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ORIGINAL ARTICLE

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The gender gap in the wage sensitivity of job transitions: a decomposition analysis



Céline Detilleux¹ and Nick Deschacht^{1*}

Abstract

Previous research shows that female workers are less sensitive to wages in their decision to switch jobs than male workers, and that this could explain a substantial part of the gender wage gap. This paper studies to what extent gender differences in preferences and personality traits explain the gender gap in the wage-elasticity of job-to-job transitions in the labor market. Using a novel decomposition approach in the context of mediated moderation and using German Socio-Economic Panel Survey (G-SOEP) data for the period 2005–2019, we find that gender differences in risk preferences, patience, trust, reciprocity, altruism, conscientiousness, ambition and self-esteem explain about 25% of the gender gap in wage-elasticities of job separations. A detailed decomposition suggests that risk preferences, trust and ambition contribute most to this gender gap in wage-elasticity.

Keywords Gender, Economic preferences, Mediation analysis, Monopsony power

JEL Classification J42, J16

1 Introduction

Research suggests that monetary considerations are less important in the job and occupational sorting of women compared to men, and that this could explain part of the persisting gender gaps in careers and wages (Bertrand 2018; Ransom and Oaxaca 2010). Women may be less sensitive to wages in job decisions than men if they attach more importance to non-wage job amenities, such as family friendly working hours. Many high wage jobs are known to be "greedy jobs" in the sense that they require long working hours and availability on shortnotice, which are hard to combine with family obligations (Bertrand 2018; Goldin 2021). Mothers with young children often reduce their working hours, or they choose a job closer to their place of residence or an occupation that is more compatible with childcare, so that female job transitions are less sensitive to wages because they occur regardless of wages. Women would also be less sensitive

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to wages in job transitions if they are more likely to be bound to a specific firm, for example if geographical job search mobility is limited for mothers, or if women have preferences or personality traits that make them less likely to quit a job for a more rewarding one.

The aim of this paper is to focus on the latter channel and to quantify the contribution of gender differences in preferences and personality traits to the gender gap in the wage-elasticity of job separations in employer-toemployer transitions (we use the concepts job separations and employer-to-employer transitions interchangeably). This study is important because if gender differences in preferences and personality traits lead women to be bound to specific firms (e.g. if women would be more loyal to an employer even if the wage is relatively low), then this could be a source of monopsony power for firms and gender wage discrimination. The explanation of gender pay differences as a result of monopsony in the labor market goes back to Robinson (1969) and recent empirical research suggests that monopsony goes a long way in explaining raw gender pay gaps (Barth and Dale-Olsen 2009; Hirsch et al. 2010; Ransom and Oaxaca 2010; Sulis 2011; Vick 2017; Webber 2016). The relationship between

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the wage elasticity of separations and monopsony can best be seen from Manning's (2003) model of monopsony which shows that the expected rate of exploitation of workers resulting from monopsony power of a firm is a function only of the wage elasticity of separations from that firm.

Our research contributes to the literature in a couple of ways. First, this is the first study that presents empirical estimates of the role of preferences and personality traits in explaining the gender difference in wage-elasticities of job separations. We thus contribute to the developing literature on the role of psychological gender differences in explaining gender gaps in the labor market (Fortin 2008; Manning and Swaffield 2008; Mueller and Plug 2006; Nyhus and Pons 2012; Risse et al. 2018; Semykina and Linz 2007). The common finding from this research is that gender differences in psychological factors account for a relatively small part of the gender pay gap. Second, we contribute methodologically by proposing a decomposition method that allows for the estimation of the role played by mediators in explaining interaction/moderator effects. Our method differs from standard Oaxaca decomposition which only allows for a decomposition of a difference in mean outcomes (the dependent variable in a model such as wages) whereas we want to decompose a difference between two regression coefficients (i.e. the effect of wages on separations in the male and female samples). Oaxaca type decompositions do not allow for this, but building on the literatures on mediated moderation (Edwards and Lambert 2007; Muller et al. 2005), causal mediation analysis (VanderWeele 2015), and Gelbach decomposition (Gelbach 2016), we propose a method that allows for a detailed decomposition of the gender-wage moderator effect into a direct effect and a sum of indirect (via preference variables) effects.

Following Manning and Swaffield (2008), we are primarily interested in the effect of gender differences in economic preference parameters which include a person's preference towards risk and time, and a person's general level of trust, altruism and reciprocity (Almlund et al. 2011; Borghans et al. 2008). The literature shows that there are clear gender differences in these economic preference parameters and these parameters are likely to also explain part of the gender differences in the wage-elasticity of separations (Babcock and Laschever 2009; Bertrand 2011; Croson and Gneezy 2009). For example, because women are more risk averse and because risk preferences are known to influence job turnover decisions, risk preferences could explain why women are less wage-sensitive in their decision to quit their employer (Allen et al. 2007, 2005). Other than preferences, we also consider the personality traits conscientiousness and its related trait ambition, as well as self-esteem, a trait related to neuroticism. In Sect. 2 we give a detailed review of the literature on gender differences in economic preference parameters and personality traits, and theories about how these might affect wage-elasticities of job separations.

