indicates the level beyond which women can go no further, whereas the second meaning is broader and does not try to identify the glass ceiling at a specific level but only within the highest levels of the hierarchy.

This latter meaning is the most widely-used and is the one we shall use in our analysis. However, whatever the definition used, it is important to point out that our analysis aims to distinguish between discrimination for vertical promotion and other types of discrimination, and to determine whether the intensity of this specific type of discrimination is greater for management positions and positions of responsibility. If so, legislation aiming to resolve gender discrimination in the labor market would have to vary depending on the type and cause of discrimination.

The doctrine has presented a number of theories analyzing the glass ceiling phenomenon, but the mechanisms behind this effect are as yet unknown. Many of the theories lead to contradictory results, and few empirical studies have been carried out to quantify and explain the glass ceiling.

The existing literature uses different methods to measure the glass ceiling. An initial group of studies analyses the phenomenon by focusing on a specific profession or sector, whereas another type of article studies the problem from a more general point of view, taking the whole working population of a city or country as the sample. The former have the advantage of more detailed information on the sample so their results are less likely to show deviation but cannot be applied to the whole population. In addition, as stated by Paulson (2002), the glass ceiling noted by women is not uniform throughout the labor market. This makes it essential to carry out studies allowing the glass ceiling to be measured in different professions in order to help design legislation to try to resolve the problem.

[3] Britton and Williams (2000) criticize the definition of the glass ceiling given by Baxter and Wright because they consider it to be a barrier not only to positions at a higher hierarchical level but also to greater prestige and/or income. Also because the definition ignores the possibility that the glass ceiling might also exist at lower levels of organizations. With regard to the first of these criticisms, the authors accept that they could use the concept in the broader sense, but this would make it necessary to describe the different glass ceilings with adjectives, and they claim that with their definition they are referring to a single dimension of the problem only. Regarding the second criticism, they consider their definition does not imply that the glass ceiling for promotions to management cannot also exist at lower management levels.

AUTHOR AND YEAR	SECTOR	SAMPLE	MAIN RESULTS
Gibelman, M. (2000)	NGOs (Non-governmental organizations)	850 NGOs carrying out humanitarian services in the USA, of which 74 were selected	• Although a mainly female profession in which almost 2/3 are women, 22% of the men held management positions, and only 11% of women. The glass ceiling exists. • In similar posts in management and with the same educational level, the women earned less than the men.
Mc Dowell, J. Singell, L and Zilliak, J. (1999)	American academic economists	Panel data from the American Economic Association	• There is a glass ceiling in its broadest sense. The average female economist is 36% less likely to be promoted from assistant to associate professor, and 9% less likely to be promoted from associate to full professor than a man. • Other possible explanations: -Female academics dedicate more time to teaching and service than their male counterparts - Differences in research orientation between women and men
Tang, J. (1997)	American scientists and engineers	1989 Survey of Natural and Social Scientists and Engineers	• There is a glass ceiling. Asian men were 56% less likely to occupy a management position than a white man in 1980. • Asian women are 70% less likely to hold a management position. • The results provide support for the double penalty thesis.
Jones, D. and Makepeace, G. (1996)	British financial sector	Personnel data from a large financial company	• Women have to meet more stringent criteria than men for promotion. • However, lack of experience is more important quantitatively than the glass ceiling in preventing the preferment of women - the proportion of women managers rises from 3% to 20% if the work experience is made comparable to that of men. - the promotion of women managers rises from 1% to 3% if women are treated in the same way as men.

Limited conclusions can be drawn from these studies because the sectors studied are too specific. Although there is unanimous agreement that it is more difficult for women to reach management positions, no-one agrees on the cause of this gender difference. Some writers consider the main explanation to be different levels of experience whereas others lay the blame more on barriers in structures, procedures, etc., that is, the glass ceiling.

AUTHOR	DATA	METHODOLOGY	MAIN RESULTS
Albrecht, J. Bjorklund, A. Vroman, S. (2003)	LINDA data for 1994 SSW (Statistics Sweden for research purposes) for 1992 SLLS (Swedish Level of Living Surveys) for 1991	Quantile regression decomposition	• There is a significant glass ceiling in Sweden (large gap between men and women at the top of wage distribution) • Adding field of education, sector and industry reduces the gender gap, but these can be considered endogenous variables. • Adding occupation, the gender gap at the top of distribution is substantially reduced, but this variable might be another way of showing the glass ceiling effect
Hultin, M. (2003)	SLLS (Swedish Level of Living Survey) from 1991	Cox regression models	• Results indicate that men who work in typically female occupations have substantially better internal promotion prospects than their similarly qualified counterparts. This confirms the glass escalator hypothesis. • Results indicate that men and women have equal internal career chances in male-dominated occupations. Hence there is no glass ceiling in male occupations.
Gang.I, Landon-Lane, J. and Yun M.S. (2002)	Panel Study of Income Dynamics (PSID), from the USA. German Socio-Economic Panel (GSEOP), from Germany	First order Markov Chain Bayesian Methods	• Results indicate strong evidence of a glass ceiling in Germany. Females enjoy greater income mobility in the lower and middle income classes but males have significantly higher income mobility for the higher initial income classes. • There is no evidence of the glass ceiling in United States. Women have a significantly lower conditional probability of moving to a higher income class for all income groupings. Therefore, there is vertical discrimination against women in all classes.
De la Rica, S. and Felgueroso, F. (2001)	EES 95 (Spanish Earnings Structure Survey)	Job cells Oaxaca decomposition of the gender gap	• Results indicate that males are more likely to be the higher job category (the human capital of men and women being equal). Therefore, there is a glass ceiling unless there are unobservable differences in productivity between sex. • Results indicate that between ¼ and 1/3 of the gender gap is explained by differences in human capital characteristics, so differences in returns account for around 70% of the total wage differential.
Baxter, J. and Wright, E. (2000)	Two cross sectional surveys - United States (1980-1991) - Australia (1986 and 1993) - Sweden (1980 and 1995)	Logistic regressions	• In all three countries, there is a gender gap in authority, but in the United States there is a little evidence for large, systematic glass ceiling effects. The disadvantages for women in acquiring authority are greatest at the lower levels of managerial hierarchy. • In Sweden and Australia there may be glass ceiling effects but they are located more around the middle or managerial hierarchies than at the top
Groot, W. Van den Brink, H. (1996)	British Household Panel Survey from 1991 and 1992	Probit models	• The data ratify the dead–end jobs hypothesis and not the glass ceiling effect. • Women are less frequently in jobs that offer promotion opportunities than male workers. However, once workers are in jobs that offer promotion possibilities, there are no significant differences by gender.

Few conclusions can be drawn from these studies because of the different samples and methodologies used. The data corroborate the existence of the glass ceiling in Germany, Sweden and Spain but the phenomenon is not clear in the United States where greater vertical discrimination is noted. It seems that American women find it more difficult to gain promotion than men but the obstacles do not increase as they rise in the occupational hierarchy.

There is no unanimity on why a glass ceiling exists. Some authors consider the main reason to be that women have few possibilities of promotion in male-dominated jobs, or that entrepreneurs evaluate men's and women's qualifications differently. Others claim the opposite, that in male-dominated jobs the possibilities of promotion are the same for both sexes and that, in most cases, the differences are determined by the more limited experience of women. All the studies seem to confirm that, as variables quantifying human capital such as studies, type of studies, experience, type of experience are introduced, the glass ceiling tends to disappear. However, it would be necessary to consider whether such variables explain the process of discrimination or are endogenous to it.

2. The data and some preliminary results

The data

The "Survey on Quality of Life at Work" (*Encuesta de la Calidad de Vida en el Trabajo*, ECVT) is carried out annually by the Spanish Ministry of Labor and Social Affairs. This study takes the 2001 survey. The geographical area covered is the whole of Spain (with the exception of the Spanish enclaves in Africa of Ceuta and Melilla). The population is limited to the working population aged 16 and over and living in family homes. The sample covers a total of 6,020 working individuals.

The aim of the survey is to study quality of life at work for workers, and to obtain objective information on real situations in the working environment and subjective information in the form of the personal perceptions of workers on their working conditions and industrial relations.

The questionnaire has four parts: *family environment* (married or cohabiting, working situation of spouse or partner, number of children, etc.); *working situation* (employee, self-employed; occupation, sector, working history, processes of integration and promotion, etc.); *quality of life* (job satisfaction, etc.); and *socio-economic data* (sex, age, educational level, size of town of residence, etc.)

This study takes the sub-group of wage-earning workers. This reduces the sample to 4,664 wage-earners, of whom 1,785 are women and 2,879 men.

Main results on some promotion variables and markers

Table 1 gives four sets of summarized data broken down by sex. The first two give data on a number of the individuals' *job characteristics*. The third gives data on individuals' *personal characteristics*. The fourth gives some basic results on the *professional promotion indicators* to be used in this study.

The first set of data in *Table 1* shows that on average women have less work experience and seniority than men. These results may reflect the fact that full incorporation of women in the Spanish labor market is relatively recent, so the limited presence of women in the 50+ age bracket reduces the average experience/seniority for total employed women.

Data on temporary employment point to a well-known feature of the Spanish labor market: the percentage of workers on temporary contracts is very high, especially for women, and this ties in with the hypothesis that women (on average) occupy lower-quality, less stable jobs than men.

Part-time jobs are practically the exclusive domain of women (21.9%). As shown lower down in this table, this may reflect the fact that the majority of working women have to make employment outside the home compatible with running a home, and this limits the possibilities of professional promotion for women having family responsibilities. To a large extent, the fact that part-time employment is almost exclusively taken up by women explains why their average working week is shorter than that for men.

It is interesting to note that levels of job satisfaction are similar for women (7.72) and men (7.83) on a scale of 10.

When asked if they usually stay on at work after their stipulated working hours, 35.53% of women and 29.18% of men reply “Never”. This might, once again, indicate that women are on average less committed to their companies because they have to make their jobs compatible with their domestic activities.

The second set of figures shows that more women than men work in the public sector (in which working conditions are more stable and there are greater facilities for maternity leave, etc.) and in small and medium companies. This may tie in with the fact that there is a greater percentage of men than women in companies with trade union representatives.

Regarding the positions held in companies (management, supervision, employees), there is a much lower percentage of women managers or supervisors than men. This breakdown of positions into just three categories does not show whether the percentage of women falls as they rise in the hierarchy (however, we are dealing with this fact later through the variable “number of people supervised”).

It is also interesting to note, although the opposite is sometimes suggested, that women (on average) receive more days training than men.

Finally, two indicators are given showing considerable wage differences between men and women.

The third set of figures (*personal characteristics*) shows that the average age of employed women is lower than that of men. As stated above, this is because the later incorporation of women into the labor market is associated with the changing generations.

Regarding educational levels, the percentage of employed women with university studies is much higher than that for employed men. This may be related to the fact that the labor force participation rate is much greater for women with university qualifications. However, taking data from the “Spanish Survey on Labor Force” (*Encuesta sobre la Población Activa*) for the 16+ population, the percentage of women with university qualifications is still greater in the <39 age group, although the difference is not as great as in the previous case.

Regarding married/coupled people, the percentage of married, employed women is much lower than that of married, employed men. This is in line with the fact that some women stop paid employment when they marry and have children (especially in the generations now aged 50+), whereas this phenomenon is practically non-existent for men. The next figure on the table corroborates this. In the case of employed women, 84.38% of their partners work, whereas only 31.74% of the partners of employed men work.

Finally, it is fairly clear that the percentage of working women who are married/with partner and who are also largely responsible for domestic activities is much higher than that for employed men who are married or cohabit.

The <u>fourth and last set</u> of figures in the table shows the average values for a set of indicators regarding professional promotion: the *number of promotions* received in the current company; the *possibility of promotion* in the current company; *levels of supervision* beneath the worker; the *number of people supervised* directly or indirectly; and the *net wage*.

For these four indicators, women stand at significantly lower levels than men. In the case of promotions, the *women-men gap* is much more important for the "number of promotions in the company" (39.5%) than for "possibility of promotion" (88.1%). This might indicate that on average women are over-optimistic about their chances of promotion. It might, however, also point to a gradual reduction in the limitation of promotion possibilities for women as a result, amongst other things, of women's better qualifications and greater professional experience today.

The "number of people supervised" can be used to indicate the position of the individual in the company or the professional hierarchy. In this case, the gender gap is at its lowest, 26.9%. This might indicate, as will be shown in detail below, that the presence of women is very limited at the highest levels of the professional hierarchy.

With respect to average net wages, and in line with the values for the above-mentioned indicators, women's wages stand at 74.4% of men's.

Table 1. *Summary of some of the main variables of the survey*

		Women	Men	*Women-men gap*
Labor experience (years)	Average (Median)	**15.61** (14)	**20.56** (20)	*75.9*
Seniority (years)	Average (Median)	**7.78** (4)	**10.12** (6)	*76.8*
Temporary employment (time-limited contract)	Percentage **(1)**	**34.73%**	**27.93%**	*124.4*
Part time workers	Percentage **(1)**	**21.91%**	**3.90%**	*561.6*
Average workweek hours	Average (Median)	**36.04** (40)	**41.69** (40)	*86.4*
Satisfaction **(2)**	Average (Median)	**7.72** (7)	**7.83** (7)	*98.5*
Working day prolongation: never	Percentage **(1)**	**35.53%**	**29.18%**	*121.8*
Public sector	Percentage **(1)**	**26.95%**	**19.97%**	*134.9*
Companies < 50	Percentage **(1)**	**61.27%**	**56.17%**	*109.1*
Labour union representative	Percentage **(1)**	**52.16%**	**58.53%**	*89.1*
Manager	Percentage **(1)**	**2.15%**	**3.72%**	*57.8*
Supervisor	Percentage **(1)**	**7.40%**	**13.96%**	*53.0*
Employee	Percentage **(1)**	**90.45%**	**82.33%**	*109.9*
Training (days per year)	Average (Median)	**13.53** (5)	**10.21** (4)	*132.5*
Net wage < 932 €	Percentage **(1)**	**37.48%**	**10.01%**	*374.4*
Net wage > 1803 €	Percentage **(1)**	**2.58%**	**7.70%**	*33.5*
Age	Average (Median)	**36.58** (36)	**38.98** (38)	*93.8*
Primary school or less	Percentage **(1)**	**14.63%**	**22.45%**	*65.2*
Secondary or high school	Percentage **(1)**	**55.61%**	**57.57%**	*96.6*
College graduates	Percentage **(1)**	**29.04%**	**19.32%**	*150.3*
Married/couple	Percentage **(1)**	**50.59%**	**66.41%**	*76.2*
The spouse works (out household)	Percentage **(1)**	**84.38%**	**31.74%**	*265.8*
Dependent children	Percentage **(1)**	**48.46%**	**54.53%**	*88.9*
Responsible for domestic work **(3)**	Percentage **(1)**	**95.56%**	**39.38%**	*242.7*
She/he does most domestic work **(3)**	Percentage **(1)**	**51.50%**	**1.88%**	*2735.0*
Number of promotions (within the organization)	Average (Median)	**0.23** (0)	**0.58** (0)	*39.5*
Possibility of promotion (within the organization) **(4)**	Average (Median)	**2.14** (2)	**2.43** (2)	*88.1*
Levels of supervision (beneath the worker)	Average (Median)	**0.25** (0)	**0.53** (0)	*46.8*
How many people she/he supervises **(5)**	Average (Median)	**1.27** (0)	**4.71** (0)	*26.9*
Net wage	Average (Median)	**802.1 €** (751.3 €)	**1,078.3 €** (1051.8 €)	*74.4*

(1) Percentages over the total amount of women and the total amount of men, respectively
(2) Satisfaction at work, in a range that goes from 1 (very unsatisfied) to 10 (very satisfied)
(3) It refers to the sub-group of married/stable couple
(4) Answer to the question: "with your training, have you possibilities of being promoted in your company/organization?, in a range that goes from 1 (no possibilities) to 5 (many possibilities)
(5) How many people she/he supervises (directly or indirectly)

The percentage of women as we rise in the professional hierarchy

Remember that the main purpose of this study is to contrast the hypothesis that, as we rise in the professional hierarchy, the percentage of women decreases. That is why *Figures 1* to *5* show how the percentage of women[4] changes as the values (or intervals) for the five above-mentioned promotion indicators rise.

