For whom is non-standard work precarious?

Heterogeneous effects of temporary and part-time employment on individual precarity risks and wage inequality in Germany

Dissertation

zur Erlangung des Grades eines Doktors der Philosophie (Dr. phil.)

am Fachbereich Politik- und Sozialwissenschaften

der Freien Universität Berlin

vorgelegt von

Nicolas Karl Morgenroth

Berlin 2020

Erstgutachterin: Prof. Dr. Heike Solga

Zweitgutachter: Dr. Martin Ehlert

Tag der Disputation: 16.10.2020

Table of contents

List of figures and tables

Figures

Tables

Acknowledgements

This somewhat peculiar endeavour of writing a dissertation has been greatly supported, criticised, tolerated and accompanied by a lot of people and institutions whom I want to thank here. Most importantly, I want to express great thanks to my supervisors Martin Ehlert and Heike Solga. Martin Ehlert devoted a lot of time to support me greatly with commitment, fairness and honesty. Heike Solga gave me precious feedback for my writing, helped me a lot in conceptualising the monography and was very ready to support me organisationally when needed. They both communicated with me at eye level, which I appreciate very much.

A very big thanks goes to all my colleagues from the doctoral programme "Good Work" who supported me and with whom I struggled together: Esther, Franziska, Friederike, Giulia, Kathleen, Lisa, Setareh, Carina, Patricia and Christian. They always gave me the feeling that their interest was in me as a person first and in my dissertation second. Moreover, I want to thank the other supervisors from the doctoral programme, Lena, Martin, Sigurt and Susanne, who always gave me sincere and valuable advice during our meetings and colloquia. Furthermore, I took a lot of inspiration and interesting discussions from the colloquia and the retreat of the AAM research unit. I also want to thank the members of the dissertation committee who have offered to read, criticise and value my research and with whom I will be able to discuss my work of the past few years.

The whole dissertation would not have been possible without the financial and infrastructural support of two outstanding institutions. Therefore, I want to thank sincerely both the Hans Böckler Foundation (HBS) and the Berlin Social Science Center (WZB). Furthermore, I want to thank the Socio-Economic Panel (SOEP) and the German Institute for Economic Research (DIW) for providing such valuable data without which, again, this dissertation would not have been possible.

Moreover, I am very lucky to have such a supportive and engaged family. Especially, I want to thank my mother Brigitte, my father Mathias and my grandmother Edith for being who they are. During the whole time of research and writing, I have been surrounded by wonderful friends, old and new, whom I cannot possibly name here. Nonetheless, I would like to permit myself two exceptions: my flatmates of the Ex14, Almut, Peter and Philipp, have become a second family for me and Philine always succeeded in pushing aside any boredom by keeping me aware of life's various themes and joys. Moreover, I want to thank the climate justice movement, which has thrived so beautifully in recent years and hopefully will thrive even more so in the next few years, and all the individuals behind it. Being part of it gives me strength and balances my priorities.

In addition, I want to thank all those who went to great length to read through parts of or even the whole of my dissertation and whom I have not yet named: Joachim, the humanist who accepts me despite my materialistic views, Martin, my fabulous flatmate in exile, Viktor, who enriches my family so profoundly, and Carmen, my wonderful friend.

Finally, I owe an incredible amount to Nils, who has accompanied me closely over the past decade, even into academia, and with whom I could share all my troubles, regardless of whether they were of a methodological, theoretical, political or emotional nature.

1 Introduction

Non-standard employment relationships, such as temporary and part-time employment, are now an integral part of the German labour market and are subject to constant re-regulation. Their denomination as non-standard is increasingly becoming a historical reference, as temporary and part-time employment is becoming one of multiple standards, especially for young and female workers. The proportion of temporary contracts rose from around seven percent in 1995 to around eleven percent in 2017 (figure 1), while nearly half of all new work contracts are temporary (Hohendanner 2019). In addition, nearly half of all female employees work part-time (BA 2019). As the most prevalent forms of non-standard work, temporary and part-time employment will be the subject of this study.

The rise in non-standard work is often related to a precarisation of work which means an increasing multidimensional insecurity of employment (for example Brinkmann et al. 2006; Kalleberg 2018). Temporary employees cannot be sure whether they will be continue to be employed after the end of the contract. Part-time employees earn lower wages due to a reduced working time which results in lower benefits such as unemployment benefits or pensions. In addition, previous research reveals wage penalties for both employment forms and shows that these are more common in lower wage groups (see section 2.4). In the same period in which non-standard work rose, the low wage employment rate and wage inequality increased substantially in Germany, now stagnating at high levels (Kalina/Weinkopf 2018; Möller 2016). Stuth et al. (2018) found that twelve percent of the workers in their sample were in continuous precarious employment.

However, previous research underlines that non-standard work is not per se precarious. Its precarity risks vary considerably for different groups of employees (Motakef 2015: 50; Kalleberg 2018: 31f.). Depending on their resources, such as education, trade union support or economic relevance, the employees have different bargaining positions for

enhancing their chances of further employment in spite of temporary contracts or to gain higher wages even in part-time employment. In addition, temporary and part-time employment potentially fulfil various functions: temporary employment can be a means for employers to establish a marginal labour force as a buffer for changing market demands, to screen new employees more extensively than the legally sanctioned six months or to bridge a parental leave. Part-time employment can in turn be a means to buy only small amounts of labour power, to adapt the placement of the working hours flexibly or, from the perspective of the employees, to balance labour and non-labour time.

While previous research unanimously concludes that non-standard work has ambivalent consequences depending on the context, it remains an open question how these ambivalent consequences are distributed among social contexts and groups of employees. Moreover, while the coincidence of a rising proportion of non-standard work and a rising wage inequality is explicitly stated in the precarisation literature, this relationship has not been statistically researched in a thorough manner. I therefore focus on these two aspects in this study in order to contribute to the sociological debate on non-standard work and to provide further scientific knowledge for the political debate: first, I research the contextual factors determining the heterogeneous precarity risks of temporary and part-time employment. Secondly, I analyse the influence non-standard work has had on wage inequality in recent decades. Consequently, I seek to answer the questions: for whom is non-standard work a precarity risk? How did non-standard work contribute to the rising wage inequality in recent decades? This study thus offers a unique and systematic endeavour to research the relationship between non-standard work and existing inequalities in the labour market in Germany.

1.1 Theoretical approach and analytical strategy

In order to answer these questions, non-standard work is framed in the context of a flexibilisation and re-commodification of the labour market and is related to the precarisation critique. The dominance of standard employment – defined minimally as

permanent, full-time and direct employment – declines as the proportion of non-standard employment rises. A series of labour market reforms in 1985, 1996 and 2001 accompanied and facilitated this development. This is often considered to be part of the flexibilisation of the labour market in order to highlight that non-standard employment relationships enable employers to make a more flexible use of human labour power in light of increasingly volatile markets (for example Dichmann/Hickel 1989; Dörre 2005; Gebel/Giesecke 2011; Kalleberg 2018). Employees, in turn, potentially profit from an employee-oriented flexibility when they can choose between full-time and part-time work, as strengthened by the latest reforms of the part-time and temporary employment law (TzBfG 2000) in 2019.

When employment relationships are understood as institutionally embedded relations between sellers and buyers of human labour power, a further layer of meaning is added to the flexibilisation of the labour market. In accordance with Polanyi (1978), human labour power in a capitalist economy can be interpreted as a fictitious commodity regulated by the labour market institutions. From that perspective, the flexibilisation of the labour market is a (re-)commodification of human labour power because it reduces the extent to which employment relationships are determined by the institutional framework in which they are embedded. Temporary contracts circumvent the legal dismissal regulations, which means that employers can choose more flexibly from whom to buy labour power and for how long. Part-time contracts allow employers – or workers – to adapt the quantity of labour power they buy from one worker – or sell to one employer. This partial re-commodification of human labour due to non-standard work exposes employees to a higher risk of precarity, depending on the resources they have to cope with this risk.

The most influential definition of precarity in Germany stems from a research group led by Klaus Dörre. They define precarity as a relative deprivation in material and subjective security (Brinkmann et al. 2006). From this perspective, being precarious means falling below a norm of security which is dominant in a given society. In this study, the standard employment relationship defines the dominant norm, while the wage

level indicates the material security and the subjective job insecurity indicates the subjective security. Hence, differentials in hourly wages between standard and non-standard workers serve as indicators for material precarity risks, whereas differentials in subjective job insecurity serve as indicators for subjective precarity risks.

In order to research the heterogeneity of these precarity risks of non-standard work, this study provides a theoretical systematisation of the relevant contextual factors which affect the bargaining positions of employees and employers. In a first step, I argue that the precarity risks are structured on a first level by established inequalities in the labour market: gender and the vertical labour market position are the primary contextual factors researched in this study.

Gender is still one of the most prevalent structuring factors for the division and the conditions of labour leading to the dominance of an unequal dual earner model in Germany. Although female labour force participation is nearly equal to the male one, there is still a considerable wage gap (Schmidt 2019; Zucco 2019) and a persisting occupational gender segregation (Hausmann/Kleinert 2014). In addition, women work part-time nearly ten times more often (see figure 1, table 5) and do more care work (Boll 2016).

Furthermore, segmentation theories and consecutive research have long shown that the labour market is horizontally and vertically segmented (Piore/Doeringer 1971; Sengenberger 1987; Köhler et al. 2008). While temporary employment is a constitutive part of the horizontal segmentation into internal and external markets, the vertical segmentation is rather based on occupational position, income or employment stability. In the analyses, the international socio-economic index of occupational status (ISEI) will serve as the indicator for vertical labour market segmentation. Both the resources of the employees to cope with non-standard work and its functions should vary for different vertical labour market positions, resulting in heterogeneous precarity risks.

In a second step, I endeavour to explain the heterogeneity of the precarity risks of non-standard work across gender and vertical labour market positions. Following the basic

assumption that they are rooted in differences in the bargaining positions of employers and employees, I focus on two theories: power resources theory adopts the perspective of the employees, identifying employees' power resources as relevant structural factors. Neo-institutional labour economics takes the employers as a starting point, identifying employers' basic problems as driving forces of labour market dynamics.

Schmalz and Dörre (2014) provide the first theoretical basis by applying the US-American power resources approach to the German context. In that approach, labour market outcomes are explained by the resources available to employees which enable them to enforce their interests. Based on their typology, I identify four main power resources potentially strengthening the bargaining position of non-standard employees. Firstly, the structural production power resources stem from the relevance of the employees in the production process. Secondly, the structural market power resources stem from a relative shortage of labour on the market. Thirdly, the associational power resources stem from collectively organised actors of labour. Lastly, the institutional power resources stem from the institutions and laws guaranteeing the rights of the employees and de-commodifying the employment relationships by legally restricting them to certain forms.

In contrast, Krause and Köhler (2012) argue that labour market outcomes can be best explained by considering the interests of the employers. Based on neo-institutional labour economics, they define two basic problems employers face in the labour market: employers have to recruit appropriate staff or dismiss employees according to the situation in the product markets or other external factors. That is what Krause and Köhler call the personnel adjustment problem. It is closely linked to the structural market power resources and becomes more prevalent the larger the market power resources of the employees are. In addition, employers ultimately rely on the willingness of the employees to use their labour power effectively in the production process, i.e. to transform their labour power into an economic value for the employer. The more difficult it is to control the product or the process of production, the more

employers are dependent on the employees, what Krause and Köhler call the transformation problem.

From these two theoretical approaches I derive five contextual factors for the analyses, which determine the bargaining positions of employees and employers. According to the theories, these should explain the heterogeneity of the precarity risks of non-standard work across the primary contextual factors of gender and vertical labour market positions: the occupational unemployment rate indicates the employees' structural market power resources as well as the employers' personnel adjustment problem . The sectoral union rate indicates the associational power resources. The sectoral collective agreement coverage indicates the institutional power resources, while the occupational proportion of non-routine tasks indicates the employers' transformation problem. Finally, the structural production power resources are difficult to measure appropriately and presumably correlate highly with the vertical market positions. Therefore, they are only taken into consideration for the explanation of gender differences, indicated by ISEI.

While I assume that the material precarity risks are a direct outcome of the bargaining positions, the analysis of subjective precarity risks demands theorising further the translation of factors outside the individual into subjective reactions. Therefore, I use the transactional theory of stress and coping by Lazarus and Folkman (1984) who conceptualise individuals' psychological reaction to stressors. Although it is a psychological theory, it is highly compatible with sociological explanations, as it comprises the individuals' appraisal of their social resources. According to this theory, individuals appraise first whether a stressor – in this case non-standard work – is a threat to their needs, values or goals. Next, individuals appraise whether they have the resources to cope with that stressor in a problem-oriented manner, meaning that they can alleviate the negative consequences of the stressor. This second appraisal in the transactional theory of stress and coping thus allows for theorising the social contextual factors of a subjective process.

The analysis of the heterogeneous precarity risks aims to answer the question as to which employees are particularly disadvantaged by having non-standard contracts, and which are not. It cannot, however, answer the question as to how non-standard work affects inequality at the macro level. Therefore, in a final step, I look into the wage inequality effects of non-standard work. While this requires a different theoretical and methodological approach, it still focuses on the heterogeneous effects of non-standard work, however at different points of the wage distribution.

Although the reasons for rising wage inequality are a much researched field, the role played in this by non-standard work has thus far been neglected. Given that a rising heterogeneity within sectors between companies is the most prevalent explanation for rising wage inequality (see section 2.5), non-standard work may explain part of that heterogeneity. As non-standard work has been shown to induce wage penalties and is concentrated in lower wage groups (see section 2.4), I expect that its quantitative rise, i.e. the compositional effect, contributed to rising wage inequality in the bottom half of the wage distribution and subsequently to overall wage inequality.

It is less clear how changing wage penalties of non-standard work, i.e. the structural effect, could have influenced the wage distribution. Both a polarisation between non-standard and standard employment and a normalisation of non-standard employment are conceivable. As the aforementioned labour market reforms were aimed at establishing marginal employment as a stepping stone into standard employment, I rather assume that a polarisation took place. In that case, increasing wage penalties should have contributed further to the rising wage inequality in the bottom half of the wage distribution as well as in the whole distribution.

1.2 Data and methods

The analyses of the heterogeneous precarity risks and inequality effects of non-standard employment are primarily based on data from the German Socio-Economic Panel (SOEP v33), a household panel survey of approximately 10,000 households a year. The sample consists of employed individuals aged between 17 and 65 observed between

1995 and 2017. Additional data on the contextual factors has been taken from the Labour Force Survey – the occupational unemployment rate –, the Structure of Earnings Survey – the collective agreement coverage – and the occupational task composition measure of Dengler et al. (2014).

In order to analyse the heterogeneity of the precarity risks, I employ fixed effects regressions, including interactions between the indicators of non-standard employment and the contextual factors. Hierarchical models make it possible to evaluate which contextual factors can explain the heterogeneity across gender and the vertical labour market positions. In the case of the subjective precarity risks indicated by dummy variables, I assume a linear probability relation and test this assumption by re-estimating the models with conditional logit regressions.

The heterogeneous effects of non-standard employment on the wage distribution are analysed by decomposing inter-quantile ratio differences between two time points. Therefore, unconditional quantile regressions of the 50/15, the 85/50 and the 85/15 inter-quantile ratio are estimated once for a pooled sample including the years 1995 and 1996 and once for a pooled sample based on the years 2010 and 2011. The differences in the respective inter-quantile ratios between the two time points are then decomposed once with standard Oaxaca Blinder decompositions and once with reweighted decompositions in order to test for departures from the linearity assumption.

1.3 Results

The results show that the precarity risks of non-standard employment are indeed significantly heterogeneous across gender and vertical labour market positions. While women are more at risk of subjective precarity as a result of temporary employment, men suffer higher material precarity risks from both temporary and part-time employment. The subjective precarity risks of temporary employment are particularly pronounced for women in high labour market positions, while the subjective precarity risks of part-time employment are the highest for men in high labour market positions. The material precarity risks of temporary employment are the greatest for those in the

highest labour market positions as well as for unskilled workers and, in the case of men, for those in the lowest labour market positions in general. On the contrary, the material precarity risks of part-time employment are consistently the greatest for those in low labour market positions. For women working part-time in middle and high labour market positions even wage premiums are found, while for male part-timers large penalties for those in low and middle labour market positions clearly predominate.

The significantly higher subjective precarity risks of female temporary employees hint at a disadvantage of nascent mothers and/or a statistical discrimination against potential mothers as further robustness checks suggest. Furthermore, the subjective precarity risks seem to be driven by occupational peer comparisons in the first subjective appraisal and thus are particularly large for non-standard workers in contexts of high-performance employment systems where stable employment relations and small occupational unemployment rates predominate. The role of power resources in the second appraisal, however, seems to be negligible for the subjective precarity risks.

The heterogeneity of the material precarity risks across vertical labour market positions is almost unaffected by controlling for differences in the other contextual factors. The labour market position seems to have its own moderating effect on the precarity risks independent of the market, the associational or the institutional power resources or the occupational transformation problem. Apparently, it is differences in the socio-economic function of non-standard employment that structure the heterogeneous material precarity risks, rather than differences in employees' resources. While temporary employment in higher labour market positions may be used predominantly as an extended probationary period, entailing large wage penalties in comparison to those who are already included in the core labour force, it may be predominantly a means to establish a constant marginal labour force in lower labour market segments which does not differ as much in wage levels from the core labour force. Likewise, the heterogeneity in the material precarity risks of part-time employment suggests that it tends to fulfil the function of allowing for additional non-labour time for women and in higher labour market segments. By contrast, it tends to provide the basis for an internal

marginal labour force, especially in the case of male part-timers in low and middle labour market segments.

Finally, the results show that the rise in non-standard employment relationships significantly and considerably increased the inequality in the bottom half of the wage distribution as well as the total wage inequality, while only marginally affecting the inequality in the top half of the wage distribution. In the estimated decomposition models, temporary and part-time employment account for ten percent of the rise in the inequality in the bottom half of the wage distribution, while accounting for seven percent in the rise in total wage inequality.

There is no effect, however, of a change in the wage penalties of temporary or part-time employment on wage inequality. Apparently, neither a polarisation between standard and non-standard employment nor a normalisation of non-standard employment predominated between 1995 and 2011.

The study is organised in four main chapters, preceded by this introduction and completed by a detailed conclusion. In the next chapter, I elaborate on the state of the art in the sociological, economic and psychological literature, which is relevant for the research question. In addition, the political and legal background for non-standard employment in Germany is concisely presented. By doing so, I wish to provide the basis for the subsequent analyses. In the third chapter, I discuss and combine the theoretical approaches used to develop the research hypotheses. The fourth chapter entails a description of the data basis, the operationalisation of the theoretical concepts developed in the previous chapter and a discussion and description of the methods and the analytical strategy. In the fifth chapter, I present in detail the results of the statistical analyses. Finally, in the conclusion, the theories and hypotheses are summarised, the results systematised and their implications for the empirical literature and the theories discussed. I end with the limitations and the remaining open questions of this study as a potential link for further research.

2 The sociological and political context of the study

The public and scientific debates as well as the policy acts concerning non-standard employment date back to at least the 1980s. My research interest in this topic, and the research design I chose, are grounded in these foregoing processes and endeavour to add further knowledge to the existing rich research. Therefore, it is pivotal to contextualise the analyses of this study by tracing the public debates and policy acts and especially by systematising the research body on which my analyses are based. In the following section, I first concisely report on the political and legal background of non-standard employment in Germany. Secondly, I show how this was accompanied by economic and sociological research. Next, I summarise the predominantly psychological research on which my analyses of subjective precarity are based. Fourthly, the sociological and economic literature on the wage effects of non-standard employment is presented. Finally, the scientific discussions about the rising wage inequality and the rising low wage rate in Germany are related to the rise in non-standard employment.

2.1 Political and legal background

The relevance of non-standard employment in general and temporary employment in particular began to increase with the labour market liberalisation reforms of the 1980s and 1990s under the Kohl administration. Taking the U.S. labour market as a model, the stated aims of the reforms were to strengthen the competitiveness of the national economy and to provide the basis for employment creation in light of the economic recession of the 1970s and the accompanying high unemployment rates. In influential publications, the liberal minister of economics Otto Graf Lambsdorff (1982) and the conservative politician Ernst Albrecht (1983) demanded a far-reaching deregulation of the labour market.

The rationale behind these demands was that the cause of the persistently high unemployment was to be found in the excessive regulation of the labour market by the state and the trade unions, which did not allow for a flexible adaptation of the labour

force and wages to increasingly volatile and global markets. Hence, from this perspective dismissal and wage setting processes should be deregulated in order to promote employment (Dichmann/Hickel 1989).

In an influential paper, Atkinson describes how companies can achieve flexibility (1984): external flexibility is provided if companies are enabled to maintain a peripheral workforce which can be flexibly adapted to the ups and downs of the market, thus protecting the core workforce, which in turn adapts with internal flexibility. In this sense, temporary contracts allow for external numerical flexibility. Internal temporal flexibility (Krause/Köhler 2011) arises from the possibility to redistribute the working time of part-time workers more flexibly within the week.

In this vein, the first Employment Promotion Act of 1985 (BeschFG 1985) extended the maximum duration of a fixed-term contract without factual reason from six months to 18 months when the employee is newly hired or when the employee is employed subsequent to a period of training and no permanent positions are available. In addition, employers could now hire temporary agency workers for a duration of six months instead of three. As the reform was highly controversial at the time (Dichmann/Hickel 1989), the Employment Promotion Act was itself restricted to a period of five years in order to be evaluated.

A study by the Berlin Social Science Center (WZB) issued by the Federal Ministry for Labour and Social Affairs (BMAS) found very modest effects on new hires (IAB 1989). In another study, Büchtemann (1989) assessed that the Employment Protection Act had no positive effect on employment. In fact, the number of fixed-term contracts had already risen substantially before 1985 (Büchtemann/Quack 1990). The Employment Protection Act was subsequently extended in 1990 and substantially expanded in 1996 (BeschFG1990; BeschFG1996). The maximum duration was extended to 24 months and the limitation to new hires or temporary positions after a training period discarded. Employees over 60 years old could be temporarily employed without restrictions.

Finally, the Part-Time and Temporary Employment Act of 2000 (TzBfG 2000) brought together all the legal regulations of fixed-term and part-time contracts while retaining the bulk of the previous acts. It defines fixed-term employment as all contracts which have a fixed expiration date or are linked to a temporarily limited labour output. Part-time employment is defined as all contracts with fewer working hours than prescribed by a comparable full-time contract or when the actual working time is less than a comparable full-time contract. Fixed-term contracts with factual reason are allowed when

- the labour demand by the employer is only temporary
- the fixed-term contract follows a period of training or study and facilitates further employment
- the employee is substituting for another employee
- the character of the labour legitimises a fixed-term contract
- the fixed-term contract serves as a probationary period
- reasons relating to the employee legitimise a fixed-term contract
- the employee is paid from budgetary funds which are legally tied to fixed-term contracts and the employee is employed accordingly
- the fixed-term contract is based on a court settlement.

Fixed-term contracts without factual reasons are still allowed for a maximum period of 24 months with a maximum of three extensions within this period. However, the Part-Time and Temporary Act reintroduces the restriction of fixed-term contracts without factual reasons to new hires. with regard to part-time work, the Act defines the right of all employees of companies with more than 15 employees to change to part-time work if there are no operative reasons against it. Since 2019, employees of companies with more than 45 employees also have the right to change only temporarily to part-time work if there are no operative reasons against it (TzBfG 2020).

As the described liberalisation of the labour market was officially aimed at promoting employment, economists and sociologists focused firstly on an evaluation of the employment effects (Adamy 1988; IAB 1989; Büchtemann 1989; Bielenski 1998; Bielenski et al. 1994). Predominantly, they come to the conclusion that the liberalisation contributed neither to a rise in standard employment, as wished for by its proponents, nor to a substitution of permanent positions by fixed-term ones, as feared by its opponents (Giesecke 2006: 55).

Parallel to the general regulations in the Employment Promotion Acts and the Part-time and Temporary Employment Act, the temporary employment of academic personnel has always been subject to specific regulations. The Act on Temporary Contracts in Science (WissZeitVG 2007), which was part of the University Framework Act until 2006, enabled fixed-term contracts with factual reasons for academic personnel until 2002. Since 2003 the need for a factual reason was discarded and the maximum length of temporary employment was set at 6 years for those without a doctorate and another six years – nine years for physicians – for those with a doctorate (Giesecke 2006). Since 2015, fixed-term contracts without factual reason are restricted to personnel who are employed for their qualification, which also entails state doctorates (*Habilitation*) (WissZeitVG 2017). The legal possibilities for temporarily employing academic personnel thus considerably exceed those prescribed in the Part-time and Temporary Employment Act.

2.2 Sociological research on non-standard work and precarity

Temporary and part-time employment has increased substantially in recent decades, while the number of standard employment relationships has remained somewhat stable (Eichhorst/Tobsch 2015). As can be seen in figure 1, the proportion of temporary employment among men rose from six percent in 1995 to ten percent in 2017, while among women it rose from eight percent to 11.5 percent. The proportion of part-time employment among men rose from one percent in 1995 to five percent in 2017 and among women from 32 percent in 1995 to more than 40 percent in 2017.

Figure 1: Proportions of temporary and part-time employment from 1995 to 2017

Note: Weighted results; Sample consists of employed individuals aged between 17 and 65 excluding the self-employed, students, apprentices and retirees as well as all those working in workshops for people with disabilities; Part-time employment does not entail marginal employment

Source: SOEP v34, 1995-2017; Author's calculations

As the proportion of non-standard work in relation to standard work increased, researchers started to ask about the quality of these emerging forms of employment which could no longer reasonably be labelled atypical employment. This development was further strengthened by the emerging discourse about a recurring precarity in the European industrial countries. In this vein, Büchtemann and Quack already asked in 1990: "How precarious is non-standard employment?". However, it was only around 2000 that inferential quantitative research about the social consequences of non-standard work on the individual level took off considerably in Germany (see sections 2.3 and 2.4). The research interest shifted from the employment effects of a liberalisation of non-standard work to the individual social consequences for those who work in non-standard work arrangements.

It is presumably no coincidence that at the same time the scientific and political debate about a newly emerging precarity started to gain popularity. Castel's "From manual workers to wage laborers: transformation of the social question" (2002), published in French in 1995 and in German in 2000, is generally taken as a starting point for the scientific debate (Motakef 2015: 6). in this work he argues that the neoliberal reforms of the labour market and social security systems in the previous decades lead to a new quality of insecurity for workers. Bourdieu (1999: 81ff.) further popularised the precarisation thesis and analysed it as a new mode of domination as insecurity spills over from the labour sphere to social relations in general. A research group led by Dörre popularised the precarisation thesis in Germany and at the same time tried to establish definitions and typologies which could instigate further empirical research. Importantly, they made the distinction between objective, material precarity risks, such as low wages or less social security, and subjective precarity risks, such as a lack of recognition or being worried about losing one's job (Brinkmann et al. 2006).

At the core of the sociological discourse about precarity in Germany were the emerging forms of non-standard work and their precarity risks. While in the early years the research concentrated more on the question of to what extent non-standard employment is precarious, it has only recently shifted to the question of under what conditions it is precarious (Motakef 2015: 50). This is also the main question of this study.

As I focus a) on the subjective precarity risks indicated by subjective insecurity, b) on the material precarity risks indicated by wage differentials and c) the distributional effects of non-standard work on wage inequality, I restrict the following research summary to these outcomes. This leaves out some questions, for example for whom temporary and part-time jobs are a more long-term condition and for whom they are stepping stones to standard employment (see for example Büchtemann/Quack 1989; Gash 2008; Gensicke et al. 2010; OECD 2015; Stuth et al. 2018). Moreover, the impact of flexible employment features on the fit between labour and non-labour time demands is researched (see for example Lott 2014). Finally, there is an abundance of descriptive

research, which also provides much information for less-researched fields (see for example BMAS 2016; Eichhorst/Marx 2011).

2.3 Subjective insecurity and non-standard work

To begin with, I focus on the research literature, which provides the basis for the analyses of the subjective precarity risk. Most importantly, the psychological literature already extensively discussed the measurement and implications of subjective job insecurity. And the subjective evaluation of one's situation as precarious is an integral part of the sociological definition of being precarious (Brinkmann et al. 2006; Kiersztyn 2017; Alberti et al. 2018).

As Bourdieu argues, it is precisely through the subjective internalisation of the insecurity and the difficulty in planning one's own life that precarity functions as a mode of domination, which inhibits creativity and self-determination and hinders resistance against outside demands (1999: 82). Accordingly, the social psychological research finds that the subjective feeling of job insecurity has a larger impact on a series of well-being-related outcomes than the objectively insecure situation of a temporary contract. Empirical results clearly show that subjective job insecurity has negative effects on physical and mental health as well as on other aspects of subjective well-being, such as life and job satisfaction (Sverke et al. 2002, Cheng/Chan 2008; László et al. 2010). Although objective job insecurity is also related to higher risks of perceived social exclusion and well-being (Gundert/Hohendanner 2014; Voßemer et al. 2017), research has shown that subjective job insecurity is eventually more consequential (De Witte/Näswall 2003; Origo/Pagani 2009; Kirves et al. 2011; Jahn 2015). One explanation for this is the strong heterogeneity of temporary employment in its function for employers (De Cuyper et al. 2008).

Dixon et al. (2013) identify three different forms of subjective insecurity related to work. Firstly, job insecurity describes the insecurity associated with the loss of the current job. Secondly, labour market insecurity points to the chance of finding a new job comparable to the current one. Lastly, employment insecurity combines both these

factors and thus entails both the insecurity of the current job and the chance of finding a new comparable job.

While all three concepts have their legitimate use, it is predominantly subjective job insecurity which is researched, especially in the socio-psychological literature. There, subjective job insecurity is further differentiated into a global and a multidimensional measurement (Sverke et al. 2002; Keim et al. 2014; Gallie et al. 2017; Lee et al. 2018). The global measurement points to the potential loss of the current job, while the multidimensional measurement focuses on the potential loss of various aspects of the job. In addition, Keim et al. (2014: 270) differentiate between a cognitive and an affective dimension: cognitive job insecurity assesses the perception of the likelihood of losing one's job. Affective job insecurity measures the extent to which one worries about it.

There is clear evidence that people working on fixed-term contracts experience higher levels of subjective job insecurity, cognitively as well as affectively (Kinnunen/Nätti 1994; De Cuyper/De Witte 2007; Burgoon/Dekker 2010; Muñoz de Bustillo/de Pedraza 2010; Klandermans et al. 2010; Kirves et al. 2011; Keim et al. 2014; Lübke/Erlinghagen 2014; Gallie et al. 2017). To date, however, there has been very little research that poses the question of how this effect may vary by contextual factors such as gender and labour market positions.

Hank and Erlinghagen (2011) – without making it explicit – report different effects of temporary employment on subjective job insecurity for men and women, however the authors do not discuss this difference. Kiersztyn (2017) makes the argument that it is crucial to understand under which conditions temporary work leads to subjective job insecurity in order to gain an understanding of complex precarisation processes. In her preliminary analyses with temporary workers in the European Working Conditions Survey 2010, she finds evidence that labour market and household characteristics play a significant role in the moderation of the effect of temporary employment on subjective job insecurity.

Other studies look at mere differences in subjective job insecurity between men and women independent of the employment type. They show very mixed results (Keim et al. 2014): some scholars do not find any significant difference in job insecurity between men and women, controlling for labour market characteristics (Kinnunen/Nätti 1994; Erlinghagen 2008; Mau et al. 2012; Hipp 2016; Gallie et al. 2017). Others do find a higher subjective insecurity in women, but show explicitly that the gender difference disappears when controlling for labour market characteristics (Muñoz de Bustillo/de Pedraza 2010; Hank/Erlinghagen 2011). In particular, gender-specific selection into different economic sectors (Lengfeld/Hirschle 2009) and occupations (Stier/Yaish 2014) seems to account for higher subjective job insecurity for women than for men. There is also research that shows empirically that women worry less about job insecurity (Rosenblatt et al. 1999); this research is, however, limited to schoolteachers.

Recently, studies have concentrated on institutional contextual factors. They have investigated whether the effect of temporary work on job insecurity is affected by institutional and country-level differences (Erlinghagen 2008; Green 2009; Chung/Van Oorschot 2011; Carr/Chung 2014; Lübke/Erlinghagen 2014; Balz 2017).

There has been almost no research on the question of whether part-time work aggravates subjective insecurity and literally no research on contextual factors of this relation. In fact, the theoretical connection between part-time work and subjective *job* insecurity in particular is not clear (Muñoz de Bustillo/de Pedraza 2010: 17). Accordingly, Keim et al. (2014: 276) find no significant effect of part-time work on subjective job insecurity in their meta study and Muñoz de Bustillo and de Pedraza find no effect for most countries, but a negative effect in Germany and Belgium. According to their study, part-time work even reduces subjective job insecurity in Germany. Nonetheless, one could still argue that part-time workers are less integrated in the employing organisation and more vulnerable to job loss in the case of downsizing or restructuring (Keim et al. 2014: 273). In addition, part-time workers receive less on-the-job experience and could be stigmatised as less career-oriented, which could aggravate their subjective *labour market* insecurity – the chance of finding a comparable job – if

not the subjective *job* insecurity. However, to the best of my knowledge, there exists no research which analyses this relation.

2.4 Wage effects of non-standard work

When studying empirically the material precarity risks of non-standard employment, wage is a straightforward outcome of interest. The amount of the wage influences the standard of living, societal participation and the amount of important social transfer payments, such as the pension or the unemployment benefit. Therefore, I will summarise below the literature on the wage effects of non-standard employment. There is an abundance of research on the material dimension, which is why I will focus exclusively on Germany.

Studies that research the effect of non-standard work on different wage-related outcomes in Germany focus on various types beyond temporary and part-time employment: Groß (2000), Brehmer and Seifert (2008), Giesecke (2009) and Garz (2013) estimate wage differentials for the marginally employed and find contradictory results, depending on the choice between gross and net wages as well as the time period. However, Kalina and Weinkopf (2008) and Brehmer and Seifert (2008) find the highest probabilities of low wages for marginal workers. Kvasnicka and Werwatz (2002), Jahn (2008) and Garz (2013) find significant wage penalties for temporary agency workers and Kalina and Weinkopf (2008) and Brehmer and Seifert (2008) show that there are significantly higher low wage risks compared to standard workers. Lastly, Tangian (2007) constructs a flexibility index on the European level and shows a significant effect of temporary work on income precarity in Germany. However, as I focus on the most dominant non-standard employment forms – temporary and regular part-time work – the following research summary focuses on these two. Whether marginal work is integrated in part-time work changes from study to study. I will first summarise the findings for temporary employment and then for part-time employment.

Most of the studies find significant wage penalties for temporary contracts. However, those vary significantly from two percent for women (Giesecke/Groß 2007) to 22

percent for all workers (Hagen 2002). This variance of the size of the effects is mostly due to methodological differences but also to the choice of the groups looked at as well as the data used. As a general pattern, most ordinary least square regression estimates show mean wage penalties around ten percent (McGinnity/Mertens 2002; Mertens/McGinnity 2005; Giesecke 2006; Giesecke/Groß 2007; Pfeifer 2012) with some showing larger effects (Groß 2000; Stancanelli 2002; Mertens et al. 2005; da Silva/Turrini 2015) up to 17 percent and some showing smaller effects (Giesecke 2009; Kahn 2015), with the smallest being three percent. When unobserved time-invariant heterogeneity is accounted for – using within-estimates of fixed or random effects panel regressions –, the effects mostly remain significant but diminish in size from two (Giesecke/Groß 2007) to nine percent (Brehmer/Seifert 2008).

In addition, Mertens et al. (2005) find that workers who were employed with a temporary contract at one point in time experience higher wage growth than those who were employed permanently. However, this only holds when they look exclusively at those who stay in employment. When including those who become unemployed after the spell of temporary employment by setting their wage to zero, the authors quite obviously find a negative wage growth. This finding supports the assumption of temporary contracts having ambivalent functions. For some it is a stepping stone to better permanent positions, while for others it means staying in the margins of the labour market.

Two studies look at the effect of temporary contracts on the probability of earning a wage below the low wage threshold, defined as two thirds of the median gross hourly wage. While they both find a significant positive effect on the probability of low income, it is difficult to compare the substantial size of their effects, as one uses marginal effects while the other uses odds-ratios. Kalina and Weinkopf (2008) estimate a 13.6 percent higher probability of low income for workers with temporary contracts. Brehmer and Seifert (2008) use odds-ratios and find that men have a 2.6 higher chance of low income while women even have a 3.4 higher chance of low income when temporarily employed compared to being permanently employed. Despite the different

effect measures, both find not only significant but substantial differences in the risk of receiving a low income for temporary workers.

Finally, da Silva and Turrini (2015) find that Germany has a relatively high temporary contract wage penalty compared to other European countries.

As the studies show, the wage penalties of temporary employment are structured by different contextual factors. Firstly, the studies predominantly find larger wage penalties for men – the only exception being Brehmer and Seifert (2008) – and for workers employed in the west. Secondly, some sectors seem to have larger wage penalties than others. However, the results vary: Giesecke (2006), Groß (2000) and Giesecke and Groß (2007) reveal the largest wage penalties for the public sector, whereas Mertens and McGinnity (2005) reveal the largest penalties for the trade and service sector and the agricultural sector. Thirdly, Giesecke (2006), Groß (2000) and Giesecke and Groß (2007) find larger penalties for higher educational levels. Interestingly though, Pfeifer (2012) lastly finds the highest penalties in the lowest wage groups, whereas middle wage groups suffer the lowest penalties and highest wage groups show only slightly larger penalties than the middle wage groups. Regoli et al. (2019) find a continually decreasing wage penalty along the wage distribution, suggesting that those with the lowest wages suffer the highest penalties from temporary work, while those with the highest wages suffer the smallest penalties. However, Pfeifer uses quantile regressions without further explaining his methodological approach, while Regoli et al. decompose unconditional quantile regressions. As I will explain later in detail, some suspicion regarding the interpretation of these results is advisable. Arguably, unconditional quantile regressions cannot estimate wage differentials between temporary and permanent employees across the wage distribution, but estimate the influence of temporary employment on different points of the wage distribution (see section 4.5).

After having focused on temporary employment, I will now turn to the wage effects of part-time employment. Although part-time contracts are the quantitatively dominant form of non-standard employment, the related wage differentials are the most

contentious in the studies reviewed. This is partly due to differences in the definition of part-time work, the most pivotal difference being whether the studies include marginal work or work under 15 hours a week in their definition. In addition, it makes a difference for part-time work whether one looks at gross or net hourly wages and which model specification is chosen. Nonetheless, the heterogeneity of the results points to a large real heterogeneity of part-time work.

