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ABSTRACT

Working Time Mismatch and Job Satisfaction – The Role of Employees' Time Autonomy and Gender

Evidence shows that working time mismatch, i.e. the difference between actual and desired working hours, is negatively related to employees' job satisfaction. Using longitudinal data from the German Socio-Economic Panel, we examine the potential moderating effect of working time autonomy on this relation and we also consider the corresponding role of gender. First, individual fixed effects panel estimations reaffirm both the negative link of working hours mismatch and the positive relation of working time autonomy to employees' job satisfaction. Second, our results show a positive moderating relation of working time autonomy on the link between mismatch and job satisfaction. Third, our analyses hint at gender-specific differences: particularly women seem to benefit from the moderation role of working time autonomy.

JEL Classification: J22, J28, J81, M5

Keywords: working time mismatch, working hours discrepancies, job satisfaction, over-employment, Socio-Economic Panel, working time autonomy

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Working Time Mismatch and Job Satisfaction – The Role of Employees' Time Autonomy and Gender

1. Introduction

The average number of usual weekly working hours has decreased slightly in the European Union during the last ten years. In 2019 employees spent 37.1 hours per week at work on average (Eurostat, 2020). There is a huge amount of heterogeneity, though, and individual working time preferences may not fit with actual arrangements. Therefore, discrepancies between actual and desired working hours – the so-called working hours mismatch – are likely to occur. Working hours mismatches can arise in the form of over-employment or under-employment. Working time mismatch has been a subject of interest in politics, social science and economics for more than 20 years (Reynolds/Aletraris 2010), and a vast body of literature has found evidence of employees' over- and under-employment (e.g. Holtom et al. 2002, Reynolds 2003, Wilkins 2007, Miranti/Li 2020).

It is important to understand the nature of working hours mismatches, because the empirical literature hints at their adverse effects on employee outcomes, such as commitment (e.g. van Emmerik/Sanders 2005, Abrahamsen 2010), job mobility (e.g. Böheim/Taylor 2004, Knaus/Ottenbach 2019), absenteeism (e.g. Lee et al. 2015) and health (e.g. Otterbach et al. 2019, Bartoll/Ramos 2020). Further findings demonstrate a negative link between working hours mismatch and job satisfaction (e.g. Angrave/Charlwood 2015, Pagan 2017, Matiaske et al. 2017). The literature also hints at gender-specific differences in perceived working hours mismatch (e.g. Reynolds/Aletraris 2007, Groezinger et al. 2010, de Moortel et al. 2017, Wanger 2017). Women seem to be somewhat more affected than men due to uneven distribution of non-work responsibilities, such as caring for children or relatives, or running the household.

In addition to working hours constraints, employees experience different working time regulations. Employees' control or discretion over their working time schedule is one dimension of job autonomy (e.g. Breaugh 1985, Spiegelaere et al. 2016). In contrast to employer-determined working hours, self-managed working time reflects employees' decisions about their timing of working hours (e.g. Costa et al. 2004, Possenriede/Plantenga 2014, Wheatley 2017). Albeit,

decisions on the type of working time arrangements are mainly made by the employer or determined by job characteristics (Zapf/Weber 2017). The main reasons why firms give their employees such discretion are an intended increased performance and an improved work-family balance (Ortega 2009). Indeed, recent empirical studies find evidence of positive effects of working time autonomy on both individual effort (Beckmann et al. 2017) and opportunities to schedule private and working lives in a family-friendly way (Beckmann 2016). Gender-specific research shows differences in outcomes of high degrees of working time autonomy: women enhance their work-life balance, while men increase their work commitment (Hofäcker et al. 2013). Further findings indicate that working time flexibility increases actual working hours and work intensity for both genders (Lott 2015).

Overall, working hours mismatch and working time autonomy imply contrary effects on employees' wellbeing, particularly with regard to job satisfaction. Interdependencies between these two issues are likely but have not been addressed before. We contribute to the literature on the link between working hours mismatch and employees' job satisfaction by investigating the possible moderating role of flexible working time arrangements. To address our research endeavour, we make use of the German Socio-Economic Panel and focus on employees' job satisfaction. Further, we study possible gender-specific differences with regard to the role of working time autonomy in this context. We focus on the phenomenon of over-employment (people working more than they desire) and disregard under-employment due to the very different specific underlying mechanisms (see de Moortel (2020) for a discussion of involuntary part-time work, for instance). It is important to gain insights into these issues both from a policy point of view and from a firm's perspective in order to give consideration to employee preferences.

The remainder is structured as follows: We present general theoretical considerations and state our hypotheses in section 2. In the third section, we describe the data from the Socio-Economic Panel, our variables and our used methodology. In the next section, we present our descriptive and main multivariate results. In section 5, we extend our analysis by further estimations and discuss our findings. Finally, we conclude in section 6.

2. Theoretical considerations and hypotheses

In a market without any frictions, a discrepancy between desired and actual working hours is absent, because individuals choose their working hours based on their preferences while maximizing their own utility function with respect to budget and time constraints. However, empirical research shows that working hours mismatch does exist and that employees cannot choose their working hours freely, whereby over-employment occurs. Over-employed employees are willing to reduce their income in exchange for more individual time use (Wielers et al. 2014). Hence, over-employment implies a tradeoff between income from paid work and individual time use for other activities, such as leisure time or domestic and family work.[1]

In line with previous research (e.g. Holtom et al. 2002, Lee et al. 2015, Pagan 2017), we use discrepancy theory (Locke 1969, Lawler 1973) and social exchange theory (Blau 1964) to argue for an effect of working hours mismatch on job outcomes. Following discrepancy theory, individuals value an object or a situation based on its subjectively 'perceived relationship between what [they] […] perceive and what [they] […] value' (Locke 1969: 319). Focusing on working time, a match between desired and actual working hours should result fully in positive working outcomes, while a mismatch may imply lower job outcomes (Lee et al. 2015). Moreover, human relationships are based on exchanges between individuals (Blau 1964). Social exchange theory mentions an exchange between an employee's and an employer's induced values, e.g. training courses and extrinsic rewards such as monetary compensation (Pagan 2017). In addition to an increase in employees' effort levels, employees develop positive emotive attitudes towards the employer, which may simultaneously increase employees' commitment and job satisfaction (Pagan 2017). Then, employees appreciate a working environment which cares for their preferences, such as working hours, which again increases their job satisfaction (Lee et al. 2015). Again, a working hours mismatch may result in negative working outcomes. Accordingly, employees may react reciprocally towards an employee-friendly working environment (e.g. Fehr/Gächter 2000). With regard to our theoretical considerations and previous empirical findings, we assume a negative relationship between work hours mismatch and job satisfaction as a baseline expectation.