Using the German Socio-Economic Panel (G-SOEP), we find that overall gender differences in risk preferences, patience, trust, reciprocity, altruism, conscientiousness, ambition and self-esteem explain about 25% of the gender difference in wage-elasticities of job separations. That is, if male and female workers had similar preferences, female workers' wage-elasticity of job separations would be 0.103 points lower than that of male workers (otherwise, the gender gap in wage-elasticity not adjusted for preferences is 0.135). Our analyses further indicate that gender differences in risk preferences, trust, and ambition, contribute most to the gender gap wage-elasticity. These estimates should be interpreted as correlations and should not be given a causal interpretation because we cannot exclude the possibility that wages, preferences and separations are endogenous and that our estimates of the explained part are biased (downward or upward) resulting from omitted variables.

The remainder of this paper is organized as follows: the next section discusses theories on the relationship between preferences and employer-to-employer transitions, Sect. 3 introduces the empirical specification and the data, Sect. 4 presents the empirical results and the final section discusses the results and concludes.

2 Preferences and the wage-elasticity of job separations

Over the past several years, economists have become more and more interested in the role of psychological gender differences in explaining gender pay gaps (Fortin 2008; Manning and Swaffield 2008; Mueller and Plug 2006; Nyhus and Pons 2012; Risse et al. 2018; Semykina and Linz 2007). The common finding from this research is that gender differences in psychological factors account for a relatively small part of the gender pay gap. With the exception of Manning and Swaffield (2008), who find a higher contribution, all studies find that gender differences in psychological traits explain 16 percent or less of the gender differences in wage. Another explanation comes from a related recent literature which emphasizes the role of employer-to-employer job transitions and monopsonistic discrimination in the labor market. If female labor supply facing firms is less wage elastic than male labor supply, then firms hold more wage setting power over female workers which could explain part of the persisting gender pay and career gaps. It is important to clarify that the determining parameter for the degree of monopsony power is the wage elasticity

of labor supply facing a firm, and distinguish it from the wage elasticity of the labor supply of working hours in the labor market by (an) individual worker(s). The latter elasticity is typically larger for women than for men, whereas both theory and empirical estimates suggest that the elasticity of labor supply facing a firm is smaller for women than for men, for example because women are less mobile because of family obligations (Manning 2003; Ransom and Oaxaca 2010; Robinson 1969; Sulis 2011; Vick 2017; Webber 2016). A measure for the extent of monopsony power and this labor supply facing a firm, is the degree to which workers stick to the firm if the firm lowers the wage. In fact, Manning (2003) showed that under certain assumptions—the elasticity of labor supply facing a firm can be measured simply as two times the elasticity of separations from the firm.

The aim of this paper is to study to what extent gender differences in preferences and personality traits explain gender differences in the wage-elasticity of job separations. Theories about the effect of preferences on wageelasticities of separations should explain a moderator/ interaction effect between a preference parameter and wages. There may also be main effects of a preference parameter on job separations, but these are irrelevant in terms of wage-elasticity.

Following Manning and Swaffield (2008), we are primarily interested in the effect of gender differences in economic preference parameters which include a person's preference towards risk, leisure and time, and a person's general level of trust, altruism and reciprocity (Almlund et al. 2011; Borghans et al. 2008). Preference for leisure which characterizes preference for work versus leisure, is difficult to measure and will thus not be considered in our analysis. Similarly to Almlund et al. (2011); Becker et al. (2012), we define time preferences in terms of individuals' levels of patience. The literature shows that there are clear gender differences in the economic preference parameters (Babcock and Laschever 2009; Bertrand 2011; Croson and Gneezy 2009):

Risk preferences. Research consistently shows that men are more inclined to take risk than women (Bertrand 2011; Croson and Gneezy 2009; Eckel and Grossman 2008). Risk preferences are also known to influence job turnover decisions (Allen et al. 2007, 2005) since such decisions involve uncertainty regarding outcomes. If women are more risk averse, then we hypothesize that even at higher wage levels women may be less like to separate so that their wage elasticity of separations would be lower than that of men.

Patience. Research shows that women are less patient than men, but the difference is small (Falk et al. 2018; Falk and Hermle 2018). We expect patience to influence workers' wage-elasticity of separations because, contrary

to impulsive workers who make their decisions based on their intuitions and emotions (Donohew et al. 2000; Zaleskiewicz 2001), we hypothesize that patient workers make more thoughtful decisions because they take the time to consider all possible alternatives. Their choices may thus be more wage-driven.

Trust. There are many aspects to individual trust and the empirical evidence is mixed about gender difference in trust (Croson and Gneezy 2009). In the context of wage-sensitivity, it seems appropriate to focus on trust in the sense of trusting others to be fair. After all, if one believes that people (and the employer in particular) are fair, he would tend to presume that he is receiving the wage that he deserves. In other words, high levels of trust may lead workers to behave in a less competitive way, and if women tend to more often believe other people to be fair, their choices may be less wage-driven.

