UNIMORE
UNIVERSITÀ DEGLI STUDI DI MODENA E REGGIO EMILIA
Dipartimento di Economia Marco Biagi

DEMB Working Paper Series

N. 218

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November 2022

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ISSN: 2281-440X online

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Abstract

This paper delves into the effects of workers' aspirations on the levels of the perceived job satisfaction, as well as the determinants of their aspiration goals. It rests on the idea that aspirations are determined both by individual and work characteristics and by a continuous comparison with the corporate and social environment. This can be a source of aspiration bias reducing or increasing the reported job satisfaction in the case of failure in achieving aspiration goals that generate frustration, or conversely gratification for exceeding set goals. Using a Two-tier stochastic frontier approach, we estimate the levels of aspiration bias in the European labour market, simultaneously assessing the effects of several individual and social environment characteristics on aspirations. We find that aspirations are statistically relevant to explain satisfaction: workers exhibit high levels of frustration, reporting a job satisfaction twenty percent lower than the level that would be in line with their wages, individual and job characteristics. Furthermore, worker's aspirations increase with the presence of colleagues with the same job title, consistent with the mechanism of aspirations adjustment through social comparison. This framework is also useful to explain the gender-job satisfaction paradox, that is women report higher levels of job satisfaction than men although they are at a disadvantage in the labour market. Consistently with the idea that gender inequality has an effect on aspirations, individuals in male-dominated occupations have higher levels of aspirations than workers in mixed occupations, while individuals (conceivably women) in female-dominated occupations fix lower aspirations.

JEL classification: C10, C38, J01, J16, J28

Keywords: Aspirations, Job satisfaction, Gender-job satisfaction paradox, Two-tier stochastic frontier analysis

Acknowledgement and funding: We would like to thank Christopher F. Parmeter and Chang Liu for useful suggestions regarding the implementation of thedri estimation procedure. We wish to underline that they had no involvement in the final design of the study, the analysis and interpretation of the data, the drafting of this article and the decision to submit it for publication. We are also grateful to Stefan Roland Schneck and all participants to the 40th Eurasia Business and Economics Society (EBES) conference, Istanbul (Turkey), 6-7-8 July 2022 for useful comments This work received funding from the Ministry of University and Research [PRIN 2017 (2019) GRANT, prot. 20174ESLX7-001] and was also supported by the University of Modena and Reggio Emilia [Unimore FAR GRANT 2021].

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1 Introduction

Job satisfaction is one of the most explored topics in economic, organisational and psychological literature. The reason is that a multitude of individual and organisational behaviours, such as turnover decisions, absenteeism, organisational profitability and performance, are affected by employee job satisfaction (Judge et al., 2020), driving scholars to investigate its determinants. Despite the extensive literature on the key factors determining satisfaction with work, some issues remain open and debated. The case of the *gender-job satisfaction paradox* is emblematic: female workers despite lower wages and disadvantaged working conditions, female workers tend to report equal or higher satisfaction than men (e.g. Clark, 1997; Perugini & Vladisavljević, 2019; Pita & Torregrosa, 2021; A. Sousa-Poza & Sousa-Poza, 2003).

The reasons behind inconsistent or unexpected levels of job satisfaction may lie in a subjective evaluation of job characteristics, driven by aspirations. The desire to achieve a goal attainable through personal effort (i.e. aspirations) may influence job satisfaction due to the discrepancy between goals and outcomes (Genicot & Ray, 2017, 2020; Stutzer & Henne, 2014). Workers who have higher aspirations than the actual job characteristics may report lower levels of job satisfaction; conversely, individuals with lower aspirations than the job characteristics experienced are likely to be more satisfied with their job. Clearly, the effects that aspirations have on reported job satisfaction are different between individuals and related to the process of aspiration formation. The aspirations of individuals depend on certain individual circumstances, such as one's past and personality traits, and continuous comparisons with corporate and social environment and relevant others. In particular, Ray (2006, p. 410) introduces the concept of aspiration windows, i.e. *"the individual's cognitive world, his zone of similar and attainable individuals"*. The idea is that people tend to compare themselves with their peers whom they identify as a reference in shaping their aspirations.

Bringing together the literature on job satisfaction, the gender-job satisfaction paradox and studies on aspirations, we aim to find evidence that the difference between achievement goals and aspirations can lead to distortions in reported job satisfaction, by estimating a negative and a positive bias effect on job satisfaction. For this purpose, we analyse the European Working Conditions Survey (EWCS) conducted in 2015 for 33 countries using the Two-Tier Stochastic Frontier analysis (2TSF). The 2TSF analysis enables us to estimate the negative and positive effect that aspirations have on job satisfaction, overcoming the limitation of identifying them because they are unobservable in our dataset. This technique also allows us to study the determinants of negative and positive aspiration bias exploring how workers' aspirations are formed. Using the concept of the aspiration window, we explore whether working with people with the same job title influences individuals' aspirations and whether these effects differ between men and women. Finally, in line with the idea that greater exposure to better jobs and more equal settings women revise aspirations upward, we explore the aspiration gap among workers in male-dominated

occupations, female-dominated and mixed gender occupations. In summary, this study finds evidence of the existence of an additional job satisfaction payoff which may reduce or increase the reported job satisfaction in the case of failure in achieving aspiration goals that generate frustration, or conversely gratification for exceeding set goals.

The rest of the paper is organised as follows. Section 2 reviews and discusses the main existing studies on job satisfaction and its connections with aspiration theory and the gender-job satisfaction paradox. Section 3 presents the data and variables used in the analysis, while Section 4 details the methodology. Section 5 outlines the estimation results. Finally, Section 6 summarises the main findings suggesting practical implications finally concludes.