[1] An individual's time use can be split into time for paid work, for domestic and family work, for personal care, for leisure, and others (OECD 2018). We interpret the occurrence of working time mismatch as an individual's perceived mismatch between time for paid work and time for other activities, in particular for domestic and family work or for personal care or for leisure, or others.

Working time autonomy is an important fact of job autonomy (Barney/Elias 2010). Many employees are assumed to appreciate working time autonomy or schedule control as a system of having a certain degree of discretion over the timing of their working hours (Wheatley 2017). According to Beckmann (2016), working time autonomy increases employee motivation due to the opportunity for them to arrange their working schedule around their circadian rhythms or a work-life balance. Thus, working time autonomy, in line with social exchange theory and reciprocity theory, may increase employees' job outcomes, in particular their job satisfaction. Therefore, we anticipate a positive link between working time autonomy and job satisfaction as a second baseline expectation.

Overall, working time mismatch and working time autonomy are diametrically linked to job satisfaction. However, interactions are possible. Employees may perceive their individual working-hours mismatch differently given a low or high level of working time autonomy. Our conjecture is that the size of the negative effects of working hour mismatches depend on the flexibility with regard to the timing of work. Opportunity costs of alternative time use are likely to be considerable higher if employees have no or little working time autonomy. Whereas given that an employee perceives her working time as over-employment, the disadvantage for job satisfaction may diminish on account of a high level of working time autonomy, because she can allocate her time to paid work, domestic and family work, and leisure by herself, in spite of a general working hours mismatch. Over-employed individuals' opportunity to distribute time resources on their own may therefore reduce the negative link of work hours mismatch and job satisfaction. Hence, our first hypothesis is:

H1: The negative relation between working hours mismatch and job satisfaction is positively moderated by the degree of an individual's working time autonomy.

Besides, evidence suggests gender differences in time use, in particular for paid work, domestic and family work, and leisure time (e.g. García-Mainar 2011). Routine housework and caring activities are a typical component of domestic and family work, while leisure time includes sports, visiting friends or attending events (OECD 2018). Over the last decades, gender-specific time use has shifted: women have dramatically increased their participation in paid work and have decreased their domestic and family work time; albeit men have decreased their paid work time and increased their domestic and family work time (Sayer 2005). Nonetheless, a gender gap between distribution of domestic and family work still exists and a so-called 'stalled revolution' has occurred, which

describes a higher participation of women in paid work and male-dominated activities, whereas men have only partially adopted traditional feminine duties (Hochschild/Machung 2012). Further, empirical studies imply that domestic and family work, in particular for housework by women and men, has changed tremendously; however, gender differences still emerge and women still engage more in domestic work than men do, regardless of the existence of children in the household or not (e.g. Shelton et al. 1993; South/Spitze 1994; Gwozdz/Sousa-Poza 2010; Craig et al. 2016). Linking these findings to our expectation of working time autonomy, the lack of working time control may be perceived as an even larger restriction by women than is the case for men. Given gender-specific differences for schedule control, we hypothesize that the positive moderating effect of working time autonomy on the link between working hours mismatch and employees' job satisfaction is relevant in particular for women compared to men. Hence, we formulate:

H2: The positive moderation effect of individuals' working time autonomy on the negative relation between working hours mismatch and job satisfaction is more pronounced for women than it is for men.

Supposing that domestic and family work time use, in particular for domestic work, varies between gender, further differences may occur while considering child care. Over the last decades, women have reduced domestic and family work time; however, time use for child care has been relatively constant for mothers despite leaning into paid work (e.g. Sayer 2005, Raley et al. 2012). Thus, children may have a greater impact on actual and desired working hours of mothers compared to non-mothers. However, previous studies show ambiguous results for the link between children and working hours mismatch, the so-called child-mismatch hypothesis (e.g. Clarkberg/Moen 2001, Reynolds 2005, Golden/ Gebreselassie 2007). Reasons include that most studies cannot control for parenting styles, efficiency of working, or family life (Reynolds/Johnson 2012). Indeed, time use of mothers compared to women without children is affected by childcare (Gimenez-Nadal/Sevilla-Sanz 2010) and, thus, the probability of working hours mismatch seems more likely. Albeit, a high level of working time autonomy may reduce mothers' time conflicts in particular (Pollmann-Schult 2018). Therefore, we expect that:

H3: The positive moderation effect of individuals' working time autonomy on the negative relation between working hours mismatch and job satisfaction is more pronounced for mothers than it is for women without children.

3. Data, variables and methodology

We use data from the Socio-Economic Panel (SOEP), which is an annually and nationally representative longitudinal analysis of individuals living in Germany (see Schröder et al. 2020 for an overview). The panel contains information on individual demographics, employees' job-related characteristics – such as actual and desired working hours and working time arrangements – and further asks employees about their job satisfaction.

We use the waves 2003 to 2018 and exclude self-employed persons and apprentices to focus on part-time[2] and full-time employees in the private and the public sector. We also restrict our sample to individuals between 18 and 65 years of age. Moreover, we focus on matched and over-employed individuals and omit cases of under-employment from our analyses.[3] Overall, our sample consists of about 68,069 observations of 23,051 different individuals, in particular 12,714 men and 10,337 women with an average age of 44 years. Further, 43 percent of the individuals in our sample have children and about two thirds are married.

Our main dependent variable is job satisfaction as a measure for employee well-being at work and is continuously part of the SOEP questionnaire. Individuals are asked 'How satisfied are you with your job?' on an 11-digit scale from 0 to 10 where 0 represents 'completely dissatisfied' and 10 'completely satisfied'. Average job satisfaction in our sample is 7.1 (see Table 1).

As independent variable, we calculate working time mismatch: Yearly, SOEP asked about actual ('How many hours do you generally work, including any overtime?') and desired ('If you could choose your own working hours, taking into account that your income would change according to the number of hours: How many hours would you want to work?') working time per week and, thus, working time mismatch is calculated as the difference between the two, in line with previous research (e.g. Wooden et al. 2009, Pagan 2017). A third of individuals report a perfectly matched working time, whereas almost one third face a working hours mismatch of more than eight hours per week. The mean working hours mismatch is about 6 hours per week (see Table1).

[2] We define part-time employment as usual work with 'less than 30 hours per week' (OECD 2021a).
[3] In total, 4,529 individuals reported under-employment.

