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J. Oriol Escardíbul, Sergio Afcha

Human Capital

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Postal Address:
Institut d'Economia de Barcelona
Facultat d'Economia i Empresa
Universitat de Barcelona
C/ John M. Keynes, 1-11
(08034) Barcelona, Spain
Tel.: + 34 93 403 46 46
ieb@ub.edu
http://www.ieb.ub.edu

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ABSTRACT: In this study we analyze the determinants of job satisfaction of doctorate holders in Spain. Specifically, we consider overall job satisfaction as well as basic and motivational satisfaction following Herzberg's typology (based on Maslow's hierarchy of needs). Using data from the Spanish Survey on Human Resources in Science and Technology of 2009, representative of the Spanish doctoral graduate population, we develop an analysis by gender and institutional sector (university and non-university) where employees are employed. We propose OLS regression to identify the determinants of basic and motivational satisfaction at job as well as an ordered logit model for overall job satisfaction. Results do not allow us to confirm Herzberg's differentiation for the Spanish PhD holders, since factors related with basic motivation (such as salary or working conditions referred to 'safety') have a bearing on all types of job satisfaction (not only the basic one as expected). Likewise, results do not show significant differences by gender. However, it seems that these 'basic' needs are less important for the job satisfaction those PhD holders working at the University. Our results seem reasonable for a Southern European country where monetary conditions in labor relations are worse than in other developed countries.

JEL Codes: I23, J24, J31, J32

Keywords: Gender, Herzberg, Maslow, job satisfaction, PhD labor market, Spain

J. Oriol Escardíbul
Universidad de Barcelona & IEB
Av. Diagonal, 690
08034 Barcelona, Spain
E-mail: oescardibul@ub.edu

Sergio Afcha
Centrum Católica Graduate Business School
Pontificia Universidad Católica del Perú
Av. Universitaria 1801, Lima, Perú

Introduction

The supply of new doctoral graduates in Spain has increased significantly in recent times, reaching almost 9 thousand in 2011 (this figure was 6.4 thousand in 2000) –see INE (2014). This represents an average annual increase of 3.7%. This group of employees is important from an economic perspective since they are a key factor to develop R&D activities and foster economic growth (Romer 1986, 1990; Auriol 2010). In addition, they have better economic condition in the labor market in terms of unemployment and earnings. For the former, their rate of unemployment is very low (considering that Spain is one of the countries with higher levels of unemployment). Thus, unemployment between doctorate holders is 4.3%, being 16.0% for those with a university degree and 25.7% the average rate (INE 2013). For the latter, employees with higher levels of education earn higher wages. In Spain, those in the higher levels of education (with a university grade, master or PhD) earn, in average, 60% more than those who just finished high school, and around the double salary of those who finished compulsory education (INE 2010).

As it has been shown, PhD holders have, in average, better conditions in the labor market in monetary terms. However, job satisfaction may include non-monetary factors, such as job stability, promotion opportunities, conciliation between labor and family life, self-fulfillment, etc. (see a review of non-monetary benefits of education in McMahon 1999 and Vila 2000). However, literature typically shows that the more educated have lower job satisfaction (Clark and Oswald 1996). Thus, PhD graduates are at the top of the education system and have better working conditions in economic terms, but are they satisfied with their job?

The importance of analyzing job satisfaction is twofold. On the one hand, employees maximize their well-being. On the other hand, job satisfaction is associated with increased productivity and organizational commitment, lower absenteeism and turnover as well as greater organizational effectiveness (Ellickson and Logsdon 2001; Noordin and Jusoff 2009). Satisfaction may be measured in an objective and subjective way. Objective measures usually refer to the hierarchical position achieved and especially the salary level (see a review in Canal-Domínguez and Wall 2013). Subjective measures need to ask PhDs about their degree of satisfaction in several topics related to their job. The latter is the approach of this article, which follows Maslow's typology of job satisfaction and the subsequent revision of Herzberg (see Maslow 1943, 1954; Herzberg et al. 1959; Herzberg 1968).

As it well-known, Maslow establishes a hierarchy of needs (in the shape of a pyramid). From top to bottom, these are esteem, affection (and love and belongingness), safety, and physiological needs. Maslow points out that the most basic level of needs (safety, and physiological needs) must be met before the individual will strongly desire the secondary or higher level needs (although both levels are interrelated and not only sharply separated). Likewise, esteem has two levels: the lower one is the need for the respect of others, status, recognition, or attention, and the higher one (self-actualization) is the need for self-respect, mastery, self-confidence, independence and freedom.

Herzberg (1968) adds a dual approach by which not having job satisfaction does not mean dissatisfaction, but rather no satisfaction. Thus, the lack of achievement of lower order needs (in Maslow's typology) generates dissatisfaction but their achievement do not motivate. The latter is achieved when higher-level needs (related to the job itself) are satisfied. Herzberg defines factors related to working conditions as 'hygiene' factors, which are related to the

work environment and may generate job dissatisfaction. These needs require satisfaction before higher-level needs emerge and determine motivation. Thus personnel policies should focus on the satisfaction of higher-level needs (once lower levels are achieved) in order to increase individuals' motivation It has to be pointed out, however, that Herzberg's taxonomy is questioned by different authors that consider a different typology of factors that generate satisfaction and dissatisfaction (see a review in Shin and Jung, 2014).

In this study we analyze job satisfaction of doctorate holders in Spain. Specifically, we consider the determinants of job satisfaction. In the analysis we consider overall job satisfaction, and we also split satisfaction between basic and higher level or motivational needs following Herzberg's typology. The analysis is carried out for the whole sample as well as considering gender and work sector (university or elsewhere). Both factors seem to be relevant in previous analysis as it is shown in the literature review section. Results show that Herzberg's differentiation is not so clear for the Spanish PhD holders, since factors related with basic motivation (such as salary or working conditions referred to 'safety') have a bearing on all types of job satisfaction (not only the basic one as should be expected). It seems that these 'basic' needs are important for the job satisfaction of PhD holders. Moreover, factors related to basic needs seem to be less relevant for those working at the University. In addition, there are minor differences in the determinants of job satisfaction between men and women.

We highlight the following. Firstly, there is hardly evidence that specifically consider job satisfaction of employees with doctoral degrees further than analyses of faculty members. Secondly, unlike many studies, our research contains many responses related to job satisfaction (in fact, 13). This is important since job satisfaction is a complex concept that

includes several dimensions. Actually, some authors suggest that multiple-items scales are preferable to single-item scales in the case of job satisfaction (Oshagbemi, 2006; Wanous et al., 1997) Thirdly, we consider a less common perspective in the definition of satisfaction in educational research (basic or 'hygiene' and motivational), which is closer to a human management perspective. Finally, we divide the sample in several groups allowing to a better understanding of the determinants of job satisfaction for different groups of employees.

The remainder of this paper is structured as follows. The next section considers the literature review. Then, data and the econometric strategy are shown. Finally, results and a conclusion section are displayed.

Literature review on the determinants of doctorate holders' job satisfaction

Most studies examining job satisfaction do not focus on the case of PhD graduates, but usually include all type of employees. In this review, we only include studies focused on doctorate holders (see a review for determinants of employees' job satisfaction in general in Bender and Heywood 2006). We also do not consider studies in which doctorate holders explain the factors that generate satisfaction but do not analyze causality (see a review in Raddon and Sung 2009).

Moguerou (2002) and Bender and Heywood (2006) analyze job satisfaction (defined as a categorical response to a general question about the feelings of the individuals with their job) in the United States. The authors consider the same data sample: the Survey of Doctorate Recipients (SDR) carried out by the National Science Foundation (a branch of the United States government). It has 35,000 individuals with a PhD in sciences ('hard' and social) and

engineering. The authors show that a U-shaped age profile for job satisfaction is found (especially for males).

