Do Women Expect Wage Cuts for Part-Time Work?

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Abstract

I quantify the perceived changes in hourly wage rates associated with working different hours on the same job for a representative sample of female workers. While part-time working women expect significant hourly wage gains from switching to full-time work - 7% on average - full-time workers expect no effect on current wages when switching to part-time, on average. Perceived pecuniary losses from part-time work are most pronounced among full-time working mothers and women in managerial jobs. Using density forecasts, I document a large uncertainty about the perceived pay gap that correlates with the probability to report extreme wage penalties, as well as with worker characteristics. Comparing beliefs with selectivity-corrected estimates of the objective part-time penalty further indicates that full-time workers on average underestimate part-time wage losses, whereas part-time workers tend to overestimate full-time wage gains.

Keywords: expectations, female labor supply, part-time wage gap

JEL codes: D84; J22; J31

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1. Introduction

Many women will work part-time at some stage of their working career.[2] Although both men and women mostly start out in full-time positions, women, more frequently than men, make adjustments to their labor supply choices (Kleven et al., 2019; Apps and Rees, 2005). One common pattern is that women sharply reduce working hours after giving birth to their first child, subsequently increasing hours as children enter day care or school, then reduce hours again when elderly relatives are in need of care.[3] Despite this mobility, women remain overrepresented in part-time jobs well beyond the child-rearing years, generating substantial and persistent gender segregation in employment contracts (Petrongolo, 2004), which in turn has significant implications for gender wage gaps (Cortés and Pan, 2019; Goldin, 2014).

One key factor that may influence a woman's decision to work part-time or to resume a full-time position after spending years in part-time employment is whether she expects wage gains or losses when moving between full-time and part-time work. In standard labor supply models, the number of hours chosen to work directly depends on expected wage offers, which may differ between part-time and full-time employment (Blundell et al., 2016; Francesconi, 2002).

Previous studies analyze if women experience changes in hourly wage rates when they transition between full-time and part-time work, but unless one is willing to impose rational expectations, worker beliefs about the part-time wage penalty remain unidentified. If women fail to factor in wage losses where they exist or anticipate wage gains where there are none, they may misjudge the true costs or benefits of changing working hours, which can lead to suboptimal decision making. Moreover, even in the absence of beliefs-

[2] As of 2022, one in four women in OECD countries works part-time; in Germany the female part-time share amounts to 37 percent (OECD, 2022). Throughout their career, two thirds of working women are predicted to work part-time, based on UK data (Connolly and Gregory, 2010).

[3] The link between female labor supply and children is well documented, amongst others by Kleven et al. (2019); Adda et al. (2017); Rosenzweig and Wolpin (1980). Apps and Rees (2005) relate gender differences and life-cycle variation in time use and labor supply to tax policy and formal child care. Schmieder (2021) provides a comprehensive overview of studies on fertility and female employment. Johnson and Lo Sasso (2006), Fischer and Müller (2020), and Geyer and Korfhage (2018), among others, analyze the labor supply effects of elder care.

biases, measuring the perceived returns to full- and part-time work would release us from making unverified assumptions about rationality. Yet, whether women expect different wage rates in part-time and in full-time employment remains largely unanswered. Stevens et al. (2004), in a survey of British women about various aspects of work-life balance, report that 74% of surveyed women believe their employer pays part-time and full-time working women the same hourly wage. Boneva et al. (2021), using vignettes to depict a hypothetical family in which the mother works full-time, part-time, or stays at home, document that survey respondents predict lower life-time earnings for part-time working mothers. However, none of these existing studies measure women's self-beliefs about their *own* perceived wage loss or gain when switching between full- and part-time work, which is arguably the more relevant criterion in labor supply decisions. For example, individuals may predict negative part-time penalties for other (hypothetical) persons but not for themselves if they are informed but overconfident. Moreover, existing work on the perceived returns to hours worked mostly focus on future returns, hence documenting the perceived long-run effects of part-time work on wage growth (Boneva et al., 2021; Blesch et al., 2021).[4] Although beliefs about the long-run effects are important when agents are forward-looking, expectations about the direct or short-run impact of part-time work on current wages are of particular interest if agents are either myopic, that is, not forward-looking, or if they are present-biased, thereby prioritizing immediate over future pay-offs. To the best of my knowledge, no existing study analyzes women's expectations about the effect of working different hours on current wages. Hence, whether women expect wage cuts for part-time work is not fully understood.

In this paper, I quantify the perceived hourly wage losses and gains from working different hours on the same job among a representative sample of working women. I utilize a within-subject design with hypothetical scenarios implemented in a survey experiment, hence comparing the part-time and the full-time scenarios at the individual respondent

[4]In the long-term, part-time employment can cause productivity losses (Blundell et al., 2016) or different rates of promotions (Deschacht, 2017) that, in turn, compress wage growth (Gicheva, 2013). These 'second-order effects' on future wages (not to be confused with effects on current nonwage outcomes or fringe benefits) can arise as part-time work becomes persistent, creating a 'part-time experience penalty' that goes beyond the direct first-order effect of working part-time in a given period. Unless noted otherwise, this paper refers to first-order wage effects, i.e. effects of working different hours on current wages.

level. The within-subject design allows me to evaluate the perceived wage changes associated with working different hours while holding constant individual and job characteristics. Specifically, I ask full-time working respondents to consider a hypothetical transition to working part-time at 20 hours per week, *ceteris paribus*, and report the anticipated wage offer associated with this transition. Conversely, part-time working respondents are asked to report their expected wage offer for a hypothetical transition to working full-time at 40 hours per week. Utilizing information on current earnings and working hours, I measure the perceived hourly part-time wage penalty among full-time working respondents, and the perceived full-time wage premium among part-time working respondents. I integrate the survey experiment into the Innovation Sample of the German Socio-Economic Panel (SOEP-IS) between 2016-2019. The SOEP-IS is a moderately sized survey of German households that is representative of the German population, thus allowing me to study the expectations of employed women across various backgrounds and occupations.

I find that full-time working women, on average, expect no hourly wage cuts for switching to part-time (0.21 percent, $p>0.1$). However, part-time working women expect notable full-time wage premiums (6.70 percent, $p<0.01$). The asymmetry between full-time and part-time working women is amplified further when estimates of the wage penalties and premiums account for current overtime. Thus, women's beliefs do not appear to be affected by cognitive dissonance, the inclination to report beliefs that justify past choices, which is a commonly voiced concern with subjective data (Bertrand and Mullainathan, 2001), but seems to be less relevant here.

In studying the disagreement between workers about the part-time penalty, I document that motherhood is a significant correlate of belief heterogeneity among full-time workers. Full-time working women with children expect 6.74 percentage points stronger wage losses from part-time work compared to non-mothers ($p<0.1$), suggesting that these women may have self-selected into full-time employment precisely because they would face a wage penalty if they chose to work part-time on that job. However, the majority of mothers work part-time. Among part-time workers, both mothers and non-mothers expect similarly high returns to full-time employment of about 7 percent. Adding to previous findings by Boneva et al. (2021) who show that individuals predict pecuniary losses for

part-time working mothers, I document that mothers themselves perceive the relationship between hours and their own earnings as convex.

Besides analyzing the point forecasts of counterfactual wage offers, I quantify respondents' uncertainty about the perceived wage penalties and premiums. Using the methods proposed by Engelberg et al. (2009) and Bellemare et al. (2012), I construct density forecasts from subjective bin probabilities to measure belief uncertainty and to evaluate the robustness of the point forecasts as measures of subjective central tendency. I find that full-time workers tend to report point estimates that correspond to the lower percentiles of their subjective distribution, in line with point-prediction optimism (Engelberg et al., 2009). The extent to which point estimates deviate from subjective means further correlates with belief uncertainty. I also show that workers who are more uncertain expect more extreme wage penalties and premiums. Overall, belief uncertainty is substantial, with respondents assigning large probabilities to penalties above 20 percent and below -20 percent. Observable characteristics can to some extent predict uncertainty among full-time workers, but barely among part-time workers. Regional variation in uncertainty indicates that there might be learning effects, given that full-time workers in Eastern Germany - where part-time employment is less common - reveal higher uncertainty about the part-time penalty.

To further interpret and evaluate workers' beliefs, I estimate the returns to full- and part-time work from observed data, using these estimates as proxies of the objective pay penalty and the premium of working different hours, controlling for job and worker characteristics. Estimates of the observed returns are then compared to the perceived returns. To compute the observed returns, I build a static structural discrete choice model of female labor supply and estimate the model on a sample of German women that is comparable to the SOEP-IS sample, exploiting the longitudinal dimension of the larger German Socio-Economic Panel (SOEP) to model selection into part-time, full-time, and non-employment. To account for the endogeneity of wages and working hours, I estimate counterfactual full-time and part-time wage offers jointly with a multinomial logit hours equation, building on Van Soest (1995) and Francesconi (2002).

In comparing estimates of the observed returns with women's expectations, I provide suggestive evidence of a mismatch between women's beliefs and objective data. Adding

to previous work by Hirsch (2005) who documents stronger effects on hourly wages for full-time workers moving to part-time than for part-time workers moving to full-time, I find that part-time workers appear to overestimate full-time wage gains, whereas full-time workers seem to underestimate part-time wage losses. The apparent mismatch is consistent with worker overconfidence, possibly driven by misperceptions about the returns to work experience accumulated in full- and part-time employment. Although suggestive, these findings have some interesting implications for women's labor supply decisions, as discussed below.

In a set of robustness checks, I use alternative measures of working hours and part-time status to ensure that results do not depend on a specific hours threshold or on the exclusion of overtime. I further provide non-structural estimates of the observed part-time wage penalty based on OLS and fixed effects regressions of Mincerian log-wage equations. Moreover, I extensively discuss the role of nonwage benefits for workers' perceptions of the relative returns to full- and part-time work.

The results from this paper contribute to our understanding of observed choice patterns in many OECD labor markets, where female part-time shares reach levels up to 60 percent.[5] The beliefs documented in this paper can rationalize why few women hesitate to reduce hours, for instance to engage in care work. Full-time working women who expect no changes in the hourly wage rate when switching to a part-time position have lower incentives to prefer full- over part-time contracts in a given period, thereby explaining the mobility from full- to part-time employment observed in many female labor markets (Kleven et al., 2019; Apps and Rees, 2005). One other interesting insight from this paper is that women's wage expectations cannot explain why so many women remain in part-time positions over prolonged periods of time. Part-time working women expect wage gains from full-time work - in fact, they even seem to overestimate these gains. Possibly, expected short-run wage gains are too small to alter labor supply choices in comparison to other pecuniary and non-pecuniary benefits of part-time employment. In Germany, joint taxation schemes continue to reward, thereby incentivizing, the part-time employment of the secondary earner (Bick and Fuchs-Schündeln, 2017; Steiner and Wrohlich, 2004). Another explanation is that women's labor supply choices largely reflect (perceived) social

[5] In 2020, the female part-time share reached 57 percent in the Netherlands, 37 percent in Germany, and 34 percent in the UK (OECD, 2022).

norms and constraints related to child care (Boneva et al., 2021; Müller and Wrohlich, 2020). By uncovering women's beliefs about the relative costs of part-time employment, the results from this paper narrow down the set of potential determinants of women's labor supply decisions.

This paper also contributes to a large theoretical and empirical literature studying the wage penalty of working part-time (Ermisch and Wright, 1993; Paul, 2016; Booth and Wood, 2008; Connolly and Gregory, 2008; Manning and Petrongolo, 2008; Aaronson and French, 2004; Hirsch, 2005, to cite a few). I review this existing literature in more detail in a separate section of this paper. The main novelty of this paper is to quantify women's self-beliefs about the respective wage losses and gains of switching between full- and part-time employment.

Finally, this paper also contributes to the growing literature using stated expectations data to overcome the standard identification problem in revealed preference analysis (Manski, 2004; Zafar, 2011; Wiswall and Zafar, 2021). Specifically, the results presented here provide a behavioral foundation for economists modeling female labor supply. Labor supply models require an assumption about the wage-hours locus and there are competing approaches in the literature. Standard discrete choice models in the tradition of Van Soest (1995) impose constant wage offers for full-time and part-time work, implicitly assuming that decision-makers expect constant wages. Others estimate counterfactual part-time and full-time wage offers, hence assuming that expectations about the part-time wage penalty match econometric predictions (Francesconi, 2002; Löffler et al., 2014). So far, the choice between competing models is guided by whether researchers believe a rational agent *should* take into account a part-time wage penalty. However, whether agents *actually* expect different wage offers in part-time and in full-time employment is ultimately an empirical question. This paper answers this question for a representative sample of female workers and can serve as a behavioral guideline for researchers striving to capture key features of agents' decision-processes within economic models of female labor supply.

The remainder of this paper proceeds as follows. Section 2 discusses the mechanisms that generate part-time wage gaps and reviews previous empirical findings. Section 3 outlines the research design. Section 4 describes the data. Section 5 presents the results and section 6 concludes.

2. Part-Time Wage Gaps: Mechanisms and Empirical Literature

There are three broad explanations why part-time workers earn lower hourly wages than full-time workers: First, the jobs they do are different. Second, the workers themselves are different. Third, firms face different costs when employing workers part-time or full-time and compensate by paying different wage rates to otherwise identical workers in identical jobs. I review these three mechanisms in turn, starting with the last.

2.1. Firms' Cost Functions

Firms face fixed costs of labor for recruitment, training, and coordination. These fixed costs can pay off less for part-time workers who work fewer hours; hence, firms may pay them lower wages to offset relatively higher costs (Oi, 1962; Montgomery, 1988).[6] Goldin (2014) extends this argument, showing that coordination costs can be higher for part-time workers, incentivizing firms to reward workers who facilitate smooth workflows. Another reason why part-time workers may be less valuable to firms are productivity detriments caused by every-day 'set-up' costs which create rising marginal products of daily working hours (Barzel, 1973; Moffitt, 1984). Empirically, researchers analyze if firms reward workers with identical characteristics differently in part-time and in full-time employment, which could point to different cost functions. However, firms that face higher costs when employing workers part-time may not always have the wriggle room to adjust hourly wages to match their costs. Instead, firms may choose to not offer flexible hours for all positions, which explains why part-time and full-time employees often do different jobs.

2.2. Job Segmentation

The segmentation of jobs into those that are exclusively offered on a full-time basis and those that are 'part-time compatible' is well documented. Part-time workers are heavily concentrated in low-wage sectors and in work arrangements with fixed-term contracts, often deemed as marginal or secondary employment (Fernández-Kranz and Rodríguez-Planas, 2011). Wage gains generated by changes in the skill content of work due to technological change also fall exclusively upon full-time workers, spreading wages even

[6] See also Ermisch and Wright (1993) and Wolf (2002) for excellent reviews of the early literature.

further between sectors (Gallego-Granados, 2019; Black and Spitz-Oener, 2010). Job segmentation also generates additional job mobility. If firms do not offer comparable part-time positions, workers seeking to reduce hours may have to change employers or move to a different position within their firm. This involuntary mobility comes with the risk of losing job-specific human capital, or making an occupational downward move; both can in turn compress wages (Manning and Petrongolo, 2008).

2.3. Worker Selection

Finally, part-time workers may earn lower hourly wages because they differ in relevant ways from full-time workers. Some of these differences already exist when people initially select into part-time and full-time jobs, reflecting differences in preferences or constraints. One example is given by Adda et al. (2017), who show that career choices mirror worker differences in desired fertility, with women who have higher preferences for children choosing family friendly occupations - with the 'amenity' of part-time work - more often.[7] Other differences can arise between previously identical workers after employment choices have persisted for prolonged periods of time. Work experience appears to be most valuable if it is accumulated in full-time, which can generate second-order effects of part-time work, i.e. effects on future career progression and wage growth (Blundell et al., 2016). Hence, it is part-time work itself that can make part-time workers less productive, especially if the choice to work part-time becomes permanent (Connolly and Gregory, 2010). The extent to which part-time and full-time workers differ also depends on the labor force participation of women, in general, and of mothers, in particular. Whether and which women work reflects the gender norms of a society and the political environment, such as whether affordable child care reduces the opportunity costs for working mothers (Müller and Wrohlich, 2020). In Germany, the selection of women into part-time has undergone a major transition, going from positive in the early 1990s to null, if not negative, in the 2010s (Gallego-Granados, 2019; Biewen et al., 2018).