2 Job satisfaction, aspirations and the gender-job satisfaction paradox

Defined as *"a pleasant or positive emotional state resulting from the appraisal of one's job or job experiences"* (Locke, 1976, p. 1304), job satisfaction represents one of the most widely investigated topics in the psychological, economic, and organisational literature. The reasons for such interest lie in its relationship to multiple individual and organisational behaviours, such as turnover decisions, absenteeism, and organisational profitability (Judge et al., 2020; Scanlan & Still, 2019). Its analysis may return numerous insights in terms of managerial actions. Job satisfaction is closely related to the concept of life satisfaction and subjective well-being, which is still a central topic of economic literature. In this framework, Clark (1996) suggests that the job satisfaction function can be seen as a sub-utility of a "life satisfaction function", which depends on the utility derived from work and the utility derived from non-work spheres of life. Specifically, job satisfaction can be written as follows,

$$JS = u(w, h, c, i) \tag{1}$$

where the utility $u()$ is assumed to depend positively on wages w, negatively on hours of work h, as well as on a set of working conditions c and individuals characteristics i. Much of the empirical literature on job satisfaction has focused on the relationship between job satisfaction and working conditions in order to identify the main determinants (Judge et al., 2020). Some of these predictors are systematically associated with higher job satisfaction, such as supervisor and colleagues support, which are relevant under different levels of team implementation (Griffin et al., 2001), or permanent contracts and public sector employment due to job security-related effects (Bender et al., 2005; Buelens & Van den Broeck, 2007). Moreover, performance-related pay appears to be associated with higher satisfaction (C. Green & Heywood, 2008). Evidence of negative relationships between unfavourable working conditions, such as exposure to physical risks and work intensification is also common in the literature. The job intensification shows

three different dimensions: the frequency of overtime and work done beyond normal working hours (extensive effort); commitment during the time spent at work so that the work absorbs a higher rate of mental and physical input (intensive effort); and work-pace constraints related to the number of external factors that influence employees' choice of work (F. Green, 2001). The three dimensions impair employee well-being by reducing job satisfaction. Moreover, recently some authors have shown that workers who are victims of violence on the workplace show job dissatisfaction (Folke & Rickne, 2022) as well as those who perceive the existence of a discriminatory work environment (Di Marco et al., 2016). Among individual characteristics, although the results are inconclusive, marital status is often associated with higher job satisfaction (Gazioglu & Tansel, 2006), while age is generally U-shaped (Linz & Semykina, 2012). Finally, the evidence on the effect of education is also not conclusive, with negative, positive or non-significant effects (Clark, 1996).

Despite the extensive literature on the determinants of job satisfaction, some issues remain open and debated. For example, workers with similar job experience, working conditions, pay, contingent rewards and promotional opportunities often declare different levels of job satisfaction (Judge & Klinger, 2008). Some scholars attribute the causes of this phenomenon to differences in aspirations[1] (Poggi, 2010). Aspirations theory (Stutzer & Henne, 2014), can help us understand how workers are swayed by their desires and goals when declaring their levels of job satisfaction. Generally speaking, individuals, through comparison with the environment in which they live and work and given past experience, set different levels of aspirations and expectations for the future (Easterlin, 2003; Frey & Stutzer, 2010; Stutzer, 2004). These differences affect life satisfaction due to the relationship between goals and outcomes: any positive or negative discrepancy between goals and outcomes can result in success or failure with effects on reported subjective well-being (Genicot & Ray, 2020; Stutzer & Henne, 2014). It is reasonable to assume that this mechanism also affects job satisfaction: workers who have higher aspirations than their actual job characteristics may report lower levels of job satisfaction; conversely, individuals with lower aspirations than the actual job characteristics experienced are likely to be more satisfied with their jobs.

At this point, it is crucial to understand how aspirations are formed. As mentioned above, a central element in the determination of aspirations is the social comparison that individuals make continuously (Macours & Vakis, 2009; Stutzer & Henne, 2014). The comparison is characterised by not being generalised only to all individuals, but rather by being related to the individual's aspiration windows, i.e. "the individual's cognitive world, her zone of similar, attainable individuals" (Ray, 2006, p. 410). The idea is that people tend to compare themselves with their peers in determining their aspirations: it is plausible for a doctor to compare her income and working conditions with other doctors

[1] According to the American Psychological Association an aspiration can be seen as *"an ambition, goal, or any kind of desired end that might be achieved through personal effort"*

rather than with farmers and vice versa.

The effect that social comparison may have on satisfaction is also relevant with regard to the gender-job satisfaction paradox. The latter refers to the paradox highlighted by Clark (1997), which showed that despite evidence of a disadvantaged position in the labour market, women in the UK report a higher level of satisfaction than men. This result has emerged in several countries and in many recent studies (Perugini & Vladisavljević, 2019; Pita & Torregrosa, 2021; A. Sousa-Poza & Sousa-Poza, 2000). Women who compare wages and working conditions with their peers generate relatively lower aspirations due to unfavourable market conditions. However, this phenomenon is expected to be transitory and the gap in satisfaction is expected to narrow as labour market equality increases. A. Sousa-Poza and Sousa-Poza (2003), in a study of UK workers for the years 1991-2000, found evidence of a decline in women's job satisfaction. The same result is suggested by Kaiser (2007) in a comparison of 14 European countries during 1994-2001. In this work, differences in satisfaction between men and women are not present in countries with greater gender equality. A further step in this direction can be found in the contribution of Perugini and Vladisavljević (2019), who analysed gender gaps in job satisfaction in 32 European countries in 2013 relating them to differences in equality. They find a strong relationship between exposure to higher gender equality job contexts and lower gender gap in job satisfaction. Furthermore, the authors show that being employed in typically male-dominated occupations has the same effect of reducing the difference in satisfaction.