With regards to gender, the analyses of Moguerou (2002) and Bender and Heywood (2006) show that female doctorate holders have a greater job satisfaction that men. This result is in line with the general evidence usually defined as the 'paradox of the contented female worker': the fact that female employees have higher levels of job satisfaction is related to women's lower expectations (see Clark 1997; Bender et al. 2005). Also with data from SDR, Sabharwal and Corley (2009) show that job satisfaction (which is a composite index based on the combination of the satisfaction of employees in several job domains) gender gap disappears when all demographic, institutional and job-related characteristics are included.

Also with regard to gender, a specific framework of analysis is related to job satisfaction of academics. Sabharwal and Corley (2009) review 14 analyses and report that the majority of studies show that male faculty members have higher levels of overall job satisfaction than female faculty members, particularly in terms of benefits and salary received as well as in promotion opportunities. However, in their own study with data from the 2003 SDR, Sabharwal and Corley (2009) found no significant difference in satisfaction levels for men and women in some fields (such as engineering and social science) but that men were significant less satisfied than women in science and health studies. In addition, Kifle and Desta (2012) report that no consensus can be reached by the existing studies on gender job satisfaction between academics. Considering age and gender, Sloane and Ward (2001), who analyze academics in Scotland, find a negative effect of being a female among those younger than 35 years but a positive effect among an older cohort. In a previous analysis, also for Scotland,

Ward and Sloane (2000) show that gender (being a man) has only a bearing on promotion prospects.

Moguerou (2002) emphasizes job security (both for men and women) defined in terms of job temporality as an important predictor of job satisfaction. However, Bender and Heywood (2006) report the opposite sign for those who work in the business sector. In this framework of analysis, Oshagbemi (2006), who considers university instructors in the United Kingdom, shows that although the length of employment in higher education does not correlate with job satisfaction the longer the employment at their current university the higher the level of job satisfaction.

In the study of Moguerou (2002), the number of hours worked have a positive effect on the satisfaction of males (especially if they work in the industry sector) but a negative effect on females. However, Bender and Heywood (2006) report no effect of the number of hours worked for the whole sample, being positive only for those working for the Government. Likewise, earnings increase job satisfaction of all interviewed in both analyses.

Finally, the studies that consider the sector where PhDs work show that it affects the level of their job satisfaction as well as that some of the determinants of job satisfaction may vary according to the sector where doctorate holders have their job (Sabharwal and Corley 2009). Thus, in their study for the United States, and Bender and Heywood (2006) show a very slightly higher level of job satisfaction among those working at the University than in a non-academic sector. This positive effect is also reported by Moguerou (2002) in his subsample of PhDs in science and engineering of the sample used by Bender and Heywood (2006).

For Spain, in their study of a sample of Spanish PhD graduates not working at University, Cruz and Sanz (2004) show that they value job stability. Canal-Domínguez and Wall (2013) use a previous wave of the survey used in this study (for 2006). In their analysis they create an indicator of job satisfaction from PhDs' answers to a questionnaire referred to intellectual challenge, contribution to society and social status. The authors show that, compared to being employed in the private sector, working in the public sector (Government or University) or non-profit institutions increases the level of male and female PhDs satisfaction. This effect is also true for that doctorate in sciences but not in humanities and social studies. Likewise, following international evidence, being a woman increases the job satisfaction of PhDs employees. Moreover, age, having dependents at home or a permanent contract has a positive effect on employees' satisfaction. However, the presence of over-education or over-qualification creates dissatisfaction in line with international evidence. The latter is also true for seniority. Finally, civil status has a bearing on satisfaction: compared to being single, married women are more satisfied than married men, whereas this is the opposite in the case of being widow or divorced. In this context, the analysis of Di Paolo (2012) considers the specific case of Catalonia (a Spanish region). With a sample of two successive cohorts (2008 and 2011) of PhD recipients from the seven public universities, in line with international evidence, the author finds significant differences in job satisfaction between doctorate holders employed in different economic sectors. Thus, compared to faculty members, PhD recipients working in other sectors (public or private) are more satisfied with their earnings but they have a lower level of non-monetary satisfaction.

Data

The database used in this research is the second edition of the Survey on Human Resources in Science and Technology (*Encuesta sobre Recursos Humanos en Ciencia y Tecnología*) of 2009, carried out by the Spanish National Statistics Institute (INE). This survey provides exhaustive information about individuals with level 8 of education, according to the 2011 International Standard Classification of Education (UNESCO 2012), which are Doctorate holders from Spanish doctoral programs in public and private institutions who were resident in Spain between 1990 and 2009. The sample included 4,123 observations and is representative of the Spanish doctoral graduate population.

The questionnaire provides information about several characteristics of Doctorate holders. The survey is divided in the following sections: personal characteristics, training received during doctoral studies, labor market situation (such as earnings, international mobility, professional experience and post-doctoral activity) as well as scientific productivity measured in terms of published papers, books and patents.

As pointed out in the introduction, Maslow and Herzberg typology is used to analyze the self-perceived level of satisfaction expressed by respondents in the sample. The survey asks 13 different questions about self-perceived satisfaction referred to work related aspects. According to this, two different composite scales are constructed to proxy two dimensions of satisfaction, such as basic (or 'hygiene, in Herzberg's terms) and motivational satisfaction. Basic satisfaction captures lower order levels of needs in Maslow's pyramid and is related with extrinsic factors of the job, such as physiological needs (salary and fringe benefits in our questionnaire) and safety (labor stability, work location, and labor conditions). Motivational

satisfaction is a composite scale calculated as the arithmetic mean of the following variables: Career opportunities, Intellectual challenge, Responsibility, Level of autonomy, Contribution to society, Social status and Work-life balance. These items are related with higher order in the Maslow's pyramid, and they refer to membership and recognition (career opportunities, contribution to society and social status) as well as self-actualization (intellectual challenge, responsibility, level of autonomy and work life balance).

Each of these items is assessed with a Likert type scale, ranging from 1, for none satisfaction, to 4 in those cases the worker feel highly satisfied. In order to validate the internal consistency of this construct we compute the Cronbachs' alpha. For the basic satisfaction this composite scale was 0.68. For motivational satisfaction the scale reliability was 0.73. These values are similar to the one reported by Canal-Dominguez and Wall (2013) for their definition of overall satisfaction, which was 0.68, and they are considered as acceptable in the literature (see Rosenthal et al. 2000; Malhotra, 2010).

In addition to these composite scales, the Survey on Human Resources in Science and Technology included a question about overall job satisfaction in 2009. This is an important difference respect to the previous edition because it gives the possibility to compare differences between the determinants of overall, basic and motivational job satisfaction. Previous empirical literature uses both, single and multiple-item to measure job satisfaction, although, in general, comparative analysis between them recommends the use of the later. Wanous et al. (1997), perform a meta-analysis to assess single-item measure for job satisfaction and recommend the use of multiple-item scales, based on their internal reliability. More recently, after comparing single versus multiple-item of job satisfaction, Oshagbemi (2006) indicates that "single item measure tend to exaggerate the results obtained for

satisfaction while their underestimate results obtained for dissatisfied workers and those who show indifference" (pp. 398–399). However, he also concludes that "where possible both single as well as multiple measures of job satisfaction should be used in the same study" (p. 401). Given that data at hand provides the possibility to do this, single and multiple-item are used in the estimation.