2.4. Estimates of the Part-Time Wage Penalty in Previous Literature

[7]The fact that workers accept lower wages for part-time positions is sometimes interpreted within the narrative of *compensating wage differentials*. An alternative reading is that more vulnerable employees face constraints that firms can exploit. Ermisch and Wright (1993) point out that *monopsonistic employers* can exploit the restricted geographic mobility of potential part-time workers - often women with young children - by offering them lower wages.

Table 1: Part-Time Wage Penalties in Previous Literature

Authors (Year)	Unadjusted	Adjusted	Country/ Years	Data
Aaronson and French (2004)	20-56	-1-25	US/ 1968-2000	PSID, HRS, ORG, CPS
Averett and Hotchkiss (1996)	27-62	7-50	US/ 1989	CPS
Bardasi and Gornick (2008)	-1-22	-3-18	Cross Country/ 1994-1995	LIS
Blank (1990)	19-26	-17-18	US/ 1987	CPS
Blundell et al. (2016)	n.r.	5-8	UK/ 1991-2008	BHPS
Booth and Wood (2008)	1-13	-16 to -10	Australia/ 2001-2004	HILDA
Connolly and Gregory (2008)	15-29	3-11	UK/ 1975-2001	NESPD
Ermisch and Wright (1993)	17	8	UK/ 1980	WES
Fernández-Kranz and Rodríguez-Planas (2011)	35-38	9-14	Spain/ 1996-2006	CSWH
Fernández-Kranz et al. (2015)	31-37	6-8	Spain/ 1996-2006	CSWH
Fouarge and Muffels (2009)	n.r.	0-5	Cross Country/ 1984-2006	SEP, BHPS, SOEP
Gallego-Granados (2019)	9-19	-8-7	West GER/ 1990-2009	SOEP
Gornick and Jacobs (1996)	8-28	-19-23	Cross Country/ 1986-87	LIS
Hardoy and Schøne (2006)	5	0	Norway/ 1997-1998	LLS
Hirsch (2005)	26-49	-5-18	US/ 1995-2002	CPS
Manning and Petrongolo (2008)	25-27	3-10	UK/ 2001-2003	LFS
Matteazzi et al. (2014)	8-22	-20-15	Cross Country/ 2009	EU-SILC
Mumford and Smith (2008)	12-18	0-11	UK/ 2004	WERS04
Paul (2016)	4-32	-2- 9	GER/ 1984 - 2011	SOEP
Preston and Yu (2015)	15-22	-4-9	Australia/ 2010	Australia at Work
Simpson (1986)	31	10	Canada/ 1981	Survey of Work History
Wolf (2002)	n.r.	0-1	West GER/ 1995	SOEP

Notes: Mean or median wage gaps (log difference*100%) rounded to the closest integer value. Negative values denote part-time premia. Some papers include males. All reporting errors are my own. Literature review incomplete, suggestions welcome. The review does not contain results by McGinnity and McManus (2007); Green and Ferber (2005); Montgomery and Cosgrove (1995) due to lack of access. n.r.= not reported.

Empirical estimates of the part-time wage penalty in the existing literature vary widely (Table 1). I broadly summarize the literature with five main findings: (1) adjusting for worker and job segmentation reduces raw wage gaps by about half; (2) adjusted gaps are larger for men than for women; (3) most studies assume symmetric effects between switching from full- to part-time and from part- to full-time; (4) fixed effects estimates yield smaller part-time wage gaps than estimates that do not exclusively use within-individual variation; and (5) the wage exogeneity assumption is problematic, most studies attempt to jointly model wages and hours or correct for selection into part-time. For German females, estimates of the raw wage gap are around 20 percent including marginal part-time and adjusted penalties range from average part-time premia of eight percent (Gallego-Granados, 2019) to penalties of nine percent for short part-time work up to 15 hours per week (Paul, 2016).

3. Research Design

This section presents the empirical procedure used to quantify women's expectations about the wage gains and losses from working different hours.

3.1. Measuring the Perceived Returns to Full- and Part-Time Work

I measure the perceived returns to full- and part-time work utilizing a within-subject design with hypothetical scenarios implemented in a survey experiment. For each respondent, I collect (i) her current hourly wage given her actual work status, and (ii) her expected counterfactual wage offer in a hypothetical scenario of switching between working full-time and part-time, *ceteris paribus*. The within-subject design allows me to evaluate the perceived wage change associated with working different hours on the same job, holding constant individual and job characteristics. Hence, an important channel of selection bias is shut off by design because perceived returns to full- and part-time work are computed within rather than across individuals.

Specifically, full-time working respondents are asked to consider a hypothetical transition from full-time to part-time, then report the anticipated wage offer associated with this transition, based on the following survey instrument:[8]

[8]The survey instrument is based on a filter question that splits according to self-reported employment status.

'Please imagine you were to switch to a part-time job from now on, working 20 hours per week. Please only consider part-time jobs that you could carry-out with your current level of qualification. What monthly gross income do you expect to earn when working part-time at 20 hours per week?'

Part-time working individuals are asked a corresponding question that enquires about their expected income when switching to full-time at 40 hours per week. I construct each respondent's perceived wage differential between full- and part-time as the log difference between her actual hourly wage and the expected counterfactual wage offer in the hypothetical scenario.[9]

Formally, let n denote the individual respondent who is in one of two states of the world j, working either full-time (FT) or part-time (PT), $j_n \in \{FT, PT\}$. Then her expected full-time/part-time log wage differential conditional on her current state, $\tilde{E}[\omega_{FT,n} - \omega_{PT,n}|j_n]$, is given by,

$$\tilde{E}[\omega_{FT,n} - \omega_{PT,n}|j_n] = \begin{cases} \omega_{FT,n} - \tilde{E}[\omega_{PT,n}|j_n = FT] & \text{if } j_n = FT \\ \\ \tilde{E}[\omega_{FT,n}|j_n = PT] - \omega_{PT,n} & \text{if } j_n = PT \end{cases} \tag{1}$$

where $\omega_{j,n}$ is the natural logarithm of the respondent's actual hourly wage in the current state, based on current monthly gross labor income, Y_n, and reported weekly working hours, h_n,

$$\omega_{j,n} = ln\left(\frac{Y_n}{h_n \cdot \frac{52}{12}}\right) \quad \text{if } j_n = j \tag{2}$$

[9]One caveat in comparing actual earnings to expected earnings is that current earnings represent only a single draw from the distribution of potential earnings. However, a worker's current realized wage may not be identical to the *ex-ante* wage offer she expected before selecting into the current sector. Potential ways to circumvent this problem would be to elicit the *ex-ante* beliefs about potential wage offers in full-time and in part-time employment among a sample of women who are currently non-working, to elicit the perceived wage changes for a hypothetical worker, or to ask about self-expected wage offers for a hypothetical job in which respondents work either full- or part-time.

and $\tilde{E}[\omega_{j,n}|j_n \neq j]$ is the natural logarithm of the respondent's expected counterfactual hourly wage, based on expected monthly gross labor income for a hypothetical switch to the other state, $\tilde{Y}_n$, and $h_j \in (40, 20)$ as specified in the survey experiment,[10]

$$\tilde{E}[\omega_{j,n}|j_n \neq j] = ln\left(\frac{\tilde{Y}_n}{h_j \cdot \frac{52}{12}}\right) \quad \text{if } j_n \neq j \tag{3}$$

The sample mean across all full-time working respondents yields the average expected wage penalty of switching from full- to part-time, denoted by $\tilde{E}[\omega_{FT} - \omega_{PT}|FT]$, while the sample mean across part-time workers yields the average perceived wage premium of switching from part- to full-time, denoted by $\tilde{E}[\omega_{FT} - \omega_{PT}|PT]$.

To keep the survey instruments simple, the questions do not specify whether working hours include overtime. Arguably, the more natural reading of the questions is in terms of agreed contractual hours, therefore I define current working hours h_n as agreed hours excluding overtime in the main specification. However, to allow for the possibility that individuals read the questions differently and also account for overtime, I specify a second measure of the expected full-time/part-time wage differential that uses actual hours, including overtime, for additional robustness.

The survey questions fix qualification requirements, encouraging respondents to consider the impact of changing hours in a *ceteris paribus* scenario. This should limit the extent to which people simultaneously account for occupational downgrading, upgrading, or job switching. However, as the survey instrument is not fully explicit in this regard, one cannot rule out that some individuals do make these kinds of adjustments. Therefore, the derived measures of women's perceived returns to full- and part-time work may encompass some expected mobility-induced wage losses or gains. Furthermore, individuals may interpret the question as referring to total compensation including nonwage benefits, in which case beliefs may partly reflect the perceived loss or gain in benefits associated with

[10]In wave 2019 of the SOEP Innovation Sample, the survey instrument elicits expected hourly wages directly. Hence, the translation from monthly income to hourly wage is only applied for survey waves 2016-2018. Elicitation of hourly wages reduces the variability in responses, but the change in the wording does not significantly shift point estimates, hence, I pool all survey waves in the empirical analysis.

a transition between full- and part-time work. I investigate the role of nonwage benefits in Section 5.5.

In addition to studying beliefs based on point estimates in Euro amounts, I also estimate respondents' uncertainty about the part-time penalty using density forecasts. For each respondent, I elicit the percent chance that she expects to earn less than 80 percent and more than 120 percent of her individual-specific point estimate. I use the subjective bin probabilities to analyze the robustness of the subjective means constructed from point estimates and to investigate uncertainty in the perceived returns to full- and part-time work. Details about the probabilistic analyses are deferred to the Online Appendix.[11]

3.2. Estimation of the Observed Returns

I use a static discrete choice model of female labor supply to estimate the observed returns to full- and part-time work conditional on worker characteristics and selection into part-time. The estimated observed returns serve as proxies of the objective pay penalty or premium of working different hours and are later compared to the perceived returns. The model incorporates incentives embodied in the German tax and welfare regime that affect employment choices through a classic consumption-leisure trade-off. Identification builds on individual transitions between employment states, changes in socio-demographic characteristics, and non-linearities in the tax-benefit system.

Model and Estimation

Each decision-maker n is observed in one out of three mutually exclusive choice categories $j_n \in \{FT, PT, OLF\}$, where the choice set j is defined as working either full-time (FT), part-time (PT), or staying out of the labor force (OLF). Let w_n denote $n's$ wage if n is working at time t.[12] The decision-maker is assumed to maximize the instantaneous utility index $U(C_{nj}, L_j)$ over the choice set $j_n \in \{FT, PT, OLF\}$ according to a consumption-leisure trade-off, where leisure in choice j is given by $L_j = T - h_j$ with weekly time endowment defined as $T = (24-8)\cdot 5 = 80$ hours and weekly working hours derived from sample medians in the respective choice category. In the main specification based on self-reported part-time status and contractually agreed working hours, sample medians are $h_j \in \{39, 23, 0\}$ s.t. $L_j \in \{41, 57, 80\}$.

[11] The Online Appendix contains additional material and results.
[12] Time subscript t is dropped for better readability.

The budget constraint is given by

$$C_{nj} = w_{nj} \cdot h_j + s_n - T(w_{nj} \cdot h_j, s_n, k_n) \tag{4}$$

where C_{nj} is consumption, w_{nj} denotes hourly wage, s_n is weekly labor income of the spouse, and $T(.)$ is the tax-benefit system that also depends on the number of children, k_n. I assume an isoelastic shape of the utility index with constant relative risk aversion (CRRA),

$$U(C_{nj}, h_j) = \left[\frac{C_{nj}^{1-\gamma}}{1-\gamma} - (\sum_k \alpha_k' x_{n,k}) \cdot h_j \right] + \epsilon_{nj} \tag{5}$$

where γ denotes the coefficient of risk aversion and α_k measures disutility of hours worked, which may vary across decision-makers according to observable taste-shifters $x_{n,k}$ that include binary indicators for the presence of young children in the household and for living in Eastern Germany. The additive random component ϵ_{nj} is assumed to be Type I extreme value distributed and independent over n and j (McFadden et al., 1973).

Following Francesconi (2002), I specify separate wage functions for part-time and full-time work, thus letting hourly wages vary over hours categories j. Wages are normalized to zero in the non-employment state, $w_{n,OLF} = 0$. Counterfactual wage offers $w_{FT,n}$ and $w_{PT,n}$ are imputed according to full-time and part-time sector specific log-wage equations,

$$ln(w_{jn}) = Z_n' \gamma_j + \zeta_{nj} \tag{6}$$

where the vector Z_n contains a constant and a set of exogenous covariates including years of education, a quadratic in part-time and full-time work experience, as well as indicators for region and immigrant background, γ_j is the corresponding parameter vector.[13] Unobserved sector-specific factors ζ_{nj} are assumed to be normal and independent of Z_n and across j. I derive net income by simulating income tax payments and transfers for each choice category based on the tax-benefit function $T(.)$, which incorporates detailed features of the 2005 German tax and welfare regime (see the Online Appendix for specifics).

[13]To estimate the model, wage offers must be imputed for all decision-makers including non-workers, hence, the vector of covariates does not include job or industry controls. Given the parameter estimates, wage differentials are predicted at the individual level and conditional on the current sector, thereby accounting for job and worker characteristics.

In particular, $T(.)$ covers income tax formulas, social security contributions, solidarity surcharge tax, professional and deductible expenses, child benefits and unemployment transfers, and accounts for the joint taxation of married couples.

Labor supply and wage equations are estimated simultaneously using full information maximum simulated likelihood (FIMSL).[14] Following Van Soest (1995), I integrate out the wage equation prediction errors ζ, which may, if ignored, lead to inconsistent estimates.[15] Since the model contains separate wage equations for full-time and part-time sectors, two types of prediction errors must be integrated out (Francesconi, 2002). The resulting log likelihood function is estimated by approximating the expectation terms via Clenshaw-Curtis quadrature and is presented in the Online Appendix, together with measures of internal goodness of fit and the full set of estimation results.

Given the structural coefficient estimates, I predict log full-time and part-time wage offers, $\hat{\omega}_{FT,n}$ and $\hat{\omega}_{PT,n}$, for each decision-maker n. Individual-specific estimates of full-time/part-time log wage differentials, $\hat{\omega}_{FT,n} - \hat{\omega}_{PT,n}$, are then averaged, conditional on the current sector, where the sample mean over full-time working decision-makers yields the average predicted part-time wage penalty, denoted by, $\hat{E}[\omega_{FT} - \omega_{PT}|FT]$, while the sample mean across part-time workers gives the average predicted full-time wage premium, denoted by $\hat{E}[\omega_{FT} - \omega_{PT}|PT]$.

4. Data

This section presents the two data sets used throughout the empirical analyses, the SOEP and the SOEP Innovation Sample (SOEP-IS). Section 4.1 describes key features of the data, section 4.2 defines the subject pool used for estimation. The Online Appendix provides additional details on survey administration.

[14] FIMSL methods are commonly used in applications with missing data, in this application counterfactual full-time (part-time) wage offers are unobserved for part-time (full-time) workers and for non-workers; hence these must be integrated over using simulation methods. For an intuitive discussion of maximum simulated likelihood methods, see Löffler et al. (2014). For a detailed introduction, see Train (2009).

[15] Two-step procedures such as Heckman's two-step selection correction that impute w_n by $exp\,(Z_n'\gamma)$ implicitly assume that wages are predicted without error (Van Soest, 1995).

4.1. The SOEP and the SOEP Innovation Sample

The SOEP and the SOEP Innovation Sample (SOEP-IS) are two related annual panel surveys of private households representative of the German population.[16] Sample design and field processes of both studies are almost identical; in addition, the two surveys share a sizeable part of the questionnaire, using identical wording to facilitate comparability. The SOEP and SOEP-IS differ in longitudinal depth, sample size, and focus. The larger SOEP was launched in 1984 and comprises the life-time trajectories of approximately 15,000 households over more than 30 years, complementing employment and earnings paths with a rich set of household characteristics and socio-demographic indicators. The smaller SOEP-IS was established in 2011 as a supplement to the SOEP and facilitates innovative research by inviting users to submit their own proposals for questions, which must pass a competitive review process before being included in the survey. The 2016 wave of the SOEP-IS introduced a new module on income expectations. I utilize survey waves 2016-2019 of this module to estimate expectations about the returns to full- and part-time work for a representative sample of employed women.[17] In addition, I draw on waves 2005-2016 of the larger SOEP study, which outperforms the SOEP-IS in longitudinal depth and sample size, to estimate observed returns and compare them with women's expectations. Specifically, I exploit the rich panel dimension of the full SOEP to model the endogeneity of part-time and full-time status when estimating observed penalties and premiums. Table 2 presents summary statistics for both SOEP and SOEP-IS samples to show the two data sets are comparable and representative of the same population.