In addition to the gap in job satisfaction, there is a body of literature showing that differences between men and women are also evident in terms of aspirations. Netchaeva et al. (2022), in an extensive meta-analytic review, shows how the significant underrepresentation of women in leadership roles in the United States is related to gender differences in aspirations for these roles. Aspirations may create incentives to exert effort, correlated with chances of promotion and preference for leadership roles, partly explaining the lower likelihood for women to start climbing the job ladder (Azmat et al., 2020; Deschacht et al., 2017; Sheppard, 2018).

Our attempt is to contribute to the debate on job satisfaction in several ways. First, we seek to find evidence that the difference between achievement goals and aspirations can lead to distortions in reported job satisfaction. Second, we want to help explore how workers' aspirations are formed, bearing in mind the concept of the aspiration window. Finally, a further aim is to investigate whether the relationship between the gender-job satisfaction gap and equality is related to the difference in aspirations between women and men.

3 Data and variables

This study draws on data from the sixth wave of the European Working Conditions Survey (EWCS) conducted in 2015 (CITE). The survey provides very detailed information about

the working population in a wide range of countries, including the 28 EU countries plus 5 EU candidate countries (Albania, Former Yugoslav Republic of Macedonia (FYROM), Montenegro, Serbia, Turkey), Norway and Switzerland. This dataset is particularly suitable for our research purpose as it provides a wide range of information related to working conditions and job satisfaction. We restricted the total sample to 19389 individuals composed of workers aged 15-65, excluding the self-employed due to the inapplicability of some of the concepts analysed such as working with people with the same job title, firm size. In addition, employees are generally analysed separately from the self-employed because of income-related differences in job utility (Blanchflower and Oswald, 1992). Further, we exclude observations with missing data for the variables included. As Table 1 shows, secondary education is the prevailing level of education among workers (61%), followed by tertiary education (36%), while the workers with a primary level of education are are about 3%. The private sector is the most represented (64%) whereas the public sector accounts for 30%. The individuals work mainly in medium-large businesses with 10 to 249 employees (44%). Finally, the age is on average 41 years.

Table 1: Sample characteristics

Variable	N	(%)	Variable	N	(%)
Female	9939	51%	Private sector	12509	64%
Age[1]		41(11.7)	Public sector	5739	30%
Hours[1]		38(10.4)	Other sector	1141	6%
ln wage		6.94(0.86)	Firm size 1/9	3811	20%
Primary Edu.	561	3%	Firm size 10/249	8538	44%
Secondary Edu.	11813	61%	Firm size 250+	7040	36%
Tertiary Edu.	6989	36%	Female-dominated	7423	38%
Married	12395	63%	Mixed	5335	28%
Permanent	15578	80%	Male-dominated	6631	34%
N. observation	19289				

[a]We report mean(sd) for continuous variables

The analysis is conducted using both variables directly adopted from the EWCS 2015 dataset (e.g., wages, hours worked, age) and indicators obtained by performing Nonlinear Principal Component Analysis (NPCA) as dimension reduction technique. The description of all variables used in the analysis is reported in Table A1 in Appendix. The NPCA differs from linear principal component analysis (PCA) in its use of an optimal quantification process for handling categorical data and discovering nonlinear relationships between variables. Since NPCA is based on the analysis of quantified variables, the resulting principal components are linear combinations of those variables, as in PCA.

As it is common in literature (e.g. Léné, 2019; van Dick & Monzani, 2017), we use

multiple items to construct a measure of *"Job Satisfaction"*[2]. One item used is the overall satisfaction directly available in the questionnaire, which is measured asking individuals to rate the satisfaction on a scale ranging from "Not at all satisfied" (1) to "Very satisfied" (4). Other specific dimensions of satisfaction considered (pay, prospects and recognition satisfaction) are collected using a 5-point Likert-type scale, where (1) indicates "Strongly disagree" and (5) means "Strongly agree". Table A2 in the Appendix reports the results of NPCA run to obtain the composite indicator of job satisfaction. We extract the components which account for sufficient variance, i.e. with an eigenvalue larger than 1 (Kaiser criterion). The variance accounted for (VAF) by the first principal component is 47,6%.

Composite indicators of working conditions are obtained by running the NPCA on a second set of survey questions regarding aspects such as supervisor and colleagues support, health and safety, job intensification, violence and perceived discrimination. We selected 10 principal components explaining 54,4% of the total variability, which are: *"Supervisor support"*, *"BHW Conditions"* (Bad health working conditions), *"Extensive effort"*, *"Intensive effort"*, *"WPC"* (Work-pace constraints), *"Colleagues support"*, *"Violence"* experimented at the workplace (physical violence, sexual harassment, bullying), *"RRNo Disc."* (Race, Religion and National origin Discrimination), and *"GDSo Disc."* (Gender, Disability and Sexual orientation Discrimination). To simplify the structure and better discriminate the similar patterns of component loadings, we apply a VARIMAX rotation orthogonally rotating the solution. These findings are detailed in Table A3 in the Appendix.