Reciprocity and altruism. Reciprocity and altruism are social preferences (Becker et al. 2012; Croson and Gneezy 2009) which describe how an individual is otherregarding. Following, respectively, the definitions of Fehr and Schmidt (2005, 2006), reciprocity is "the tendency to respond in kind to the actions of other people" and altruism is "a form of unconditional kindness". That is, while reciprocity describes a situation in which a person positively (or negatively) reacts to a positive (or negative) action from another person, altruism is spontaneous and does not arise from a favor received. The empirical findings on gender differences on reciprocity and altruism are mixed: Croson and Gneezy (2009) explain that while some studies find no gender difference, others find that women are more reciprocal and altruistic. We speculate that other-regarding behaviors could reduce the wage-elasticity of job separations because workers with strong social preferences are likely to be sensitive to the reactions of others (e.g. colleagues, employer, ...) and may thus be less sensitive to wages in their decision to leave the firm. If women have stronger social preferences, then this could explain a part of the gender gap in the wage-elasticities.

Other than preferences, social scientists have also been interested in the effect of personality traits on labor outcomes. The big five or five-factor is the most widely used model of personality traits and includes openness to experience, conscientiousness, extraversion, agreeableness and neuroticism. Although preference parameters may seem conceptually related to personality traits, Borghans et al. (2008) and Becker et al. (2012) argue that standard measures of preferences and personality traits are not substitutes but rather complementary constructs. We thus also consider conscientiousness and neuroticism which, of the big five personality traits, are the two personality traits that play an important role in determining labor outcomes (Almlund et al. 2011; Borghans et al. 2008). Particularly, we include conscientiousness and its related trait ambition, as well as self-esteem, a trait related to neuroticism.

Conscientiousness. Research shows that women are more conscientious than men (Bertrand 2011; Costa Jr et al. 2001). Costa Jr and McCrae (2008) define conscientiousness as "a person's preferences for following rules and schedules, for keeping engagements and the extent to which individuals are hardworking, organized and dependable as opposed to lazy". These facets suggest that conscientiousness should be related to career success and thus to competitiveness in the labor market (Judge et al. 2002). Ng et al. (2007) have pointed out that the facets are also associated with high levels of dutifulness and deliberation which suggests that conscientious employees may feel obliged to stay with their employer (even if they are receiving a low wage). Following this idea, we expect the gender difference in conscientiousness to explain a part of the gender difference in wage sensitivity.

Ambition. Research shows that men are more ambitious than women (Babcock and Laschever 2009; Fortin 2008; Manning and Swaffield 2008). If ambition means the desire to have a successful job and high pay, it implies that more ambitious workers are also more wage sensitive. Ambitious workers would not be willing to stay in a company if they could have a better position or a better wage at another company. We thus expect ambition to play an important role in explaining why women are less sensitive to wages in their decision to separate from their employer. Other than ambition, family orientation may also play a role in explaining the gender gap in the wageelasticity of job separations since a more family-oriented worker may decide to work for an employer that offers family-friendly advantages rather than a high wage.

Self-esteem. Research shows that men have a higher opinion of their own abilities than do women (Babcock and Laschever 2009; Bertrand 2011; Croson and Gneezy 2009; Kling et al. 1999). Babcock and Laschever (2009)'s argue that the gender pay gap is largely due to the fact that women are less likely to negotiate pay raises and promotions, and that gender differences in self-esteem go a long way in explaining the difference in negotiation styles and effectiveness. For similar reasons, we hypothesize that self-esteem makes workers more wage sensitive and that women may be less wage-sensitive because they are less likely to believe that they are worth high wages.

3 Data and methodology

3.1 Data

To estimate the part of the gender difference the wageelasticities of job separations that is explained by gender differences in preferences, we use data from the German Socio-Economic Panel (G-SOEP). The G-SOEP is an annual representative panel survey of approximately 12,000 private households produced by the Deutsches Institut für Wirtschaftsforschung (DIW). The G-SOEP is highly suitable for this analysis because it contains information on many preference parameters and personality traits indicators as well as longitudinal data on wages and employment status needed to estimate the wage-elasticity. We restrict the analysis to the period 2005-2019 because information about many of the preference parameters is only available since 2005. We include all workers who were employed in both year t and year t + 1, aged between 20 and 55 years old in year t. We drop respondents that contain missing or extreme wage values (removing these wage outliers reduced the sample size by less than 1 percent). We measure transitions (or separations) using a dummy variable indicating whether a worker changed employers (1) or not (0). This implies that we ignore internal job changes such as internal promotions or internal horizontal job changes. Appendix B provides a detailed description of the variables used in the analysis and the restrictions imposed on the sample.

Table 1 presents summary statistics for the covariates, wages and dependent variables. The sample consists of 70;067 workers. The mean hourly wage is 12.81 euros for men and 10.01 euros for women, so the female mean wage is 78% of that of men. There are no clear gender differences in mean job separation rates. The main gender difference in the covariates relates to experience with an average of 18 years for men compared to less than 12 years for women. Table C.1 in Online Appendix presents additional descriptive statistics for occupation, sector and region.