Figure 1.a refers to the "number of promotions in the company". It shows that the percentage of women (the women participation) tends to drop as the number of promotions considered increases. Note, too, that the last column shows the percentage of women over total individuals in the sample (38.5%) and that if the percentages for the different intervals are compared with this, only at the interval for "no promotions" is the percentage of women higher than this global percentage.

However, the "number of promotions" is largely (and positively) determined by the years worked in the company. This is why it is of interest to offer an adjusted value for this variable that takes into account the seniority. This can be drawn from the "promotion index", PI, which is the quotient between "number of promotions" and years worked in the company. As shown in *figure 1.b*, in this case the percentage of women only decreases in the first four intervals, not in the next three, and these last three percentages are below the global percentage of women (the right-hand column).

Figure 2 shows "possibility of promotion". Here the percentage of women decreases from a very high value for "no possibilities" down to "reasonable possibilities". In the highest category, that of "many possibilities", the percentage of women rises, but the percentage (36.9%) is lower than the global percentage of women (37.7%).

In this preliminary analysis of the variables for "number of promotions" and "possibility of promotion", the percentage of women is always much higher on the left and then tends to decrease, but a clearly decreasing profile is not noted as the intervals rise.

This is not the case for *Figures 3*, *4* and *5* for "levels of supervision", "number of people supervised" and "net wage". These show a clearly decreasing profile as the intervals rise.

Take into account that these last three indicators show the *level* occupied by the worker in the professional hierarchy, while the number of promotions indicates the rate of change between levels. In any case, we are analyzing all of them in the following econometric analysis.

[4] This refers to the percentage of women over the total for women and men for each interval. That is, if we take the *i*th interval, $\frac{n^o\ women_i}{n^o\ women_i + n^o\ men_i} \times 100$.

We are calling to this percentage "women participation".

__Figure 1.__ Participation (percentage) of women at each interval of __number of promotions__ and __index of promotions__

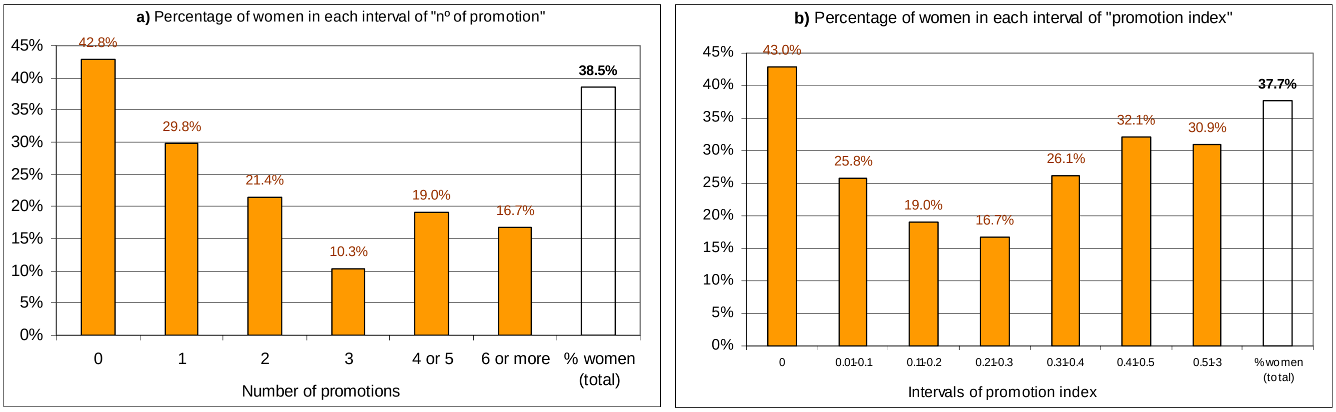


__Figure 2.__ Participation of women at each interval of __possibility of promotion__

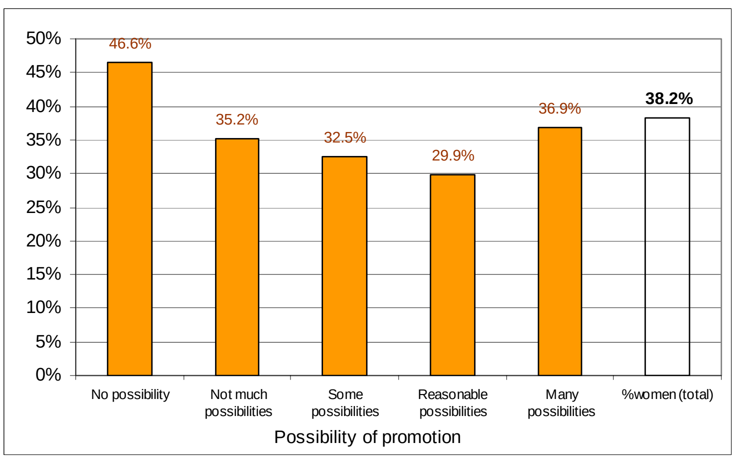


__Figure 3.__ Participation of women at each interval of __levels of supervision__

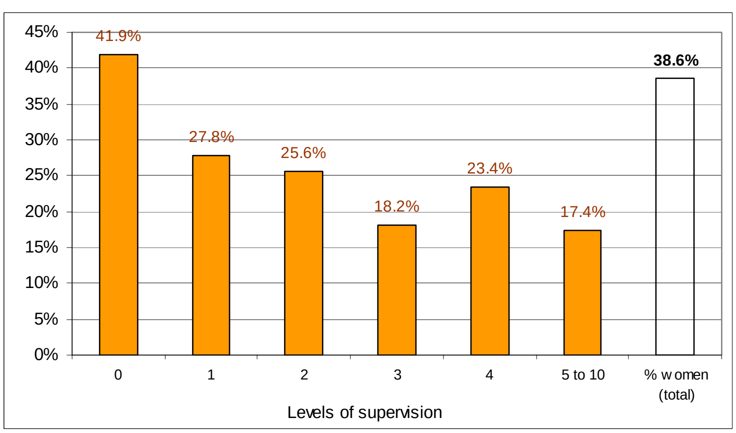


Figure 4. *Participation of women at each interval of* ***number of people supervised***

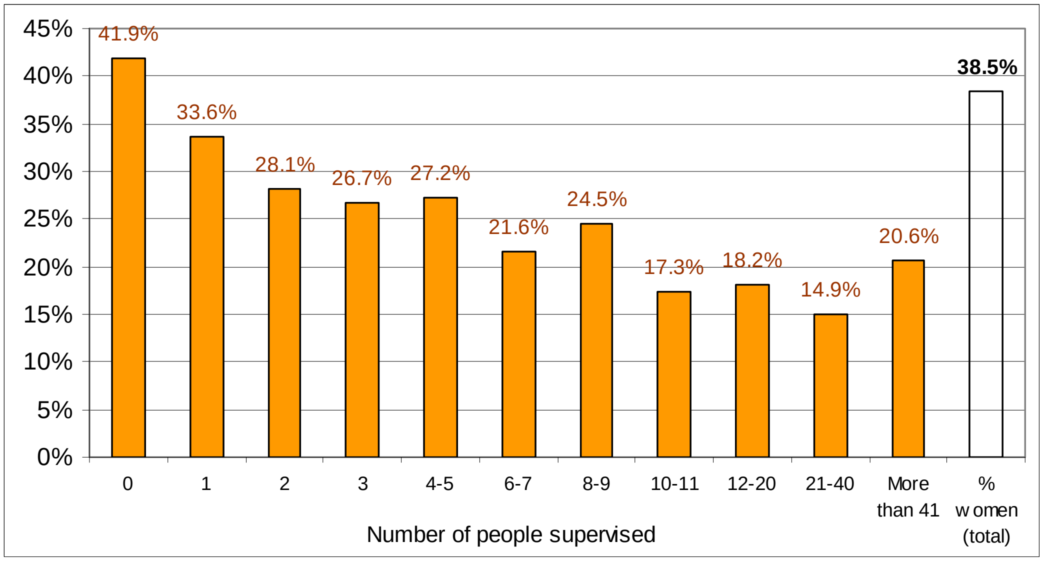
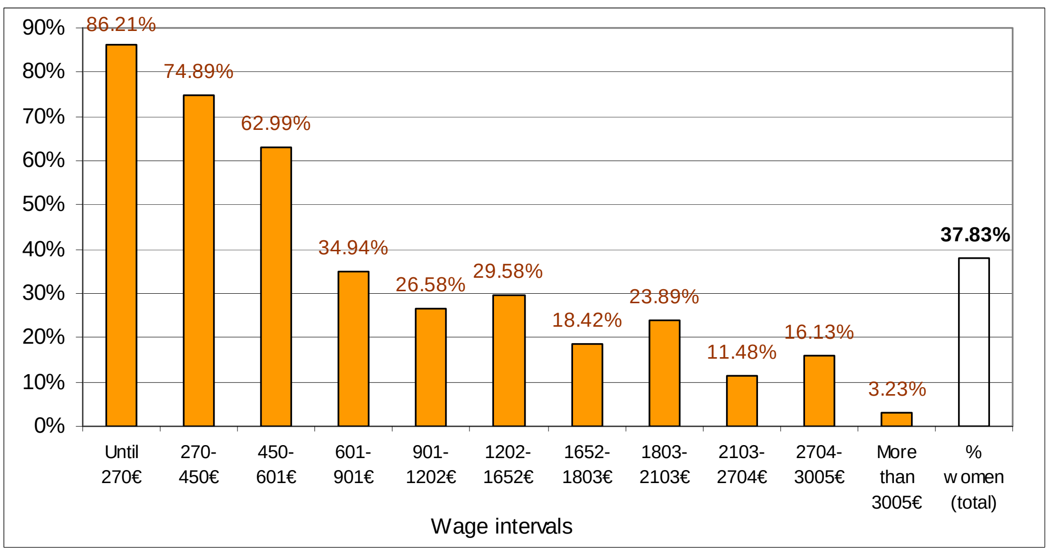


Figure 5. *Participation of women at each interval of* ***net wage***



3. The Econometric Model

Our main aim is to estimate to what extent the differences observed between men and women in the promotion variables in the Spanish ECVT Survey on Quality of Life at Work (wages, number of promotions, levels of supervision, number of workers supervised) can be explained by differences in men's and women's endowments and by gender discrimination in the Spanish labor market.

We are not trying to provide an explanation for promotion (the main variables or factors determining promotions). Our aim is less ambitious: to quantify how much gender discrimination affects promotion.

To achieve our aim, we shall follow the pseudo Oaxaca decomposition methodology. We shall assume that differences between men and women that are not explained by their different endowments are due to discrimination. The degree of discrimination is therefore obtained as a residual, as the part that is not explained by endowments. This methodology requires quantification and consideration of all the endowments that may be behind a worker's promotion. We have therefore included in our model all the possible variables relating to a worker's endowments that can be obtained from the above-mentioned survey, bearing in mind that the list is not exhaustive (certain characteristics of a worker are impossible to observe and therefore are not included in our model).[5] That is, the results obtained as residuals should not be considered as relating strictly to discrimination but rather to inequality or differences in the labor market. We can only talk of discrimination assuming that such endowments that cannot be observed or that are not included in our model are not significantly different between men and women. In other words, we may be overestimating the degree or intensity of gender discrimination in promotion.

It should also be borne in mind that our results cannot be extrapolated to discrimination between men and women in a broad sense. Since the ECVT survey does not give information for men and women as a whole in the Spanish economy (irrespective of whether they are working or not, are employed or unemployed) but only of the workers who were in employment at the time of the interview, our results can only be applied to this segment of the working population.[6]

This section summarizes the econometric model and the pseudo Oaxaca decomposition methodology we use to estimate the degree of gender discrimination at each of the levels of promotion in order to test the glass ceiling hypothesis.

The ordered probit model

[5] For example, an individual's innate skill at organising teams or tasks, heading projects or bearing responsibility for the management or organisation of work. Perhaps, if we had sufficient information to track an individual's complete professional career over the years, we could use panel data methodology to estimate these unobservable, heterogeneous effects in individuals. Unfortunately, this methodology cannot be applied to the information given in the ECVT survey used here.

[6] If we had information on all men and women (whether working or employed or not), we could use econometric methodologies involving selection sampling in order to apply our result to the general population, as it would allow us to estimate each individual's reasons for working or not or for being employed or unemployed.

As stated above, our aim is to estimate to what extent the differences observed between men and women in the promotion variables can be explained by differences in their endowments and to what extent they are due to gender discrimination in the Spanish labour market.

In addition, in order to test the glass ceiling hypothesis, we shall try to obtain an estimate of gender discrimination at each of the promotion levels or scales (Do discrimination, inequality and barriers to promotion increase for women as their skill level rises?). In this way, we have to use different promotion levels or scales, that is, category variables expressing an order.

We consider the most appropriate economic model for our purposes to be the Ordered Probit Model (see Greene, 2003, pp. 736-740, and Wooldridge, 2002, pp.504-509). This allows us to estimate an individual's probability of being in each of the categories or promotion levels because of his endowments, considering that the categories are in some type of order, e.g. 0 - no promotions; 1 - middle level; 2 - senior management).

The ordered probit (or logit) model is a special case of a multinomial-choice dependent variable model where this dependent variable is inherently ordered, and for that reason, although the outcome is discrete (skill or promotion level), the multinomial probit (or logit) model would fail to account for the ordinal nature of the dependent variable[7].

Let y be an ordered response taking on the values $\{0,1,2,\ldots,J\}$ for some known integer J. The ordered probit model for y (conditional on explanatory variables $\boldsymbol{x}$) can be derived from a *latent variable model*. Assume that a latent unobserved variable y^* is determined by the following linear regression model:

$$y^* = \mathbf{x}'\boldsymbol{\beta} + e, \qquad e\,|\boldsymbol{x} \sim \text{Normal }(0,1) \qquad [1]$$

where $\boldsymbol{\beta}$ is a $K\times 1$ and $\boldsymbol{x}$ the independent or explanatory variables (without a constant)[8]. Let $\alpha_1<\alpha_2<\cdots<\alpha_J$ be unknown cut points (which must be estimated) and let us define the observed ordered response variable y as

$$\begin{aligned} &y = 0 && \text{if} \quad y^* \leq \alpha_1 \\ &y = 1 && \text{if} \quad \alpha_1 < y^* \leq \alpha_2 \\ &\cdots && \\ &y = J && \text{if} \quad y^* > \alpha_J \end{aligned} \qquad [2]$$

Given the standard normal assumption for e, it is straightforward to derive the conditional distribution of y given x; we simply compute each response probability:

$$\begin{aligned} &\mathrm{P}(y = 0 \mid \boldsymbol{x}) = \mathrm{P}(y^* \leq \alpha_1 \mid \boldsymbol{x}) = \mathrm{P}(\boldsymbol{x}'\boldsymbol{\beta} + e \leq \alpha_1 \mid \boldsymbol{x}) = \Phi(\alpha_1 - \boldsymbol{x}'\boldsymbol{\beta}) \\ &\mathrm{P}(y = 1 \mid \boldsymbol{x}) = \mathrm{P}(\alpha_1 < y^* \leq \alpha_2 \mid \boldsymbol{x}) = \Phi(\alpha_2 - \boldsymbol{x}'\boldsymbol{\beta}) - \Phi(\alpha_1 - \boldsymbol{x}'\boldsymbol{\beta}) \\ &\cdots \\ &\mathrm{P}(y = J-1 \mid \boldsymbol{x}) = \mathrm{P}(\alpha_{J-1} < y^* \leq \alpha_J \mid \boldsymbol{x}) = \Phi(\alpha_J - \boldsymbol{x}'\boldsymbol{\beta}) - \Phi(\alpha_{J-1} - \boldsymbol{x}'\boldsymbol{\beta}) \\ &\mathrm{P}(y = J \mid \boldsymbol{x}) = \mathrm{P}(y^* > \alpha_J \mid \boldsymbol{x}) = 1 - \Phi(\alpha_J - \boldsymbol{x}'\boldsymbol{\beta}) \end{aligned} \qquad [3]$$

[7] In a similar way, if the skill or promotion levels are coded as 0, 1, 2, 3 or 4, then linear regression would treat the difference between a 4 and a 3 the same as that between a 3 and a 2, whereas in fact they are only a ranking.
[8] The probit model comes from the normal assumption for *e*. The ordered logit model is formed using the logit function for the distribution of *e*. We use the probit model only because economists tend to favour the assumption of normality.