Our second independent variable categorises employees' working time arrangement, in particular the level of working time schedule control. In the years 2003 to 2009, working time arrangements were surveyed by SOEP every second year and from 2009 onwards they were surveyed annually. Individuals replied to the question 'Which of the following possibilities is most applicable to your work?' and could respond with (a) 'Working hours set by employer, which may vary from day to day', (b) 'Fixed daily working hours', (c) 'Flexitime within a working hours account and a certain degree of self-determination of daily working hours within this account', or (d) 'No formally fixed working hours, I decide my own working hours'. Individuals' working time autonomy is increasing from (a) to (d). Most individuals have a low degree of autonomy through alternating working time set by the employer (21%) or fixed working time arrangements (40%), albeit one in four employees has a working time account and one in eight of them state that they have self-managed working time.[4]

Table 1: Descriptive statistics of main variables.

	Whole sample n= 68,069			
Variables	**Mean/Share**	**SD**	**Min**	**Max**
Job satisfaction	7.105	1.918	0	10
Working hours mismatch	5.772	6.465	0	65
Working time arrangement				
Alternating working time set by the employer	0.207		0	1
Fixed working time	0.398		0	1
Working time account	0.268		0	1
Self-managed working time	0.127		0	1

Furthermore, we consider control variables for individual and job characteristics. Individual characteristics are gender (dummy), children (dummy), married (dummy), age in years, disability (dummy), German citizenship (dummy), years of schooling, health status (3 categories), and

[4] Our variable working time arrangements vary by arrangement within our individuals during the observation period. The fraction of time that an individual has a specific working time arrangement is the highest in fixed working (76.95%) time and lower for working time account (74.62%), alternating working time determined by the employer (65.71%), and self-managed working time (65.16%). The total within variation is 72.05%.

domestic and family work in hours[5]. Job characteristics are tenure in years, firm size (4 categories with regard to the numbers of firms' employees), occupational position (9 categories), full-time employment (dummy), permanent contract (dummy), agency worker (dummy), job change from t-1 (dummy), gross income in Euro and perceived job security (3 categories). Table A in the appendix provides an overview of the corresponding descriptive statistics. All included variables are known to be related to job satisfaction (e.g. Groot/van den Brink 1999; Sousa-Poza/Sousa-Poza 2000; Green/Tsitsianis 2005, Gazioglu/Tansel 2006; Reisel et al. 2010; Faragher et al. 2013; Grund et al. 2015).

In our main analysis, we apply individual fixed effects panel estimations (see Wooldridge 2009: 265), using the following baseline model (1):

$$job\ satisfaction_{i,t} = \beta_0 + \beta_1 * working\ hours\ mismatch_{i,t} + \beta_2 * autonomy_{i,t} + \gamma * controls_{i,t} + \varepsilon_{i,t}. \quad (1)$$

Job satisfaction denotes individual i's level of job satisfaction at time t; $controls_{i,t}$ contains individual and job-based characteristics; and ε_{it} is the error term. Further, we use dummies for federal states and years. As a result of observing individuals over years, we use robust standard errors clustered at the individual level.

Additionally, we use interactions models to examine the possible moderation effect β_3 of workingtime autonomy on the link between mismatch and job satisfaction as described in (2):

$$job\ satisfaction_{i,t} = \beta_0 + \beta_1 * working\ hours\ mismatch_{i,t} + \beta_2 * autonomy_{i,t} + \beta_3 * working\ hours\ mismatch_{i,t} * autonomy_{i,t} + \gamma * controls_{i,t} + \varepsilon_{i,t}. \quad (2)$$

We complete our analyses by adding three-way interactions of (i) working hours mismatch, autonomy and gender and for the subsample of women (ii) working hours mismatch, autonomy and having children.

4. Results

[5] We define domestic and family work as time for domestic work, errands, child care, care and support for persons in need of care, and repairs on and around the house, car and garden.

Previous research mainly uses mismatch categories (e.g. Wooden et al. 2009, Bell et al. 2012, Angrave/Charlwood 2015) or the extent of mismatch hours upon a metric scale (e.g. Wooden et al. 2009). In our analysis, we mainly use the extent of mismatch in hours. First, we present some descriptive results and afterwards we focus on multivariate findings.

Descriptive statistics

For a first illustration of the link between mismatch and job satisfaction in Figure 1, however, we introduce four categories of mismatch, in particular (i) match working hours, (ii) over-employment of up to 4 hours per week, (iii) over-employment of 4 to 8 hours per week, and (iv) over-employment of more than 8 hours per week to illustrate differences by working time arrangements regarding average job satisfaction. As shown in Figure 1, job satisfaction increases with increasing level of working time autonomy from an average of 6.9 for alternating working time set by the employer to 7.3 for self-managed working time. When splitting the four categories of mismatch, the same indication occurs: an increase in working time autonomy is in line with an increase in mean job satisfaction. Indeed, in all four categories of mismatch, self-managed working time implies the highest average job satisfaction compared to other working time arrangements. In line with previous research and our baseline expectation, descriptive results positively link a higher level of working time autonomy to higher job satisfaction.

As expected, employees with a perfect working hours match report a higher job satisfaction (mean: 7.4), while increasing hours of reported over-employment go hand in hand with decreases in average job satisfaction (>0-4 hours: 7.2; >4-8 hours: 7.1; >8 hours: 6.8), which is in line with our baseline expectation that working hours mismatch is negatively related to job satisfaction.