We selected preferences and personality traits from the G-SOEP data corresponding to the ones used by Manning and Swaffield (2008): risk willingness, patience, trust, reciprocity, altruism, conscientiousness, ambition and self-esteem. Table B.2 in the Online Appendix gives the English translated phrasing of all statements measuring preferences and personality traits. Reciprocity, altruism and conscientiousness are measured by means of scales which we calculated by averaging the scores of the different items in the survey. The preference variables were not surveyed in each wave: for example, risk preferences are not available in 2005 and 2007, and ambition is only measured every five years (see Online Appendix B.2). We imputed the missing values by copying the values from the years where the variables were observed (we always impute future values except for the final survey years we impute using past values), under the assumption that preferences and personality traits are stable in the short

	Mean	SD	Min	Max	Men	Women
Age (in years)	41.78	8.49	20	55	41.51	42.06
Born in Germany	0.89	0.32	0	1	0.87	0.90
Married	0.62	0.49	0	1	0.66	0.57
Separated	0.14	0.34	0	1	0.09	0.18
Single	0.25	0.43	0	1	0.25	0.25
Number of children	0.90	1.05	0	8	0.99	0.80
High School or lower	0.75	0.44	0	1	0.74	0.75
Technical College	0.11	0.31	0	1	0.10	0.11
College graduates	0.15	0.36	0	1	0.16	0.14
Experience (in years)	14.72	9.67	0	41	17.96	11.47
Hourly wage (in euros)	11.41	4.90	1	33	12.81	10.01
Log hourly wage	2.35	0.41	0	4	2.47	2.23
Separation rate	0.07	0.25	0	1	0.07	0.07
Number of observations	70,067				35,079	34,988

Table 1 Descriptive statistics

Online Appendix B provides a detailed description of the variables

Table 2 Gender differences in personality traits

Dimensions			Gender difference
	Men	Women	
Risk willingness	5.09	4.28	***
Patience	6.09	5.95	***
People are fair	0.55	0.60	***
Positive reciprocity	5.87	5.81	***
Negative reciprocity	3.12	2.67	***
Altruism	2.65	2.73	***
Conscientious	5.79	5.97	***
Ambition: Importance for a successful job	3.01	2.94	***
Ambition: Importance of having child	3.28	3.37	***
Self-esteem	5.69	5.50	***

 $N=35{,}079$ for men and 34,988 for women

*p < 0.10, **p < 0.05 and ***p < 0.01

Table B.2 in the Online Appendix presents the questions used in the survey to measure each variable

term. In the regression models we include centered variables obtained by subtracting the variable's mean for each preference parameters.

Table 2 shows the mean (uncentered) scores for each of the personality traits by gender. In line with previous research, we find that women are more risk-averse,

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and that women attach more importance to having children and less importance to having a successful job (Bertrand 2011; Croson and Gneezy 2009). Men have higher self-esteem, higher reciprocity and are, on average, more patient than women. Finally, we find that women more often believe that individuals are fair and are more conscientious and altruist.

Table B.3 in the Online Appendix presents bivariate correlations between the various preferences parameters. Most correlation coefficients are below 0.2 in absolute terms except for the correlation between altruism and importance of having child.

3.2 Empirical model

The objective of our research is to understand how gender differences in preferences can explain part of the gender gap in the wage-elasticity of job separations in employer-to-employer transitions. In order to answer this question, we perform a mediated moderation analysis in which we test whether the gender moderator effect is mediated by preferences. Our conceptual model is illustrated in Fig. 1.

The wage-elasticity of separations is defined as the workers' sensitivity to wages in their decisions to separate from the firm and can be estimated using the regression model:

$$s_{it} = \alpha_0 + \alpha_1 \ln [w_{it}] + \alpha_2 \text{female}_i + \alpha_3 (\ln [w_{it}] \times \text{female}_i) + \sum_{k=1}^{K} \alpha_4^{(k)} \text{preference}_{(k)}^{it} + \sum_{k=1}^{K} \alpha_5^{(k)} \left(\ln [w_{it}] \times \text{preference}_{it}^{(k)} \right) + \alpha' X_{it} + \upsilon_{it}$$

$$(1)$$



Fig. 1 A mediated moderation model of the role played by preferences in the gender difference in separations elasticities

where the dependent variable, s_{it} , measures job separations between periods t and t + 1 to another job, female is a dummy variable indicating women and X_{it} is a vector of explanatory control variables observed for worker i at time period t such as demographics, occupation and sector indicators. The interaction between wages and the female indicator is included in the model to study how the effect of (log) wages on separations is moderated by gender. Preference variables and their interactions with wages are also included in the model in order to test whether these variables act as mediators of the gender moderator. The preference parameters are modeled as a function of gender:

preference^(k)_{it} =
$$\beta_0^{(k)} + \beta_1^{(k)}$$
female_i + $\beta^{(k)'}X_{it} + \upsilon_{it}^{(k)}$
(2)

where k = 1, ..., K and K represents the number of preference variables in the model. We estimate models (1) and (2) both with and without control variables X. These control variables are known to influence the decisions of workers to separate from a firm but they can also be correlated with their preferences. For example, risk aversion is related to occupations and conscientiousness is related to education (Borghans et al. 2008; Heckman et al. 2006; Zhao and Zhou 2021). Controlling for these demographic variables makes sure that the estimated effects of preferences are not driven by workers' demographics (via omitted variables bias). Yet, we also estimate the model without these controls because they could also act as 'bad controls'. A bad control is a variable that is itself an outcome variable and leads to biases in the parameters of interest (Angrist and Pischke 2009). Because of the correlation between preferences and some of the control variables, preferences could also determine workers' level of education and occupational choice. It would suggest that the variable preferences in Eq. (1), is also an outcome variable with controls X as predictors. Adding the controls *X* in model (1) may thus bias the estimated effect of preferences, α_5 .