Where $\Phi(\cdot)$ is the standard normal cumulative distribution function. Note that if the ordered variable y has a quantitative meaning, its expected value is determined by

$$E(y \mid \boldsymbol{x})=\alpha_0 P(y = 0 \mid \boldsymbol{x}) + \alpha_1 P(y = 1 \mid \boldsymbol{x}) + \cdots + \alpha_J P(y = J \mid \boldsymbol{x}) . \qquad [4]$$

The parameters $\boldsymbol{\alpha}$ and $\boldsymbol{\beta}$ can be estimated by maximum likelihood[9]. The results of this estimation require some comments, since neither the $\boldsymbol{\beta}$ estimated coefficients can be interpreted as the partial effect of the independent variables on the response probability, nor can the traditional statistics for measuring the goodness of the fit be applied.

For the ordered probit model and a continuous x_k independent variable:

$$\frac{\partial P(y=0 \mid \boldsymbol{x})}{\partial x_k} = -\beta_k \phi(\alpha_1 - \boldsymbol{x}'\boldsymbol{\beta})$$

$$\frac{\partial P(y=j \mid \boldsymbol{x})}{\partial x_k} = -\beta_k \left[\phi(\alpha_{j-1} - \boldsymbol{x}'\boldsymbol{\beta}) - \phi(\alpha_j - \boldsymbol{x}'\boldsymbol{\beta})\right], \quad 0<j<J \qquad [5]$$

$$\frac{\partial P(y=J \mid \boldsymbol{x})}{\partial x_k} = \beta_k \phi(\alpha_J - \boldsymbol{x}'\boldsymbol{\beta})$$

where $\phi(\cdot)$ is the standard normal density. Thus, while the direction of the effect of x_k on the probabilities $P(y = 0 \mid \boldsymbol{x})$ and $P(y = J \mid \boldsymbol{x})$ is unambiguously determined by the sign of β_k (since $\phi(z)>0$ for all z), the sign of β_k does not always determine the direction of the effect for the intermediate outcomes, 1,2, …, J-1. In any case, the magnitude of these partial effects depends not only on β_k but on $\boldsymbol{x}'\boldsymbol{\beta}$ and $\boldsymbol{\alpha}$ through $\phi(\cdot)$. Note, however, that when interpreting the estimated coefficients, we can look at the significance of the coefficient.[10]

Problems also arise for evaluating the model's overall adjustment. As stated above, the purpose of the model is to predict the response probability in each category given a set of endowments, and the result gives an estimated probability for each individual of being in each category. In order to obtain an overall measurement of adjustment it would be necessary to calculate the error but, since we are not observing the individual's probability, but whether or not he falls within a given category, any error cannot be directly observed. There are three widely-used alternative methods for measuring adjustment –the Expectation-Prediction table, the pseudo R-squared and the likelihood ratio statistic[11].

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[9] For each i, the log-likelihood function is $\ell_i(\boldsymbol{\alpha},\boldsymbol{\beta})=1[y_i=0] \log[\Phi(\alpha_1-\boldsymbol{x}_i'\boldsymbol{\beta})] + 1[y_i=1] \log[\Phi(\alpha_2-\boldsymbol{x}_i'\boldsymbol{\beta}) - \Phi(\alpha_1-\boldsymbol{x}_i'\boldsymbol{\beta})] + \cdots + 1[y_i=J] \log[1-\Phi(\alpha_J-\boldsymbol{x}_i'\boldsymbol{\beta})]$, where $1[\cdot]$ is the indicator function (equal to 1 if the expression inside the indicator function is true; and equal to 0 if that expression is false). We use the Eviews 4.0 (Quantitative Micro Software, 2001) statistical package to estimate the ordered probit models using the quadratic hill climbing optimisation algorithm and computing the robust standard errors and covariance using the quasi-maximum likelihood (or pseudo-ML) standard errors (Hubert/White method): $\mathrm{var}_{QML}(\hat{\beta}) = \hat{H}^{-1}\hat{g}\hat{g}'\hat{H}^{-1}$, where $\hat{g}$ and $\hat{H}^{-1}$ are the gradient and Hessian of the log likelihood evaluated at the maximum likelihood estimates. These standard errors are robust to certain mis-specifications of the underlying distribution of y (but not to heteroskedasticity).

[10] Since the most realistic estimators are not only asymptotically consistent and efficient but also asymptotically normal, the analogous can be applied to test t to find its significance.

[11] The *Expectation-Prediction Table* classifies observations on the basis of the predicted response. Our paper presents two measures of the global fit of the regression. The first one measures the difference between the observed count and the number of observations where the probability of that response is highest; and the second one measures the difference between the actual number of individuals reporting the value, and the sum of all of the individual probabilities for that value. The *pseudo R-squared* proposed by McFadden (1974) suggests the measure $1-L_{UR}/L_0$, where L_{UR} is the log-

Finally, we have to remember that ordered probit models are inconsistent for β when the error term *e* in the latent model [1] is heteroskedastic or non-normal, because the functional form in the response probability is no longer the one in [3].

Discrimination as a residual: The pseudo Oaxaca decomposition in the ordered probit model

Having explained the econometric model, we shall now briefly describe the methodology used to obtain the pseudo Oaxaca decomposition.

For each of the dependent variables representing promotion, we shall estimate an ordered probit model with the sub-sample of men and another model with the sub-sample of women. (The same explanatory variables are used in both estimations). These shall be called the men's model and the women's model respectively. This will allow us to estimate the mean probability for men and for women of being in each of the promotion categories. We shall therefore calculate the mean probability of each man of being in each of the categories in line with the model estimated for them by applying [3]:

$$\begin{aligned}
&\mathrm{P}_M^M\left(y=0 \mid \boldsymbol{x}_M\right)=\frac{1}{m}\sum_i^m \mathrm{P}_i^M\left(y=0 \mid \boldsymbol{x}_i\right)\\
&\mathrm{P}_M^M\left(y=1 \mid \boldsymbol{x}_M\right)=\frac{1}{m}\sum_i^m \mathrm{P}_i^M\left(y=1 \mid \boldsymbol{x}_i\right)\\
&\qquad\cdots \qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad [6]\\
&\mathrm{P}_M^M\left(y=J \mid \boldsymbol{x}_M\right)=\frac{1}{m}\sum_i^m \mathrm{P}_i^M\left(y=J \mid \boldsymbol{x}_i\right)
\end{aligned}$$

where *m* is the total number of men; the subindex *M* indicates male mean probability in each of the *J+1* categories; and the superindex *M* indicates that we are using the parameters estimated in the male ordered probit model.

Mean probability for women will be calculated in a similar way by using the sub-sample of women and the parameters estimated in the women's model:

$$\begin{aligned}
&\mathrm{P}_F^F\left(y=0 \mid \boldsymbol{x}_F\right)=\frac{1}{f}\sum_i^f \mathrm{P}_i^F\left(y=0 \mid \boldsymbol{x}_i\right)\\
&\mathrm{P}_F^F\left(y=1 \mid \boldsymbol{x}_F\right)=\frac{1}{f}\sum_i^f \mathrm{P}_i^F\left(y=1 \mid \boldsymbol{x}_i\right)\\
&\qquad\cdots \qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad [7]\\
&\mathrm{P}_F^F\left(y=J \mid \boldsymbol{x}_F\right)=\frac{1}{f}\sum_i^f \mathrm{P}_i^F\left(y=J \mid \boldsymbol{x}_i\right)
\end{aligned}$$

likelihood function for the estimated model (unrestricted model) and L_0 is the log-likelihood function in the model without $\boldsymbol{x}$ as independent variables (restricted model). Finally, to test the global fit of the model (global significance) we use the *likelihood ratio statistic* $2(L_{UR}-L_0)$ which has an asymptotic χ^2_k distribution under the null hypothesis (this is analogous to the usual F statistic in Ordinary Less Squared analysis of a linear model).

where *f* is the total number of women; the subindex *F* indicates female mean probability in each of the *J* categories; and the superindex *F* indicates that we are using the parameters estimated in the female ordered probit model.

If we combine the models estimated for men and women with the different sub-samples we can estimate, firstly, the mean probability for men of being in each category if their endowments are evaluated in the same way as those of women, that is, using the women's model:

$$\begin{aligned}
\mathrm{P}_M^F\left(y=0 \mid \boldsymbol{x}_M\right) &= \frac{1}{m}\sum_i^m \mathrm{P}_i^F\left(y=0 \mid \boldsymbol{x}_i\right)\\
\mathrm{P}_M^F\left(y=1 \mid \boldsymbol{x}_M\right) &= \frac{1}{m}\sum_i^m \mathrm{P}_i^F\left(y=1 \mid \boldsymbol{x}_i\right)\\
&\cdots \\
\mathrm{P}_M^F\left(y=J \mid \boldsymbol{x}_M\right) &= \frac{1}{m}\sum_i^m \mathrm{P}_i^F\left(y=J \mid \boldsymbol{x}_i\right)
\end{aligned} \qquad [8]$$

We can also calculate the mean probability for women of being in each category if their endowments are evaluated in the same way as those of men, that is, using the men's model:

$$\begin{aligned}
\mathrm{P}_F^M\left(y=0 \mid \boldsymbol{x}_F\right) &= \frac{1}{f}\sum_i^f \mathrm{P}_i^M\left(y=0 \mid \boldsymbol{x}_i\right)\\
\mathrm{P}_F^M\left(y=1 \mid \boldsymbol{x}_F\right) &= \frac{1}{f}\sum_i^f \mathrm{P}_i^M\left(y=1 \mid \boldsymbol{x}_i\right)\\
&\cdots \\
\mathrm{P}_F^M\left(y=J \mid \boldsymbol{x}_F\right) &= \frac{1}{f}\sum_i^f \mathrm{P}_i^M\left(y=J \mid \boldsymbol{x}_i\right)
\end{aligned} \qquad [9]$$

These P_F^M probabilities therefore indicate the mean probability for women of being in each of the *J+1* categories if their endowments are evaluated in the same way as those of men. They can therefore be interpreted as theoretical probabilities without gender discrimination. That is, the differences between men's probabilities (P_M^M) and women's probabilities without discrimination (P_F^M) should be explained exclusively by the differences between men's and women's average endowments.

If we take these theoretical probabilities without discrimination, it is possible to build a pseudo Oaxaca decomposition showing what percentage of the difference observed between the probabilities of being in each category for men (P_M^M) and for women (P_F^F) can be explained by differences in the average endowments of men and women and what percentage is due to other factors that we can identify with inequality or gender discrimination:

$$\underbrace{\mathrm{P}_M^M\left(y=0 \mid \boldsymbol{x}_M\right)-\mathrm{P}_F^F\left(y=0 \mid \boldsymbol{x}_F\right)}_{\text{Observed gap}}=\underbrace{\left[\mathrm{P}_M^M\left(y=0 \mid \boldsymbol{x}_M\right)-\mathrm{P}_F^M\left(y=0 \mid \boldsymbol{x}_F\right)\right]}_{\text{Gap due to diferences in endowments}}+\underbrace{\left[\mathrm{P}_F^M\left(y=0 \mid \boldsymbol{x}_F\right)-\mathrm{P}_F^F\left(y=0 \mid \boldsymbol{x}_F\right)\right]}_{\text{Gap due to discrimination}}$$

$$\underbrace{\mathrm{P}_M^M\left(y=1\mid \boldsymbol{x}_M\right)-\mathrm{P}_F^F\left(y=1\mid \boldsymbol{x}_F\right)}_{\text{Observed gap}}=\underbrace{\left[\mathrm{P}_M^M\left(y=1\mid \boldsymbol{x}_M\right)-\mathrm{P}_F^M\left(y=1\mid \boldsymbol{x}_F\right)\right]}_{\text{Gap due to diferences in endowments}}+\underbrace{\left[\mathrm{P}_F^M\left(y=1\mid \boldsymbol{x}_F\right)-\mathrm{P}_F^F\left(y=1\mid \boldsymbol{x}_F\right)\right]}_{\text{Gap due to discrimination}}$$

$$\cdots \qquad [10]$$

$$\underbrace{\mathrm{P}_M^M\left(y=J\mid \boldsymbol{x}_M\right)-\mathrm{P}_F^F\left(y=J\mid \boldsymbol{x}_F\right)}_{\text{Observed gap}}=\underbrace{\left[\mathrm{P}_M^M\left(y=J\mid \boldsymbol{x}_M\right)-\mathrm{P}_F^M\left(y=J\mid \boldsymbol{x}_F\right)\right]}_{\text{Gap due to diferences in endowments}}+\underbrace{\left[\mathrm{P}_F^M\left(y=J\mid \boldsymbol{x}_F\right)-\mathrm{P}_F^F\left(y=J\mid \boldsymbol{x}_F\right)\right]}_{\text{Gap due to discrimination}}$$

A possible index of the degree of discrimination for women in each category could be the relative difference or relative gap defined as:

$$\frac{\mathrm{P}_F^M\left(y=0\mid \boldsymbol{x}_F\right)-\mathrm{P}_F^F\left(y=0\mid \boldsymbol{x}_F\right)}{\mathrm{P}_F^F\left(y=0\mid \boldsymbol{x}_F\right)}$$

$$\frac{\mathrm{P}_F^M\left(y=1\mid \boldsymbol{x}_F\right)-\mathrm{P}_F^F\left(y=1\mid \boldsymbol{x}_F\right)}{\mathrm{P}_F^F\left(y=1\mid \boldsymbol{x}_F\right)}$$

$$\cdots \qquad [11]$$

$$\frac{\mathrm{P}_F^M\left(y=J\mid \boldsymbol{x}_F\right)-\mathrm{P}_F^F\left(y=J\mid \boldsymbol{x}_F\right)}{\mathrm{P}_F^F\left(y=J\mid \boldsymbol{x}_F\right)}$$

The discrimination index defined in [11] shows or can be interpreted as the percentage at which the probability of women of being in each category should increase in order for the real probability or frequency observed to be equal to the theoretical frequency if there were no discrimination [9].

This discrimination index can be used to test the glass ceiling hypothesis, according to which gender discrimination increases as the individual rises in the scale of promotion

4. Main results of the econometric analysis of the glass ceiling

In this section we summarize the results of our analysis on gender discrimination in promotion, obtained according to the pseudo Oaxaca decomposition showed in section 3, and using data from the ECVT.

<u>First</u>, we have estimated two ordered probit models for the sub-samples of women and men, for each of the four dependent/explained variables related to promotion:

- The *number of promotions* in the current company
- *The levels of supervision* beneath the worker
- *The number of people supervised* directly or indirectly
- The weekly *net wage*.