4.2. Sample Definition

The estimation sample contains all employed women excluding self-employed individuals, pensioners, civil servants, those in training, in the military, or in community service. Income expectations in the SOEP-IS were only surveyed for women who are working. Non-working women are included in the discrete choice model to estimate labor force

[16]For a jump-start on using the SOEP, see Haisken-DeNew and Frick (2005). For information about the SOEP-IS, see Richter and Schupp (2012); Richter et al. (2015).

[17]The SOEP-IS contains about 4,000 households in total. To ensure a reasonable length of the questionnaire but still accommodate the proposals of as many researchers as possible, the proposed innovative modules are assigned to different subsamples. As a result, each innovative module features only a subset of the full SOEP-IS sample.

participation, but I condition on current work status when computing the observed returns using the full SOEP. Observations in the top and bottom one percent of the factual and expected income distributions are dropped. Further, I exclude workers in marginal part-time contracts and use self-reported part-time status and contractually agreed working hours excluding overtime in the main specification.[18] I present additional results for hours-based definitions of part-time work and weekly hours including overtime for robustness. The subject pool contains N=959 observations in the SOEP-IS and an unbalanced panel of N=4,707 women in the full SOEP.

Table 2: Composition of SOEP and SOEP-IS

	SOEP	SOEP-IS	p-value (Δ)
Gross hourly wage (in euros)	16.27	16.94	0.18
Agreed wkly hrs.	31.80	30.99	0.16
Overtime hrs. per week	2.64	2.77	0.59
Education (in years)	12.69	12.66	0.84
Age (in years)	45.10	43.21	0.02
With children (in percent)	29.23	32.81	0.27
Eastern Germany (in percent)	18.87	16.85	0.38
Native born (in percent)	75.36	72.68	0.44
Public sector (in percent)	27.09	26.10	0.70
Firm size > 200 (in percent)	49.40	53.56	0.19
Fixed term contract (in percent)	12.00	11.94	0.98
Tenure (in years)	10.84	8.94	0.01
Manager (in percent)	4.49	3.69	0.48
N	4,707	959	

Notes: Sample averages with population weights. Sample excludes women who are not working, self-employed, in marginal employment, civil servants, pensioners, in training, in community service or in the military. SOEP (2016) and SOEP-IS (2016-19).

5. Results

This section presents the empirical results and is organized as follows: First, I present respondents' point forecasts of the perceived part-time wage penalties and full-time premiums (Section 5.1). Next, I document how worker beliefs covary with socio-demographic and job-related characteristics (Section 5.2). In Section 5.3, I examine the uncertainty in perceptions of the returns to full- and part-time work, as well as correlates of belief uncertainty, based on subjective bin probabilities. I further compare women's expectations with estimates of the part-time wage penalty derived from observed data (Section

[18]Marginal employment in Germany describes contracts with a maximum monthly income of 450 Euros, which are exempted from income tax obligations. These contracts are also known as "Mini-Jobs".

5.4). In Section 5.5, I discuss the role of nonwage benefits and how they might affect the results. The Online Appendix contains additional results.

5.1. Perceived Returns to Full- and Part-Time Work

Figure 1 shows the distribution and mean point predictions of perceived wage differentials, revealing an asymmetry in beliefs between full-time workers and part-time workers.[19] Part-time workers expect to gain more from switching to full-time than full-time workers expect to lose when switching to part-time. On average, full-time working women expect no significant wage penalty for working part-time (0.21 percent, $p>0.1$), whereas part-time working women expect notable full-time wage premiums (6.70 percent, $p<0.01$).

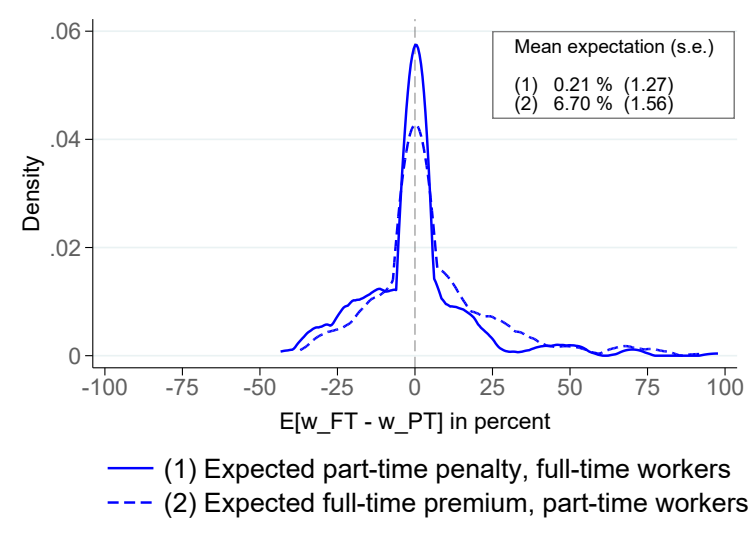

Figure 1: The plot shows the distribution of the expected part-time wage penalty among full-time workers (1, solid line, N = 312) and the expected full-time wage premium among part-time workers (2, dashed line, N = 349). Working hours are defined as contractually agreed hours excluding overtime. The box shows sample means with standard errors (s.e.) in parentheses. SOEP-IS (2016-19).

Estimates of the perceived returns to changing hours indicate that neither full- nor part-time working women seem to suffer from cognitive dissonance, the propensity to report beliefs that justify past choices (Bertrand and Mullainathan, 2001). If part-time workers wanted to implicitly justify their choice to work part-time, they should not reveal that

[19] All estimates in this section are based on contractually agreed working hours excluding overtime. For a discussion on the implications of including current overtime when constructing expectations about hourly wage penalties, see Online Appendix D.1.

they expect large wage gains in full-time employment. Conversely, full-time workers who wanted to legitimize their choice to work full-time could be expected to report part-time wage penalties, contrary to what we observe. The observation that both full-time and part-time working women report beliefs that would in theory rationalize changes of employment status has important implications for understanding women's labor supply decisions, as is discussed in more detail in Section 6.

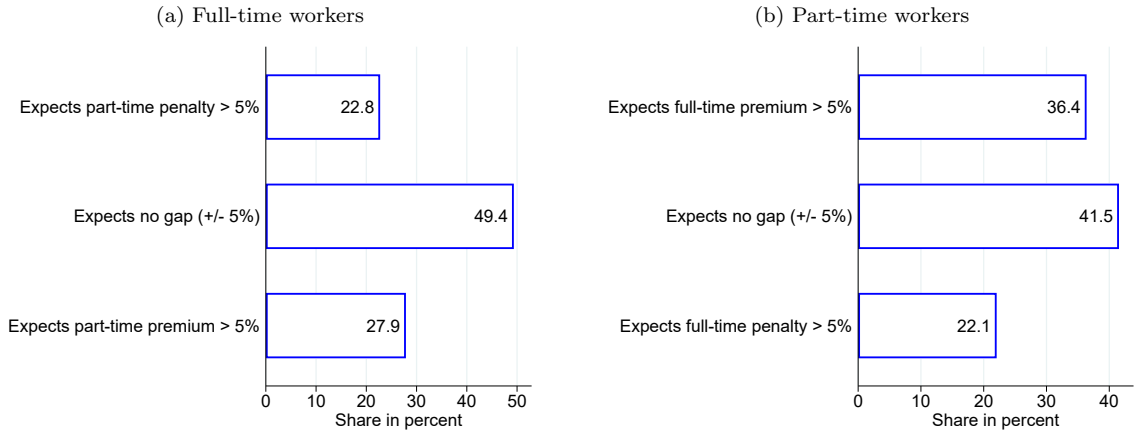

Figure 2: The plots show the proportion of full-time (part-time) workers expecting a part-time wage penalty (full-time wage premium) above 5 percent, the share expecting a small pay gap, and the share expecting a part-time wage premium (full-time wage penalty) above 5 percent. Based on contractually agreed working hours excluding overtime. N = 312 (Panel a), N = 349 (Panel b). SOEP-IS (2016-19).

In Figure 2, I further show that variation in women's beliefs about the part-time penalty is substantial. Most women - about 49 percent of full-time workers and 42 percent of part-time workers - expect only small wage differentials between full- and part-time work of 5 percent or less. However, 23 percent of full-time working women expect part-time wage penalties exceeding 5 percent. Among part-time workers, the share expecting a full-time wage premium of 5 percent or more is even higher, amounting to 36 percent. At the same time, a significant fraction of full-time workers anticipates higher wages in part-time than in full-time work: 28 percent of full-time workers expect a part-time wage premium of 5 percent or more. Likewise, 22 percent of part-time working women expect a full-time wage penalty. Overall, these numbers reveal substantial dispersion in expectations about the part-time wage penalty. This heterogeneity matters because one would expect women to sort into part-time and full-time work based in part on their subjective wage premiums and penalties. The next section further investigates belief heterogeneity.

5.2. Belief Heterogeneity

To understand the disagreement about the part-time wage penalty between workers, I explore how perceptions covary with current socio-demographic and job characteristics. In Tables 3 and 4, I show reported point forecasts disaggregated by worker attributes. Table 5 presents estimates from multivariate OLS regressions and from an ordered probit of expecting a part-time premium, no gap, or a part-time penalty on joint covariates.

Table 3: Estimates of the Perceived Returns by Socio-Demographic Characteristics

	Full-time workers				Part-time workers			
	Mean (S.E.)	PT penalty	No gap	PT premium	Mean (S.E.)	FT premium	No gap	FT penalty
All women	0.21 (1.27)	22.8	49.4	27.9	6.70 (1.56)	36.4	41.5	22.1
Education: Basic	6.85 (5.79)	34.5	44.8	20.7	11.44 (5.62)	44.9	26.5	28.6
Education: Intermediate	−1.54 (1.24)	21.0	48.5	30.5	4.53 (1.62)	34.8	40.9	24.3
Education: Tertiary	1.46 (2.97)	22.0	53.7	24.4	10.64 (3.94)	36.2	53.6	10.1
With children	7.10 (4.48)	34.7	44.9	20.4	6.81 (1.81)	40.3	42.8	17.0
Without children	−1.29 (1.20)	19.7	50.6	29.7	6.60 (2.38)	33.2	40.5	26.3
Age $<$ 40 y.	1.59 (2.46)	26.7	42.5	30.8	6.40 (2.45)	38.0	38.0	24.0
Age $>$ 40 y.	−0.65 (1.35)	20.3	53.6	26.0	6.87 (2.01)	35.5	43.6	20.9
Married	−0.26 (1.73)	24.8	42.4	32.7	8.47 (1.94)	40.9	37.0	22.0
Single	1.06 (2.04)	22.8	52.8	24.4	0.12 (2.74)	20.0	47.7	32.3
Eastern Germany	−3.48 (1.91)	16.2	51.4	32.4	7.91 (3.66)	32.7	43.6	23.6
Western Germany	1.36 (1.54)	24.8	48.7	26.5	6.47 (1.72)	37.1	41.2	21.8
Native born	1.04 (1.45)	21.1	53.3	25.6	6.52 (1.75)	35.6	41.7	22.7
Foreign born	−5.43 (2.81)	22.6	37.7	39.6	6.62 (3.23)	39.4	43.9	16.7

Notes: SOEP-IS 2016-19. All values in percent. The Table shows sample means of the expected part-time wage penalty among full-time workers, $\bar{E}[\omega_{FT} - \omega_{PT}|FT]$, and the expected full-time premium among part-time workers, $\bar{E}[\omega_{FT} - \omega_{PT}|PT]$, as well as the fraction of full-time (part-time) workers expecting a part-time wage penalty (full-time wage premium) above 5%, the share expecting no wage change (+/- 5%) and the proportion expecting a part-time premium (full-time wage penalty) above 5%. Results based on self-reported part-time status and contractually agreed working hours. Standard errors (S.E.) clustered at the person-level.

5.2.1. Maternal Perceptions of the Part-Time Penalty

I find that one important correlate of belief heterogeneity among full-time workers is motherhood: full-time working women with children expect substantial part-time wage losses (7.1 percent, p>0.1), more than one out of three full-time working mothers expects a part-time penalty of 5 percent or more. In contrast, full-time workers without children expect near-constant hourly wages in full- and part-time work. The correlation with motherhood is robust to the inclusion of worker, job, and occupation controls in both multivariate specifications. Full-time working mothers expect 6.74 percentage points stronger wage losses from part-time work compared to non-mothers (p<0.1). In contrast, motherhood is a much weaker predictor of belief heterogeneity among part-time workers: both mothers and non-mothers expect similarly high returns to full-time employment of about 7 percent.

The findings on maternal perceptions of the part-time wage penalty align with previous work by Boneva et al. (2021), who show that individuals predict pecuniary losses (gains) for part-time (full-time) working mothers. Adding to their results, I document that mothers themselves perceive the relationship between hours choices and their own earnings as convex. Importantly, I show that this is true regardless of whether mothers currently work full-time or part-time. Hence, women's beliefs are only partly consistent with self-selection based on subjective part-time penalties and premiums. On the one hand, full-time working mothers may have selected into full-time work precisely because they would face a wage penalty if they chose to work part-time on that job. On the other hand, the majority of full-time working women (without children) chose full-time employment despite expecting similar wages in full- and part-time work. Moreover, part-time working women expect sizeable wage gains from full-time employment, notwithstanding their revealed choice to work part-time. These findings substantiate the argument by Boneva et al. (2021) who show that perceptions of the pecuniary returns to full-time employment play only a secondary role for women's labor supply decisions in comparison to - perceived - social norms and constraints related to child care.

5.2.2. Perceptions by Job Type and Occupation

This Section documents the disagreement in worker beliefs about the part-time penalty by job type, qualification, and occupation.

First, I show that women in managerial positions expect significantly larger part-time penalties than non-managers (+17.04 p.p., $p<0.05$). Despite recent legislative efforts to make part-time options available to workers in managerial positions, the beliefs documented here indicate that actual implementation lags behind. Managers seeking part-time employment may see themselves forced to change to a different position and their wage expectations may reflect perceived mobility-induced wage losses.

Second, I find that low educated women also expect particularly large wage differentials, with similar effect sizes for full- (+9.74 p.p., $p<0.1$) and part-time workers (+8.96 p.p., $p>0.1$). Thus, the fear to be penalized in part-time employment - or rewarded in full-time employment - seems to concern women at the bottom as well as those at the top of the wage distribution.