In addition to the role of these composite indicators of working conditions in job satisfaction, we investigate the effect of log wage (*"ln wage"*), hours worked per week (*"Hours"*) and a wide range of control variables such as: small, medium and large firm size (respectively, *"Firm size 1/9"*, *"Firm size 10/249"*, *"Firm size 250+"*), sector of employment (*"Private sector"*, *"Public sector"*, *"Other sector"*) and type of contract (*"Permanent"*). Finally, we also control for the following individual characteristics: age (*"Age"*, *"Age2"*), marital status (*"Married"*), different level of education (*"Primary Edu."*, *"Secondary Edu."*, *"Tertiary Edu."*), and country effect (*"Country dummies"*).

In order to understand how aspirations are formed, we test the significance of several determinants related to the aspirations. Specifically, to explore whether social comparison among peers matters in determining different levels of aspirations, we identify workers who are the only ones in their workplace with a specific job title, distinguishing them from those who work with colleagues with the same job title, who in turn may be a majority of men (*"Same job title man"*), women (*"Same job title women"*) and approximately equal numbers of men and women (*"Same job title mixed"*). In addition, we control whether there is evidence of an aspirational gap between women and men (*"Female"*).

Finally, based on the International Standard Classification of Occupations (the ISCO-

[2]The analysis was also performed using overall job satisfaction indicator based on the question about satisfaction with working conditions; the results are robust.

08 at the two-digit level), we build three dummy variables separating *"Male-dominated"* (e.g. chief executives, production and services managers, science professionals), *"Female-dominated"* (e.g. teaching professionals, keyboard clerks, health professionals and personal care workers) and *"Mixed"* occupations[3] (e.g. business and professionals, hospitality and retail managers, administrative and commercial managers).

The groups are separated according to the share of women or men in each ISCO occupation. Following Eurofound (2020) a threshold of 60% is used to consider an occupation as male-dominated or female-dominated or mixed. The proportion of men and women working in occupations composed mainly of their own gender is high: 57% of male workers and 57.2% of female workers worked in male- and female-dominated occupations, respectively. The focus on occupational segregation is also relevant because it highlights the disadvantaged position of women in the labour market. As shown in Table 2, workers in female-dominated occupations show statistically significant lower wages and greater exposure to physical violence, sexual harassment, and bullying, moreover they perceive more discrimination based on gender, disability, race, religion, nationality and sexual orientation.

Table 2: Descriptive statistics and t-test on job characteristics in female-dominated, male-dominated and mixed occupations

	Male-dominated and Mixed		Female-dominated			
Variable	M	SD	M	SD	Difference	t-test
Ln wage	6.995	0.876	6.855	0.831	0.140*** (0.013)	11.086
Hours	39.83	9.927	35.03	10.624	4.8*** (0.153)	31.327
Supervisor support	0.004	0.996	-0.007	1.006	0.011 (0.015)	0.725
BHW Condition	0.200	1.056	-0.325	0.802	0.525*** (0.013)	39.132
Extensive effort	-0.026	1.018	0.040	0.967	-0.066*** (0.015)	-4.509
PRP	0.106	1.087	-0.170	0.811	0.276*** (0.014)	20.159
Work pace constraints	0.101	1.041	-0.166	0.905	0.267*** (0.014)	18.856
Colleagues support	0.017	0.997	-0.029	1.004	0.046*** (0.015)	2.913
RRNo Discrimination	-0.008	0.986	0.013	1.025	-0.021* (0.015)	-1.373
Intensive effort	0.017	1.003	-0.025	0.994	0.042*** (0.015)	2.884
GDSo Discrimination	-0.008	0.999	0.014	1.003	-0.022* (0.015)	-1.462
Violence	-0.069	0.857	0.113	1.188	-0.182*** (0.016)	-11.476

Note: Author's calculation based on data from EWCS (2015). Values represent averages for individuals in female-dominated occupations and in male and mixed occupations in the sample and t-test for the mean difference; standard errors (in parentheses)

[3]See Table A1 for a list of all occupations considered.

4 Methodology

The literature on job satisfaction is characterised by methodological approaches that neglect the possible positive or negative bias effect attributable to aspirations. The reasons for this gap lie in the issue of identifying aspirations. Because aspirations are not objectively observable, the empirical literature dealing with them uses self-report measures obtained from survey data (Stutzer, 2004). This narrows the research possibilities, since items related to aspirations are often not present in public surveys on well-being, job satisfaction and working conditions, as in our case. In addition, reported aspirations have been shown to contain a strong element of expectations or beliefs about one's future prospects (Azmat et al., 2020; Genicot & Ray, 2020). Focusing on the bias effects attributable to aspirations rather than the levels of aspirations themselves, we model job satisfaction by means of a Two-Tier Stochastic Frontier model (2TSF) which allows us to overcome these two limitations. The 2TSF analysis proves particularly suitable for our case because it allows us to estimate the effect of negative or positive aspirational biases on the job satisfaction indicator.

We assume that the logarithm of job satisfaction is a function of some individual and job characteristics:

$$log(y_i^*) = \delta x_i' + \gamma p_i' + v_i \tag{2}$$

where δ and γ are vectors of coefficients related to job characteristics (working condition indicators and job characteristics control variables) x_i' and individual characteristics p_i', respectively (as defined in Section 3). Specifically, the vector x_i' consists of the logarithms of wage, weekly working hours, 10 composite indicators related to the working conditions (see Table A3) plus control variables related to the job characteristics. The vector p_i' contains information on gender, age, education and countries. The term v_i is an independently, identically, and normally distributed random term capturing the measurement errors and other random factors. To accommodate the existence of aspirations we add two terms, u_i and w_i, which represent the negative and positive aspiration bias, respectively:

$$log(y_i) = log(y_i^*) - u_i + w_i \tag{3}$$

where $log(y_i)$ represent the reported job satisfaction in logs, which is assumed to be stochastic and different from the unbiased job satisfaction $log(y_i^*)$ due to the terms u_i and w_i, capturing different effects of aspirations. The two terms have an opposite effect on reported job satisfaction: negative aspiration bias u_i decreases job satisfaction due to higher aspirations than actually experienced job characteristics. Positive aspiration bias w_i increase reported self-reported job satisfaction due to lower initial aspiration levels compared to actual job characteristics. Obviously, the 2TSF model of equation (3) collapses into (2) when aspiration terms are not present. This feature allows us to choose the best model specification through LR tests.