Indeed, for each of these four explained variables we have estimated two models (female and male) with the same regressors in both, although we have used a different set of regressors for each explained variables. In particular, for each explained variable we have selected as a regressors all the variables that were statistically significant, either in the women's model or in the men's model[12]. Among this explanatory variables we can point up:

- Age
- Married/stable couple
- Number of children
- Private or public sector
- Part time or full time workers
- Temporary employment
- Average workweek hours
- Seniority
- Size of the company
- Working day prolongation: always
- She/he has a job with lower level than that one corresponding to her/his formation
- Monotonous job
- She/he has now more studies than at the beginning of he/his working live
- Training in the company
- Number of times unemployed
- Education attainment
- Region of residence
- Activity sector (of the company)
- Occupation (of the worker)

The results of the estimation of the eight models are in the appendix. We can make a brief commentary of these results. In general, the goodness-of-fit of the women' models are better than men's. Except for the model for wages (where we get the best fit), in the rest of promotion variables the models fail quite a lot when predicting in which interval (of promotion or hierarchical) is each worker (both men and women). In despite of this, all models replicate quite well the observed frequencies. Among the more statistically significant variables we have seniority, activity sector, occupation and average workweek hours

We also might point up that for all explanatory variables there are important differences among the models corresponding to women and men (according to the *log likelihood ratio-test* for sex). Among the explanatory variables for which we find biggest differences between sex we can point up the size of the company, education attainment and region of residence (they are globally significant for men but not so for women).

<u>Second</u>, starting from the results obtained in these models we have estimated the average probabilities (the ***frequencies***) for women and men of being in each category (evaluating the endowments of each worker in each model according to the equations 6 and 9); those probabilities are show in the tables of the appendix. These estimated average probabilities are going to be used in the following analysis of gender discrimination for each category or promotion level.

[12] Besides the variable "number of children", that in spite of not been significant in any model, we decided to maintain it in all of them, because the theory state this is an important explanatory variable

Indeed, *figures 5* to *8* and *tables 2* to *9* show the results, concerning glass ceiling, obtained from the econometric analysis of the four promotion's indicators used in this study. More specifically, the following are given for each of these explained variables:

- A table with the *frequencies*[13] and *participations* for the different categories (intervals)
- A figure representing the theoretical results in graphic form, with and without discrimination, of women's *participation* at the different categories considered
- A table with the Oaxaca decomposition for the *frequencies*.

• Table 2 shows women's frequencies and women's participations for "**number of promotions**". *Real frequencies* were obtained directly from the sub-sample of women used in the econometric analysis, and *theoretical frequencies* were obtained from the results of the ordered probit models. These then gave the real and theoretical participation. Concerning the theoretical values, a distinction must be made between:

- The columns for *theoretical* frequency/participation, which give the values obtained when women's endowments are evaluated using the coefficients estimated in the women's equation (the estimated ordered probit model for the sub-sample of women).
- The columns for *theoretical-without-discrimination* frequency/participation, which give the values obtained when women's endowments are evaluated with the coefficients estimated for men (in the estimated ordered probit model for the sub-sample of men), which can be assumed to not be subject to gender discrimination.

If we focus the analysis on *participation* –as in *Figure 5* which gives the data for participation– we can see (at the top) that for the "zero promotions" category estimated participation by women (42.93%) is greater than it would be if evaluated using the same criteria as for men (40.47%). As we move towards the right, the opposite occurs: as the number of promotions considered increases, the percentages estimated are smaller than if they were evaluated using the same criteria as for men.

(Theoretic) participation by women decreases sharply as we rise in the intervals for "number of promotions" (except for the last of them). But, moreover, examination of the columns in the figure for (theoretic) participation by women "without discrimination" show that the decrease in the percentages in much less steep. This means that the model "without discrimination" results in less inequality in promotion opportunities[14].

The *relative gap* can be seen at the bottom of the figure. This is the percentage by which women's participation would have to increase in order to reach the level that would exist if

[13] Note that **women's frequency** at the i-*th* interval measures the percentage of women at the i-*th* interval with respect to total women in the sample (this indicator is also called "Concentration"): $\frac{number\ of\ women_i}{total\ women\ in\ the\ sample} \times 100$

whereas **women's participation** at the i-*th* interval represents the percentage of women at the i-*th* interval with respect to total individuals at the i-*th* interval: $\frac{number\ of\ women_i}{number\ of\ women_i + number\ of\ men_i} \times 100$.

[14] Even so, the decreasing trend in the "without discrimination" graph shows that on average women's endowments (less experience and seniority, less stable employment, etc.) would also explain a part of the existing gender differences regarding promotion opportunities.

there were no discrimination. The relative gap increases, except at the last interval. The fact that the relative gap increases might indicate that the obstacles faced by women for professional promotion are greater at the positions offering greatest possibilities for promotion.

However, it must be stressed that for the last category –"4 or more promotions"– the difference between theoretical participation without discrimination and theoretical participation is small than that for the previous category. It may therefore be more correct to refer to the result achieved as a non-linear relation between the "number of promotions" and the relative gap, because this percentage increases over the first four intervals and drops in the last[15].

Finalizing with "number of promotions", *Table 3* shows the Oaxaca decomposition obtained from the theoretical frequencies obtained for men and women. The last column of the table shows the *discrimination percentage* for each category, measured as the fraction of the difference in men's and women's frequencies that cannot be attributed to different endowments. This percentage tends to grow with the intervals for "number of promotions", but drops in the last[16] of them. This may be related to what happens in the last interval for the relative gap.

• *Tables 4* and *5* and *Figure 6* reproduce this same method of analysis for "**supervision levels**". The figure shows a fairly similar result to before:

- Women's participation decreases sharply as we rise in the intervals for supervision level (except for the last one), whereas women's participation "without discrimination" decreases much more gently.
- The percentage by which women's participation should increase in order to reach participation without discrimination (the relative gap) increases, except for the last interval. This result might indicate that the obstacles faced by women for professional promotion increase as they rise in the professional hierarchy, except for the upper end. As with number of promotions, the result is non-linear.
- In the Oaxaca decomposition in *Table 5*, the discrimination percentage increases from "no supervision level" to "one supervision level" and then gradually decreases until it reaches "5 or more" when it decreases substantially[17].

[15] The relative gap drops in the last category for "number of promotions", "supervision levels" and "supervised people", but not in the case of "net wages". The interpretation of this result is not easy, but it is necessary to bear in mind that the sub-samples corresponding to these last categories are very small, what means that we cannot easily do generalizations from them.

[16] Although this result is fairly similar to the one for the relative gap (the percentage by which women's participation would have to increase in order to be equal to women's participation without discrimination), there is no reason why these should be similar, and they can be interpreted differently. In the case of the relative gap, only *women's situations* (with and without discrimination) are being compared, whereas in the Oaxaca decomposition *women's situations* (with and without discrimination) are being compared with *men's*. So, for example, it might happen that as we rise towards higher categories, the relative gap will increase (because discriminatory obstacles to promotion for women increase) whereas simultaneously the percentage of discrimination decreases, because as we rise in the intervals women's average endowments become increasingly less appropriate (so frequency would decrease), and this effect is more marked than the previous one.

[17] The explanation for the decrease in the discrimination percentage between the second and fourth intervals while the relative gap increases may be that, although obstacles to promotion for women increase as they rise in the hierarchy, at the same time average women's endowments become increasingly less appropriate (so frequency decreases even without discrimination). That is, when we brake down the differences in men's and women's frequencies between differences in

• *Tables 6* and *7* and *Figure 7* give results for "**number of people supervised**" that are very similar to those for the "supervision levels", as was already seen by estimating the econometric model. These two variables amount to very similar indicators for the positions occupied by men and women in professional hierarchies.

• Finally, *Tables 8* and *9* and *Figure 8* show the results for the "**net wage**" intervals. Unlike the three previous cases, in this case the glass ceiling phenomenon is much more marked:

- Women's participation drops sharply as we go up the wage intervals, whereas women's participation "without discrimination" drops much more gently.
- The relative gap increases exponentially, so this might indicate that the obstacles faced by women for professional promotion increase as they rise in the professional hierarchy (reflected in this case in wage levels). In this case, the non-linearity (exponential growth) is very different to the previous three.
- Moreover, in the Oaxaca decomposition in Table 8, the discrimination percentage tends to increase as we rise in the wage ladder.

endowments and differences that cannot be explained by endowments (discrimination), they may both be increasing but if the former increases more, the discrimination percentage would be reduced.

The decrease in the fifth interval may be related to the non-linearity in the relative gap.

Table 2. *Frequency and participation at each category of* ***number of promotions***

Number of promotions	WOMEN Frequency (2) Real	Theoretic	*Theoric without discrimin. (4)*	**Participation** (3) Real	Theoretic	*Theoretic without discrimin. (4)*	**Relative gap (5)**
0	84.59%	84.53%	*78.76%*	41.93%	42.93%	*40.47%*	**-5.73%**
1	10.25%	10.41%	*11.55%*	29.34%	30.28%	*30.58%*	**0.99%**
2	3.35%	3.30%	*5.30%*	20.87%	19.96%	*27.73%*	**38.92%**
3	0.98%	0.94%	*2.89%*	10.53%	10.25%	*25.47%*	**148.55%**
4 or more	0.84%	0.83%	*1.50%*	13.19%	14.18%	*23.21%*	**63.74%**
Total	100.00%	100.00%	100.00%	37.19%	37.19%	*37.19%*	

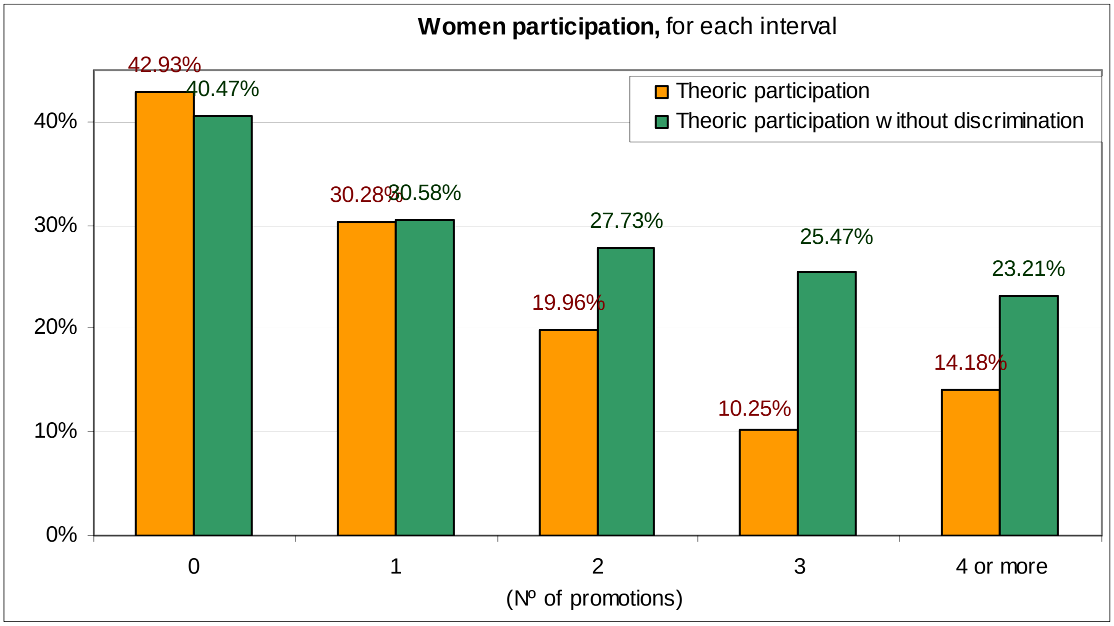
Number of promotions	MEN Frequency Real	Theoretic	Participation Real	Theoretic
0	69.59%	69.19%	58.07%	57.07%
1	14.66%	14.89%	70.66%	69.72%
2	7.54%	7.89%	79.13%	80.04%
3	4.93%	4.93%	89.47%	89.75%
4 or more	3.27%	3.10%	86.81%	85.82%
Total	100.00%	100.00%	62.81%	62.81%

Notes:
(1) Number of women in the sample: 1434; number of men: 2414.
(2) The **frequency of women** in the i-th category measures the percentage of women in the i-th category over the total of women in the sample
(3) The **participation of women** in the i-th category measures the percentage of women in the i-th category over the total for women and men in the i-th category
(5) **Relative gap**: is the percentage increase required in (theoretic) *women participation* in order to iqualize the *women participation without discrimination*.

Table 3. *Pseudo Oaxaca decomposition for frequency at each category of* ***number of promotions***

Number of promotions	Oaxaca decomposition: Probability differential (total difference)	Difference in endowments	Difference not explained by endowments (due to discrimination)	**Percentage Of Discrimination**
	$(P_M^M - P_F^F)$	$(P_M^M - P_F^M)$	$(P_F^M - P_F^F)$	$(P_F^M - P_F^F)/(P_M^M - P_F^F)$
0	-0.1534	-0.0957	-0.0577	**37.59%**
1	0.0448	0.0334	0.0114	**25.42%**
2	0.0459	0.0259	0.0200	**43.56%**
3	0.0399	0.0204	0.0196	**49.01%**
4 or more	0.0228	0.0161	0.0067	**29.50%**
Average	*0.3475*	*0.2106*	*0.1370*	***39.42%***

Figure 5. *Participation of women at each category of* ***number of promotions****: theoretic results, with or without discrimination, and the* **relative gap**



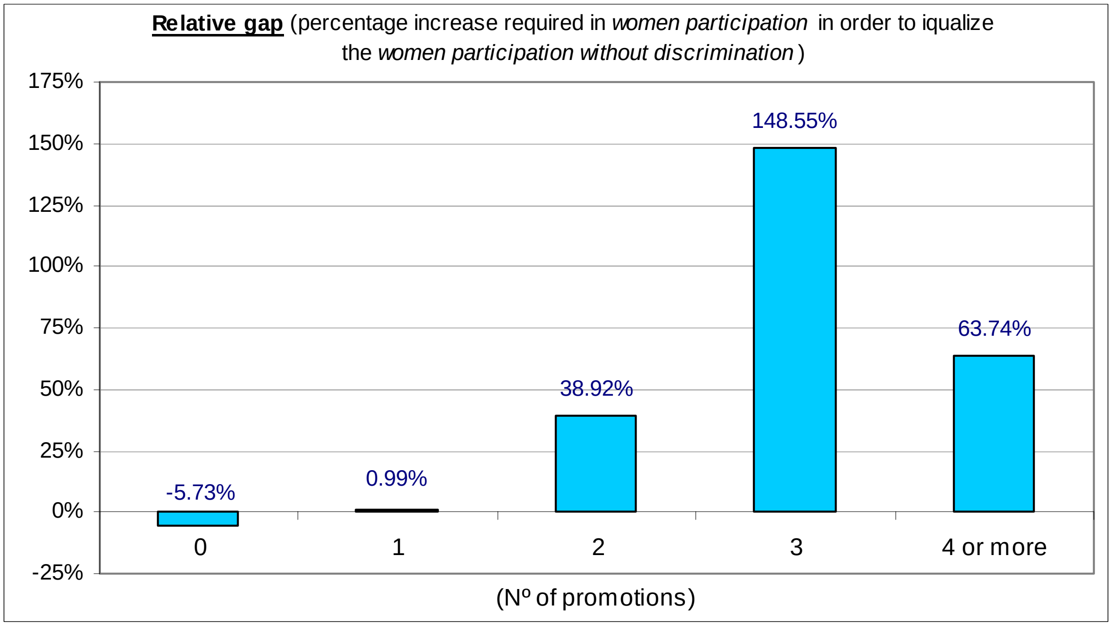


Table 4. *Frequency and participation at each category of* ***levels of supervision***

Levels of supervision	WOMEN						
	Frequency (2)			**Participation** (3)			
	Real	Theoretic	*Theoretic without discrimin. (4)*	Real	Theoretic	*Theoretic without discrimin. (4)*	**Relative gap (5)**
0	87.10%	87.11%	*81.07%*	40.82%	40.78%	*39.05%*	**-4.23%**
1	4.39%	4.47%	*6.13%*	26.64%	27.03%	*33.70%*	**24.70%**
2	5.40%	5.38%	*7.80%*	24.69%	24.67%	*32.18%*	**30.45%**
3 or 4	2.57%	2.49%	*4.24%*	19.69%	19.65%	*29.42%*	**49.68%**
5 or more	0.54%	0.55%	*0.75%*	20.51%	20.05%	*25.62%*	**27.81%**
Total	100.00%	100.00%	100.00%	37.40%	37.40%	*37.40%*	

Levels of supervision	MEN			
	Frequency		Participation	
	Real	Theoretic	Real	Theoretic
0	75.43%	75.58%	59.18%	59.22%
1	7.22%	7.21%	73.36%	72.97%
2	9.84%	9.82%	75.31%	75.33%
3 or 4	6.25%	6.08%	80.31%	80.35%
5 or more	1.25%	1.31%	79.49%	79.95%
Total	100.00%	100.00%	62.60%	62.60%

Notes:
(1) Number of women in the sample: 1434; number of men: 2414.
(2) The **frequency of women** in the i-th category measures the percentage of women in the i-th category over the total of women in the sample
(3) The **participation of women** in the i-th category measures the percentage of women in the i-th category over the total for women and men in the i-th category
(5) **Relative gap**: is the percentage increase required in (theoretic) *women participation* in order to iqualize the *women participation without discrimination*.