3.3 Decomposition analysis

We now decompose the total gender difference in separations elasticities (the total effect TE) into a direct effect (DE) of gender and an indirect effect (IE) resulting from gender differences in preferences, so that TE = DE + IEand so that the sum of the contributions of each of the preference variables equals the total indirect effect. By taking the derivative of Eq. (1), the elasticity of separations can be written as:

$$\epsilon_{sw} = \left[\frac{\partial s}{\partial w}\frac{w}{s}\right]$$
$$= \left[\frac{\alpha_1}{w} + \frac{\alpha_3 \text{female}_i}{w} + \sum_{k=1}^{K}\frac{\alpha_5^{(k)}\text{preference}_{it}^{(k)}}{w}\right]\frac{w}{s} \quad (3)$$
$$= \frac{1}{s}\left[\alpha_1 + \alpha_3 \text{female}_i + \sum_{k=1}^{K}\alpha_5^{(k)}\text{preference}_{it}^{(k)}\right]$$

where we calculate the elasticities at the mean separation rate, $s = \overline{s}$.

The direct effect of the gender moderator captures changes in the wage-elasticity of separations that are only due to changes in the female variable, assuming that the preference mediators remain constant with gender. We can write the direct effect of gender (see Online Appendix A for the derivation):

$$DE = E(\varepsilon_{sw} [female, preference = preference(male)] -\varepsilon_{sw} [male, preference = preference(male)]) = \frac{1}{\overline{s}} \alpha_3$$
(4)

The indirect effect of the gender moderator captures the effect of gender which operates through the preference mediators. That is, it captures how the wage-elasticity of separations differs between men and women due solely to gender differences in preference parameters. The indirect effect of gender via preferences can be written as (see Online Appendix A for the derivation): moderator effect is reduced in size after adding the mediating variables as additional moderators (Deschacht et al. 2017; Edwards and Lambert 2007; Muller et al. 2005), but

IE =
$$E(\varepsilon_{sw}$$
[female, preference = preference(female)] - ε_{sw} [female, preference = preference(male)])

$$= \frac{1}{\bar{s}} \sum_{k=1}^{K} \beta_1^{(k)} \alpha_5^{(k)}$$

Intuitively, this expression for the indirect effect should make sense because it is product of the gender difference in preferences (β_1) and the effect of that preference on the wage elasticity of separations (α_5). Also, it should be noted that the sum of the contributions ($\beta_1\alpha_5$) of each variable *k* equals the total indirect effect, which is what any decomposition intends to do.

The total effect of the gender moderator is given by the sum of the two: $\frac{1}{\overline{s}} \left(\alpha_3 + \sum_{k=1}^{K} \beta_1^{(k)} \alpha_5^{(k)} \right)$. To quantify the role of the preference mediators in the total effect of gender, we calculate the proportion of the total effect that arises from the indirect paths via the mediators:

Proportion mediated =
$$\frac{\text{IE}}{\text{TE}} = \frac{\sum_{k=1}^{K} \beta_1^{(k)} \alpha_5^{(k)}}{\alpha_3 + \sum_{k=1}^{K} \beta_1^{(k)} \alpha_5^{(k)}}$$
 (6)

We use bootstrapping methods to test whether the total and indirect effects are significantly different from zero.

The method we propose is similar to a Oaxaca-Blinder decomposition in the sense that we estimate the individual contribution of each preference variable in explaining the gap in the wage-elasticity of separations, and that we estimate a counterfactual by plugging in the male preferences into the female regression equation (similar to Oaxaca who obtains a counterfactual by plugging in male characteristics into a female wage equation). Applying the standard Oaxaca method is not possible in this case because this decomposes a difference in mean outcomes, whereas we aim to decompose a difference in regression coefficients (i.e. the effect of wages on separations), but the intuitive approach is very close to Oaxaca decomposition and the results can be interpreted as such. The method we propose is also similar to mediation analysis in which the effect of one variable (say gender) on another variable is explained through the influence of intermediate variables or 'mediators' (preferences). As opposed to standard mediation analysis which studies mediation in the relationship between two variables, we aim to study mediation in a moderator effect (between gender and the effect of wages on separations). A mediated moderation approach allows to decompose a total moderator effect into a direct and an indirect effect by estimating how a

it does not allow for the detailed decomposition into contributions of the various mediating preference variables which we aim at. The method we propose for a detailed decomposition in the setting of mediated moderation, is inspired by the formal counterfactual framework for mediation analysis by VanderWeele (2015) and by the decomposition framework suggested by Gelbach (2016). Although Gelbach does not refer to mediation analysis (he studies how omitted variable bias in an estimated regression coefficient changes as additional variables are added to the model), his approach is equivalent to that of the standard mediation analysis, and he shows that his method nests the Oaxaca decomposition. Our methodological contribution lies in the way we explicitly connect the literatures about mediation analysis and decomposition approaches, and in our application of a decomposition approach to a setting of mediated moderation.