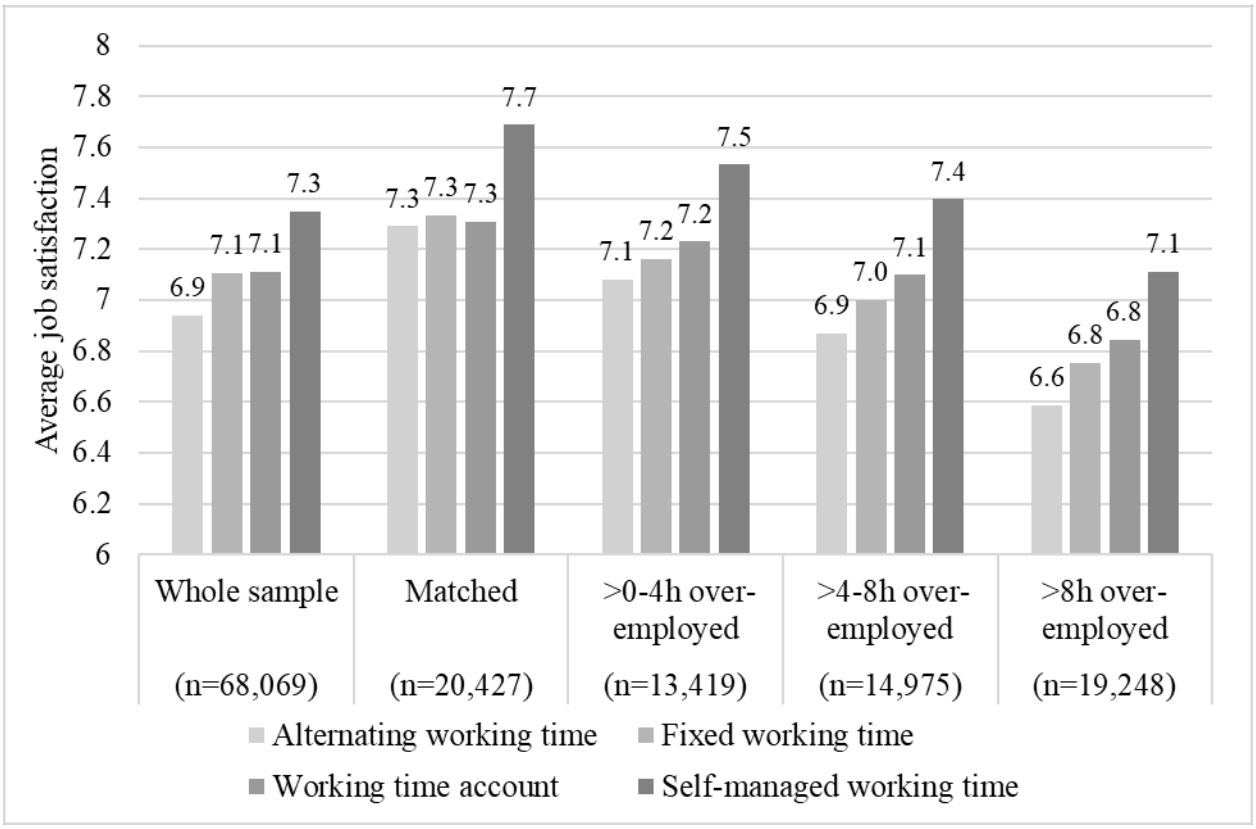

Figure 1: Average job satisfaction by working time mismatch and working time arrangement categories.

Multivariate analysis

In the next step, we apply individual fixed effects panel estimations with robust standard errors on job satisfaction. First, we independently use our main variables 'working hours mismatch' and 'working time arrangements' and include additional individual and job characteristics as control variables, as described above. In Table 2, we focus on our complete sample, and the results on working hours mismatch confirm previous research and our baseline expectation by indicating a significantly negative link to job satisfaction. The size of the coefficient indicates that a working hours mismatch of 10 hours instead of 0 is related to a reduction of 0.23 points (or 44 percent of a standard deviation) of job satisfaction.[6] Moreover, fixed working time, working time account and self-managed working time are highly significantly related to job satisfaction compared to alternating working time arrangements (determined by the employer), which is in line with our

[6] The within-person standard deviation of job satisfaction is 1.173, which is smaller compared to the overall (1.918) or between (1.707) standard deviation. Hence, the variation in job satisfaction across the individuals in our sample is greater than that observed within an individual over time.

descriptive analysis and our baseline expectation that working time autonomy is positively linked to job satisfaction. Further, our control variables support evidence from the job satisfaction literature, e.g. age, disability and agency work are significantly negatively related to job satisfaction (see full regression in Table B in the appendix). We checked that our main results are robust to adding control variables successively. Insights from the checks (not reported in tables but available upon request) include the finding that neither individuals' health status nor perceived job security act as meaningful mediators for the link between working hours mismatch and job satisfaction.

In model 2, we extend our model by interacting mismatch and working time arrangements. Again, 'alternating working time set by employer' acts as the reference category. We find a significantly positive link of the interaction between mismatch and fixed working time on job satisfaction and a marginal significantly positively relationship regarding self-managed working time. There is no significance for the respective interaction of working time accounts, though. Arguments for this result may be down to the use of working time accounts in Germany. Mainly, a working time account 'allows flexible working time over a given week or month without extra overtime compensation' (Burgoon/Damain 2009: 563). Individuals can purposely work overtime to reduce accrued overtime hours in busy (private) times (during the week or month) and may not perceive that overtime as a 'mismatch' due to their flexible working time. Albeit, our results support our hypothesis 1 in general, which implies that the negative relation between working hours mismatch and job satisfaction is positively moderated by the degree of an individual's working time autonomy.

Table 2: Individual fixed effects panel estimations on job satisfaction.

	(1) Whole sample	(2) Whole sample
Working hours mismatch (in hours)	-0.0226***	-0.0280***
	(0.0017)	(0.0030)
Working time arrangement (ref. Alternating working time set by employer)		
Fixed working time	0.1130***	0.0651**
	(0.0253)	(0.0312)
Working time account	0.1270***	0.0913**
	(0.0346)	(0.0421)
Self-managed working time	0.1350***	0.0765*
	(0.0373)	(0.0457)
Mismatch × Fixed working time		0.0079**
		(0.0036)
Mismatch × Working time account		0.0053
		(0.0042)
Mismatch × Self-managed working time		0.0081**
		(0.00414
Individual characteristics	yes	yes
Job-related characteristics	yes	yes
Year dummies	yes	yes
Constant	8.2670***	8.3100***
	(0.674)	(0.675)
Observations	68,069	68,069
R-squared (overall)	0.0793	0.0793
Number of individuals	23,051	23,051

Notes: Robust standard errors in brackets. Clustered by individuals. *** p<0.01, ** p<0.05, * p<0.1. Individual characteristics: children (dummy), married (dummy), age in years, age squared, disability (dummy), German citizenship (dummy), years of schooling, health status (3 categories), and domestic and family work time in hours. Job characteristics: tenure in years, firm size (4 categories), occupational position (9 categories), full-time employment (dummy), permanent contract (dummy), agency worker (dummy), job change (dummy), gross income in Euro, perceived job security (3 categories).

Next, we focus on gender-specific differences in Table 3. Separate estimations for women and men analogously to Table 2 (see models (1) and (2)) hint at a particular role of mismatch and show that the interaction effects between mismatch and working time autonomy are rather relevant for women. The joint estimation does indeed reveal a significant interaction effect of mismatch and gender. Focusing on the three-way interaction between mismatch, working time arrangement and gender, gender-specific differences only (marginally) apply to fixed working time. The result implies that because of additional domestic duties, women suffer more from working hours mismatches in the case of alternating working time set by the employers.

Thus, our results provide a hint of gender-differences but, overall, our results cannot support our hypothesis 2 that the positive moderation effect of individuals' working time autonomy on the negative relation between working hours mismatch and job satisfaction is more pronounced for women than it is for men.

Often, gender differences are assumed to be relevant due to inequalities in childcare. That is why we complement our analyses with respect to the impact of children on the relationship between working hours mismatch, working time autonomy and job satisfaction of women (as shown in Table 4). However, we do not find any hints of a particular effect of children, since the three-way interaction of working hours mismatch, working time arrangement and children remains insignificant. Therefore, our results cannot support hypothesis 3.