Third, among part-time employed women, working in the public sector (-4.95 p.p., $p<0.1$)

Table 4: Estimates of the Perceived Returns by Job Characteristics

	Full-time workers				Part-time workers			
	Mean (S.E.)	PT penalty	No gap	PT premium	Mean (S.E.)	FT premium	No gap	FT penalty
All women	0.21 (1.27)	22.8	49.4	27.9	6.70 (1.56)	36.4	41.5	22.1
Public sector	0.62 (2.07)	15.1	61.3	23.7	3.48 (2.29)	29.9	45.3	24.8
Private sector	−0.07 (1.51)	25.7	44.5	29.8	8.32 (1.92)	39.7	39.7	20.7
Firm size > 200	1.07 (1.81)	25.3	48.2	26.5	3.77 (1.80)	30.3	45.6	24.1
Firm size < 200	−1.00 (1.63)	19.3	50.7	30.0	10.84 (2.50)	44.7	37.3	18.0
Fixed term contract	5.46 (6.47)	36.4	33.3	30.3	13.04 (5.95)	42.5	37.5	20.0
Permanent contract	−0.47 (1.15)	20.9	51.3	27.8	5.87 (1.60)	35.4	42.2	22.4
Manager	13.98 (8.12)	37.5	37.5	25.0	10.48 (3.82)	71.4	28.6	0.0
No manager	−0.94 (1.05)	21.5	50.3	28.1	6.62 (1.58)	35.7	41.8	22.5
Tenure > 10y.	0.05 (1.67)	15.7	61.4	22.8	3.90 (2.08)	30.8	47.7	21.5
Tenure < 10y.	0.91 (1.92)	28.2	41.7	30.1	6.99 (2.08)	39.1	38.5	22.4
Overtime hrs. > 0	1.75 (1.84)	22.6	51.4	26.0	4.25 (1.78)	35.2	39.7	25.1
No overtime hrs.	−1.75 (1.37)	23.3	46.6	30.1	8.70 (2.41)	37.2	43.3	19.5

Notes: SOEP-IS 2016-19. All values in percent. The Table shows sample means of the expected part-time wage penalty among full-time workers, $\tilde{E}[\omega_{FT} - \omega_{PT}|FT]$, and the expected full-time premium among part-time workers, $\tilde{E}[\omega_{FT} - \omega_{PT}|PT]$, as well as the fraction of full-time (part-time) workers expecting a part-time wage penalty (full-time wage premium) above 5%, the share expecting no wage change (+/- 5%) and the proportion expecting a part-time premium (full-time wage penalty) above 5%. Results based on self-reported part-time status and contractually agreed working hours. Standard errors (S.E.) clustered at the person-level.

and in large firms (-7.73 p.p., p<0.01) is associated with smaller perceived full-time wage gains. Part-time workers are over proportionally represented in public sector jobs, indicating that workers may select into part-time friendly jobs based on their subjective wage penalties and premia. An alternative explanation is that workers alter their subjective perceptions of the part-time penalty *after* selecting into jobs with lower wage differentials.

Fourth, and finally, perceived penalties and premiums differ substantially across occupational areas. Sample size limitations prevent a detailed analysis by industrial branch or by specific occupation, but evidence based on broad measures of current occupation indicate that workers in managerial and professional occupations expect larger wage penalties than workers in elementary occupations (Table A.4 in the Online Appendix). Moreover, workers in certain sectors (e.g. Health Care, Natural Sciences) expect particularly large wage penalties for part-time work, whereas workers in other sectors (e.g. Craft, Security) tend to expect part-time premiums. Further research (with higher statistical power) is needed to understand the specific mechanisms driving these differences between workers in different occupations and branches.

Table 5: Multivariate OLS and Ordered Probit Estimates of the Perceived Returns

	Full-time workers				Part-time workers			
	(1) OLS		(2) Ordered Probit		(1) OLS		(2) Ordered Probit	
Socio-Demographic Characteristics								
Education: Basic	9.74*	(5.55)	0.40	(0.30)	8.86	(5.56)	0.24	(0.29)
Education: Tertiary	0.63	(2.67)	0.05	(0.16)	7.63	(4.86)	0.25	(0.19)
With children	6.74*	(3.99)	0.47**	(0.20)	4.16	(4.24)	0.49***	(0.17)
Age (in years)	0.05	(0.12)	0.01	(0.01)	0.24	(0.21)	0.02**	(0.01)
Eastern Germany	−3.97	(2.51)	−0.22	(0.17)	−0.97	(3.68)	−0.21	(0.19)
Job Characteristics								
Public sector	−0.48	(2.48)	−0.18	(0.15)	−4.95*	(2.61)	−0.21	(0.15)
Firm size > 200	2.62	(2.47)	0.23	(0.14)	−7.73***	(2.95)	−0.35**	(0.16)
Fixed term contract	5.57	(6.37)	0.20	(0.25)	9.17	(6.17)	0.37	(0.27)
Manager	17.04**	(7.76)	0.34	(0.32)	2.38	(5.27)	1.24**	(0.61)
Occupational Area (Ref.: 1. Agriculture etc.)								
2. Raw Materials, Goods, Manufacturing	4.14	(10.33)	0.93	(0.88)	24.86	(18.61)	0.88	(1.07)
3. Construction, Architecture, Technical Building	4.49	(10.78)	1.06	(0.86)	2.63	(9.99)	−0.08	(0.93)
4. Natural Sciences, Geography, Informatics	12.86*	(7.66)	1.32*	(0.77)	7.10	(11.47)	−0.28	(1.06)
5. Traffic, Logistics, Safety, Security	9.14	(8.52)	1.18	(0.82)	10.38	(10.09)	0.70	(0.92)
6. Commercial Services, Trading, Tourism etc.	3.21	(8.43)	0.89	(0.80)	12.37	(11.47)	0.53	(0.91)
7. Business Organization, Accounting, Law etc.	8.24	(7.80)	1.02	(0.78)	13.48	(10.68)	0.60	(0.92)
8. Health Care, Social Sector, Teaching etc.	12.14	(8.16)	1.14	(0.78)	15.58	(10.42)	0.59	(0.91)
9. Philology, Literature, Humanities etc.	4.66	(8.77)	0.98	(0.84)	7.96	(11.17)	0.43	(0.95)
Constant	yes		yes		yes		yes	
Survey year FE	yes		yes		yes		yes	
Mean dep. variable	−0.18		−0.18		6.91		6.91	
N	301		301		340		340	

Notes: SOEP-IS 2016-19. The Table shows estimates from multivariate OLS regressions of the expected part-time wage penalty among full-time workers, $\tilde{E}[\omega_{FT} - \omega_{PT}|FT]$, and the expected full-time premium among part-time workers, $\tilde{E}[\omega_{FT} - \omega_{PT}|PT]$, in percent, as well as estimates from multivariate ordered probit regressions where the ordinal dependent variable indicates if the perceived wage differential is below -5%, between -5 to 5% or above 5% . Education base category: intermediate education. Based on self-reported part-time status and contractually agreed working hours. Standard errors clustered at the person-level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

5.3. Uncertainty in Beliefs

Besides disagreement across respondents in reported point forecasts, I document substantial variation in the extent of uncertainty about the part-time penalty, based on the subjective probability intervals reported in SOEP-IS Wave 2016 (see Online Appendix B.1 for methodological details).

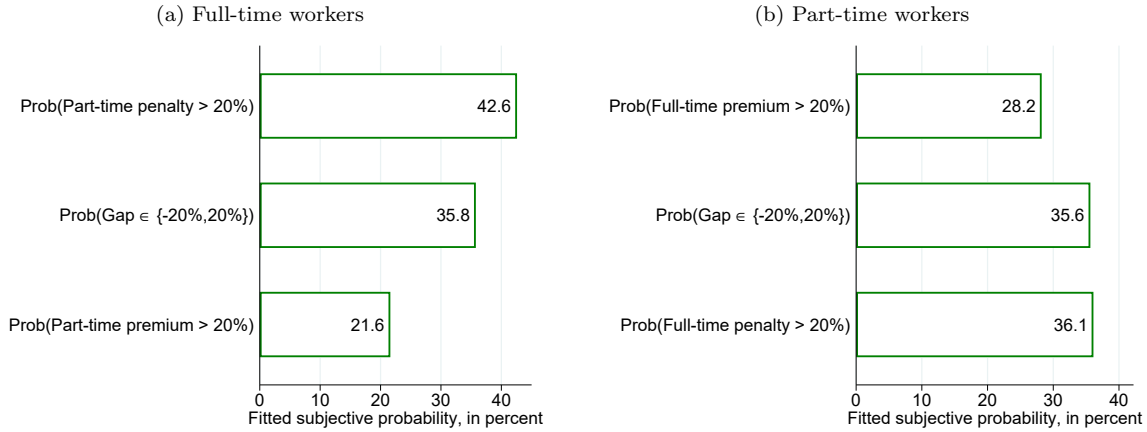

Figure 3: The plots show the average fitted probability that respondents assign to wage penalties above 20 and below -20 percent, based on subjective bin probabilities. N=66 (Panel a), N=75 (Panel b). SOEP-IS (2016).

Density forecasts using bin probabilities reveal considerable probability mass at the tails of the distribution of perceived wage penalties, with respondents assigning large probabilities to penalties above 20 percent and below -20 percent (Figure 3).

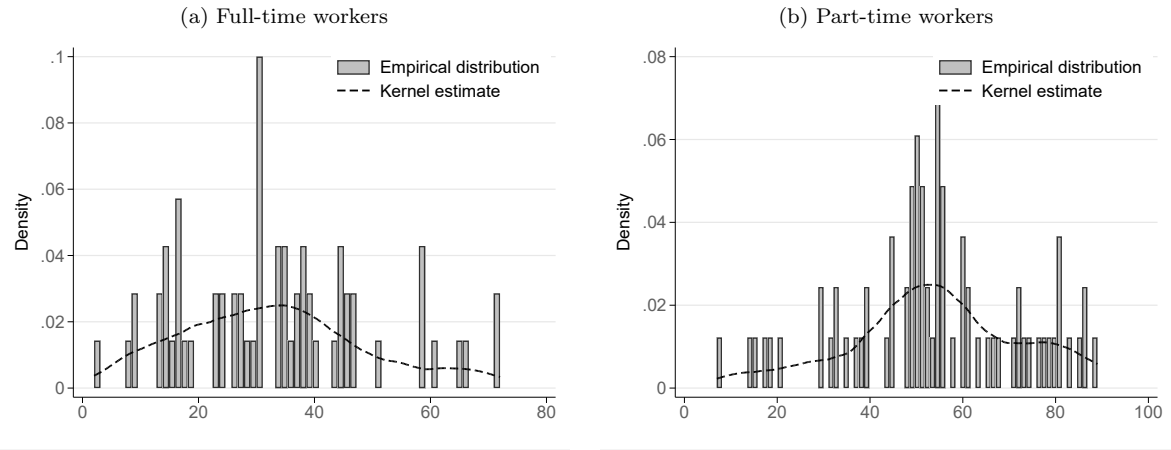

Figure 4: The plots show the empirical distribution of point-prediction percentiles derived from fitted CDFs. N=66 (Panel a), N=75 (Panel b). SOEP-IS (2016).

In comparing the reported point predictions with the fitted CDFs, I find that full-time workers tend to report point estimates that correspond to the lower percentiles of their

subjective distribution, whereas part-time workers' point predictions are closer to the central tendencies of the CDFs (Figure 4). Among full-time workers, 89 percent report point estimates that are below or equal to their subjective median, while part-time workers show similar shares of point estimates below (51%) and above (49%) the fitted median. The distribution of point estimates and subjective central tendencies estimated using the interval probabilities further illustrates this finding (Figure A.4). The asymmetry in deviations between point forecasts and subjective central tendency reveals that full-time workers' point forecasts are more optimistic than their underlying probability distributions suggest. This 'point-prediction optimism' is documented in other contexts, most prominently by Engelberg et al. (2009), who find that point forecasts of future inflation and GDP give more favorable assessments of the economy than do probabilistic beliefs.[20]

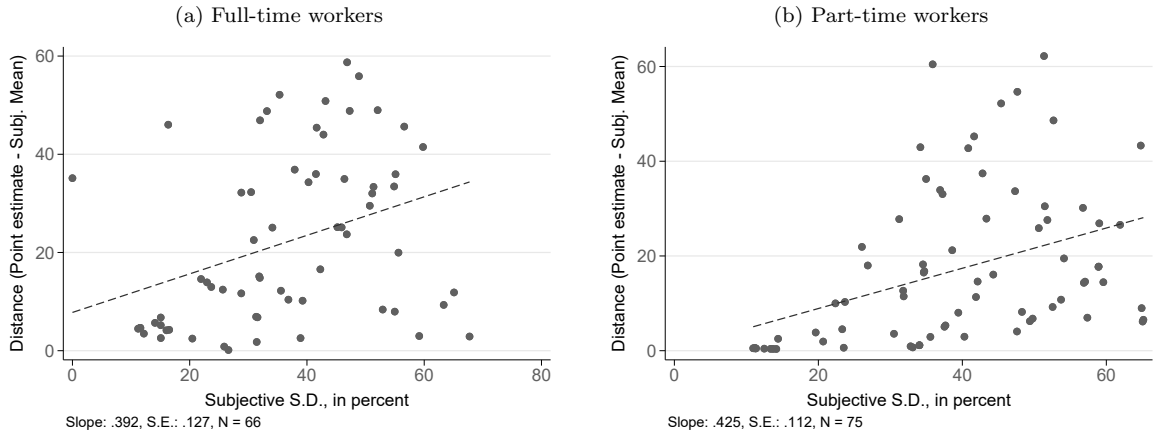

Figure 5: Scatterplots of the absolute deviation between point forecasts and subjective means of perceived wage differentials plotted against the subjective standard deviation capturing belief uncertainty, based on subjective bin probabilities. The dashed line shows the linear fit. SOEP-IS (2016).

In line with Engelberg et al. (2009), the extent to which point estimates deviate from subjective means further correlates with belief uncertainty. The absolute distance between point predictions and subjective means correlates positively with different measures of uncertainty, such as the fitted standard deviation and the interquartile range of the fitted

[20] I do not know why full-time workers are more prone to point prediction optimism than part-time workers. One conjecture is that point prediction optimism may be more pronounced in settings where an optimistic benchmark is well defined. For example, optimists will target low inflation and high GDP growth. In the context studied in this paper, optimism quite unequivocally predicts small part-time wage losses for full-time workers, whereas optimistic part-time workers may either expect large full-time wage gains or small part-time penalties.

distribution (Figure 5, Table A.6). Moreover, I find that workers who are more uncertain, as measured by higher percentiles in the distribution of the subjective standard deviation, expect more extreme wage penalties and premiums (Table A.6).

Observable worker and job characteristics can, to some extent, predict belief uncertainty among full-time workers, but barely among part-time workers (Table A.7). There is considerably higher uncertainty about the part-time wage penalty among full-time workers living in Eastern Germany relative to Western Germany (+17.9 percent in the subjective SD). Although I do not measure work experience in full- or part-time employment in the SOEP-IS, full-time workers in Western Germany presumably have more own part-time work experience, so there might be learning effects.[21] Correspondingly, managers (+18.8 percent) and women with self-reported overtime hours (+9.8 percent) also exhibit higher levels of uncertainty. Mothers, in contrast, are more confident of their (higher) estimate of the part-time penalty than women without children (-14.8 percent). The disagreement in belief uncertainty across part-time working women is only weakly correlated with observable characteristics, with the exception of job sector: part-time workers in public sector jobs report significantly lower uncertainty about the full-time wage premium than workers in the private sector (-9.12 percent). Overall, belief uncertainty is more pronounced among part-time workers relative to full-time workers, as shown by density estimates of the fitted standard deviations and interquartile ranges (Figure A.5 in the Online Appendix).

5.4. Comparison of Perceived and Observed Returns

In this section, I compare women's point forecasts of the part-time penalty with estimates of the returns to full- and part-time work from observed data. The aim of this exercise is to measure whether workers, on average, overestimate or underestimate the part-time penalty. However, one challenge in using estimates from observed data as a benchmark for women's beliefs is that the validity of the econometric estimates depends on many modeling assumptions. Moreover, there are reasonable explanations for a mismatch between average expectations and average realizations, such as information barriers or the existence of aggregate shocks. Given these caveats, the findings from this section are to be interpreted as suggestive.

[21] I explore the link between perceived returns and work experience in Online Appendix D.3.

Table 6 presents estimates of the observed returns based on the structural discrete choice model detailed in Section 3.2, Column 1 shows the main specification with self-reported part-time status and agreed hours. Alternative ('reduced-form') estimates based on OLS and fixed effects estimation techniques are presented as a reference in Online Appendix D.5.