Note that both preference parameters and wages can be correlated with the error term in our regression models (endogeneity) and omitted variables could be a source of bias. The identification problem is particularly hard to solve for psychological traits since they cannot be easily randomly assigned to individuals by means of a randomized experiment. Moreover, no credible instruments exist, as far as we know, and the fact that preferences are relatively stable over time excludes the possibility to control for individual fixed effects. Therefore, the usual assumptions of ordinary least squares regression analysis apply and the estimates in this study should be interpreted as correlations rather than causal effects.

4 Results

We now apply the estimation procedure developed in Sects. 3.2 and 3.3 to study how gender differences in preferences explain the gender differences in wageelasticity of job-to-job transitions. Table 3 presents the results of our decomposition (the underlying estimated regression coefficients are reported in Table C.2 in Online Appendix). Two different models are estimated: one without controls and one with controls. The percentages in the second column are the part of the total gender gap in separations elasticities that are explained by each of

(5)

Table 3 Decomposition of the gender difference in wage-elasticities of job separations

	Coefficient	Percent	Gender differences ^a	Preference effect on the wage-separation path ^b
Panel A: model with controls				
Total effect	0.0099*	100.00%		
Direct effect	0.0076	76.73%		
Indirect effect	0.0023	23.27%		
Detailed decomposition				
Risk willingness	0.0016*	16.63%	-0.7212***	-0.0023*
Patience	0.0007	6.79%	-0.3519***	-0.0019
People are fair	0.0008***	8.04%	0.0478**	0.0149***
Positive reciprocity	0.0000	0.14%	-0.0046	-0.0030
Negative reciprocity	-0.0009	-9.02%	-0.2952***	0.0030
Altruism	0.0000	0.47%	0.0084*	0.0056
Conscientious	0.0007	6.65%	0.2712***	0.0024
Ambition: importance for a successful job	0.0003**	2.75%	-0.0301***	-0.0091**
Ambition: importance of having child	-0.0001	- 1.03%	0.0459***	-0.0022
Self-esteem	-0.0008**	-8.16%	-0.1684***	0.0048*
Sum of contributions	0.0023	23.27%		
Number of observations	70,067			
Panel B: model without controls				
Total effect	0.0145	100.00%		
Direct effect	0.0096	66.17%		
Indirect effect	0.0049	33.83%		
Detailed decomposition				
Risk willingness	0.0028**	19.61%	-0.8228***	-0.0035***
Patience	0.0003	1.77%	-0.1358***	-0.0019
People are fair	0.0011***	7.83%	0.2161***	0.0214***
Positive reciprocity	0.0002	1.20%	-0.0587***	- 0.0030
Negative reciprocity	-0.0008	-5.33%	-0.4418***	0.0017
Altruism	0.0005	3.80%	0.0733***	0.0075
Conscientious	0.0006	4.15%	0.1785***	0.0034
Ambition: importance for a successful job	0.0007***	5.13%	-0.0736***	-0.0101**
Ambition: importance of having child	0.0001	0.76%	0.0801***	0.0014
Self-esteem	-0.0007*	-5.11%	-0.1992***	0.0037
Sum of contributions	0.0049	33.83%		
Number of observations	70,067			

The table decomposes the gender difference in wage-elasticities on job separations into a direct effect and indirect effect resulting from mediation via preference parameters. The direct effect is the estimate for α_3 in model (1) and the indirect effect is the product between the estimates β_1 from model (2) and α_5 from model (1) Controls include: age, age2, marital status, number of children, whether born in Germany, education, experience 10, occupation and sector indicators. Regions and year fixed effects are included in all models

Standard errors are clustered at the person level

P-values for the indirect effects and total effect are computed using bootstrapping methods

*p<0.10, **p<0.05 and ***p<0.01

^a Estimate for β_1 in model (2)

^b Estimate for α_5 in model (1)

the preference variables. The last two columns give the estimated gender differences in preferences (β_1) and the estimated effect of preference parameter on the wageelasticity of separations (α_5), of which the product is the indirect effect explained by the preferences. Note that the results for the gender differences in preferences (β_1) in the model without controls are equivalent to the ones reported in Table 2, the results differ in the models with controls because the gender differences in preferences

are adjusted for demographics, occupation and sector characteristics in that case.