Only considering part-time over 15 hours a week or without marginal work, Giesecke (2009) finds no significant wage differentials except for the net wage of male part-timers – which receive an eight percent premium – and Groß (2000) finds significant premiums for men and women in part-time work of eleven and eight percent respectively, however also using net hourly wages. On the contrary, Brehmer and Seifert (2008) find significant wage penalties of eight and four percent for men and women respectively, and Garz (2013) estimates significant wage penalties of two percent for the primary sector, while estimating a wage premium of over 14 percent for the secondary sector for the years 2006 to 2010. While all of them use SOEP data, Giesecke (2009) and Groß (2000) use cross-sectional regression models, while Brehmer and Seifert (2008) use a Heckman corrected random effects model and Garz (2013) employs an unknown regime switching regression. The estimates thus seem to be highly sensitive to the methods used. Moreover, those studies which include marginal work in their definition of part-time do differ considerably in their findings. Tõnurist and Pavlopoulos (2014) find a six percent wage penalty associated with part-time contracts under 30 hours a week and Wolf (2010) estimates wage penalties up to 25 percent for male workers in West Germany, while estimating an eleven percent wage penalty for female workers in West Germany and estimating no significant differences for female workers in East Germany. Starkly standing out, Fouarge and Muffels (2009) find wage premiums between 17 and 35 percent for part-time contracts under 35 hours a week. However, the meaningfulness of these findings remains uncertain, as they focus on the part-time history of the workers in their models and do not even interpret the abovementioned results.

There are also seemingly contradictory results regarding the long-term effects of part-time work: whereas the number of years in part-time increases the wage penalty (Fouarge/Muffels 2009), a longer tenure in one part-time position is accompanied by a decreasing wage penalty (Wolf 2010). A sequence of part-time positions seems to be particularly harmful to the wage level.

Finally, the low wage risk for regular part-timers – excluding marginal work – is significantly higher than for permanent workers. Kalina and Weinkopf (2008) find a four percent higher probability of low wages for part-time workers, however only significant at the ten percent level. Brehmer and Seifert (2008) find a 4.5 higher chance for men and a 1.8 higher chance for women of receiving a low wage at the one percent significance level.

Again, the results suggest that higher educational levels are accompanied by higher penalties – or lower premiums. However, as in the case of temporary employment, the lowest wage groups seem to suffer the highest penalties, while the highest wage groups even benefit from part-time contracts (Tõnurist/Pavlopoulos 2014). As for the other studies which use quantile regressions, however, some suspicion regarding the interpretation of these results is arguably advisable (see section 4.5). Interestingly, the effects for men compared to women seem to be larger in any direction: male workers are estimated to have larger penalties for those studies which find penalties associated with part-time work and larger premiums for those studies which find wage premiums.

As the studies reviewed have shown, the wage effects differ noticeably across different contextual factors such as gender, education, region, wage groups, sector and company characteristics. These findings are especially important, as they can clarify the differing functions and ambivalent consequences of non-standard employment. In that sense – and because the findings are only rudimentary or even contradictory –, a further and more systematic analysis of these contextual factors is the aim of this study.

2.5 Rising wage inequality and non-standard work

After having summarised the state of the art concerning the heterogeneous precarity risks of non-standard employment, I now turn to the state of the art regarding the heterogeneous distributional effects of temporary and regular part-time employment. Besides the discussions about the liberalisation of the labour market and the growing precarity of work, there were additionally two important closely related processes in recent decades: a growing proportion of low wages as well as growing wage inequality. Contrary to the individual-level precarity risks, they provide information about macro level changes in the overall distribution of wages and thus complement the picture.

Low wage employment can be defined in various ways depending on the choice between a relative and an absolute measure, between gross and net earnings and between hourly, monthly and yearly earnings. The dominant convention as established by the OECD (1996: 68) defines low wages as those wages which fall below the threshold of two thirds of the gross earnings median (see for example European Commission 2004; Kalina/Weinkopf 2018). The proportion of employees with low wages in all employees then defines the low wage rate. Wage inequality is a much broader concept and can be measured quite differently. Even the low wage rate can be seen as a measure of wage inequality at the bottom of the wage distribution. Other commonly used measurements are quantile ratios such as the 50/15, the 85/50 or the 85/15 quantile ratios (for example Giesecke/Verwiebe 2008; Möller 2016), the standard deviation of the wages (for example Dustmann et al. 2009) and the Gini index (for example Goebel et al. 2015).

Germany has long been seen as a notable exception to the rise in income and wage inequality in most industrial countries during the 1980s and 1990s (Kalina/Weinkopf 2008; Dustmann et al. 2009). Gradually, this common knowledge has changed during the 2000s. The proportion of low wage employment grew sharply in Germany from the mid- 1990s onwards (Schäfer 2003; Eichhorst et al. 2005; Goebel et al. 2005; Brenke 2006; Rhein/Stamm 2006; Bosch/Kalina 2007; Kalina/Weinkopf 2008) and topped the European mean for the first time in 2000 (European Commission 2004: 168). Using the

OECD definition and hourly wages from the SOEP data, Kalina and Weinkopf find that whereas in 1995 17 percent of all employees in Germany earned a wage below 60 percent of the median, 24 percent already earned a low wage in 2010, a rise of 42 percent (Kalina/Weinkopf 2018). While older studies using SOEP survey data find that the wage structure in Germany was relatively stable during the 1980s and 1990s (OECD 1996; Steiner/Wagner 1998; Prasad 2004), studies using IABS register data find that wage inequality rose substantially in the top half of the distribution during the 1980s and in the bottom half of the distribution in the 1990s (Fitzenberger 1999; Kohn 2006; Dustmann et al. 2009). These trends have been confirmed by later studies which show that wage inequality rose substantially throughout the 1990s and the 2000s until around 2010 and that they have stagnated since then (Antonzcyk et al. 2010; Card et al. 2012; Fitzenberger 2012; Möller 2016; Haipeter 2017). Möller (2016) estimates that in 1992 employees at the 85th quantile of the wage distribution earned around 1.9 times the wage of the employees at the 15th quantile. In 2010 this ratio changed to around 2.6 times and even nearly three times in the case of women in East Germany. Both a decline of the lower wages as well as the rise in higher wages are shown to have contributed to that development (Giesecke/Verwiebe 2008: 419; Dustmann et al. 2009).

The reasons behind this trend of rising wage inequality are widely discussed. Kalina and Weinkopf (2008; 2018) and Dustmann et al. (2009) argue that the decline of the power of unions and collective agreements can be held responsible for a large part of the rising inequality in the bottom half of the wage distribution and the rising low wage rate. Concentrating on the period from 2001 to 2006, Antonzcyk et al. (2010) confirm the influence of declining collective bargaining regimes but find a larger effect of other company-level and sector-level differences. Möller (2016) underlines that the rise in inequality has mainly happened within sectors and qualification and age groups. Both Dustmann et al. (2009) and Antonzcyk et al. (2010) find evidence that skill or task-biased technological change contributed to inequality, especially in the top half of the wage distribution, as returns for certain personal characteristics have been rising. However, they conclude that it only plays a minor role. While, according to these

studies, de-unionisation and declining collective bargaining increased wage inequality to a certain extent, the greatest common ground seems to be the increasing segregation between good-paying and bad-paying companies, also within industries, as well as rising inequalities between sectors independent from bargaining regimes (Kalina/Weinkopf 2008; Antonzcyk et al. 2010; Card et al. 2012; Möller 2016). These tendencies are possibly the result of increasing outsourcing and a segregation between service and supply companies on the one hand and central export-oriented industries on the other hand (Kalina/Weinkopf 2008; Möller 2016).

It is quite probable that a varying use of non-standard employment contracts between companies plays a part in this segregation dynamic (Kalina/Weinkopf 2008; Card et al. 2012). However, only two studies explicitly research the effects of non-standard work on wage inequality or the low wage rate.

Using unconditional quantile regressions, the OECD (2015) finds that in Germany an increase in the amount of non-standard work – temporary and part-time work taken together – decreases wages across all quantiles of the wage distribution; however, the most pronounced decrease is in the lowest quantiles and the least pronounced in the highest quantiles. Speaking counterfactually, if the proportion of non-standard contracts were to rise, the lowest wages would decrease the most and the decrease would incrementally weaken with higher wages, thereby enlarging wage inequality. However, as the study does not analyse actual change over time, but constructs two counterfactuals (see section 4.5) in a cross-sectional analysis it cannot say anything definite about the effect non-standard work had on wage inequality in recent decades. Moreover, it cannot differentiate between part-time and temporary work, nor between compositional and structural effects. Nonetheless, it is a pivotal hint at the relevance of non-standard work for wage inequality which demands further research.

Kalina and Weinkopf (2008) firstly estimate the probability differences of low wages based on gross hourly earnings between standard and non-standard workers and show that non-standard workers are more likely to be paid under the low wage threshold (see

section 2.4). Secondly, the authors employ a decomposition analysis of the difference in the low wage rate between 1995 and 2006. While part-time work only contributed with around three percent to the rise in the low wage rate between 1995 and 2006, marginal work contributed with around 25 percent and temporary work with 13 to 20 percent. As Kalina and Weinkopf (2008) show, non-standard work seems to have a major influence on the low wage rate.

While initial studies hint at a considerable relevance of non-standard employment for the explanation of the rising wage inequality in recent decades, this has not yet been explicitly researched in the context of the scientific discourse on wage inequality. The analyses of the effects of non-standard work on wage inequality in the realm of this study thus tackle an important gap in the research.

3 Theory and research hypotheses

Now that the scientific and political background of this study has been established, I turn next to the theoretical foundation and the development of the research hypotheses guiding the empirical analyses. To begin with, I will concisely outline the basic character of the employment relationship as an institutionally embedded unequal bargain between sellers – employees – and buyers – employers – of human labour power in the current capitalist economy which underlies changing dynamics of (de-)commodification. On this basis, I will discuss the relationship between non-standard employment and precarity in order to clarify what I mean by precarity risks. Next, I systematise the contextual factors relevant for the heterogeneity of the precarity risks of non-standard employment. For this purpose, I identify gender and the vertical labour market position as primary contextual factors for the precarity risks of non-standard employment relationships. Moreover, I introduce neo-institutional labour economics and power resources theory with the aim of systematising the secondary contextual factors which influence the bargaining positions of both sides. In order to theorise the transformation of external conditions such as non-standard work to subjective individual reactions, accounting also for variance in contextual factors, I then introduce the transactional theory of stress and coping. Once the theoretical background is established, I finally develop the research hypotheses, first for the heterogeneity of the s*ubjective precarity risks* of non-standard employment and secondly for the heterogeneity of the *material precarity risks.* Thirdly, I address the theoretical considerations and hypotheses concerning the contribution of non-standard employment to rising *wage inequality*.

3.1 Labour as commodity, non-standard work and precarity

The central social institution of interest in this study is the employment relationship. This relationship between employee and employer is a specific form of organising human work which, with the emergence of the industrial capitalist system, increasingly

substitutes other forms (Marx 1968[1867]: 743; Thompson 1963). Becoming dominant during the 19th and 20th century, the spread of the employment relationship to ever more individuals and fields of human activity is still an ongoing process as – for example – the employment rate is still increasing; especially for women. In this relationship, labour power is treated as a commodity and is traded between a seller – the employee – and a buyer – the employer (Marx 1968[1867]: 181). On this point, Marxist-inspired economic theories as well as neoclassical-inspired economic theories agree. However, they disagree strongly about the question of whether this trade of labour is an exchange between equivalent partners, which can be organised in a free market, or whether the trade of human labour is structurally unequal and results in an exploitation of the workers and ultimately in the destruction of the human labour power (Marx: 1968[1867]: 104). As basic and historical as this question may seem, it was nevertheless at the core of the debate around the liberalisation of the labour market in the 1980s in Germany (Dichmann/Hickel 1989: 10).

In this study, I want to follow the Marxist research stream which argues that human labour power cannot be treated as a real commodity and explains the high embeddedness of employment relationships in social institutions with that predicament. From this perspective, the employers or the capital side tend to push for a commodification of labour – which means a reduction of the institutions embedding the market – in order to depress wages and to dispose more flexibly of human labour, while the labour side tends to push for a de-commodification of labour in order to raise wages and render the employment relationships more reliable (Marx 1968[1867]: 294ff.; Polanyi 1978; Yergin/Stanislaw 1999; Dörre 2012).

Quite fundamentally, Marx and Polanyi famously argue that the reason for this lies in the nature of human labour. According to them, labour cannot be a real commodity, such as for example a table, as it is always inextricably tied to a human being. Thus a worker can only sell the time-specific *use* of her "labour power" (Marx 1968[1867]: 181) while labour remains a "fictitious commodity" (Polanyi 1978: 108). For a substantial labour power to be offered in the labour market, a number of workers must exist who firstly

own their own labour power – in contrast to slaves – and secondly who do not own any means of production – in contrast to manufacturers (Marx 1968[1867]: 182). Given the conditions of a market, if more potential workers are available for a given amount of work, the wages become smaller. This is essential, as the only means to survive for wage workers is to sell the use of their labour power under the conditions of the market.

In that fundamental sense, being on the workers' side of the employment relationship necessarily entails a precarious condition, as one has no means to survive but to sell one's own labour power (Jonna/Foster 2016). Because of increasing productivity, the relative need for human labour decreases (Marx 1968[1867]: 412), while the extensive and intensive expansion of the capitalist system [Polanyi 1978: 331; Thompson 1963; Dörre 2012; Jonna/Foster 2016) constantly enlarges the number of wage labourers. Together, this raises the pressure on wages – what Marx calls the reserve army mechanism. The existential threat of precarity – and with it the economic threat of destroying the foundation of the human labour power – triggered interventions by both the state and organised labour to embed the labour market in social institutions – i.e. to partially de-commodify human labour by regulating its trade. This de-commodification was further reinforced – among other factors – by the strong economic growth after the Second World War, which allowed considerable wealth gains to be passed down to the workers, and the competition with the Soviet system and the GDR.

From this perspective, non-standard employment relationships are part of the re-commodification process of human labour since the late 1970s, as they render its trade more flexible. Temporary employment makes it possible to buy labour power on a purely temporarily basis from one worker and makes it easier to dismiss unwanted staff. Part-time employment makes it possible to buy any amount of labour force from a worker instead of a fixed quantity and facilitates its flexible allocation beyond the standard work day. In that sense, non-standard contracts provide the legal basis for the potential establishment of a peripheral labour force which serves as a buffer for volatile product and funding markets. While temporary workers can serve as an *external* flexible labour force, part-time workers can be used as an *internally* flexible labour force, since

the allocation of their working time can be adjusted to a greater extent (Krause/Köhler 2011).

Beyond that, however, their social function can vary considerably (Hohendanner/Gerner 2010). Temporary contracts can also be used as extended probationary periods, especially when skills are not easily observable, which is often described as the screening hypothesis, or as highly qualified and specialised personnel for product development periods. Part-time employment can in turn also be the result of the employees' preferences – either out of choice or as a result of restraints – for more time capacities beyond wage labour.

The precarious dependency on selling one's own labour power is thus moderated by the processes of de- and re-commodification and the resulting importance of social institutions for the labour market. It was reduced to a historically unprecedented level in the Western industrial countries after the Second World War, at least for a part of the population, by the establishment of the standard employment relationship, dismissal protection, collective bargaining, unemployment benefits, universal health insurance, a pension scheme, minimum wages and so forth. Globally, however, precarity never ceased to exist for the vast majority, but rather rose as an increasing part of the world population was included in capitalist modes of production (Dörre 2012; Jonna/Foster 2016). Even in Germany, the post-war institutional setting of the welfare state and the standard employment relationship excluded large parts of the population. While women provided the necessary unpaid care work, being ultimately dependent on the family or husband (Aulenbacher 2009: 65), migrant workers filled the low-paid positions with the most unfavourable tasks (Höhne et al. 2014).

Therefore, it is not the case that precarity emerged as a new phenomenon with the neoliberal reforms starting in the 1980s and the recurrence of non-standard employment, but that the extent of the precarity grew again and affected, at least subjectively, population groups which had previously been relatively unaffected. As Bourdieu (1999: 82) puts it, "the existence of a large reserve army […] helps to give all those in work the

sense that they are in no way irreplaceable." Castel also analyses precarisation as a fragmentation and de-institutionalisation of the post-war employment regime, which not only affects those outside standard employment, but also those in stable and well paid employment, at least subjectively (2002; 2009).

Numerous studies in Germany since then have endeavoured to make this broad concept of precarisation empirically applicable in order to differentiate how and to what extent individuals are affected by precarity. Most of them take Bourdieu's basic definition of precarity as a starting point. According to him, precarity is the condition of not being able to plan one's own life on a long-term basis (Bourdieu 1999: 82). For example, Kraemer (2008) proposes a division of this insecurity into four dimensions, ranging from the employment relationship over the employment history and the economic situation of the household to the subjective evaluation. Stuth et al. (2018) employ a very complex set of indicators capturing low wages, a lack of social security, job insecurity, bad housing conditions, economic distress of the household, special care obligations and a lack of insurance protection in order to identify precarious living conditions. Brehmer and Seifert (2008), in turn, concentrate on the dimensions of the employment relationship and history, and analyse precarity risks of employment characteristics instead of measuring precarious conditions of individuals.

Building on these studies, I focus on subjective and material precarity risks. As I am interested in the role of non-standard work for precarious employment conditions, I firstly concentrate on the employment dimension of precarity. Secondly, my research question aims at the precarity effects of certain employment characteristics, instead of asking whether individuals are in a precarious condition. Therefore, the definition of precarious employment from the research group led by Dörre is the best fit for my research interest. Building on Bourdieu's and Castel's work, they define an employment relationship as precarious when the employees – because of their jobs – fall substantially below an income, security and social integration level that is currently defined as a standard and recognised by a majority. Moreover, employment is precarious when it is subjectively connected to a lack of purpose, recognition and

planning reliability to an extent that falls considerably between societal standards (Brinkmann et al. 2006: 17; author's translation).

Hence, Brinkmann et al. establish firstly a relative definition of precarity which reformulates it as a concept of inequality. From this perspective, being precarious is coupled to a societal norm. Secondly, they clearly identify two major dimensions of precarity: the objective or material dimension, which reflects a certain material insecurity, for example based on lower wages or lower social security, and the subjective dimension, which reflects the perceived extent of insecurity, for example subjective job insecurity or a lack of recognition.

Therefore, in accordance with Brinkmann et al. (2006) and Brehmer and Seifert (2008), I aim to analyse subjective and material precarity risks of non-standard work instead of absolute precarity. Taking the mean characteristics of the standard employment relationship as an influential societal norm then means that significant negative deviations in the subjective or material security of non-standard workers from standard workers can be interpreted as a precarity risk. Whether these precarity risks entail a precarious condition for any given employee remains outside the scope of this study. However, the focus on the precarity risks of non-standard employment facilitates research into the relevance of the contextual factors.

3.2 Gender and the vertical segmentation of the labour market

This study not only focuses on the precarity risks of non-standard employment but also on their heterogeneity for different groups and contexts. After having clarified the conception of the outcome of interest – the subjective and material precarity risks – I want to establish which contextual factors are arguably relevant for the precarity risks of non-standard employment. Therefore, I first elaborate on two basic dimensions of inequality among employees: gender and the vertical labour market segmentation. As they bring together several factors influencing the bargaining positions of employers and employees, I consider them as primary contextual factors. In the next section, I then identify further contextual factors that are likely to have a direct impact on the

bargaining positions of employers and employees and thereby moderate the precarity risks of non-standard employment.

Gender is arguably still one of the most influential social categories with regard to the division of work and the allocation of social positions in modern societies. It thus has to be considered when researching the contextual factors of the precarity risks of non-standard work. Although the number of women participating in the labour force is constantly growing, gender is still highly influential for inequalities within the labour market (Aisenbrey/Brückner 2008; Bechmann et al. 2013; Blau et al. 2014; Busch 2013; Ochsenfeld 2014). The dominance of the male earner model has faded and been replaced by an unequal dual earner model, which still assigns the bulk of care work to women while both enabling and requiring them to earn supplemental income via wage labour (Trappe et al. 2015; Dieckhoff et al. 2020). Thus, women have been shown to earn less in equal positions (Aisenbrey/Brückner 2008; Schmidt 2019; Zucco 2019), work part-time nearly ten times more often than men (see figure 1) and are less represented in higher positions (Gundert/Mayer 2012; Manzoni et al. 2014).

In addition, this occupational gender segregation has remained quite stable in recent decades despite the higher labour force participation of women (Aisenbrey/Brückner 2008; Bechmann et al. 2013; Hausmann/Kleinert 2014). Women work more often in education, in the public and private service and in the health sector, where temporary contracts are more frequent (Bechmann et al. 2013; Hohendanner 2019). In these sectors, temporary employment is more often used to ensure external flexibility for companies (Hohendanner/Gerner 2010). In addition, descriptive evidence suggests that the probabilities of conversion to a permanent contract are lower in female-dominated sectors and occupations (Hohendanner 2019).

Hence, previous literature suggests that the precarity risks of non-standard employment may differ considerably between women and men. Gender thus not only has an effect on various labour market outcomes, but may also affect how non-standard employment

affects the employment precarity of employees. It is therefore the first of the primary contextual factors being considered in this study.

Furthermore, segmentation theories (Piore/Doeringer 1971) and consecutive research in Germany (for example Sengenberger 1987) have shown that the labour market cannot be seen as one market equally connecting all actors in accordance with a single system of logic, but that it is highly segmented into several differently structured fields for the allocation of work and gratifications.

More recently, Köhler et al. (2008) published a renewed analysis of the segmentation of the labour market in Germany. Basically, they differentiate firstly on a horizontal dimension between an internal and an external employment system (Krause/Köhler 2012: 13). In the internal employment system the (re-)allocation of labour power, wages and skills is managed according to the rules of the organisation, i.e. the employing company. It is only in the external labour market that the (re-)allocation follows the rules of supply and demand of the market. Hence, being permanently employed in a company which offers internal career paths, further education and so forth, and enjoying statutory dismissal protection means a substantial de-commodification of the employment relationship. On the contrary, a temporary job or no dismissal protection in a company with high fluctuation is a highly commodified form of labour.

Secondly, they differentiate on the vertical dimension between a primary and a secondary employment system (Ibid.). The critical question here is concerned with the quality of the working conditions. In the primary employment system – be it an internal or an external market – jobs have relatively favourable conditions, whereas in the secondary employment system jobs are characterised by relatively poor conditions. These differences in job conditions are the result of structurally better bargaining positions of the employees in primary employment compared to the secondary employment system. Köhler et al. (2008: 12ff.) determine wages and employment stability as indicators for the differentiation between primary and secondary employment systems.

Table 1: The segmentation of the labour market and non-standard employment

	Internal employment systems	External employment systems
Primary	Stable, long-term employment High wages *Part-time employment (by workers' preference)*	Insecure, short-term employment High wages *Temporary employment (for screening or highly specialised services)* *Part-time employment (by workers' preference)*
Secondary	Stable, long-term employment Low wages *Part-time employment (internal temporal flexibility, reduced labour force)*	Insecure, short-term employment Low wages *Temporary employment (as marginal labour force)* *Part-time employment (internal temporal flexibility, reduced labour force)*

Source: Author's table, based on Krause/Köhler (2012: 14)

This typology is meant as a heuristic analytical tool which underlines differing logics within the labour market and not as an empirical finding, since the subfields of the labour market are not clearly distinguishable categories but rather ideal types (Ibid.: 14).

Arguably, **vertical labour market segmentation** very likely moderates the effects of non-standard employment. By this definition, temporary employment is part of the external labour market. However, it can be found in both the primary and the secondary labour market. This likely correlates with the economic function that temporary contracts have: in the primary sector it may be more likely to find temporary contracts, as extended probationary periods or highly specialised services, since costs of recruiting are high and employees' skills are more difficult to observe. Conversely, in the secondary sector the use of temporary workers as marginal labour force may dominate, since transaction costs are relatively low and the potential labour surplus relatively high. Likewise, part-time employment can be found in both the primary and the secondary sector, partially depending on the function it fulfils. Part-time workers in primary employment systems may more likely be employed part-time by preference, as employers are more interested in full-time positions but the costs of recruiting are

relatively high. By contrast, part-time workers in the secondary employment system may more likely be used involuntarily as an internal flexibility buffer or a means to obtain small amounts of human labour. Finally, part-time employment can be found both in the internal and the external employment systems, depending on whether it is accompanied by a temporary contract.

Hence, the position on the vertical labour market dimension likely influences how non-standard employment is used and therefore also its precarity risks. Therefore, the vertical labour market position is the second contextual factor after gender which I want to consider in my analyses. Both gender and the vertical labour market position are pivotal for the structuring of inequalities in labour market outcomes and are thus considered primary contextual factors.

3.3 Employers' problems and employees' power resources

However, differences in labour outcomes due to gender and vertical labour market position may simply reflect differences in the structural bargaining positions of employers and employees determined by other factors. In order to identify these factors, it is crucial to understand the perspective of both employers and employees. Two current theories in German sociology are helpful in this context, as they both focus on strategies for shaping employment relationships: one from the employers' perspective and the other from the employees' perspective. Considering neo-institutional labour economics and the power resources theory, I identify six such contextual factors which determine the structural bargaining conditions and therefore may explain the heterogeneous precarity risks of non-standard employment across gender and the vertical labour market positions: the degree of the personnel adjustment problem, the degree of the transformation problem, the structural market power resources, the associational power resources, the institutional power resources and the public power resources.

In order to analyse the employer's interests, Krause and Köhler draw from neo-institutional labour economics theory (2012: 19f.; see also Abraham/Hinz 2018;

Sesselmeier et al. 2010). This approach tries to explain the labour market institutions by the logics and dynamics of the labour market itself – endogenously – and not by the influence of the rest of societies' institutions – exogenously. Nonetheless, it recognises that the internal dynamics interact with external factors. More explicitly, Krause and Köhler take the interests of capital – the employers in the case of the labour market – as the central driving force by which labour market institutions have to be explained, however conditioned by external structures, such as the national and international political system and demographic developments.

In accordance with neo-institutional labour economics, Krause and Köhler identify two basic problems employers face in the labour market: the **problem of personnel adjustment** and the **problem of the transformation of labour power** (2012: 20). The first one simply means that employers a) have to recruit and qualify personnel and b) dismiss personnel depending on the economic situation. They argue that a structural surplus of labour power – i.e. a substantial reserve army – pushes employers to a more extensive use of external labour markets and thus to a re-commodification of labour, as they can recruit easily with low transactional costs (availability hypothesis). Equally, an increasing volatility of the product markets and the constriction of financing possibilities pushes employers to a more flexible use of labour power (discontinuity hypothesis). The transformation problem means that employers are ultimately dependent on the willingness of employees to transform their labour power effectively and efficiently into products, as the labour power cannot be separated from the employees. Krause and Köhler argue that employers retain the willingness of their workers by integrating them into the organisation and offering them secure employment – thereby partially de-commodifying work. However, the more employers can control the process or the result of the work – i.e. the transformation of labour power – the less they need to rely on the willingness of the workers and the more they can make use of external labour markets (control hypothesis) (Krause/Köhler 2012: 21).

This theoretical perspective entails an emphasis on the capital strategies while ignoring the counter-strategies of the employees (Krause/Köhler 2012: 23). In order to gain a

more extensive view on possible contextual factors for the precarity risks of non-standard employment, I therefore include a second perspective in this study which serves as the theoretical counterpart of neo-institutional labour economics.

Schmalz and Dörre (2014) refine the power resources theory for the German context and offer a useful typology for the empirical research of employment relationships. From this perspective, the focus lies on the power resources that employees have at their disposal to shape the conditions of their work within the capitalist system. The extent of the commodification of work and the extent of the welfare and labour market institutions is primarily seen as an outcome of the current power configuration of the working class and past struggles driven by previous power configurations (O'Connor/Olsen 1998; Wright 2000; Schmalz/Dörre 2014: 221). The term 'power' constitutes the core of the theory. Schmalz and Dörre use the seminal sociological definition of Weber that power is every chance to push one's interests in a social relationship even against conflicting interests (Weber 1980: 28; Schmalz/Dörre 2014: 221). Labour power is thus every chance of the workers to shape the working conditions in their own interests against the interests of the employers. In accordance with Wright (2000) and Silver (2005), Schmalz and Dörre differentiate between different forms of labour power: structural, organisational, institutional and public power (2014: 222ff.).

Structural labour power derives from the position and thereby relevance of the worker in the economic system and the employing organisation. As primary power, it is directly based on the dependence of the employer on the employee and thus basically on the potential power of the employee to disrupt economic processes. Firstly, structural power is enhanced by the economic relevance of the worker's job, what Schmalz and Dörre call "production", "reproduction" or "circulation power". Secondly, structural power is enhanced by a small or non-existent reserve army, which enables workers to change employers easily and by the ability of workers to opt out of the labour market, what the authors call "market power" (Ibid.: 222f.).

Associational labour power derives from the association of workers in order to act collectively. It is a secondary power in the sense that it uses the primary power of workers and leverages it by a process of association. This can be done in multiple ways, from somewhat spontaneous company-level collective actions to highly institutionalised national organisations. In Germany, the most relevant organisational forms are workers' councils and trade unions. Schmalz and Dörre identify various factors which influence the power of trade unions, the most basic being the proportion of workers organised in trade unions (2014: 224).

Institutional labour power is based on the established social institutions regulating employment relationships. Labour law, the social welfare state and collective agreements are pertinent examples. They are the outcome of previous political struggles and thus form institutional labour power as a secondary power. The institutions are always ambivalent, simultaneously guaranteeing workers' rights while constricting their capacity to act (Ibid.: 227ff.).

Finally, **public labour power** rests on cooperation with other political or economic actors, as well as the public discourse on labour issues. The capacity of workers to build alliances and networks enhances their possibilities to act. Moreover, their capacity to intervene in public discourse secures support from other actors, such as political parties, the media and the electorate (Ibid.: 230ff.).

Evidently, these forms of power resources are not always clearly distinguishable and interact in manifold ways. Associational power would not be possible without existing structural power, while institutional power such as collective agreements is the outcome of political struggles based on structural and associational power. In turn, institutional power directly influences the structural market power of workers when restricting access to certain occupations or reducing the financial dependency on employers. It also enables associational power when guaranteeing the right to form a union and to strike, while still being restricted to certain forms and causes.

From this perspective, non-standard employment can be interpreted as a decrease in the institutional labour power of the workers in question, which makes them more dependent on other power resources in the process of selling their labour force and bargaining the conditions. They either have to rely on other institutional resources, such as collective agreements or the support of workers' councils and trade unions, or on their structural power in form of skills or a shortage of human labour. Basically, these power resources influence the structural bargaining positions of non-standard employees. Thus, the precarity risks of non-standard employment likely differ considerably depending on these power resources. The influence of the public labour power is much harder to conceptualise, as it likely needs to be translated into institutional or associational power resources to become effective. Public campaigns by trade unions are predominantly aimed at concrete legal changes or labour disputes and thus endeavour to use the public discourse to augment or leverage the institutional or associational power resources.

Hence, the basic problems of employers in the labour market according to neo-institutional labour economics and the power resources of employees presented here directly shape the structural context in which they can sell and buy human labour power and agree on the conditions of the employment relationships. These contextual factors are therefore expected to determine to what extent a temporary or a part-time contract presents a precarity risk for the employees. The **personnel adjustment problem** and the **structural market power resources** pertain to the same contextual factor as they both refer to the availability of labour surplus. The **transformation problem** refers to the degree to which employers can control the production process or the product. The **structural production power resources** refer to the position of the employee in the production process and are therefore closely related to the vertical labour market position. The **associational power resources** refer to the degree of organisation of the employees. Finally, the **institutional power resources** refer to the degree to which the employment conditions are framed by collective agreements or public law. As the public

power resources arguably affect the structural bargaining conditions only indirectly, I do not consider them in the study below.

3.4 The transactional theory of stress and coping

In order to formulate hypotheses about the exact mechanisms of how non-standard employment leads to subjective precarity in the presence of varying contextual factors, a further theoretical gap has to be filled. As subjective precarity presupposes a subjective evaluation of an objective condition, a theory is needed that explains how individuals cope cognitively and affectively with the situations they face. Therefore, I introduce the transactional theory of stress and coping, as it firstly theorises how individuals cope subjectively with the problems they face and secondly considers how individuals integrate social contextual factors in their evaluation (Folkman/Lazarus 1984).

The transactional theory of stress and coping endeavours to explain how a stressor translates into a subjective stress reaction. In this regard, stress is conceptualised as a subjective product of a complex transaction between an individual and her environment in which potential stressors originate (Lazarus 1966). Thus, being in an employment relationship based on a temporary contract or reduced hours forms part of the social environment of a person and works as a potential stressor which has to be processed. Subjective precarity is then a specific form of a stress reaction to this stressor. Whether the objective insecurity of temporary employment or the disadvantage of reduced hours translates into this reaction, however, depends on the process of coping.

Folkman and Lazarus (1984) divide this process of coping into three stages of evaluation. Firstly, in the primary appraisal, individuals assess to what extent the stressor poses a threat to their needs, values or goals. Taking the case of temporary employment, this means reflecting whether the temporary character of the contract is indeed seen as a potential threat to employment or whether a continued employment is even desirable. When temporary employment functions as a probationary period with very high chances of being taken on permanently or when the employee aims to receive unemployment benefits afterwards, temporary employment may be assessed as posing

no threat. However, when employees are interested in further employment and are not sure about their chances of being retained or of receiving an extension, they likely identify temporary employment as a threat to their material needs, their self-image and/ or their career goals in the primary appraisal.

When the stressor is identified as a threat, individuals turn to the secondary appraisal. In this second stage, individuals determine whether they dispose of appropriate resources to be able to cope with the threat in a problem-oriented manner, meaning that they can offset the material negative consequences of the stressor. This is where the contextual factors identified above gain relevance. If an employee determines her temporary contract as a threat, she has to evaluate whether her (power) resources can reduce the risk of dismissal, facilitate a job transition or allow for a period of unemployment without material distress. Depending on the evaluation of these resources, the employee is expected to express very different levels of subjective precarity. These two stages of appraisal – whether a stressor poses a threat and whether one has the appropriate resources to handle this threat – are then continuously reiterated and updated in a process of reappraisal which may also entail appraising one's own lack of resources as a stressor (Folkman et al. 1986; Walinga 2008).

This theory is particularly useful among psychological stress theories, as it allows us to theorise the role of contextual factors, which makes it arguably one of the more sociological stress theories.

3.5 Hypotheses I: The heterogeneity of the subjective precarity risks

With the theoretical basis having been established, I shall now develop the research hypotheses concerning the exact mechanisms between non-standard employment and the subjective precarity risk, in light of varying contextual factors. In the next section, I do the same for the material precarity risks, before turning to the inequality effects of non-standard employment. The hypotheses in this section follow the structure of the theoretical considerations in the previous sections. First, the main effect of the employment form in question on the precarity risk is substantiated. Secondly, its

heterogeneity depending on the primary contextual factors gender and the vertical labour market position is claimed, before arguing how these heterogeneities can be explained by the secondary contextual factors. This is done first for the subjective precarity risks of temporary employment and then for those of part-time employment.

For the rigour of the analysis, I focus on one sub-dimension of the subjective precarity conceptualisation of Brinkmann et al. (2006): the lack of planning reliability. This seems to be the most suitable one, as it reflects Bourdieu's classic definition of precarity being a condition which does not allow one to plan on a long-term basis (1999). With regard to employment, the lack of planning reliability is mainly determined by the subjective evaluation of one's job or employment stability.

As temporary and part-time employment deviate from standard employment in different ways, I focus on subjective precarity indicated by the subjective job insecurity in the case of temporary employment and subjective precarity indicated by subjective labour market insecurity in the case of part-time employment. Temporary employment as part of external flexibility inherently entails the risk of job loss. Therefore, worrying about the reliability of one's job is the most straightforward subjective reaction to the stressor of a temporary contract. By contrast, for part-time employees it is not job loss that is the potential outcome of non-standard work, but the deterioration of future labour market prospects due to a lack of job experience and the stigma of a lack of career orientation. Therefore, worrying about the reliability of further employment chances is the most straightforward subjective reaction to reduced hours.

Turning now to the hypotheses regarding **temporary employment**, I expect that the majority of temporary workers consider their fixed-term contract to be a threat and *that temporary employment thus increases the subjective precarity risks on average (hypothesis S-1a)*. Given the heavy material and subjective dependence of most workers on their jobs, this should hold true even in the presence of a large heterogeneity.

As argued in section 3.2, gender is one of the most influential inequality dimensions in the labour market. I thus expect gender to substantially effect the transaction of a

temporary contract to a stress response in the first and second appraisal. Given the horizontal and vertical gender segregation of the labour market, I expect that temporary employment is more often a means of establishing a marginal labour force for women, thereby aggravating the threat in the first appraisal, and that they have fewer resources to compensate for the detrimental effects of temporary employment, diminishing their capacities to react in a problem-oriented manner in the second appraisal. Hence, *I expect a larger effect of temporary employment on the subjective precarity risks for women than for men (hypothesis S-2a)*.

However, women are arguably more likely to show less labour market attachment than men, resulting in a less severe appraisal of temporary employment for women than for men. Against the background of the unequal dual earner model, men's job loss often leads to higher income losses for the household and has more severe consequences for families than does women's job loss (Ehlert 2016). Moreover, temporary employment is primarily a counter-normative situation for a husband and father, not for a wife and mother, because the potential job loss also entails a loss in the man's socially expected role (Knabe et al. 2016; Van der Meer 2014). The resulting lower average labour market attachment of women and their higher potential dependence on resources of the partner should therefore partly conceal the aforementioned larger effect of temporary employment on the subjective precarity risks for women than for men. *Thus, I expect that the gender gap in the effect of temporary employment on the subjective precarity risks increases when accounting for differences in the household resources provided by the partner (hypothesis S-2.1a).*

In addition, the gendered segregation of the labour market leads to a different availability of power resources for the second appraisal for women and men. Thus, male and female-dominated occupations differ in wage levels (Busch 2013), which affects the potential to provide savings and entitlements for unemployment insurance benefits that may help bridge job search periods. Furthermore, occupational choice and the segregated labour market are strong factors for gendered career advancements placing men more often in leading positions than women (Dämmrich/Blossfeld, 2017; Manzoni

et al. 2014). This accounts for the actual gendered distribution of higher positions as well as the gendered mobility from lower occupational positions to higher occupational positions (Gundert/Mayer 2012). Finally, women are less often organised in trade unions, while these are the strongest in the male-dominated industrial sectors (Dieke/Lesch 2017). Women thus have on average fewer structural and associational power resources to cope with the threat of a temporary contract. Accounting for them should at least partly explain the gender gap in the subjective precarity risk of temporary employment. Hence, *I expect that the gender gap in the effect of temporary employment on subjective precarity risks decreases when accounting for the differences in the structural production (hypotheses S-2.2a) and market power of the employees or the employers' personnel adjustment problem (hypotheses S-2.3a). Furthermore, I expect that the gender gap decreases when accounting for the differences in the associational power of the employees (hypothesis S-2.4a).*

Regardless of gender, both power resources theory and neo-institutional labour economics predict that the subjective precarity risks of temporary employment decrease with higher labour market positions. The two-dimensional segmentation matrix of Krause and Köhler (see table 1; Köhler et al. 2008; Krause/Köhler 2012) underlines that temporary workers by definition belong to the external labour market in the horizontal dimension but that they can differ widely in the vertical dimension between primary and secondary positions, defined by wage levels and employment stability. As employment stability rises with higher labour market positions and arguably also with structural power resources such as education and skills, the secondary appraisal of the threat of a temporary contract should be more optimistic for workers in higher positions. The high amount of structural resources should either help them to stay in the job or to find another equivalent one. In other words, *I expect that the effect of temporary employment on subjective precarity risks decreases with higher labour market positions (hypothesis S-3a)*.