The survey uncovers several individual characteristics of doctorate holders as well as some aspects related to doctorate training and labor conditions. In order to identify determinants of basic, motivational and total satisfaction in doctorate holders we consider seven categories of variables (see all descriptives in Table A1 in the annex).

Individual characteristics. These are basic standard variables including age (we also use age squared to check for non-linear effects), gender, civil status, father's level of education (if attended tertiary education), and whether individual's mostly attended private education.

Current labor conditions. This category contains the wage level (in intervals), type of contract (permanent or temporary), if full time job, average number of weekly hours worked, institutional sector which the employee works (university, public administration, private sector or non-profit organization), level of relation between the job and the doctoral studies as well as the relationship between required education of the job and qualification of the individual: educational mismatch (difference between the individual's level of education and the level of education needed to be able for the current position), and qualification mismatch (difference between the individual's level of education and the level of education considered as appropriate to be able for current position).

Doctoral training. Dummy variables indicating whether doctoral studies are in the field of natural sciences, engineering and technology, medical science, humanities, agricultural sciences or social sciences. Moreover, it is considered if PhD student has a grant, the duration of doctoral studies as well as if the PhD holder has an intention to work on research.

Academic job related characteristics. Job position at the University (professor, associate or other teaching positions), and being advisor in post graduates studies are considered as control variables when academic sub-sample is taken into account.

Region: Dummy variable indicating region of doctorate holders' residence were also included. In Spain, regional governments have some political power on the university system. Therefore, public policy for tertiary education institutions may change from one region to other. Regions are Andalusia, Aragon, Asturias, Balearic Islands, Canary Islands, Cantabria, Castile and Leon, Castile-La Mancha, Catalonia, Valencia, Extremadura, Galicia, Madrid, Murcia, Navarre, Basque Country, and Rioja. In addition, the two autonomous cities in Africa are jointly considered (Ceuta and Melilla).

In our sample, female doctorate holders represent 44% of the sample and those working at the university are 42% (as indicated, see all descriptives in the Table A1 in the annex section). We analyze all data displayed in terms of basic, motivational and overall job satisfaction. As it is shown in Table 1, men are more satisfied than women in overall satisfaction, although this difference is not statistically significant. Moreover, men are also more satisfied in all types of elements composing the scale of basic satisfaction (except in the case of salaries where men and female report the same level). With regards to motivational satisfaction, when differences are statistically significant, men are more satisfied in terms of career opportunities

and job autonomy. By employment sector, doctorate holders working in the university are more satisfied in most of elements in both basic and motivational satisfaction. Those working outside the university have higher levels of satisfaction only in salary and fringe benefits (basic satisfaction) and responsibility (motivational satisfaction). Our analysis also considers gender by employment sector. At the university, males are more satisfied in terms of basic satisfaction but motivational satisfaction is more evenly distributed by gender. Ne employed outside the university are more satisfied than women when basic satisfaction is considered but there are hardly differences with regards to motivational satisfaction.

(Insert Table 1)

Econometric strategy

We have three measures for job satisfaction. Two of them correspond to the scales created to assess basic and motivational satisfaction (as previously described), and one comes from a specific question about overall job satisfaction in the questionnaire. In the cases of basic and motivational satisfaction, both indexes are arithmetic means of different variables, being continuous variables. We propose Ordinary Least Squares regression to identify the determinants of basic and motivational satisfaction at job. In addition, considering the ordered response for the variable overall job satisfaction, an ordered logit model is estimated in this case, as in previous similar studies (Bender & Heywood, 2006; Mohr & Zoghi, 2014; Ward & Sloane, 2000).

In total, we propose the following estimations. First, three models to identify determinants of overall, basic and motivational satisfaction taking the whole sample. Second, estimations by

gender considering only the subsample of doctorate holders working at universities, using overall, basic and motivational satisfaction as dependent variable. Third, estimation by gender using the subsample of those who do not work at universities. According to this, three model specifications are formulated (see equations 1 to 3):

$$Job\ Sat. = B_0 + B_1 IC_{i1.} + B_2 LC_{i2.} + B_3 DT_{i3} + B_4 RR_{i4.} + \varepsilon_i \quad (1)$$

$$Job\ Sat. (Non\ University) = B_0 + B_1 IC_{i1.} + B_2 LC_{i2.} + B_3 DT_{i3} + B_4 RR_{i4.} + \varepsilon_i \quad (2)$$

$$Job\ Sat. (Uni.) = B_0 + B_1 IC_{i1.} + B_2 LC_{i2.} + B_3 DT_{i3} + B_4 AE_{i4.} + B_5 RR_{i5} + \varepsilon_i \quad (3)$$

Following these specifications, job satisfaction is analyzed for the total sample of doctorate holders, doctorate holders working at non university sector and doctorate holders working at universities. Each equation is estimated by gender and for different types of job satisfaction (overall, basic and motivational). On the right side of the equations, explanatory variables are represented by elements from different vectors corresponding to the following categories (see table A1 for details of variable description): IC (individual characteristics), LC (labor conditions), DT (doctoral training), AE (academic employment), and RR (region of residence).

Results

Tables 2 to 4 show the determinants of PhD holders' satisfaction. In each table the analysis considers the determinants of overall, basic and motivational satisfaction by gender. Table 2 considers the entire sample, Table 3 includes only employees working at University, and Table 4 those employed elsewhere. As indicated in the previous section, in overall satisfaction ordered logit estimations are considered, taking "low level of satisfaction" as base for

comparison, whereas the analysis of the determinants of basic and motivational satisfaction follows OLS estimations.

Table 2 shows the results for the whole sample. With regards to individual characteristics, only one of the variables is significant (married men), and at 10%, in one of the six regressions, so we can conclude that these type of variables are not significant determining job satisfaction. The same applies to doctoral training variables since most variables are not statistically significant. However, most labor conditions have a bearing on job satisfaction. Thus, the higher the wage level the higher the level of overall, basic and motivational satisfaction in both men and women employees. Likewise, having a permanent contract increases all type of satisfaction whereas the number of hours worked reduces them. Other variables condition job satisfaction to a lesser extent. Thus, having a full time job increases overall and basic satisfaction in female employees. A high relation of the job with the studies of the PhD holder increases overall and motivational satisfaction and a low relation decreases basic and motivational satisfaction (although only for males in the first case). In this context, a mismatch between the job and PhD holder qualifications reduces all type of satisfaction in men (and also motivational satisfaction in the case of females). The institution where employees work and the existence of educational mismatch hardly have an incidence on job satisfaction. Finally, some regional variables are significant: compared to live in Catalonia, being in Cantabria, Castile-La Mancha, Valencia and Murcia increases most types of satisfaction.

To sum up, some labor conditions have a bearing on job satisfaction (with the expected sign): a higher wage level, being permanent, having less hours of work, and whether the job is related to the field of specialization relate positively with job satisfaction. In addition, there

are no differences in the type of job satisfaction and gender. Likewise, only some variables show different results by gender: a mismatch qualification is relevant especially among men whereas having a full time job is significant only for females. Finally, there are hardly differences between types of satisfaction (overall, basic or motivational) in those variables expected to have a special incidence in basic satisfaction (those related to income and basic needs, as pointed out by Maslow, such as type of contract, hours worked, and workday). However, variables related to motivational satisfaction hardly affects basic motivation.