In the model with controls, the total effect of the gender moderator is 0.0099, which indicates that female workers are less sensitive to wages in their decisions to separate from a firm. At the mean separation rate and in the model with controls, the results suggest that the female wage-elasticity of job separations is 0.14 points lower (in absolute terms) than the one of male workers. The direct effect is equal to 0.0076 and represents about 77% of the total effect. That is, the direct effect of gender on the wage-elasticity of separations via pathways that do not involve personality traits included in the analysis is equal to 0.1033. The indirect effect is equal to 0.0313. Thus, gender differences in personality explain about 23% of the total gender gap in wage-elasticities.

Next, we perform a detailed decomposition by estimating the contribution of each preference parameter separately. The estimated coefficient for risk willingness in the model without controls (panel B), implies that 0.0028 (about 20%) of the overall gender gap in wage elasticities with respect to separations, can be explained by gender differences in risk willingness. This indirect effect results from the fact that women are less risk-willing (the gender difference is -0.82, see column 3) and that less risk-willing workers are less responsive to wages in their decisions to separate from their employer

(column 4). The second largest contribution comes from the variable "people are fair," which accounts for about 8% of the overall gender moderator effect in both models. The mediating effects of "patience" and "conscientiousness" explain, respectively, 6.79% and 6.65% of the total gender gap in wage-elasticities (in the model with controls) but the mediating effects are not significantly different from zero. The contributions of the variable "importance for a successful job" are smaller but, their indirect effects are significantly different from zero. Finally, the mediating effect of the variable self-esteem is negative and significantly different from zero, which implies that women are benefiting from this personality trait in the sense that the gender gap in wage-elasticity of separations would have been even bigger if men and women had equal values of self-esteem.

As a robustness check, we repeat the analysis using gross hourly wage instead of net hourly wage. Using an experiment, Fochmann et al. (2013) demonstrate that the existence of a gross wage that differs from the net wage leads to higher work effort, compared to a gross wage that is identical to the net wage. They referred to this phenomenon as the "net wage illusion" which is closely related to the phenomenon of "money illusion" which refers to the finding that individuals base economic decisions on nominal rather than on real terms (Brunnermeier and Julliard 2008; Fehr and Tyran

	Coefficient	Percent	Gender differences ^a	Preference effect on the wage-separation path ^b
Total effect	0.0066	100.00%		
Direct effect	0.0037	56.17%		
Indirect effect	0.0029**	43.83%		
Detailed decomposition				
Risk willingness	0.0017**	25.46%	-0.7220***	-0.0023*
Patience	0.0008*	11.73%	-0.3532***	-0.0022*
People are fair	0.0008**	12.60%	0.0498**	0.0153***
Positive reciprocity	0.0000	0.21%	-0.0049	-0.0028
Negative reciprocity	-0.0006	-9.57%	-0.2981***	0.0021
Altruism	0.0000	0.10%	0.0088*	0.0007
Conscientious	0.0008	12.32%	0.2709***	0.0030
Ambition: importance for a successful job	0.0004***	5.37%	-0.0304***	-0.0116***
Ambition: importance of having child	-0.0001	-1.02%	0.0460***	-0.0014
Self-esteem	- 0.0009**	-13.37%	-0.1695***	0.0052**
Sum of contributions	0.0029	43.83%		
Number of observations	69,972			

 Table 4
 Decomposition of the gender difference in gross wage-elasticities of job separations

See Table 3

*p < 0.10, **p < 0.05 and ***p < 0.01

^a Estimate for β_1 in model (2)

^b Estimate for α_5 in model (1)

2001). A similar situation could be observed in our study if workers make their turnover decisions based on their gross wages rather than their net wages. The results of our decomposition using gross hourly wage rather than net hourly wage are reported in Table 4. The total indirect effect is larger in this specification (44%), but the main conclusions remain unchanged: risk preferences, trust, patience and the importance for a successful job have the highest contributions.

5 Discussion

Previous research shows that female workers are less sensitive to wages in their decision to switch jobs than male workers, and that this could explain a substantial part of the gender wage gap (Barth and Dale-Olsen 2009; Booth and Katic 2011; Hirsch et al. 2010; Ransom and Sims 2010; Sulis 2011; Vick 2017; Webber 2016). Using data from the German Socio-Economic Panel (G-SOEP) and a mediated moderation regression, this paper studies the role of gender differences in preferences in explaining the gender gap in the wage-elasticity of job separations in employer-to-employer transitions.

Overall, our results suggest that gender differences in risk preferences, patience, trust, conscientiousness, ambition and self-esteem explain about 25% of the gender gap in wage-elasticity of separations (the contributions of reciprocity and altruism are limited). That is, if male and female workers had identical preference parameters, the wage-elasticity of separations of female workers would be 0.103 points lower than that of male workers, compared to a gap in wage-elasticity not adjusted for preferences of 0.135. Our results thus suggest that gender differences in preferences can explain a larger part of the gender gap in wage-elasticities than the gender gap in pay. Indeed, with the exception of Manning and Swaffield (2008), who find a higher contribution, Fortin (2008); Mueller and Plug (2006); Nyhus and Pons (2012); Risse et al. (2018); Semykina and Linz (2007) all find that gender differences in psychological traits explain 16 percent or less of the gender wage gap.