This could also be an effect of a shrinking reserve army – i.e. labour surplus – across the vertical dimension of the labour market. At the bottom of the labour market

segmentation matrix one is more likely to find occupations with no or low skill requirements, which potentially could be filled by anyone, whereas at the top the skill and educational requirements are likely to exclude the vast majority of the labour force. Consequently, the structural market power of workers should increase with higher labour market positions, as the structural surplus of labour should decrease and with it the personnel adjustment problem of the employers. This should explain at least part of the differences in the effect of temporary employment on affective job insecurity between primary and secondary temporary workers. Thus *I expect that the heterogeneity in the subjective precarity risk of temporary employment across labour market positions decreases when accounting for differences in structural market power of the employees or the employers' personnel adjustment problem (hypothesis S-3.1a)*.

Moreover, the associational and institutional power resources of workers should vary considerably across the vertical dimension of the labour market segmentation, with them being more present in the middle and upper middle positions. It is less straightforward, however, how associational power resources could interact with the coping mechanisms of temporary workers. A workers' council, when asked to, could potentially support employees in their desire to be retained. A high union density could also pressure employers not to use temporary contracts to establish a marginal labour force. However, this is not necessarily the case, as core employees may theoretically also have an interest in a marginal labour force safeguarding their permanent jobs. Finally, collective agreements can do both, expanding or restricting the possible use of temporary contracts. As the evaluation showed, however, there are only very few instances of collective agreements liberalising the use of temporary contracts (Büchtemann 1989). Overall, I assume that the positive effects of associational and institutional power resources predominate. Therefore, *I expect that the heterogeneity in the subjective precarity risk of temporary employment across labour market positions decreases when accounting for differences in the associational (hypothesis S-3.2a) and institutional power (hypothesis S-3.4a) of the employees*.

Lastly, neo-institutional labour economics argues that employers are pushed to guarantee more secure jobs by the degree of the transformation problem (Krause/Köhler 2012). That is, the less employers can control the process or product of work directly, the more likely they will combine it with safe internal jobs, thereby securing the commitment of the employee. In addition, the skills and qualifications of employees seeking a job with a large transformation problem are likely to be difficult to observe by the employer beforehand. Therefore, temporary jobs with a pronounced transformation problem will more likely be used as a screening tool, while temporary jobs with no transformation problem can more easily be part of a marginal labour force (Reichelt 2015). Assuming that the transformation problem is larger for jobs in higher labour market positions, *I expect that the heterogeneity in the subjective precarity risk of temporary employment across labour market positions decreases when accounting for differences in the employers' transformation problem (hypothesis S-3.4a)*.

As argued above, when analysing the subjective precarity risks of **part-time employment**, it is more useful to look at labour market insecurity than at job insecurity, as part-time employment can also be permanent but potentially decreases the chances for further employment by a stigma of less career orientation and fewer occupational experiences. For that reason, involuntary part-time workers in particular may perceive their reduced hours as a threat to their chance of further equivalent employment in the first appraisal of their coping process. Therefore, *I expect part-time employment to increase the subjective precarity risk on average (hypothesis S-1b)*.

Already in the first appraisal, however, there may be a gender difference, as the use of part-time employment differs strongly between women and men. Given the hegemony of the unequal dual earner regime, women's choices are pushed towards a care orientation and a second earner's position, while men's choices are pushed towards a career orientation and a primary earner's position. Being in part-time work is therefore likely to pose more of a threat to men than to women, as their material position as a prime wage earner and their male identity are at stake. Despite a gendered labour market segregation disadvantaging women, *I thus expect the effect of part-time*

employment on the subjective precarity risk to be larger for men than for women (hypothesis S-2b).

Explicitly accounting for the material position in the household, and thereby the requirement to perform in the labour market, should, however, partly explain this gap. *I thus expect that the gender gap in the subjective precarity risk of part-time employment decreases when accounting for differences in the household resources (hypothesis S-2.1b)*.

As argued above, women are disadvantaged in terms of their resources in the labour market because of the gendered segregation which still prevails. Thus, women have fewer resources on average than men for coping with the threat of part-time employment to further employability in the second appraisal. This should partly conceal the larger effect of part-time employment on labour market insecurity of men. Thus, *I expect that the gender gap in the subjective precarity risk of part-time employment increases when accounting for structural production (hypothesis S-2.2b) and structural market power of the employees or the employers' personnel adjustment problem (hypothesis S-2.3b). Furthermore, it should increase when accounting for the associational power of the employees (hypothesis S-2.4b)*.

Again, beyond gender there are likely differences in the effect across the vertical dimension of labour market segregation. However, this time I expect two counteracting dynamics. In similar fashion to the argument above, part-time workers in higher labour market positions have more resources to compensate for the disadvantages of part-time employment in further job searches and can count on a smaller labour surplus, increasing the personnel adjustment problem of employers (secondary appraisal). Contrarily, jobs in higher labour market positions are more often career-oriented and have a stronger full-time norm (Hipp/Stuth 2013). Being on a part-time contract could therefore be more of a stigma than in lower labour market positions where less career attachment may be more accepted (primary appraisal). Assuming that the primary

appraisal is more relevant, *I expect that the subjective precarity risk of part-time employment increases with higher labour market positions (hypothesis S-3b)*.

This heterogeneity should at least partly be concealed by the counteracting effect of the differences in resources in the secondary appraisal. When accounting for these differences and thus isolating the primary appraisal, the higher subjective precarity risks for higher labour market positions should be even more pronounced. Thus, *I expect that the heterogeneity of the subjective precarity risk of part-time employment across vertical labour market positions increases when accounting for differences in the structural market power of the employees or the employers' personnel adjustment problem (hypothesis S-3.1b), as well as when accounting for differences in the associational (hypothesis S-3.2b) and the institutional power (hypothesis S-3.3b) of the employees*.

Finally, the role of the transformation problem in the heterogeneity of the subjective precarity risks of part-time employment across vertical labour market positions is less straightforward. Assuming that the larger transformation problem for jobs in higher labour market positions is at least partly the reason for the stronger full-time norm in these positions, *I expect that the heterogeneity of the subjective precarity risks of part-time employment decreases when accounting for differences in the employers' transformation problem (hypothesis S-3.4b)*.

Table 2: Hypotheses for the subjective precarity risks

Temporary employment		**Part-time employment**	
Temporary employment increases the subjective precarity risks *(S-1a)*		Part-time employment increases the subjective precarity risks *(S-1b)*	
Gender	Women more affected *(S-2a)*	Men more affected *(S-2b)*	
Household resources	increase *(S-2.1a)*	decrease *(S-2.1b)*	Gender gap
Production power	decreases *(S-2.2a)*	increases *(S-2.2b)*	
Market power / Personnel adjustment problem	decreases *(S-2.3a)*	increases *(S-2.3b)*	
Associational power	decreases *(S-2.4a)*	increases *(S-2.4b)*	
Vertical labour market position	Higher positions less affected *(S-3a)*	Higher positions more affected *(S-3b)*	
Market power / Personnel adjustment problem	decreases *(S-3.1a)*	increases *(S-3.1b)*	Heterogeneity across labour market positions
Associational power	decreases *(S-3.2a)*	increases *(S-3.2b)*	
Institutional power	decreases *(S-3.3a)*	increases *(S-3.3b)*	
Transformation problem	decreases *(S-3.4a)*	decreases *(S-3.4b)*	
Affective job insecurity		**Cognitive labour market insecurity**	

Source: Author's table

3.6 Hypotheses II: The heterogeneity of the material precarity risks

After having established the research hypotheses for the subjective precarity risks, the following section is dedicated to the hypotheses concerning the material precarity risks. The structure of the hypotheses thereby remains similar. First, I will focus on the main effects of non-standard employment on the material precarity risks. Next, I will consider their heterogeneity across the vertical labour market position as primary contextual factor. Thirdly, I aim to test whether this heterogeneity is due to differences in power resources, the degree of the personnel adjustment and the transformation problem of the employers. Based on this structure, I will first establish the hypotheses regarding the

material precarity risks of temporary employment before establishing those of part-time employment.

For the analyses, I will focus on the income dimension of the precarity definition of Brinkmann et al. (2006; see 2.2). Wage differentials are the most commonly used indicator in the literature, even without mentioning precarity. As I wish to build on previous findings when shifting the focus to the contextual factors, and for the sake of comparability, these will also be at the centre of the analyses below.

The material precarity risks indicated by wage differentials can be conceptualised as an outcome of complex individual and collective bargaining processes under certain structural conditions, as elaborated in the previous sections. The wage penalties found in earlier literature for firstly temporary and secondly part-time employment can thus be substantiated from various perspectives. Basically, temporary employment is part of the external labour market and lacks the integration in a closed employment system in comparison to permanent employment. From the perspective of power resources theory, temporary employment can thus be interpreted as a partly de-institutionalised employment relationship, which lacks a certain amount of institutional power resources in comparison to permanent employment. From the perspective of neo-institutional labour economics – turning the control hypothesis upside down – temporary employment could also serve as a disciplinary mechanism that compensates for the lack of control of the employer over the production process. Thereby, a temporary contract could substitute for the need for internal high wage positions in order to secure the employee's commitment for external lower wage positions. This argument comes very close to the efficiency wage theory, which states that employers have to pay relatively higher wages to permanent employees in order to secure their commitment, while this is not necessary for temporary employees who are disciplined by the pending threat of dismissal (Shapiro/Stiglitz 1984; see for example Gariety/Shaffer 2001; Weeden 2005; Comi/Grasseni 2012; Garz 2013; Bossler 2015). It is therefore possible to deduce from both these theories a weaker position of temporary employees in comparison to standard employees in the wage bargaining process. Finally, also when considering the function

of temporary employment as an extended probationary period – the screening hypothesis – lower wages for temporary employees are likely as they are not (yet) part of the core labour force (see for example McGinnity/Mertens 2002; Mertens/McGinnity 2005; da Silva/Turrini 2015). Based on both empirical findings and theoretical considerations, *I thus expect that temporary employment increases the material precarity risk in comparison to permanent employees (hypothesis M-1a)*.

Regarding part-time employment, both theory and empirical findings (see section 2.4) are less clear. However, part-time employment is a partly de-institutionalised employment relationship in the sense that it deviates from the full-time norm. Whether this lack of institutional resources compared to full-time employees translates into lower wages presumably largely depends on the function of the part-time contract and whether it is a (restricted) choice of the employee or a requirement of the employer. When the part-time position is part of a secondary labour force and serves as an internal flexibility buffer, it is likely to entail lower wages. This is not the case when the part-time position is part of the primary labour force. However, regardless of the position or even more pronounced in primary employment systems, voluntary part-time work in particular may be a signal for the employer of less commitment and career orientation and therefore a reason for lower wages (Spence 1973; see for example Anger 2005; Weeden 2005; Zapf/Weber 2017). Therefore, *I expect that part-time employment increases the material precarity risks in comparison to full-time employees (hypothesis M-1b)*.

Considering the various functions of temporary and part-time employment, it is likely that the material precarity risks differ across the vertical dimension of the labour market. However, two contrary relations are theoretically conceivable: firstly, power resources theory suggests that low labour market positions have fewer structural, associational and institutional power resources to compensate for the lack of institutional power resources entailed by non-standard employment. While middle labour market positions can draw on larger associational and other institutional resources, high labour market positions can draw on large structural resources to compensate for the material precarity risks of temporary and part-time employment. Seen from this perspective, *the effects of*

temporary (hypothesis M-2a) and part-time employment (hypothesis M-2b) on the material precarity risk should ***decrease*** *with higher labour market positions*.

Secondly, when considering neo-institutional labour economics and interpreting the temporary employment wage penalty as a deviation from efficiency wages paid to permanent employees, the relation may be the opposite. As the transformation problem is expected to increase with higher labour market positions, the part of the wages paid for reasons of efficiency – i.e. to secure the commitment of the employees whose work can hardly be controlled – should increase as well. In addition, higher wages presumably demand a higher level of extra pay in order to motivate. From that perspective, the wage difference to permanent employees should be greater for temporary employees in higher labour market positions. Moreover, temporary employment could also entail especially high wage penalties when used as extended probationary periods, since the wages are only provisional until a final decision is taken on further employment. Assuming that the screening function of temporary employment is largely located in higher labour market positions, this could also be a reason for larger penalties in higher labour market positions (Gebel 2010). Considering these arguments and contradicting hypothesis M-2a, *the effect of temporary employment on the material precarity risk should* ***increase*** *with higher labour market positions (hypothesis M-3a)*.

In a similar vein, part-time employment may be more disadvantageous for higher labour market positions than for lower positions. If bad signals to the employer are the reason for the higher material precarity risks of part-time employment, then it is likely that these signals are especially bad in high-performance internal or external employment systems which demand a large career commitment from the employee. In these cases, working part-time may deviate more strongly from the norm than in lower labour market positions and hence entail larger wage penalties for this deviation. From this perspective and contradicting hypotheses M-2b, *the effect of part-time employment on the material precarity risk should* ***increase*** *with higher labour market positions (hypothesis M-3b)*.

In the event that case differences in power resources or the employers' problems are the reason for the differences of the material precarity risks of temporary and part-time employment across labour market positions (hypotheses M-2a & M-2b), they should also be able to statistically explain this heterogeneity. Thus, being in temporary or part-time employment in a lower labour market segment may be particularly harmful for the wage level because the employees only have a small amount of structural market power or, expressed differently, the employers can resort to a large labour surplus. The pressure of a large reserve army diminishes the capacities of the employees to negotiate to an even greater extent than those in standard positions, as they always run the risk of being replaced or are less integrated in the organisation. As lower labour market segments are faced more severely with a large labour surplus, i.e. little structural market power, this should explain at least part of the higher material precarity risks of non-standard employees in lower labour market segments. Hence, *I expect that the heterogeneity of the material precarity risks of temporary (hypothesis M-2.1a) and part-time employment (hypothesis M-2.1b) decreases when accounting for differences in the structural market power of the employees or the employers' personnel adjustment problem*.

The role of associational and of institutional power resources is less clear in this regard. A high union and collective agreement presence could either safeguard core employees at the expense of non-standard workers or pressure for the alignment of the wages between the two groups. As above, I assume that a higher union and collective agreement presence rather equalises the working conditions by enforcing the equality under law. Assuming that associational and institutional power resources are the highest in the middle to upper middle positions, *I expect that the heterogeneity of the material precarity risks of temporary employment decreases when accounting for differences in the associational (hypothesis M-2.2a) and the institutional power (hypothesis M-2.3a) of the employees*.

Likewise, *I expect that the heterogeneity of the material precarity risks of part-time employment decreases when accounting for differences in the associational (hypothesis M-2.2b) and the institutional power (hypothesis M-2.3b) of the employees*.

However, when differences in the transformation problem and thereby in the size of the efficiency wage extra pay are responsible for the heterogeneity of the material precarity risks of temporary employment (hypotheses M-3a & M-3b), then differences in the control potential of the required tasks should at least partly explain this heterogeneity. In addition, in the event that bad signals are the cause of the higher material precarity risks of part-time employment, especially for those who work in primary employment systems, then differences in the potential to control the production process should partially account for the greater risks in higher positions. This is because signals are particularly relevant when the employer experiences difficulty in screening the capacities of the employee, as is likely to be the case for jobs which are difficult to control. Hence, *I expect that the heterogeneity of the material precarity risks of temporary (hypothesis M-3.1a) and part-time employment (hypothesis M-3.1b) decreases when accounting for differences in the employers' transformation problem*.

Table 3: Hypotheses for the material precarity risks

Temporary Employment		**Part-time employment**	
increases the material precarity risks *(M-1a)*		increases the material precarity risks *(M-1b)*	
Vertical labour market position	Higher positions less affected *(M-2a)*	Higher positions less affected *(M-2b)*	
	Higher positions more affected *(M-3a)*	Higher positions more affected *(M-3b)*	
Market power / Personnel adjustment problem	decreases *(M-2.1a)*	decreases *(M-2.1b)*	Heterogeneity across labour market positions
Associational power	decreases *(M-2.2a)*	decreases *(M-2.2b)*	
Institutional power	decreases *(M-2.3a)*	decreases *(M-2.3b)*	
Transformation problem	decreases *(M-3.1a)*	decreases *(M-3.1b)*	
Log gross hourly wages			

Source: Author's table

3.7 Hypotheses III: The inequality effects of non-standard work

Analysing the subjective and material precarity risks of non-standard work and particularly their contextual factors has the potential to provide more insights into how non-standard contracts heterogeneously affect those who work in accordance with them on an individual level. However, it is only possible indirectly to derive from that any conclusions about the effect of non-standard work on the macro level of the wage distribution, i.e. on overall inequality. In the event that non-standard work entails higher material precarity risks and particularly affects those at the bottom of the wage distribution, it is likely that non-standard work contributed to the rise in overall wage inequality and the low wage rate. Nonetheless, it remains unclear to what extent and even whether declining wage penalties may have reduced wage inequality. Therefore, I address these issues explicitly in the third part of the study, for which I develop the research hypotheses below.

The logic of the hypotheses differs from the hypotheses regarding the individual precarity risks, as they aim at the distributional level. Instead of discussing how non-standard work affects the individual precarity risks differently depending on contextual factors, I discuss below firstly how the increase in non-standard employment expectedly affects different points, i.e. quantiles, of the wage distribution. After that, I discuss how changing wage penalties of non-standard employment expectedly affect these quantiles.

As explained in section 2.5, from the mid-1990s to 2010 there was a substantial rise in wage inequality both in the bottom half and the top half of the wage distribution, paralleled by a rise in the low wage rate. These developments have stagnated since 2010. Previous research concludes that rising wage inequalities within sectors between companies are primarily responsible for this, as well as sector differences beyond differences in the collective agreement coverage (see section 2.5). The differing extent and manner of the use of non-standard employment between companies is thus potentially a part of this wage segregation dynamic.

In order to statistically test the actual contribution of non-standard work to this rising inequality, differences in the use of non-standard work between the mid-90s and 2010 need to be related to differences in wage inequality between these two time points. As non-standard work could likely have heterogeneous effects on different parts of the distribution, I will consider the effect on the bottom half, the top half and the overall wage distribution.

There are two possible ways in which groups such as non-standard workers can influence the wage distribution. Firstly, given that non-standard workers have a certain wage penalty in comparison to standard workers, a rise in the relative proportion of non-standard workers would increase the overall proportion of lower wages and thereby wage inequality. This is often called the compositional effect of a group on an outcome distribution, meaning that a compositional change in the population, in this case the increase in non-standard workers, changes the outcome distribution. Secondly, given a certain proportion of non-standard workers in the population, a rise in the wage penalty of non-standard workers in comparison to standard workers would also increase the overall wage inequality . This is often called the structural or characteristics effect of a group on an outcome because its structural relationship with the outcome – the wage differential – is changing.

Looking at the **compositional effects** first, the reasoning is quite straightforward. Given substantial wage penalties for non-standard work, the rising proportion of temporary and part-time employment over recent decades should have contributed to rising wage inequality. Hence, *I expect that the compositional differences in temporary (hypothesis I-1.1a) and part-time employment (hypothesis I-1.1b) between 1995/1996 and 2010/2011 contributed to the rise in overall wage inequality in this period*.

As previous research shows (see section 2.4), both temporary and part-time employment are overrepresented in the low wage sector. A rising proportion of these forms of employment thus puts particular pressure on low wages, depressing the bottom of the wage distribution. Assuming that the rise in non-standard work did not equally affect the

median of the wage distribution, as the proportion of non-standard workers decreases with higher wages, this development should have particularly affected the inequality in the bottom half of the wage distribution. Therefore, *I expect that the compositional differences in temporary (hypothesis I-2.1a) and part-time employment (hypothesis I-2.1b) between 1995/1996 and 2010/2011 contributed to the rise in wage inequality in the bottom half of the wage distribution in this period*.

Moreover, I expect that the compositional differences in temporary (hypothesis I-3.1a) and part-time employment (hypothesis I-3.1b) between 1995/1996 and 2010/2011 contributed less to the rise in wage inequality in the top half than in the bottom half of the wage distribution in this period.

Secondly, with regard to the **structural effects**, the expected results are less clear. Basically, three scenarios are conceivable. Firstly, a further polarisation between internal and external as well as between primary and secondary employment systems may have driven non-standard work further to the margins of the labour market and worsened their employment conditions compared to standard workers. Alternatively, non-standard workers simply did not catch up with the rising wages of standard workers. In this scenario, the wage differences between non-standard and standard workers would have become larger, and this change would have contributed to the rising inequality. Conversely, in the alternative scenario a rising normalisation of non-standard employment and a better enforcement of equality laws may have equalised the wage conditions of non-standard and standard workers. The decreasing wage differentials would then have worked against the rising wage inequality. Lastly, it is also possible that no substantial change might have happened.

Here, I want to argue that the explicit goals of the labour market reforms from 1995 to 2004 were to create conditions under which secondary jobs could more easily be offered and people were under more pressure to accept them (see section 2.1). Although these secondary jobs were ultimately meant to function as bridges to the primary labour market, the rising employment in this period was concentrated almost entirely on non-

standard forms of employment (Eichhorst/Tobsch 2015). In addition, ongoing outsourcing processes and an increasing segmentation between companies (see section 2.5) hint at a further segmentation of the labour market, which likely affects non-standard workers in particular. Although recently there has been growing public acceptance of and legal support for part-time work, this was not the case until 2010. Therefore, *I expect that the structural differences in the wage characteristics of temporary (hypothesis I-1.2a) and part-time employment (hypothesis I-1.2b) between 1995/1996 and 2010/2011 contributed to the rise in wage inequality in this period*.

As non-standard employment is particularly prevalent in the lower wage segments, increasing wage penalties should especially affect the lower wages, at least if the wage penalties are either similar across wage groups or if they are higher in lower wage groups. Even if the wage penalties might be higher for higher wage groups, the higher prevalence of non-standard work in the low wage segment should make the bottom half of the wage distribution especially vulnerable to structural changes. Hence, *I expect that the structural differences in the wage characteristics of temporary (hypothesis I-2.2a) and part-time employment (hypothesis I-2.2b) between 1995/1996 and 2010/2011 contributed to the rise in wage inequality in the bottom half of the wage distribution in this period*.

Moreover, *I expect that the structural differences in the wage characteristics of temporary (hypothesis I-3.2a) and part-time employment (hypothesis I-3.2b) between 1995/1996 and 2010/2011 contributed less to the rise in wage inequality in the top half than in the bottom half of the wage distribution in this period.*

Table 4: Hypotheses for the wage inequality effects

	Temporary employment	**Part-time employment**	
Composition	increased *(I-1.1a)*	increased *(I-1.1b)*	**Overall wage inequality**
Structure	increased *(I-1.2a)*	increased *(I-1.2b)*	
Composition	increased *(I-2.1a)*	increased *(I-2.1b)*	**Bottom half wage inequality**
Structure	increased *(I-2.2a)*	increased *(I-2.2b)*	
Composition	increased less *(I-3.1a)*	increased less *(I-3.1b)*	**Top half wage inequality**
Structure	increased less *(I-3.2a)*	increased less *(I-3.2b)*	

Source: Author's table

4 Data, methods and the analytical strategy

Now that the state of the art, the theoretical framework and the research hypotheses have been established, it remains to be clarified how the hypotheses can be tested. In the following chapter, I therefore firstly present the data basis, secondly provide an operationalisation of the theoretical concepts and thirdly describe the employed variables in more detail. Next, I present and discuss the methods used and finally establish the analytical strategy for researching the heterogeneity of the subjective and material precarity risks of non-standard employment as well as their effects on wage inequality.

4.1 The data, the sample and the operationalisation

The data is mainly based on the German Socio-Economic Panel (SOEP v.33) (Goebel et al., 2019). The SOEP is an annual representative longitudinal study of households in Germany that samples approximately 10,000 households at each wave since 1984. It comprises a large set of data covering socio-demographics, individual well-being, job and company characteristics and the household context. The SOEP is therefore a suitable choice for analysing material and subjective outcomes of employment relationships.

Nonetheless, some contextual variables are missing in the SOEP. Therefore, single variables from the Structure of Earnings Survey (SES) and the European Union Labour Force Survey (LFS), both from the European Commission, as well as from Dengler et al. (2014) have been appended to the sample. The SES (European Commission 2014; Statistisches Bundesamt 2016) is a two-stage four-yearly survey of enterprises and their employees providing comparable data on earnings and personal and job characteristics of the employees as well as characteristics of the enterprises. Thanks to its higher number of observations of around one million employees in Germany, the sectoral collective agreement coverage can be estimated much more precisely. The LFS (European Commission 1998) is a quarterly survey of households providing statistics on

the labour participation of all persons above 15 years old. In Germany, it is integrated in the Mikrozensus (Bihler/Zimmermann 2016) and is the largest representative household survey. It is therefore particularly suitable for estimating occupational unemployment rates. Lastly, Dengler et al. (2014) use the expert knowledge on occupations in the BERUFENET data of the Federal Employment Agency to calculate task compositions on the occupational level. If not specified otherwise, variables are derived from the SOEP. The descriptive statistics of the variables presented below can be found in table 5 in chapter 5.

The sample of analysis contains the employed population aged between 17 and 65 excluding the self-employed, students, apprentices and retirees as well as all those working in workshops for people with disabilities. I employ the waves 1995 to 2017 for the analyses of the material and subjective precarity risks and the waves 1995, 1996, 2010 and 2011 for the analyses of the wage inequality effects. The only exception is the analysis of the subjective precarity risks of part-time workers, as the indicator for labour market insecurity is not measured in the last two waves. 1995 is arguably a fitting starting year, as the Employment Protection Act was renewed in this year and the unification process of Germany had already had some time to settle. For the first two analyses, I exploit as much data as possible since then and include the survey waves until 2017. For the third analysis, I only observe the data until 2011, as the inequality dynamics came to a halt at that point. In total, the sample consists of 34,497 individuals observed on average over a time period of around seven years, resulting in 245,502 person-year observations.

The independent variables in the analyses below indicating **temporary and regular part-time employment** are measured by two dummies reflecting whether or not a respondent has a fixed-term contract (reference category) and whether or not a respondent has a regular part-time contract (reference category). The dummy indicating temporary employment thus also includes temporary agency workers. However, the dummy indicating part-time employment excludes marginal employment, as the respondents were asked whether they work full-time, part-time or in marginal

employment in one question. This allows the effects of these two very different employment forms to be differentiated (see also Giesecke 2009).

The dependent variables entail firstly the indicators for **subjective precarity risks**, i.e. affective job and cognitive labour market insecurity. As discussed above in section 3.5, I focus on the subdimension of planning reliability from the subjective precarity definition of Brinkmann et al. (2006), because this subdimension is the closest to the canonical broad definition of precarity by Bourdieu as the inability to plan one's life on a long-term basis (1999). Planning reliability with regard to employment is commonly analysed in the related literature as either subjective job or labour market insecurity (Helbling/Kanji 2018). Subjective job insecurity reflects how individuals think or feel about the insecurity of their current position, while subjective labour market insecurity reflects how individuals think or feel about their chances of finding a new position in the labour market. Arguably, the subjective precarity risks of temporary employment predominantly become manifest in the subjective *job* insecurity of the employees, as temporary employment by definition increases the objective insecurity of the job. The subjective precarity risks of part-time employment, in turn, predominantly become manifest in the subjective *labour market* insecurity, as part-time employment may well be permanent but may deteriorate further job chances by a relative lack of job experiences and the stigma of a lack of commitment and career orientation. Therefore, subjective job insecurity shall serve as the indicator for the subjective precarity risks of temporary employment, while subjective labour market insecurity shall serve as the indicator for the subjective precarity risks of part-time employment.

More precisely, a dummy measuring *affective* job insecurity shall be used for the analysis of temporary employment, while a dummy measuring *cognitive* labour market insecurity shall be used for the analyses of part-time employment. The item in the SOEP for subjective job insecurity asks whether respondents are not concerned, somewhat concerned or very concerned about their job security. It therefore reflects the extent to which employees worry about their job, asking them for an affective evaluation of their job insecurity. The item for subjective labour market insecurity is reflected by a variable

which differentiates between those who consider finding a new equivalent job almost impossible, those who consider it difficult and those who consider it easy. It rather aims at a cognitive evaluation of labour market insecurity. For the analyses, I construct firstly a dummy variable differentiating between those employees who are somewhat or very concerned about their job security and those employees who are not concerned (reference category). Secondly, I construct a dummy variable differentiating between those employees who consider finding a new equivalent job difficult or impossible and those employees who consider finding a new equivalent job easy. In both instances, a distribution that is as balanced as possible leads the coding decisions, but coincides with the aim of differentiating between those reporting weak to strong levels of subjective precarity and those not reporting any subjective precarity.

Secondly, the dependent variables entail the natural logarithm of the gross hourly wages as an indicator for **material precarity risks**. The wage is the central factor for the material gains of an employment relationship. It not only affects the monthly income but also the amount of transfer payments such as the unemployment benefit and the pension. The gross hourly wages are calculated by firstly adjusting the monthly labour income – before tax and social contributions – for inflation with the reference year 2017. Secondly, this is divided by the actual weekly working hours and multiplied by 4.3 to calculate the hourly wage. Lastly, the natural logarithm of the resulting gross hourly wages is calculated in order to correct the skewness of the wage distribution.

Thirdly, the dependent variables include the inter-quantile ratios of the 50^{th} to the 15^{th}, the 85^{th} to the 50^{th} and the 85^{th} to the 15^{th} quantile of the unconditional wage distribution which serve as indicators for the **wage inequality in the bottom half** and **the top half of the wage distribution** as well as for the **overall wage inequality** respectively. The inter-quantile ratios are estimated by employing the oaxaca_rif Stata module based on the natural logarithm of the gross hourly wages (Rios-Avila 2019; see section 4.6). Basically, the values of the respective quantiles of the unconditional wage distribution are estimated and then divided one by the other.

The following operationalisation of the contextual factors in the analyses mostly occurs at the occupational or sectoral level, as most of these do not operate on the individual level. Only **gender** – measured by a dummy with the reference being male – operates on the individual level.

The **vertical labour market position** is measured with the 1988 International Socio-Economic Index (ISEI), a continuous scale sorting occupations into values between 16 (for example cleaners) and 90 (for example judges). The occupations are ranked by employing their average wage and education levels in an iterative algorithm adjusted for age levels (Ganzeboom et al. 1992; Ganzeboom/Treiman (1996); Connelly et al. 2016). The ISEI is a particularly good fit for indicating the vertical labour market segmentation. To begin with, it is a widely used and verified scale which facilitates the replication and comparability of the results. Furthermore, the main two indicators for the differentiation between primary and secondary labour markets proposed by Köhler and Krause (2008: 12ff.) are wage level and employment stability. As they show, education highly correlates with job tenure in Germany (Ibid.: 81f.). Thus, as ISEI is based on occupational wage and education levels, it shall serve as the indicator for the vertical labour market position in the analyses below.

The indicator for the employers' **personnel adjustment problem** and the **structural market power resources** of the employees is the unemployment rate on the occupational level. It is calculated by using data from the European Labour Force Survey (LFS). Therefore, I firstly calculate the number of unemployed individuals and of individuals in the labour force – unemployed or employed – per occupation on the two-digit level of the International Standard Classification of Occupations (ISCO) from 1988 (Hoffmann/Scott 1993) and from 2008 (ILO 2012). Next, I divide the number of unemployed persons per occupation by the number of the labour force per occupation. For 2006 to 2011, the German LFS sample contains only a tenth of the original sample, so some ISCO categories have to be combined, as otherwise they would be too small. Thus, firstly the armed forces are all merged into one category as are the agricultural and fishery workers and hunters. Lastly, the chief executives, senior officials, legislators

and managers are also put into one category . For 1995 to 2010, ISCO-88 provides the occupational classification whereas ISCO-08 is used for 2011 to 2017. In order to merge the data to the SOEP data, I derive the ISCO-08 values from ISCO-88 using the iscogen Stata module (Jann 2019).

For the analyses of the material precarity risks and wage inequality, the **transformation problem** is indicated by the occupational task composition. Arguably, the task complexity of a job determines the employers' transformation problem to a large extent. Non-routine tasks in particular cannot by definition be standardised. For those tasks, it is much harder for employers to impose strict criteria, guidelines or time management. Therefore, the more non-routine tasks have to be carried out in the production process, the more difficult it is to control the process for the employer. Hence, the measure of Dengler et al. (2014) is merged to the SOEP data. In contrast to other survey-based task measures, Dengler et al. create a task measure based on the expert knowledge on the specific job requirements of around 3,900 occupations provided by the BERUFENET data of the Federal Employment Agency. The authors sort the approximately 8000 job requirements into the task typology of Spitz-Oener (2006), which differentiates between analytical, interactive and manual non-routine tasks as well as cognitive and manual routine tasks. The differentiation between routine and non-routine tasks refers to their potential substitutability by algorithms and machines. Analytical tasks include all those which require thinking and analysing, interactive tasks include communication in all forms and manual tasks involve all necessary physical activities carried out mainly with the hands. As there are only very few routine interactive tasks, the typology does not differentiate between analytical and interactive tasks in the cognitive routine task category (Dengler et al. 2014: 7). Finally, Dengler et al. calculate the proportion of the core job requirements related to each task in all core job requirements per occupation, thereby estimating the relative proportion of each task type per occupation. These task composition indicators are merged to the SOEP data via the "Klassifikation der Berufe" (KldB) 2010 occupational typology on the three-digit level (BA 2011). In the analyses below, only the proportions of the non-routine tasks in every occupation are used to

indicate the transformation problem of the occupation, as their inability to be substituted by algorithms and machines should also impede their potential for being controlled by the employer. In any case, at least one task proportion has to be omitted, as the task proportions of each occupation add up to one and thus risk multicollinearity.

The **structural production power resources** for the analyses of the gender difference in the subjective precarity risks of non-standard employment are particularly difficult to measure, but shall be indicated by the 1988 International Socio-Economic Index (ISEI) as the vertical labour market position. Arguably, the wage level can be seen as an indicator of the relevance of the employee in economic production, and higher education enables employees to reach positions of higher relevance. Therefore, ISEI is the most appropriate measure at hand, as it combines these two variables in one index. However, it is a rather indirect measure of the latent concept of the structural production power resources and presumably entails a relatively high amount of noise from other factors. This is precisely why it is a good fit for the vertical labour market position. Hence, the results concerning the structural production power resources should be interpreted while keeping this in mind.

The **associational power resources** are indicated by the trade union density at the sectoral level, as trade unions are organised at this level. Therefore, the Statistical Classification of Economic Activities in the European Community version 1.1 (NACE Rev. 1.1) (Eurostat 2002) is recoded in order to avoid small categories. Again, agriculture and fishery are merged. Extra-territorial organisations are added to the category entailing public administration, defence and social security. Lastly, mining and quarrying activities are merged with the manufacturing sector. Next, the dummy indicating whether a respondent is a member of a trade union is used to calculate the density at the sectoral level. As the variable is only available for a small number of years, 2015 is used as the reference year in order to create a constant sectoral union density for all years. This means that the variable reflects only the variation between the sectors, but not the variation within sectors over time. As the comparison with the other

years shows, the structural relationship between the sectors in union density stays almost constant (see figure A1 in the Appendix).

The **institutional power resources** are indicated by the collective agreement coverage at the sectoral level, where collective agreements traditionally operate. I use the corresponding variable in the Structure of Earnings Survey (European Commission 2014) recoded to a dummy whereby all types of collective agreements – industrial, regional, enterprise and local unit agreements – are contrasted to no agreement (reference category). Based on this dummy, I calculate the collective agreement coverage for the NACE Rev. 2 (Eurostat 2008) sectors for 2014. Adapting the NACE Rev. 2 classification of the SOEP to the one in the SES, the sectoral collective agreement coverage is then merged to the SOEP data. As before, the variable is then used to create a sectoral collective agreement coverage constant over all years with the reference being 2014. Again, a comparison with other waves from the SES shows that the structure of the coverages across sectors remains somewhat constant (see figure A2 in the Appendix).

The **material household resources** are added only for the analyses of the subjective precarity risks. These are indicated by two variables. Firstly, a categorical variable is coded which differentiates between single households (reference), shared households with a partner, shared households with a partner and children and single parent households with children. Secondly, the relative wage position in the household is measured. For this purpose, the wages of the respondents are divided by the total labour income of the respective households and the resulting index divided into ten categories ranging from 1, which means providing less than ten percent of the total household labour income, to 10, which means providing more than 90 percent of the total household labour income.

In addition, a few **control variables** are added to the models in order to account for likely differences between non-standard and standard workers which may also affect the dependent variables. Depending on the model specification, a selection of the following

variables is included (see sections 4.3 to 4.5): the age of the respondents in years, as well as its square term, education in years, labour market experience in years of full-time equivalent employment, job tenure in years, the actual weekly working time hours and the weekly overtime in hours are all measured as continuous variables. The place of residence of the respondents is measured as a dummy differentiating between those who live in the regions of the former GDR and those who live in Western Germany (reference). The gender of the respondents is measured with a dummy differentiating between women and men (reference). The size of the employing company is measured as a categorical variable, ranging from the first category of companies with under 20 employees, via companies with 20 to 199 employees and companies with 200 to 1999 employees to companies with 2000 or more employees, in order to account for differences at the company level. Marginal employment is measured as a dummy with the reference being non-marginal employment. Year dummies indicate the year of observation in comparison to all other years (reference). Finally, the regional unemployment rate at the Federal State level is additionally derived from the LFS and appended to the data set.

4.2 Fixed effects models, the linear probability assumption and interaction terms

In this section, I will present the strategy for analysing the heterogeneity of the subjective precarity risks of non-standard employment. Therefore, I firstly argue why fixed effects models have been chosen and then discuss two problems related to them in the presence of dummy dependent variables and interaction effects. On this basis, I afterwards present in detail the consecutively estimated linear probability fixed effects models for, firstly, the heterogeneous subjective precarity risks and, secondly, the heterogeneous material precarity risks.

To estimate heterogeneous effects of non-standard work on subjective job and labour market insecurity, person fixed effects regressions provide the basis for the models. In the usual ordinary least squares (OLS) regression models, potential time-constant unobserved heterogeneity may bias the results by affecting both the independent and the

outcome variables. The found effect would then erroneously ascribe this causal relation to the effect of the independent variable. In that sense, unobserved personality characteristics such as doubtfulness or anxiety may influence chances in the labour market and heighten the risk of working on a temporary contract as well as strongly raise affective job insecurity. Or, a non-academic habitus from a working-class socialisation may negatively influence both the chances of acquiring a permanent position and the wage in academic jobs.