Table 5. *Pseudo Oaxaca decomposition for frequency at each category of* ***levels of supervision***

Oaxaca decomposition				
Levels Of Supervision	Probability differential (total difference)	Difference in endowments	Difference not explained by endowments (due to discrimination)	**Percentage Of Discrimination**
	$(P_M^M - P_F^F)$	$(P_M^M - P_F^M)$	$(P_F^M - P_F^F)$	$(P_F^M - P_F^F)/(P_M^M - P_F^F)$
0	-0.1153	-0.0549	-0.0604	**52.39%**
1	0.0274	0.0107	0.0166	**60.78%**
2	0.0444	0.0202	0.0242	**54.45%**
3 or 4	0.0359	0.0184	0.0175	**48.80%**
5 or more	0.0076	0.0055	0.0021	**27.05%**
Average	*0.2542*	*0.1285*	*0.1258*	***49.47%***

Figure 6. *Participation of women at each category of* ***levels of supervision****: theoretic results, with or without discrimination, and the* **relative gap**

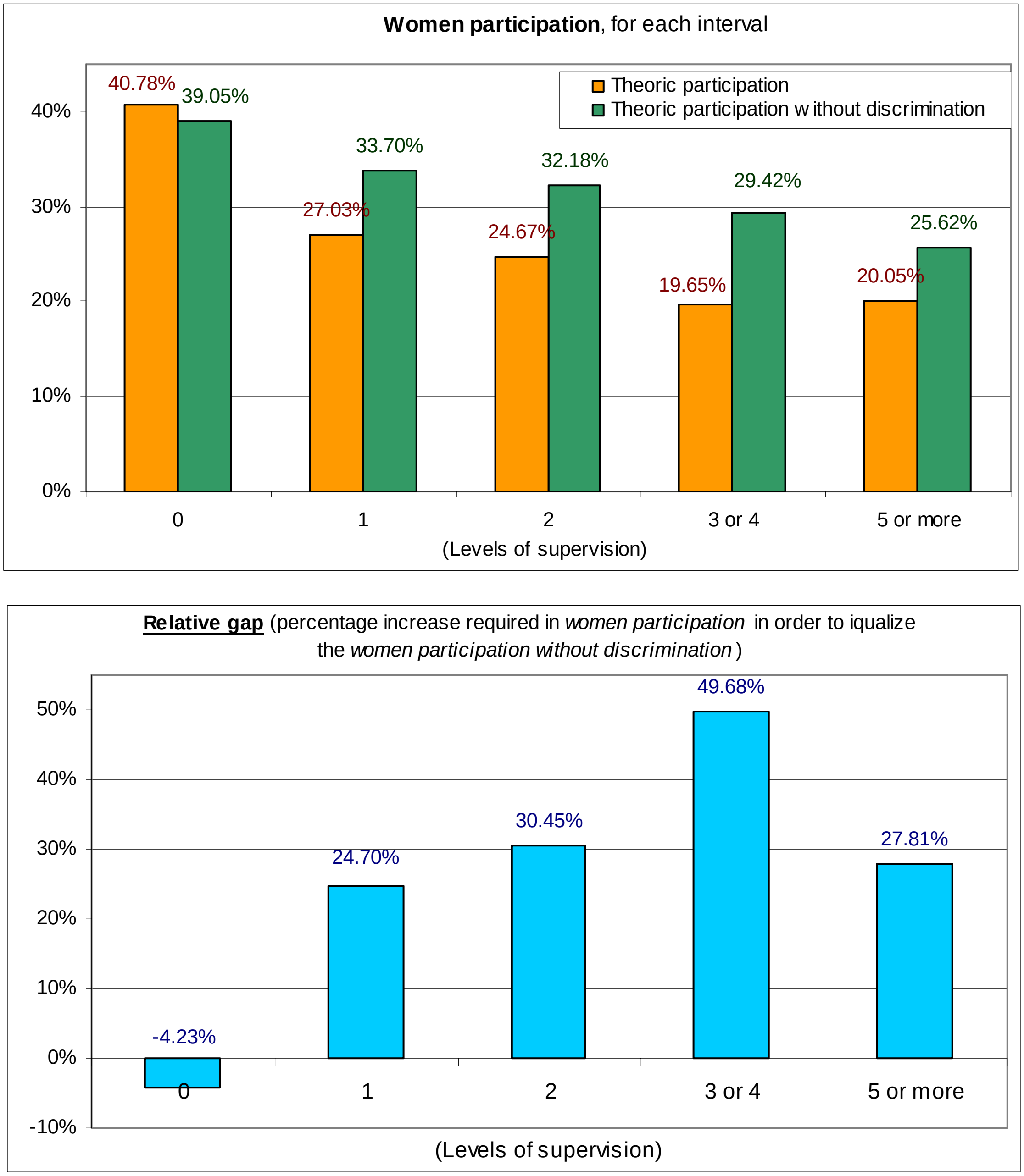


Table 6. *Frequency and participation at each category of* ***number of people supervised***

Number of people supervised	WOMEN Frequency (2) Real	Theoretic	*Theoric without discrimin. (4)*	**Participation** (3) Real	Theoretic	*Theoretic without discrimin. (4)*	**Relative gap (5)**
0	86.46%	86.59%	*80.45%*	40.82%	40.90%	*39.13%*	**-4.32%**
1-2	5.50%	5.60%	*6.45%*	30.60%	30.53%	*33.60%*	**10.08%**
3-5	3.15%	3.11%	*4.77%*	24.61%	23.84%	*32.43%*	**36.05%**
6-9	1.68%	1.60%	*2.82%*	21.19%	20.50%	*31.29%*	**52.62%**
10-20	1.74%	1.63%	*3.23%*	18.18%	17.60%	*29.77%*	**69.11%**
21-60	1.07%	0.98%	*1.69%*	18.60%	17.76%	*27.25%*	**53.46%**
More than 60	0.40%	0.50%	*0.59%*	18.18%	20.85%	*23.77%*	**14.00%**
Total	100.00%	100.00%	*100.00%*	37.31%	37.31%	*37.31%*	

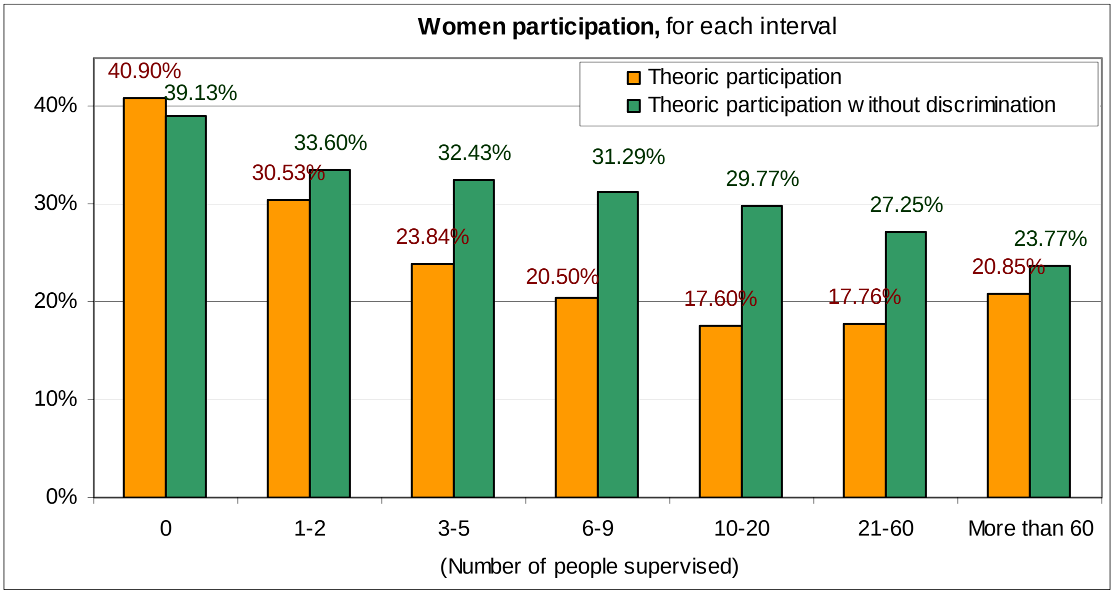
Number of people supervised	MEN Frequency Real	Theoretic	Participation Real	Theoretic
0	74.59%	74.47%	59.18%	59.10%
1-2	7.42%	7.58%	69.40%	69.47%
3-5	5.74%	5.91%	75.39%	76.16%
6-9	3.71%	3.69%	78.81%	79.50%
10-20	4.67%	4.54%	81.82%	82.40%
21-60	2.79%	2.69%	81.40%	82.24%
More than 60	1.08%	1.12%	81.82%	79.15%
Total	100.00%	*100.00%*	62.69%	62.69%

Notes:
(1) Number of women in the sample: 1434; number of men: 2414.
(2) The **frequency of women** in the i-th category measures the percentage of women in the i-th category over the total of women in the sample
(3) The **participation of women** in the i-th category measures the percentage of women in the i-th category over the total for women and men in the i-th category
(5) **Relative gap**: is the percentage increase required in (theoretic) *women participation* in order to iqualize the *women participation without discrimination*.

Table 7. *Pseudo Oaxaca decomposition for frequency at each category of* ***number of people supervised***

Number of Supervised People	Oaxaca decomposition: Probability differential (total difference)	Difference in endowments	Difference not explained by endowments (due to discrimination)	**Percentage Of discrimination**
	$(P_M^M - P_F^F)$	$(P_M^M - P_F^M)$	$(P_F^M - P_F^F)$	$(P_F^M - P_F^F)/(P_M^M - P_F^F)$
0	-0.1213	-0.0598	-0.0614	**50.67%**
1-2	0.0198	0.0113	0.0085	**42.84%**
3-5	0.0280	0.0114	0.0166	**59.18%**
6-9	0.0209	0.0087	0.0122	**58.55%**
10-20	0.0291	0.0131	0.0160	**55.11%**
21-60	0.0171	0.0100	0.0072	**41.85%**
More than 60	0.0062	0.0053	0.0009	**14.58%**
Average	*0.3782*	*0.1943*	*0.1839*	***48.62%***

Figure 7. *Participation of women at each category of* ***number of people supervised****: theoretic results, with or without discrimination, and the* **relative gap**



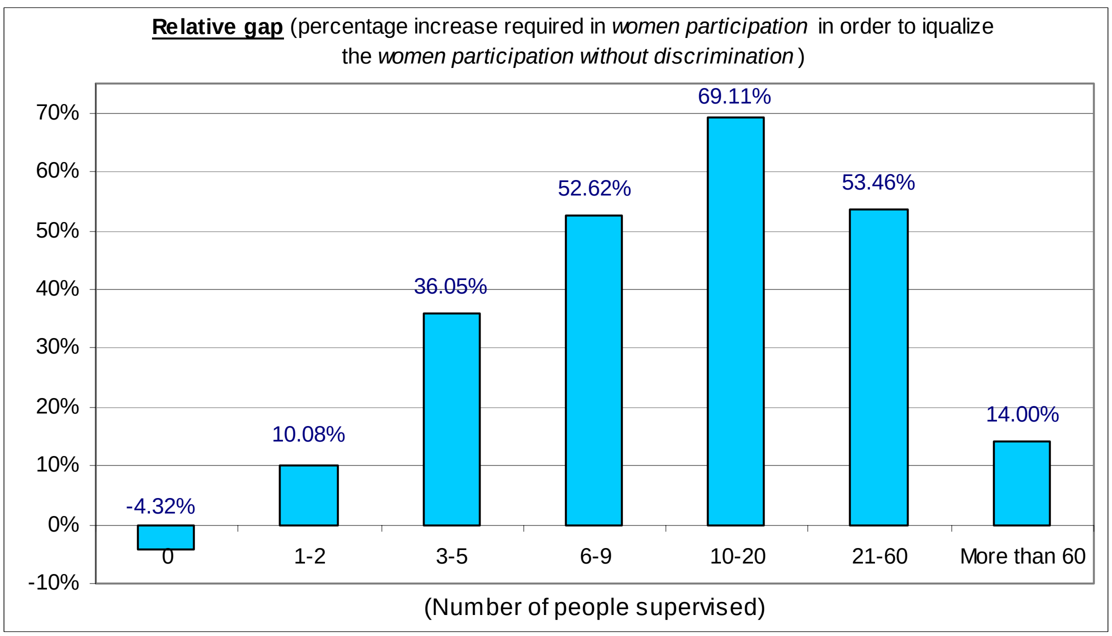


Table 8. *Frequency and participation at each category of* ***weekly net wage***

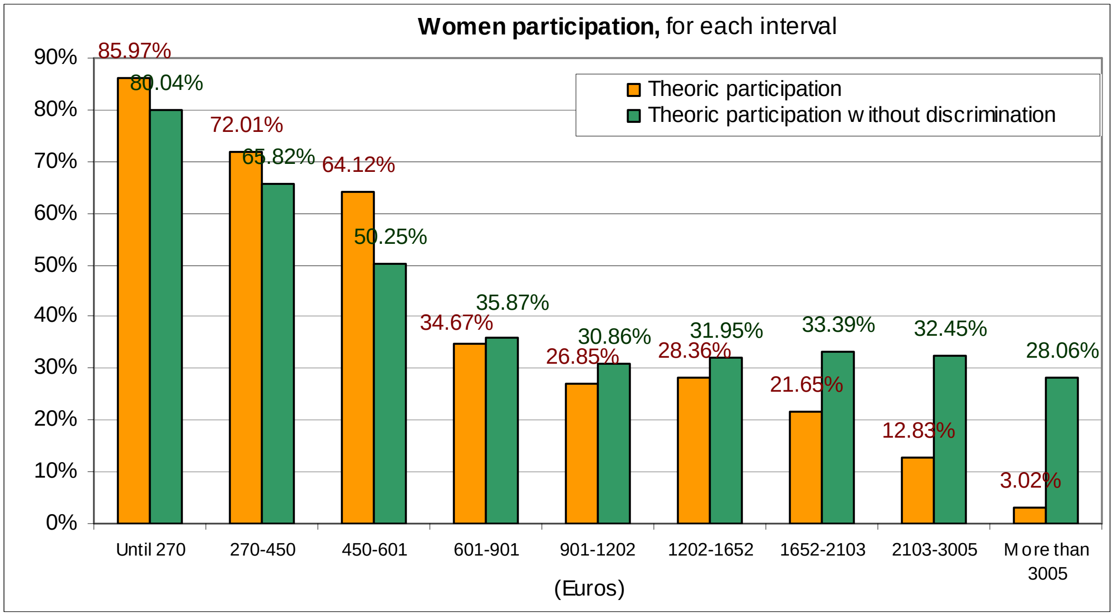
Wage intervals (euros)	WOMEN Frequency (2) Real	Theoretic	*Theoric without discrimin. (4)*	**Participation** (3) Real	Theoretic	*Theoretic without discrimin. (4)*	**Relative gap (5)**
Until 270	5.34%	5.65%	*3.70%*	86.25%	85.97%	*80.04%*	**-6.89%**
270-450	10.53%	9.88%	*7.39%*	73.12%	72.01%	*65.82%*	**-8.61%**
450-601	19.50%	19.66%	*11.12%*	64.12%	64.12%	*50.25%*	**-21.62%**
601-901	31.73%	31.67%	*33.39%*	34.48%	34.67%	*35.87%*	**3.47%**
901-1202	17.57%	18.05%	*21.96%*	26.49%	26.85%	*30.86%*	**14.96%**
1202-1652	10.99%	10.84%	*12.86%*	28.86%	28.36%	*31.95%*	**12.65%**
1652-2103	3.48%	3.39%	*6.14%*	22.06%	21.65%	*33.39%*	**54.18%**
2103-3005	0.77%	0.78%	*2.55%*	12.35%	12.83%	*32.45%*	**152.88%**
More than 3005	0.08%	0.07%	*0.90%*	3.23%	3.02%	*28.06%*	**828.44%**
Total	100.00%	100.00%	*100.00%*	36.78%	36.78%	*36.78%*	