Table 6: Discrete Choice Estimates of the Observed Returns

	(1)	(2)	(3)	(4)
PT Penalty FT Workers	10.23 (0.92)***	7.93 (0.96)***	9.08 (0.88)***	5.80 (0.86)***
N	2,136	2,123	2,302	2,668
FT Premium PT Workers	-0.10 (0.85)	-4.89 (0.89)***	0.12 (0.87)	-2.22 (1.02)*
N	2,418	2,400	2,252	1,855
Part-time status	self-reported	self-reported	hours < 30	hours < 30
Working hours	agreed hrs.	incl. overtime	agreed hrs.	incl. overtime

Notes: The Table shows estimates of the part-time wage penalty for full-time workers and of the full-time wage premium for part-time workers in percent, based on structural discrete choice estimates. Predictions are presented for working women in full-time or in part-time employment sampled in GSOEP-Core 2016. Robust standard errors in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Estimates indicate that full-time workers would earn between 5.8 and 10.2 percent lower hourly wages in part-time employment in comparison to full-time employment, on average. In contrast, part-time workers would not earn significantly higher wages in full-time employment, with estimates of the average full-time premium ranging between -4.9 and 0.1 percent. Although point estimates vary somewhat depending on specification choices, the results compare to findings in the literature documenting stronger effects on hourly wages for full-time workers moving to part-time than for part-time workers moving to full-time (see for example Hirsch, 2005; Schmitt, 2022). This asymmetry can be explained by differences in the returns to work experience between full- and part-time employment: on average, part-time workers have accumulated more part-time work experience, which is not rewarded in full-time positions (see Table A.11 and also compare Blundell et al. (2016)).[22] Hence, for an average part-time worker, the benefits of moving to a full-time job are not immediate but will only materialize once she accumulates additional full-time work experience. For full-time workers, the returns to the qualifications and experience accumulated during full-time employment would be lower in part-time, on average, gen-

[22] Alternative explanations for asymmetric effects are scarring and signaling effects which prevent a full recovery of part-time wage losses when workers switch back into full-time employment (Schmitt, 2022).

erating wage losses.[23]

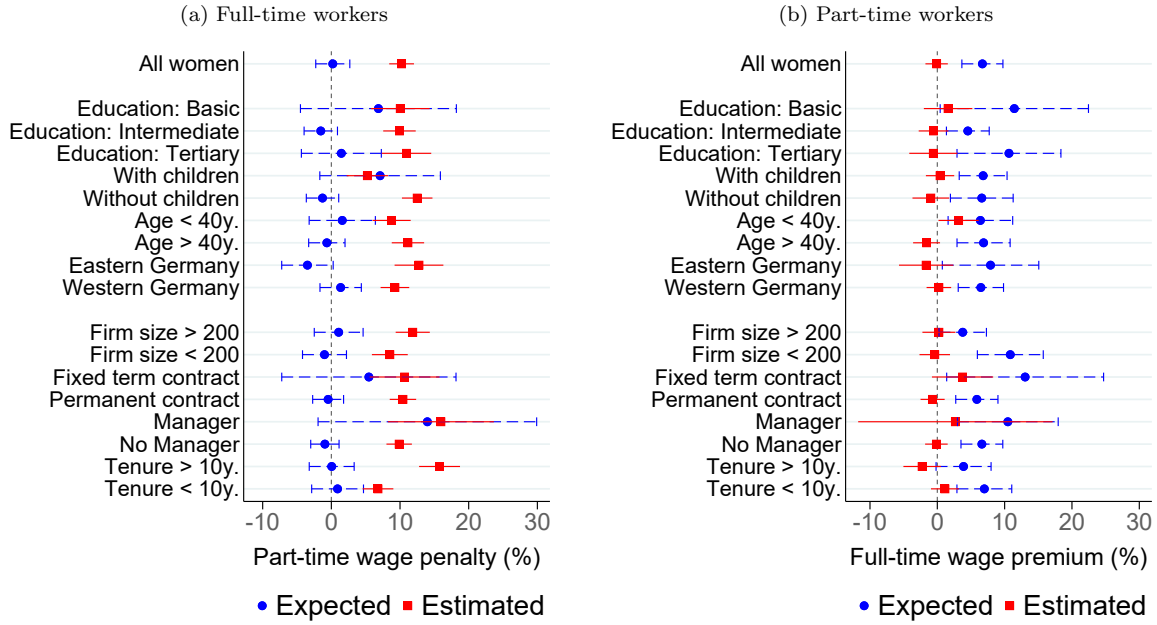

Figure 6: Comparison of expected (blue dashed line) and estimated (red solid line) part-time wage penalties among full-time workers (Panel a) and full-time wage premiums among part-time workers (Panel b). Based on agreed working hours excluding overtime and self-reported part-time status. Estimates from the discrete choice model. Markers indicate point estimates and whiskers 95% C.I.s. SOEP-IS (2016-19) and SOEP (2016).

In comparing estimates of the observed returns with women's expectations, I provide suggestive evidence indicating a mismatch between women's beliefs and objective data (Figure 6, Table A.13). Full-time workers, on average, expect proportional wages, whereas part-time workers expect wage gains in full-time employment. Estimates of the observed returns suggest the reverse: part-time workers are unlikely to benefit immediately from switching to full-time, but full-time workers are predicted to face wage losses in part-time. The results further suggest that worker beliefs may be explained by overconfidence: part-time workers believe they would fare considerably better in full-time positions even though estimates indicate that they would not; similarly, full-time workers are confident that they wouldn't incur wage cuts in part-time employment whereas estimates suggest that they would. Within-subgroup comparisons of the perceived and observed returns based

[23]It is worth noting that the average part-time penalty predicted for full-time working women is larger than fixed effects estimates of the wage loss experienced among women who actually switched from full-time to part-time employment (see Table A.9 and the related discussion in the Online Appendix regarding identification challenges based on switchers).

on splits by socio-demographic and job characteristics align with the overall picture: the beliefs reported among full-time workers appear to be consistent with an underestimation of the part-time wage penalty, whereas the expectations of part-time working women suggest an overestimation of the full-time wage premium. I discuss some implications of these results in the concluding Section 6.

5.5. Nonwage Benefits

When considering an increase or a reduction in hours, workers may not only expect changes in the hourly wage rate but they may also anticipate losses or gains of nonwage benefits.[24] While I have no information about the nonwage benefits received by respondents in the experimental SOEP-IS sample, I can use core SOEP data to investigate to what extent nonwage benefits differ between full- and part-time workers, and whether workers who are switching between full- and part-time employment experience changes in nonwage forms of compensation. I then discuss some potential implications for worker beliefs.

A comparison of the nonwage benefits received by full-time and part-time working women reveals that while full-time workers more often receive subsidized meals or company cars, coverage rates of major benefits like health insurance, paid vacation, or employer pensions, are almost identical between full-time and part-time workers (Table 7).[25] This is not surprising, given that many benefits that are privately provided by employers in countries like the US are heavily regulated or statutory in the context of the German labor market.[26] For example, full-time and part-time workers report comparable vacation days (29 versus 28 days, respectively); 97 percent of full-time workers and 99 percent of part-time workers are insured through statutory health insurance (SHI), and employer pensions are equally common with coverage rates of 24 and 23 percent, respectively.

[24] For an introduction to nonwage compensation, see Budd (2004). Vella (1993) analyzes the relationship between nonwage benefits and hours worked, indicating that employers may use nonwage benefits to avoid taxation as weekly hours increase.

[25] The smaller proportion of compulsory SHI members among part-time workers can be explained by the higher share of part-time workers who are co-insured in the SHI by their partners.

[26] Exceptions exist for workers in irregular or marginal part-time employment not subject to social insurance contributions (also known as *Minijobs* in the German context), as well as self-employed individuals, all of which are excluded from the analyses in the present paper.

Table 7: Nonwage Benefits and Bonuses in Full- and Part-Time Employment

	Full-time workers	Part-time workers	Δ FT-PT	Δ FT-PT, Adjusted
Statutory Health Insurance (SHI)	96.75	99.16	−2.40***	−0.19
Compulsary SHI	86.74	83.66	3.08***	4.75***
Employer-provided pension	24.14	22.51	1.63	−0.24
Vacation (in days)	29.25	28.01	1.23***	1.46***
Working from home (WFH)	14.24	11.21	3.03**	−0.85
Benefits: Any	30.63	18.60	12.03***	5.78***
Meals	22.91	13.19	9.72***	4.61***
Company car	5.63	0.54	5.09***	2.67***
Phone	5.80	1.04	4.76***	2.23***
Charges/expenses	25.6	0.43	2.13***	1.29**
Computer/IT	4.58	1.25	3.33***	0.94
Other benefit	9.28	6.71	2.57***	0.97
Allowances: Any	23.00	18.90	4.10***	1.57
Bad weather	0.04	0.00	0.04	0.07
Shift/weekend	15.28	13.50	1.78	0.37
Overtime	5.07	3.33	1.74**	0.39
Hardship	1.47	1.07	0.40	−0.33
Personal	3.54	1.94	1.60***	0.91
Gratuity/Tips	2.01	1.81	0.20	0.09
Other allowance	6.79	5.32	1.47*	−0.16
Christmas bonus	41.39	38.98	2.40*	2.74*
Gross amount/year (in Euros)	1113.77	687.80	425.97***	283.06***
Gross amount/hour worked (in Euros)	0.59	0.58	0.01	−0.05**
13th monthly salary	23.59	17.18	6.41***	3.96***
Gross amount/year (in Euros)	2184.74	1361.00	823.74***	541.61***
Gross amount/hour worked (in Euros)	1.11	1.12	−0.01	−0.11***
Vacation bonus	39.32	32.90	6.42***	3.06*
Gross amount/year (in Euros)	692.66	419.03	273.63***	148.13***
Gross amount/hour worked (in Euros)	0.36	0.35	0.01	−0.06***
Profit sharing	13.74	7.25	6.49***	2.17**
Gross amount/year (in Euros)	2609.84	1666.33	943.52	180.01
Gross amount/hour worked (in Euros)	1.10	2.51	−1.41	−1.00
Public transport/commuting grant	7.64	4.27	3.37***	2.85***
Amount/year (in Euros)	304.74	233.18	71.56**	89.11**
Amount/hour worked (in Euros)	0.16	0.19	−0.03	−0.02
Other bonus	3.51	2.54	0.98**	0.82*
Gross amount/year (in Euros)	1162.78	664.84	497.93***	119.92
Gross amount/hour worked (in Euros)	0.61	0.53	0.08	−0.05

Notes: GSOEP-Core 2005-2016. The Table shows fractions (in percent) and sample averages adjusted for population weights separately for full-time (FT) and part-time (PT) workers, as well as raw and adjusted differences in means. Estimates in Column 4 adjusted for differences in worker and job characteristics between full- and part-time employees, including years of education, linear and quadratic work experience in part-time and full-time, region (Eastern/ Western GER), immigrant background, occupation major group (ISCO 88, 1 digit), industry (NACE,2 digit), linear and quadratic tenure and indicators for firm size > 200, public sector and fixed term contract. Estimation with standard errors clustered at the person level, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Hence, it is unlikely that workers expect notable changes in these types of benefits when they consider switching between full- and part-time work. In addition, although full-time workers are somewhat more likely to receive irregular nonwage cash benefits, such as Christmas and vacation bonuses, conditional on participation, the amount received is proportional to hours worked, indicating no disadvantageous treatment of part-time workers at the intensive margin. Moreover, estimates based on fixed effects regressions indicate no significant changes in any of these cash and non-cash benefits for women who switched between full- and part-time work (Table A.14 in the Online Appendix). Further, the correlation between current nonwage benefits and estimated wage penalties is weak and insignificant (Table A.15.)[27]

One possible reason, besides overconfidence, that might explain the diverging beliefs about the part-time penalty between full- and part-time workers in the experiment is that current full-time workers may keep benefits fixed, while current part-time respondents may imagine that switching to full-time would involve an increase in nonwage benefits. Given data limitations, I can neither test empirically whether reported wage penalties covary with current nonwage benefits, nor can I rule out that full-time and part-time workers may differ in the way they perceive changes in nonwage benefits when changing hours. However, given that major nonwage benefits are mostly fixed or proportional to hours worked, perceived changes in nonwage forms of compensation are probably small in the context studied in this paper.

6. Discussion

This paper uses novel representative survey evidence from Germany to show that part-time working women expect sizeable hourly wage gains when switching to full-time employment, whereas full-time working women expect no hourly wage losses when switching to part-time.

The findings from this paper shed light on important labor supply decisions that women face over the life-cycle. The beliefs documented here can rationalize why few women hesitate to reduce hours; for instance, to engage in care work. Full-time working women who

[27] If anything, the correlations between nonwage benefits and predicted wage penalties in Table A.15 are suggestive of a positive selection of full-time *and* part-time workers receiving nonwage benefits.

expect no changes in the hourly wage rate when switching to part-time employment have lower incentives to prefer full- over part-time work in a given period, thereby explaining the mobility from full- to part-time employment observed in female labor markets across OECD countries.

These findings can be reassuring from a policy perspective, because many women value part-time work (Wippermann, 2018) and spells of part-time employment can support a woman's career by maintaining labor force attachment (Connolly and Gregory, 2010). However, as part-time work becomes persistent, it can harm workers in the long-run by creating second-order effects, such as effects on future career progression and wage growth (Deschacht, 2017; Gicheva, 2013).

One interesting insight from this paper is that women's wage expectations seem to be at odds with the persistent part-time employment of women observed in Germany and elsewhere. Part-time working women expect wage gains from full-time work - in fact they even seem to overestimate hourly wage gains - which should create a disincentive to remain in part-time employment over prolonged periods of time. Possibly, expected gross wage gains for full-time work are too small to alter labor supply choices, in comparison to other pecuniary and non-pecuniary benefits of part-time employment. In Germany, joint taxation schemes continue to reward, thereby incentivizing, the part-time employment of the secondary earner (Bick and Fuchs-Schündeln, 2017; Steiner and Wrohlich, 2004). This paper studies women's beliefs about individual gross wages, but women's labor supply decisions are partly based on total net income of the household. Under joint taxation, the expected budget effect of a higher full-time wage rate may be offset by anticipated net losses from tax splitting, which might explain why women remain in part-time employment even though they expect wage gains when working full-time. Additionally, beliefs about the long-term consequences of part-time work might be biased. One limitation of this paper is that it does not incorporate women's expectations regarding future wage growth and career progression, which can provide another mechanism explaining persistent part-time employment (Blesch et al., 2021). Other explanations are involuntary part-time work, caused by inflexible work contracts (Manning and Petrongolo, 2008) or by the lack of formal care arrangements (Müller and Wrohlich, 2020; Boneva et al., 2021), as well as persistent gender norms (Boneva et al., 2021).

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Online Appendix

Do Women Expect Wage Cuts for Part-Time Work?

Annekatrin Schrenker

This Online Appendix provides additional material discussed in 'Do Women Expect Wage Cuts for Part-Time Work?' by Annekatrin Schrenker. Appendix A contains further details on the data, Appendix B contains additional information about the probabilistic analyses, Appendix C presents details about the discrete choice model and Appendix D presents additional results.

Online Appendix

Contents

Appendix A Data

A.1 Survey Instrument

Below is a description of the survey instrument used to elicit expectations of full-time workers about counterfactual earnings in part-time. Part-time workers are asked to consider the opposite scenario of switching to a full-time position of 40 hours per week.

Please imagine you were to switch to a part-time job from now on working 20 hours per week. Please only consider part-time jobs that you could carry out with your qualification.

(a) What monthly gross income do you expect to earn when working part-time at 20 hours per week?

(b) How likely do you think it is that a part-time position at 20 hours per week yields a gross income of less than X-20% per month?*

(c) How likely do you think it is that a part-time position at 20 hours per week yields a gross income of more than X+20% per month?*

**Please report your answer in percent. 0% means you consider it impossible, 100% means that you are certain. You can use the percent values in between to graduate your answer.* [Note: X is the individual-specific response to (a)]

A.2 Survey Administration

Sample design and field work of the SOEP and the SOEP Innovation Sample (SOEP-IS) are almost identical. For both surveys, participating households were initially selected through multi-stage random sampling with regional clustering. Face-to-face interviews take place once a year and last approximately 1.5-2 hours. Participants receive small gifts upon completion of each interview, as well as small cash incentives. Households either receive 5 Euros per completed personal interview and 10 Euros per household interview, or they receive a lottery ticket for the charitable TV lottery "Ein Platz an der Sonne" (A place in the sun). Administration of both surveys lies with the German Institute for Economic Research, DIW Berlin, but Kantar Public (formerly TNS Infratest) is responsible for the field work, including software programming, interviewer recruitment, interviewer training, and coordination of interviews.