Results in Table 3 consider only those working at the University. Similar to the general case, hardly individual and doctoral training characteristics are statistically significant. With regards to labor conditions, results are the following. The influence of wages is less clear in the case of university sector (especially in overall and motivational satisfaction). As regard to permanent contract, it has a positive effect in satisfaction for both male and female in the case of overall and basic satisfaction. The number of weekly hours reduces all kind of satisfaction but only for men. Full-time job is significant especially in the case of basic satisfaction. The relation of job with doctoral studies is significant positively only in the case of high relation (and especially in the case of male doctorate holders). No effect of mismatch education and qualification is found, since it is difficult that this is the case in PhDs working at university. With respect to variables related with the academic job position, being professor increases all type of satisfaction, but this occurs only in the case of male doctorate holders. Moreover, being supervisor of Master or PhD thesis increase motivational satisfaction in men. As for the whole sample, residence in some regions is also significant. For university employees, these are (positive sign compared to Catalonia): Castile-La Mancha and Navarre.

Results on doctorate holders not working at the University are displayed in Table 4. Again, estimations show few differences with previous analyses with respect to individual characteristics and doctoral training. Labor conditions are more relevant. In comparison with previous estimations, results in Table 4 show that wages have a bearing on satisfaction similar to the one described for the whole sample. Thus, this variable is more relevant than for those employed at the University sector: low wages reduce significantly the three types of satisfaction in men and women. High wages increase satisfaction (especially in the case of male doctorate holders). Permanent contract increases satisfaction (especially overall and basic). Full time job also increases job satisfaction (especially the basic one). As in previous cases, the number of hours worked reduce satisfaction. The grade of relation between doctoral studies and work is again significant. However, it mainly increases motivational satisfaction. Results for educative and qualification mismatch confirm, in certain manner, those found for the total sample: overqualified women have lower levels of motivational satisfaction, whereas overqualified men have lower levels of basic and overall satisfaction. With regards to the institution where PhD holders work, only men in non-profit organizations show higher levels of motivational satisfaction. For non-university employees, there are positive signs and statistically significant (compared to living in Catalonia) for several satisfaction definitions in the Basque Country, Madrid, Murcia and Valencia.

Conclusions

Most PhD holders have better conditions in the labor market in monetary terms (employment and salary). In our study we analyze whether they also have a higher level of job satisfaction. In this analysis, job satisfaction follows Maslow's typology and the subsequent revision of

Herzberg. Maslow (1943, 1954) establishes a hierarchy of needs (in the shape of a pyramid). From top to bottom, these are esteem (self-actualization and recognition), affection, safety, and physiological needs. Maslow points out that the most basic level of needs (safety, and physiological needs) must be met before the individual will strongly desire the secondary or higher level needs. In this context, Herzberg (1968) adds a dual approach by which the lack of achievement of lower order needs (in Maslow's typology) generates dissatisfaction but their achievement do not motivate. The latter is only achieved when higher-level needs (related to the job itself) are satisfied.

Thus, in the study we analyze the determinants of satisfaction of doctorate holders in Spain. Specifically, we consider overall job satisfaction as well as basic and motivational satisfaction following Herzberg's typology. The analysis is carried out for the whole sample as well as considering gender and work sector (university or elsewhere).

The analysis carried out shows several interesting results. Thus, when the whole sample is considered the variables that may be related with basic motivation (salary, type of contract and workday) have a bearing, with the expected signs, on both basic and motivational job satisfaction (as well as overall satisfaction). However, the variables that may be related to motivational satisfaction affect mainly this type of job satisfaction. Thus it seems that the differentiation between basic and motivational satisfaction is not so clear in the case of the former for Spain, since wages and labor stability increase all type of job satisfaction among Spanish employees. Results do not show significant differences by gender. In addition, other variables related to individual characteristics and doctoral training are neither significant.

The sample of university employees allow us to conclude that the differentiation between factors related to basic and motivational satisfaction a bit clearer. In this context we highlight the minor role of wages in employees' satisfaction. Moreover, variables related to mismatch are not significant (as it is expected in PhD holders working at the University). In this context, some 'motivational variables' related to status and mastery, such as being professor and PhD advisor, increase males' motivational satisfaction (as well as basic satisfaction in the case of the former). The sample of employees not working at the university shows a relevant role of wages to increase all types of satisfaction (as for the whole sample). In general, results are more similar than those for the whole sample (as expected since almost 60% of all employees work outside the university). The rest of variables (personal and related to training) are hardly significant in both subsamples, as this is the case for the whole sample. Likewise, no significant differences by gender are found in any subsample.

To sum up, Herzberg's differentiation is not so clear for the Spanish PhD holders, since factors related with basic motivation (such as salary or working conditions referred to 'safety')

have a bearing on all types of job satisfaction (not only the basic one as should be expected). It seems that these 'basic' needs are important for the job satisfaction of PhD holders. It is reasonable in a Southern European country where labor relations are not as 'sophisticated', following Purcell and Sisson (1983) terminology as in other European countries. Factors related to basic needs seem to be less relevant for those working at the University.

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Table 1. Comparison of means for job satisfaction (overall, basic and motivational) across gender and sector

	Gender			Sector			Non-university			University		
	Mean males	*Signif.*	*Mean females*	*Mean non-university*	*Signif.*	*Mean university*	*Mean males*	*Signif.*	*Mean females*	*Mean males*	*Signif.*	*Mean females*
Salary	3.00		3.00	3.03	***	2.95	3.05		3.01	2.93		2.97
Fringe benefits	2.68	*	2.62	2.71	***	2.58	2.75	*	2.66	2.58		2.56
Job stability	3.56	***	3.36	3.42	***	3.53	3.53	***	3.29	3.59	***	3.45
Work location	3.58	**	3.52	3.53	**	3.59	3.56	*	3.49	3.61		3.57
Labor conditions	3.36	***	3.25	3.28	***	3.36	3.32	**	3.23	3.42	***	3.28
Basic satisfaction	3.23	***	3.15	3.19		3.20	3.24	***	3.14	3.23	*	3.17
Career opportunities	2.73	***	2.63	2.57	***	2.83	2.64	***	2.50	2.84		2.81
Intellectual challenge	3.50		3.45	3.32	***	3.69	3.33		3.31	3.71		3.66
Responsibility	3.53		3.55	3.57	***	3.49	3.58		3.57	3.46	*	3.52
Level of autonomy	3.47	***	3.39	3.35	***	3.55	3.37		3.32	3.60	***	3.49
Contribution to society	3.56		3.57	3.58		3.55	3.58		3.57	3.54		3.57
Social status	3.13		3.16	3.13		3.16	3.13		3.12	3.12	**	3.21
Work-life balance	3.17		3.11	3.07	***	3.24	3.05		3.10	3.32	***	3.14
Motivational satisfaction	3.30	*	3.27	3.23	***	3.36	3.24		3.21	3.37		3.34
Overall satisfaction	3.27		3.23	3.19	***	3.33	3.21		3.16	3.34		3.32
Sample size	*2219*		*1741*	*2279*		*1681*	*1251*		*1028*	*968*		*713*

Table 2. Overall, basic and motivational job satisfaction by gender.