Table 3: Individual fixed effects panel estimations on job satisfaction - effects of gender.

	(1) Women	(2) Men	(3) Whole sample
Working hours mismatch (in hours)	-0.0382***	-0.0224***	-0.0224***
	(0.00505)	(0.0037)	(0.00369)
Working time arrangement (ref. Alternating working time set by employer)			
Fixed working time	0.0748	0.0603	0.0568
	(0.0494)	(0.0403)	(0.0402)
Working time account	0.1700**	0.0441	0.0426
	(0.0681)	(0.0535)	(0.0535)
Self-managed working time	0.0513	0.0979*	0.0960*
	(0.0786)	(0.0562)	(0.0562)
Mismatch × Fixed working time	0.0168***	0.0029	0.0029
	(0.0059)	(0.0047)	(0.0047)
Mismatch × Working time account	0.0022	0.0080	0.0079
	(0.0070)	(0.0052)	(0.0052)
Mismatch × Self-managed working time	0.0159**	0.0035	0.0034
	(0.0078)	(0.0049)	(0.0049)
Mismatch × Women			-0.0161***
			(0.0063)
Fixed working time × Women			0.0190
			(0.0637)
Working time account × Women			0.1260
			(0.0865)
Self-managed working time × Women			-0.0430
			(0.0965)
Mismatch × Fixed working time × Women			0.0141*
			(0.0075)
Mismatch × Working time account × Women			-0.0052
			(0.0087)
Mismatch × Self-managed working time × Women			0.0128
			(0.0092)
Individual characteristics	yes	yes	yes
Job-related characteristics	yes	yes	yes
Year dummies	yes	yes	yes
Constant	9.404***	7.583***	8.273***
	(1.106)	(0.862)	(0.673)
Observations	27,812	40,257	68,069
R-squared (overall)	0.0647	0.0830	0.0795
Number of individuals	10,337	12,714	23,051

Notes: Robust standard errors in brackets. Clustered by individuals. *** p<0.01, ** p<0.05, * p<0.1. Individual characteristics: married (dummy), children (dummy), age in years, age squared, disability (dummy), German citizenship (dummy), years of schooling, health status (3 categories), domestic and family work time in hours. Job characteristics: tenure in years, firm size (4 categories), occupational position (9 categories), full-time employment (dummy), permanent contract (dummy), agency worker (dummy), job change (dummy), gross income in Euro,

perceived job security (3 categories).

Table 4: Individual fixed effects panel estimations on job satisfaction - effects of children.

	(1) Women
Working hours mismatch (in hours)	-0.0398***
	(0.0063)
Working time arrangement (ref. Alternating working time set by employer)	
Fixed working time	0.0666
	(0.0629)
Working time account	0.1440*
	(0.0836)
Self-managed working time	0.0434
	(0.102)
Mismatch × Fixed working time	0.0212***
	(0.0074)
Mismatch × Working time account	0.0008
	(0.0086)
Mismatch × Self-managed working time	0.0176*
	(0.0095)
Children	-0.0096
	(0.0958)
Mismatch × Children	0.0036
	(0.0100)
Fixed working time × Children	0.0208
	(0.0970)
Working time account × Children	0.0607
	(0.1200)
Self-managed working time × Children	0.0235
	(0.1450)
Mismatch × Fixed working time × Children	-0.0131
	(0.0121)
Mismatch × Working time account × Children	0.0085
	(0.0143)
Mismatch × Self-managed working time × Children	-0.0046
	(0.0161)
Individual characteristics	yes
Job-related characteristics	yes
Year dummies	yes
Constant	9.445***
	(1.107)
Observations	27,812
R-squared (overall)	0.0642
Number of individuals	10,337

Notes: Robust standard errors in brackets. Clustered by individuals. *** p<0.01, ** p<0.05, * p<0.1. Individual and

job characteristics: see notes of Table 3.

5. Robustness checks and remaining limitations

Our main results support our hypothesis that the negative relation between work hours mismatch and job satisfaction is positively moderated by the degree of an individual's working time autonomy. However, we only find marginal hints of gender differences but cannot find consistent particular effects for mothers. In the following, we perform some additional estimations and discuss our main results in more detail. Hereby, we address the role of contract hours (part-time vs. full-time employment), the role of overtime work and its compensation as well as additional domestic and family work. Moreover, we also apply a sensitivity check with regard to our sample. Results are not driven by outliers regarding working hours mismatch. Re-estimating our main fixed-effects approach of Table 2 and excluding observations with more than 25 hours of over-employment (n= 831) and our findings remain stable (see Table C in the appendix).[7]

Full-time and part-time employment

Employees may subjectively perceive their working hours mismatch depending on their contractual working hours. Therefore, we apply our estimation for full-time (n=60,330) and part-time (n=7,739) employees separately (see Table D in the appendix). Results largely confirm our previous results from Table 2 but, only over-employed individuals with fixed working hours report significantly higher job satisfaction than the reference group of employees with alternating working time set by the employer. Albeit, self-managed working time does not moderate the relation between mismatch and job satisfaction.

Indeed, part-time employment is mainly dominated by women (n=7,357), which is in line with official statistics (see OECD 2021b, for instance). The literature shows that women use part-time employment to reduce the family-work conflict (Wielers et al. 2014). The effect of employees who are working part-time but working more than preferred is known as 'part-time illusion' (van Echtelt et al. 2006). Analogously to Table 3, we focus on part-time employees. Gender-specific differences in part-time employment occur (see Table E in the appendix). In line with our previous results for the whole sample, working hours mismatch is more relevant for women's job satisfaction. Interestingly, gender differences are particularly prevalent for the moderating effect of working

[7] We also introduce four mismatch categories to examine our dataset for non-linear relations according to which lower or higher over-employment may drive our previous results. We do not find any hints of a non-linear relation, though.

time accounts for hours mismatch. The characteristics of working time accounts and the flexibilization of working hours given per week or month seem to support (especially) women in part-time work.

Hence, not only gender effects but also the type of employment contract is linked to the relationship of mismatch, autonomy and job satisfaction. It is reasonable that the use of paid working time, domestic and family work time and leisure time may differ between women and men and, additionally, between part-time and full-time employees; and their individual time use affects job satisfaction. Therefore, future research should disentangle an individual's time use, namely domestic and family work, in more detail to provide implications for those employees. Additionally, in our analysis we disregard under-employment. However, under-employment is more present in part-time employment, and therefore future part-time employment literature should take into account the effects of under-employment in part-time work on the relation between working time autonomy and job satisfaction.