Therefore, I make use of person fixed effects models that rule out unobserved heterogeneity by only looking at changes within individuals over time (Wooldridge 2010: 300ff.). In contrast to a normal regression, the variables in a person fixed effects regression are demeaned (*dm*). Their individual means over all years in which they are observed are subtracted from their yearly values. Assuming that the error in the regression equation is split into a systematic error (*c*), stemming from time-constant heterogeneity, and a random error (*e*), the demeaned regression can be expressed as:

$$(1) \qquad y_{it} - \overline{y_i} = \beta(x_{it} - \overline{x_i}) + (c_i - \overline{c_i}) + (e_{it} - \overline{e_i})$$

$$(2) \qquad = \beta(x_{it} - \overline{x_i}) + (e_{it} - \overline{e_i})$$

$$= \beta\, dm(x_{it}) + (dm(e_{it}))$$

As the mean of a time-constant characteristic equals the constant value over all years, the systematic error stemming from time-constant heterogeneity is removed from the equation. The estimates of fixed effects regressions are thus more consistent than usual regression estimates, but less efficient, since all observations that do not change their value of a given variable over time do not count for the estimation of the respective effect. Nonetheless, analysing a yearly observed sample spanning more than 20 years should compensate for the reduced efficiency.

However, there are two problems with linear fixed effects probability models including interaction effects. The first relates to the assumption of linear probability and the second to the inclusion of interaction effects in a demeaned regression. Before explaining the analytical strategy, I will elaborate concisely on both problems.

In the case of job and labour market insecurity, the dependent variables only have two possible values: one and zero. One basic assumption of linear regression is, however, a linear relation between the independent variables and the outcome. Nonetheless, it is possible to include job and labour market insecurity as dependent variables when assuming that they rather represent probabilities of insecurity ranging between zero and one and that the independent variables have a linear relationship with these insecurity probabilities. However, for a probability indicator ranging between zero and one, a logistic relationship would be much more fitting because, firstly, the variable cannot exceed zero nor one as theoretically implied by a linear relationship. Secondly, the errors are by definition heteroskedastic, as there are only two possible empirical outcomes one and zero and the variance of the errors is therefore the smallest when the predicted probabilities are around 0.5.

Therefore, logistic regression models instead of linear models are arguably the better fit when the dependent variables are dummies. Conditional logit models (Chamberlain 1980; Hamerle/Ronning 1995; Hosmer et al. 2013) are designed to apply a logistic regression to a person fixed effect logic. Instead of demeaning the data, conditional logit models group the data on the person level, with each group containing all the observed years of one person, and then estimate the regression equation under the condition of the empirically found positive outcomes of y in each group (Greene 2012: 722).

However, the interpretation of logistic effect coefficients is not intuitive, unlike those of linear probability models (Hellevik 2009). The effects, i.e. the coefficients, of non-standard work on the probability of subjective insecurity is, however, precisely what I am interested in and not the predicted probability values of subjective insecurity. Finally, there are also some serious arguments against logistic regression. Mood (2010) argues that unrelated unobserved heterogeneity biases the coefficients of logistic models. While this is not undisputed (Kuha/Mills 2020), the ongoing discussion on the choice between logistic and linear probability models shows that there is no consensus on the correct methods. Because of methodological simplicity and better interpretability

of the coefficients, I thus employ linear probability models, but test the robustness of their results by comparing them with those of conditional logit models (see Appendix I).

The second problem concerns the inclusion of interaction terms in the context of demeaned variables. The purpose of demeaning the data in a person fixed effects model is that only variance within individuals counts for the estimation of the effects. Including an interaction term in such a model thus aims at analysing how the within effect of one variable *X*, in this case non-standard work, differs by different values of another variable *Z*, in this case the contextual factor.

Giesselmann and Schmidt-Catran (2020) show that this is easily done when *Z* only varies between individuals showing no variation within individuals, as it is also common practice. Including an interaction term of non-standard work and gender for example by multiplying the two variables and then using the product in a fixed effects regression estimates heterogeneous within effects of non-standard work for men and women, since gender does not vary over time. The within variation of non-standard work activates the between variation of gender for the estimation of within effects.

As Giesselmann and Schmidt-Catran reveal, the problem arises when both variables *X* and *Z* vary within individuals because in that case the within variation of *Z* also activates the between variation of *X* which is explicitly meant to be excluded in fixed effects models. Integrating an interaction term of two variables with within variation in a fixed effects regression by simply demeaning the product thus re-introduces the between variation of these variables. Therefore, the authors conclude that any interaction term in a fixed effects regression with two variables including within variation has to be demeaned twice: first, each variable has to be demeaned separately before then demeaning the product term in order to exclude the between variation (Ibid.: 6):

$$(3.1) \qquad dm\left(dm\left(x_{it}\right)\cdot dm\left(z_{it}\right)\right)=\left(x_{it}-\overline{x_i}\right)\cdot\left(z_{it}-\overline{z_i}\right)-\frac{\sum_{t=1}^{T_i}\left(x_{it}-\overline{x_i}\right)\cdot\left(z_{it}-\overline{z_i}\right)}{T_i}$$

Nonetheless, the aim of the study is to identify how the within effect of non-standard work changes for different values of the contextual factors, which is their between variation. In accordance with Giesselmann and Schmidt-Catran (2020), it would therefore be necessary in a first step to demean only the indicators of non-standard work (x) but not the contextual factors (z). In a second step, the product term of both would be demeaned again, resulting in an asymmetric double demeaning of the interaction effect. Equation (3.2) expresses this in the context of a fixed effects regression:

$$(3.2) \qquad dm(y_{it}) = \beta_1 dm(x_{it}) + \beta_2 dm(z_{it}) + \beta_3 dm(dm(x_{it})z_{it}) + dm(e_{it})$$

As shown by a comparison of models employing asymmetric double demeaned interaction terms with models employing Stata's factor variables, there are, however, no differences in the coefficients (see table A1 in the Appendix). Integrating interaction terms in fixed effects models using factor variables thus already seems to account for the problem formulated by Giesselmann and Schmidt-Catran (2020) by preventing the within-variation from being re-introduced to the fixed effects model. Hence, interaction terms using factor variables will be used for the analyses below, simply denoted as $dm(x_{it}\, z_{it})$.

4.3 Analytical strategy I: Subjective precarity risks

The methods having been clarified, the analytical strategy for the heterogeneity of the subjective precarity risks of non-standard employment is presented below. The analyses are carried out in three steps. In all the steps, models are estimated with cluster robust standard errors accounting for heteroscedasticity and the clustering of the data around individuals. The sample size is hold constant when explanatory variables are added incrementally. First, I examine whether temporary (TE) and part-time employment (PE) have an effect on affective job (JI) and cognitive labour market insecurity (LMI) (hypotheses S-1a & S-1b). Simple fixed effect models are used to identify the main effects:

$$(4.1) \qquad dm(JI_{it}) = \beta_1 dm(TE_{it}) + \beta_3 dm(CV_{it}) + dm(e_{it})$$

$$(4.2) \qquad dm(LMI_{it}) = \beta_1 dm(PE_{it}) + \beta_3 dm(CV_{it}) + dm(e_{it})$$

To approach causality in the model, the assumption must hold that a change in the properties of the working contract is uncorrelated with the person-specific error term e_{it} in the same time period and all other time periods. In other words, there should not be any unobserved changes accompanying or causing a change in the working contract that also affect levels of subjective insecurity. At the same time, I want to estimate the entire effect of non-standard work on insecurity which may also be mediated by other variables. Controlling for these variables would falsely reduce the estimated effect (Grätz 2019).

Therefore, a selection of potentially confounding variables (*CV*) is integrated: model (10.1) controls for a change in a) the actual weekly working time and the amount of overtime, b) the tenure, c) the company size and d) the regional unemployment rate. In doing so, I want to exclude the possibility of a) changing degrees of integration in the company, b) changing degrees of company-specific experiences and internal career progression, c) changes of employment systems between companies or d) changing regional unemployment rates biasing the effect of a change in the working contract on the subjective job insecurity. In model (10.2) the same covariates are controlled for, with the exception of the actual working time, as this would eliminate the part of the effect of part-time employment which is due to a reduced working time, which is the essential characteristic of this form of employment. Instead, I control for marginal employment in order to exclude it from the reference group and identify the effect of regular part-time employment in comparison to full-time employment. To address issues of serial correlation and heteroscedasticity, time fixed effects are also included.

In a second step, I investigate the variation in the main effect by gender (hypotheses S-2a & S-2b). Therefore, the previous models are extended by an interaction effect of temporary or part-time employment with a dummy identifying women (*FEM*):

$$(5.1) \qquad dm(JI_{it}) = \beta_1 dm(TE_{it}) + \beta_2 dm(TE_{it} FEM_i) + \beta_3 dm(CV_{it}) + dm(e_{it})$$

$$(5.2) \qquad dm(LMI_{it}) = \beta_1 dm(PE_{it}) + \beta_2 dm(PE_{it} FEM_i) + \beta_3 dm(CV_{it}) + dm(e_{it})$$

Next, the hypotheses S-2.1a – S-2.4a and S-2.1b – S-2.4b are tested to determine whether gendered endowments with household resources (*HR*) or structural production (*SPR*), structural market (*SMR*) or associational power resources (*APR*) can explain the potential gender gap in the effect on non-standard work on subjective precarity risks. Technically speaking, I test whether the moderating effect of gender is mediated by differences in the household situation and labour market resources between women and men. As the employers' personnel adjustment problem is measured by the same indicator as the structural market power, i.e. the occupational unemployment rate, I test for it as well. For the sake of simplicity, I will, however, only speak of the structural market power in this section.

The explanatory variables have to be included in the model on the same level of analysis as the gender moderation in order to test the potential mediation mechanism. Therefore, I incrementally add interaction terms of temporary or part-time employment with the explanatory variables to the models (11.1) and (11.2).

$$(6.1) \qquad dm(JI_{it}) = \beta_1 dm(TE_{it}) + \beta_2 dm(TE_{it} FEM_i) + \beta_3 dm(CV_{it}) + dm(e_{it}) + \beta_4 dm(TE_{it} HR_{it})$$

$$(7.1) \qquad dm(JI_{it}) = \beta_1 dm(TE_{it}) + \beta_2 dm(TE_{it} FEM_i) + \beta_3 dm(CV_{it}) + dm(e_{it}) + \beta_4 dm(TE_{it} HR_{it}) + \beta_5 dm(TE_{it} SPR_{it})$$

$$(8.1) \qquad dm(JI_{it}) = \beta_1 dm(TE_{it}) + \beta_2 dm(TE_{it} FEM_i) + \beta_3 dm(CV_{it}) + dm(e_{it}) + \beta_4 dm(TE_{it} HR_{it}) + \beta_5 dm(TE_{it} SPR_{it}) + \beta_5 dm(TE_{it} SMR_{it})$$

$$(9.1) \qquad dm(JI_{it}) = \beta_1 dm(TE_{it}) + \beta_2 dm(TE_{it} FEM_i) + \beta_3 dm(CV_{it}) + dm(e_{it}) + \beta_4 dm(TE_{it} HR_{it}) + \beta_5 dm(TE_{it} SPR_{it}) + \beta_5 dm(TE_{it} SMR_{it}) + \beta_6 dm(TE_{it} AR_{it})$$

$$(6.2) \quad dm(LMI_{it}) = \beta_1 dm(PE_{it}) + \beta_2 dm(PE_{it} FEM_i) + \beta_3 dm(CV_{it}) + dm(e_{it}) + \beta_4 dm(PE_{it} HR_{it})$$

$$(7.2) \quad dm(LMI_{it}) = \beta_1 dm(PE_{it}) + \beta_2 dm(PE_{it} FEM_i) + \beta_3 dm(CV_{it}) + dm(e_{it}) + \beta_4 dm(PE_{it} HR_{it}) + \beta_5 dm(PE_{it} SPR_{it})$$

$$(8.2) \quad dm(LMI_{it}) = \beta_1 dm(PE_{it}) + \beta_2 dm(PE_{it} FEM_i) + \beta_3 dm(CV_{it}) + dm(e_{it}) + \beta_4 dm(PE_{it} HR_{it}) + \beta_5 dm(PE_{it} SPR_{it}) + \beta_5 dm(PE_{it} SMR_{it})$$

$$(9.2) \quad dm(LMI_{it}) = \beta_1 dm(PE_{it}) + \beta_2 dm(PE_{it} FEM_i) + \beta_3 dm(CV_{it}) + dm(e_{it}) + \beta_4 dm(PE_{it} HR_{it}) + \beta_5 dm(PE_{it} SPR_{it}) + \beta_5 dm(PE_{it} SMR_{it}) + \beta_6 dm(PE_{it} AR_{it})$$

If gender inequalities in the labour market or in households' resources are responsible for gender differences in the effects of non-standard work on subjective precarity risks, then the interaction effect with gender should decrease or dissolve in the course of adding the interactions with the explanatory variables.

Thirdly, I analyse the heterogeneous effects of non-standard work on subjective precarity risks across vertical labour market positions (hypotheses S-3a & S-3b). Therefore, analogously to before, I firstly extend model (10.1) and (10.2) with an interaction term between temporary or part-time employment and the ISEI index, indicating the vertical labour market position (*VLP*). In order to still account for gender differences, the models are estimated separately for women and men.

$$(10.1) \quad dm(JI_{it}) = \beta_1 dm(TE_{it}) + \beta_2 dm(TE_{it} VLP_{it}) + \beta_3 dm(CV_{it}) + dm(e_{it})$$

$$(10.2) \quad dm(LMI_{it}) = \beta_1 dm(PE_{it}) + \beta_2 dm(PE_{it} VLP_{it}) + \beta_3 dm(CV_{it}) + dm(e_{it})$$

The explanatory variables are then incrementally added to the models interacted with temporary or part-time employment. Thus, I test whether structural market power resources (*SMR*), associational power resources (*AR*), institutional power resources (*IR*) or the occupational transformation problem (*TP*) are able to explain the heterogeneity of the effect of non-standard work across vertical labour market positions by diminishing the interaction coefficient (hypotheses S-3.1a – S-3.4a & S-3.1b – S-3.4b).

$$(11.1) \quad dm(JI_{it}) = \beta_1 dm(TE_{it}) + \beta_2 dm(TE_{it} VLP_{it}) + \beta_3 dm(CV_{it}) + dm(e_{it}) + \beta_4 dm(TE_{it} SMR_{it})$$

$$(12.1) \quad dm(JI_{it}) = \beta_1 dm(TE_{it}) + \beta_2 dm(TE_{it} VLP_{it}) + \beta_3 dm(CV_{it}) + dm(e_{it}) + \beta_4 dm(TE_{it} SMR_{it}) + \beta_5 dm(TE_{it} AR_{it})$$

$$(13.1) \quad dm(JI_{it}) = \beta_1 dm(TE_{it}) + \beta_2 dm(TE_{it} VLP_{it}) + \beta_3 dm(CV_{it}) + dm(e_{it}) + \beta_4 dm(TE_{it} SMR_{it}) + \beta_5 dm(TE_{it} AR_{it}) + \beta_6 dm(TE_{it} IR_{it})$$

$$(14.1) \quad dm(JI_{it}) = \beta_1 dm(TE_{it}) + \beta_2 dm(TE_{it} VLP_{it}) + \beta_3 dm(CV_{it}) + dm(e_{it}) + \beta_4 dm(TE_{it} SMR_{it}) + \beta_5 dm(TE_{it} AR_{it}) + \beta_6 dm(TE_{it} IR_{it}) + \beta_7 dm(TE_{it} TP_{it})$$

$$(11.2) \quad dm(LMI_{it}) = \beta_1 dm(PE_{it}) + \beta_2 dm(PE_{it} VLP_{it}) + \beta_3 dm(CV_{it}) + dm(e_{it}) + \beta_4 dm(PE_{it} SMR_{it})$$

$$(12.2) \quad dm(LMI_{it}) = \beta_1 dm(PE_{it}) + \beta_2 dm(PE_{it} VLP_{it}) + \beta_3 dm(CV_{it}) + dm(e_{it}) + \beta_4 dm(PE_{it} SMR_{it}) + \beta_5 dm(PE_{it} AR_{it})$$

$$(13.2) \quad dm(LMI_{it}) = \beta_1 dm(PE_{it}) + \beta_2 dm(PE_{it} VLP_{it}) + \beta_3 dm(CV_{it}) + dm(e_{it}) + \beta_4 dm(PE_{it} SMR_{it}) + \beta_5 dm(PE_{it} AR_{it}) + \beta_6 dm(PE_{it} IR_{it})$$

$$(14.2) \quad dm(LMI_{it}) = \beta_1 dm(PE_{it}) + \beta_2 dm(PE_{it} VLP_{it}) + \beta_3 dm(CV_{it}) + dm(e_{it}) + \beta_4 dm(PE_{it} SMR_{it}) + \beta_5 dm(PE_{it} AR_{it}) + \beta_6 dm(PE_{it} IR_{it}) + \beta_7 dm(PE_{it} TP_{it})$$

4.4 Analytical strategy II: Material precarity risks

Fixed effects regressions with interaction effects are also employed for the material precarity risks. Therefore, having already presented fixed effects regressions in the previous section, I will directly turn to the description of the consecutive models for the analysis of the heterogeneity of the material precarity risks of non-standard employment. All the following models are estimated with cluster robust standard errors accounting for heteroscedasticity and the clustering of the data around individuals. The sample size of all models is hold constant when explanatory variables are added incrementally. The analysis is carried out in two steps. Firstly, the main effects of

temporary and part-time employment on the gross hourly wage (*W*) are again estimated with a simple fixed effects model, resulting in two regressions (hypotheses M-1a & M-1b):

$$(15.1) \qquad dm(W_{it}) = \beta_1 dm(TE_{it}) + \beta_3 dm(CV_{it}) + dm(e_{it})$$

$$(15.2) \qquad = \beta_1 dm(PE_{it}) + \beta_3 dm(CV_{it}) + dm(e_{it})$$

Some basic potentially confounding factors (*CV*) are controlled in order to avoid a change in one of these factors influencing a change in the working contract as well as the wage level. Therefore, in model (21.1) I control for the following variables: the actual working time and the amount of overtime can be interpreted as indicators of the degree of the integration of the employee in the company processes, which may correlate with the type of the working contract and the wage level. The tenure accounts for the fact that a change between temporary and permanent employment may entail a job change and the fact that temporary employees by definition have shorter tenures. Lastly, including the company size accounts for between-company differences in the use of temporary employment which may also influence the wage level. In model (21.2), I also control for most of the confounding variables from above. Companies may differ in their use of part-time employment depending on their size. A change in the working contract between part-time and full-time employment may also entail a new job and a different extent of integration in the company processes. However, I do not control for the actual working time in this specification, as the defining characteristic of part-time employment lies in the reduced working hours. Controlling for them would therefore falsely eliminate this part from the estimated coefficient. Instead, a dummy indicating marginal employment is integrated in the model specification, as part-time employment only entails regular part-time employees. Additionally controlling for marginal employment ensures that the reference category only consists of permanent employees.

Next, in accordance with hypotheses M-2a, M-3a, M-2b and M-3b, I investigate whether the wage differentials vary across vertical labour market positions (*VLP*). Therefore, as before, an interaction term of temporary or part-time employment with

ISEI is integrated in the models and each model is estimated separately for women and men.

$$(16.1) \qquad dm(W_{it}) = \beta_1 dm(TE_{it}) + \beta_2 dm(TE_{it} VLP_{it}) + \beta_3 dm(CV_{it}) + dm(e_{it})$$

$$(16.2) \qquad = \beta_1 dm(PE_{it}) + \beta_2 dm(PE_{it} VLP_{it}) + \beta_3 dm(CV_{it}) + dm(e_{it})$$

I then attempt to explain the heterogeneity of the differentials across vertical labour market positions by incrementally adding interaction terms with the structural market power resources (*SMR*), associational power resources (*AR*), institutional power resources (*IR*) and the employers' transformation problem (*TP*). This is done once for the wage differentials of temporary and once for the wage differentials of part-time employment, separately for women and men (hypotheses M-2.1a – M-2.3a, M-3.1a, M-2.1b – M-2.3b, M-3.1b):

$$(17.1) \qquad dm(W_{it}) = \beta_1 dm(TE_{it}) + \beta_2 dm(TE_{it} VLP_{it}) + \beta_3 dm(CV_{it}) + dm(e_{it}) + \beta_4 dm(TE_{it} SMR_{it})$$

$$(18.1) \qquad dm(W_{it}) = \beta_1 dm(TE_{it}) + \beta_2 dm(TE_{it} VLP_{it}) + \beta_3 dm(CV_{it}) + dm(e_{it}) + \beta_4 dm(TE_{it} SMR_{it}) + \beta_5 dm(TE_{it} AR_{it})$$

$$(19.1) \qquad dm(W_{it}) = \beta_1 dm(TE_{it}) + \beta_2 dm(TE_{it} VLP_{it}) + \beta_3 dm(CV_{it}) + dm(e_{it}) + \beta_4 dm(TE_{it} SMR_{it}) + \beta_5 dm(TE_{it} AR_{it}) + \beta_6 dm(TE_{it} IR_{it})$$

$$(20.1) \qquad dm(W_{it}) = \beta_1 dm(TE_{it}) + \beta_2 dm(TE_{it} VLP_{it}) + \beta_3 dm(CV_{it}) + dm(e_{it}) + \beta_4 dm(TE_{it} SMR_{it}) + \beta_5 dm(TE_{it} AR_{it}) + \beta_6 dm(TE_{it} IR_{it}) + \beta_7 dm(TE_{it} TP_{it})$$

$$(17.2) \quad dm(W_{it}) = \beta_1 dm(PE_{it}) + \beta_2 dm(PE_{it}VLP_{it}) + \beta_3 dm(CV_{it}) + dm(e_{it}) + \beta_4 dm(PE_{it}SMR_{it})$$

$$(18.2) \quad dm(W_{it}) = \beta_1 dm(PE_{it}) + \beta_2 dm(PE_{it}VLP_{it}) + \beta_3 dm(CV_{it}) + dm(e_{it}) + \beta_4 dm(PE_{it}SMR_{it}) + \beta_5 dm(PE_{it}AR_{it})$$

$$(19.2) \quad dm(W_{it}) = \beta_1 dm(PE_{it}) + \beta_2 dm(PE_{it}VLP_{it}) + \beta_3 dm(CV_{it}) + dm(e_{it}) + \beta_4 dm(PE_{it}SMR_{it}) + \beta_5 dm(PE_{it}AR_{it}) + \beta_6 dm(PE_{it}IR_{it})$$

$$(20.2) \quad dm(W_{it}) = \beta_1 dm(PE_{it}) + \beta_2 dm(PE_{it}VLP_{it}) + \beta_3 dm(CV_{it}) + dm(e_{it}) + \beta_4 dm(PE_{it}SMR_{it}) + \beta_5 dm(PE_{it}AR_{it}) + \beta_6 dm(PE_{it}IR_{it}) + \beta_7 dm(PE_{it}TP_{it})$$

In the event that the explanatory variables do indeed moderate the interaction effects of temporary and part-time employment with ISEI, i.e. they explain the heterogeneity of the effects, the interaction coefficient β_2 should diminish in size and eventually vanish.

4.5 Parenthesis: Why (not) to use unconditional quantile regressions

Before turning to the analytical strategy for the wage inequality effects of non-standard employment, it is necessary to make a small detour, as unconditional quantiles regressions are gaining increasing popularity, but their application is arguably often erroneous. Therefore, I want to argue in this section why unconditional quantile regressions are often interpreted wrongly, and why I refrain from using them to analyse heterogeneous individual effects of non-standard work, as is regularly done in the literature. In the next section, I present how decomposed unconditional quantile regressions are used in this study to analyse heterogeneous distributional effects, i.e. wage inequality effects, of non-standard work.

Recently, unconditional quantile regression (UQR) seems to be the new method in the research field of non-standard work (see for example Laß/Wooden 2019; Regoli et al. 2019). The papers employing UQR suggest that this method allows one to analyse wage penalties at every quantile across the wage distribution. In that case, it would be possible to estimate heterogeneous wage differentials across the most eminent labour

market characteristic and answer the question of whether low earners suffer a higher wage penalty than high earners from non-standard employment. Thus, UQR would also seem to be the perfect fit for this study.

This is, however, not the first time that quantile regressions have promised a straightforward analysis, which ultimately did not hold entirely true . The first papers analysing wage penalties of non-standard work across the wage distribution in Germany are to my knowledge those of Mertens and McGinnity (Mertens/McGinnity 2005; Mertens et al. 2005), followed later by a few other papers (see for example Tõnurist/Pavlopoulos 2014). Employing conditional quantile regressions as initially proposed by Koenker and Bassett (1978), they estimate wage differentials between temporary and permanent – or part-time and full-time – workers at different points of the conditional wage distribution. They then interpret their findings as heterogeneous wage penalties in the sense that low earning temporary workers have a higher wage penalty than high earning temporary workers.

However, multivariate conditional quantile regression estimates the quantiles conditional on the employed variables. Thus, they do not compare wage penalties between absolutely low earning and high earning temporary workers but between those who earn relatively low wages when considering their characteristics and those who earn relatively high wages when considering their characteristics (Killewald/Bearak 2014; Porter 2015). While the results of conditional quantile regressions can be of much interest, they do not fit the research question of whether wage penalties for temporary work differ across the *unconditional* wage distribution, i.e. between low earners and high earners unconditional on their further characteristics.

In 2009 Firpo, Fortin and Lemieux proposed a new computationally simple method to estimate the impact of a change in an explanatory variable on any quantile of the marginal outcome distribution. Following the terminology of Koenker (2005) and for methodological distinction, they named the method unconditional quantile regression (Firpo et al. 2009; Porter 2015). Transforming the outcome variable with the recentred

influence function (RIF), this method calculates the quantiles of the outcome distribution without considering any independent variables, i.e. unconditional on any other factors, before the regression. Later, Borgen (2016) adds an easy-to-use panel fixed effects implementation of UQR. The UQR as proposed by Firpo et al. (2009) is now widely used and has also found its way into the research on the heterogeneous wage penalties of non-standard work (Laß/Wooden 2019; Regoli et al. 2019). However, this is arguably not exactly what UQR is estimating and such an interpretation of UQR results may overstretch their implications. In order to underline this, I will concisely explain the logic of the approach of Firpo et al. (2009) and the resulting possible interpretations. While Haupt et al. (forthcoming) have not yet published their paper on this, I owe the following considerations entirely to them.

The basis of UQR as proposed by Firpo et al. (2009) is the transformation of the outcome variable y – in this case log gross hourly wages – with a recentred influence function of the statistic of interest – in this case a given quantile τ.

$$(21) \qquad RIF(y, Q_\tau) = Q_\tau + \frac{\tau - \mathbf{1}[y \leq Q_\tau]}{f_y(Q_\tau)}$$

The influence function contains most importantly an indicator function ($\mathbf{1}[y \leq Q_\tau]$), which equals one if the wage of an observed individual is less than or equal to the value of the quantile of the wage distribution and equals zero otherwise. This function is subtracted from the quantile τ (for example 0.15 for the 15th quantile) and the result is divided by the density at the quantile value. The influence function is then recentred by adding the value of the given quantile (Q_τ), i.e. the wage at the 15th quantile. Hence, for any given quantile it is only the indicator function which varies between observations. The transformed dependent variable in a UQR thus only consists of two values, determined by the quantile itself and the value and the density at the quantile. The observations sort into these two values depending on whether or not their wages fall above the given quantile value. Firpo et al. (2009) clarify this by transforming and then simplifying equation (21):

$$(22) \qquad RIF(y, Q_\tau) = \underbrace{\frac{1}{f_y(Q_\tau)}}_{c_{1,\tau}} \cdot \mathbf{1}[y > Q_\tau] + \underbrace{Q_\tau - \frac{1}{f_y(Q_\tau)} \cdot (1-\tau)}_{c_{2,\tau}}$$

$$(23) \qquad = c_{1,\tau} \cdot \mathbf{1}[y > Q_\tau] + c_{2,\tau}$$

In the end there are two constants $c_{1,\tau}$ and $c_{2,\tau}$, which only vary between quantiles and the indicator function which either has the value one or zero depending on y. Now this is only how the dependent variable is transformed. The new RIF variable has then to be regressed on the independent variables of interest (X). Therefore, it is helpful to rewrite equation (23) in terms of expected values (Ibid.):

$$(24) \qquad E[RIF(y, Q_\tau) \mid X] = c_{1,\tau} \cdot P(y > Q_\tau \mid X) + c_{2,\tau}$$

In an Ordinary Least Squares regression with RIF as the dependent variable (RIF-OLS), the β coefficient is a difference of expected RIF values. Assuming that X is a dummy, the β coefficient can thus be expressed as (Firpo et al. 2007):

$$(25) \qquad \beta_{\tau,X} = E[RIF(y, Q_\tau) \mid X=1] - E[RIF(y, Q_\tau) \mid X=0]$$

$$(26) \qquad = c_{1,\tau} \cdot [P(y > Q_\tau \mid X=1) - P(y > Q_\tau \mid X=0)]$$

As the second constant cancels out in equation (26) – an expected value of a constant is the constant itself – it becomes obvious that the coefficients of a UQR are weighted differentials of conditional probabilities to be above the value of a given quantile. Firpo et al. (2009: 958) call this the "unconditional quantile partial effect" (UQPE). In the case of temporary employment and wage, the coefficient is thus the weighted difference between the conditional probability of temporary workers being above the quantile value and the respective probability of permanent workers. The weight is given by the inverse of the estimated density at the quantile and is pivotal. Only the weight transforms a difference in probabilities of being above a certain value into an effect of X on unconditional quantiles of Y (Firpo et al. 2007: 15f.). A RIF-OLS regression, which is an unconditional quantile regression, thus estimates effects of X on unconditional

quantiles of *Y* only by considering local properties of this quantile, disregarding the rest of the distribution.

Haupt et al. (forthcoming) assert that the implications of this estimation method should be taken seriously: firstly, the weight leads to different coefficients in areas with the same probability differences. Thus, even when the probability difference would be the same across the whole distribution, the UQPE changes with changing densities. This makes sense when estimating the impact of a change in a group (for instance the proportion of temporary workers) on the 15th quantile of the marginal wage distribution, because the more temporary workers are located around the quantile, the more impact they might possibly have. However, it does not make sense when thinking in the logic of wage penalties. Estimating the wage penalty at a quantile should not be influenced by the proportion of temporary workers at this quantile. That temporary workers would, for example, earn ten percent less at the 15th quantile should not depend on the number of temporary workers at the quantile. Secondly, for the estimation of the UQPE it is not relevant whether groups differ in wage levels below and above unconditional quantile values. Instead, only the difference in the probability of being above the value counts. Again, this does not conform to the idea of a wage difference. Thirdly, the density at a given unconditional quantile can only be estimated with a certain error. This is not taken into account by the OLS regression. Thus, the estimation procedures should be made transparent and robustness tests should be conducted (Porter 2015). Finally, as the basis of the UQPE is the difference between the conditional probability of one group (X=1) and the conditional probability of the other group (X=0), the UQPE can be seen as the difference between the counterfactual quantile value if every observation pertained to the first group (X=1) and the counterfactual quantile value if every observation belonged to the reference group (X=0) (Machado/Mata 2005; Chernozhukov et al. 2013; Powell forthcoming; Haupt et al. forthcoming). Taking the example of a UQR regressing wage on temporary work at the 15th quantile, the UQPE, thoroughly interpreted, would thus be the difference between the wage at the 15th quantile of the unconditional wage distribution if everyone had the same probability of being above the

15th quantile as permanent workers and the wage at the 15th quantile if everyone had the same probability as temporary workers. The UQPE thus expresses the difference between two counterfactuals and the interpretation of the exact value of the coefficient is therefore not intuitive. Given these considerations, the UQPE hardly represents a wage differential, but can be a helpful indicator for the impact of a change in the non-standard labour force on the value of a given unconditional quantile. This is why Firpo et al. (2009) interpret the results of their exemplary analyses as the effect of unionisation, i.e. a change in the proportion of union members, on the different quantiles of the unconditional wage distribution. Likewise, they compare the magnitude of the effects between quantiles, but do not interpret their absolute values.

4.6 Analytical strategy III: Wage inequality

While I refrain from using unconditional quantile regressions to analyse heterogeneous wage differentials, they are even more useful for analysing the inequality effects of non-standard work by combining them with decomposition analyses. In order to establish the strategy for analysing the contribution of non-standard employment to the rising wage inequality of recent decades, I first recall the logic of unconditional quantile regressions as elaborated in section 4.5. Secondly, I concisely present decomposition analyses as introduced by Oaxaca (1973) and Blinder (1973), before presenting their application to unconditional quantile regressions by Firpo et al. (2018). Finally, I describe how this application is used to analyse the compositional and structural contribution of non-standard employment to the rise in wage inequality.

Unconditional quantile partial effects estimate the influence of a group such as temporary employees on a quantile based on probability differences and the density at the quantile, thereby accounting for the changeability of a given quantile when the group changes in size. As elaborated in section 4.5, unconditional quantile regressions estimate the impact of a change in X on a given quantile of the marginal distribution of Y. They do so by estimating the change in the marginal unconditional quantile value of Y when X shifts one unit to the right. Thus estimating an unconditional quantile

regression of the 15th quantile of the wage distribution on temporary employment provides a coefficient which tells us whether a rise in the proportion of temporary employment increases or decreases – or is irrelevant for – the wages of those earning relatively low wages. The size of the effect gives an impression of how much the quantile value would change if a population with no temporary employment all signed temporary contracts. While this is hardly interpretable in a practical way, the size of the effect provides at least a hint of the relevance of temporary employment for the change in the given quantile value compared to other quantile values.

However, by combining them with decomposition analyses, unconditional quantile regressions can be used to analyse the relative structural and compositional contribution of non-standard work to rising inequality over time by comparing the effects over two time points. A decomposition analysis, as originally formulated by Oaxaca (1973) and Blinder (1973), is meant to decompose the difference in the mean of an outcome between two groups in two parts: the differences in the composition of the characteristics between the two groups and the differences in the returns to these characteristics. Expressed simply, the difference in any statistic of Y between two groups t=0;1 can be written as:

$$(27) \qquad \Delta \nu = \nu_1 - \nu_0$$

Assuming a linear relation, the group statistics can be expressed as the product of the group averages of the covariates and the coefficients defining their relation to Y, usually estimated with OLS regressions:

$$(28) \qquad \Delta \nu = X^1 \beta^1 - X^0 \beta^0$$

The difference in the statistic ν can be traced back to differences in X, i.e. in the composition, and differences in β, i.e. in the coefficient structure, between the two groups. In order to evaluate the contribution of each part to the overall differential, a counterfactual distribution needs to serve as a reference. Usually, it is constructed by assigning the coefficients of group two (t=1) to the covariate averages of group one

(t=0), but the contrary is also possible. This counterfactual thus asks what would the statistic of interest be if group one had the same coefficient structure as group two. Adding and subtracting the counterfactual distribution as linear function to the above equation results in the following:

$$(29a) \qquad \Delta v = (X^1\beta^1 - X^1\beta^0) + (X^1\beta^0 - X^0\beta^0)$$

$$(29b) \qquad = \underbrace{X^1(\beta^1 - \beta^0)}_{\Delta v_S} + \underbrace{(X^1 - X^0)\beta^0}_{\Delta v_X}$$

Factoring out the averages of group two and the coefficients of group one results in two parts of the equation representing firstly the difference between the two groups due to differences in the coefficient structure (Δv_S) and secondly the difference due to differences in the covariate composition (Δv_X).

This is, however, only true under two assumptions: the ignorability assumption states that the distribution of the unobserved factors affecting Y should be the same for both groups once the observed factors are accounted for (Firpo et al. 2018). This assumption is rather restrictive, as it requires us to control for all covariates which differ between the two groups. For these analyses, an elaborate choice of covariates should reduce the bias from the violation of this assumption. Secondly, the overlapping support assumption states that there should be values observed in one group which are not observed in the other group. This assumption is rather easy to uphold, especially when the groups consist of the same sample observed at two time points.

The classic application of the Oaxaca Blinder decomposition is interested in mean differences between population groups – for example the gender wage gap. Here I am interested in decomposing differences between two time points, as I want to trace the causes of the rising wage inequality of recent decades. Group two (t=1) therefore entails a cross-section of my sample of analysis at a later point in time while group one (t=0) entails a cross-section measured earlier. In addition, it is not the mean which is interesting for the research question but quantiles of the marginal wage distribution and their ratios, measuring wage inequality at different points of the distribution.

Building on their unconditional quantile regression methodology (Firpo et al. 2007; 2009) and the Oaxaca Blinder decomposition, Firpo, Fortin and Lemieux (2018) propose an estimation strategy for decomposing unconditional quantile differences. In that case, the statistic v is a given quantile τ of the wage distribution and the recentred influence function of the quantile is used to estimate the coefficients β^T of the two groups (for further details, see section 4.5; Firpo et al. 2018: 13f.).

In addition, they implement a strategy to relax the linearity assumption when constructing the counterfactual distribution (see equation (29a)) based on the conditional propensity score of pertaining to group two. The idea is to reweight the distribution of the characteristics of group one in such a way that it resembles the distribution of group two in order to construct the counterfactual distribution (equation (31c)). The distributions of both groups are then likewise reweighted with functions of their marginal propensity (equation (31a) and (31b)) (Firpo et al. 2018: 7).

$$(30) \qquad w_1(T) = \frac{T}{p}; \;\; w_0(T) = \frac{1-T}{1-p}; \;\; w_C(T, X) = \frac{1-T}{p} \frac{p(T|X)}{1-p(T|X)}$$

$$(31a) \qquad \nu_1 = w_1(T) X^1 \beta^1 = X_w^1 \beta_w^1$$

$$(31b) \qquad \nu_0 = w_0(T) X^0 \beta^0 = X_w^0 \beta_w^0$$

$$(31c) \qquad \nu_C = w_C(T, X) X^0 \beta^0 = X^C \beta^C$$

Applying the reweighted counterfactual distribution to equation (29b) yields the following expression of the reweighted decomposition analysis:

$$(32) \qquad \Delta \nu = \underbrace{X_w^1 (\beta_w^1 - \beta^C)}_{\Delta \nu_S^p} + \underbrace{(X_w^1 - X^C) \beta^C}_{\Delta \nu_S^e} + \underbrace{(X^C - X_w^0) \beta_w^0}_{\Delta \nu_X^p} + \underbrace{X^C (\beta^C - \beta_w^0)}_{\Delta \nu_X^e}$$

In this specification, the overall difference in v, or τ, can be attributed to four different sources. The pure wage structure effect (Δv^p_S) and the reweighting error (Δv^e_S) together form the aggregate wage structure effect. The pure composition effect (Δv^p_X) and the specification error (Δv^e_X) constitute the aggregate composition effect. The reweighting error can be interpreted as an indicator for the quality of the reweighting strategy and

the specification error as an indicator for the departure from linearity in the model specification (Rios-Avila 2019: 19; Firpo et al. 2018). Rios-Avila (2019) provides the Stata package oaxaca-rif which makes it possible to estimate decompositions of quantile RIF regressions with reweighting – as in equation (32) – or without reweighting – as in equation (29b) – as proposed by Firpo et al. (2018).