	Overall satisfaction		Basic satisfaction		Motivational satisfac.	
	Female	Male	Female	Male	Female	Male
Individual characteristics						
Age	-0.052	-0.042	-0.014	-0.019	-0.013	-0.017
	(0.071)	(0.062)	(0.015)	(0.013)	(0.014)	(0.012)
Age squared	0.000	0.000	0.000	0.000	0.000	0.000
	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)
Single	-0.084	-0.239	0.019	0.012	-0.029	-0.026
	(0.224)	(0.231)	(0.048)	(0.049)	(0.043)	(0.045)
Married	0.088	-0.426*	0.036	-0.053	0.006	-0.072
	(0.206)	(0.206)	(0.044)	(0.044)	(0.040)	(0.040)
Father with tertiary education	0.035	0.240	-0.001	0.028	0.001	0.048
	(0.138)	(0.128)	(0.029)	(0.028)	(0.026)	(0.025)
Private publicly financed	0.072	-0.067	-0.002	-0.032	-0.004	0.003
	(0.128)	(0.124)	(0.027)	(0.027)	(0.025)	(0.024)
Private	0.205	-0.044	-0.009	-0.027	0.032	0.007
	(0.130)	(0.111)	(0.028)	(0.024)	(0.025)	(0.022)
Labor conditions						
Wage level 1	-1.066***	-1.161***	-0.463***	-0.278***	-0.230***	-0.149**
	(0.245)	(0.260)	(0.050)	(0.055)	(0.045)	(0.051)
Wage level 2	-0.398**	-0.511***	-0.205***	-0.157***	-0.059*	-0.080***
	(0.131)	(0.118)	(0.028)	(0.025)	(0.025)	(0.023)
Wage level 4	0.467**	0.505***	0.092*	0.131***	0.088**	0.101***
	(0.168)	(0.128)	(0.036)	(0.027)	(0.032)	(0.025)
Permanent contract	0.704***	0.716***	0.403***	0.460***	0.057*	0.076**
	(0.142)	(0.141)	(0.030)	(0.030)	(0.027)	(0.027)
Full time job	0.558*	-0.019	0.241***	-0.012	0.013	0.059
	(0.249)	(0.268)	(0.052)	(0.057)	(0.047)	(0.052)
Hours worked	-0.022**	-0.021***	-0.005***	-0.006***	-0.004**	-0.004***
	(0.008)	(0.006)	(0.002)	(0.001)	(0.001)	(0.001)
Public administration	0.164	-0.111	0.022	-0.053	0.045	-0.005
	(0.185)	(0.162)	(0.039)	(0.035)	(0.035)	(0.032)
University	0.391	-0.246	-0.006	-0.105**	0.063	0.003
	(0.202)	(0.171)	(0.043)	(0.037)	(0.039)	(0.034)
Non-profit organization	0.446	0.194	0.003	-0.076	-0.016	0.085
	(0.306)	(0.272)	(0.065)	(0.058)	(0.059)	(0.053)
High relation job	0.612***	0.592***	0.041	0.051	0.156***	0.193***
	(0.139)	(0.125)	(0.030)	(0.027)	(0.027)	(0.025)
Low relation job	-0.329	-0.435**	-0.059	-0.122***	-0.131***	-0.151***
	(0.172)	(0.162)	(0.036)	(0.035)	(0.033)	(0.032)
Mismatch education	-0.006	0.057	0.011	0.040*	-0.021	-0.014
	(0.082)	(0.078)	(0.017)	(0.016)	(0.016)	(0.015)
Mismatch qualification	-0.126	-0.157*	-0.021	-0.050**	-0.039*	-0.035*
	(0.078)	(0.078)	(0.017)	(0.016)	(0.015)	(0.015)
Doctoral training						
Natural science	-0.143	-0.316	-0.126*	-0.043	0.021	-0.039
	(0.293)	(0.270)	(0.063)	(0.059)	(0.057)	(0.054)
Engineering & technology	0.233	-0.235	-0.007	-0.001	0.071	-0.008
	(0.362)	(0.293)	(0.077)	(0.063)	(0.070)	(0.058)
Medical science	-0.346	-0.479	-0.150*	-0.099	0.092	0.002
	(0.307)	(0.284)	(0.066)	(0.062)	(0.060)	(0.057)
Humanities	0.077	-0.151	-0.033	0.025	0.069	0.012
	(0.311)	(0.286)	(0.067)	(0.062)	(0.060)	(0.057)

	Overall satisfaction		Basic satisfaction		Motivational satisfac.	
	Female	**Male**	**Female**	**Male**	**Female**	**Male**
Doctoral training						
Social science	-0.096	-0.069	-0.057	0.037	0.069	0.060
	(0.302)	(0.280)	(0.065)	(0.061)	(0.059)	(0.056)
Duration doctoral studies	0.000	-0.002	-0.000	-0.001*	0.000	-0.001*
	(0.002)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)
Grant	-0.100	0.108	0.040	0.029	0.011	-0.008
	(0.124)	(0.108)	(0.026)	(0.023)	(0.024)	(0.021)
Intention to work on research	-0.163	0.220	-0.074*	-0.031	0.019	0.047*
	(0.138)	(0.119)	(0.029)	(0.026)	(0.026)	(0.023)
Residence						
Andalusia	0.066	0.151	0.002	0.108**	0.049	0.054
	(0.215)	(0.183)	(0.046)	(0.040)	(0.041)	(0.037)
Aragon	-0.025	0.034	0.034	0.054	0.021	-0.027
	(0.285)	(0.265)	(0.060)	(0.058)	(0.054)	(0.053)
Asturias	-0.157	-0.081	0.120	0.121*	0.005	-0.024
	(0.291)	(0.253)	(0.063)	(0.055)	(0.057)	(0.051)
Balearic Islands	-0.149	0.131	-0.005	0.023	0.081	-0.007
	(0.367)	(0.301)	(0.081)	(0.065)	(0.073)	(0.059)
Canary Islands	0.462	-0.059	0.071	0.033	0.077	0.002
	(0.302)	(0.245)	(0.063)	(0.053)	(0.057)	(0.049)
Cantabria	0.910*	0.397	0.206**	0.172**	0.184**	0.031
	(0.372)	(0.301)	(0.078)	(0.065)	(0.070)	(0.059)
Castile-Leon	0.150	0.079	-0.002	0.046	0.046	0.003
	(0.271)	(0.234)	(0.057)	(0.050)	(0.051)	(0.046)
Castile-La Mancha	1.064**	-0.044	0.249**	0.088	0.153*	-0.006
	(0.382)	(0.278)	(0.080)	(0.060)	(0.073)	(0.055)
Valencia	0.285	0.522**	0.052	0.134**	0.052	0.103**
	(0.230)	(0.200)	(0.048)	(0.043)	(0.043)	(0.039)
Extremadura	0.236	-0.277	-0.041	-0.108	0.071	0.011
	(0.406)	(0.300)	(0.087)	(0.065)	(0.079)	(0.060)
Galicia	-0.114	0.065	0.013	0.110*	-0.062	0.026
	(0.245)	(0.219)	(0.052)	(0.047)	(0.047)	(0.043)
Madrid	0.247	0.246	0.008	0.035	0.082*	0.050
	(0.186)	(0.176)	(0.040)	(0.038)	(0.036)	(0.035)
Murcia	0.805**	0.445	0.134*	0.097	0.185**	0.121*
	(0.301)	(0.244)	(0.064)	(0.052)	(0.057)	(0.048)
Navarre	0.309	0.235	0.025	0.060	0.082	0.078
	(0.313)	(0.295)	(0.067)	(0.063)	(0.060)	(0.058)
Basque Country	0.534	0.472	0.026	0.092	0.141*	0.096
	(0.292)	(0.288)	(0.063)	(0.061)	(0.057)	(0.056)
Rioja	0.515	-0.138	0.082	0.068	0.088	-0.023
	(0.361)	(0.329)	(0.077)	(0.072)	(0.069)	(0.066)
Ceuta & Melilla	-0.788	0.001	-0.095	-0.025	-0.009	0.083
	(0.447)	(0.371)	(0.095)	(0.079)	(0.086)	(0.072)
Constant			3.376***	3.665***	3.445***	3.692***
			(0.362)	(0.323)	(0.327)	(0.296)
Cut1	-3.863*	-4.352**				
Constant	(1.705)	(1.516)				
Cut1	-0.382	-1.176				
Constant	(1.701)	(1.512)				
R-squared			0.295	0.234	0.176	0.184
N	1641	2084	1641	2084	1641	2084