Appendix B Probabilistic Analysis

B.1 Subjective Probability Distributions

In addition to providing point estimates of the expected counterfactual hourly wage in Euros, respondents in Wave 2016 of the SOEP-IS report the subjective probability for earning less than 80 percent and more than 120 percent of their numeric point estimate (see Section A.1 for the question wording). Figure A.1 illustrates the average discrete subjective CDF. I use non-parametric spline interpolation to fit individual-specific smooth subjective CDFs, following Engelberg et al. (2009). Non-parametric techniques allow for flexible approximations to individuals' subjective distributions and have been shown to outperform parametric approximations (Bellemare et al., 2012). The fitted CDFs pass through reported point estimates, as well as through the respective wage thresholds associated with 80 percent and 120 percent of individual-specific point estimates.

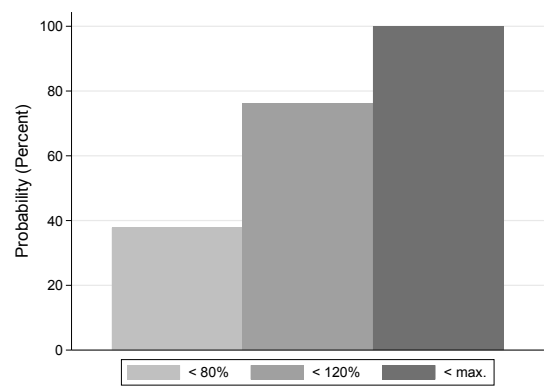


Figure A.1: Mean discrete subjective cumulative density function (CDF) for expected wages based on reported subjective probabilities. SOEP-IS (2016).

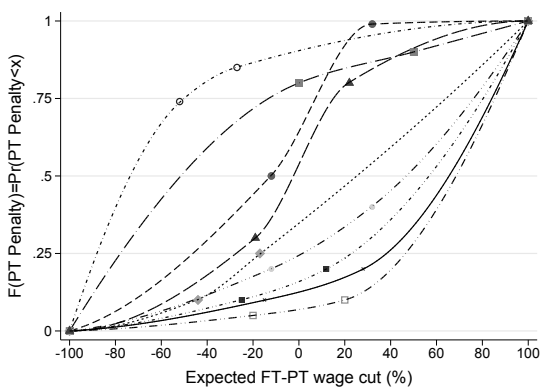


Figure A.2: Fitted smooth subjective CDFs for selected individuals, based on subjective probabilities and non-parametric piecewise cubic hermite interpolating polynomials. SOEP-IS (2016).

I use monotonicity preserving piecewise cubic Hermite interpolating polynomials based on Matlab's PCHIP, using a grid step size of one percent and setting the lower and upper bounds to -100 percent and 100 percent, respectively. Individuals who report incomplete or implausible probabilities (i.e. summing to more than 100 percent) are excluded from the probabilistic analyses. Figure A.2 illustrates the interpolation for ten randomly selected individuals. From the fitted distributions, I derive alternative measures of central tendency (subjective means and medians) and construct subjective standard deviations, interquartile ranges (P75-P25) and point prediction percentiles to measure belief uncertainty, as pioneered by Engelberg et al. (2009).

Appendix C Discrete Choice Model

C.1 Tax and Welfare Regime

The model implements details of the 2005 German tax and benefit system based on features of the German Tax and Benefit Microsimulation Model (STSM) described in Steiner et al. (2012) to simulate net income for each employment choice, following three steps: First, I subtract professional and deductible expenses to derive taxable income. Second, I calculate income tax liability by applying tax formulas depending on marital status. Finally, I deduct liabilities from gross income and add transfers to obtain net income.

To obtain taxable income in step one, gross labor income of the household is converted into real terms (base year 2005) and aggregated to annual amounts. For counterfactual choice categories, I derive alternative-specific gross earnings by multiplying hours times the hourly wage rate that is allowed to vary across full-time and part-time choices. I disregard income components from alternative sources such as capital income or income from renting and leasing.[28] Given gross annual real income, I deduct the lump-sum amount of 920 Euros for professional expenses ("Werbungskosten") for all workers. In addition, actual or lump-sum deductible expenses ("Sonderausgaben") are subtracted up to a maximum amount. I simplify this step and consider only the general flat rate amount of 36 Euros ("Pauschbetrag") as well as expenses for social security contributions.[29] Table A.1 presents detailed information on how deductible expenses are accounted for. For simplicity, the model does not incorporate loss deductions and extraordinary deductible expenses ("aussergewöhnliche Belastungen"). One further simplification I resume to involves the distinction between child allowances that are deducted before applying the tax function and child benefits ("Kindergeld"), which are added afterwards. A more accurate account of the tax-benefit system would conduct a higher-yield test ("Günstigerprüfung") and assign the more favorable rule (Steiner and Wrohlich, 2008). I abstract from this distinction and assume all couples with children receive child benefits.

[28] Since I exclude pensioners and self-employed women, I also disregard income from pensions or self-employment.

[29] I abstract from other deductible expenses such as insurance contributions, alimony payments, church tax, expenses for training, donations, and tax consultancy expenses

Table A.1: Annual Deductable Expenses for Social Security Contributions in 2005

	Single individual	Married couple
Minimum ("Vorsorgepauschale")	$0.2 \cdot RV \ + \ min(0.12 \cdot INC, 1900)$	$0.2 \cdot RV_{HH} \ + \ min(0.12 \cdot INC_{HH}, 3800)$
Actual expenses		
Bracket 1 ("Diff. Vorwegabzug")	$max(0, 3068 - 0.16 \cdot INC)$	$max(0, 6136 - 0.16 \cdot INC_{HH})$
Bracket 2	$min(1334, SV - Bracket\ 1)$	$min(2668, SV - Bracket\ 1)$
Bracket 3	$min(667, SV - Bracket\ 1 - Bracket\ 2)$	$min(1334, SV - Bracket\ 1 - Bracket\ 2)$
Maximum	2001	4002

Notes: All amounts in Euros and annual terms. RV= old age pension contributions ("Rentenversicherung"). HH= household level. INC= gross income. SV= total social security contributions ("Sozialversicherung"). Old age (RV) contributions deductable up to a correction factor (20% in 2005)

Given taxable income, I obtain income tax liability of the household in step two. In Germany, due to the joint taxation of married couples ("Ehegattensplitting"), singles and married individuals are taxed differently. For singles, income tax formulas are applied directly to individual taxable income. For married couples, total taxable income of the household is first divided by two. Income tax formulas are then applied to half the amount of total taxable household income. The derived tax liability is then doubled to determine overall tax liability of the couple. Table A.2 contains income tax formulas as well as minimal and maximal marginal tax rates for all available tax brackets. Income is not taxed below an annual allowance of 7,664 Euros and tax rates evolve according to a partially linear rule until a top income threshold of 52,152 Euros, after which income is taxed at a constant marginal rate of 42%.

Table A.2: Income Tax Formula in 2005 (§ 32 a Abs. 1 EStG)

Zone	Tax bracket	Tax formula	MTR (min)	MTR (max)
1	$\leq$ 7664	t=0	0	0
2	7665-12739	t=(883.74Y + 1500)Y	15%	23.97%
3	12740-52151	t=(228.74Z + 2397)Z + 989	23.97%	42%
4	$\geq$ 52152	t=0.42X - 7914	42%	42%

Notes: Income and tax liabilities refer to annual Euro amounts. MTR = marginal tax rate. Y and Z are 1/10000 of excess income over upper bound of the previous bracket. X is taxable income.

In step three, I compute net income by deducting income tax, social security contributions, and the solidarity surcharge ("Solidaritätszuschlag")[30] from gross income and by adding transfers and benefits. I calculate unemployment benefits according to ALG II standard rates ("Regelbedarfssätze") that differ between East and West German regions and by household composition (Table A.3). Payments are means-tested and individuals

[30]Solidarity surcharge of 5.5% on tax liability accrues for couples (individuals) owing above 1944 (972) Euros annual tax.

are only eligible for unemployment transfers if joint household income, including spousal income, is lower than transfer claims and if household assets are below exempted wealth allowances. I simplify the means-test by assuming households are ineligible for social assistance as soon as one spouse has positive labor income. In accordance with the STSM, I do not model payments from unemployment insurance (ALG I).[31] Child benefits are added once for each couple (the first three children receive 154 Euros each, all additional children receive 179 Euros each). I refrain from covering any additional benefits (e.g. allowances for housing, education, widows etc.).

Table A.3: Unemployment Benefit Standard Rates in 2005 (SGB II/Hartz IV and SGB XII)

	Single adults (I)	Adults in couples (II)	Youth 14 - 18 (III)	Children < 14 (IV)
East	331	298	265	199
West	345	311	276	207

Notes: Monthly allowances per person in Euros.

C.2 Simulated Log Likelihood Function

If full-time and part-time wages were observed for all individuals, including non-workers, the log-likelihood function would be given by

$$ln(L(\theta)) = \sum^{N} ln\left(\frac{exp(\beta' x_{ni})}{\sum_j exp(\beta' x_{nj})}\right) + \sum^{N}\left\{ln\ \phi\left(\frac{lnw_n - Z_n'\gamma}{\sigma_w}\right) - ln\ \sigma_w\right\} \qquad \text{(C.1)}$$

where the first summand denotes the likelihood contributions from logit choice probabilities over hours choices and the second term gives the likelihood of the wage equation residuals, assuming log-normality, where $\phi(.)$ is the normal density.

Accounting for unobserved wage offers, two types of prediction errors must be integrated out, resulting in the following simulated log-likelihood function:

[31] Individuals who worked in the previous year are, in principle, entitled to payments from unemployment insurance for the first 6 months after becoming unemployed. These payments are not means-tested and replace 60-67% of previous net income. I follow the STSM and assume all unemployed directly apply for unemployment benefits (ALG II).

$$
\begin{aligned}
ln(SL) = & \sum^{FT} ln \left\{ \frac{1}{R} \sum^{R} P^{(r)}_{n,FT} \right\} + \sum^{FT} \left\{ ln\ \phi \left(\frac{lnw^{FT}_n - Z'_n \gamma^{FT}}{\sigma^{FT}_w} \right) - ln\ \sigma^{FT}_w \right\} \\
& + \sum^{FT} \left\{ ln\ \frac{1}{R} \sum^{R} \phi \left(\frac{lnw^{PT,(r)}_n - Z'_n \gamma^{PT}}{\sigma^{PT}_w} \right) - ln\ \sigma^{PT}_w \right\} \\
& + \sum^{PT} ln \left\{ \frac{1}{R} \sum^{R} P^{(r)}_{n,PT} \right\} + \sum^{PT} \left\{ ln\ \phi \left(\frac{lnw^{PT}_n - Z'_n \gamma^{PT}}{\sigma^{PT}_w} \right) - ln\ \sigma^{PT}_w \right\} \\
& + \sum^{PT} \left\{ ln\ \frac{1}{R} \sum^{R} \phi \left(\frac{lnw^{FT,(r)}_n - Z'_n \gamma^{FT}}{\sigma^{FT}_w} \right) - ln\ \sigma^{FT}_w \right\} \\
& + \sum^{OLF} ln \left\{ \frac{1}{R} \sum^{R} P^{(r)}_{n,OLF} \right\} + \sum^{OLF} \left\{ ln\ \frac{1}{R} \sum^{R} \phi \left(\frac{lnw^{FT,(r)}_n - Z'_n \gamma^{FT}}{\sigma^{FT}_w} \right) - ln\ \sigma^{FT}_w \right\} \\
& + \sum^{OLF} \left\{ ln\ \frac{1}{R} \sum^{R} \phi \left(\frac{lnw^{PT,(r)}_n - Z'_n \gamma^{PT}}{\sigma^{PT}_w} \right) - ln\ \sigma^{PT}_w \right\}
\end{aligned}
\tag{C.2}
$$

where $P^{(r)}_{n,i} = \frac{exp(\beta' x_{ni})}{\sum_j exp(\beta' x^{(r)}_{nj})}$ denotes the simulated logit choice probability from draw $r \in R$. $w^{FT,(r)}_n$ and $w^{PT,(r)}_n \in x^{(r)}_{nj}$ are simulated full-time and part-time wage offers.

A full information maximum simulated likelihood estimator is given by

$$
\hat{\theta}_{FIMSL} = argmax_\theta\ ln(SL), \qquad \theta = (\beta, \gamma, \sigma^{FT}_w, \sigma^{PT}_w)
$$

Appendix D Additional Results

D.1 Perceived Returns based on Working Hours including Overtime

In this section, I explore the implications of including current overtime in defining women's working hours for estimating the perceived returns (also see the discussion in Section 3.1). The asymmetry in beliefs between full-time workers and part-time workers documented in Figure 1 is amplified further when expectations take into account current overtime (Figure A.3). Full-time working women expect even smaller part-time wage penalties when overtime is taken into account (yielding small expected part-time wage premiums, -4.65 percent), whereas part-time working women expect even stronger full-time premiums (12.84 percent). This finding is not surprising, given that an inclusion of overtime hours reduces the current factual hourly wages of both full-time workers and part-time workers, while leaving untouched perceived counterfactual wage offers. Hence, perceived pay gaps between working full-time and part-time decrease for full-time workers and increase for part-time workers.

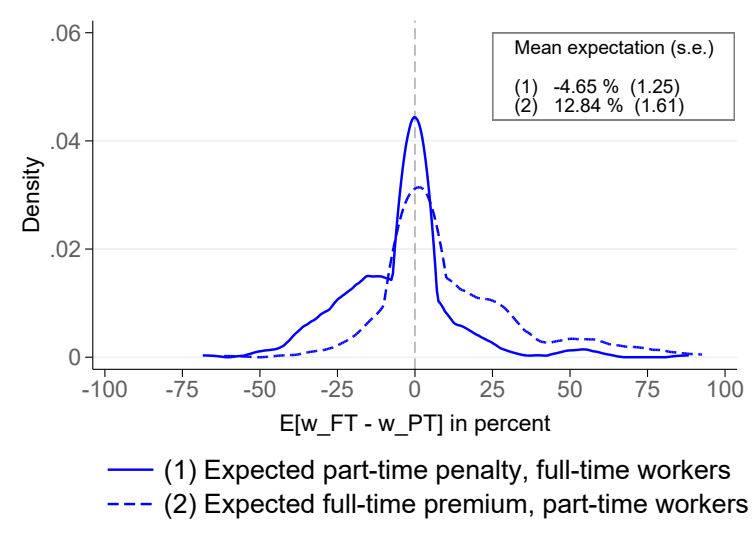


Figure A.3: The plot shows the distribution of the expected part-time wage penalty amongst full-time workers (1, solid line, N = 312) and the expected full-time wage premium amongst part-time workers (2, dashed line, N = 349). Working hours are defined as actual hours including overtime. The box shows sample means with standard errors (s.e.) in parentheses. SOEP-IS (2016-19).

D.2 Perceived Returns by Occupation and Industry

Here I show how expectations covary with current occupation and industry.

Table A.4: Estimates of the Perceived Returns by Occupation and Industry

	Full-time workers		Part-time workers	
	Mean	S.E.	Mean	S.E.
All women	0.21	(1.27)	6.70	(1.56)
International Standard Classification of Occupations (ISCO 2008)				
1. Managers	6.69	(4.85)	4.97	(6.96)
2. Professionals	3.72	(4.99)	11.20	(4.65)
3. Technicians and associate professionals	−1.09	(1.67)	5.09	(1.97)
4. Clerical support workers	−0.77	(1.76)	5.77	(4.12)
5. Service and sales workers	1.25	(3.60)	9.58	(4.52)
7. Craft and related trades workers	−16.73	(6.78)	−5.78	(21.49)
8. Plant and machine operators, assemblers	3.99	(3.04)	43.89	(28.19)
9. Elementary occupations	−3.52	(5.27)	−1.07	(2.92)
German Classification of Occupations (KldB 2010)				
1. Agriculture, Forestry, Farming, Gardening	−6.33	(3.61)	3.20	(6.50)
2. Raw Materials, Goods, Manufacturing	−2.25	(8.93)	18.76	(15.90)
3. Construction, Architecture, Technical Building	−4.03	(3.10)	−2.51	(4.11)
4. Natural Sciences, Geography, Informatics	0.03	(0.05)	2.64	(4.76)
5. Traffic, Logistics, Safety, Security	−0.26	(2.53)	−0.23	(3.63)
6. Commercial Services, Trading, Tourism etc.	0.06	(2.89)	7.52	(4.49)
7. Business Organization, Accounting, Law etc.	−1.64	(1.29)	6.53	(2.90)
8. Health Care, Social Sector, Teaching etc.	4.44	(3.14)	8.05	(2.49)
9. Philology, Literature, Humanities etc.	−5.95	(6.12)	−1.03	(2.37)

Notes: SOEP-IS 2016-19. The Table shows sample means of the expected part-time wage penalty among full-time workers, $\bar{E}[\omega_{FT} - \omega_{PT}|FT]$, and the expected full-time premium among part-time workers, $\bar{E}[\omega_{FT} - \omega_{PT}|PT]$ (in percent), with standard errors (S.E.) clustered at the person-level in parentheses. Results based on self-reported part-time status and contractually agreed working hours.