In the analyses, I focus on the contribution of non-standard work to wage inequality between 1995 and 2011. In this period, wage inequality rose the steepest (see section 2.5). As before, temporary and part-time employment are the central indicators for non-standard work, although marginal employment is also controlled for. Wage inequality in the bottom half of the wage distribution is indicated by the ratio of the 50^{th} to the 15^{th} quantile of the logarithmic gross hourly wage distribution. Wage inequality in the top half is indicated by the 85^{th} to the 50^{th} quantile ratio and overall wage inequality is indicated by the 85^{th} to the 15^{th} quantile ratio. As control variables, I include firstly a set of demographic indicators: the age of the respondents as well as its squared term are used to account for changes in the age structure of the sample and its non-linear relation to wages. A dummy indicates whether the respondent is living on the territory of the former GDR, as East and West Germany differ considerably in their wage structure. Finally, a dummy indicates whether the respondent is female. Secondly, I include some individual labour market characteristics, such as education in years and experience of full-time equivalent employment in years, in order to account for changes in skill structure and returns. Thirdly, I control for a series of job characteristics: marginal employment, tenure in years and the size of the company. Fourthly, I control for the workers' power resources: the occupational unemployment rate, the sectoral union density and the sectoral collective agreement coverage. However, the last two are constant over time, which means that they only come into effect as a result of employment changes between the sectors. Lastly, I include the occupational non-routine task proportions in order to account for changes in the transformation problem for the employers. These indicators are also constant over time, which means that they only come into effect as a result of employment changes between occupations. Changes in

union density, the collective agreement coverage and the non-routine task proportions within sectors and occupations are thus not accounted for.

I pool the waves 1995 and 1996 – constituting group two ($t=1$) – and the waves 2010 and 2011 – constituting group one ($t=0$) – in order to compensate for the small number of observations in the margins of the wage distribution (see for example Haupt/Nollmann 2014: 611). The small number may be a problem in particular for unconditional quantile regressions, as they rely on the estimation of the density at the quantile values. Pooling the waves thus hopefully renders the estimation of the density values at the 15^{th} and the 85^{th} quantile more robust. Therefore, the standard errors are adjusted for clusters at the individual level and estimated using bootstrapping with 1000 repetitions. Firpo et al. (2018: 29) and Rios-Avila (2019: 21) recommend bootstrapping, as the need for estimating densities to calculate the RIF values also renders the estimation of analytical standard errors more complicated. Bootstrapping instead makes it possible to draw the standard errors from an iterative random resampling process of the data at hand (Efron 1982).

The models are estimated once with the classic estimation of the counterfactual distribution – equation (29b) – and once with a reweighted estimation of the counterfactual distribution – equation (32). As the reweighting procedure relaxes some important assumptions, in particular for the decomposition of RIF regressions, but is not yet established, I prefer comparing the results instead of concentrating on one estimation procedure. The propensity score to be in group two – necessary for the estimation of the counterfactual distribution with the reweighting approach – is derived from a logit model containing all the variables which are also part of the RIF regressions.

Finally, the model according to equation (32b) is re-estimated once with the base group ($t=0$) being constituted by the waves 1995 and 1996 in order to test for the robustness of the results with the alternative base group choice, and once separately for women and men to check for gender differences.

5 Results

In the previous chapters, I prepared the ground for the empirical analyses to follow here. The tables, which summarise the hypotheses guiding the analyses below, can be found on page 62 for the analyses of the subjective precarity risks (table 2), page 67 for the analyses of the material precarity risks (table 3) and page 72 for the inequality effects of non-standard work (table 4). A detailed description of the data, the sample, the operationalisation, the methods and the analytical strategy can be found in the previous chapter. Here, I will present and discuss the results of the analyses.

Before presenting the results of the models, I will provide a basic descriptive analysis of the main variables being used. Next, I will consecutively present the results of the analysis of a) the heterogeneous subjective precarity risks of first temporary (section 5.2), secondly part-time employment (section 5.4), b) the heterogeneous material precarity risks of first temporary (section 5.6), secondly part-time employment (section 5.8) and c) the effects of temporary and part-time employment on the rise in wage inequality (section 5.10).

5.1 Descriptive statistics of central variables

In table 5, the descriptive statistics of the most relevant variables are displayed once for the year 1995 and once for the year 2017, separately for women and men. Depending on the measurement of the variables, percentages, means or quantile values are shown. Without going into all the details of table 5, I want to highlight some findings that are relevant for the analyses.

Firstly, in both years non-standard employment is substantially more relevant for women than for men, the difference being most pronounced in part-time employment followed by marginal employment. Thus, in 2017 women are nearly ten times more often in part-time employment than men. For temporary employment, the difference is still 17 percent in 2017. These plain differences in relative frequencies already require

that analyses of non-standard work consider gender heterogeneity. For both women and men non-standard work has become more frequent. Interestingly, the steepest increase is measured for men, who work more than four times more often in part-time employment in 2017 compared to 1995. Nonetheless, only five percent of men work part-time in 2017.

Secondly, the proportion of those who worry about their job or expect to have few chances in the labour market of finding a new equivalent job has decreased appreciably from 1995 to 2017 for both women and men. Whereas in 1995 45 percent of all women expressed worries about their job security, 37 percent did so in 2017. This is presumably mostly due to the development of the unemployment rate and similar external factors (Erlinghagen 2010). Therefore, it is possible that the increase in non-standard work did increase the subjective insecurity, but that this was compensated for by falling unemployment rates since 2005. Interestingly, expecting difficulties or no chances of finding a new equivalent job is much more prevalent than worries about the current job. Whereas 41 percent of men worry about their job in 2017, even 68 percent think that it will be difficult to impossible to find a new equivalent one. In addition, women report subjective insecurity consistently less often than men.

Thirdly, the growing inequality in gross hourly wages is clearly visible in the marginal quantile values for both women and men. For men, this development is much more pronounced. Whereas the 15th quantile of the male wage distribution remains quite constant at around ten euros, the median increases by nearly two euros from 15 to 17 euros and the 85th quantile even increases by more than six euros from 23 to 29 euros. For women, the rising inequality is more concentrated in the upper half of the wage distribution: while the 15th quantile increases by slightly less than one euro, the median rises by slightly more than one euro. However, the 85th quantile increases by more than five euros from 18 to 23 euros.

Fourthly, the means of the trade union density and the collective agreement coverage at the level of economic sectors are only displayed for the years 2015 and 2014,

respectively, as they are held constant with those reference years (see section 4.1). While women work slightly more often in sectors with some collective agreement than men, men tend to work in sectors with higher union densities than women. This finding, which at first sight is counter-intuitive, can probably be explained by differing types of collective agreements which range from plant-level agreements to industrial or regional level agreements. It may be that women work more often in sectors with a higher proportion of plant-level agreements or in the public sector which overcompensates for their relatively smaller presence in sectors with industrial agreements.

Fifthly, the occupational non-routine task proportions are also held constant at the values of 2013 (see section 4.1). As expected, women display a substantially larger proportion of interactive non-routine tasks, while men have a slightly higher proportion of manual non-routine tasks. Moreover, women have a slightly higher proportion of analytical non-routine tasks.

Lastly, the indicators for household resources, i.e. the household type and the relative labour income position in the household, reflect the increasing prevalence of single as well as dual earner households. The proportion of single households rose by 37 percent from 19 percent to 26 percent for women and by 30 percent from 21 to 28 percent for men. The average relative labour income position of women increased by 19 percent and approaches an index value of five which means earning half of the household labour income. However, as I am only observing employed women and men, this surely substantially overestimates the population average of women.

Table 5: Descriptives of analytical sample in selected years

	1995		2017 (2015[1], 2014[2], 2013[3])	
	Women (41.84%)	Men (58.16%)	Women (48.1%)	Men (51.9%)
	mean/proportion		mean/proportion	
Temporary employment (%)	7.86	6.23	11.49	9.79
Regular part-time employment (%)	31.89	1.12	40.44	4.96
Marginal employment (%)	6.12	0.61	8.95	1.73
Affective job insecurity (%)	44.92	50.93	37.05	40.50
Cognitive labour market insecurity (%)	75.84	77.49	66.2	67.92
East Germany (%)	19.17	18.2	16.6	17.26
Age (years)	39.93	40.9	44.91	44.45
Education (years)	11.84	12.07	12.83	12.72
Gross hourly wage mean (euro)	14.9	18.47	16.05	19.95
Gross hourly wage 15th quantile (euro)	7.86	10.26	8.52	9.89
Gross hourly wage 50th quantile (euro)	12.34	15.23	13.99	17.03
Gross hourly wage 85th quantile (euro)	17.91	22.58	23.08	29.22
ISEI (scale: 16 – 90)	44.5	44	45.9	46.6
Company size (number of employees)				
Less than 20 (%)	31.99	21.61	24.9	19.44
20-199 (%)	26.72	27.89	24.47	25.34
200-1999 (%)	21.49	22.41	21.81	22.94
2000 or more (%)	19.79	28.09	28.81	32.28
Weekly overtime hours	1.34	2.84	1.54	2.37
Actual weekly working hours	33.21	43.3	32.68	42.39
Tenure (years)	8.46	11.56	10.57	11.96
Full-time equivalent experience (years)	14.1	19	15.72	20.43
Sectoral union density (%)	–	–	12.77	15.3
Sectoral collective agreement rate (%)	–	–	58.04	53.44
Occupational unemployment rate (%)	6.14	6.7	2.43	2.52
Analytical non-routine task proportion (%)	–	–	29.76	26.9
Interactive non-routine task proportion (%)	–	–	18.81	10.55
Manual non-routine task proportion (%)	–	–	19.92	21.82
Relative income position in household (scale: 1 – 10)	3.89	5.53	4.63	5.6

	1995		2017 (2015[1], 2014[2], 2013[3])	
	Women (41.84%)	Men (58.16%)	Women (48.1%)	Men (51.9%)
	mean/proportion		mean/proportion	
Household type				
Single (%)	19.21	21.21	26.25	27.65
w/ partner (%)	42.65	36.22	41.74	39.32
w/ partner and children (%)	32.47	40.96	26.7	31.21
w/ children (%)	5.67	1.61	5.31	1.82
Observations (N)	2,887	3,840	7,329 6,961[1] 7,009[2] 7,985[3]	7,112 6,596[1] 6,624[2] 7,549[3]

Note: Weighted results except for quantile values; 1 labour market insecurity and union density, 2 collective agreement coverage, 3 non-routine task proportions

Source: SOEP v34, LFS, SES 2014, Dengler et al. 2014; Author's calculations

5.2 The heterogeneous subjective precarity risks of temporary employment

In this section, I present and discuss the results of the analyses of the heterogeneity of the subjective precarity risks of temporary employment. Firstly, the analyses of the gender heterogeneity are presented, followed secondly by the analyses of the heterogeneity across vertical labour market positions. Before each part, I concisely recall the hypotheses and the analytical strategy as developed in the previous chapter.

For these analyses, I estimate linear probability fixed effects regression models of affective job insecurity on temporary employment (see section 4.3). I expect that temporary employment increases the affective job insecurity compared to permanent employment, as it lacks by definition the institutional power resources of dismissal protection (hypothesis S-1a). On account of a gendered labour market segmentation, I expect that women are on average more affectively subjected to the threat of temporary employment in the first and second appraisal (hypothesis S-2a). In the context of an unequal dual earner model, women exhibit on average a lower labour market attachment and more financial resources provided by the partner. This should lead to a suppression

of the gender gap in the first and second appraisal. Controlling for the household resources should therefore enlarge the gender gap (hypothesis S-2.1a). Lastly, differences in the labour market power resources between women and men should explain the gender differences in the effect of temporary employment on affective job insecurity. Controlling for employees' structural production power, indicated by ISEI (hypothesis S-2.2a), their structural market power, indicated by the occupational unemployment rate (hypothesis S-2.3a) and their associational power, indicated by the sectoral union density (hypothesis S-2.4a) should therefore reduce the gender gap.

The sample of analysis consists of 38,732 individuals observed on average over five years resulting in 189,153 observations, i.e. person-years. 56,249 observations have been dropped because of missing values on the covariates. The fixed effects estimates rely on 9,741 changes between temporary and permanent employment, consisting of 59 percent changes from temporary to permanent employment and 41 percent changes in the opposite direction, as well as 35,354 changes between subjective insecurity and security, consisting of 52 percent changes from insecurity to security and 48 percent changes in the opposite direction. Thus, for both variables both directions of change are relevant for the analyses below.

In a first step, I estimate the subjective precarity differential between temporary and permanent employment with a concise fixed effects model as in equation (4.1), attempting to approach the causal effect of temporary employment on affective job insecurity. Table 6 displays the estimated effect as well as the predictive margins of the probability of affective job insecurity for temporary and for permanent workers. A temporary contract increases the probability of worrying about one's job by 13.8 percentage points. This effect is significant on the one percent level. The probability of affective job insecurity for permanent workers is estimated to be 49 percent, while the probability of temporary workers is estimated to be 63 percent, the difference being the effect. Thus, as expected in hypothesis S-1a, temporary employment significantly increases the subjective precarity risks by 13.8 percentage points or 28 percent, which is not only statistically significant but a substantial effect.

However, it is not clear whether this effect is driven by changes from temporary to permanent employment *decreasing* the subjective insecurity or by changes from permanent to temporary employment *increasing* it. Therefore, I re-estimate the model once without any observations included in changes from permanent to temporary employment and once without any observations included in opposite changes. In both models, all individuals who change more than two times are excluded. As shown in table 6, each direction of change analysed separately confirms the overall effect of temporary employment. However, changing from a temporary to a permanent contract seems to be more reassuring than changing from a permanent to a temporary contract is concerning. While the first change is estimated to decrease the probability of affective job insecurity by 18 percentage points, the second change increases the probability by eleven percentage points.

Table 6: Average marginal effects of temporary employment on affective job insecurity and predictive margins of temporary and permanent workers

	Total		Changes from temporary to permanent employment		Changes from permanent to temporary employment	
	Average marginal effect	Predictive margins	Average marginal effect	Predictive margins	Average marginal effect	Predictive margins
Temporary employment	0.138*** (25.12)		0.184*** (17.41)		0.108*** (6.37)	
Temporary workers		0.63*** (124.85)		0.659*** (65.69)		0.587*** (36.28)
Permanent workers		0.492*** (1057.93)		0.475*** (912.79)		0.479*** (649.88)
Constant	0.490*** (53.78)		0.485*** (44.44)		0.467*** (44.83)	
Observations (n)	189,153	189,153	161,648	161,648	140,266	140,266

Note: t and z statistics in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$; Fixed effects models w/ cluster-robust standard errors; Controls: regional unemployment rate, company size, actual weekly working hours, weekly overtime hours, tenure, year dummies

Source: SOEP v34; 1995-2017; Author's calculations

In the second step, I focus on a possible **gender gap** in the effect of temporary employment on subjective precarity. In accordance with equation (5.1), an interaction term of gender and temporary employment is added in order to test for gender differences. After that, I endeavour to explain the gap by gender differences in material household and power resources. Therefore, interaction terms with temporary employment and the explaining variables are incrementally added as in equation (6.1) to (9.1) (see also section 4.3 for a methodological discussion of interaction terms in fixed effects models). The results of the models are displayed in table 7.

Most importantly, I find a gender difference in the effect of temporary employment on affective job insecurity which is significant on the one percent level. As expected in hypothesis S-2a, women have a six percentage points higher probability of worrying about their job when being temporarily employed than men. The effect size of temporary employment thus increases by 58 percent for women from a ten percentage points differential between male temporary and male permanent workers to a 16 percentage points differential between female temporary and female permanent workers.

The only other significant covariates are firstly the regional unemployment rate, which increases the probability of affective job insecurity at a very robust rate of one percentage point per every additional percentage point of regional unemployment across all model specifications. Secondly, every additional overtime hour per week decreases the probability of affective job insecurity by 0.2 percentage points. Although this is not a very substantial effect, it points in the expected direction when taking overtime as an indicator for the commitment of the employee and her integration in the company. This effect is also surprisingly stable across all model specifications. Lastly, every additional year of job tenure increases the probability of affective job insecurity by 0.3 percentage points. Although not being substantial, this is a surprising effect, as one would expect that the longer an employee works in a company, the more she would be integrated and the more difficult it is to dismiss her. The effect is also very stable across the model specifications.

When adding the material household resources to the model interacted with temporary employment, hardly anything changes. Only the gender interaction term increases slightly by eleven percent from 6.07 to 6.73 percentage points. This is in line with hypothesis S-2.1a that women's weaker dependence on the job – as a result of a gendered division of work – hides an even larger gender gap in the effect of temporary employment on job insecurity. However, the increase is not very substantial and hardly significant. Either this weaker job attachment of women is not necessarily based on actual income inequalities but on socialised norms and the suppressing effect is underestimated. Or the job attachment is not that different between employed women and men. This seems more likely as, firstly, I am only observing a selected group of women and men who are in employment and thus apparently have a certain need to work. Secondly, the descriptive analysis of the relative labour income position in the household shows a clear tendency towards gender equality among employed women and men.

Accordingly, the coefficients of the material household resource indicators and their respective interaction terms with temporary employment do not show any significant effects on the five percent level. There is no significant difference in the probability of affective job insecurity between those living with a partner or a partner and children and those who live in single households. Only being a single parent seems to entail higher job insecurity compared to childless singles. The model estimates an effect of nearly two percentage points, but is only significant on the ten percent level. This effect should arguably nonetheless be taken seriously, as the small significance could be due to the small number of single parents in the sample, with only around nine percent (8,291 person-years) of the women being single parents and around 2 percent (1,924 person-years) of the men. Moreover, the effect remains very stable across the model specifications. It does not translate, however, into an interaction effect with temporary employment. Temporary employment and being a single parent seem to increase affective job insecurity independently from one another.

Although the main effect of the relative labour income position in the household is not significant, the interaction term with temporary employment is weakly significant at the ten percent level across all models. The weak effect is a hint for the expected relationship that worries about one's job increase with the relevance of the job for the household income when employed temporarily. Or, expressed differently, additional financial resources in the household weaken the effect of temporary employment on subjective precarity risks. Nonetheless, as the indicator is a direct measure of the dependence of the household on the labour income of the respondent, this lack of significance is rather surprising. It raises the question of whether additional financial resources stemming from the household influence the appraisal of temporary employment to a substantial extent, especially in the context of the dual earner regime and a rise in single households. Altogether, the findings suggest the correctness of hypothesis S-2a without providing it with substantial backing.

Next, I add the ISEI index to the model also interacted with temporary employment in order to test whether gendered differences in the vertical labour market position or, from the perspective of power resources theory, structural production power resources can explain the gender gap in the effect of temporary employment on affective job insecurity. While the main effect of the ISEI index is not significantly different from zero, the interaction term with temporary employment is highly significant. For every additional unit on the ISEI score, which means a higher position or more resources, the effect of temporary employment on job insecurity increases by 0.1 percentage points. Considering the scale of ISEI this is a substantial effect. As the analysis of the heterogeneity across ISEI is the focus of the next part, I will not interpret it further at this point. It shall suffice to say here that this does not affect the gender gap, reducing it by only 0.1 percentage points. Apparently, there are no gender differences in the distribution of structural production power resources, which may explain the greater effect of temporary employment on affective job insecurity for women than for men. The raw ISEI means in table 5 already hint at gender equality in this sample. As both education and wage are used to calculate the ISEI index at the occupational level, it may

be that the higher educational attainment of women and the educational level of typically female occupations offsets the preference of men for higher paying occupations. Therefore, I reject hypothesis S-2.2a.

The discovered interaction effect of the ISEI index with temporary employment vanishes, however, when one includes the occupational unemployment rate and its interaction as an indicator for structural market power. Interestingly, the higher affective insecurity of those temporary employees with larger production power resources seems to be due to *lower* occupational unemployment rates. While the main effect of the occupational unemployment rate points in the intuitive direction, stating that every additional percentage point of occupational unemployment raises the affective job insecurity by 0.3 percentage points, the interaction effect is counter-intuitive. According to this, the effect of temporary employment on affective job insecurity *decreases* with higher occupational unemployment rates, even by 0.6 percentage points per every additional percentage point of occupational unemployment.

This result disproves the consideration that temporary employment is seen as more of a threat in the context of high competition among the employees, i.e. when their structural market power is low and the problem of personnel adjustment for employers is less severe. This does not necessarily mean that temporary employment is less of a threat in these occupations, but simply that the psychological coping mechanisms of the employees are more successful. One reason may be that temporary employment is more prevalent in occupations with high unemployment rates and thus a more standard employment form than in occupations with low unemployment rates. Employees therefore may appraise it as less of a threat only because they compare themselves with their colleagues in the same occupation. Conversely, temporary employees in occupations with very few temporary contracts may perceive it as more of a threat, although the actual risk is not as high. Another reason may, however, be that temporary employment in occupations with high unemployment rates poses less of a threat compared to permanent employment because permanent jobs are also not as stable. According to this line of argument, it is the reference category, permanent employment,

which changes its character with rising unemployment rates. For that, the legal dismissal protection would have to lose its relevance with higher unemployment rates.

However, the gender gap in the effect of temporary employment decreases slightly when accounting for differences in occupational unemployment rates. In comparison to before, it does so, however, by only eight percent to 6.1 percentage points, which is still highly significant. As this may be a hint that gender differences in occupational unemployment rates are relevant for the gender gap, it is by no means a substantial or significant change. Therefore, I reject hypothesis S-2.3a.

Lastly, I add the indicator for associational power resources, the sectoral union density, also interacted with temporary employment. Overall, this does not change anything substantially. Accordingly, there is also no effect of union density on affective job insecurity. Nonetheless, the interaction effect with temporary employment is significant. As shown in table 7, the effect of temporary employment on the probability of affective job insecurity increases with every percentage point of union density by 0.3 percentage points. This runs counter to the reasoning that a higher union density indicates a context with more reliability for temporary workers provided by organised labour. However, one can argue in the opposite direction (see section 3.5): apparently, a higher union density indicates a more stable and privileged position for standard permanent employees, which may come at the cost of marginal workers such as temporary employees, thus rendering their situation more precarious. Or a higher union density may simply increase mechanically the difference between temporary and permanent employees by providing a safer context for permanent employees only. In addition, temporary employees may then appraise their employment relationship even more as a threat, as they compare themselves to the high quality standard employment relationships in the sector.

Most importantly, accounting for differences in sectoral union density does not explain the gender gap. Thus, hypothesis S-2.4a is rejected. The interaction effect of temporary employment and gender rather slightly increases from 6.1 to 6.7 percentage points. This

reflects the positive effect of union density on the effect of temporary employment on job insecurity and the lower average union density for women (see table 5). It suppresses the gender gap rather than explaining it.

Table 7: Heterogeneous effects of temporary employment on affective job insecurity across gender with incrementally added contextual factors

	(1)	(2)	(3)	(4)	(5)	(6)
Regional unemployment rate *(centred)*	0.0095*** (7.53)	0.0095*** (7.53)	0.0095*** (7.48)	0.0095*** (7.48)	0.0094*** (7.45)	0.0094*** (7.46)
Temporary employment (TE)	0.1383*** (25.10)	0.1040*** (13.40)	0.1089*** (7.03)	0.1085*** (7.00)	0.1426*** (7.80)	0.1019*** (4.77)
Company size *(reference: less than 20 employees)*						
20-199 employees	0.0037 (0.70)	0.0036 (0.70)	0.0038 (0.74)	0.0039 (0.75)	0.0040 (0.78)	0.0042 (0.81)
200-1999 employees	0.0029 (0.47)	0.0029 (0.47)	0.0033 (0.54)	0.0033 (0.55)	0.0035 (0.57)	0.0038 (0.62)
2000 or more employees	-0.0095 (-1.46)	-0.0095 (-1.46)	-0.0091 (-1.40)	-0.0090 (-1.38)	-0.0089 (-1.38)	-0.0087 (-1.34)
Actual weekly working hours *(centred)*	0.0001 (0.44)	0.0001 (0.36)	0.0002 (0.94)	0.0002 (0.94)	0.0002 (0.93)	0.0002 (0.92)
Weekly overtime hours *(centred)*	-0.0019*** (-4.76)	-0.0019*** (-4.77)	-0.0020*** (-4.86)	-0.0020*** (-4.88)	-0.0020*** (-4.88)	-0.0020*** (-4.86)
Tenure *(centred)*	0.0029*** (6.39)	0.0029*** (6.38)	0.0029*** (6.46)	0.0029*** (6.40)	0.0029*** (6.46)	0.0030*** (6.48)
Interaction of TE and gender *(reference: men)*		0.0607*** (5.65)	0.0673*** (5.80)	0.0663*** (5.72)	0.0610*** (5.21)	0.0668*** (5.64)
Household type *(reference: single)*						
w/ partner			-0.0068 (-0.73)	-0.0066 (-0.71)	-0.0066 (-0.71)	-0.0064 (-0.69)
w/ partner and children			0.0078 (0.83)	0.0081 (0.86)	0.0080 (0.85)	0.0082 (0.87)
w/ children			0.0182* (1.87)	0.0182* (1.86)	0.0185* (1.89)	0.0182* (1.87)
Interaction of TE and household type						
TE – w/ partner			-0.0001 (-0.00)	0.0016 (0.08)	0.0030 (0.16)	0.0019 (0.10)
TE – w/ partner and children			-0.0116 (-0.64)	-0.0087 (-0.48)	-0.0089 (-0.49)	-0.0100 (-0.55)

	(1)	(2)	(3)	(4)	(5)	(6)
TE – w/ children			-0.0127	-0.0096	-0.0108	-0.0100
			(-0.66)	(-0.50)	(-0.56)	(-0.52)
Relative income position in household *(centred)*			-0.0018	-0.0017	-0.0017	-0.0017
			(-1.59)	(-1.57)	(-1.57)	(-1.55)
Interaction of TE and relative income position			0.0044*	0.0047*	0.0048**	0.0046*
			(1.80)	(1.91)	(1.96)	(1.89)
ISEI *(centred)*				-0.0001	0.0002	0.0002
				(-0.64)	(0.88)	(0.91)
Interaction of TE and ISEI				0.0009***	0.0002	0.0002
				(3.02)	(0.59)	(0.45)
Occupational unemployment rate					0.0027***	0.0027***
					(3.28)	(3.28)
Interaction of TE and unemployment rate					-0.0059***	-0.0059***
					(-3.67)	(-3.69)
Sectoral union density						-0.0005
						(-1.21)
Interaction of TE and union density						0.0028***
						(3.61)
Constant	0.4898***	0.4897***	0.4831***	0.4825***	0.4658***	0.4720***
	(53.78)	(53.82)	(42.72)	(42.65)	(37.55)	(34.96)
Observations (n)	189,153	189,153	189,153	189,153	189,153	189,153

Note: t statistics in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$; Fixed effects models w/ cluster-robust standard errors; Controls: year dummies

Source: SOEP v34, LFS, 1995-2017; Author's calculations

As expected, women display a significantly higher vulnerability to the subjective precarity risks of temporary employment compared to men, confirming hypothesis S-2a. This difference is remarkably stable across all model specifications and cannot be explained by differences in household resources, production power resources indicated by the ISEI index, market power resources indicated by occupational unemployment rates or associational power resources indicated by the sectoral union density. Hypotheses S-2.1a to S-2.4a are thus rejected. Interacting the control variables with temporary employment does not change this finding.

Hence, there must be an important difference between women and men which is not part of the models and which affects the effect of temporary employment on affective

job insecurity. This unobserved heterogeneity could potentially contain gender differences in, firstly, the actual threat of temporary employment and, secondly, the coping process. The analyses above show that it is at least highly improbable that the discovered gender difference is due to the secondary appraisal of the coping mechanism, as conceptualised by transactional stress theory. Gender differences in resources which serve for a problem-oriented coping strategy do not seem to be the reason for the gender gap. In the same vein, important differences in job, occupation or individual labour market characteristics, which may account for differences in the threat of temporary employment or its evaluation in the primary appraisal, are also already accounted for in the models.

Thus, assuming that all the relevant factors on the level of the labour market and the household have been considered, there are arguably two explanations left for the gender gap at the level of the first appraisal and at the labour market level. Either there are gendered personality traits which make women feel more insecure than men when facing temporary employment or women suffer a statistical discrimination in the labour market when being temporarily employed.

The first argument is conceivable, as the interaction term with gender re-introduces the variance *between* women and men for the interaction, even though the main effects are only estimated with variance *within* individuals. In order to provide the basis for an ad-hoc evaluation of the first consideration, I test the robustness of the above findings by re-estimating the last model with the Big Five personality traits and an indicator for the willingness to take risks. The Big Five are based on 15 survey questions which are transformed into five latent factors by factor analysis: extraversion, openness, conscientiousness, agreeableness and neuroticism. The risk aversion indicator is a single item where respondents are asked to estimate their personal willingness to take risks on a scale from zero to ten.

As displayed in the first column of table A2 in the Appendix, the results of the last model are reproduced without major changes when re-estimating it without all those

observations which have no values on either the Big Five or the risk willingness indicators. Only the main effect of the occupational unemployment rate becomes insignificant. Adding the personality indicators does not substantially change the coefficients of other variables. Therefore, in table 8 only the coefficients of temporary employment, its interaction with gender and the coefficients of the personality traits and their interactions are displayed.

Personality traits are estimated to have a considerable effect on the probability of affective job insecurity, but none of them change the effect of temporary employment on insecurity. As may intuitively be expected, openness, conscientiousness and risk willingness significantly reduce the probability of affective job insecurity. Agreeableness and neuroticism, in turn, increase it significantly. However, only the interaction term of temporary employment with openness exhibits a weak significance. It indicates a larger effect of temporary employment on job insecurity for open people. Apparently, more open people generally show less affective job insecurity, but are more unsettled by temporary employment than less open people. Most importantly, the gender difference in the effect of temporary employment is not reduced by accounting for differences in the controlled personality traits. The interaction term only exhibits a minor increase of 0.5 percentage points, which is not a significant change. Hence, while this is only a first test, gender differences in personality traits do not seem to be the source of the discovered gender gap.

Table 8: Heterogeneous effects of temporary employment on affective job insecurity across gender with additional controls of gender specific personality traits

	(6)	+ Big Five	+ Risk aversion
Temporary employment (TE)	0.1016***	0.1025***	0.0805**
	(3.53)	(3.52)	(2.43)
Interaction of TE and gender *(reference: men)*	0.0676***	0.0695***	0.0727***
	(4.26)	(4.19)	(4.36)
Extraversion		-0.0031	-0.0027
		(-0.62)	(-0.54)
Interaction of TE and extraversion		-0.0132	-0.0143
		(-1.23)	(-1.33)
Openness		-0.0099**	-0.0100**
		(-2.13)	(-2.15)
Interaction of TE and openness		0.0169	0.0169
		(1.54)	(1.54)
Conscientiousness		-0.0117**	-0.0111**
		(-2.37)	(-2.26)
Interaction of TE and conscientiousness		0.0028	0.0010
		(0.25)	(0.09)
Agreeableness		0.0097**	0.0094**
		(2.14)	(2.07)
Interaction of TE and agreeableness		-0.0166	-0.0154
		(-1.49)	(-1.38)
Neuroticism		0.0227***	0.0225***
		(5.38)	(5.32)
Interaction of TE and neuroticism		0.0031	0.0042
		(0.34)	(0.46)
Risk aversion			-0.0033***
			(-3.50)
Interaction of TE and risk aversion			0.0040
			(1.39)
Constant	0.6216***	0.6241***	0.6407***
	(35.87)	(36.03)	(35.75)
Observations (n)	103,372	103,372	103,372

Note: t statistics in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$; Fixed effects models w/ cluster-robust standard errors; Controls: see table 7, model (6)

Source: SOEP v34, LFS, 2004-2017; Author's calculations

The second possible explanation besides the evaluation of different resource endowments lies in the (anticipated) career interruptions of women after childbirth or a statistical discrimination against potential mothers by employers, which is not due to individual, job or occupation characteristics. As Hipp (2020) points out, women experience manifold disadvantages in the labour market when they are mothers. Previous research documents motherhood wage penalties and fewer chances of promotion due to motherhood. In her experiment, Hipp (2020) was able to show that mothers are less likely to be invited to job interviews in the application process than women without children, while men's fatherhood does not entail any difference in the likelihood of being invited. In the models I already account for parenthood by controlling the household type, which also differentiates between households with and without children. The gender gap in the subjective precarity risks is thus not due to differences between current motherhood and fatherhood.

Nonetheless, it may be that exposure to temporary employment is more risky for women than for men, as temporary contracts may expire during pregnancy or parental leave and the likelihood of receiving a follow-up contract is reduced. In addition, employers may anticipate – rightly or not – a potential motherhood in the foreseeable future which would entail a temporary loss of the employee's labour force and may therefore be more reluctant to transform temporary contracts into permanent ones. This would mean that women are disadvantaged compared to men with regard to their chances of continued and potentially permanent employment after a temporary job because they can potentially become mothers. Possibly, the disadvantages and possible discrimination could also be anticipated by temporarily employed women without being real, resulting in a more negative first appraisal of their position.

In order to empirically test whether this proposition is worth being explored further, I re-estimate the last model in table 9 separately for individuals aged under 40 and those aged 40 and over. If the previous considerations are true, the gender gap should prevail for those who are more likely to become mothers, i.e. women under 40, and vanish for those who are increasingly unlikely to become mothers, i.e. women older than that. The

threshold is set rather arbitrary, but should suffice for a first test. Table 9 shows the coefficients of both models in comparison to the model including all ages. First and foremost, the gender difference of the effect of temporary employment on affective job insecurity decreases substantially. While the differential in the pooled model is – as shown before – around seven percentage points, it reaches nine percentage points for those under 40. For those aged 40 or above, however, the gender differential is 40 percent smaller than for the younger ones and only reaches five percentage points. In line with the potential motherhood discrimination argument, it is particularly younger women who are affected more than men by temporary employment.

However, the results only hint at the explanation of disadvantages or discrimination because of potential motherhood. While the difference between the age groups is substantial, the gender differential is still very significant in the older sample. In addition, there may be other potential explanations for the difference between the age groups. Possibly, men become more subjectively affected by temporary employment when they are older because of their main earner role, which then reduces the gender differential. The gender differential in the effect of temporary employment on affective job insecurity therefore remains an open question for future research.

Table 9: Heterogeneous effects of temporary employment on affective job insecurity across gender separately for age groups

	Age 17 – 65 (full sample)	Age 17 – 39 (young sample)	Age 40 – 65 (old sample)
Regional unemployment rate *(centred)*	0.0094***	0.0107***	0.0089***
	(7.46)	(5.20)	(5.08)
Temporary employment (TE)	0.1019***	0.0875***	0.0971***
	(4.77)	(3.05)	(2.87)
Interaction of TE and gender *(reference: men)*	0.0668***	0.0835***	0.0502***
	(5.64)	(5.24)	(2.81)
Company size *(reference: less than 20 employees)*			
20-199 employees	0.0042	-0.0043	0.0103
	(0.81)	(-0.53)	(1.49)
200-1999 employees	0.0038	-0.0043	0.0033
	(0.62)	(-0.44)	(0.42)
2000 or more employees	-0.0087	-0.0201*	-0.0065
	(-1.34)	(-1.92)	(-0.78)
Actual weekly working hours *(centred)*	0.0002	-0.0004	0.0005
	(0.92)	(-1.26)	(1.61)
Weekly overtime hours *(centred)*	-0.0020***	-0.0013**	-0.0028***
	(-4.86)	(-1.97)	(-5.39)
Tenure *(centred)*	0.0030***	0.0065***	0.0028***
	(6.48)	(6.47)	(5.02)
Household type *(reference: single)*			
w/ partner	-0.0064	0.0108	-0.0099
	(-0.69)	(0.76)	(-0.76)
w/ partner and children	0.0082	0.0061	-0.0369***
	(0.87)	(0.42)	(-2.78)
w/ children	0.0182*	0.0063	-0.0086
	(1.87)	(0.41)	(-0.64)
Interaction of TE and household type			
TE – w/ partner	0.0019	0.0364	-0.0137
	(0.10)	(1.36)	(-0.46)
TE – w/ partner and children	-0.0100	-0.0274	0.0132
	(-0.55)	(-1.15)	(0.44)
TE – w/ children	-0.0100	-0.0044	0.0196
	(-0.52)	(-0.17)	(0.62)
Relative income position in household *(centred)*	-0.0017	0.0035*	-0.0029**
	(-1.55)	(1.93)	(-2.05)
Interaction of TE and relative income position in household	0.0046*	0.0041	0.0031
	(1.89)	(1.15)	(0.90)

	Age 17 – 65 (full sample)	Age 17 – 39 (young sample)	Age 40 – 65 (old sample)
ISEI *(centred)*	0.0002	0.0002	0.0003
	(0.91)	(0.42)	(1.34)
Interaction of TE and ISEI	0.0002	0.0005	-0.0012**
	(0.45)	(0.88)	(-2.21)
Occupational unemployment rate	0.0027***	0.0032**	0.0030***
	(3.28)	(2.31)	(2.85)
Interaction of TE and unemployment rate	-0.0059***	-0.0039*	-0.0103***
	(-3.69)	(-1.75)	(-4.18)
Sectoral union density	-0.0005	-0.0003	-0.0004
	(-1.21)	(-0.42)	(-0.83)
Interaction of TE and union density	0.0028***	0.0037***	0.0025**
	(3.61)	(3.56)	(2.15)
Constant	0.4720***	0.4548***	0.5933***
	(34.96)	(19.94)	(31.30)
Observations (n)	189,153	72,306	116,847

Note: t statistics in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$; Fixed effects models w/ cluster-robust standard errors; Controls: year dummies

Source: SOEP v34, LFS, 1995-2017; Author's calculations

When re-estimating the main models with conditional logit regressions (see section 4.2), the results are reproduced to a very large extent (see table A3 in the Appendix). In particular, the gender gap shows exactly the same structure across models. Only very few changes occur with regard to the coefficients: in the conditional logit models, the main effect of the relative labour income position in the household now has a very significant effect in reducing affective job insecurity. The interaction term of the ISEI index remains significant across all models instead of being confounded by the occupational unemployment rate. By contrast, the interaction term of the occupational unemployment rate never becomes significant. As these changes are not relevant for the interpretation of the main findings, I conclude that the linear probability model is appropriate in this case.