Domestic and family work

As mentioned before, domestic and family work is relevant for women's time resources. Hence, domestic and family work time itself may moderate the link between mismatch and job satisfaction, in particular for women. Analogously to Table 4, we apply fixed-effects estimation considering three-way interaction between mismatch, working time autonomy and domestic and family work hours (see Table F in the appendix). In line with our previous results regarding the effects of children, our findings indicate no moderating link of domestic and family work hours on job satisfaction. However, focusing on other well-being scales, namely leisure time satisfaction or general life satisfaction, domestic and family work time may have an impact as moderator. Future research should attend to this consideration.

Actual working hours and the compensation of overtime work

Evidence implies an inverse relation between individuals' working time autonomy and overtime hours (e.g. Kelly et al. 2011, Seitz/Rigotti 2018). Following this consideration, a high level of working time autonomy, namely self-managed working time, may directly affect actual working time and, further, may influence working time mismatch. Van Echtelt et al. (2006) formulate this relationship as 'the autonomy paradox', which implies that employees with a high working time

control are at risk of working more than they have been contracted to do. In our sample, the working hours mismatch variable implicitly includes overtime while asking for generally actually worked hours, including any overtime, in the SOEP questionnaire. We apply individual fixed-effects estimation with (i) actual working hours and (ii) working hours mismatch as dependent variables, and self-managed working time is linked significantly positively with both respective variables, which is in line with previous findings (e.g. Beckmann et al. 2017; see Table G in the appendix). However, the relationship between overtime and job satisfaction varies with respect to its degree of voluntariness (Beckers et al. 2008), which is supposed to be relevant for self-managed working time in particular. As described in Table 2, the negative association of working hours mismatch on job satisfaction is positively moderated by a high level of individual working time autonomy. Unfortunately, we cannot control for voluntary overtime hours. Hence, future research should examine whether the nature of overtime hours is a relevant mediator for the relation between working hours mismatch and working time autonomy, and also examine its role for job satisfaction in more detail.

Closely related empirical studies reveal a positive link between overtime compensation and preferred working hours (Holly/Mohnen 2012). Unfortunately, individuals were not asked for their overtime compensation from 2015 to 2017 in the SOEP. Future research may address this issue in detail.

6. Conclusion

In our study, we add to the literature by focusing on the role of working time autonomy on the relationship between working hours mismatch and job satisfaction. In line with previous work, we report that hours mismatch is negatively related and working time autonomy positively related to job satisfaction. In line with our theoretical considerations, novel results reveal a positive moderation effect of working time autonomy on the link between working time mismatch and job satisfaction.

Further analyses unveil gender-specific differences but cannot support our hypothesis that working time autonomy moderates the negative relation between working hours mismatch and job satisfaction more for women than it does for men per se. Results are ambiguous and the differentiation of gender seem subject to a huge range of personal circumstances, schemes of life, or job characteristics which may affect individuals' and job-induced working time preferences and

autonomy arrangements. Future research should analyse individual characteristics which may determine working time mismatch more in-depth.

Further, the incidence of minor children does not seem to affect the relation between mismatch, autonomy and job satisfaction in a fundamental way in our sample and mothers do not seem to benefit from a high level of working time autonomy in particular. From the methodological point of view, the impact of children on mismatch may be less serious because employees, in particular women, may change their actual working hours after the arrival of a child. According to Drago et al. (2009), the arrival of a child is statistically linked to a decrease in working hours preferences of women, whereas the existence of children does not affect these preferences. Changing working hours after the arrival of a child may directly reduce an individual's perceived working hours mismatch, and working time autonomy may matter less. Further research should analyse family-life and its time use more deeply to reveal the (gender-specific) impact of children more precisely.

Overall, our results indicate that over-employment is a widespread phenomenon for employees and that employees' working time autonomy reduces its effect on job satisfaction. Therefore, politics and organisations should consider creating more opportunities – regardless of gender and family status – to offer employees working time autonomy in order to reduce the negative implications of over-employment on job outcomes. Possible trade-offs with respect to additional costs need to be taken into account. Additionally, research should analyse effects of other forms of autonomy, such as place of work or work method, on the link between mismatch and job satisfaction.

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Appendix

Table A: Descriptive statistics.

	Whole sample n= 68,069			
Variables	**Mean/ Share**	**SD**	**Min**	**Max**
Women (1=yes)	0.409		0	1
Children (1=yes)	0.435		0	1
Married (1=yes)	0.640		0	1
Age (in years)	43.61	10.292	18	66
Disability (1=yes)	0.057		0	1
German citizenship (1=yes)	0.920		0	1
Years of schooling	12.92	2.759	7	18
Domestic and family work time in hours	3.499	2.945	0	24
Firm tenure (in years)	11.81	10.277	0	50.6
Gross monthly wage (in €)	3166.37	1958.19	401	57,000
Full-time employment (1=yes)	0.886		0	1
Permanent contract (1=yes)	0.892		0	1
Agency worker (1=yes)	0.021		0	1
Firm size				
<20 (reference)	0.183			
20-199	0.284			
200-1999	0.235			
>2000	0.299			
Job change (1=yes)	0.129		0	1
Perceived job security				
Very concerned (reference)	0.103			
Somewhat concerned	0.344			
Not concerned at all	0.553			
Health status				
Very good (reference)	0.106			
Good	0.478			
Satisfactory	0.308			
Poor	0.096			
Bad	0.012			
Occupational position				
Unskilled blue-collar worker (reference)	0.101			
Skilled blue-collar worker	0.121			
Highly skilled blue-collar worker	0.035			
Unskilled white-collar worker	0.036			
Skilled white-collar worker	0.077			
Highly skilled white-collar worker	0.541			
Low/middle civil servant	0.023			
High level civil servant	0.041			
Executive civil servant	0.027			

Table B: Individual fixed effects panel estimations on job satisfaction.