Table 3. Overall, basic and motivational satisfaction for doctorate holders working at the University

	Overall satisfaction		Basic satisfaction		Motivational satisfac.	
	Female	Male	Female	Male	Female	Male
Individual characteristics						
Age	-0.005	-0.116	0.002	-0.023	0.004	-0.027
	(0.128)	(0.101)	(0.026)	(0.019)	(0.024)	(0.017)
Age squared	-0.000	0.001	-0.000	0.000	-0.000	0.000
	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)
Single	0.132	0.229	-0.077	0.124	-0.059	0.067
	(0.379)	(0.384)	(0.078)	(0.071)	(0.071)	(0.065)
Married	0.431	0.092	-0.011	0.008	0.012	0.012
	(0.346)	(0.350)	(0.071)	(0.065)	(0.065)	(0.059)
Father with tertiary education	0.249	0.329	0.019	0.096*	0.049	0.054
	(0.232)	(0.214)	(0.047)	(0.041)	(0.043)	(0.037)
Private publicly financed	-0.005	-0.160	-0.006	-0.008	0.012	-0.007
	(0.229)	(0.211)	(0.046)	(0.040)	(0.042)	(0.036)
Private	0.264	-0.272	-0.021	-0.026	0.029	-0.043
	(0.221)	(0.187)	(0.045)	(0.035)	(0.041)	(0.032)
Labor conditions						
Wage level 1	-0.881	-0.637	-0.267**	-0.115	-0.178*	0.016
	(0.465)	(0.473)	(0.092)	(0.088)	(0.084)	(0.080)
Wage level 2	-0.355	-0.555**	-0.103*	-0.158***	-0.014	-0.022
	(0.210)	(0.193)	(0.043)	(0.037)	(0.040)	(0.033)
Wage level 4	0.335	0.353	0.104	0.065	0.139*	0.069
	(0.289)	(0.213)	(0.059)	(0.040)	(0.054)	(0.036)
Permanent contract	0.629*	0.557*	0.481***	0.381***	0.088	-0.013
	(0.286)	(0.264)	(0.058)	(0.049)	(0.053)	(0.045)
Full time job	0.186	1.003	0.327***	0.255*	0.013	0.195*
	(0.475)	(0.546)	(0.095)	(0.102)	(0.087)	(0.093)
Hours worked	-0.008	-0.038***	-0.002	-0.008***	-0.005	-0.006***
	(0.013)	(0.011)	(0.003)	(0.002)	(0.002)	(0.002)
High relation job	0.503	0.769**	0.040	0.103*	0.138**	0.208***
	(0.273)	(0.265)	(0.056)	(0.048)	(0.051)	(0.044)
Low relation job	-0.276	-0.341	-0.073	-0.063	-0.120	-0.029
	(0.470)	(0.485)	(0.096)	(0.089)	(0.088)	(0.081)
Mismatch education	-0.060	0.243	0.003	0.055	0.001	0.026
	(0.162)	(0.171)	(0.034)	(0.032)	(0.031)	(0.029)
Mismatch qualification	-0.089	-0.171	0.017	-0.043	-0.026	-0.040
	(0.158)	(0.166)	(0.033)	(0.031)	(0.031)	(0.028)
Doctoral training						
Natural science	-0.076	-0.720	-0.083	0.037	0.004	-0.117
	(0.580)	(0.460)	(0.121)	(0.085)	(0.110)	(0.077)
Engineering & technology	0.314	-0.715	0.014	0.034	0.063	-0.134
	(0.648)	(0.484)	(0.133)	(0.090)	(0.122)	(0.081)
Medical science	-0.446	-1.442*	-0.153	-0.055	0.043	-0.173
	(0.652)	(0.631)	(0.136)	(0.116)	(0.124)	(0.105)
Humanities	0.439	-0.711	0.007	0.025	0.062	-0.044
	(0.593)	(0.486)	(0.123)	(0.090)	(0.112)	(0.082)
Social science	-0.027	-0.412	-0.079	0.102	0.033	-0.013
	(0.582)	(0.467)	(0.121)	(0.087)	(0.111)	(0.079)
Duration doctoral studies	-0.003	-0.003	0.000	-0.001	-0.000	-0.000
	(0.003)	(0.002)	(0.001)	(0.000)	(0.001)	(0.000)
Grant	0.068	0.158	0.117*	0.026	0.009	0.013
	(0.230)	(0.204)	(0.047)	(0.038)	(0.043)	(0.034)
Intention to work on research	0.092	0.245	-0.036	-0.097	0.096	0.032
	(0.392)	(0.299)	(0.077)	(0.057)	(0.071)	(0.052)

	Overall satisfaction		Basic satisfaction		Motivational satisfac.	
	Female	Male	Female	Male	Female	Male
Academic job related characteristics						
Professor	0.236	0.929*	-0.039	0.223**	0.079	0.164*
	(0.605)	(0.401)	(0.125)	(0.072)	(0.114)	(0.065)
Associate	0.077	0.299	0.042	0.058	0.004	0.021
	(0.228)	(0.199)	(0.046)	(0.038)	(0.042)	(0.034)
Advisor	0.103	0.130	-0.048	0.046	0.022	0.080**
	(0.189)	(0.159)	(0.038)	(0.030)	(0.035)	(0.027)
Residence						
Andalusia	0.109	-0.103	0.031	0.100	0.159*	-0.001
	(0.377)	(0.313)	(0.077)	(0.059)	(0.071)	(0.054)
Aragon	0.162	0.058	0.087	0.048	0.036	-0.038
	(0.461)	(0.440)	(0.095)	(0.084)	(0.087)	(0.076)
Asturias	0.133	-0.771	0.140	0.054	0.123	-0.119
	(0.495)	(0.405)	(0.102)	(0.077)	(0.094)	(0.070)
Balearic Islands	-0.042	-0.055	0.014	0.146	0.155	-0.048
	(0.594)	(0.631)	(0.125)	(0.115)	(0.115)	(0.105)
Canary Islands	0.428	-0.391	0.075	-0.016	0.138	-0.096
	(0.448)	(0.382)	(0.091)	(0.073)	(0.083)	(0.066)
Cantabria	0.676	0.272	0.323*	0.240*	0.224	-0.022
	(0.678)	(0.524)	(0.134)	(0.098)	(0.123)	(0.089)
Castile-Leon	1.073*	-0.588	0.125	-0.083	0.167	-0.039
	(0.498)	(0.380)	(0.099)	(0.070)	(0.090)	(0.064)
Castile-La Mancha	2.453**	0.086	0.409**	0.120	0.440**	0.068
	(0.946)	(0.601)	(0.148)	(0.110)	(0.135)	(0.100)
Valencia	0.456	0.120	0.082	0.063	0.137	0.058
	(0.392)	(0.328)	(0.079)	(0.062)	(0.072)	(0.056)
Extremadura	0.269	-0.707	-0.034	-0.012	0.215	-0.050
	(0.675)	(0.510)	(0.138)	(0.096)	(0.126)	(0.087)
Galicia	-0.221	-0.055	0.083	0.081	0.004	-0.018
	(0.413)	(0.361)	(0.085)	(0.068)	(0.078)	(0.062)
Madrid	0.302	-0.262	0.015	-0.028	0.155*	-0.058
	(0.365)	(0.316)	(0.074)	(0.059)	(0.068)	(0.054)
Murcia	0.727	-0.132	0.054	-0.021	0.155	0.031
	(0.565)	(0.417)	(0.115)	(0.079)	(0.105)	(0.071)
Navarre	1.356*	0.131	0.294*	0.098	0.414***	0.080
	(0.650)	(0.516)	(0.126)	(0.095)	(0.115)	(0.086)
Basque Country	1.275*	-0.139	-0.009	0.003	0.141	0.087
	(0.576)	(0.485)	(0.114)	(0.093)	(0.104)	(0.084)
Rioja	0.742	-0.529	0.244	0.109	0.284*	0.067
	(0.699)	(0.608)	(0.143)	(0.116)	(0.131)	(0.106)
Ceuta & Melilla	-0.993	-0.817	-0.016	-0.280*	-0.003	0.059
	(0.690)	(0.659)	(0.142)	(0.125)	(0.130)	(0.114)
Constant			2.601***	3.401***	2.940***	3.823***
			(0.636)	(0.468)	(0.582)	(0.424)
Cut1 Constant	-2.186	-6.059*				
	(3.114)	(2.513)				
Cut1 Constant	1.254	-2.139				
	(3.112)	(2.502)				
R-squared			0.289	0.244	0.082	0.107
N	603	825	603	825	603	825