In the third step of the analysis of affective job insecurity, I focus on the heterogeneity of the subjective precarity risks of temporary employment across **vertical labour**

market positions. I expect that the subjective precarity risks of temporary employment decline with higher labour market positions, as the larger structural production power resources allow for problem-based coping strategies (hypothesis S-3a). This may be partly explained by the lower occupational unemployment rates or, expressed differently, the larger market power resources in higher positions (hypothesis S-3.1a). Likewise, differences in associational and institutional power resources – indicated by the sectoral union density and collective agreement coverage – may explain part of the heterogeneity (hypotheses S-3.2a & S-3.3a). Lastly, the higher non-routine task proportions in higher positions may explain part of the heterogeneity, as temporary jobs in occupations with a large transformation problem are more difficult to control for the employer and are more likely used as extended probationary periods (hypothesis S-3.4a).

In order to test these hypotheses, the interaction of temporary employment with the ISEI index is in the focus of the next analyses. As in equation (10.1), I first introduce this interaction to the raw model. Next, according to the hypotheses, I incrementally add the explaining variables also interacted with temporary employment as in equations (11.1) to (14.1). In so doing, I test whether differences in the structural market power, the associational power, the institutional power or the occupational transformation problem can explain the heterogeneity of the subjective precarity risks of temporary employment across vertical labour market positions. In order to account for possible gender differences, the models are estimated separately for women and men.

Beginning with the models only including **women,** I find a main effect of temporary employment on the probability of affective job insecurity of around 16 percentage points in line with the previous models. The control variables exhibit the same stable coefficients as in the models for the gender differential. They are only displayed in table A4 in the Appendix. In table 10, only the coefficients of temporary employment, the ISEI index, the explaining variables and the respective interactions are shown.

While there seem to be no insecurity differences across ISEI, the interaction effect with temporary employment proves very significant. With every unit on the ISEI scale the effect of temporary employment on the probability of affective job insecurity is however *increased* by 0.15 percentage points. The lowest ISEI value 16, for example cleaners, and the highest value 90, representing judges, thus differ in the effect of temporary employment by eleven percentage points. For a more intuitive understanding, the average marginal effects of temporary employment across ISEI are plotted in figure 2. As can be seen in the first panel, the effect of temporary employment nearly doubles from the lowest to the highest vertical labour market position.

Hence, while there is considerable heterogeneity across ISEI, it is in the opposite direction to what I had hypothesised. Hypothesis S-3a is thus rejected for women. The greater amount of structural production power resources accompanying higher positions does not apparently serve as compensating resources in the second appraisal of the psychological coping process of temporary employment, at least for women.

Nonetheless, the significance of the interaction effect vanishes when one adds the occupation unemployment rate and its interaction with temporary employment to the model, confirming hypothesis S-3.1a. As before, the coefficients show that the unemployment rate significantly increases the probability of affective job insecurity, but that it also significantly reduces the effect of temporary employment on it. With every percentage point increase in the unemployment rate, the effect of temporary employment is reduced by 0.8 percentage points. Thus, it seems that temporary employment is a harsher threat for those women in occupations with low unemployment rates than for those in occupations with high unemployment rates.

Again, structural market power resources do not seem to work as a compensation in the *second appraisal* of the coping process. Rather, high occupational unemployment rates or low ISEI values seem to indicate a context in which a temporary contract is seen less of a threat in the *primary appraisal* in comparison to contexts with low unemployment rates and high ISEI values. It may be that in these contexts at the bottom of the vertical

labour market dimension unstable employment relationships are more part of what is perceived as normal, because temporary employment is more common or permanent employment is not stable either. Here, paradoxically, the relative higher prevalence of objective and subjective precarity may lead female temporary workers to assess the temporary character of their contract not as much of an additional threat compared to having a permanent contract. The positive main effect of the unemployment rate also hints at that interpretation. In contrast, a temporary employment at the top end of the vertical labour market segmentation may be more unusual as a situation and therefore raise the subjective insecurity in relation to a permanent contract to a greater extent precisely because the overall level of objective and subjective insecurity may be relatively low.

These considerations also fit the assertion that temporary contracts may be more likely to be used as screening devices in higher labour market positions, while they may be more likely to be used as contractual means to establish a marginal labour force in lower labour market positions. Contrary to my considerations in section 3.5, however, temporary contracts with a screening function seem rather to entail greater subjective insecurity than those used to maintain a marginal labour force. While the overall level of insecurity seems to be higher in low labour market positions, the additional insecurity due to temporary employment seems to be lower.

Accordingly, the main effects of the proportions of non-routine tasks as indicators for the potential to control the employees are all negative, while the interaction effects are all positive. While only the main effect of the proportion of manual non-routine tasks is significant, the interaction effects of analytical and of manual non-routine tasks are both significant. The more manual non-routine tasks women have to do in their jobs, the lower is their subjective insecurity. And the more manual and analytical non-routine tasks women have to do, the harsher is the subjective threat of temporary employment. Assuming that the proportion of non-routine tasks indicates the need for more extensive screening of the employees, this also suggests that temporary employment as a

screening device is particularly worrying for the employees in question, at least in comparison to the equivalent permanent employment.

When one changes the order of adding the explaining variables, it becomes clear that both the occupational unemployment rate as an indicator of structural market power and the proportion of non-routine tasks as indicators for the occupational transformation problem explain the heterogeneity of the subjective precarity risks of temporary employment across vertical labour market positions. Therefore, the results confirm hypotheses S-3.1a and S-3.4a, but under a condition contrary to the one expected.

By contrast, adding the indicators of associational and institutional power resources does not influence the heterogeneity. Hypotheses S-3.2a and S-3.3a are thus rejected. Nonetheless, the interaction terms of the sectoral union density and the sectoral collective agreement coverage with temporary employment are highly significant and point at a mechanism similar to above: the higher the union density and the more extensive the collective agreement coverage, the greater the effect of temporary employment on the probability of affective job insecurity. Apparently, while the overall level of insecurity is reduced by associational and institutional power resources, the effect of temporary employment is higher in contexts of organised labour. Again, this may be a result of a more negative first appraisal, as temporary employment is even more non-standard in these contexts, and of an exclusive focus of unions and agreements on core workers to the detriment of marginal workers.

Table 10: Heterogeneous effects of temporary employment on affective job insecurity across ISEI with incrementally added contextual factors (Women)

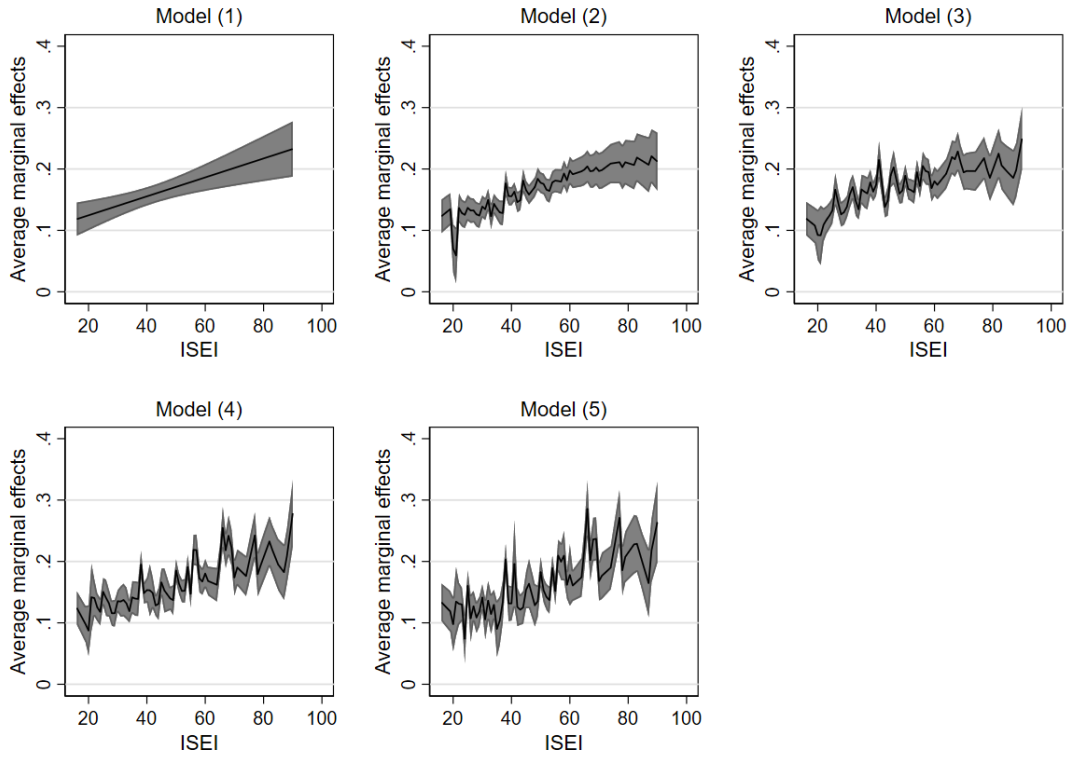
	(1)	(2)	(3)	(4)	(5)
Temporary employment (TE)	0.1618***	0.2030***	0.1474***	0.0793***	-0.0246
	(21.21)	(13.93)	(7.34)	(2.94)	(-0.53)
ISEI *(centred)*	-0.0001	0.0002	0.0002	0.0002	0.0002
	(-0.35)	(0.56)	(0.68)	(0.52)	(0.45)
Interaction of TE and ISEI	0.0015***	0.0006	0.0003	0.0004	0.0002
	(3.43)	(1.13)	(0.64)	(0.76)	(0.19)
Occupational unemployment rate		0.0028*	0.0028**	0.0022	0.0018
		(1.94)	(2.00)	(1.57)	(1.25)
Interaction of TE and unemployment rate		-0.0084***	-0.0088***	-0.0061**	-0.0041
		(-3.30)	(-3.45)	(-2.29)	(-1.50)
Sectoral union density			-0.0008	0.0010	0.0007
			(-1.46)	(1.48)	(1.05)
Interaction of TE and union density			0.0045***	0.0019	0.0032**
			(3.97)	(1.47)	(2.34)
Sectoral collective agreement coverage				-0.0012***	-0.0011***
				(-4.56)	(-3.96)
Interaction of TE and collective agreement coverage				0.0015***	0.0009**
				(3.91)	(2.02)
Analytical non-routine task proportion					-0.0007
					(-1.19)
Interaction of TE and analytical task proportion					0.0020**
					(1.97)
Interactive non-routine task proportion					-0.0005
					(-1.39)
Interaction of TE and interactive task proportion					0.0012*
					(1.77)
Manual non-routine task proportion					-0.0007**
					(-2.08)
Interaction of TE and manual task proportion					0.0015**
					(2.23)
Constant	0.4435***	0.4279***	0.4379***	0.4837***	0.5234***
	(32.11)	(26.16)	(24.25)	(23.54)	(17.30)
Observations (n)	91,876	91,876	91,876	91,876	91,876

Note: t statistics in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$; Fixed effects models w/ cluster-robust standard errors; Controls: regional unemployment rate, company size, actual weekly working hours, weekly overtime hours, tenure, year dummies

Source: SOEP v34, LFS, SES 2014, Dengler et al. 2014; 1995-2017; Author's calculations

Alternatively, looking at the average marginal effects of temporary employment across ISEI values as plotted in figure 2 gives another impression of the extent to which the heterogeneity across vertical labour market positions can be explained by the covariates. While in panel 1 a clear linear relation (by definition of the model) is identifiable, this becomes more fuzzy when further covariates are interacted with temporary employment and thereby influence the marginal effects. However, a positive relation between the ISEI index and the size of the marginal effect of temporary employment can be clearly seen until the last model, which includes all explaining covariates. This hints at a prevailing heterogeneity across vertical labour market positions, which has not yet been explained through the covariates, although the statistical test of a linear interaction with temporary employment is non-significant from panel 2 onwards.

Figure 2: Average marginal effects of temporary employment on affective job insecurity across ISEI (Women)



Note: Fixed effects models w/ cluster-robust standard errors; Controls as in table 10; Incrementally added contextual factors: occupational unemployment rate (2), sectoral union density (3), sectoral collective agreement coverage (4), non-routine task proportions (5); Grey area displays 95% confidence intervals

Source: SOEP v34, LFS, SES 2014, Dengler et al. 2014; 1995-2017; Author's calculations

The same analysis is applied to the **men** in the sample. The results are displayed in table 11 without the coefficients of the control variables, which do not change for men either and are thus stable across all models (see table 5 in the Appendix).

The coefficients of the explaining variables relevant to women are the same for men. While the occupational unemployment rate increases the risk of affective job insecurity, it reduces the effect of temporary employment on it. In turn, the proportion of analytical non-routine tasks decreases the risk of insecurity, while it increases the effect of temporary employment on it. With every percentage point of the unemployment rate the

effect decreases by 0.4 percentage points. And with every percentage point of the proportion of analytical non-routine tasks the effect increases by 0.3 percentage points. However, in contrast to the results for women, only the interaction effect of the analytical tasks is significant and the interaction effects of both the union density and the collective agreement rate are not significant. The last finding is particularly interesting. Apparently, female temporary workers are, at least subjectively, particularly disadvantaged in contexts of a high organisation of labour, while male temporary workers are not. This may be due to a certain discrimination against women in contexts of high levels of organised labour, which tend to be male-dominated, possibly by both the workers' institutions and those of the employers. Likewise, women may more often belong to the marginal labour force than to the core labour force.

Most importantly, however, I do not find any heterogeneity across vertical labour market positions for men in the first model. Only when controlling for the proportion of non-routine tasks and the occupational unemployment rate does the interaction effect of ISEI with temporary employment become significant. Interestingly, it then has a significant negative coefficient, revealing that the effect of temporary employment on affective job insecurity becomes weaker by 0.2 percentage points with every unit increase on the ISEI scale. These findings suggest that, in line with hypothesis S-3a, temporary employment seems to be more detrimental for lower labour market positions, while being less of a threat for higher labour market positions, however only when the task composition and the occupational unemployment rate is held constant.

Considering that the unemployment rate and task composition have the same effects as for women, this may suggest that for men higher vertical labour market positions do indeed mean more (production power) resources for the second appraisal of the coping process, at least when the relatively higher subjective threat of temporary employment in contexts of low unemployment rates and low control potential is accounted for. Expressed differently, higher labour market positions seem to be accompanied by a higher perceived threat from temporary employment in the first appraisal – mediated by the unemployment rate and the non-routine task proportions – but entail more resources

to cope with the threat in the second appraisal. Only accounting for the ISEI index without controlling for the unemployment rate and the task composition may mix both contradicting effects and therefore shows no significant effect. Thus, hypothesis S-3a, stating the heterogeneity of the subjective precarity risks of temporary employment across the vertical labour market segmentation, is confirmed by the results under different conditions than expected while hypotheses S-3.1a to S-3.4a, stating that this heterogeneity can be explained by differences in power resources and the task composition, are rejected.

The question remains, however, as to why this relationship was not previously reproduced for women in the models. Somehow, the relatively higher subjective threat of temporary employment in the first appraisal seems to predominate for women, while the production power resources stemming from a high labour market position do not seem to come into effect in the second appraisal. One explanation may be that the gender differential found above in the subjective precarity risks of temporary employment outweighs the effect of the vertical labour market position, thus generally attenuating the risks. Disadvantages of or discrimination against potential mothers in the retention of temporary employees may be more relevant than the labour market position for the coping process of women. These are, however, only initial considerations of the difference that has been found and would require further research.

Table 11: Heterogeneous effects of temporary employment on affective job insecurity across ISEI with incrementally added contextual factors (Men)

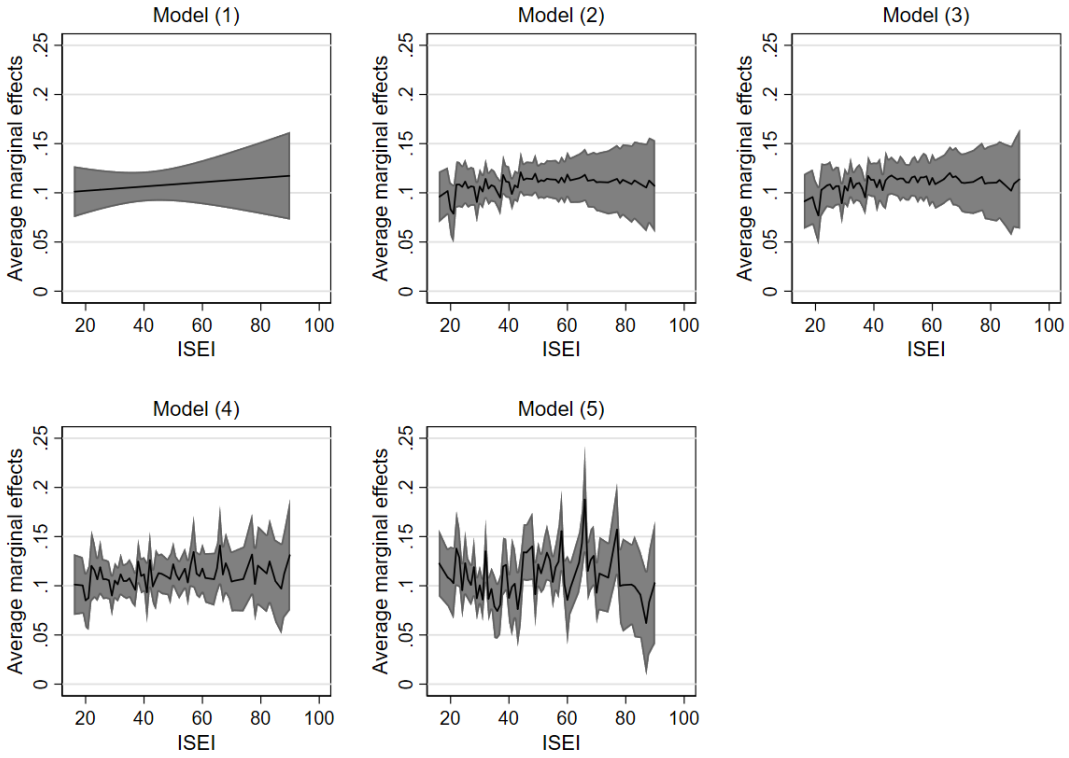
	(1)	(2)	(3)	(4)	(5)
Temporary employment (TE)	0.1073***	0.1321***	0.1202***	0.0939***	0.0208
	(13.59)	(9.11)	(5.59)	(3.28)	(0.51)
ISEI *(centred)*	-0.0001	0.0002	0.0002	0.0002	0.0006*
	(-0.54)	(0.71)	(0.70)	(0.77)	(1.80)
Interaction of TE and ISEI	0.0002	-0.0003	-0.0003	-0.0005	-0.0018**
	(0.50)	(-0.63)	(-0.59)	(-0.88)	(-2.15)
Occupational unemployment rate		0.0028***	0.0028***	0.0028***	0.0028***
		(2.71)	(2.70)	(2.74)	(2.67)
Interaction of TE and unemployment rate		-0.0042**	-0.0042**	-0.0042**	-0.0042**
		(-2.09)	(-2.06)	(-2.06)	(-2.01)
Sectoral union density			-0.0001	0.0004	0.0003
			(-0.22)	(0.79)	(0.55)
Interaction of TE and union density			0.0008	0.0003	0.0006
			(0.74)	(0.26)	(0.48)
Sectoral collective agreement coverage				-0.0006**	-0.0006**
				(-2.38)	(-2.16)
Interaction of TE and collective agreement coverage				0.0006	0.0004
				(1.39)	(0.75)
Analytical non-routine task proportion					-0.0011**
					(-2.45)
Interaction of TE and analytical task proportion					0.0030***
					(2.82)
Interactive non-routine task proportion					-0.0003
					(-0.72)
Interaction of TE and interactive task proportion					-0.0008
					(-0.93)
Manual non-routine task proportion					-0.0006**
					(-2.39)
Interaction of TE and manual task proportion					0.0007
					(1.43)
Constant	0.5291***	0.5108***	0.5125***	0.5380***	0.5798***
	(42.68)	(36.15)	(32.22)	(27.98)	(23.95)
Observations (n)	97,277	97,277	97,277	97,277	97,277

Note: t statistics in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$; Fixed effects models w/ cluster-robust standard errors; Controls: regional unemployment rate, company size, actual weekly working hours, weekly overtime hours, tenure, year dummies

Source: SOEP v34, LFS, SES 2014, Dengler et al. 2014; 1995-2017; Author's calculations

Looking at the average marginal effects of temporary employment on affective job insecurity across ISEI in figure 3 provides some further understanding of the results. As can be seen in the first panel, the first model estimates slightly increasing average marginal effects across ISEI. The confidence intervals largely overlap, however, for all marginal effects, hinting again at the non-significance of the increase. Adding the occupational unemployment rate in panel 2 causes the average marginal effects to vary to a greater extent between the ISEI values and reverses the increasing trend for the second half of the ISEI distribution to a very slight decrease by depressing the marginal effects for the highest ISEI values. Adding the sectoral union density and collective agreement coverage in panels 3 and 4 mainly renders the distribution of the average marginal effects fuzzier. Lastly, adding the occupational proportions of non-routine tasks both slightly increases the marginal effects of those with the lowest labour market positions and decreases the marginal effects of those with the highest labour market positions, but with a considerable variation of the effects in between. Interestingly, the two highest peaks in panel 5 of figure 3 located in the second half of the ISEI distribution are found at the ISEI values 66 and 77, which predominantly identify primary and special education teachers as well as university and college lecturers. The latter are indeed a special case, because they have a very high level of education, but at the same time are especially affected by temporary employment due to special legislation extending the legally possible use of temporary contracts (section 2.1; WissZeitVG 2017). Beyond a linear heterogeneity across ISEI, there seems to be considerable variation on the occupational level, which exceeds the complexity of the models for both women and men (figures 2 and 3).

Figure 3: Average marginal effects of temporary employment on affective job insecurity across ISEI (Men)



Note: Fixed effects models w/ cluster-robust standard errors; Controls as in table 11; Incrementally added contextual factors: occupational unemployment rate (2), sectoral union density (3), sectoral collective agreement coverage (4), non-routine task proportions (5); Grey area displays 95% confidence intervals

Source: SOEP v34, LFS, SES 2014, Dengler et al. 2014; 1995-2017; Author's calculations

Repeating the same analyses with conditional logit models instead of linear probability fixed effects models reveals largely the same coefficient structure (see tables A6 and A7 in the Appendix). Again, assuming a linear probability distribution seems sufficiently appropriate. Only two important differences need to be considered. Firstly, the interaction effect of ISEI with temporary employment for women only becomes insignificant when controlling for the occupational unemployment rate *and* the sectoral union density. This does not, however, change the interpretation above that temporary employment is especially a subjective threat when the context is shaped by relatively safe permanent jobs. Secondly, the interaction effect of ISEI with temporary

employment for men never becomes significant in the conditional logit models, not even in the full specification. This raises further doubt about the heterogeneity of the subjective precarity risks of temporary employment across ISEI for men (hypothesis S-3a) as well as about the resources employees can draw from high vertical labour market positions in order to attenuate the risks of temporary employment.

5.3 Intermediate summary I

The aim of this section was to analyse the heterogeneity of the subjective precarity risks of temporary employment across gender and vertical labour market positions. As expected, I find a substantial and highly significant effect of temporary employment on affective job insecurity of 13.8 percentage points. This holds true for both types of change between permanent and temporary employment, suggesting that changing from permanent to temporary employment *increases* job insecurity, while changing form temporary to permanent employment *decreases* it.

Secondly, the hypothesised gender gap is confirmed. The models show a significantly greater effect of temporary employment for women of six percentage points. While temporary employment raises the subjective precarity risks of men by ten percentage points, it does so by 16 percentage points in the case of female temporary workers. This gender gap in the subjective precarity risks of temporary employment is stable across all model specifications and basically unchanged by controlling for gendered differences in the material household resources, the structural production, the structural market and the associational power resources. While the on average greater financial resources of women provided by the partner slightly attenuate the detrimental effect of temporary employment, this mechanism is by no means substantial. Checking the robustness of the results by accounting for gender differences in personality traits does not change the gender gap that has been found. In order to check for disadvantages of or discrimination against potential mothers, the models are re-estimated separately for employees under the age of 40 and for employees aged 40 or over. The gender gap in the subjective precarity risk of temporary employment is indeed substantially smaller for the older

employees, for whom a new motherhood is unlikely, while it reaches as much as nine percentage points for those under 40.

Thirdly, a heterogeneity of the subjective precarity risks across vertical labour market positions is only confirmed for female employees. However, contrary to the hypothesis, the effect of temporary employment becomes *greater* with higher ISEI values. Apparently, the greater structural production power resources of higher positions cannot be used by temporary employees for a problem-oriented coping process for the threat of temporary employment in the second appraisal. Rather, temporary employment seems to be assessed in the first appraisal as a greater threat in higher labour market segments. This may be due to the fact that temporary employment deviates more from the norm in these segments where permanent employment relationships may be more common and more stable than in lower labour market segments. As temporary employees presumably assess the threat of their contract condition in comparison to other employees in the same segment, this may lead to higher subjective precarity risks.

This is further supported by the coefficients of the other contextual variables. While in the context of low occupational unemployment rates the overall insecurity level is lower, the unsettling effect of temporary employment is higher. For women, a higher sectoral union density and collective agreement coverage entail less subjective precarity in general, but also greater subjective precarity risks due to temporary employment. And higher occupational proportions of non-routine tasks tend to reduce the subjective precarity while at the same time enlarging the subjective risks of temporary employment. Hence, in the context of more stable permanent jobs, temporary employment seems to be particularly perceived as a threat. This is not compensated for by the greater power resources of temporary employees in these contexts. Only for men do I find a hint that the structural production power resources of higher positions attenuate the subjective effect of temporary employment in the second appraisal, which is, however, not confirmed by the results of the conditional logit models. A relative assessment of the threat of temporary employment in the first appraisal of the coping process seems to predominate over the second appraisal accounting for the resources.

Table 12: Summary of the hypotheses and results for the subjective precarity risks of temporary employment

Temporary employment			
Hypotheses			**Results**
Temporary employment increases the subjective precarity risks *(S-1a)*			Confirmed
Gender	Women more affected *(S-2a)*		Confirmed
Household resources	increase *(S-2.1a)*	Gender gap	Not confirmed – but weak evidence
Production power	decreases *(S-2.2a)*		Not confirmed
Market power / Personnel adjustment problem	decreases *(S-2.3a)*		Not confirmed
Associational power	decreases *(S-2.4a)*		Not confirmed
Vertical labour market position	Higher positions less affected *(S-3a)*		Not confirmed for women – higher positions are *more* affected; Not confirmed for men – only weak evidence in final model;
Market power / Personnel adjustment problem	decreases *(S-3.1a)*	Heterogeneity across labour market positions	Confirmed for women; Not confirmed for men
Associational power	decreases *(S-3.2a)*		Not confirmed for either women or men
Institutional power	decreases *(S-3.3a)*		Not confirmed for either women or men
Transformation problem	decreases *(S-3.4a)*		Not confirmed for either women or men
Affective job insecurity			

Source: Author's table

5.4 The heterogeneous subjective precarity risks of part-time employment

Analogously to the analyses of the heterogeneity of the subjective precarity risks of temporary employment, I now turn to part-time work as the second indicator for non-standard employment. As in the previous section, I will first look at the gender heterogeneity of the subjective precarity risks of part-time employment. Next, I will focus on the heterogeneity across vertical labour market positions separately for women and men. Each part will be preceded by a concise summary of the hypotheses and models.

As explained in section 4.1, the indicator for subjective precarity risks in this case is the cognitive labour market insecurity in order to reflect the specific risks associated with part-time employment. In contrast to temporary employment, it does not inherently entail an end date of the employment, but the reduced hours defining part-time employment may weaken further employment chances. Therefore, instead of worries about the current job, the perceived likelihood of finding equivalent employment in the labour market, i.e. cognitive labour market insecurity, is used as an indicator for the subjective precarity risks.

I expect that part-time employment results in higher subjective precarity risks by a worse first appraisal, as part-time working is often still a stigma in the view of employers, entails fewer job experiences and may entail a weaker integration in the company. Further, I expect that part-time employment increases the subjective precarity risks more for male than for female employees. In the context of the unequal dual earner model, part-time employment should be a greater stigma for men than for women, who are also defined by their role of family carers. Controlling for the actual financial relevance of the labour income should decrease the gap, as the greater financial responsibility of men on average is then accounted for. Due to the gendered labour market segmentation, men should, however, have greater resources for coping with the threat of part-time employment in a problem-oriented way in the second appraisal, thus reducing their final assessment of part-time as a threat to further employability. These resources should therefore suppress the gender gap, and controlling for them is expected to increase the gender differential in the subjective precarity risks of part-time employment to the detriment of the male employees.

The sample for the analyses below consists of 33,648 individuals observed on average over nearly five years, resulting in 158,492 person-year observations. In total 86,910 observations have been excluded due to missing values. As labour market insecurity was only measured until 2015, 27,110 observations from 2016 and 2017 have been excluded. In the sample I observe 8,409 changes between part-time and full-time employment, of which 46 percent are changes from part-time to full-time and 54 percent

are changes from full-time to part-time. For the dependent variable I observe 18,611 changes between labour market security and insecurity, consisting of around 48 percent changes from subjective insecurity to security and 52 percent changes in the opposite direction. The analyses hence cover all possible directions of change quite equally.

In the first step, I estimate the mean effect of part-time employment on labour market insecurity in order to construct the basis for the further analyses of its heterogeneity. Therefore, a simple fixed effects model as in equation (4.2) is employed in order to approximate the causal effect of part-time employment. For a detailed description of the control variables, see section 4.1. In table 13, the discrete marginal effect of part-time employment on the probability of cognitive labour market insecurity is displayed along with the predictive margins of the probability of labour market insecurity for part-time and for full-time workers. As before, asymmetric effects are estimated for each direction of change in the independent variable and the results are also displayed in table 13.

First, the effect of part-time employment on the probability of labour market insecurity amounts to only 0.2 percentage points and is not significant. The asymmetric effects are also insignificant. Both part-time and full-time employees show a risk of 77 percent of labour market insecurity. Apparently, regular part-time employment does not entail a subjective precarity risk compared to full-time employment at the mean, at least when measured as labour market insecurity differentials. Hypothesis S-1b is thus rejected.

Table 13: Average marginal effects of part-time employment on cognitive labour market insecurity and predictive margins of part-time and full-time workers

	Total		Changes from part-time to full-time employment		Changes from full-time to part-time employment	
	Average marginal effect	Predictive margins	Average marginal effect	Predictive margins	Average marginal effect	Predictive margins
Part-time employment	0.002 (0.32)		0.008 (1.358)		0.004 (0.526)	
Part-time workers		0.775*** (179.82)		0.784*** (161.7)		0.79*** (149.52)
Full-time workers		0.773*** (651.88)		0.776*** (592.49)		0.787*** (548.79)
Constant	0.638*** (76.231)		0.644*** (65.727)		0.655*** (69.098)	
Observations (n)	158,492	158,492	134,538	134,538	117,075	117,075

Note: t and z statistics in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$; Fixed effects models w/ cluster-robust standard errors; Controls: regional unemployment rate, company size, marginal employment, weekly overtime hours, tenure, year dummies

Source: SOEP v34; 1995-2015; Author's calculations

Nonetheless, in the second step I estimate interacted fixed effects models according to equation (5.2) in order to analyse potential **gender** differentials in the subjective precarity risks of temporary employment. While I do not find any mean effect of part-time employment, it may still be the case that women and men have opposite effects which suppress each other. Therefore, first an interaction of part-time employment with gender is added to the model according to hypothesis S-2b. Secondly, the explaining variables according to hypotheses S-2.1b to S-2.4b are added, respectively interacted with part-time employment as in equations (6.2) to (9.2).

However, while the models reveal that women have a 2.4 percentage points lower subjective precarity risk related to part-time employment, this is only significant at the ten percent level. Controlling for gender differences in power resources in the subsequent models does not change anything. The magnitude and the significance of the gender difference are stable across all model specifications. As the other coefficients

will be discussed in the next step, I only include the results table in the Appendix (see table A8 in the Appendix). The conditional logit models confirm these results (see table A9 in the Appendix). Despite the hint that men may have a greater subjective precarity risk from part-time employment than women, I reject hypothesis S-2b on account of the lack of significance.

In fact, the models reveal that only men show weak subjective precarity risks of part-time employment. In order to check these underlying main effects of the weak gender difference that has been found, I re-estimate the first plain fixed effects model of equation (4.2) for women and men separately. The results are displayed in table 14. Women show a very small negative effect that is not significantly different from zero. Conversely, for men the models estimate a small positive effect of around two percentage points, which is significant only at the ten percent level. The difference between these two point estimates corresponds to the gender difference found above of 2.4 percentage points. As the standard errors for men may be driven by the lack of changes between part-time and full-time employment – 1,164 changes between 1995 and 2015 compared to 7,245 changes for women – it may be the case that only men suffer on the mean subjective precarity risks by working part-time, while women do not. However, even if the effect was significant it would still be a relatively small effect compared to the absolute levels of subjective labour market insecurity – which is 80 percent for male part-timers and 78 percent for male full-timers – and to the effect of temporary employment on affective job insecurity.

Table 14: Average marginal effects of part-time employment on cognitive labour market insecurity and predictive margins separately for women and men

	Total		Women		Men	
	Average marginal effect	Predictive margins	Average marginal effect	Predictive margins	Average marginal effect	Predictive margins
Part-time employment	0.002 (0.32)		-0.002 (-0.303)		0.022* (1.800)	
Part-time workers		0.775*** (179.82)		0.765*** (211.53)		0.802*** (66.87)
Full-time workers		0.773*** (651.88)		0.767*** (305.08)		0.78*** (2182.78)
Constant	0.638*** (76.231)		0.642*** (49.987)		0.642*** (57.106)	
Observations (n)	158,492	158,492	77,725	77,725	80,767	80,767

Note: t and z statistics in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$; Fixed effects models w/ cluster-robust standard errors; Controls: regional unemployment rate, company size, marginal employment, weekly overtime hours, tenure, year dummies

Source: SOEP v34; 1995-2015; Author's calculations

In the third step of analysing the subjective precarity risks of part-time employment, I focus on their heterogeneity across the **vertical labour market segmentation**. Contrary to my expectations regarding the subjective precarity risks of temporary employment, I expect that the risks of part-time employment are greater for those in higher positions as the career and performance orientation in these segments is more pronounced and thus part-time employment is an even clearer deviation from the norm. Likewise, I expect that structural market, associational and institutional power resources help in coping with the threat of reduced employability by part-time employment in the second appraisal. As higher positions are expected to have more resources at their disposal, their subjective precarity risks of part-time employment should be reduced by these resources. The heterogeneity rooted in the first appraisal should thus be suppressed. Therefore, I expect that controlling for these resources increases the heterogeneity across vertical labour market positions. As jobs with high proportions of non-routine tasks and therefore a large transformation problem should be predominantly found in

higher segments, I expect that controlling for them will partly explain the heterogeneity of the subjective precarity risks of part-time employment across vertical labour market positions.

For testing these considerations, an interaction term of part-time employment with ISEI is added to the model as in equation (10.2). In order to explain the potential heterogeneity across ISEI in that case, the explaining variables interacted with part-time employment are incrementally added to the model as in equations (11.2) to (14.2). These analytical steps are conducted separately for women and men.

The results of the models for **women** are displayed in table 15. As before, part-time employment does not have a significant effect on the probability of labour market insecurity. As with the models regressing affective job insecurity, the regional unemployment rate exhibits a very stable and significant effect on the probability of cognitive labour market insecurity across all specifications of around 1.3 percentage points. Working in larger companies with more than 200 employees also significantly increases the perceived difficulty of finding an equivalent job by two to three percentage points compared to small companies with less than 20 employees. This is stable across all models as well as the coefficients of the other job characteristics: the probability of labour market insecurity decreases with every overtime hour by 0.3 percentage points. Every year of tenure increases the probability of subjective labour market insecurity by slightly less than 0.2 percentage points. Finally, marginal employment significantly decreases the probability of labour market insecurity by as much as five to six percentage points.

Basically, there are two conceivable mechanisms through which these job characteristics could influence cognitive labour market insecurity: either by shaping the reference of the equivalent job, which is used as a benchmark, or by affecting how much experience and skills the employees can acquire in the job, which are also valuable for other employers. Considering the found coefficients, larger companies may both raise the requirements for an equivalent job as well as entail more company-

specific job experience. Working a large number of overtime hours may both lower the requirements for a new job as well as provide more experience useful for the job search. A long tenure may indicate both a stable job and an advanced internal career, thereby raising the benchmark, as well as a dominance of company-specific skills in relation to general skills, thereby reducing the perceived chances in the labour market. Lastly, marginal employment may considerably lower the benchmark for an equivalent job to such an extent that the reported labour market insecurity is substantially decreased.

In the first model with ISEI, a one unit rise on ISEI increases labour market insecurity by 0.1 percentage points. Apparently, employees in higher labour market positions assess that it is more difficult to find an equivalent job, which again may be due to their higher benchmark or increasingly specific skills, which reduce the amount of potential jobs. In addition, as expected, ISEI significantly increases the subjective precarity risks of part-time employment. Hypothesis S-3b, that higher labour market positions suffer higher subjective precarity risks from part-time employment, is thus confirmed. However, its relatively small size of 0.08 percentage points hints at a rather weak heterogeneity. In total, the effect of part-time employment differs by around five percentage points between the lowest and the highest labour market position. As can be seen in panel 1 of figure 4, the female part-timers in the lowest positions – for example cleaners – even consider themselves less insecure than their permanent counterparts, while the highest positions – for example judges or physicians – suffer significant subjective precarity risks from part-time employment of around three percentage points.

Adding the occupational unemployment rate indicating the structural market power resources or the employers' personnel adjustment problem does not change the interaction effect. Hypothesis S-3.1b is thus rejected. The main effect of the unemployment rate and the interaction term with part-time employment are not quite significant. Hence, the influence of the structural market power resources is surprisingly too small to become statistically significant.

Adding the indicators for associational and institutional power resources to the model also does not change the interaction of ISEI with part-time employment. Thus, hypotheses S-3.2b and S-3.3b are rejected as well. Accordingly, the only significant result shows that a higher sectoral union density increases the probability of labour market insecurity by around 0.2 percentage points. Being employed in a sector with a high union density, indicating large associational power resources, apparently means few subjective chances of finding a new equivalent job. This may be due to the relatively high quality of these jobs raising the benchmark for any potential new job. Likewise, these sectors are rather shaped by long-term stable employment relationships with little fluctuation. Paradoxically, this seems to increase the subjective precarity risk when measured as labour market insecurity, since the jobs are considered to be more stable, but finding a new equivalent job is seen as relatively difficult.

Lastly, adding the occupational proportions of the non-routine tasks as indicators of the employers' transformation problem decreases the significance of the interaction term of ISEI with part-time employment, which is then no longer significant at the five percent level, but only at the ten percent level. Hypothesis S-3.4b is thus confirmed when only looking at the significance. However, the *t* value decreases only slightly, and the magnitude of the effect remains stable. I am therefore cautious in claiming that the occupational task proportions explain the heterogeneity of the subjective precarity risks. While none of the interaction effects of the task proportions with part-time employment are significant, the main effects suggest that the proportion of interactive and of manual non-routine tasks decreases the probability of labour market insecurity. Apparently, these task types are linked with more general skills that can be used effectively in the job search and may be more prevalent in labour market segments with high fluctuations.