D.3 Perceived Returns by Experience in the Other Sector

To investigate if there are learning effects, Table A.5 shows how perceived returns covary with work experience in the other sector. I do not observe the full employment trajectories of respondents in the SOEP-IS. To proxy work experience in the other sector, I restrict the sample to workers observed in Wave 2019 of SOEP-IS sample I5 for which I have complete information on past employment status from 2016 onwards (N=70). I then distinguish part-time workers who were observed in part-time employment for the past 3 years from part-time workers who were observed to work full-time at least once since 2016. Likewise, I distinguish full-time-only workers from full-time workers with experience in part-time employment. Given these (limited) proxies of work experience, I do not find any evidence of learning effects, but more research with better measures and larger samples would be incredibly useful.

Table A.5: Estimates of the Perceived Returns by Experience in the Other Sector

	Mean	(S.E.)
A. Full-time workers		
Full-time only	−1.34	(1.34)
Ever part-time in last 3y.	−1.11	(1.11)
Δ Mean Diff.	−0.23	(1.73)
B. Part-time workers		
Part-time only	5.29	(2.56)
Ever full-time in last 3y.	5.80	(2.85)
Δ Mean Diff.	−0.51	(3.82)

Notes: SOEP-IS (I5) 2019. The Table shows sample means of the expected part-time wage penalty among full-time workers (Panel A, N=33), and the expected full-time premium among part-time workers (Panel B, N=37), separately by work experience in the other sector. Robust standard errors (S.E.) in parentheses. All values in percent.

D.4 Belief Uncertainty and Subjective Central Tendency

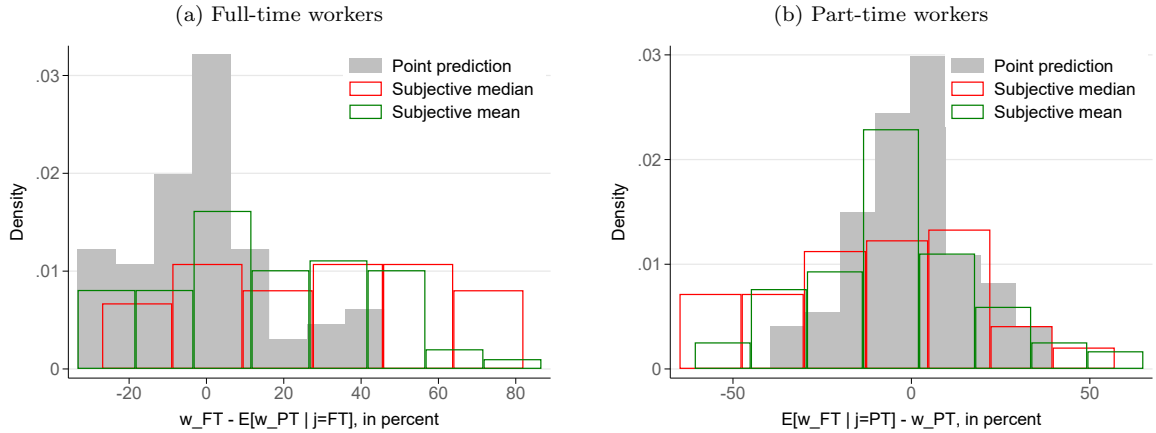


Figure A.4: The plots compare reported point predictions of the perceived returns with measures of central tendency obtained from subjective probabilities. N=66 (Panel a), N=75 (Panel b). SOEP-IS (2016).

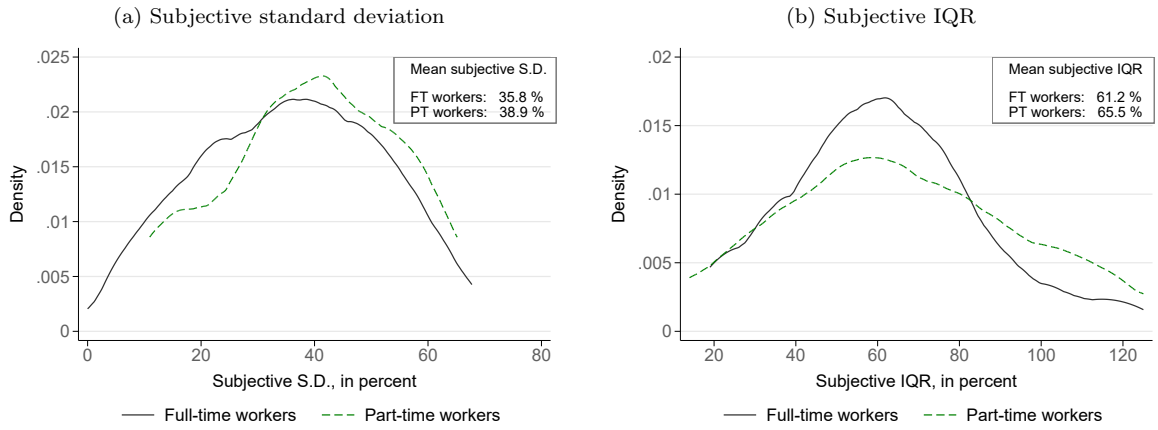


Figure A.5: The plots show kernel density estimates of the fitted subjective standard deviation (Panel a) and the subjective interquartile range, the IQR, (Panel b), based on subjective bin probabilities, separately for full-time workers (solid black line, N=66) and part-time workers (dashed green line, N=75). The IQR is given by the difference between the 75th and the 25th percentile of the fitted distribution. SOEP-IS (2016).

Table A.6: Uncertainty and Subjective Central Tendency

	Full-time workers		Part-time workers	
Subjective central tendency (CT)	Mean	Median	Mean	Median
S.D. < P25	8.2	5.5	2.4	−4.1
S.D. P25-P50	12.2	20.8	−5.3	−9.8
S.D. P50-P75	16.8	19.3	−7.7	−10.1
S.D. > P75	27.0	41.5	−7.6	−13.1
Corr (CT, S.D.)	0.52	1.46***	−0.08	−0.01
Corr (DIST, S.D.)	0.40*	0.91**	0.50***	0.80***

Notes: SOEP-IS 2016. The Table shows sample averages of the fitted subjective means and medians in percent by respondent uncertainty (measured by different percentiles of the subjective standard deviation, S.D.) for full-time workers (N=66) and part-time workers (N=75). Correlations of subjective central tendency (CT) and standard deviations, as well as of the absolute distance between reported point estimates and subjective central tendency (DIST), are adjusted for worker education, children, age, marital status, region, immigrant background, overtime hours, managerial responsibility, sector (public/private), firm size, tenure and contract type (permanent/fixed-term). Estimation with robust standard errors, * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table A.7: Correlates of Belief Uncertainty

	Full-time workers		Part-time workers	
Dep.Var. = Subjective S.D.	Coef.	Std.Err.	Coef.	Std.Err.
Education: Basic	10.13	(1.56)	1.04	(0.17)
Education: Tertiary	−13.11*	(−1.94)	−4.38	(−0.63)
With children	−14.79**	(−2.66)	−2.86	(−0.54)
Age > 40y.	−8.71*	(−1.98)	2.14	(0.41)
Married	6.04	(1.06)	−7.22	(−0.78)
Eastern Germany	17.87***	(3.56)	1.37	(0.28)
Native born	−10.70	(−1.33)	4.03	(0.92)
Overtime hrs. > 0	9.78**	(2.09)	−2.00	(−0.45)
Manager	18.84***	(3.25)	13.28	(1.21)
Public sector	9.34*	(1.71)	−9.12**	(−2.28)
Firm size > 200	−6.34	(−1.58)	−2.59	(−0.61)
Fixed term contract	−3.86	(−0.83)	−0.72	(−0.10)
Tenure > 10y.	2.99	(0.64)	−2.47	(−0.60)

Notes: SOEP-IS 2016. The Table shows OLS estimates of belief uncertainty, measured by the fitted subjective standard deviation obtained from bin probabilities, on worker and job characteristics. N=51 (full-time workers), N=68 (part-time workers). Estimation with a constant and robust standard errors (Std.Err.) in parentheses, * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

D.5 Reduced-form Estimation of the Observed Returns

In this Appendix, I present alternative ('reduced-form') estimates of the part-time wage penalties and premiums. Section D.5.1 presents results from OLS and fixed effects estimation of sector-specific log wage functions. Section D.5.2 shows wage changes for women who actually switched between full- and part-time employment and discusses the identification challenges associated with this approach.

D.5.1. Reduced-form Wage Estimation of Sector-specific Wage Functions

I estimate sector-specific log wage equations for full-time and part-time work to impute counterfactual full-time wages for all part-time workers and vice versa, holding fixed individual-specific characteristics (endowments). A part-time wage penalty or premium can unfold if parameters vary across sectors such that the returns to identical characteristics differ between part-time and full-time work; for instance, if the returns to work experience or to having a permanent contract differ across employment states.

Formally, sector-specific log wage equations for full-time and part-time work are given by

$$ln(w_{jn}) = \alpha_j + Z_n'\gamma_j + \mu_{jn} + \epsilon_{jn} \tag{D.1}$$

where parameters and disturbances may vary over $j_n \in \{FT, PT\}$. The vector Z_n collects basic controls for years of education, a quadratic in part-time and full-time work experience (in years), as well as binary indicators for region (East/West) and immigrant background; if specified broadly Z_n additionally contains occupation major group (1-digit ISCO-88), industry (2-digit NACE), linear and quadratic tenure, as well as binary indicators for firm size (> 200), public sector, and fixed term contract. An individual-specific fixed effect that may vary over j is given by μ_{jn}.

Table A.8 presents the reduced-form estimates of Equation (D.1). Point estimates vary widely across different specifications, but largely confirm previous findings by Hirsch (2005) who documents stronger wage effects for full-time workers switching to part-time relative to the wage effects for part-time workers switching to full-time.

Table A.8: Reduced Form Estimates of the Observed Returns

	(1)		(2)		(3)		(4)	
	Coef.	Std.Err.	Coef.	Std.Err.	Coef.	Std.Err.	Coef.	Std.Err.
1. OLS, basic controls								
PT Penalty FT Workers	8.56	(0.21)***	9.16	(0.20)***	5.26	(0.16)***	4.15	(0.14)***
FT Premium PT Workers	−0.21	(0.13)	0.45	(0.13)***	−0.72	(0.12)***	−0.99	(0.13)***
2. OLS, broad controls								
PT Penalty FT Workers	3.16	(0.16)***	3.89	(0.15)***	−0.49	(0.16)**	−1.96	(0.12)***
FT Premium PT Workers	−2.20	(0.14)***	−1.14	(0.12)***	−4.52	(0.15)***	−4.72	(0.14)***
3. Fixed effects, basic controls								
PT Penalty FT Workers	11.39	(0.31)***	12.57	(0.32)***	7.35	(0.24)***	7.46	(0.21)***
FT Premium PT Workers	5.23	(0.27)***	5.80	(0.24)***	2.06	(0.23)***	2.99	(0.23)***
4. Fixed effects, broad controls								
PT Penalty FT Workers	8.71	(0.31)***	10.10	(0.31)***	6.95	(0.26)***	6.57	(0.24)***
FT Premium PT Workers	3.18	(0.29)***	4.03	(0.26)***	1.17	(0.25)***	1.31	(0.25)***
Part-time status	self-reported		self-reported		hours < 30		hours < 30	
Working hours	agreed hrs.		incl. overtime		agreed hrs.		incl. overtime	

Notes: The Table shows reduced form predictions of the part-time wage penalty for full-time workers and of the full-time wage premium for part-time workers, obtained after separate full- and part-time log wage regressions. All wage regressions are based on SOEP waves 2005-2016, with a minimum sample size of N=48,603. Predictions are presented for working women in full-time or in part-time employment sampled in GSOEP-Core 2016. Basic controls include years of education, linear and quadratic work experience in part-time and full-time, region (Eastern/ Western GER) and immigrant background. Broad controls add occupation major group (ISCO 88, 1 digit), industry (NACE,2 digit), linear and quadratic tenure and indicators for firm size > 200, public sector and fixed term contract. Robust standard errors in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

D.5.2. Identification based on Switchers

This section presents estimates of the average wage changes among women who actually switched from full-time to part-time employment ('full-time leavers') or from part- to full-time employment ('part-time leavers').

Formally, for $j \in \{FT, PT\}$, Mincerian log wage functions are given by

$$ln(w_{n,t}) = \alpha + \beta \cdot \mathbb{1}(j_{n,t} = j | j_{n,t-\eta} \neq j) + Z'_{n,t}\gamma + \mu_n + \epsilon_{n,t} \tag{D.2}$$

where for $j = PT$, $\mathbb{1}(j_{n,t} = PT | j_{n,t-\eta} = FT)$ indicates whether individual n switched from full- to part-time employment between time t and $t - \eta$ and for $j = FT$, $\mathbb{1}(j_{n,t} = FT | j_{n,t-\eta} = PT)$ indicates a respective transition from part- to full-time employment. The parameter of interest is given by β, measured conditional on the same vector of exogenous covariates described in Equation (D.1), $Z_{n,t}$, and an individual-specific fixed effect, μ_n. Table A.9 presents estimates of Equation (D.2) based on direct year-to-year transitions, $\eta = 1$, or from all transitions within the observation period 2005-2016, $\eta \in (1, 11)$.

Table A.9: Estimates of the Observed Returns based on Switchers

	(1)		(2)		(3)		(4)	
	Coef.	Std.Err.	Coef.	Std.Err.	Coef.	Std.Err.	Coef.	Std.Err.
1. OLS, direct transition								
PT Penalty FT Leavers	−1.87	(1.11)	0.07	(1.13)	−4.93	(1.30)***	−7.38	(1.09)***
FT Premium PT Leavers	−2.66	(0.90)**	−1.95	(0.92)*	−10.94	(0.96)***	−12.10	(0.91)***
2. Fixed effects, direct transition								
PT Penalty FT Leavers	−3.48	(1.10)**	−1.57	(1.14)	−11.92	(1.28)***	−12.20	(1.07)***
FT Premium PT Leavers	−3.47	(0.93)***	−1.37	(0.97)	−11.19	(1.09)***	−12.03	(0.99)***
3. OLS, any transition								
PT Penalty FT Leavers	3.43	(0.92)***	4.32	(0.93)***	0.42	(0.96)	−0.06	(1.03)
FT Premium PT Leavers	−1.63	(1.65)	−0.49	(1.66)	−6.57	(1.64)***	−7.16	(1.66)***
4. Fixed effects, any transition								
PT Penalty FT Leavers	−2.93	(1.26)*	−1.19	(1.30)	−8.88	(1.49)***	−0.06	(1.81)***
FT Premium PT Leavers	0.61	(3.20)	6.14	(3.20)	−5.41	(3.21)	−7.95	(2.47)**
Part-time status	self-reported		self-reported		hours < 30		hours < 30	
Working hours	agreed hrs.		incl. overtime		agreed hrs.		incl. overtime	

Notes: The Table shows reduced form estimates of the part-time wage penalty for full-time working women who switched to part-time (FT Leavers) and of the full-time wage premium for part-time working women who switched to full-time (PT Leavers) in percent, in comparison to stayers. Coefficient estimates are either based on women with direct year-to-year transitions between full- and part-time sectors (Models 1-2), or on women with at least one transition in the observation period (Models 3-4). Controls include years of education, linear and quadratic work experience in part-time and full-time, region (Eastern/ Western GER), immigrant background, occupation major group (ISCO 88, 1 digit), industry (NACE,2 digit), linear and quadratic tenure and indicators for firm size > 200, public sector and fixed term contract. All wage regressions are based on GSOEP-Core waves 2005-2016, OLS estimates contain additional survey year controls. Robust standard errors in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Estimates of the observed returns to full- and part-time work based on women switching employment status differ notably from reduced-form and structural discrete choice estimates. Estimates based on within-variation generally yield no wage penalty for full-time workers switching to part-time; if anything, these estimates suggest small wage gains in part-time. Estimates for part-time leaving women further suggest wage losses in full-time.