Equation 2 correspond to a standard OLS regression (Model A), while equation (3) is a 2TSF specification (Model B) and the maximum likelihood (ML) method is used to es-

timate the parameters by making distributional assumptions about the error components: (i) $v_i \sim i.i.d. \mathcal{N}(0\, \sigma_v^2)$; (ii) $u_i \sim i.i.d.\, Exp(\sigma_u\, \sigma_u^2)$; (iii) $w_i \sim i.i.d.\, Exp(\sigma_w\, \sigma_w^2)$

These assumptions are used to derive the probability density function of the composed error term, $\epsilon = v_i - u_i + w_i$ and the log-likelihood for each observation (Kumbhakar & Parmeter, 2009). Since the dependent variable is in logarithmic form, we could interpret $E(u)$ and $E(w)$ as the percentage reduction and increase in job satisfaction due to negative and positive cognitive bias respectively, when u and w are small.

So far we have assumed that the distribution of u_i and w_i is identical for all workers. Since negative and positive bias can depend on several dimensions: the past of individuals, their individual characteristics and social comparison (aspiration windows), our aim is to allow the parameters of the distribution of u_i and w_i to depend on several variables. This can be done by allowing the mean (standard deviation) of u_i and w_i to depend on several determinants of aspirations (Kumbhakar & Parmeter, 2010), as defined in Section 3. This allows us to study the effect that social comparison has on aspirations. Therefore, we specify σ_u and σ_w as:

$$\sigma_u = e^{\rho_u z'_u} \quad and \quad \sigma_w = e^{\rho_w z'_w} \tag{4}$$

where z'_u and z'_w are vectors that contain the determinants of aspirations, i.e. Female, Job titles (man, women and mixed) and female-dominated, male-dominanted and mixed occupation. Note that this third specification (Model C) corresponds to equation (3) (Model B), except for the assumption that the negative and positive biases now depend on some determinants (equation (4)).

5 Results

Table 3 shows the OLS estimates of equation (1) used as the baseline model (Model A); the estimates of the 2TSF model related to equation (2), which accounts for negative and positive aspiration bias (Model B), and the estimates of the 2TSF model with determinants, equation (3) (Model C).

Before discussing the results associated with the discrepancy between aspirations and the actual conditions experienced, we focus on the results related to demographic and socioeconomic characteristics as well as working conditions and other occupational dimensions (e.g. firm's size and sectors) as determinants of job satisfaction. The sign and significance of the coefficients of the determinants of job satisfaction are stable across specifications. These signs are also as expected, meaning they are in line with the theoretical model and the previous literature results discussed above. Among the determinants considered, only two appear to be not statistically relevant: the difference in job satisfaction for married individuals such as the effect of education, although the direction of relationship indicates higher job satisfaction by more educated workers. Turning to relevant determinants, job satisfaction results higher for people who receive higher wages and lower for people working longer hours per week. A nonlinear relationship between

age and job satisfaction is found. The coefficients for age and age squared indicate a U-shaped relation: as the worker's age increases, satisfaction decreases, but this effect is gradually diminishing. Public-sector employees show higher levels of job satisfaction than private-sector employees. Regarding working conditions, the results also confirm what has emerged in the literature so far: workers who benefit from colleagues support and supervisor support are on average more satisfied. Moreover, performance related pay schemes (PRP) positively relate to job satisfaction. In contrast, extensive effort, intensive effort, work-pace constraints (WPC) and bad health working conditions (BHW Conditions) entail lower job satisfaction. The same applies to physical violence, sexual harassment, bullying experimented at the workplace (Violence) and the perceived discrimination based on race, religion, nationality, gender, disability or sexual orientation (RRNo Discrimination and GDSo Discrimination) inducing dissatisfaction.

As mentioned above, all estimated coefficients remain fairly stable across specifications indicating the goodness of the frontier estimates (Model B and Model C). However, Model A does not account for the potential discrepancy between aspirations and actual working conditions experienced. Individuals may have higher aspirations than their actual working conditions and report lower job satisfaction: their job evaluation is revised downward (negative aspiration bias). Conversely, individuals with lower aspirations than their actual working conditions are likely to be more satisfied with their jobs: their evaluation of their working conditions is revised upward (positive aspiration bias).

On the contrary, Model B in Table 3 reports the estimations of the 2TSF specification which accommodate for a negative and positive bias. The estimates for both negative aspiration bias and positive aspiration bias are statistically different from zero. Although we find evidence of both a positive and negative effect, the negative bias prevails over the positive one, i.e. the job satisfaction stated in the survey is lower than the unbiased job satisfaction. The negative aspiration bias decreases job satisfaction by 26%, while the positive aspiration bias increases it by 8%. This result is confirmed if we look at the variance of the estimated bias terms: 96% of the variability of both aspiration biases is due to the negative one[4], meaning that the aspirational bias on job satisfaction is mainly due to a frustration effect (Genicot & Ray, 2017) resulting from the failure to achieve one's goals regarding working conditions.