Table 15: Heterogeneous effects of part-time employment on cognitive labour market insecurity across ISEI with incrementally added contextual factors (Women)

	(1)	(2)	(3)	(4)	(5)
Regional unemployment rate *(centred)*	0.0127***	0.0127***	0.0128***	0.0128***	0.0129***
	(8.14)	(8.14)	(8.22)	(8.19)	(8.26)
Part-time employment (PTE)	-0.0027	-0.0083	-0.0144	0.0003	0.0085
	(-0.44)	(-0.79)	(-1.02)	(0.02)	(0.27)
ISEI *(centred)*	0.0011***	0.0008***	0.0008***	0.0009***	0.0001
	(4.02)	(2.67)	(2.66)	(2.71)	(0.16)
Interaction of PTE and ISEI	0.0008**	0.0009**	0.0009**	0.0008**	0.0010*
	(2.43)	(2.43)	(2.28)	(2.25)	(1.88)
Company size *(reference: less than 20 employees)*					
20-199 employees	0.0069	0.0069	0.0051	0.0051	0.0046
	(0.97)	(0.97)	(0.71)	(0.71)	(0.65)
200-1999 employees	0.0217**	0.0219***	0.0191**	0.0191**	0.0191**
	(2.57)	(2.59)	(2.27)	(2.27)	(2.27)
2000 and more employees	0.0325***	0.0325***	0.0295***	0.0295***	0.0293***
	(3.73)	(3.74)	(3.39)	(3.39)	(3.37)
Weekly overtime hours *(centred)*	-0.0020***	-0.0020***	-0.0020***	-0.0020***	-0.0019***
	(-3.22)	(-3.23)	(-3.16)	(-3.14)	(-3.05)
Marginal employment	-0.0564***	-0.0560***	-0.0551***	-0.0539***	-0.0519***
	(-5.16)	(-5.12)	(-5.01)	(-4.89)	(-4.71)
Tenure *(centred)*	0.0016**	0.0016**	0.0016**	0.0016**	0.0016**
	(2.39)	(2.41)	(2.40)	(2.45)	(2.40)
Occupational unemployment rate		-0.0024*	-0.0024*	-0.0021*	-0.0016
		(-1.89)	(-1.87)	(-1.66)	(-1.22)
Interaction of PTE and unemployment rate		0.0011	0.0012	0.0007	0.0006
		(0.69)	(0.72)	(0.42)	(0.37)
Sectoral union density			0.0020***	0.0014**	0.0012*
			(3.52)	(2.13)	(1.78)
Interaction of PTE and union density			0.0005	0.0011	0.0010
			(0.70)	(1.27)	(1.15)
Sectoral collective agreement coverage				0.0003	0.0004
				(1.36)	(1.42)
Interaction of PTE and collective agreement coverage				-0.0003	-0.0003
				(-1.24)	(-0.99)
Analytical non-routine task proportion					0.0010*
					(1.87)
Interaction of PTE and analytical task proportion					-0.0001
					(-0.11)
Interactive non-routine task proportion					-0.0011***
					(-2.91)

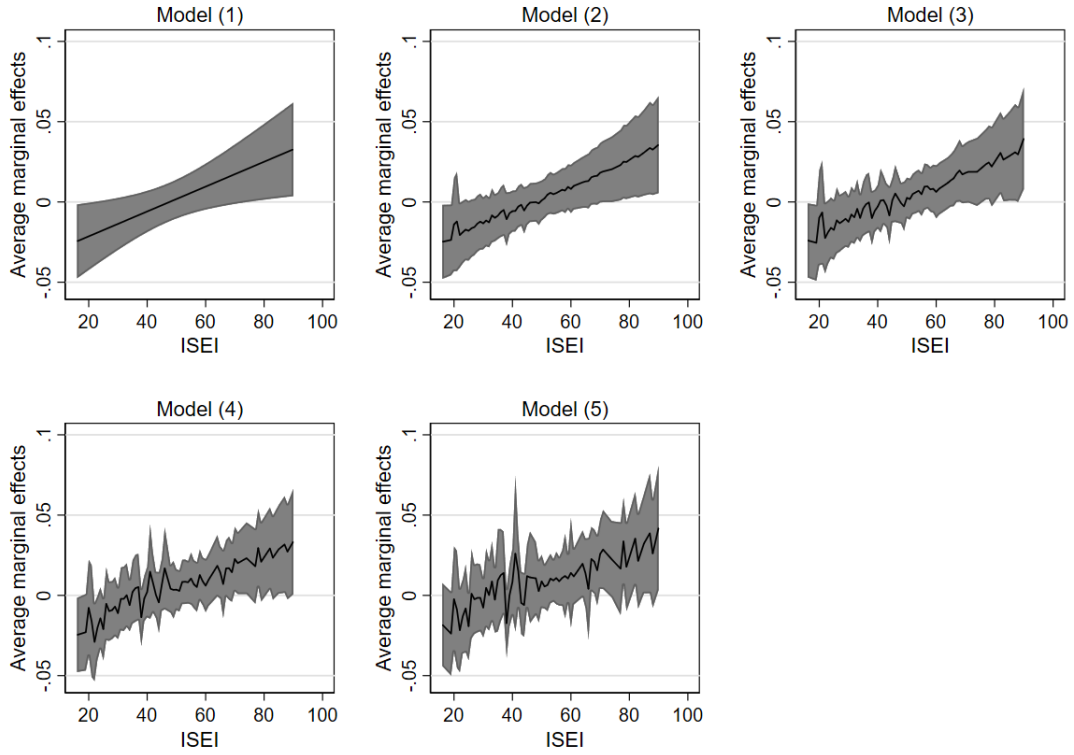
	(1)	(2)	(3)	(4)	(5)
Interaction of PTE and interactive task proportion					-0.0004 (-0.95)
Manual non-routine task proportion					-0.0010*** (-2.98)
Interaction of PTE and manual task share					0.0001 (0.19)
Constant	0.6415*** (49.91)	0.6559*** (44.06)	0.6307*** (38.31)	0.6169*** (32.36)	0.6259*** (22.45)
Observations (n)	77,725	77,725	77,725	77,725	77,725

Note: t statistics in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$; Fixed effects models w/ cluster-robust standard errors; Controls: year dummies

Source: SOEP v34, LFS, SES 2014, Dengler et al. 2014; 1995-2015; Author's calculations

As before, figure 4 plots the average marginal effects of part-time employment on the probability of cognitive labour market insecurity across vertical labour market positions, i.e. ISEI, for female employees. The tendency found above of increasing subjective precarity risks with increasing labour market positions can easily be seen in the plots through all panels, including the last one, which additionally controls for the occupational transformation problem. Incrementally adding the explaining variables does not substantially change the pattern.

Figure 4: Average marginal effects of part-time employment on cognitive labour market insecurity across ISEI (Women)



Note: Fixed effects models w/ cluster-robust standard errors; Controls as in table 15; Incrementally added contextual factors: occupational unemployment rate (2), sectoral union density (3), sectoral collective agreement coverage (4), non-routine task proportions (5); Grey area displays 95% confidence intervals

Source: SOEP v34, LFS, SES 2014, Dengler et al. 2014; 1995-2015; Author's calculations

Regarding **men,** the results are very similar but more pronounced (see table 16). To begin with, the coefficients of the control job characteristics are similar to those of the female sample except for the company size, which does not reveal any significant effect. Most importantly, however, the male interaction term of part-time employment with ISEI is also highly significant and even greater than the one for women. The subjective precarity risk of male part-timers increases by 0.2 percentage points with every additional value on ISEI, showing a total difference of nearly 15 percentage points between the lowest and the highest labour market positions (see also panel 1, figure 5). Hypothesis S-3b is thus confirmed. Apparently, part-time employment only

poses a subjective precarity risk for those in higher labour market positions from ISEI value 51 onwards, reaching a substantial effect of ten percentage points for the highest positions (see panel 1, figure 5). As in the female sample, the general subjective precarity risk significantly increases with the vertical labour market position.

Interestingly, the found heterogeneity is not changed by adding any of the power resource indicators to the model. The interaction effect only increases from 0.2 to 0.3 percentage points when controlling for the interaction terms with the non-routine task proportions. Thus, hypotheses S-3.1b to S-3.4b are rejected. Accordingly, only few of the coefficients of the explaining variables are significant. The occupational unemployment rate increases the probability of subjective labour market insecurity by around 0.2 percentage points with every percentage point of unemployment, while the proportion of manual non-routine tasks reduces it by around 0.06 percentage points.

Table 16: Heterogeneous effects of part-time employment on cognitive labour market insecurity across ISEI with incrementally added contextual factors (Men)

	(1)	(2)	(3)	(4)	(5)
Regional unemployment rate *(centred)*	0.0075***	0.0073***	0.0073***	0.0073***	0.0073***
	(5.22)	(5.14)	(5.14)	(5.13)	(5.13)
Part-time employment (PTE)	0.0182	0.0138	0.0413	0.0279	0.0390
	(1.49)	(0.58)	(1.20)	(0.72)	(0.67)
ISEI *(centred)*	0.0005**	0.0007***	0.0007***	0.0007***	0.0006*
	(2.27)	(3.03)	(3.02)	(3.02)	(1.79)
Interaction of PTE and ISEI	0.0019***	0.0021**	0.0022***	0.0021**	0.0032***
	(3.20)	(2.52)	(2.66)	(2.55)	(2.78)
Company size *(reference: less than 20 employees)*					
20-199 employees	0.0001	0.0003	0.0001	0.0001	-0.0004
	(0.02)	(0.04)	(0.02)	(0.02)	(-0.05)
200-1999 employees	0.0062	0.0063	0.0060	0.0058	0.0052
	(0.73)	(0.74)	(0.71)	(0.68)	(0.61)
2000 and more employees	0.0045	0.0045	0.0042	0.0041	0.0035
	(0.50)	(0.50)	(0.47)	(0.46)	(0.39)
Weekly overtime hours *(centred)*	-0.0021***	-0.0021***	-0.0021***	-0.0021***	-0.0021***
	(-4.69)	(-4.69)	(-4.69)	(-4.67)	(-4.65)

	(1)	(2)	(3)	(4)	(5)
Marginal employment	-0.0469**	-0.0476**	-0.0471**	-0.0473**	-0.0454**
	(-2.22)	(-2.25)	(-2.22)	(-2.23)	(-2.15)
Tenure *(centred)*	0.0011**	0.0011**	0.0011**	0.0011**	0.0011**
	(2.31)	(2.27)	(2.28)	(2.31)	(2.23)
Occupational unemployment rate		0.0020**	0.0020**	0.0020**	0.0025***
		(2.22)	(2.22)	(2.21)	(2.67)
Interaction of PTE and unemployment rate		0.0008	0.0009	0.0011	0.0006
		(0.24)	(0.27)	(0.34)	(0.17)
Sectoral union density			0.0002	-0.0000	-0.0001
			(0.56)	(-0.03)	(-0.16)
Interaction of PTE and union density			-0.0021	-0.0027	-0.0026
			(-1.30)	(-1.42)	(-1.30)
Sectoral collective agreement coverage				0.0003	0.0003
				(1.21)	(1.22)
Interaction of PTE and collective agreement coverage				0.0004	0.0005
				(0.63)	(0.76)
Analytical non-routine task proportion					-0.0000
					(-0.04)
Interaction of PTE and analytical task proportion					-0.0013
					(-0.93)
Interactive non-routine task proportion					-0.0003
					(-0.91)
Interaction of PTE and interactive task proportion					0.0007
					(0.54)
Manual non-routine task proportion					-0.0006**
					(-2.47)
Interaction of PTE and manual task proportion					0.0005
					(0.59)
Constant	0.6426***	0.6294***	0.6259***	0.6152***	0.6296***
	(57.16)	(49.10)	(43.96)	(37.24)	(29.10)
Observations (n)	80,767	80,767	80,767	80,767	80,767

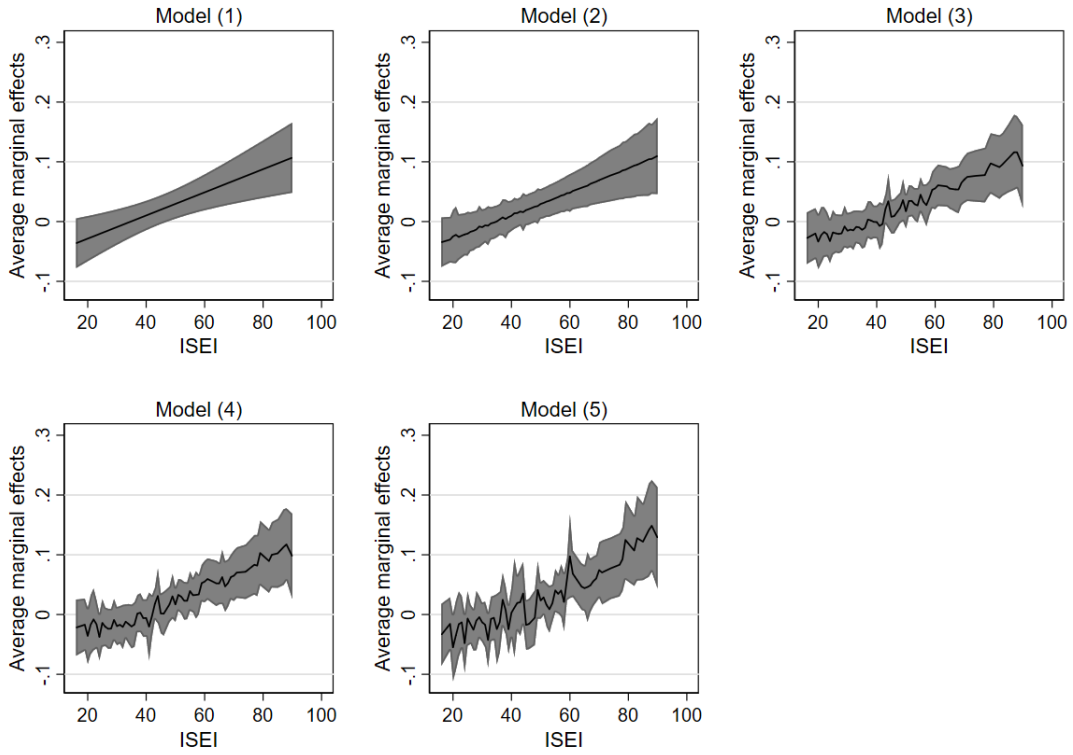
Note: t statistics in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$; Fixed effects models w/ cluster-robust standard errors; Controls: year dummies

Source: SOEP v34, LFS, SES 2014, Dengler et al. 2014; 1995-2015; Author's calculations

In addition, figure 5 reveals that the average marginal effects of part-time employment across ISEI increase approximately linearly in all model specifications. Controlling for the non-routine task proportions in the last panel increases the subjective precarity risks

of the highest positions even further, resulting in the larger interaction coefficient. Contrary to my expectations, the non-routine task proportions rather suppress the greater subjective precarity risks of part-time employment of higher positions instead of explaining them.

Figure 5: Average marginal effects of part-time employment on cognitive labour market insecurity across ISEI (Men)



Note: Fixed effects models w/ cluster-robust standard errors; Controls as in table 16; Incrementally added contextual factors: occupational unemployment rate (2), sectoral union density (3), sectoral collective agreement coverage (4), non-routine task proportions (5); Grey area displays 95% confidence intervals

Source: SOEP v34, LFS, SES 2014, Dengler et al. 2014; 1995-2015; Author's calculations

The results of the corresponding conditional logit models for both women and men reveal the same coefficient structure both in size and significance (see tables A10 and A11 in the Appendix). Thus, the linear probability assumption does hold in the case of these analyses.

5.5 Intermediate summary II

The previous section was dedicated to the analysis of the subjective precarity risks of part-time employment across gender and vertical labour market positions. First of all, no significant mean effect of part-time employment on cognitive labour market insecurity is found. Only when estimating gender separate models is there a subjective precarity risk of part-time employment for male employees of around two percentage points, but this is only significant at the ten percent level. Accordingly, I find only a weakly significant gender heterogeneity, which cannot be explained by differences in power resources or the employers' problems. Part-time employment thus only entails subjective precarity risks for men, and these are rather small compared to overall levels and to those of temporary employment, which increased affective job insecurity by nearly 14 percentage points.

For both women and men, I find as expected a significant heterogeneity of the risks across vertical labour market positions indicated by ISEI. The subjective precarity risks related to part-time employment increase with higher labour market positions, presumably due to a harsh first appraisal of part-time employment as a stigma and a lack of integration in the context of high-performance employment systems. Thus, part-time employment only exhibits a significant effect on cognitive labour market insecurity in higher labour market positions. This effect is much higher for men – around ten percentage points – than for women – around three percentage points. The relatively greater power resources do not seem to help with coping with the threat of part-time employment. Nor can the larger transformation problem indicated by the occupational non-routine task proportions explain this heterogeneity. Only in the male sample does the linear interaction effect vanish when controlling for the task proportions. This, however, hides a curvilinear relationship with both low and high positions suffering the highest subjective precarity risks, while the middle positions show the lowest risks. In the female sample, unskilled workers also show particular high precarity risks when accounting for the explaining variables. The subjective precarity risks of female part-time workers, however, do not change as much across the vertical labour market

segmentation. Their first appraisal of part-time employment is apparently not as dependent on their labour market position as that for men. This is presumably due to a higher societal acceptance of female part-time work and maybe also to a weaker average career orientation of women. Finally, the highest subjective precarity risks of part-time employment are suffered by those in high labour market positions, unskilled workers and – in the case of men – those in low positions in general.

Table 17: Summary of the hypotheses and results for the subjective precarity risks of part-time employment

Part-time employment			
Hypotheses			**Results**
Part-time employment increases the subjective precarity risks *(S-1b)*			Not confirmed for women; Not confirmed for men – only weak evidence
Gender	Men more affected *(S-2b)*		Not confirmed – only weak evidence
Household resources	decrease *(S-2.1b)*	Gender gap	Not confirmed
Production power	increases *(S-2.2b)*		Not confirmed
Market power / Personnel adjustment problem	increases *(S-2.3b)*		Not confirmed
Associational power	increases *(S-2.4b)*		Not confirmed
Vertical labour market position	Higher positions more affected *(S-3b)*		Confirmed for both women and men
Market power / Personnel adjustment problem	increases *(S-3.1b)*	Heterogeneity across labour market positions	Not confirmed for either women or men
Associational power	increases *(S-3.2b)*		Not confirmed for either women or men
Institutional power	increases *(S-3.3b)*		Not confirmed for either women or men
Transformation problem	decreases *(S-3.4b)*		Confirmed for women – but only weak evidence; Not confirmed for men
Cognitive labour market insecurity			

Source: Author's table

5.6 The heterogeneous material precarity risks of temporary employment

In this section, I turn to the second dimension of precarity as defined by Brinkmann et al. (2006, see section 3.1): material precarity. Therefore, I analyse the heterogeneity of material precarity risks of first temporary employment and then, in the next section, part-time employment across the vertical segmentation of the labour market. In both instances, I first test whether the wage differentials are heterogeneous across ISEI and then endeavour to explain the heterogeneity by differences in power resources or the degree of the employers' problems. Each section will be preceded by a concise summary of the hypotheses and concluded by a short summary of the results.

In the analyses below, I first turn to the material precarity risks of temporary employment. As argued in detail in section 3.6, I expect that temporary employment is related to a wage penalty, as by definition it lacks the institutional power resources of a permanent employment relationship in the form of dismissal protection and may substitute the threat of dismissal for the efficiency wage parts paid to permanent employees (hypothesis M-1a). Furthermore, I argue that the wage penalty of temporary employment varies across the vertical segmentation of the labour market. However, both directions of heterogeneity are arguably conceivable: from the perspective of power resources theory, employees in high labour market positions have more resources to compensate for the temporary character of their employment relationship and thus should suffer a smaller wage penalty than those in lower labour market positions (hypothesis M-2a). From the perspective of neo-institutional labour economics, permanent workers in high labour market positions receive a larger efficiency wage due to a larger transformation problem. Temporary employees may lack this efficiency wage, as their commitment can be ensured externally by the threat of dismissal, thus suffering from a larger wage penalty in higher labour market positions than in lower ones (hypothesis M-3a). In the first case, explicitly controlling for market, associational and institutional power resources should decrease the potential heterogeneity of the wage penalty across ISEI (hypotheses M-2.1a – M-2.3a). In the second case, the

heterogeneity should be decreased by controlling the occupational transformation problem of the employer indicated by the non-routine task proportions (hypothesis M-3.1a).

The sample of the analyses below consists of 40,273 individuals, who are on average observed over a time period of around five years between 1995 to 2017, resulting in 197,085 person-year observations. This means that 48,317 person-year observations have been excluded because of missing values on the covariates. The fixed effects models for both women and men rely on 10,342 changes between temporary and permanent employment, of which 59 percent are changes from temporary to permanent employment and 41 percent are changes in the opposite direction.

In the first step, I estimate a concise fixed effects model of the natural logarithm of the gross hourly wages on temporary employment, year dummies and selected job characteristics, including company size, the actual working time, the number of overtime hours and tenure (equation (15.1)). As argued in section 3.6, I thereby endeavour to control for the influence of confounding factors, while preventing the effect estimate from being biased by bad controls moderating the effect. As the effect of temporary employment is driven by changes from permanent to temporary and from temporary to permanent employment, I estimate the model once for all changes, once excluding all changes from permanent to temporary employment and once excluding all changes from temporary to permanent employment. All individuals with more than two changes are excluded from the two latter models. In table 18, the effect coefficient of temporary employment and the predictive margins of permanent and of temporary employees are displayed for all three specifications. As the wages are transformed into their natural logarithm, the coefficients β_i can be interpreted as percentage changes when calculating $(e^{\beta i}\text{-}1)\cdot 100$. Approximately, this equals $\beta_i \cdot 100$ for all coefficients less than around 0.2 and can thus be intuitively drawn from the results tables.

In the first model, a highly significant wage penalty for temporary employees is estimated of around six percent. At the mean, this equals a difference of around one

euro in the gross hourly wages, with permanent employees earning 15.06 euros an hour on average and temporary employees earning 14.18 euros an hour on average, with the amounts of actual working time, overtime and tenure, as well as the size of the company and all time-constant covariates, being equal. This finding confirms previous estimates of the wage penalty with similar methods ranging between two and nine percent (see section 2.4) as well as hypothesis M-1a.

The wage penalty is, however, solely due to the changes from temporary to permanent employment resulting in wage gains. When only looking at these changes, there is a highly significant wage penalty of as much as 14 percent. Only looking at changes from permanent to temporary employment shows no significant or substantial difference between temporary and permanent workers. One reason for this may be that changing from permanent to temporary employment usually means changing one's job and is – if voluntary – only done when the conditions of the new job are at least as favourable as those of the old job. Nonetheless, the analyses below consist of both types of change in order to avoid observations having to be excluded systematically. For the interpretation, however, it is useful to keep the asymmetry of the effects in mind.

Table 18: Average marginal effects of temporary employment on gross hourly wages and predictive margins of temporary and permanent workers

	Total		Changes from temporary to permanent employment		Changes from permanent to temporary employment	
	Average marginal effect	e^(Predictive margins)	Average marginal effect	e^(Predictive margins)	Average marginal effect	e^(Predictive margins)
Temporary employment	-0.06*** (-12.7)		-0.131*** (-16.31)		-0.001 (-0.072)	
Temporary workers		14.18*** (617.67)		13.64*** (342.89)		15.67*** (147.39)
Permanent workers		15.06*** (6734.87)		15.55*** (6598.02)		15.71*** (3165.90)
Constant	2.582*** (371.27)		2.591*** (325.69)		2.617*** (342.92)	
Observations (n)	197,085	197,085	168,515	168,515	146,966	146,966

Note: t and z statistics in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$; Fixed effects models w/ cluster-robust standard errors; Controls: company size, actual weekly working hours, weekly overtime hours, tenure, year dummies

Source: SOEP v34; 1995-2017; Author's calculations

Next, I test whether the wage penalty found for temporary employees varies systematically across vertical labour market positions. This is done by adding an interaction term of temporary employment with ISEI to the model, as in equation (16.1). As before, in order to account for likely gender differences, the regressions are estimated separately for women and men.

The first column of table 19 shows the results of this model specification for **women**. For them, temporary employment entails a wage penalty of four percent. The reduction of the penalty in comparison to the previous pooled model is not due to the inclusion of ISEI in the model but reveals a significantly lower wage penalty for women than for men, as is shown by a model with an interaction term with gender (see table A12 in the Appendix).

Looking at the control job characteristics firstly shows that wages tend to increase with the size of the company. A company with 2000 or more employees has on average

nearly eleven percent higher wages than companies with less than 20 employees, holding all other covariates constant. More weekly overtime hours and more actual weekly working hours both decrease the hourly wages. With regard to the overtime hours, however, this effect is not substantial, while every additional working hour reduces the hourly wages by slightly more than one percent. Finally, with every year of tenure in the company, the wages increase on average by 0.5 percent. These coefficients are almost unaffected by the inclusion of ISEI and are stable across all the model specifications below.

Turning now to ISEI, it is not surprising that the model reveals a positive effect of ISEI on hourly wages, as the wage level is also one indicator for the occupational ranking of ISEI. Instead, the interaction term of temporary employment with ISEI is the focus of this analysis. It shows how the wage penalty for temporary employment changes across occupations ranked according to the vertical labour market segmentation. The models show that the temporary employment wage penalty of women significantly increases with higher labour market positions. For every unit on the ISEI scale, the penalty increases by nearly 0.2 percentage points, meaning that the highest labour market position has a wage penalty that is around twelve percentage points higher than that for the lowest labour market position (see also panel 1, figure 6). This finding confirms hypothesis M-3a and rejects hypothesis M-2a for women. Apparently, the considerations drawn from the neo-institutional labour theory are more prevalent than those of the power resources theory.

In order to explain the heterogeneity of the wage penalties across ISEI, the power resources indicators and their interactions with temporary employment are incrementally added to the models (equations (17.1) to (20.1)). From the perspective of power resources theory, I expect decreasing wage penalties with higher ISEI values, as employees in higher labour markets positions should have more power resources to compensate for the loss of institutional power resources related to temporary employment. Although this hypothesis is rejected, I nevertheless test for the influence of the power resources by explicitly controlling them. As can be seen in table 19, the

structural market resources slightly suppress the heterogeneity of the temporary employment wage penalty. Controlling for the occupational unemployment rate raises the female interaction term of temporary employment with ISEI by 0.1 percentage points. As higher unemployment rates – which mean fewer market power resources – significantly increase the wage penalty, but decrease with higher ISEI values, they slightly suppress the heterogeneity of the wage penalty across ISEI when they are not controlled for. While the mechanism is in line with power resources theory and hypothesis M-2.1a, the difference is nonetheless minor. For these reasons, I reject hypothesis M-2.1a for women, although temporary employment is accompanied by higher wage penalties in contexts with high occupational unemployment rates. For every additional percent of unemployment, the wage penalty of temporary employment increases by nearly one percentage point and the wage level decreases by 0.4 percent.

Adding the indicators for associational and institutional power resources, also interacted with temporary employment, does not change the heterogeneity of the female wage penalty of temporary employment across ISEI. Thus, hypotheses M-2.2a and M-2.3a are rejected for women. While a higher sectoral union density entails significantly higher wages, it does not change the temporary employment penalty. Interestingly, while higher sectoral collective agreement coverages entail higher wages, they also increase the wage penalty of temporary employment.

As the interaction term of temporary employment and ISEI points at higher wage penalties for female temporary workers in higher labour market positions, the heterogeneity can be explained from the perspective of neo-institutional labour economics rather than from the perspective of power resources theory. The higher penalties for higher positions may be due to the relatively larger transformation problem of the employers in the case of higher positioned jobs (hypothesis M-3.1a). In a situation in which there are few possibilities for controlling the product or the process of the job, employers may pay an extra efficiency wage in order to secure the employees' commitment. Temporary employees, however, may lack this efficiency wage element, as their commitment can be secured by the threat of not extending the contract. The

higher wage penalties of temporary employment in higher labour market positions would then be explained by the increasing transformation problem for jobs in higher labour market positions. Therefore, the non-routine task proportions are added to the model, also interacted with temporary employment. Contrary to expectations, this only decreases the heterogeneity very slightly by 0.03 percentage points, leaving the interaction term of temporary employment with ISEI highly significant for women. Apparently, differences in the occupational non-routine task composition do not explain the found heterogeneity, which suggests that the heterogeneity is not due to differences in the transformation problem of the jobs. Thus, hypothesis M-3.1a is rejected for women. Accordingly, no task indicator significantly affects the temporary wage penalty. The only significant coefficients of the non-routine task proportions reveal that the proportion of analytical non-routine tasks increases the hourly wage, while the proportion of interactive non-routine tasks decreases it.

Hence, the heterogeneity of the temporary employment wage penalty across ISEI remains unexplained in the models. As reasoned in section 3.6, it could nonetheless be the case that higher values on ISEI in fact indicate the predominance of the use of temporary contracts as extended probationary periods in order to screen employees. In that case, temporary employment in higher labour market segments may mean that one is not yet a fully integrated and productive employee and thus entail a large wage penalty, while in lower labour market segments temporary employees may be more often equivalent to the permanent employees, except for their contract status. However, the proportion of non-routine tasks should also indicate the prevalence of temporary contracts as screening devices, since the less the required tasks can be controlled by the employer the more important screening becomes. The fact that non-routine task proportions do not explain the heterogeneity of the temporary wage penalty thus also speaks against this consideration.

Table 19: Heterogeneous effects of temporary employment on gross hourly wages across ISEI with incrementally added contextual factors (Women)

	(1)	(2)	(3)	(4)	(5)
Temporary employment (TE)	-0.0407***	0.0028	0.0159	0.0518**	0.0605
	(-6.54)	(0.24)	(1.01)	(2.42)	(1.50)
ISEI *(centred)*	0.0021***	0.0017***	0.0016***	0.0017***	0.0013***
	(8.42)	(5.96)	(5.89)	(6.00)	(3.60)
Interaction of TE and ISEI	-0.0018***	-0.0028***	-0.0028***	-0.0028***	-0.0025***
	(-4.32)	(-5.89)	(-5.66)	(-5.72)	(-3.62)
Company size *(reference: less than 20 employees)*					
20-199 employees	0.0633***	0.0634***	0.0617***	0.0614***	0.0611***
	(9.78)	(9.79)	(9.55)	(9.52)	(9.49)
200-1999 employees	0.0983***	0.0987***	0.0961***	0.0956***	0.0956***
	(13.64)	(13.71)	(13.42)	(13.37)	(13.38)
2000 or more employees	0.1002***	0.1005***	0.0975***	0.0973***	0.0974***
	(12.94)	(12.99)	(12.68)	(12.65)	(12.67)
Weekly overtime hours *(centred)*	-0.0015***	-0.0015***	-0.0015***	-0.0015***	-0.0015***
	(-2.82)	(-2.88)	(-2.79)	(-2.79)	(-2.74)
Actual weekly working hours *(centred)*	-0.0115***	-0.0115***	-0.0115***	-0.0115***	-0.0115***
	(-31.32)	(-31.38)	(-31.43)	(-31.46)	(-31.54)
Tenure *(centred)*	0.0049***	0.0050***	0.0050***	0.0051***	0.0051***
	(7.45)	(7.66)	(7.61)	(7.76)	(7.77)
Occupational unemployment rate		-0.0038***	-0.0038***	-0.0034***	-0.0028**
		(-3.24)	(-3.25)	(-2.97)	(-2.43)
Interaction of TE and unemployment rate		-0.0089***	-0.0087***	-0.0101***	-0.0103***
		(-4.14)	(-4.06)	(-4.45)	(-4.37)
Sectoral union density			0.0022***	0.0012**	0.0012**
			(4.81)	(2.07)	(2.03)
Interaction of TE and union density			-0.0011	0.0002	0.0005
			(-1.27)	(0.20)	(0.37)
Sectoral collective agreement coverage				0.0007***	0.0006***
				(2.89)	(2.65)
Interaction of TE and collective agreement coverage				-0.0008**	-0.0008**
				(-2.41)	(-2.05)
Analytical non-routine task proportion					0.0015***
					(3.16)
Interaction of TE and analytical task proportion					-0.0009
					(-1.07)
Interactive non-routine task proportion					-0.0009***
					(-2.65)
Interaction of TE and interactive task proportion					0.0008
					(1.47)

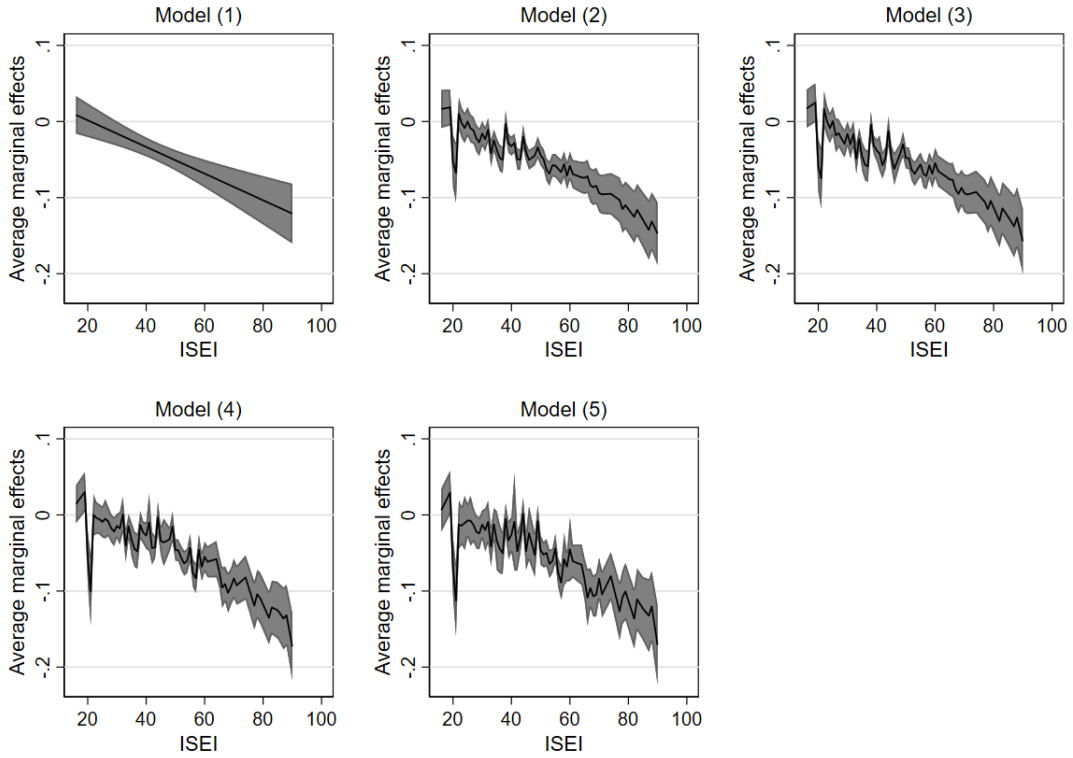
	(1)	(2)	(3)	(4)	(5)
Manual non-routine task proportion					0.0002 (0.58)
Interaction of TE and manual task proportion					-0.0001 (-0.10)
Constant	2.3985*** (211.48)	2.4234*** (181.62)	2.3950*** (159.62)	2.3694*** (136.48)	2.3385*** (85.79)
Observations (n)	95,484	95,484	95,484	95,484	95,484

Note: t statistics in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$; Fixed effects models w/ cluster-robust standard errors; Controls: year dummies

Source: SOEP v34, LFS, SES 2014, Dengler et al. 2014; 1995-2017; Author's calculations

In figure 6, the average marginal effects of female temporary employment on the gross hourly wage is depicted for each ISEI value separately for each model specification. The panels confirm the previous interpretation that, firstly, there is a considerable heterogeneity across vertical labour market positions in the sense that, secondly, the wage penalty of temporary employment increases with higher labour market positions for women. While there is no penalty in the lowest labour market segments, it reaches nearly twelve percent for the highest labour market segment. Controlling for differences in power resources, thirdly, does not explain the heterogeneity, but rather enlarges it as can be seen in panels 2 to 4. A considerable exception to the linear rise in wage penalties across ISEI is the relatively high wage penalties at the relatively low ISEI values 20 and 21, which consist of unskilled workers. These workers seem to be especially affected by wage penalties due to temporary employment. For them, temporary employment seems to be particularly related to financial disadvantages when confronted by high unemployment rates. Ultimately, the significant and substantial heterogeneity of the temporary employment wage penalties of women remains unexplained.

Figure 6: Average marginal effects of temporary employment on gross hourly wages across ISEI (Women)



Note: Fixed effects models w/ cluster-robust standard errors; Controls as in table 19; Incrementally added contextual factors: occupational unemployment rate (2), sectoral union density (3), sectoral collective agreement coverage (4), non-routine task proportions (5); Grey area displays 95% confidence intervals

Source: SOEP v34, LFS, SES 2014, Dengler et al. 2014; 1995-2017; Author's calculations

Next, I conduct the same analyses of the heterogeneity of temporary employment across vertical labour market positions for **men**. Table 20 displays the results of the hierarchical models. As before, the first column shows the main model with the interaction term between temporary employment and ISEI. The subsequent columns display the results of the models with incrementally added explaining variables.

As can be seen in the first column, the wage penalty of temporary employment for men is estimated at eight percent at the one percent significance level and is thus twice as large as the one for women. This gender difference proves significant when re-

estimating the model with an interaction term of temporary employment with gender (see table A12 in the Appendix). Again, this is not influenced by the inclusion of ISEI in the model. The control variables are almost identical to those of women, with one remarkable exception. While for women wages decrease with the number of overtime hours, they increase for men. Although this points to an interesting gender difference, this is not the focus of the analysis here and thus remains simply stated.

The coefficient of ISEI and its interaction with temporary employment are also similar to those of the female sample. The wage penalty of temporary employment increases significantly with higher labour market positions, but only by around 0.1 percentage points with every ISEI unit. The difference in the wage penalty between the lowest position – six percent – and the highest position – twelve percent – amounts to six percentage points, effectively doubling in size (see also panel 1 in figure 7). For men, the empirically found heterogeneity of the wage penalties also accords with the considerations from neo-institutional labour economics, rather than those of power resources theory. Hypothesis M-2a is thus rejected, while hypothesis M-3a is confirmed.