To the extent that the subset of switchers differs from the population of interest, results based on switchers diverge from average treatment effects.

Table A.10: Composition of Switchers and Stayers

	FT Leaver	FT Stayer	Δ FT Leaver vs. Stayer (*p-val*)	PT Leaver	PT Stayer	Δ PT Leaver vs. Stayer (*p-val*)
Gross hourly wage (in Euros)	14.97	15.91	0.02	13.97	14.47	0.09
Agreed weekly hrs.	28.31	38.67	0.00	34.77	24.00	0.00
Overtime hrs. per week	3.15	3.27	0.66	2.86	2.20	0.00
Education (in years)	12.45	12.69	0.07	12.46	12.12	0.00
Age (in years)	44.85	42.78	0.00	43.53	47.06	0.00
With children (in percent)	0.29	0.14	0.00	0.35	0.45	0.00
Eastern Germany (in percent)	0.25	0.22	0.25	0.24	0.17	0.00
Native born (in percent)	0.77	0.83	0.02	0.77	0.81	0.11
Public sector (in percent)	0.34	0.29	0.04	0.31	0.33	0.45
Firm size > 200 (in percent)	0.48	0.53	0.08	0.47	0.45	0.36
Fixed term contract (in percent)	0.13	0.06	0.00	0.17	0.08	0.00
Tenure (in years)	11.04	12.11	0.07	9.73	12.21	0.00
Manager (in percent)	0.01	0.02	0.05	0.02	0.01	0.10
N	1,164	16,298		1,432	14,902	

Notes: Sample averages with population weights. Switchers defined based on direct year-to-year transitions between full- and part-time sectors. GSOEP-Core (2005-2016).

Table A.10 presents summary statistics for the subset of women who switched between full- and part-time ('Leavers'), comparing them to women who maintained their employment status ('Stayers'). Full-time leavers significantly differ from full-time stayers in a number of observable characteristics. Likewise, part-time leavers differ notably from part-time stayers. If leavers constitute a selected group, estimates of observed penalties and premiums from actual transitions are not transferable to the sample of stayers. Given that I elicit expectations about the part-time penalty (full-time premium) among a representative sample of full-time (part-time) working women, observed returns must be computed for the population of interest comprising both switchers and stayers. Therefore, I use the wage imputation technique in the main specification, further modeling the choice to work full- or part-time within a discrete choice framework.

D.6 FIMSL Estimation Results

Table A.11 presents the full set of estimation results of the discrete choice model for different specifications of part-time status and working hours.

Table A.11: FIMSL Estimation Results of the Discrete Choice Model

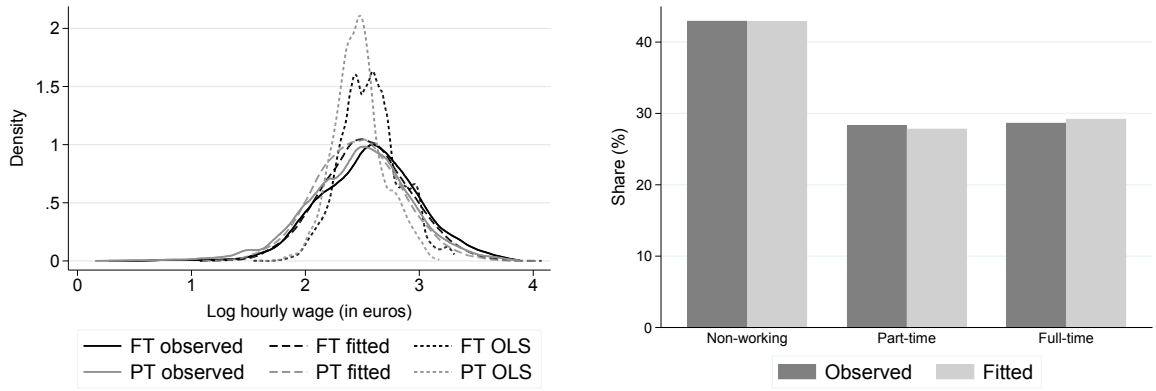
PT status: self-reported	**(1) Agreed hours**				**(2) Incl. overtime**			
	Full-time		Part-time		Full-time		Part-time	
Log wages	Coef.	Std.Err.	Coef.	Std.Err.	Coef.	Std.Err.	Coef.	Std.Err.
Education (years)	0.091	0.001	0.090	0.001	0.091	0.001	0.087	0.001
FT experience (years)	0.030	0.001	0.028	0.001	0.034	0.001	0.030	0.001
FT experience sq.	0.000	0.000	−0.001	0.000	−0.001	0.000	−0.001	0.000
PT experience (years)	0.000	0.001	0.018	0.001	−0.003	0.001	0.016	0.001
PT experience sq.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
East	−0.282	0.003	−0.261	0.004	−0.287	0.004	−0.267	0.004
Foreign born	−0.061	0.004	−0.050	0.004	−0.066	0.004	−0.052	0.004
Constant	1.140	0.009	1.060	0.010	0.994	0.011	1.018	0.012
Std.Dev.	0.076	0.001	0.090	0.001	0.087	0.001	0.102	0.001
Hours choice		Coef.	Std.Err.			Coef.	Std.Err.	
Consumption		0.124	0.003			0.138	0.003	
Hours		0.038	0.001			0.036	0.001	
Hours × Kids		0.041	0.001			0.039	0.001	
Hours × East		−0.018	0.001			−0.017	0.001	
Log likelihood		167219.180				186678.8172		
PT status: hours-based	**(3) Agreed hours**				**(4) Incl. overtime**			
	Full-time		Part-time		Full-time		Part-time	
Log wages	Coef.	Std.Err.	Coef.	Std.Err.	Coef.	Std.Err.	Coef.	Std.Err.
Education (years)	0.090	0.001	0.091	0.001	0.092	0.001	0.086	0.001
FT experience (years)	0.030	0.001	0.027	0.001	0.034	0.001	0.028	0.001
FT experience sq.	0.000	0.000	−0.001	0.000	−0.001	0.000	−0.001	0.000
PT experience (years)	0.001	0.001	0.017	0.001	0.000	0.001	0.017	0.001
PT experience sq.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
East	−0.280	0.003	−0.261	0.004	−0.279	0.004	−0.277	0.005
Foreign born	−0.064	0.004	−0.048	0.004	−0.068	0.004	−0.051	0.004
Constant	1.145	0.009	1.060	0.010	0.976	0.010	1.028	0.011
Std.Dev.	0.077	0.001	0.090	0.001	0.093	0.001	0.098	0.001
Hours choice		Coef.	Std.Err.			Coef.	Std.Err.	
Consumption		0.120	0.003			0.149	0.003	
Hours		0.037	0.001			0.035	0.001	
Hours × Kids		0.043	0.001			0.041	0.001	
Hours × East		−0.019	0.001			−0.021	0.001	
Log likelihood		167485.728				186786.764		

Notes: SOEP (2005-2016). Results from full information maximum simulated likelihood (FIMSL) estimation with constant relative risk aversion (CRRA) utility index.

D.7 Internal Goodness of Fit

I present graphical evidence of model fit (Figure A.6) and estimated wage elasticities (Table A.12) for the main specification of the discrete choice model with self-reported part-time status and agreed working hours.

D.7.1. Model Fit: Wages and Hours Choices



(a) Hourly Wages

(b) Hours Choices

Figure A.6: Goodness of Fit of the Discrete Choice Model

D.7.2. Wage Elasticities

Estimated elasticities for a one percent increase in gross hourly wage for females in the sample are 0.41 percent for working hours and 0.22 percentage points for participation. These elasticities are mostly within the confidence intervals of comparable estimates by Haan (2006), deviations can be explained by differences in sample composition, most notably I include singles whereas Haan (2006) focuses on married couples.

Table A.12: Labor Supply Elasticities

	Δ Hours (percent)		Δ Participation (p.p.)	
	Coef.	Std.Err.	Coef.	Std.Err.
All women	0.41	0.00	0.22	0.02
By region				
East	0.34	0.00	0.25	0.04
West	0.43	0.00	0.21	0.02

Notes: Predicted changes for a 1% increase in gross hourly wage.

D.8 Subgroup Comparison of the Perceived and Observed Returns

Table A.13 presents the point estimates corresponding to the graphical evidence in Figure 6 in Section 5.4.

Table A.13: Comparison of expected and estimated wage penalties and premiums by subgroups

	Full-time workers				Part-time workers			
	Expected		Estimated		Expected		Estimated	
	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.
All women	0.21	1.27	10.23	0.92	6.70	1.56	−0.10	0.85
Education: Basic	6.85	5.79	10.03	2.18	11.44	5.62	1.60	1.84
Education: Intermediate	−1.54	1.24	9.92	1.21	4.53	1.62	−0.57	1.12
Education: Tertiary	1.46	2.97	10.94	1.84	10.64	3.94	−0.59	1.82
With children	7.10	4.48	5.24	1.54	6.81	1.81	0.41	1.07
Without children	−1.29	1.20	12.50	1.13	6.60	2.38	−0.97	1.39
Age $<$ 40 y.	1.59	2.46	8.77	1.42	6.40	2.45	3.17	1.52
Age $>$ 40 y.	−0.65	1.35	11.15	1.20	6.87	2.01	−1.60	1.02
Eastern Germany	−3.48	1.91	12.76	1.81	7.91	3.66	−1.66	2.06
Western Germany	1.36	1.54	9.26	1.06	6.47	1.72	0.23	0.93
Firm size $>$ 200	1.07	1.81	11.85	1.27	3.77	1.80	0.24	1.25
Firm size $<$ 200	−1.00	1.63	8.52	1.33	10.84	2.50	−0.38	1.16
Fixed term contract	5.46	6.47	10.66	2.59	13.04	5.95	3.75	2.32
Permanent contract	−0.47	1.15	10.43	0.98	5.87	1.60	−0.70	0.91
Manager	13.98	8.12	15.95	3.94	10.48	3.82	2.68	7.37
No Manager	−0.94	1.05	9.88	0.94	6.62	1.58	−0.13	0.85
Tenure $>$ 10 y.	0.05	1.67	15.76	1.52	3.90	2.08	−2.25	1.42
Tenure $<$ 10 y.	0.91	1.92	6.79	1.14	6.99	2.08	1.13	1.06

Notes: SOEP-IS (2016-19) and SOEP (2016). Sample means with standard errors (S.E.) of the expected and estimated part-time wage penalty (full-time workers) and full-time premium (part-time workers) overall and within subgroups. Results based on self-reported part-time status and contractually agreed working hours including overtime. Estimates from the CRRA discrete choice model. Standard errors in SOEP-IS clustered at the person-level.

D.9 Nonwage Benefits

Table A.14 shows OLS and fixed effects estimates of changes in nonwage benefits among women switching from full-time to part-time work (full-time leavers) and for women switching from part- to full-time work (part-time leavers).

Table A.14: Changes in Nonwage Benefits among Switchers

	Full-Time Leavers (vs. FT Stayers)		Part-Time Leavers (vs. PT stayers)	
	OLS	FE	OLS	FE
Christmas bonus (EUR/hr)	−0.02	−0.01	0.01	0.02
13th monthly salary (EUR/hr)	−0.06	−0.04	0.13***	0.13**
Vacation bonus (EUR/hr)	0.01	−0.03	0.00	0.01
Profit sharing (EUR/hr)	−0.16	0.12	−1.18	0.13
Public transport/ commuting grant (EUR/hr)	0.03	0.01	−0.01	0.04
Other bonus (EUR/hr)	−0.04	−0.07	−0.02	0.23
Working from home (WFH)	−0.00	−0.03	0.01	0.01
Benefit: Any	−0.06***	0.02	0.05***	0.03
Meals	−0.04**	0.02	0.04**	0.03
Company car	−0.02***	−0.00	0.02**	0.01
Phone	−0.02**	−0.00	0.01	0.01
Charges/ expenses	0.00	0.00	0.02**	0.02*
Computer/ IT	−0.02**	0.01	0.01	0.01
Other benefit	−0.01	0.00	0.01	0.00
Allowances: Any	−0.03	−0.01	0.01	−0.03
Shift/ weekend	−0.01	−0.02	−0.00	−0.04*
Overtime	−0.01	0.01	0.01	0.01
Personal	−0.02**	−0.02*	0.01	−0.00
Gratuity/ Tips	0.00	0.00	−0.00	−0.00
Other allowance	−0.02	−0.00	0.01	−0.02
Christmas bonus	−0.04**	−0.03	−0.02	0.00
13th monthly salary	−0.03*	−0.01	0.01	−0.00
Vacation bonus	−0.03*	0.01	−0.02*	−0.01
Profit sharing	−0.02*	−0.01	−0.01	0.02

Notes: GSOEP-Core 2005-2016. The Table shows coefficient estimates of changes in nonwage benefits for full-time working women who switched to part-time (full-time leavers) and for part-time working women who switched to full-time (part-time leavers), in comparison to stayers. Estimates obtained from multivariate OLS and fixed effects (FE) regression, adjusted for years of education, linear and quadratic work experience in part-time and full-time, region (Eastern/ Western GER), immigrant background, occupation major group (ISCO 88, 1 digit), industry (NACE,2 digit), linear and quadratic tenure and indicators for firm size > 200, public sector and fixed term contract. OLS models additionally contain survey year fixed effects. Estimates are based on women with direct year-to-year transitions between full- and part-time employment. Estimation with robust standard errors (FE) or with standard errors clustered at the person level (OLS), * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

In Table A.15, I document how estimated returns to full- and part-time work obtained from the discrete choice model covary with current nonwage benefits. Conditional on worker and job characteristics, full-time workers who currently receive nonwage benefits are predicted to lose less from switching to part-time than comparable workers without benefits. Among part-time workers, those receiving nonwage benefits are predicted to

gain over proportionally from switching to full-time. This correlational evidence seems to suggest that workers who receive nonwage benefits tend to work in better jobs and, on top, seem to be positively selected, but correlations are statistically insignificant, so I do not want to overinterpret these results.

Table A.15: Observed Returns and Nonwage Benefits

Dep. Var. =	Full-time workers		Part-time workers	
Predicted FT-PT wage gap in percent	BV	MV	BV	MV
Benefit: Any	−2.75	−2.20	3.31	3.10
Meals	−2.40	−2.85	4.17	3.59
Company car	−0.25	−1.69	5.33	3.81
Phone	−3.03	−3.44	13.01	9.35
Charges/ expenses	−11.60	−9.50	16.95	12.72
Computer/ IT	1.94	2.14	14.54	12.18
Other benefit	−10.43**	−8.93*	4.08	4.05
Allowances: Any	2.15	2.10	2.25	0.84
Shift/ weekend	2.73	2.68	0.10	−2.59
Overtime	6.37	6.48	7.17	3.29
Hardship	11.06	10.25	4.05	−0.89
Personal	5.66	5.59	7.89	5.09
Gratuity/ Tips	5.09	8.49	9.95	10.90
Other allowance	−0.66	−1.00	5.30	5.85
Christmas bonus	2.75	1.28	1.40	3.12
13th monthly salary	1.90	−0.51	−1.66	−0.23
Vacation bonus	2.82	0.77	0.55	2.18
Profit sharing	0.86	−0.12	−0.48	0.61
Public transport/ commuting grant	0.09	0.39	4.37	4.66
Other bonus	4.99	2.07	−5.51	−5.24

Notes: GSOEP-Core 2016. The Table shows coefficient estimates of the structurally estimated part-time wage penalty on various measures of current nonwage benefits. Estimates obtained from bivariate (BV) and multivariate (MV) OLS regressions. Multivariate estimates adjusted for years of education, linear and quadratic work experience in part-time and full-time, region (Eastern/ Western GER), immigrant background, occupation major group (ISCO 88, 1 digit), industry (NACE,2 digit), linear and quadratic tenure and indicators for firm size > 200, public sector and fixed term contract. Estimation with robust standard errors, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.