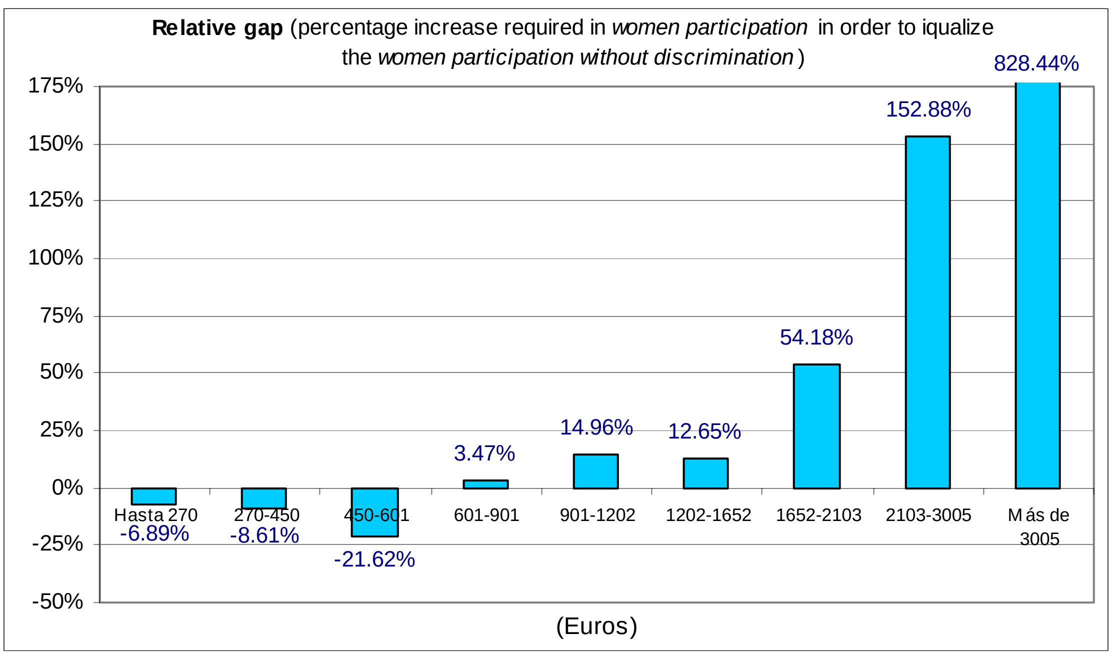
Wage intervals (euros)	MEN Frequency Real	Theoretic	Participation Real	Theoretic
Until 270	0.50%	0.54%	13.75%	14.03%
270-450	2.25%	2.23%	26.88%	27.99%
450-601	6.35%	6.40%	35.88%	35.88%
601-901	35.07%	34.73%	65.52%	65.33%
901-1202	28.37%	28.62%	73.51%	73.15%
1202-1652	15.76%	15.93%	71.14%	71.64%
1652-2103	7.16%	7.13%	77.94%	78.35%
2103-3005	3.20%	3.08%	87.65%	87.17%
More than 3005	1.35%	1.34%	96.77%	96.98%
Total	100.00%	100.00%	63.22%	63.22%

Table 9. *Pseudo Oaxaca decomposition for frequency at each category of* ***weekly net wage***

Oaxaca decomposition: Wage intervals (Euros)	Probability differential (total difference)	Difference in endowments	Difference not explained by endowments (due to discrimination)	**Percentage Of Discrimination**
	$(P_M^M - P_F^F)$	$(P_M^M - P_F^M)$	$(P_F^M - P_F^F)$	$(P_F^M - P_F^F)/(P_M^M - P_F^F)$
Until 270	-0.0512	-0.0316	-0.0195	**38.15%**
270-450	-0.0764	-0.0516	-0.0249	**32.53%**
450-601	-0.1326	-0.0471	-0.0855	**64.45%**
601-901	0.0305	0.0134	0.0171	**56.15%**
901-1202	0.1056	0.0666	0.0391	**36.98%**
1202-1652	0.0509	0.0308	0.0201	**39.58%**
1652-2103	0.0374	0.0099	0.0276	**73.63%**
2103-3005	0.0230	0.0054	0.0177	**76.69%**
More than 3005	0.0127	0.0044	0.0083	**65.19%**
Average	*0.9143*	*0.4465*	*0.4678*	***51.17%***

Figure 8. *Participation of women at each category of* ***weekly net wage****: theoretic results, with or without discrimination, and the* **relative gap**





Final Remarks

This paper has attempted to test the hypothesis that a glass ceiling exists in the Spanish labor market. (The glass ceiling is understood as being an increasing number of obstacles to promotion for women as they rise in the professional hierarchy). A number of promotion indicators were selected: “number of promotions”, “supervision levels”, “number of people supervised” and “net wage”. Then, for each of the categories of these variables, ordered from the smallest to the largest, the *relative gaps* were calculated (the relative gap measures the percentage by which women’s participation would have to increase in order to reach the level that would exist if there were no discrimination). In order to calculate these relative gaps, for each of the indicators one ordered probit model was estimated for women and another for men; these models allows to calculate the probabilities (or theoretical frequencies) of the presence of women/men at each of the intervals considered. We believe this method has not previously been applied in this context.

The *relative gaps* calculated for the four variables show that:

- In all cases, women’s participation tends to fall as the intervals rise. Women’s participation “without discrimination” also tends to decrease but much less sharply.
- In line with the above, in all cases the percentage by which women’s participation would have to increase in order to reach the level of participation “without discrimination” (the relative gap) tends to increase as the intervals rise.
- However, for “number of promotions”, “supervision levels” and “number of people supervised”, the above result is not linear, because the relative gap decreases at the highest interval. This seems to contradict the hypothesis that at the highest levels of the professional hierarchy the obstacles to the presence of women are greatest. All the same, for “net wage” this phenomenon does not occur; in this case the relative gap increases exponentially.

These results support the hypothesis that there is a glass ceiling in the Spanish labor market. This result is especially important if “net wage” is used as indicator for the professional level reached.

When the Oaxaca decomposition is applied to the four variables, for “supervision levels”, “number of people supervised” and “net wage” the (average) discrimination percentage is about 50%, whereas for “number of promotions” it is about 40%.

With respect to the limitations of our analysis we have to point out, amongst other, that the ECVT only gives information on employed workers, what can be biasing our results. And that the results on discrimination obtained as residuals must be taken with caution as there are variables for promotion that cannot be quantified, such as effort, capacity for relating to others, etc.; or variables, such as experience or education, which in principle were considered exogenous but which may be endogenous.

The present work is open to further extensions. Some of the most relevant would be to combine the survey used here (for 2001) with those for 2000 and 2002 in order to obtain a larger sample, to study the relative importance of the glass ceiling in the public and private sectors, etc.

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Appendix

Dependent variable: NUMASCEMCAT Order Probit Model Estimation Results								
Variables	***Male Coefficient***	***Female Coefficient***	***Variables***	***Male Coefficient***	***Female Coefficient***	***Variables***	***Male Coefficient***	***Female Coefficient***
LOG(EDAD)	-1.014* (0.174)	-0.988* (0.285)	*CCAA05*	-0.453** (0.191)	-0.081 (0.239)	*OCUL_C*	-6.926* (0.370)	-
CASADO	0.188** (0.080)	0.369* (0.102)	*CCAA06*	-0.395** (0.189)	-0.682 (0.354)	*OCUL_D*	0.640** (0.265)	0.433 (0.517)
NUMHIJOS	0.007 (0.030)	-0.061 (0.057)	*CCAA07*	-0.132 (0.157)	-0.022 (0.270)	*OCUL_E*	0.433 (0.269)	0.424 (0.519)
SPRIVAD	0.214 (0.126)	0.475* (0.180)	*CCAA08*	-0.648* (0.182)	-1.166* (0.417)	*OCUL_F*	0.451 (0.239)	0.444 (0.488)
PARCIAL	-0.555** (0.226)	-0.647* (0.197)	*CCAA09*	-0.044 (0.118)	-0.319 (0.174)	*OCUL_G*	0.747* (0.267)	0.077 (0.501)
LOG(ANTIGAEM+1)	0.751* (0.058)	0.691* (0.082)	*CCAA10*	-0.128 (0.135)	-0.296 (0.213)	*OCUL_H*	0.543 (0.284)	-0.242 (0.513)
TEMPORAL	-0.222** (0.099)	-0.274 (0.148)	*CCAA11*	-0.496* (0.191)	-0.173 (0.295)	*OCUL_K*	0.719** (0.293)	0.054 (0.520)
TAMA2	0.226* (0.087)	0.031 (0.148)	*CCAA12*	-0.279** (0.133)	-0.448 (0.259)	*OCUL_L*	-0.523 (0.436)	-6.634* (0.648)
TAMA3	0.325* (0.098)	-0.017 (0.163)	*CCAA14*	-0.076 (0.172)	-0.335 (0.278)	*OCUL_M*	0.616** (0.247)	0.913 (0.763)
TAMA4	0.563* (0.096)	-0.072 (0.146)	*CCAA15*	-0.075 (0.181)	-0.040 (0.203)	*OCUL_N*	0.584** (0.250)	0.926 (0.811)
PROLON1	0.251** (0.104)	0.533* (0.153)	*CCAA16*	-0.042 (0.139)	-0.102 (0.195)	*OCUL_P*	0.670** (0.272)	0.198 (0.621)
ADECUA2	-0.187** (0.089)	-0.219 (0.134)	*CCAA17*	-0.340 (0.181)	-0.069 (0.242)	*OCUL_Q*	0.707* (0.250)	-0.287 (0.561)
REPETITI	-0.167** (0.069)	-0.288** (0.114)	*ACTL_A*	0.075 (0.341)	-6.644* (0.473)	*OCUL_R*	0.155 (0.267)	0.087 (1.082)
FORMACIO	0.318* (0.067)	0.248** (0.109)	*ACTL_B*	0.940** (0.404)	-5.900* (0.430)	*OCUL_S*	-0.018 (0.274)	-0.067 (0.531)
MASESTUD	0.159** (0.065)	0.302* (0.102)	*ACTL_C*	0.325 (0.317)	-6.355* (0.778)	*OCUL_T*	-0.032 (0.262)	-0.490 (0.587)
EDU01	2.273* (0.541)	-5.715* (0.456)	*ACTL_D*	0.325 (0.196)	-0.268 (0.278)	*OCUL_U*	1.532* (0.311)	2.941* (0.583)
EDU02	-0.228 (0.241)	-7.301* (0.339)	*ACTL_E*	0.221 (0.276)	-0.766 (0.631)	*LIMIT_1*	-0.491 (0.578)	-1.216 (1.015)
EDU03	-0.140 (0.173)	-0.091 (0.340)	*ACTL_F*	0.201 (0.210)	-0.676 (0.514)	*LIMIT_2*	0.247 (0.574)	-0.275 (1.005)
EDU04	0.177 (0.152)	0.056 (0.217)	*ACTL_G*	-0.018 (0.217)	-0.069 (0.272)	*LIMIT_3*	0.833 (0.573)	0.421 (1.000)
EDU05	0.095 (0.169)	0.304 (0.239)	*ACTL_H*	0.029 (0.259)	0.086 (0.295)	*LIMIT_4*	1.490* (0.572)	0.851 (1.003)
EDU06	0.093 (0.163)	0.110 (0.213)	*ACTL_I*	0.061 (0.195)	0.178 (0.301)	Pseudo-R^2	0.237	0.288
EDU07	0.190 (0.151)	-0.082 (0.198)	*ACTL_J*	0.780* (0.236)	0.294 (0.270)	*Log likelihood*	-1821.374	-585.863
EDU08	0.245 (0.142)	0.002 (0.180)	*ACTL_K*	0.054 (0.214)	-0.318 (0.256)	*LR* statistic[a]	1132.01* (0.000) (74df)	474.516* (0.000) (73df)
EDU10	0.179 (0.191)	0.278 (0.240)	*ACTL_M*	-0.204 (0.206)	-0.909* (0.242)	*Number of Obs.*	2414	1434
EDU11	0.076 (0.332)	-1.105 (0.641)	*ACTL_N*	-0.635* (0.207)	-0.526** (0.222)	*LR statistic[a] Educations*	27.911* (0.002)	16.747 (0.080)
CCAA01	-0.350* (0.133)	-0.895* (0.275)	*ACTL_O*	-0.074 (0.253)	0.235 (0.262)	*LR statistic[a] CCAA regions*	44.930* (0.000)	34.610* (0.004)
CCAA02	-0.141 (0.133)	-0.589** (0.262)	*ACTL_P*	-6.077* (0.274)	-6.913* (0.411)	*LR statistic[a] Activities*	52.163* (0.000)	40.187* (0.000)
CCAA03	0.122 (0.144)	-0.689** (0.346)	*OCUL_A*	0.952* (0.291)	0.939 (0.563)	*LR statistic[a] Ocupatios*	92.897* (0.000)	30.396** (0.024)
CCAA04	0.140 (0.148)	-0.451 (0.293)	*OCUL_B*	2.243* (0.602)	-0.404 (0.573)	*LR statistic[a] SEX*	35.460* (0.000)	

Standard deviation into brackets; [a] $\chi^2_{(df)}$ Log likelihood ratio test p-value into brackets; *significant at 1% level; **significant at 5% level

NUMASCEMCAT: EXPECTATION-PREDICTION TABLE MALE					
Categories	Count (Observed)	Count of obs with Max Prob	Error	Sum of all Probabilities	Error
0	1680	2141	*-461*	1670.158	*9.842*
1	354	176	*178*	359.443	*-5.443*
2	182	21	*161*	190.470	*-8.470*
3	119	16	*103*	119.000	*0.000*
4	79	60	*19*	74.929	*4.071*
Total	2414	2414		2414	

NUMASCEMCAT: EXPECTATION-PREDICTION TABLE FEMALE					
Categories	Count (Observed)	Count of obs with Max Prob	Error	Sum of all Probabilities	Error
0	1213	1364	*-151*	1212.140	*0.860*
1	147	62	*85*	149.285	*-2.285*
2	48	5	*43*	47.305	*0.695*
3	14	0	*14*	13.411	*0.589*
4	12	3	*9*	11.860	*0.140*
Total	1434	1434		1434	