	(1) Whole sample	(2) Whole sample
Working hours mismatch	-0.0226***	-0.0280***
	(0.0017)	(0.0030)
Working time arrangement (ref. Alternating working time set by employer)		
Fixed working time	0.1130***	0.0651**
	(0.0253)	(0.0312)
Working time account	0.1270***	0.0913**
	(0.0346)	(0.0421)
Self-managed working time	0.1350***	0.0765*
	(0.0373)	(0.0457)
Mismatch × Fixed working time		0.0079**
		(0.0036)
Mismatch × Working time account		0.0053
		(0.0042)
Mismatch × Self-managed working time		0.0081**
		(0.0041)
Married (1=yes)	0.0077	0.0094
	(0.0416)	(0.0416)
Children (1=yes)	-0.0052	-0.0051
	(0.0319)	(0.0319)
Age	-0.0308**	-0.0310**
	(0.0137)	(0.0137)
Age × Age	0.0003*	0.0003*
	(0.0001)	(0.0001)
Disability (1=yes)	-0.1100*	-0.1100*
	(0.0592)	(0.0591)
German citizenship (1=yes)	-0.1990	-0.1970
	(0.1240)	(0.1240)
Years of schooling	-0.0337	-0.0338
	(0.0480)	(0.0480)
Current health status (Ref.: Very good)		
Good	-0.1870***	-0.1870***
	(0.0277)	(0.0277)
Satisfactory	-0.5410***	-0.5410***
	(0.0328)	(0.0328)
Poor	-0.9370***	-0.9370***
	(0.0441)	(0.0441)
Bad	-1.3870***	-1.3850***
	(0.1060)	(0.1060)
Domestic and family work time in hours	-0.0070*	-0.0070*
	(0.0043)	(0.0043)
Firm tenure in years	-0.0076*	-0.0076*

	(0.0043)	(0.0043)
Firm size		
(Ref.: < 20)		
20-199	0.0268	0.0262
	(0.0411)	(0.0411)
200-1999	0.0903*	0.0890*
	(0.0468)	(0.0468)
≥ 2000	0.1210**	0.1190**
	(0.0482)	(0.0482)
Occupational position		
(Ref.: Unskilled blue-collar worker)		
Skilled blue-collar worker	0.1770***	0.1760***
	(0.0537)	(0.0537)
Highly skilled blue-collar worker	0.3020***	0.3010***
	(0.0692)	(0.0692)
Unskilled/semiskilled white-collar worker	0.2100***	0.2100***
	(0.0684)	(0.0684)
Skilled white-collar worker	0.2450***	0.2440***
	(0.0598)	(0.0598)
Highly skilled white-collar worker	0.3620***	0.3610***
	(0.0577)	(0.0577)
Low/middle-level civil service	0.210	0.212
	(0.184)	(0.184)
High-level civil service	0.4890***	0.4910***
	(0.157)	(0.157)
Executive civil service	0.7280***	0.7310***
	(0.1570)	(0.1570)
Full-time employment (1=yes)	-0.0552	-0.0566
	(0.0748)	(0.0747)
Permanent contract (1=yes)	-0.0622*	-0.0625*
	(0.0369)	(0.0369)
Agency worker (1=yes)	-0.201**	-0.201**
	(0.0783)	(0.0783)
Job change (1=yes)	0.3020***	0.3020***
	(0.0283)	(0.0283)
Gross monthly wage	5.73e-05***	5.72e-05***
	(1.14e-05)	(1.14e-05)
Perceived job security		
(Ref.: Very concerned)		
Somewhat concerned	0.5820***	0.5830***
	(0.0346)	(0.0346)
Not concerned at all	0.8850***	0.8860***
	(0.0387)	(0.0387)
Federal state		
(Ref.: North Rhine-Westphalia)		
Schleswig-Holstein	0.587*	0.585*
	(0.319)	(0.318)

Hamburg	0.325	0.324
	(0.335)	(0.335)
Lower Saxony	-0.318	-0.321
	(0.235)	(0.235)
Bremen	0.108	0.106
	(0.366)	(0.366)
Hesse	0.0921	0.0939
	(0.247)	(0.247)
Rhineland-Palatinate	0.464	0.464
	(0.300)	(0.300)
Baden-Württemberg	0.289	0.287
	(0.237)	(0.237)
Bavaria	0.224	0.222
	(0.239)	(0.239)
Saarland	0.245	0.231
	(0.669)	(0.669)
Berlin	-0.305	-0.310
	(0.340)	(0.339)
Mecklenburg-West Pomerania	-0.542*	-0.544*
	(0.308)	(0.307)
Brandenburg	-0.933**	-0.937**
	(0.463)	(0.464)
Saxony-Anhalt	0.247	0.241
	(0.308)	(0.308)
Thuringia	0.522	0.519
	(0.403)	(0.404)
Saxony	0.0531	0.0492
	(0.387)	(0.388)
2005	-0.0611**	-0.0606**
	(0.0276)	(0.0276)
2007	-0.0802***	-0.0805***
	(0.0275)	(0.0275)
2009	-0.130***	-0.130***
	(0.0299)	(0.0298)
2010	0.267**	0.268**
	(0.113)	(0.113)
2011	-0.0315	-0.0312
	(0.0282)	(0.0282)
2012	-0.0934	-0.0927
	(0.0866)	(0.0865)
2013	-0.0475	-0.0484
	(0.0795)	(0.0795)
2014	0.0876***	0.0876***
	(0.0248)	(0.0248)
2015	0.104***	0.104***
	(0.0239)	(0.0239)
2016	0.123***	0.123***

	(0.0232)	(0.0232)
2017	0.0607***	0.0600***
	(0.0212)	(0.0212)
2018	-	-
Constant	8.267***	8.310***
	(0.674)	(0.675)
Observations	68,069	68,069
R-squared (overall)	0.0793	0.0793
Number of individuals	23,051	23,051

Notes: Robust standard errors in brackets. Clustered by individuals. *** p<0.01, ** p<0.05, * p<0.1.

Table C: Individual fixed effects panel estimations on job satisfaction – sample without outliers.

	(1) Whole sample	(2) Whole sample
Working hours mismatch	-0.0256***	-0.0306***
	(0.00180)	(0.00334)
Working time arrangement		
(ref. Alternating working time set by employer)		
Fixed working time	0.107***	0.0669**
	(0.0254)	(0.0318)
Working time account	0.116***	0.0935**
	(0.0347)	(0.0429)
Self-managed working time	0.131***	0.0701
	(0.0376)	(0.0471)
Mismatch × Fixed working time		0.0071*
		(0.0040)
Mismatch × Working time account		0.0037
		(0.0046)
Mismatch × Self-managed working time		0.0088*
		(0.0047)
Individual characteristics	yes	yes
Job-related characteristics	yes	yes
Year dummies	yes	yes
Constant	8.102***	8.142***
	(0.666)	(0.667)
Observations	67,238	67,238
R-squared (overall)	0.0797	0.0798
Number of individuals	22,921	22,921

Notes: Robust standard errors in brackets. Clustered by individuals. *** p<0.01, ** p<0.05, * p<0.1. Individual characteristics: women (dummy), children (dummy), married (dummy), age in years, age squared, disability (dummy), German citizenship (dummy), years of schooling, health status (3 categories), domestic and family work time in hours. Job characteristics: tenure in years, firm size (4 categories), occupational position (9 categories), full-time employment (dummy), permanent contract (dummy), agency worker (dummy), job change (dummy), gross income in Euro, perceived job security (3 categories).