These initial results allow us to state that an aspirational bias effect emerges empirically, but do not provide insight into how workers form their aspirations and whether there are differences between men and women. The specification of Model C goes in this direction, allowing us to study the determinants of negative and positive aspiration bias.

Note that, all models presented in Table 3 are also compared to each other by con-

[4]The relative weights of the various components are as follows: the proportion of $\frac{\sigma_u^2+\sigma_w^2}{\sigma_u^2+\sigma_w^2+\sigma_v} = 0.90$ while the proportion of negative and positive bias is equal to $\frac{\sigma_u^2}{\sigma_u^2+\sigma_w^2} = 0.96$ and $\frac{\sigma_w^2}{\sigma_u^2+\sigma_w^2} = 0.04$

Table 3: Job satisfaction

	Model A: OLS		Model B: 2TSF		Model C: 2TSF-H	
Constant	1.111***	(0.041)	1.64***	(0.029)	1.66***	(0.029)
ln wage	0.155***	(0.005)	0.094***	(0.004)	0.093***	(0.004)
Hours	−0.002***	(0.000)	−0.001***	(0.000)	−0.001***	(0.000)
Age	−0.014***	(0.001)	−0.010***	(0.001)	−0.010***	(0.001)
$Age^2/100$	0.013***	(0.002)	0.009***	(0.001)	0.009***	(0.001)
Primary edu. (omitted)						
Secondary edu.	0.021	(0.013)	0.004	(0.009)	0.004	(0.009)
Tertiary edu.	0.028*	(0.013)	0.012	(0.009)	0.011	(0.009)
Married	0.003	(0.005)	−0.001	(0.003)	−0.000	(0.005)
Permanent	0.063***	(0.006)	0.025***	(0.004)	0.025***	(0.006)
Private sector (omitted)						
Public sector	0.0283***	(0.005)	0.019***	(0.003)	0.021***	(0.003)
Other sector	0.0195**	(0.009)	0.018*	(0.006)	0.121**	(0.003)
Firm size 1–9 (omitted)						
Firm size 10/249	−0.017***	(0.006)	−0.011***	(0.003)	−0.011***	(0.004)
Firm size 250+	−0.028***	(0.006)	−0.010**	(0.004)	−0.009**	(0.004)
Supervisor support	0.151***	(0.002)	0.104***	(0.002)	0.104***	(0.002)
BHW Condition	−0.037***	(0.002)	−0.024***	(0.001)	−0.024***	(0.002)
Extensive effort	−0.024***	(0.002)	−0.012***	(0.002)	−0.012***	(0.002)
PRP	0.024***	(0.002)	0.018***	(0.001)	0.017***	(0.001)
Work pace constraints	−0.032***	(0.002)	−0.017***	(0.002)	−0.016***	(0.002)
Colleagues support	0.054***	(0.002)	0.048***	(0.002)	0.048***	(0.002)
RRNo Discrimination	−0.021***	(0.002)	−0.011***	(0.002)	−0.011***	(0.002)
Intensive effort	−0.053***	(0.002)	−0.029***	(0.002)	−0.029***	(0.002)
GDSo Discrimination	−0.020***	(0.002)	−0.009***	(0.002)	−0.009***	(0.002)
Violence	−0.039***	(0.002)	−0.020***	(0.002)	−0.020***	(0.002)
Country dummies	Yes		Yes		Yes	
ln sig v			−2.440***	(0.036)	−2.428***	(0.037)
ln sig u			−1.33***	(0.011)	−1.511***	(0.037)
ln sig w			−2.942***	(0.068)	−2.934***	(0.111)
R-squared	0.374					
Log likelihood	-3096.27		99.42		145.92	
LR test			6391.39		92.99	
N	19389		19389		19389	

Note: Standard errors in parentheses; * $p < .05$, ** $p < .01$ *** $p < .001$. LR test: Model A - B χ^2 distribution - critical value at 1%: > 8.27; Model B - C χ^2 distribution - critical value at 1%: > 22.52

ducting the Likelihood Ratio (LR) tests[5]. The likelihood ratio (LR) strategy confirms that Model C is the optimal specification compared to Model B and Model A.

Table 4 shows the estimated coefficients of the determinants of negative and positive bias derived from Model C. The positive effect on perceived satisfaction due to lower aspirations with respect to work conditions experienced (positive bias) is lower for individuals working in a male-dominated occupation. In fact, they experience a lower positive bias as suggested by the negative sign of the male-dominated variable and thus have higher aspirations on average. All other coefficients of the positive bias turn out to be not significant. This result is consistent with the low variability of the estimated term w_i suggesting that the relevant effect must be attributed to negative bias.

We turn to the analysis of the negative bias' determinants: the first result relates to the positive effect attributable to working with colleagues who have the same job titles. Workers' aspirations are found to be higher in the case in which individuals work with colleagues who have the same job title, indicating the presence of a social comparison effect among peers, as expected. Note that this result is true whether the comparison is made in a primarily male (Same job title man) or purely female (Same job title man) work environment or in a mixed work environment (Same job title mixed). Therefore, social comparison between peers would seem to have an effect regardless of gender. The same insight comes from the analysis of the coefficient related to being female. In fact, the effect turns out to be not significant: being a woman per se does not seem to be a key factor in determining a different level of aspirations than men.