NUMASCEMCAT Frequencies	MALE			FEMALE		
Categories	Real-Observed	Estimated	Error	Real-Observed	Estimated	Error
0	69.59%	69.19%	*0.408%*	84.59%	84.53%	0.060%
1	14.66%	14.89%	*-0.225%*	10.25%	10.41%	-0.159%
2	7.54%	7.89%	*-0.351%*	3.35%	3.30%	0.048%
3	4.93%	4.93%	*0.000%*	0.98%	0.94%	0.041%
4	3.27%	3.10%	*0.169%*	0.84%	0.83%	0.010%
Total	100.00%	100.00%		100.00%	100.00%	

NUMASCEMCAT ESTIMATED MEAN PROBABILITIES USING **MALE** ORDERED PROBIT MODEL			
	Both Sexs	Male	Female
P(y=0|X)	72.75%	69.19%	78.76%
P(y=1|X)	13.64%	14.89%	11.55%
P(y=2|X)	6.92%	7.89%	5.30%
P(y=3|X)	4.17%	4.93%	2.89%
P(y=4|X)	2.51%	3.10%	1.50%
Total number Obs	3848	2414	1434
Expectet Value [4]	0.500	0.579	0.368

NUMASCEMCAT ESTIMATED MEAN PROBABILITIES USING **FEMALE** ORDERED PROBIT MODEL			
	Both Sexs	Male	Female
P(y=0|X)	79.18%	76.01%	84.53%
P(y=1|X)	13.17%	14.82%	10.41%
P(y=2|X)	4.72%	5.56%	3.30%
P(y=3|X)	1.45%	1.75%	0.94%
P(y=4|X)	1.48%	1.87%	0.83%
Total number Obs	3848	2414	1434
Expectet Value [4]	0.329	0.387	0.231

NUMASCEMCAT CATEGORIES
0:0
1:1
2:2
3:3
4:4 or more

Dependent variable: SUPERNIVCAT
Order Probit Model Estimation Results

Variables	Male Coefficient	Female Coefficient	Variables	Male Coefficient	Female Coefficient	Variables	Male Coefficient	Female Coefficient
LOG(EDAD)	0.386* (0.147)	-0.204 (0.255)	CCAA06	-0.405** (0.163)	-0.235 (0.265)	OCUL_D	0.487 (0.249)	-0.202 (0.562)
CASADO	0.207* (0.080)	0.180 (0.102)	CCAA07	-0.364** (0.158)	-0.003 (0.275)	OCUL_E	0.553** (0.261)	-0.660 (0.578)
NUMHIJOS	0.031 (0.025)	0.042 (0.053)	CCAA08	-0.490* (0.162)	-0.443 (0.286)	OCUL_F	0.476** (0.226)	-0.951 (0.557)
SPRIVAD	0.049 (0.126)	0.251 (0.175)	CCAA09	-0.428* (0.116)	0.081 (0.183)	OCUL_G	0.395 (0.252)	-1.315** (0.571)
LOG(ANTIGAEM+1)	0.084** (0.039)	0.172** (0.071)	CCAA10	-0.194 (0.129)	0.123 (0.213)	OCUL_H	0.641** (0.288)	-1.360** (0.572)
LOG(HORASEM)	0.460* (0.161)	0.925* (0.241)	CCAA11	-0.371** (0.164)	-0.242 (0.366)	OCUL_K	0.463 (0.287)	-1.029 (0.582)
TEMPORAL	-0.309* (0.093)	-0.205 (0.143)	CCAA12	-0.348* (0.126)	-0.067 (0.269)	OCUL_L	0.239 (0.319)	-7.735* (0.745)
TAMA2	0.376* (0.085)	0.023 (0.143)	CCAA14	-0.192 (0.178)	-0.040 (0.366)	OCUL_M	0.507** (0.239)	-0.275 (0.730)
TAMA3	0.394* (0.096)	-0.161 (0.182)	CCAA15	-0.500* (0.184)	-0.328 (0.282)	OCUL_N	0.377 (0.242)	-8.880* (0.630)
TAMA4	0.356* (0.096)	0.052 (0.154)	CCAA16	-0.515* (0.140)	-0.116 (0.217)	OCUL_P	0.634** (0.264)	-1.342** (0.655)
PROLON1	0.310* (0.095)	0.482* (0.152)	CCAA17	-0.426* (0.165)	-0.189 (0.248)	OCUL_Q	0.597** (0.242)	-1.467** (0.637)
ADECUA2	-0.073 (0.088)	-0.441* (0.148)	ACTL_A	0.216 (0.265)	-6.781* (0.455)	OCUL_R	-0.166 (0.262)	-8.977* (0.645)
REPETITI	-0.204* (0.067)	-0.193 (0.112)	ACTL_B	0.214 (0.475)	-6.326* (0.503)	OCUL_S	-0.080 (0.296)	-1.427** (0.633)
FORMACIO	0.332* (0.069)	0.425* (0.108)	ACTL_C	-0.384 (0.388)	2.122* (0.573)	OCUL_T	-0.048 (0.249)	-0.867 (0.615)
EDU01	-7.184* (0.228)	-7.079* (0.329)	ACTL_D	0.008 (0.182)	0.368 (0.269)	OCUL_U	1.453* (0.387)	1.547** (0.641)
EDU02	-1.088* (0.218)	-7.910* (0.439)	ACTL_E	0.118 (0.298)	-0.590 (0.470)	LIMIT_1	3.957* (0.795)	2.796** (1.340)
EDU03	-0.777* (0.158)	-0.958* (0.311)	ACTL_F	0.078 (0.198)	0.863 (0.499)	LIMIT_2	4.276* (0.795)	3.141** (1.342)
EDU04	-0.592* (0.138)	-0.926* (0.230)	ACTL_G	0.060 (0.200)	0.227 (0.289)	LIMIT_3	4.917* (0.795)	3.857* (1.347)
EDU05	-0.503* (0.161)	-0.511 (0.266)	ACTL_H	-0.157 (0.244)	0.489 (0.312)	LIMIT_4	5.943* (0.794)	4.886* (1.366)
EDU06	-0.433* (0.148)	-0.512** (0.213)	ACTL_I	-0.109 (0.188)	0.327 (0.328)	Pseudo-R^2	0.153	0.233
EDU07	-0.485* (0.133)	-0.655* (0.192)	ACTL_J	-0.015 (0.217)	-0.009 (0.307)	*Log likelihood*	-1804.140	-609.974
EDU08	-0.080 (0.129)	-0.259 (0.166)	ACTL_K	-0.030 (0.199)	-0.023 (0.267)	*LR* statistic[a]	649.432* (0.000) (73 d.f.)	371.544* (0.000) (72 d.f.)
EDU10	0.330** (0.167)	-0.248 (0.225)	ACTL_M	-0.567* (0.191)	-0.933* (0.237)	Number of Obs.	2479	1481
EDU11	-0.291 (0.287)	-1.008 (0.553)	ACTL_N	-0.554* (0.190)	0.047 (0.202)	LR statistic[a] Educations	46.666* (0.000)	23.221* (0.010)
CCAA01	-0.346* (0.124)	-0.067 (0.238)	ACTL_O	0.160 (0.241)	0.348 (0.261)	LR statistic[a] CCAA regions	32.904* (0.008)	9.044 (0.912)
CCAA02	-0.512* (0.162)	0.066 (0.276)	ACTL_P	0.051 (0.388)	-6.022* (0.414)	LR statistic[a] Activities	23.386 (0.076)	47.260* (0.000)
CCAA03	-0.323** (0.159)	-0.188 (0.287)	OCUL_A	1.384* (0.256)	0.329 (0.619)	LR statistic[a] Ocupatios	93.748* (0.000)	52.439* (0.000)
CCAA04	-0.200 (0.149)	-0.151 (0.297)	OCUL_B	1.394* (0.340)	-1.220 (0.735)	LR statistic[a] SEX	23.736 (0.000)	
CCAA05	-0.555* (0.171)	0.132 (0.241)	OCUL_C	0.724 (0.810)	-			

Standard deviation into brackets; [a] $\chi^2_{(df)}$ Log likelihood ratio test p-value into brackets; *significant at 1% level; **significant at 5% level

SUPERNIVCAT: EXPECTATION-PREDICTION TABLE MALE					
Categories	**Count (Observed)**	**Count of obs with Max Prob**	**Error**	**Sum of all Probabilities**	**Error**
0	1870	2391	*-521*	1873.7	*-3.72*
1	179	0	*179*	178.7	*0.34*
2	244	0	*244*	243.4	*0.59*
3	155	82	*73*	150.8	*4.18*
4	31	6	*25*	32.4	*-1.40*
Total	2479	2479		2479	

SUPERNIVCAT: EXPECTATION-PREDICTION TABLE FEMALE					
Categories	**Count (Observed)**	**Count of obs with Max Prob**	**Error**	**Sum of all Probabilities**	**Error**
0	1290	1457	*-167*	1290.1	*-0.11*
1	65	0	*65*	66.2	*-1.18*
2	80	6	*74*	79.7	*0.30*
3	38	15	*23*	36.9	*1.11*
4	8	3	*5*	8.1	*-0.12*
Total	1481	1481		1481	

SUPERNIVCAT Frecuencies	MALE			FEMALE		
Categories	Real-Observed	Estimated	Error	Real-Observed	Estimated	Error
0	75.43%	75.58%	*-0.150%*	87.10%	87.11%	*-0.007%*
1	7.22%	7.21%	*0.014%*	4.39%	4.47%	*-0.079%*
2	9.84%	9.82%	*0.024%*	5.40%	5.38%	*0.020%*
3	6.25%	6.08%	*0.169%*	2.57%	2.49%	*0.075%*
4	1.25%	1.31%	*-0.056%*	0.54%	0.55%	*-0.008%*
Total	100.00%	100.00%		100.00%	100.00%	

SUPERNIVCAT ESTIMATED MEAN PROBABILITIES USING **MALE** ORDERED PROBIT MODEL			
	Both Sexs	Male	Female
P(y=0|X)	77.64%	75.58%	81.07%
P(y=1|X)	6.81%	7.21%	6.13%
P(y=2|X)	9.06%	9.82%	7.80%
P(y=3|X)	5.40%	6.08%	4.24%
P(y=4|X)	1.10%	1.31%	0.75%
Total number Obs	3960	2479	1481
Expectet Value [4]	0.455	0.503	0.375

SUPERNIVCAT ESTIMATED MEAN PROBABILITIES USING **FEMALE** ORDERED PROBIT MODEL			
	Both Sexs	Male	Female
P(y=0|X)	81.22%	77.70%	87.11%
P(y=1|X)	5.51%	6.13%	4.47%
P(y=2|X)	7.66%	9.02%	5.38%
P(y=3|X)	4.43%	5.59%	2.49%
P(y=4|X)	1.18%	1.56%	0.55%
Total number Obs	3960	2479	1481
Expectet Value [4]	0.388	0.472	0.249

SUPERNIVCAT CATEGORIES	
0:	0 levels
1:	1 levels
2:	2 levels
3:	3 or 4 levels
4:	5 or more levels

Dependent variable: SUPERTOTCAT Order Probit Model Estimation Results								
Variables	***Male Coefficient***	***Female Coefficient***	***Variables***	***Male Coefficient***	***Female Coefficient***	***Variables***	***Male Coefficient***	***Female Coefficient***
LOG(EDAD)	-0.872 (2.287)	8.068** (4.077)	*CCAA06*	-0.457* (0.164)	-0.269 (0.268)	*OCUL_E*	0.416 (0.265)	-0.583 (0.500)
LOG(EDAD)^2	0.175 (0.315)	-1.140** (0.575)	*CCAA07*	-0.311** (0.153)	0.045 (0.252)	*OCUL_F*	0.237 (0.234)	-0.670 (0.480)
CASADO	0.223* (0.080)	0.131 (0.105)	*CCAA08*	-0.428* (0.159)	-0.620** (0.267)	*OCUL_G*	0.221 (0.255)	-1.096** (0.500)
NUMHIJOS	0.040 (0.026)	0.009 (0.053)	*CCAA09*	-0.299* (0.110)	0.035 (0.180)	*OCUL_H*	0.299 (0.288)	-1.216** (0.494)
SPRIVAD	0.083 (0.128)	0.275 (0.168)	*CCAA10*	-0.200 (0.121)	0.034 (0.206)	*OCUL_K*	0.211 (0.285)	-0.940 (0.509)
LOG(ANTIGAEM+1)	0.094** (0.038)	0.182* (0.066)	*CCAA11*	-0.391** (0.168)	-0.325 (0.346)	*OCUL_L*	0.042 (0.323)	-7.464* (0.674)
LOG(HORASEM)	0.574* (0.164)	0.802* (0.216)	*CCAA12*	-0.336** (0.131)	-0.279 (0.268)	*OCUL_M*	0.266 (0.253)	0.328 (0.850)
TEMPORAL	-0.244* (0.093)	-0.149 (0.136)	*CCAA14*	-0.238 (0.174)	-0.141 (0.348)	*OCUL_N*	0.122 (0.255)	-8.839* (0.805)
TAMA2	0.380* (0.081)	0.119 (0.143)	*CCAA15*	-0.349 (0.185)	-0.520** (0.238)	*OCUL_P*	0.317 (0.268)	-0.966 (0.562)
TAMA3	0.472* (0.095)	0.002 (0.176)	*CCAA16*	-0.512* (0.141)	-0.109 (0.212)	*OCUL_Q*	0.358 (0.250)	-1.064 (0.567)
TAMA4	0.432* (0.096)	0.162 (0.152)	*CCAA17*	-0.411* (0.150)	-0.092 (0.257)	*OCUL_R*	-0.383 (0.272)	-8.798* (0.581)
PROLON1	0.303* (0.093)	0.378* (0.145)	*ACTL_A*	0.407 (0.267)	-6.757* (0.370)	*OCUL_S*	-0.234 (0.299)	-1.371** (0.560)
ADECUA2	-0.142 (0.083)	-0.401* (0.141)	*ACTL_B*	0.263 (0.449)	-6.303* (0.468)	*OCUL_T*	-0.349 (0.264)	-0.635 (0.542)
REPETITI	-0.185* (0.066)	-0.245** (0.111)	*ACTL_C*	-0.331 (0.377)	2.117* (0.678)	*OCUL_U*	1.487* (0.400)	10.373* (0.597)
FORMACIO	0.395* (0.068)	0.388* (0.104)	*ACTL_D*	0.155 (0.184)	0.138 (0.264)	*LIMIT_1*	2.151 (4.175)	17.481** (7.335)
EDU01	-7.340* (0.219)	-6.936* (0.330)	*ACTL_E*	0.091 (0.260)	-0.512 (0.471)	*LIMIT_2*	2.484 (4.175)	17.913** (7.334)
EDU02	-1.103* (0.210)	-7.830* (0.378)	*ACTL_F*	0.213 (0.204)	0.262 (0.373)	*LIMIT_3*	2.815 (4.176)	18.275** (7.337)
EDU03	-0.859* (0.154)	-1.122* (0.313)	*ACTL_G*	0.188 (0.194)	0.265 (0.291)	*LIMIT_4*	3.088 (4.175)	18.550** (7.329)
EDU04	-0.628* (0.141)	-0.648* (0.219)	*ACTL_H*	0.111 (0.244)	0.608** (0.292)	*LIMIT_5*	3.609 (4.170)	19.016** (7.344)
EDU05	-0.519* (0.160)	-0.385 (0.242)	*ACTL_I*	0.009 (0.198)	0.237 (0.320)	*LIMIT_6*	4.311 (4.175)	19.668* (7.340)
EDU06	-0.430* (0.147)	-0.458** (0.210)	*ACTL_J*	-0.264 (0.202)	-0.223 (0.286)	Pseudo-R^2	0.144	0.214
EDU07	-0.481* (0.133)	-0.428** (0.182)	*ACTL_K*	0.111 (0.194)	-0.246 (0.277)	*Log likelihood*	-2122.866	-708.482
EDU08	-0.098 (0.127)	-0.119 (0.149)	*ACTL_M*	-0.446** (0.188)	-0.761* (0.235)	LR statistic[a]	716.580 (0.000) (74df)	385.539 (0.000) (73df)
EDU10	0.382** (0.174)	-0.108 (0.221)	*ACTL_N*	-0.491* (0.185)	0.056 (0.193)	*Number of Obs.*	2507	1492
EDU11	-0.474 (0.276)	-0.663 (0.439)	*ACTL_O*	0.202 (0.235)	0.207 (0.274)	*LR statistic[a] Educations*	55.990* (0.000)	18.574** (0.046)
CCAA01	-0.277** (0.119)	-0.124 (0.243)	*ACTL_P*	0.250 (0.411)	-5.939* (0.411)	*LR statistic[a] CCAA regions*	29.979** (0.018)	11.996 (0.744)
CCAA02	-0.415** (0.162)	-0.052 (0.269)	*OCUL_A*	1.228* (0.265)	0.546 (0.539)	*LR statistic[a] Activities*	28.217** (0.020)	40.482* (0.000)
CCAA03	-0.243 (0.164)	-0.243 (0.297)	*OCUL_B*	1.214* (0.430)	-0.506 (0.836)	*LR statistic[a] Ocupatios*	102.842* (0.000)	62.254* (0.000)
CCAA04	-0.078 (0.131)	-0.073 (0.300)	*OCUL_C*	0.454 (0.902)	-	*LR statistic[a] SEX*	27.670* (0.000)	
CCAA05	-0.556* (0.174)	-0.161 (0.225)	*OCUL_D*	0.307 (0.260)	-0.027 (0.489)			