When looking at the detailed contribution of each of the personality variables, we find that risk preferences has the largest contribution: the fact that women are more risk averse explains almost 20% of the gender gap in separations elasticities. That is, while Manning and Swaffield (2008) find that risk preferences does not contribute to the gender pay gap, our results suggest that it plays a major role in explaining the wage-elasticity gap. Turnover decisions are naturally risky because they involve significant risk and uncertainty regarding outcomes. A worker decision to quit his/her current job for an alternative job involves some uncertainty since the worker does not know about the work environment at the new job (Allen et al. 2007). Next, we find that trust has the second largest contribution with about 8% of the overall gender moderator effect being explained by gender differences in this characteristics. We define trust as the likelihood to trust others to be fair and our results suggest that because females are more trusting, they are have lower wage-elasticity of separations (in absolute terms). We also find that the importance for a successful job explains about 3% of the gender differences in wage-elasticities. The contribution of patience and conscientiousness are relatively large but the mediating effects are not significantly different from zero. Perhaps somewhat surprisingly, our results suggest that the role of gender differences in family orientation is negligible, which could be related to the fact that we limit the sample to the employed population only and that the gender difference in family orientation preferences is relatively small.

Finally, our results suggest that the gender gap in wageelasticities would be even bigger if women had same values of self-esteem as men. This arises from the fact that workers with higher self-esteem are found to be less wage-sensitive in their decision to separate from their employers. This finding goes against our hypothesis that workers with higher self-esteem would more strongly follow pecuniary consideration since they are more confident about their abilities and capabilities. A possible channel for this finding could be that workers with higher self-esteem more often believe that they are paid what they worth and thus are less likely to search for higher paying jobs.

While our estimates suggest that about 25% of the gender gap in wage-elasticities of separations is attributed to gender differences in preferences, still 75% of the gender gap in wage-elasticity remains unexplained in our model and further investigation is needed to understand the mechanisms behind it. Domestic responsibilities may be one of the key drivers behind those 75% since they may prevent women, more strongly than men, from following monetary considerations when choosing their employers (Hirsch et al. 2010). Indeed, women usually take care of the home responsibilities and they may thus care more about the job's location, for example because they need a job close to their home or near a nursery school, or about the working hours offered than men. Furthermore, women are usually the second earner within the household and this may again increase the importance of the non-wage attributes of their jobs. Bredemeier (2019) shows that the wage-elasticity of guits is smaller for workers who contribute the least to their household earnings. Even though not related to wage-elasticity, Averkamp et al. (2020) show that a much larger part of the gender pay gap can be explained when taking into account this career prioritization within the household.

The gender gap in household work may thus play an important role in explaining the gender gap in wage-elasticity of separations.

Another potential explanation for the gender gap in the wage-elasticity of separations could be the difference between the male and female occupational and sectorial distributions. Women are usually more concentrated in the public sector: for example, in 2017, the share of female workers in the OECD countries in the public sector was 60.1% (OECD 2019). The pay of workers in the public sector is usually more strongly covered by union agreements and is thus more likely to exhibit some form of wage rigidity compared to the pay of workers in the private sector. Because of this wage rigidity, workers in the public sector may have less outside options and may be less likely to find another higher-paying job.

Using the Burdett and Mortensen's model, Manning (2003) shows that there is a close link between the firms' monopsony power, which can be measured by the wage-elasticity of labor supply to the firm, and the wage-elasticity of separations. The results of this study can thus also be expanded to investigate the role of gender differences in personality characteristics in explaining gender differences in monopsony.

The main limitations of this paper arise from the fact that preferences parameters and wages could be correlated with the error term in our regression models (endogeneity). Psychological traits cannot easily be randomly assigned to individuals by means of a randomized experiment, no credible instruments exist and the fact that preferences are relatively stable over time excludes the possibility to control for individual fixed effects. The limitations of our decomposition analysis are essentially the same limitations that are present in standard Oaxaca-type decomposition: the coefficients used in the decomposition could be subject to bias and adding additional personal traits into the model might lead to a somewhat smaller or larger explained part (the indirect effect in this study). Nevertheless, we believe that these correlational results are informative, as we await further research that can exploit exogenous sources of variation in psychological characteristics. Another limitation arises from the fact that preferences and personality traits in the G-SOEP are measured by self-report questionnaires, and this could lead to less precise estimates of the effects of preferences on outcomes (Borghans et al. 2008). Respondents may over- or under-evaluate their true preferences and respondents may be tempted to respond in a socially desired way. Despite general recognition of these limitations, no other measurement method has been proposed in large-scale data (Borghans et al. 2008). Further research could study how preferences change over the life cycle, how certain life events and experiences affect preferences and what is the role of such changing preferences for job transitions and the persisting gender career gaps.

Supplementary Information

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Additional file 1.

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Author contributions

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Availability of data and materials

The dataset is available upon request in the G-SOEP repository, https://www. diw.de/en/diw_01.c.678568.en/research_data_center_soep.html. Programs (Stata do files) that reproduce all tables and figures are available upon request from the authors.

Declarations

Competing interests

The authors declare that they have no competing interests.

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