Table 4: The determinants of aspirations

	Negative bias		Positive bias	
Female	0.008	(0.022)	0.057	(0.057)
No same job title (omitted)				
Same job title women	0.232^{***}	(0.035)	-0.079	(0.089)
Same job title man	0.178^{***}	(0.036)	0.055	(0.090)
Same job title mixed	0.137^{***}	(0.036)	0.034	(0.090)
Mixed (omitted)				
Female-dominated	-0.0824^{***}	(0.021)	-0.153	(0.061)
Male-dominated	0.042^{**}	(0.021)	-0.054^{**}	(0.056)
ln sig u	-1.51^{***}	(0.036)		
ln sig w			-2.934^{***}	(0.111)

Note: Standard errors in parentheses; * $p < .05$, ** $p < .01$ *** $p < .001$.

Thus, the results so far suggest that there are no particular differences between women and men in the way aspirations are shaped: only the peer comparison mechanism appears

[5]The LR statistic is given by $LR = -2(ll_r - ll_u)$, where ll_r and ll_u are the log-likelihood values of the restricted model and the unrestricted model, respectively.

to be significant. However, there are significant and opposite differences when we consider occupations: working in female-dominated occupations is significantly associated with lower levels of aspiration, while working in male-dominated occupations with respect to the mixed occupations.

Aspiration levels in occupations with higher female segregation are lower because of the disadvantageous market conditions (e.g. lower wage, reported violence and perceived discrimination) that we have documented to be relevant in the descriptive statistics in Table 2. Comparison among peers who are segregated in disadvantaged occupations determines a downward revision of women's aspirations providing support for the explanation of the gender paradox that women's higher self-reported satisfaction is linked to lower aspirations about their future employment.

6 Discussion and conclusion

An individual's degree of contentment with his or her job is known as job satisfaction. Workers should make efficient choices to maximise their job satisfaction and minimise their job dissatisfaction. However, workers with similar demographic characteristics, working conditions, job experience, pay, contingent rewards and promotional opportunities often declare different levels of satisfaction in the workplace. We argue that the discrepancy between aspiration goals and achieved job characteristics can generate negative and positive aspiration biases, respectively frustration and gratification, that reduce or increase perceived satisfaction. Furthermore, we investigate whether social comparison between peers has a different effect between men and women, connecting the literature on aspirations and social comparison to the gender-job satisfaction paradox highlighted by Clark (1997), who showed that despite evidence of a disadvantaged position in the labour market, women report a higher level of satisfaction than men. To this aim, we analysed the European Working Conditions Survey (EWCS) conducted in 2015 for 33 countries using Two-tier Stochastic Frontier analysis. This technique allows us to estimate the effects of a negative and a positive aspiration bias on job satisfaction and to analyse its determinants.

The first result concerns the estimated levels of negative and positive aspiration bias: although both are relevant and significant, negative bias prevails over positive one. The negative aspiration bias decreases job satisfaction by 26%, while the positive aspiration bias increases it by 8%. The evaluation of objective job characteristics cannot fully explain reported job satisfaction; individuals, in a process of subjective evaluation, relate them to aspirations by adapting to the circumstances experienced. This achievement suggests that aspirations play a key role in explaining employee job satisfaction and that disregarding them may lead to incorrect or incomplete results. Workers may feel dissatisfied not because of unfavourable job characteristics, but rather as a consequence of higher aspirational goals compared to actual conditions.

To well understand how expectations are formed, we study the determinants of the

negative and positive aspiration bias. This leads to a second outcome: social comparison among peers plays an important role in determining different levels of job aspiration, individuals working in firms with other workers doing the same job (i.e. same job title) show higher levels of aspiration regardless of the gender with whom they compare themselves. Finally, consistent with the idea that gender inequality has an effect on beliefs, preferences and aspirations, a third result reveals that individuals in male-dominated occupations have higher levels of aspirations than workers in mixed occupations, while individuals in female-dominated occupations show lower aspirations.

All these findings help us understand the complex nature of aspirations and the role they play in determining job satisfaction and the aspiration gap in male-dominated and female-dominated occupations. This gap is not driven by a different social comparison mechanism: all workers who work with colleagues with the same job title tend to have higher aspirations regardless of gender. Instead, the differences in aspirations between male-dominated and female-dominated occupations are mainly driven by the disadvantaged position in the labour market for female-dominated occupations. Thus, occupational segregation leads female workers to accept bad job positions due to the development of low aspirations, influenced by the work environment characterised by low wages and bad job characteristics of their reference group of peers feeding self-stereotypes persisting over time. From this it follows that working in mixed environments, or fostering equity in occupations would allow women to form aspirations and preferences that are not conditioned downwards by aligning with those of men.

Our analysis has implications for practice. The findings suggest the importance for organisations (private companies or public institutions) of interventions aimed at strengthening women's aspirations, with for example increased support of supervisors, role models, mentors, work-life balance policies, particularly in female-dominated occupations. Supporting women's aspirations also by directing women towards senior roles through the implementation of regulatory policies such as gender quotas on boards of directors. Including more women in the labour market and directing them towards senior roles and top executive positions can also be beneficial for organisations and society. Some studies have found better firm's performance by analysing the dynamics of financial indicators, for example ROE, ROA, among organisations with a higher proportion of women at the top management or on the boards of directors (Ferrari et al., 2022; Flabbi et al., 2019; Jeong & Harrison, 2017). This paper has the limitation of using cross-sectional data that the estimated empirical models do not include the time dimension, which is crucial for investigating how aspiration levels evolve over time. Hence, future research employing longitudinal research designs could provide stronger support for the proposed relationships.