Table 4. Overall, basic and motivational satisfaction for doctorate holders not working at the University

	Overall satisfaction		Basic satisfaction		Motivational satisfac.	
	Female	Male	Female	Male	Female	Male
Individual characteristics						
Age	-0.067	-0.034	-0.020	-0.019	-0.016	-0.013
	(0.095)	(0.085)	(0.020)	(0.019)	(0.018)	(0.018)
Age squared	0.000	0.000	0.000	0.000	0.000	0.000
	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)
Single	-0.176	-0.605	0.060	-0.070	0.005	-0.070
	(0.296)	(0.318)	(0.063)	(0.071)	(0.058)	(0.065)
Married	-0.073	-0.675*	0.048	-0.063	0.018	-0.093
	(0.273)	(0.279)	(0.058)	(0.062)	(0.053)	(0.057)
Father with tertiary education	-0.082	0.209	-0.006	-0.018	-0.041	0.024
	(0.191)	(0.175)	(0.040)	(0.040)	(0.036)	(0.037)
Private publicly financed	0.128	-0.126	0.034	-0.079*	-0.008	0.010
	(0.169)	(0.169)	(0.036)	(0.039)	(0.033)	(0.036)
Private	0.224	0.108	0.015	-0.028	0.034	0.051
	(0.179)	(0.149)	(0.038)	(0.034)	(0.034)	(0.031)
Labor conditions						
Wage level 1	-1.072***	-1.490***	-0.545***	-0.353***	-0.290***	-0.289***
	(0.321)	(0.354)	(0.065)	(0.080)	(0.059)	(0.074)
Wage level 2	-0.420*	-0.454**	-0.272***	-0.153***	-0.092**	-0.133***
	(0.184)	(0.171)	(0.039)	(0.039)	(0.035)	(0.036)
Wage level 4	0.575**	0.528**	0.073	0.167***	0.058	0.092*
	(0.222)	(0.173)	(0.047)	(0.039)	(0.043)	(0.036)
Permanent contract	0.720***	0.676***	0.367***	0.472***	0.037	0.122**
	(0.183)	(0.190)	(0.038)	(0.043)	(0.035)	(0.040)
Full time job	0.735*	-0.283	0.195**	-0.146*	0.027	0.041
	(0.319)	(0.328)	(0.066)	(0.074)	(0.060)	(0.068)
Hours worked	-0.028**	-0.015	-0.006**	-0.005**	-0.004*	-0.003*
	(0.010)	(0.007)	(0.002)	(0.002)	(0.002)	(0.002)
High relation job	0.649***	0.614***	0.054	0.038	0.158***	0.188***
	(0.176)	(0.153)	(0.037)	(0.035)	(0.034)	(0.032)
Low relation job	-0.308	-0.326	-0.033	-0.131**	-0.126***	-0.147***
	(0.197)	(0.177)	(0.041)	(0.041)	(0.038)	(0.038)
Mismatch education	0.016	0.076	0.014	0.041*	-0.014	-0.022
	(0.101)	(0.093)	(0.021)	(0.021)	(0.019)	(0.019)
Mismatch qualification	-0.162	-0.193*	-0.036	-0.058**	-0.046*	-0.030
	(0.096)	(0.094)	(0.020)	(0.021)	(0.018)	(0.019)
Public administration	0.230	-0.064	0.026	-0.052	0.057	0.027
	(0.194)	(0.167)	(0.041)	(0.038)	(0.037)	(0.035)
Non-profit organization	0.518	0.240	-0.013	-0.074	-0.000	0.121*
	(0.316)	(0.276)	(0.067)	(0.062)	(0.061)	(0.057)
Doctoral training						
Natural science	-0.081	-0.162	-0.132	-0.092	0.026	0.016
	(0.375)	(0.363)	(0.080)	(0.085)	(0.073)	(0.078)
Engineering & technology	0.315	0.007	0.042	-0.039	0.100	0.063
	(0.508)	(0.415)	(0.108)	(0.096)	(0.099)	(0.089)
Medical science	-0.328	-0.365	-0.140	-0.155	0.114	0.019
	(0.387)	(0.365)	(0.082)	(0.086)	(0.075)	(0.079)
Humanities	-0.193	0.133	-0.066	0.026	0.061	0.052
	(0.419)	(0.382)	(0.089)	(0.089)	(0.081)	(0.082)
Social science	-0.072	0.098	0.001	0.010	0.102	0.068
	(0.403)	(0.384)	(0.086)	(0.089)	(0.079)	(0.082)
Duration doctoral studies	0.003	-0.001	-0.000	-0.001	0.000	-0.001
	(0.002)	(0.002)	(0.000)	(0.000)	(0.000)	(0.000)