Table D: Individual fixed effects panel estimations on job satisfaction by employment type.

	(1) Full-time employed	(2) Part-time employed
Working hours mismatch (in hours)	-0.0270***	-0.0499***
	(0.00307)	(0.0180)
Working time arrangement		
(ref. Alternating working time set by employer)		
Fixed working time	0.0565*	0.0438
	(0.0337)	(0.0854)
Working time account	0.0702	0.203*
	(0.0451)	(0.117)
Self-managed working time	0.0735	0.0403
	(0.0490)	(0.132)
Mismatch × Fixed working time	0.0068*	0.0385*
	(0.0038)	(0.0216)
Mismatch × Working time account	0.0060	0.0149
	(0.0043)	(0.0230)
Mismatch × Self-managed working time	0.0070	0.0435
	(0.0043)	(0.0304)
Individual characteristics	yes	yes
Job-related characteristics	yes	yes
Year dummies	yes	yes
Constant	8.495***	13.32***
	(0.765)	(1.726)
Observations	60,330	7,739
R-squared (overall)	0.0808	0.0137
Number of individuals	19,959	3,791

Note: Robust standard errors in brackets. Clustered by individuals. *** p<0.01, ** p<0.05, * p<0.1. Individual characteristics: children (dummy), married (dummy), age in years, age squared, disability (dummy), German citizenship (dummy), years of schooling, health status (3 categories), and domestic and family work time in hours. Job characteristics: tenure in years, firm size (4 categories), occupational position (9 categories), full-time employment (dummy), permanent contract (dummy), agency worker (dummy), job change (dummy), gross income in Euro, perceived job security (3 categories).

Table E: Individual fixed effects panel estimations on job satisfaction for part-time employed individuals.

	(1) Part-time employed
Working hours mismatch (in hours)	0.0992
	(0.0840)
Working time arrangement	
(ref. Alternating working time set by employer)	
Fixed working time	-0.0346
	(0.496)
Working time account	0.698
	(0.693)
Self-managed working time	0.622
	(0.824)
Mismatch × Fixed working time	-0.0437
	(0.103)
Mismatch × Working time account	-0.259***
	(0.0947)
Mismatch × Self-managed working time	-0.0710
	(0.111)
Mismatch × Women	-0.153*
	(0.0860)
Fixed working time × Women	0.0880
	(0.503)
Working time account × Women	-0.514
	(0.702)
Self-managed working time × Women	-0.600
	(0.834)
Mismatch × Fixed working time × Women	0.0835
	(0.105)
Mismatch × Working time account × Women	0.282***
	(0.0976)
Mismatch × Self-managed working time × Women	0.118
	(0.115)
Individual characteristics	yes
Job-related characteristics	yes
Year dummies	yes
Constant	13.43***
	(1.748)
Observations	7,739
R-squared (overall)	0.0137
Number of individuals	3,791

Notes: Robust standard errors in brackets. Clustered by individuals. *** p<0.01, ** p<0.05, * p<0.1. Individual characteristics: women (dummy), children (dummy), married (dummy), age in years, age squared, disability (dummy), German citizenship (dummy), years of schooling, health status (3 categories), and domestic and family work time in hours. Job characteristics: tenure in years, firm size (4 categories), occupational position (9 categories), full-time employment (dummy), permanent contract (dummy), agency worker (dummy), job change (dummy), gross income in Euro, perceived job security (3 categories).

Table F: Individual fixed effects panel estimations job satisfaction moderation of domestic and family work.

		(1) Women
Working hours mismatch (in hours)		-0.0376***
		(0.00873)
Working time arrangement (ref. Alternating working time set by employer)		
	Fixed working time	0.0109
		(0.0813)
	Working time account	0.0525
		(0.0997)
	Self-managed working time	-0.0923
		(0.119)
Mismatch × Fixed working time		0.0136
		(0.0106)
Mismatch × Working time account		0.0022
		(0.0119)
Mismatch × Self-managed working time		0.0196
		(0.0119)
Domestic and family work time		-0.0234**
		(0.0119)
Mismatch × Domestic and family work time		-0.00032
		(0.0019)
Fixed working time × Domestic and family work time		0.0131
		(0.0137)
Working time account × Domestic and family work time		0.0253*
		(0.0153)
Self-managed working time × Domestic and family work time		0.0305*
		(0.0182)
Mismatch × Fixed working time × Domestic and family work time		0.0009
		(0.0022)
Mismatch × Working time account × Domestic and family work time		0.0002
		(0.0026)
Mismatch × Self-managed working time × Domestic and family work time		-0.0007
		(0.0024)
Individual characteristics		yes
Job-related characteristics		yes
Year dummies		yes
Constant		9.493***
		(1.106)
Observations		27,812
R-squared (overall)		0.0648
Number of individuals		10,337

Notes: Robust standard errors in brackets. Clustered by individuals. *** p<0.01, ** p<0.05, * p<0.1. Individual characteristics: women (dummy), children (dummy), married (dummy), age in years, age squared, disability (dummy), German citizenship (dummy), years of schooling, and health status (3 categories). Job characteristics: tenure in years, firm size (4 categories), occupational position (9 categories), full-time employment (dummy), permanent contract (dummy), agency worker (dummy), job change (dummy), gross income in Euro, perceived job security (3 categories).

Table G: Individual fixed effects panel estimations on actual working hours.

	(1) Whole sample	(2) Whole sample
Dep. Variable:	**Actual working hours**	**Workings hours mismatch**
Working time arrangement		
(ref. Alternating working time set by employer)		
Fixed working time	-0.674***	-0.485***
	(0.0759)	(0.0866)
Working time account	-0.0825	-0.118
	(0.102)	(0.116)
Self-managed working time	0.978***	0.561***
	(0.134)	(0.143)
Individual characteristics	yes	yes
Job-related characteristics	yes	yes
Year dummies	yes	yes
Constant	15.35***	-7.012***
	(2.095)	(2.012)
Observations	68,069	68,069
R-squared (overall)	0.5306	0.0738
Number of individuals	23,051	23,051

Notes: Robust standard errors in brackets. Clustered by individuals. *** p<0.01, ** p<0.05, * p<0.1. Individual characteristics: children (dummy), married (dummy), age in years, age squared, disability (dummy), German citizenship (dummy), years of schooling, health status (3 categories), and domestic and family work time in hours. Job characteristics: tenure in years, firm size (4 categories), occupational position (9 categories), full-time employment (dummy), permanent contract (dummy), agency worker (dummy), job change (dummy), gross income in Euro, perceived job security (3 categories).