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Appendix: Variables description and NPCA results

Table A1: Variables description

Variable	Description
Job satisfaction	It captures overall job satisfaction, the feeling of being adequately paid, career prospects, and the possibility of losing job
ln wage	Log of monthly wage
Hours	Number of hours usually worked per week in main job
Age	Number of years
Age^2	Number of years (squared)
Primary Edu.	Primary Education dummy (ISCED levels 0–2 = 1)
Secondary Edu.	Secondary Education dummy (ISCED levels 3–4 = 1)
Tertiary Edu.	Tertiary Education dummy (ISCED levels 5–6=1)
Married	Marital status dummy (Married = 1)
Permanent	Permanent contract = 1
Private sector	Sector dummy (Private sector = 1)
Public sector	Sector dummy (Public sector = 1)
Other sector	Sector dummy (Joint private-public; not-for-profit; other organisation = 1)
Firm size 1/9	Small firm size dummy (between 1 and 9 = 1)
Firm size 10/249	Medium-large firm size dummy (between 10 and 249 = 1)
Firm size 250+	Large firm size dummy (over 250 = 1)
Supervisor support	It indicates the level of support from the manager, the supportive leadership style (e.g. helping and supporting employees, providing useful feedback and encouraging their development).
BHW conditions	The component 'Bad health working conditions' contains items indicating exposure to physical hazards.
Extensive effort	The indicator refers to the time spent at work (e.g. days of work)
Intensive effort	It captures the intensity of work during the time spent at work (e.g. working to tight deadlines, at very high speed)
WPC	Work-pace constraints (WPC) refer to the number of external factors impinging on employees' choice of their work pace.
PRP	Performance-related pay (PRP) schemes are a proxy for whether individual pay is linked to the evaluation of predetermined objectives.
Colleagues support	It captures the presence of good cooperation with colleagues and a good level of support
RRNo Disc.	It includes variables referring to discrimination based on race, religion and national origin of the employee
GDSo Disc.	It describes discrimination on the grounds of gender, disability, and sexual orientation
Violence	It refers to the presence of physical violence in the workplace
Female	Gender dummy (female = 1)
Job title men	The individual works with colleagues with the job title, mainly men = 1.
Job title women	The individual works with colleagues with the job title, mainly women = 1
Job title mixed	The individual works with colleagues with the same qualification, with the same number of women and men =1

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Table A1 – *Continued from previous page*

Male-dominated	Building workers; Building workers; Metal workers; Metal workers;Drivers and operators; Science associate professionals; Armed forces officers; Communications technicians; Protective workers; Skilled agricultural workers; Agricultural workers; Electrical trades workers; Science and engineering professionals; Mining and construction workers; Plant operators; Chief executives, senior and legislators; Production and services managers; Communications professionals; Handicraft and printing workers; Other elementary workers
Female-dominated	Sales workers; Teaching professionals; Health professionals; Keyboard clerks; Customer services clerks; Other clerical support workers; Food preparation assistants; Health assoiciate professionals; Cleaners and helpers; Personal care workers.
Mixed	Business and professionals; Business and associate professionals; Legal, social and cultural professionals; Numerical recording clerks; Personal service workers; Administrative and commercial managers; Hospitality and retail managers; Legal, social and cultural associate professionals; Food, wood, garment trades workers; Assemblers; Street sales and service workers.

Table A2: Job satisfaction - Component Loadings

Code	Variable description	
Q88	On the whole, are you very satisfied, satisfied, not very satisfied or not at all satisfied with working conditions in your main paid job?	0.683
QQ89a	Considering all my efforts and achievements in my job, I feel I get paid appropriately	0.672
QQ89b	My job offers good prospects for career advancement	0.608
QQ89c	I receive the recognition I deserve for my work	0.810
	Variance accounted for (VAF) (%)	47,6
	Eigenvalue	1.90

Table A3: Working conditions - Component Loadings

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
manager support (Q61b)	0.64									
boss respects you (Q63a)	0.69									
boss gives recognition Q63b)	0.82									
people work together (Q63c)	0.79									
boss is helpful (Q63d)	0.79									
boss provides feedback (Q63e)	0.83									
boss encourages development (Q63f)	0.85									
vibrations (Q29a)		0.72								
noise (Q29b)		0.73								
high temperatures (Q29c)		0.75								
low temperatures (Q29d)		0.75								
breathing in smoke (Q29e)		0.57								
working days a week (Q26)			0.78							

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Table A3 – *Continued from previous page*

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
work on sundays (Q37b)			0.75							
work on saturdays (Q37c)			0.86							
work $>$ 10 h days (Q37d)			0.36							
productivity payments (Q101b)				0.43						
on individual performance (Q101f)				0.69						
on team performance (Q101g)				0.73						
on company performance (Q101h)				0.70						
income from shares (Q101i)				0.53						
on colleagues (Q50a)					0.59					
on production targets (Q50c)					0.54					
on automatic speed (Q50d)					0.59					
on boss control (Q50e)					0.63					
colleagues support (Q61a)						0.65				
good cooperation (Q70e)						0.75				
get on well with colleagues ((Q70e)						0.78				
race discrimination (Q72b)							0.82			
national origin (Q72c)							0.81			
religious (Q72e)							0.62			
at very high speed (Q49a)								0.57		
to tight deadlines (Q49b)								0.63		
interrupt a task (Q51)								0.66		
having enough time (61g)								0.58		
sex (Q72d)									0.56	
disability (Q72f)									0.66	
sexual orientation (Q72g)									0.70	
physical violence (Q81a)										0.71
sexual harassment (Q81b)										0.63
bullying/ harassment (Q81c)										0.55
Variance accounted for (VAF) (%)	11.15	6.69	5.29	4.99	4.83	4.81	4.71	4.64	3.89	3.47
Eigenvalues	4.57	2.74	2.14	2.05	1.98	1.97	1.93	1.90	1.59	1.42