	Overall satisfaction		Basic satisfaction		Motivational satisfac.	
	Female	**Male**	**Female**	**Male**	**Female**	**Male**
Doctoral training						
Grant	-0.174	0.043	-0.002	0.032	0.000	-0.005
	(0.159)	(0.139)	(0.034)	(0.032)	(0.031)	(0.029)
Intention to work on research	-0.211	0.233	-0.082*	-0.018	-0.000	0.041
	(0.160)	(0.136)	(0.034)	(0.031)	(0.031)	(0.029)
Residence						
Andalusia	0.146	0.306	-0.033	0.113*	-0.015	0.097
	(0.285)	(0.247)	(0.060)	(0.057)	(0.055)	(0.053)
Aragon	-0.392	0.119	-0.051	0.091	-0.030	0.006
	(0.404)	(0.353)	(0.084)	(0.083)	(0.076)	(0.076)
Asturias	-0.359	0.329	0.096	0.203*	-0.084	0.071
	(0.401)	(0.358)	(0.086)	(0.082)	(0.078)	(0.075)
Balearic Islands	-0.127	0.311	-0.029	0.025	0.059	0.026
	(0.500)	(0.359)	(0.109)	(0.083)	(0.100)	(0.076)
Canary Islands	0.506	0.120	0.002	0.143	-0.002	0.123
	(0.515)	(0.357)	(0.107)	(0.083)	(0.097)	(0.077)
Cantabria	0.994*	0.596	0.149	0.155	0.166	0.090
	(0.466)	(0.385)	(0.099)	(0.088)	(0.090)	(0.081)
Castile-Leon	-0.533	0.431	-0.100	0.171*	-0.042	0.053
	(0.361)	(0.337)	(0.075)	(0.077)	(0.068)	(0.070)
Castile-La Mancha	0.405	-0.065	0.114	0.066	0.012	-0.031
	(0.471)	(0.338)	(0.102)	(0.080)	(0.093)	(0.073)
Valencia	0.258	0.691*	0.061	0.186**	-0.016	0.130*
	(0.321)	(0.280)	(0.066)	(0.065)	(0.061)	(0.060)
Extremadura	0.280	-0.210	-0.032	-0.174	-0.011	0.010
	(0.537)	(0.394)	(0.114)	(0.091)	(0.104)	(0.083)
Galicia	-0.215	0.329	-0.045	0.186**	-0.125	0.105
	(0.336)	(0.310)	(0.071)	(0.071)	(0.065)	(0.066)
Madrid	0.195	0.556*	-0.010	0.091	0.035	0.104*
	(0.231)	(0.226)	(0.049)	(0.052)	(0.044)	(0.048)
Murcia	0.900*	0.754*	0.137	0.153*	0.160*	0.159*
	(0.375)	(0.323)	(0.079)	(0.073)	(0.072)	(0.067)
Navarre	0.054	0.673	-0.051	0.141	-0.046	0.129
	(0.405)	(0.409)	(0.087)	(0.094)	(0.079)	(0.087)
Basque Country	0.387	0.957*	0.056	0.186*	0.160*	0.119
	(0.359)	(0.383)	(0.077)	(0.085)	(0.070)	(0.078)
Rioja	0.430	0.088	0.011	0.079	-0.037	-0.039
	(0.453)	(0.415)	(0.095)	(0.098)	(0.087)	(0.090)
Ceuta & Melilla	-0.558	0.633	-0.156	0.185	0.001	0.103
	(0.633)	(0.492)	(0.134)	(0.107)	(0.123)	(0.098)
Constant			3.713***	3.810***	3.586***	3.561***
			(0.476)	(0.475)	(0.434)	(0.437)
Cut1 Constant	-4.609*	-3.955				
	(2.268)	(2.088)				
Cut1 Constant	-1.027	-1.004				
	(2.262)	(2.083)				
R-squared			0.300	0.230	0.177	0.196
N	941	1134	941	1134	941	1134

Table A1. Descriptive statistics

Variable	Variable description	N	Mean	SD	Min	Max
Individual characteristics						
Age	Number of years	4123	43.45	7.60	29	69
Female	1 if female	4123	0.44	0.50	0	1
Single	1 if single	4123	0.22	0.42	0	1
Married	1 if married or civil union	4123	0.72	0.45	0	1
Other marital status	1 if widow, divorced or separated	4123	0.06	0.23	0	1
Father third education	1 if father attended third education level	4123	0.16	0.37	0	1
Public	1 if attend 2/3 of educational stages at public school	4123	0.52	0.49	0	1
Private publicly financed	1 if attend 2/3 at private publicly financed school	4123	0.21	0.40	0	1
Private	1 if attend 2/3 of educational stages at private school	4123	0.27	0.44	0	1
Labor conditions						
Wage level 1	1 if wage ≤ Euro 20,000	3960	0.06	0.25	0	1
Wage level 2	1 if wage between Euro20,001 − 40,000	3960	0.45	0.49	0	1
Wage level 3	1 if wage between Euro 40,001 − 50,000	3960	0.25	0.43	0	1
Wage level 4	1 if wage is >50,000	3960	0.24	0.42	0	1
Permanent	1 if permanent contract	3725	0.81	0.39	0	1
Full time position	1 if full time job	3960	0.94	0.23	0	1
Hours worked	Number of weekly hours worked	3960	41.14	8.53	4	99
Public administration	1 if working at Public Sector	3960	0.39	0.49	0	1
University	1 if working at university	3960	0.43	0.49	0	1
Non-profit organization	1 if working for a non-profit organization	3960	0.04	0.19	0	1
Private sector	1 if working for a private firm	3960	0.14	0.35	0	1
High relation job	1 if current job has a high relation with doctoral studies	3960	0.63	0.48	0	1
Low relation job	1 if current job has a low relation with doctoral studies	3960	0.16	0.37	0	1
Middle relation job	1 if job has a medium relation with doctoral studies	3960	0.21	0.40	0	1
Mismatch education	Difference between individual's level of education and level of education needed to be able for current position	3960	0.53	1.02	-1	6
Mismatch qualification	Dif. between individual's level of education and level of education considered as appropriate for current position	3960	0.68	1.03	-1	6
Doctoral training						
Natural science	1 if doctoral studies are in the field of pure sciences,	4123	0.33	0.47	0	1
Engineering & technology	1 if doctoral studies are in the field of engineering & tech.	4123	0.08	0.28	0	1
Medical science	1 if doctoral studies are in medical science	4123	0.21	0.41	0	1
Humanities	1 if doctoral studies are in humanities	4123	0.15	0.35	0	1
Social sciences	1 if doctoral studies are in social sciences	4123	0.20	0.40	0	1
Agricultural sciences	1 if doctoral studies are in agricultural sciences	4123	0.03	0.17	0	1
Duration doctoral studies	Duration of doctoral studies, in months	4123	70.79	35.93	0	420

Variable	Variable description	N	Mean	SD	Min	Max
	Doctoral training					
Grant	1 if graduate education funded	4123	0.63	0.48	0	1
Intention to work in research	1 if work in research during next year	4123	0.67	0.47	0	1
	Academic employment					
Professor	1 if tenured - Chair	1748	0.05	0.21	0	1
Associate	1 if tenured - Associate professor	1748	0.58	0.49	0	1
Other teaching positions	1 if visitant, assistant, adjunct or other teaching categories	1748	0.37	0.48	0	1
Advisor	1 if supervise doctoral or master dissertation	4123	0.33	0.47	0	1
	Residence					
Andalusia	1 if resides in Andalusia	4123	0.12	0.32	0	1
Aragon	1 if resides in Aragon	4123	0.04	0.19	0	1
Asturias	1 if resides in Asturias	4123	0.04	0.20	0	1
Balearic Islands	1 if resides in Balearic Islands	4123	0.02	0.15	0	1
Canary Islands	1 if resides in Canary Islands	4123	0.04	0.20	0	1
Cantabria	1 if resides in Cantabria	4123	0.03	0.16	0	1
Castile and Leon	1 if resides in Castile and Leon	4123	0.05	0.23	0	1
Castile-La Mancha	1 if resides in Castile-La Mancha	4123	0.03	0.16	0	1
Catalonia	1 if resides in Catalonia	4123	0.12	0.32	0	1
Valencia	1 if resides in Valencia	4123	0.09	0.29	0	1
Extremadura	1 if resides in Extremadura	4123	0.02	0.15	0	1
Galicia	1 if resides in Galicia	4123	0.06	0.25	0	1
Madrid	1 if resides in Madrid	4123	0.18	0.38	0	1
Murcia	1 if resides in Murcia	4123	0.04	0.20	0	1
Navarre	1 if resides in Navarre	4123	0.03	0.17	0	1
Basque country	1 if resides in Basque Country	4123	0.04	0.19	0	1
Rioja	1 if resides in Rioja	4123	0.02	0.15	0	1
Ceuta-Melilla	1 if resides in Ceuta or Melilla	4123	0.02	0.12	0	1

2011

2011/1, Oppedisano, V; Turati, G.: "What are the causes of educational inequalities and of their evolution over time in Europe? Evidence from PISA"

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2012

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