SUPERTOTCAT: EXPECTATION-PREDICTION TABLE MALE					
Categories	Count (Observed)	Count of obs with Max Prob	Error	Sum of all Probabilities	Error
0	1870	2443	-573	1866.87	3.13
1	186	0	186	190.09	-4.09
2	144	0	144	148.18	-4.18
3	93	0	93	92.53	0.47
4	117	19	98	113.84	3.16
5	70	30	40	67.38	2.62
6	27	15	12	28.11	-1.11
Total	2507	2507		2507	

SUPERTOTCAT: EXPECTATION-PREDICTION TABLE FEMALE					
Categories	Count (Observed)	Count of obs with Max Prob	Error	Sum of all Probabilities	Error
0	1290	1478	-188	1291.97	-1.97
1	82	0	82	83.52	-1.52
2	47	0	47	46.37	0.63
3	25	0	25	23.86	1.14
4	26	0	26	24.32	1.68
5	16	7	9	14.55	1.45
6	6	7	-1	7.40	-1.40
Total	1492	1492		1492	

SUPERTOTCAT Frecuencies	MALE			FEMALE		
Categories	Real-Observada	Estimated	Error	Real-Observada	Estimated	Error
0	74.59%	74.47%	0.125%	86.46%	86.59%	-0.132%
1	7.42%	7.58%	-0.163%	5.50%	5.60%	-0.102%
2	5.74%	5.91%	-0.167%	3.15%	3.11%	0.042%
3	3.71%	3.69%	0.019%	1.68%	1.60%	0.076%
4	4.67%	4.54%	0.126%	1.74%	1.63%	0.113%
5	2.79%	2.69%	0.104%	1.07%	0.98%	0.097%
6	1.08%	1.12%	-0.044%	0.40%	0.50%	-0.094%
Total	100.00%	100.00%		100.00%	100.00%	

SUPERTOTCAT ESTIMATED MEAN PROBABILITIES USING **MALE** ORDERED PROBIT MODEL			
	Both Sexs	Male	Female
P(y=0|X)	76.70%	**74.47%**	80.45%
P(y=1|X)	7.16%	**7.58%**	6.45%
P(y=2|X)	5.48%	**5.91%**	4.77%
P(y=3|X)	3.37%	**3.69%**	2.82%
P(y=4|X)	4.05%	**4.54%**	3.23%
P(y=5|X)	2.32%	**2.69%**	1.69%
P(y=6|X)	0.92%	**1.12%**	0.59%
Total number Obs	3999	2507	1492
Expectet Value [4]	0.6156	0.688	0.494

SUPERTOTCAT ESTIMATED MEAN PROBABILITIES USING **FEMALE** ORDERED PROBIT MODEL			
	Both Sexs	Male	Female
P(y=0|X)	81.61%	78.64%	**86.59%**
P(y=1|X)	6.66%	7.30%	**5.60%**
P(y=2|X)	4.08%	4.66%	**3.11%**
P(y=3|X)	2.28%	2.68%	**1.60%**
P(y=4|X)	2.53%	3.07%	**1.63%**
P(y=5|X)	1.70%	2.12%	**0.98%**
P(y=6|X)	1.14%	1.53%	**0.50%**
Total number Obs.	3999	2507	1492
Expectet Value [4]	0.4713	0.567	0.310

SUPERTOT CATEGORIES

0: 0
1: 1-2
2: 3-5
3: 6-9
4: 10-20
5: 21-60
6: More than 60

Dependent variable: SALARIOCAT Order Probit Model Estimation Results								
Variables	**Male Coefficient**	**Female Coefficient**	**Variables**	**Male Coefficient**	**Female Coefficient**	**Variables**	**Male Coefficient**	**Female Coefficient**
LOG(EDAD)	4.739* (1.757)	1.843 (2.545)	*CCAA07*	-0.082 (0.127)	0.104 (0.181)	*OCUL_G*	-0.319 (0.183)	-1.185** (0.538)
LOG(EDAD)^2	-0.570** (0.244)	-0.164 (0.360)	*CCAA08*	-0.298** (0.130)	-0.002 (0.160)	*OCUL_H*	-0.377 (0.220)	-1.084** (0.546)
CASADO	0.379* (0.064)	0.129 (0.068)	*CCAA09*	0.109 (0.110)	-0.046 (0.145)	*OCUL_K*	-0.285 (0.214)	-1.173** (0.547)
NUMHIJOS	0.027 (0.021)	0.041 (0.032)	*CCAA10*	-0.099 (0.108)	-0.054 (0.165)	*OCUL_L*	-0.511** (0.231)	-2.238* (0.729)
SPRIVAD	-0.235** (0.109)	-0.584* (0.126)	CCAA11	-0.674* (0.117)	-0.574* (0.209)	*OCUL_M*	-0.077 (0.170)	-0.092 (0.656)
PARCIAL	-0.996* (0.179)	-1.049* (0.145)	*CCAA12*	-0.320* (0.116)	-0.241 (0.164)	*OCUL_N*	-0.131 (0.174)	-0.476 (0.603)
LOG(HORASEM)	1.197* (0.165)	1.057* (0.181)	*CCAA14*	-0.472* (0.137)	-0.326 (0.188)	*OCUL_P*	-0.376 (0.195)	-1.485** (0.586)
LOG(ANTIGAEM+1)	0.157* (0.029)	0.221* (0.040)	*CCAA15*	0.409* (0.138)	0.522* (0.185)	*OCUL_Q*	-0.099 (0.175)	-1.283** (0.559)
TAMA2	0.223* (0.066)	0.274* (0.090)	*CCAA16*	0.228 (0.126)	0.433** (0.175)	*OCUL_R*	-0.178 (0.180)	-1.196** (0.589)
TAMA3	0.383* (0.076)	0.130 (0.107)	*CCAA17*	-0.186 (0.152)	0.085 (0.177)	*OCUL_S*	-1.010* (0.193)	-1.345** (0.541)
TAMA4	0.555* (0.082)	0.649* (0.103)	*ACTL_A*	-0.261 (0.188)	0.507 (0.439)	*OCUL_T*	-0.552* (0.166)	-1.112 (0.571)
PROLON1	0.181 (0.094)	0.190 (0.129)	*ACTL_B*	-0.092 (0.548)	2.343* (0.275)	*OCUL_U*	-0.563 (0.319)	-2.069* (0.552)
ADECUA2	-0.493* (0.068)	-0.327* (0.081)	*ACTL_C*	1.254* (0.205)	0.759 (0.578)	*LIMIT_2*	*9.529* (3.190)*	3.738 (4.593)
FORMACIO	0.198* (0.060)	0.194** (0.078)	*ACTL_D*	0.193 (0.144)	0.266 (0.198)	*LIMIT_3*	10.774* (3.208)	4.903 (4.605)
NUMPARAD	-0.032* (0.010)	-0.001 (0.014)	*ACTL_E*	0.273 (0.282)	0.733** (0.333)	*LIMIT_4*	11.767* (3.223)	6.147 (4.611)
EDU01	-1.536* (0.297)	-2.361* (0.425)	*ACTL_F*	0.181 (0.152)	0.231 (0.296)	*LIMIT_5*	13.581* (3.234)	7.720 (4.619)
EDU02	-1.279* (0.194)	-1.400* (0.256)	*ACTL_G*	-0.161 (0.158)	0.072 (0.192)	*LIMIT_6*	14.744* (3.235)	8.913 (4.621)
EDU03	-1.038* (0.147)	-1.040* (0.190)	*ACTL_H*	0.042 (0.205)	0.490** (0.203)	*LIMIT_7*	15.716* (3.235)	10.194** (4.626)
EDU04	-0.883* (0.136)	-0.908* (0.159)	*ACTL_I*	0.041 (0.155)	0.185 (0.265)	*LIMIT_8*	16.559* (3.235)	11.284** (4.623)
EDU05	-0.798* (0.148)	-0.659* (0.185)	*ACTL_J*	0.820* (0.215)	0.845* (0.261)	*LIMIT_9*	17.393* (3.240)	12.515* (4.639)
EDU06	-0.579* (0.139)	-0.600* (0.147)	*ACTL_K*	-0.075 (0.165)	0.096 (0.193)	Pseudo-R^2	0.253	0.342
EDU07	-0.623* (0.135)	-0.585* (0.140)	*ACTL_M*	-0.325** (0.141)	0.125 (0.169)	*Log likelihood*	-2753.114	-1518.376
EDU08	-0.502* (0.137)	-0.125 (0.126)	*ACTL_N*	-0.148 (0.153)	-0.138 (0.148)	LR statistic[a]	1866.417* (0.000) (74 d.f.)	1575.223* (0.000) (73 d.f.)
EDU10	-0.132 (0.177)	0.082 (0.262)	*ACTL_O*	0.208 (0.240)	-0.410 (0.229)	*Number of Obs.*	2221	1292
EDU11	-0.935* (0.278)	-0.068 (0.464)	*ACTL_P*	-0.074 (0.275)	-0.180 (0.235)	*LR statistic[a] Educations*	74.815* (0.000)	57.018* (0.000)
CCAA01	-0.086 (0.110)	-0.258 (0.171)	*OCUL_A*	1.099* (0.217)	1.222** (0.594)	*LR statistic[a] CCAA regions*	116.287* (0.000)	66.564* (0.000)
CCAA02	0.083 (0.123)	-0.187 (0.173)	*OCUL_B*	1.278* (0.404)	0.847 (0.669)	*LR statistic[a] Activities*	81.355* (0.000)	61.294* (0.000)
CCAA03	-0.244** (0.116)	-0.315 (0.210)	*OCUL_C*	0.003 (0.803)	-	*LR statistic[a] Ocupatios*	187.962* (0.000)	110.374* (0.000)
CCAA04	0.433* (0.137)	0.396** (0.200)	*OCUL_D*	0.830* (0.199)	-0.023 (0.555)	*LR statistic[a] SEX*	184.766* (0.000)	
CCAA05	-0.109 (0.137)	0.320 (0.173)	*OCUL_E*	0.818* (0.200)	-0.290 (0.549)			
CCAA06	-0.580* (0.136)	-0.078 (0.177)	*OCUL_F*	0.245 (0.161)	-0.718 (0.534)			

Standard deviation into brackets; [a] $\chi^2_{(df)}$ Log likelihood ratio test p-value into brackets; *significant at 1% level; **significant at 5% level

SALARIOCAT: EXPECTATION-PREDICTION TABLE MALE					
Categories	Count (Observed)	Count of obs with Max Prob	Error	Sum of all Probabilities	Error
1	11	5	6	11.92	-0.92
2	50	26	24	49.60	0.40
3	141	31	110	142.18	-1.18
4	779	1017	-238	771.25	7.75
5	630	744	-114	635.57	-5.57
6	350	266	84	353.85	-3.85
7	159	90	69	158.35	0.65
8	71	29	42	68.44	2.56
9	30	13	17	29.83	0.17
Total	2221	2221		2221	

SALARIOCAT: EXPECTATION-PREDICTION TABLE FEMALE					
Categories	Count (Observed)	Count of obs with Max Prob	Error	Sum of all Probabilities	Error
1	69	59	10	73.03	-4.03
2	136	96	40	127.62	8.38
3	252	218	34	254.05	-2.05
4	410	566	-156	409.22	0.78
5	227	180	47	233.25	-6.25
6	142	160	-18	140.07	1.93
7	45	12	33	43.77	1.23
8	10	1	9	10.08	-0.08
9	1	0	1	0.93	0.07
Total	1292	1292		1292	

SALARIOCAT Frecuencies	MALE			FEMALE		
Categories	Real-Observed	Estimated	Error	Real-Observed	Estimated	Error
1	0.50%	0.54%	*-0.041%*	5.34%	5.65%	*-0.312%*
2	2.25%	2.23%	*0.018%*	10.53%	9.88%	*0.649%*
3	6.35%	6.40%	*-0.053%*	19.50%	19.66%	*-0.158%*
4	35.07%	34.73%	*0.349%*	31.73%	31.67%	*0.061%*
5	28.37%	28.62%	*-0.251%*	17.57%	18.05%	*-0.484%*
6	15.76%	15.93%	*-0.173%*	10.99%	10.84%	*0.150%*
7	7.16%	7.13%	*0.029%*	3.48%	3.39%	*0.095%*
8	3.20%	3.08%	*0.115%*	0.77%	0.78%	*-0.006%*
9	1.35%	1.34%	*0.008%*	0.08%	0.07%	*0.005%*
Total	100.00%	100.00%		100.00%	100.00%	

SALARIOCAT ESTIMATED MEAN PROBABILITIES USING **MALE** ORDERED PROBIT MODEL			
	Both Sexs	Male	Female
P(y=1|X)	1.70%	0.54%	3.70%
P(y=2|X)	4.13%	2.23%	7.39%
P(y=3|X)	8.14%	6.40%	11.12%
P(y=4|X)	34.23%	34.73%	33.39%
P(y=5|X)	26.17%	28.62%	21.96%
P(y=6|X)	14.80%	15.93%	12.86%
P(y=7|X)	6.77%	7.13%	6.14%
P(y=8|X)	2.88%	3.08%	2.55%
P(y=9|X)	1.18%	1.34%	0.90%
Total number Obs	3513	2221	1292
Expectet Value [4]	4.720	4.884	4.438

SALARIOCAT ESTIMATED MEAN PROBABILITIES USING **FEMALE** ORDERED PROBIT MODEL			
	Both Sexs	Male	Female
P(y=1|X)	2.68%	0.96%	5.65%
P(y=2|X)	6.16%	4.00%	9.88%
P(y=3|X)	16.75%	15.05%	19.66%
P(y=4|X)	35.07%	37.05%	31.67%
P(y=5|X)	22.06%	24.39%	18.05%
P(y=6|X)	12.25%	13.07%	10.84%
P(y=7|X)	3.80%	4.04%	3.39%
P(y=8|X)	1.07%	1.25%	0.78%
P(y=9|X)	0.15%	0.19%	0.07%
Total number Obs	3513	2221	1292
Expectet Value [4]	4.259	4.427	3.970

SALARIOCAT CATEGORIES	
1:	$w \leq 270$ €
2:	270€< $w \leq$ 450€
3:	451€< $w \leq$601€
4:	601€< $w \leq$901€
5:	901€< $w \leq$1202€
6:	1202€< $w \leq$1652€
7:	1652€< $w \leq$2103€
8:	2103€< $w \leq$3005€
9:	3005€< w