Adding the indicators for structural market, associational and institutional power resources in the subsequent model specifications does not reduce the heterogeneity. The results are displayed in columns 2 to 4 of table 20. Since they were meant to explain a possible heterogeneity with reversed sign, exposing the lower labour market segments as the ones with the highest penalties, it is no surprise that they do not. Hypotheses M-2.1a to M-2.3a are thus rejected. However, the results are consistent with the reasoning of hypothesis M-2.1a that differences in the occupational unemployment rate are responsible for *decreasing* penalties over ISEI. Controlling for these differences thus further reinforces the found heterogeneity of *increasing* wage penalties over ISEI. The coefficient of the interaction term more than doubles in size from 0.1 percent to 0.24 percent and is now significant at the one percent level. As for women, a higher occupational unemployment rate aggravates the wage penalty of temporary employment significantly by one percentage point per unit. Unlike with women, however, a higher

occupational unemployment rate entails slightly higher wages, which is a puzzling result.

Furthermore, adding the sectoral union density does not change the interaction of temporary employment with ISEI, nor are the coefficients of union density significant. It is only in the last model that the interaction of temporary employment with union density becomes significant. While for women union density makes no difference, a higher union density reduces the male wage penalty of temporary employment. With every percentage point of union density, the wage penalty decreases by 0.3 percentage points. At least for men, unions seem to have an equalising effect on the wage difference between permanent and temporary employees. The opposite is true for the sectoral collective agreement coverage. Temporary employees rather seem to be relatively disadvantaged by collective agreements. With every percentage point of coverage in a sector, the wage penalty increases by 0.2 percentage points. Controlling for differences in collective agreement coverage renders the main wage penalty insignificant and slightly reduces its heterogeneity over ISEI.

Finally, I test for the explanation of higher penalties in higher labour market positions as empirically found in the model. These may be due to higher efficiency wages paid to permanent employees in higher labour market positions because of the difficulty experienced by employers in controlling these jobs. Temporary employees in the same positions may lack these efficiency wages, as the threat of dismissal inherent in fixed-term contracts secures the employees' commitment and thus compensates for the lack of control. Controlling for the non-routine task proportions as indicators for the employers' transformation problem should therefore explain the found heterogeneity. While for women this is not the case, controlling for the non-routine task proportions decreases the interaction term of temporary employment with ISEI for men considerably. It is no longer significantly different from zero and merely amounts to 0.04 percentage points. The non-routine task proportions thus explain the found heterogeneity of the wage penalty over ISEI, which means that hypothesis M-3.1a is confirmed.

However, none of the interaction terms of temporary employment with the task proportion indicators is significant or substantial. Only the main effects reveal that, contrary to the case with women, the proportion of analytical non-routine tasks entails slightly lower wages, as does the proportion of manual non-routine tasks. The non-significance of the interaction effects is, however, due to the multicollinearity of the three task indicators. Re-estimating the model with only one of the task indicators for all three indicators reveals that there is a significant and negative interaction of temporary employment with the analytical non-routine task proportion, which is responsible for explaining the heterogeneity of the wage penalty over ISEI (see table A13 in the Appendix).

Table 20: Heterogeneous effects of temporary employment on gross hourly wages across ISEI with incrementally added contextual factors (Men)

	(1)	(2)	(3)	(4)	(5)
Temporary employment (TE)	-0.0887***	-0.0297**	-0.0568***	0.0318	0.0637*
	(-12.62)	(-2.07)	(-2.78)	(1.14)	(1.67)
ISEI *(centred)*	0.0017***	0.0019***	0.0019***	0.0018***	0.0021***
	(9.46)	(9.34)	(9.31)	(9.11)	(8.80)
Interaction of TE and ISEI	-0.0009**	-0.0024***	-0.0024***	-0.0017***	-0.0004
	(-2.25)	(-4.60)	(-4.52)	(-3.18)	(-0.45)
Company size *(reference: less than 20 employees)*					
20-199 employees	0.0588***	0.0591***	0.0586***	0.0584***	0.0582***
	(9.84)	(9.90)	(9.82)	(9.80)	(9.76)
200-1999 employees	0.0778***	0.0781***	0.0771***	0.0770***	0.0766***
	(10.88)	(10.91)	(10.78)	(10.78)	(10.73)
2000 or more employees	0.0966***	0.0967***	0.0954***	0.0953***	0.0949***
	(12.42)	(12.44)	(12.32)	(12.33)	(12.29)
Weekly overtime hours *(centred)*	0.0039***	0.0038***	0.0039***	0.0039***	0.0039***
	(10.55)	(10.52)	(10.53)	(10.56)	(10.58)
Actual weekly working hours *(centred)*	-0.0161***	-0.0161***	-0.0161***	-0.0161***	-0.0161***
	(-38.59)	(-38.61)	(-38.65)	(-38.77)	(-38.77)
Tenure *(centred)*	0.0048***	0.0048***	0.0049***	0.0049***	0.0048***
	(9.09)	(9.20)	(9.25)	(9.29)	(9.22)
Occupational unemployment rate		0.0013**	0.0013**	0.0013**	0.0015**
		(2.04)	(2.03)	(1.98)	(2.22)

	(1)	(2)	(3)	(4)	(5)
Interaction of TE and unemployment rate		-0.0102***	-0.0101***	-0.0100***	-0.0107***
		(-4.46)	(-4.42)	(-4.45)	(-4.63)
Sectoral union density			0.0004	0.0003	0.0002
			(1.26)	(0.77)	(0.51)
Interaction of TE and union density			0.0018*	0.0035***	0.0030***
			(1.86)	(3.55)	(2.87)
Sectoral collective agreement coverage				0.0002	0.0002
				(1.01)	(1.10)
Interaction of TE and collective agreement coverage				-0.0022***	-0.0018***
				(-4.88)	(-4.04)
Analytical non-routine task proportion					-0.0009***
					(-2.75)
Interaction of TE and analytical task proportion					-0.0014
					(-1.49)
Interactive non-routine task proportion					-0.0004
					(-1.47)
Interaction of TE and interactive task proportion					-0.0006
					(-0.70)
Manual non-routine task proportion					-0.0007***
					(-3.58)
Interaction of TE and manual task proportion					0.0002
					(0.45)
Constant	2.7460***	2.7378***	2.7320***	2.7233***	2.7626***
	(311.69)	(274.92)	(245.63)	(194.48)	(152.13)
Observations (n)	101,601	101,601	101,601	101,601	101,601

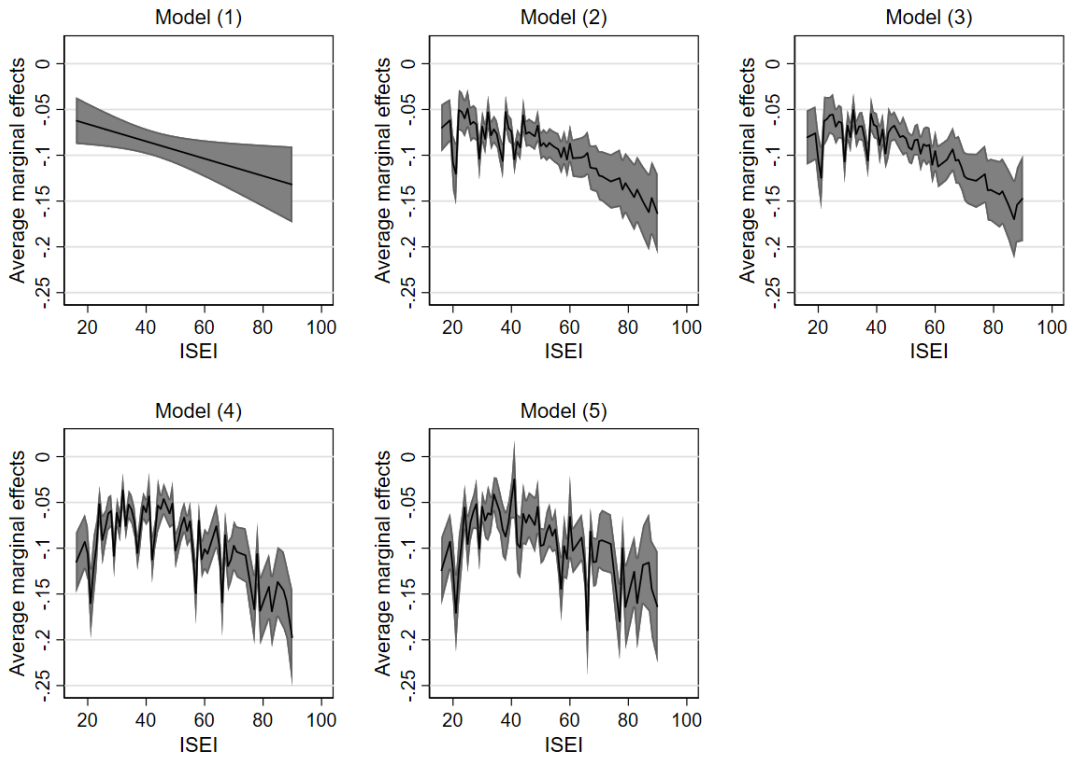
Note: t statistics in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$; Fixed effects models w/ cluster-robust standard errors; Controls: year dummies

Source: SOEP v34, LFS, SES 2014, Dengler et al. 2014; 1995-2017; Author's calculations

The graphical analysis of the average marginal effects of temporary employment over ISEI suggests a different interpretation, revealing that the largest penalties are found both in the lowest and the highest labour market positions, while being the smallest in middle labour market positions (figure 7). The first panel displays the increasing wage penalties over ISEI without any other interactions, resulting in a linear slope ranging from a penalty of six percent to a penalty of twelve percent. Adding the interaction with the occupational unemployment rate aggravates the wage penalties of the highest labour

market positions and those of the unskilled workers at the values 20 and 21 of ISEI. This changes further when one adds the sectoral collective agreement coverage, which both aggravates the penalties of those in low and in high labour market positions and slightly decreases the penalties of those around the ISEI value 40. The collective agreement coverage suppresses the penalties of those sectors with low coverage predominantly found in the lowest and the highest positions, while it confounds the penalties of those with higher coverage predominantly found in middle labour market positions. Lastly, adding the non-routine task proportions again slightly decreases the wage penalties of those in the highest positions, resulting in an inverted U-shaped distribution of the wage penalties across the vertical labour market segmentation. Both in lower labour market segments, especially unskilled workers, and in higher labour market segments the wage penalty of temporary employment reaches around 16 percent, while it remains at around six percent for middle labour market segments.

Figure 7: Average marginal effects of temporary employment on gross hourly wages across ISEI (Men)



Note: Fixed effects models w/ cluster-robust standard errors; Controls as in table 20; Incrementally added contextual factors: occupational unemployment rate (2), sectoral union density (3), sectoral collective agreement coverage (4), non-routine task proportions (5); Grey area displays 95% confidence intervals

Source: SOEP v34, LFS, SES 2014, Dengler et al. 2014; 1995-2017; Author's calculations

5.7 Intermediate summary III

In this section, I analyse the heterogeneity of the material precarity risks of temporary employment across vertical labour market positions. First and foremost, I find a significant and substantial gross hourly wage penalty of temporary employment of six percent. Interestingly, this is solely due to changes from temporary to permanent employment resulting in wage gains of 14 percent on average. Apparently, changing from permanent to temporary employment does not entail any wage change on average. This may be due to the variance of reasons for changing in this direction having

contradictory effects. While changing due to a previous dismissal may entail wage penalties, voluntary career-oriented changes may entail wage premiums.

Secondly, the wage penalties of temporary employment vary significantly across labour market positions for both women and men. In both cases, the wage penalty increases with higher labour market positions indicated by ISEI. This is contrary to the hypotheses from the perspective of power resources theory that expect the greater power resources of higher positions to result in smaller wage penalties. However, it supports the reasoning from the perspective of neo-institutional labour economics that asserts that jobs in higher positions entail a larger transformation problem for the employers, resulting in efficiency wages for permanent employees. Temporary employees, on the other hand, may lack these efficiency wages, as their commitment can be assured by the threat of dismissal.

This explanation is further supported by the fact that controlling for the occupational non-routine task proportions – indicating the control potential – diminishes the interaction effect of temporary employment with ISEI to zero in the male sample. This is, however, not the case for the female sample, where the interaction effect remains significant. For female temporary workers, there seems to be more behind the found heterogeneity than differences in non-routine task proportions. Analysing the average marginal effects graphically in figure 7 reveals a prevailing heterogeneity in the form of an inverted U for men as well. In the case of the male sample, both the lowest and the highest labour market segments suffer the greatest penalties, while the middle labour market segments suffer the smallest penalties. In the case of the female sample, the highest labour market segments and unskilled workers suffer the highest penalties.

Table 21: Summary of the hypotheses and results for the material precarity risks of temporary employment

Temporary Employment			
Hypotheses			**Results**
Temporary employment increases the material precarity risks *(M-1a)*			Confirmed
Vertical labour market position	Higher positions less affected *(M-2a)*		Not confirmed for either women or men
	Higher positions more affected *(M-3a)*		Confirmed for both women and men – however wage penalties are particularly high both for unskilled workers (women) and for workers in low positions in general (men) in the final models
Market power / Personnel adjustment problem	decreases *(M-2.1a)*	Heterogeneity across labour market positions	Not confirmed for either women or men
Associational power	decreases *(M-2.2a)*		Not confirmed for either women or men
Institutional power	decreases *(M-2.3a)*		Not confirmed for either women or men
Transformation problem	decreases *(M-3.1a)*		Not confirmed for women; Confirmed for men – but only decreases linear heterogeneity while exposing curvilinear heterogeneity
Log gross hourly wages			

Source: Author's table

5.8 The heterogeneous material precarity risks of part-time employment

After having analysed the heterogeneity of the material precarity risks of temporary employment across the vertical labour market segmentation, in this section I apply the same analyses to part-time employment. Before reporting the results, I recapitulate the hypotheses and the reasoning behind them.

Firstly, I test whether part-time employment is related to a wage penalty in comparison with permanent employment. For several intersecting reasons, I expect that part-time employment does indeed entail a wage penalty (hypothesis M-1b). It deviates from the still prevalent full-time norm and may therefore be less integrated and valued in the company. Moreover, it may be used as an internal flexibility buffer as part of a marginal work force. Lastly, it may signal to the employer less career orientation, experience or productivity.

Secondly, I test whether the wage penalty differs across vertical labour market positions indicated by ISEI, as I expect part-time employment to fulfil different functions in different segments. However, two opposite cases are conceivable: considering that part-time employment may be more likely to be part of the marginal work force in lower labour market segments and that part-time employees in lower labour market segments have fewer power resources at their disposal to compensate for the weaker position of part-time employment, I would expect the wage penalties to be the highest in lower labour market positions and to decrease with higher positions (hypothesis M-2b). Conversely, considering that part-time employment may be a particular bad signal to the employer in the context of high performance employment systems where career commitment is a strong norm, I would expect the wage penalties to be the highest in higher labour market positions, increasing from lower to higher labour market segments (hypothesis M-3b).

Thirdly, I explicitly test for the aforementioned explanations by incrementally integrating further explaining covariates in the analysis. At first, I test whether differences in structural market, associational or institutional power resources can

explain the fact that the part-time wage penalties decrease with higher labour market positions. If the higher penalties in lower labour market segments are due to a worse endowment with power resources, explicitly controlling for them should decrease the heterogeneity (hypotheses M-2.1b to M-2.3b). Next, I test whether differences in the occupational proportion of non-routine tasks indicating the degree of the employers' transformation problem can explain the fact that the part-time wage penalty increases with higher labour market positions. When assuming that the task composition indicates the importance of signals for the employer because jobs with high proportions of non-routine tasks and their holders are difficult to monitor, the heterogeneity should be reduced by explicitly controlling for them (hypothesis M-3.1b).

The sample of analysis is the same as in the previous section and amounts to 40,273 individuals observed over a time span of around five years, resulting in 197,085 person-year observations from 1995 to 2017. In this period, I observe in total 10,388 individual changes between full-time and part-time employment, consisting of 46 percent changes from part-time to full-time and 54 percent changes from full-time to part-time employment. However, the male part of the sample only accounts for 1,569 changes, while the female sample accounts for the main part of 8,819 changes. Both samples exhibit the same relative proportion of each type of change. Estimating fixed effects regressions on part-time employment with this sample means that a considerable amount of changes in both directions are used for the estimation. However, the estimation of the male coefficients relies on much fewer changes than the estimation of the female coefficients, which may reduce their efficiency.

The first analysis tests whether there is a mean wage penalty of part-time employment in comparison to full-time employment. Therefore, a basic fixed effects model specification as in equation (15.2) is estimated integrating a basic set of control variables as described in section 4.4. The first two columns of table 22 display the estimated wage effect of part-time employment on the mean and the predicted marginal wages of full-time and part-time employees. Here, I find no wage penalty for working part-time, as the coefficient is neither substantial with a 0.4 percent wage difference nor

significant. While part-time workers are estimated to earn 15.02 euros an hour on average, full-time workers are estimated to earn 14.97 euros.

Interestingly, this zero mean effect based on the changes in both possible directions – from full-time to part-time and from part-time to full-time – hides significant and substantial wage differentials when one looks at each type of change separately. In order to do so, I first exclude all observations, i.e. person-years, that change from full-time to part-time employment or that change more than twice between the two employment forms and re-estimate the same model. As can be seen in the third column of table 22, changing from part-time to full-time significantly raises the gross hourly wage by three percent from 15.15 euros to 15.64 euros on average. Or, expressed differently, only considering changes from part-time employment reveals a three percent wage penalty. Conversely, when re-estimating the model excluding all changes from part-time to full-time employment by the same procedure, I find a significant wage premium of four percent for part-time workers. This means that changing from a full-time to a part-time position entails an average wage rise of four percent from 15.39 euros to 16.05 euros an hour. By merging both effects – the wage penalty when changing from part-time employment and the wage premium when changing to part-time employment – the mean wage penalty for both types of changes remains zero. The pronounced asymmetry of the effect of part-time employment on the hourly wage could be one reason for the starkly diverging results in the previous literature.

Table 22: Average marginal effects of part-time employment on gross hourly wages and predictive margins of part-time and full-time workers

	Total		Changes from part-time to full-time employment		Changes from part-time to full-time employment	
	Average marginal effect	e^(Predictive margins)	Average marginal effect	e^(Predictive margins)	Average marginal effect	e^(Predictive margins)
Part-time employment	0.004 (0.723)		-0.032** (-2.367)		0.042*** (4.181)	
Part-time workers		15.02*** (678.92)		15.15*** (236.41)		16.05*** (333.88)
Full-time workers		14.97*** (2375.16)		15.64*** (1386.55)		15.39*** (1575.32)
Constant	2.560*** (368.601)		2.595*** (316.765)		2.579*** (345.143)	
Observations (n)	197,085	197,085	157,721	157,721	163,483	163,483

Note: t and z statistics in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$; Fixed effects models w/ cluster-robust standard errors; Controls: company size, marginal employment, weekly overtime hours, tenure, year dummies

Source: SOEP v34; 1995-2017; Author's calculations

As the analyses below are conducted separately for women and men, I also test the asymmetry for gender differences in order to be able to interpret the results correctly. Interestingly, the asymmetric wage differentials of part-time employment are clearly sorted by gender (see table 23). While for female part-timers I find a highly significant two percent wage premium at the mean, male part-timers suffer a highly significant 4.5 percent wage penalty. Also estimating the asymmetric effects for the gendered samples reveals that the female part-time wage premium is solely driven by changes from full-time to part-time employment. When all changes in the other direction are excluded, a significant wage premium of as much as six percent is estimated. The hourly wages of women changing to part-time employment from a full-time position are raised by six percent on average. However, the exact estimation should be treated with caution here, as observations had to be excluded systematically on account of their pattern of part-time employment. Female employees changing from part-time to full-time employment rather suffer a two percent wage penalty in this sample, but this is not significant. The

opposite is true for male part-time employees. The total wage penalty when accounting for all contract changes is solely driven by the changes from part-time to full-time employment. Men's wages are estimated to be raised by seven percent when changing from part-time to full-time employment, resulting in the analogous wage penalty of part-time employment. This estimate is, however, only significant at the ten percent level. This is presumably due to the low number of changes on which it is based, as there are fewer changes for men in the sample generally and more than half of these are furthermore deleted for the estimation of the asymmetric effects.

Table 23: Average marginal effects of part-time employment on gross hourly wages separately for women and men and asymmetric effects

	Women			Men		
	Total	Part-time to full-time	Full-time to part-time	Total	Part-time to full-time	Full-time to part-time
Part-time employment	0.019*** (3.413)	-0.020 (-1.424)	0.061*** (5.490)	-0.046*** (-3.305)	-0.076* (-1.817)	0.015 (0.649)
Constant	2.451*** (221.322)	2.489*** (155.032)	2.447*** (178.777)	2.655*** (298.454)	2.659*** (289.901)	2.662*** (302.354)
Observations (n)	95,484	62,375	67,240	101,601	95,346	96,243

Note: t and z statistics in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$; Fixed effects models w/ cluster-robust standard errors; Controls: company size, marginal employment, weekly overtime hours, tenure, year dummies

Source: SOEP v34; 1995-2017; Author's calculations

Hypothesis M-1b therefore has to be judged differently for women and men. While I reject it for women because of the analyses revealing a female part-time premium of two percent, I confirm it for men, as the analyses reveal a 4.5 percent part-time penalty for them.

The found asymmetry of the wage differentials may furthermore hint at an important difference in the use of part-time employment between women and men. The wage premium associated with women changing to part-time employment could be explained by them changing voluntarily – given external restrictions – because of family demands or other preferences. In this case, the function of part-time employment may be to keep

employees in times of higher family demands and gross wages may be raised in order to provide a further incentive to stay in employment. For women, this use of part-time employment is the normatively accepted one under an unequal dual earner regime. For men, by contrast, the considerable mean wage rise when changing from part-time to full-time employment could be explained by a predominance of involuntary part-time employment among men, which serves as an internal flexibility buffer for the employers and as such may be part of the marginal labour force. In that case, changing to full-time employment would mean an integration into the core labour force, potentially entailing a wage rise. This may be an explanation for why male part-time workers rather suffer a wage penalty in comparison to their permanent counterparts, while female part-timers even gain a wage premium.

In the next step, I focus on the heterogeneity of the found wage differentials across the vertical labour market segmentation indicated by ISEI. I do so separately for women and men by first including an interaction term of part-time employment with ISEI as in equation (16.2) and then incrementally adding the explaining variables also interacted with part-time employment to the model as in equations (17.2) to (20.2).

Table 24 displays the results of the hierarchical models of the **female sample**. As can be seen in the first column, the estimated wage premium is reproduced even when controlling for the labour market position. The coefficients of the control variables reproduce the same structure as in the wage models of temporary employment. The wages rise with the number of employees in the company attaining an eight percent premium for those in companies with more than 2000 employees compared to those working in companies with less than 20 employees. This effect remains stable across all model specifications. With each hour of overtime, wages decrease by one percent in every model specification. And each additional year of tenure raises the wage by 0.4 percent in every model. In addition, I find a significant and large wage penalty for marginal employment of nearly eleven percent compared to non-marginal full-time employment. This penalty is also stable over all model specifications.

Most importantly, I find a highly significant interaction term of part-time employment with ISEI. With every additional unit of ISEI, the wage premium of part-time employment increases by 0.15 percentage points, amounting to a total difference of around twelve percentage points in the wage differential between the lowest and the highest labour market segment. As I find a mean wage premium for female part-timers instead of a penalty, the reflection on hypotheses M-2b and M-3b is more complicated. Hypothesis M-2b states that the wage penalty should decrease over ISEI in the sense that those in lower labour market segments have the highest penalties. While the sign of the interaction coefficient is positive, this means that the premium is increasing over ISEI in the sense that those in lower labour market segments have the smallest premiums or even penalties. Indeed, calculating average marginal effects of part-time employment for every ISEI value shows that the lowest labour market segments suffer a wage penalty which becomes zero for higher ISEI values around 34 (roughly, skilled workers) and then turns into a wage premium for all those above ISEI value 41 (train drivers) (see panel 1, figure 8). Cleaners are estimated to have the highest part-time penalties of nearly three percent, while physicians and judges are estimated to have the highest premiums of nearly nine percent compared to their permanent colleagues. Therefore, the results arguably confirm hypothesis M-2b that the penalty is decreasing – or the premium is increasing – over labour market positions, although the sign of the coefficient is positive. On the contrary, the alternative hypothesis M-3b is rejected.

In the next step, I try to explain the found heterogeneity over ISEI. Therefore, the indicators for structural market – the occupational unemployment rate –, associational – the sectoral union density – and institutional power resources – the sectoral collective agreement coverage – as well as for the employers' transformation problem – the proportions of non-routine tasks – are incrementally added to the model.

In the second column of table 24 it can be seen that the occupational unemployment rate significantly decreases the wage on average by 0.5 percent for every percentage point of unemployment. The interaction with part-time employment is, however, not quite significant, indicating an increasing wage premium for part-time employment with an

increasing unemployment rate. This becomes clearly significant later when controlling for the other explaining variables. The higher the unemployment rate, the smaller the wage penalties or the greater the wage premiums of part-time employment. This runs counter to the reasoning of hypothesis M-2.1b that higher unemployment rates would indicate fewer structural market power resources and thereby entail greater penalties. As its inclusion in the model does also not change the interaction term of ISEI, I reject hypothesis M-2.1b. As can be seen in figure 8, this counter-intuitive estimate may be due to female unskilled workers with ISEI values 20 and 21 who are faced with particularly high unemployment rates but who do not exhibit any wage differential between part-time and full-time workers.

Adding next the sectoral union density and the sectoral collective agreement coverage also does not explain any heterogeneity. The interaction term of part-time employment remains basically unchanged. Hypotheses M-2.2b and M-2.3b are therefore also rejected. However, both interaction terms of union density and collective agreement coverage with part-time employment reveal decreasing wage pena1ties or increasing wage premiums for part-time employment with a higher presence of unions and collective agreements. For female part-time employees, associational and institutional power resources seem to be at least financially beneficial in relation to permanent employees.

Table 24: Heterogeneous effects of part-time employment on gross hourly wages across ISEI with incrementally added contextual factors (Women)

	(1)	(2)	(3)	(4)	(5)
Part-time employment (PTE)	0.0159***	0.0038	-0.0196	-0.0418***	-0.0664**
	(2.93)	(0.44)	(-1.64)	(-2.62)	(-2.41)
ISEI *(centred)*	0.0005*	-0.0001	-0.0000	-0.0000	0.0002
	(1.91)	(-0.28)	(-0.15)	(-0.10)	(0.54)
Interaction of PTE and ISEI	0.0015***	0.0018***	0.0017***	0.0017***	0.0008
	(5.18)	(5.43)	(5.01)	(5.15)	(1.56)
Marginal employment	-0.1125***	-0.1119***	-0.1133***	-0.1146***	-0.1149***
	(-8.23)	(-8.20)	(-8.25)	(-8.30)	(-8.34)
Company size *(reference: less than 20 employees)*					
20-199 employees	0.0398***	0.0399***	0.0385***	0.0381***	0.0379***
	(6.34)	(6.35)	(6.13)	(6.09)	(6.07)
200-1999 employees	0.0699***	0.0701***	0.0681***	0.0678***	0.0677***
	(9.98)	(10.02)	(9.79)	(9.76)	(9.77)
2000 or more employees	0.0743***	0.0744***	0.0722***	0.0722***	0.0721***
	(9.86)	(9.88)	(9.65)	(9.65)	(9.66)
Weekly overtime hours *(centred)*	-0.0097***	-0.0097***	-0.0097***	-0.0097***	-0.0097***
	(-18.13)	(-18.15)	(-18.13)	(-18.14)	(-18.15)
Tenure *(centred)*	0.0037***	0.0038***	0.0037***	0.0038***	0.0038***
	(6.11)	(6.19)	(6.13)	(6.24)	(6.27)
Occupational unemployment rate		-0.0051***	-0.0051***	-0.0052***	-0.0049***
		(-4.09)	(-4.05)	(-4.14)	(-3.94)
Interaction of PTE and unemployment rate		0.0025*	0.0026*	0.0034**	0.0040***
		(1.71)	(1.72)	(2.23)	(2.59)
Sectoral union density			0.0009*	0.0006	0.0006
			(1.76)	(0.88)	(0.90)
Interaction of PTE and union density			0.0018***	0.0008	0.0009
			(2.87)	(0.96)	(1.11)
Sectoral collective agreement coverage				0.0002	0.0002
				(1.00)	(0.95)
Interaction of PTE and collective agreement coverage				0.0005**	0.0004
				(2.16)	(1.35)
Analytical non-routine task proportion					0.0009*
					(1.84)
Interaction of PTE and analytical task proportion					0.0008
					(1.36)
Interactive non-routine task proportion					-0.0008**
					(-2.20)
Interaction of PTE and interactive task proportion					0.0007*
					(1.73)

	(1)	(2)	(3)	(4)	(5)
Manual non-routine task proportion					0.0007** (2.09)
Interaction of PTE and manual task proportion					-0.0004 (-0.99)
Constant	2.4518*** (222.15)	2.4823*** (185.83)	2.4709*** (162.65)	2.4633*** (139.69)	2.4360*** (90.95)
Observations (n)	95,484	95,484	95,484	95,484	95,484

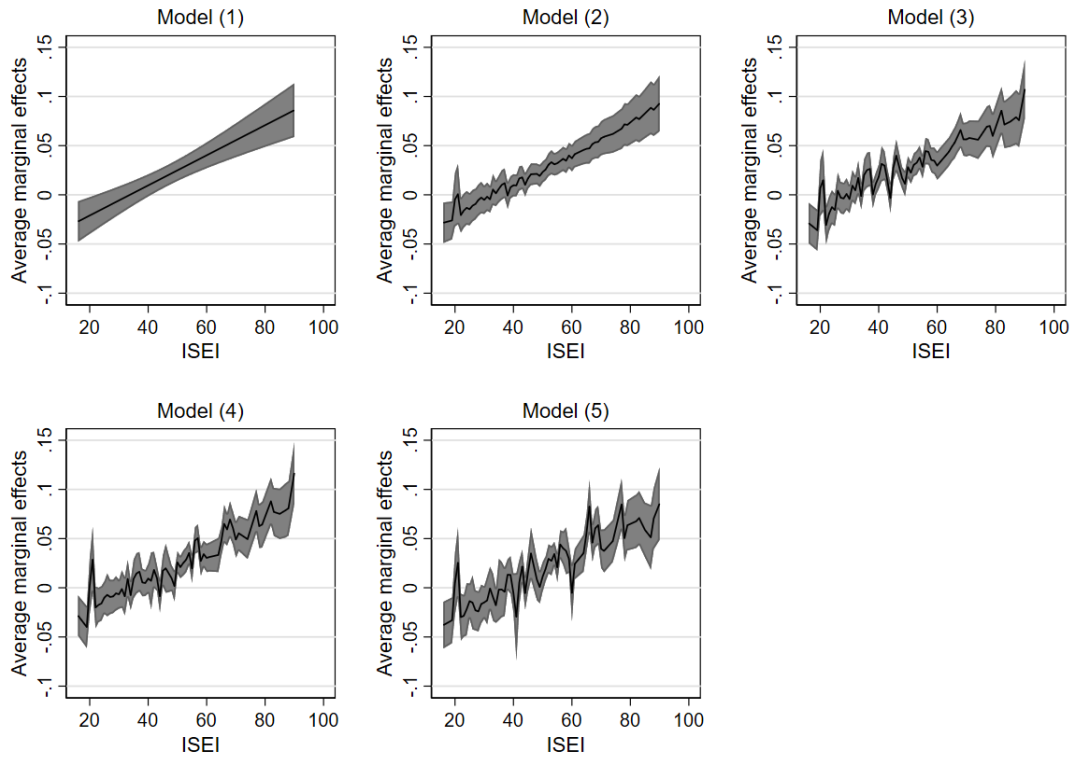
Note: t statistics in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$; Fixed effects models w/ cluster-robust standard errors; Controls: year dummies

Source: SOEP v34, LFS, SES 2014, Dengler et al. 2014; 1995-2017; Author's calculations

Lastly, adding the indicators for the transformation problem has a substantial influence. Under the control of the non-routine task proportions, the interaction term of ISEI with part-time employment is reduced by more than half and becomes insignificant. Technically, hypothesis M-3.1b is thus confirmed. The original reasoning behind the hypothesis was, however, that part-time employment represents a particularly bad signal in jobs with a large transformation problem often found in high performance employment systems and therefore exhibits the worst penalties in these contexts. Now, the task proportions rather seem to explain the premiums of those in higher labour market positions. In accordance with the previous considerations, this may point to the fact that in particular women who are of particular importance for the employer may be able to secure gross hourly wage rises. Non-routine tasks imply a job for which it is difficult to screen new employees and the related costs are relatively high. Employers may thus opt for securing the employee by granting a relatively well-paid part-time position. This is supported by the interaction terms of the analytical and interactive task proportion indicators, which show that the wage penalties of part-time employment increase with larger cognitive non-routine task proportions. While they are not significant, re-estimating the final model specification with only one task proportion indicator at a time for each indicator in order to avoid multicollinearity problems reveals significant positive interaction terms of both analytical and interactive non-routine task proportions (see table A14 in the Appendix).

However, some remarkable heterogeneity still remains even in this last model, which is, however, not well reflected in the linear specification along ISEI as shown in the last panel of figure 8. Nonetheless, the lowest labour market segments are confronted with significant wage penalties of around three percent and the highest labour market segments still show significant wage premiums of up to eight percent. The coefficients of the task proportions do not reveal any significant interaction effect, which is, however, due to their multicollinearity. Excluding one of the variables renders the interaction effects of the others significant. While analytical and interactive non-routine tasks decrease the wage penalty or increase the premium of part-time employment, the opposite is true for manual non-routine tasks. In addition, interactive non-routine tasks significantly reduce the wage, while manual non-routine tasks raise it.

Figure 8: Average marginal effects of part-time employment on gross hourly wages across ISEI (Women)



Note: Fixed effects models w/ cluster-robust standard errors; Controls as in table 24; Incrementally added contextual factors: occupational unemployment rate (2), sectoral union density (3), sectoral collective agreement coverage (4), non-routine task proportions (5); Grey area displays 95% confidence intervals

Source: SOEP v34, LFS, SES 2014, Dengler et al. 2014; 1995-2017; Author's calculations

The same analyses are applied to the **male sample**. Firstly, an interaction term of part-time employment with ISEI is added as in equation (16.2) in order to test for the heterogeneity of part-time employment across vertical labour market segments. The results are displayed in the first column of table 25. As is the case without ISEI, I find a highly significant part-time wage penalty for men of around five percent. The coefficients of the control variables show largely the same effect estimates as in the models with the female sample, with two exceptions. The effect of ISEI on the wage is much clearer than for women and highly significant across all model specifications. The hourly wage rises by 0.12 percent for every unit on the ISEI scale, displaying a total

difference of nine percentage points between the lowest and the highest ISEI value. Apparently, the male wages are much more dispersed over ISEI than the female wages. In addition, the wage penalty for marginal employment is remarkably larger for men. I find a penalty of around 27 percent across all models.

Interestingly, men show the same heterogeneity of the part-time wage penalty over ISEI as women, with the interaction coefficient revealing a highly significant 0.2 percentage points smaller wage penalty for every additional ISEI unit. The wage penalty of part-time employment thus differs by 16 percentage points between the lowest and the highest labour market segment. As can be seen in figure 9, this means a wage penalty for lower labour market segments and a wage premium for higher labour market segments. As was the case with women, hypothesis M-2b is confirmed while hypothesis M-3b is not. However, the wage penalties are much greater for men and the premiums not even significant. While the lowest labour market segment suffers wage penalties of up to ten percent, the wage penalties are no longer significant from ISEI value 56 onwards – division managers, administrative professionals, among others – and become wage premiums of more than four percent which are, however, not significant in the highest labour market segments. Men thus exhibit a very similar distribution of the part-time wage penalty over ISEI to the one for women, but it is shifted downwards on the y-axis, thereby exposing more male part-timers to higher wage penalties than female part-timers.

Table 25: Heterogeneous effects of part-time employment on gross hourly wages across ISEI with incrementally added contextual factors (Men)

	(1)	(2)	(3)	(4)	(5)
Part-time employment (PTE)	-0.0484***	0.0025	0.0117	0.0180	0.0519
	(-3.41)	(0.08)	(0.31)	(0.37)	(0.63)
ISEI *(centred)*	0.0012***	0.0013***	0.0013***	0.0013***	0.0016***
	(6.48)	(6.28)	(6.27)	(6.26)	(6.40)
Interaction of PTE and ISEI	0.0020***	0.0007	0.0007	0.0008	0.0009
	(2.77)	(0.78)	(0.81)	(0.87)	(0.63)
Marginal employment	-0.3199***	-0.3182***	-0.3176***	-0.3174***	-0.3150***
	(-6.59)	(-6.54)	(-6.52)	(-6.52)	(-6.45)
Company size *(reference: less than 20 employees)*					
20-199 employees	0.0561***	0.0560***	0.0555***	0.0555***	0.0552***
	(9.17)	(9.16)	(9.11)	(9.11)	(9.05)
200-1999 employees	0.0763***	0.0762***	0.0753***	0.0753***	0.0746***
	(10.61)	(10.59)	(10.51)	(10.52)	(10.44)
2000 or more employees	0.0960***	0.0960***	0.0949***	0.0949***	0.0942***
	(12.49)	(12.48)	(12.41)	(12.42)	(12.35)
Weekly overtime hours *(centred)*	-0.0058***	-0.0058***	-0.0058***	-0.0058***	-0.0058***
	(-17.10)	(-17.11)	(-17.12)	(-17.10)	(-17.08)
Tenure *(centred)*	0.0044***	0.0044***	0.0044***	0.0044***	0.0043***
	(8.59)	(8.58)	(8.61)	(8.61)	(8.50)
Occupational unemployment rate		0.0007	0.0007	0.0007	0.0009
		(1.02)	(1.05)	(1.04)	(1.30)
Interaction of PTE and unemployment rate		-0.0101	-0.0100	-0.0101	-0.0096
		(-1.61)	(-1.59)	(-1.59)	(-1.48)
Sectoral union density			0.0006*	0.0006	0.0004
			(1.67)	(1.39)	(0.92)
Interaction of PTE and union density			-0.0007	-0.0005	0.0003
			(-0.39)	(-0.24)	(0.16)
Sectoral collective agreement coverage				0.0000	0.0001
				(0.19)	(0.47)
Interaction of PTE and collective agreement coverage				-0.0002	-0.0002
				(-0.25)	(-0.30)
Analytical non-routine task proportion					-0.0009***
					(-2.71)
Interaction of PTE and analytical task proportion					-0.0020
					(-1.06)
Interactive non-routine task proportion					-0.0007**
					(-2.54)
Interaction of PTE and interactive task proportion					0.0024*
					(1.94)

	(1)	(2)	(3)	(4)	(5)
Manual non-routine task proportion					-0.0008*** (-4.16)
Interaction of PTE and manual task proportion					-0.0008 (-0.75)
Constant	2.6556*** (299.84)	2.6511*** (260.41)	2.6425*** (229.32)	2.6410*** (184.75)	2.6856*** (144.05)
Observations (n)	101,601	101,601	101,601	101,601	101,601

Note: t statistics in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$; Fixed effects models w/ cluster-robust standard errors; Controls: year dummies

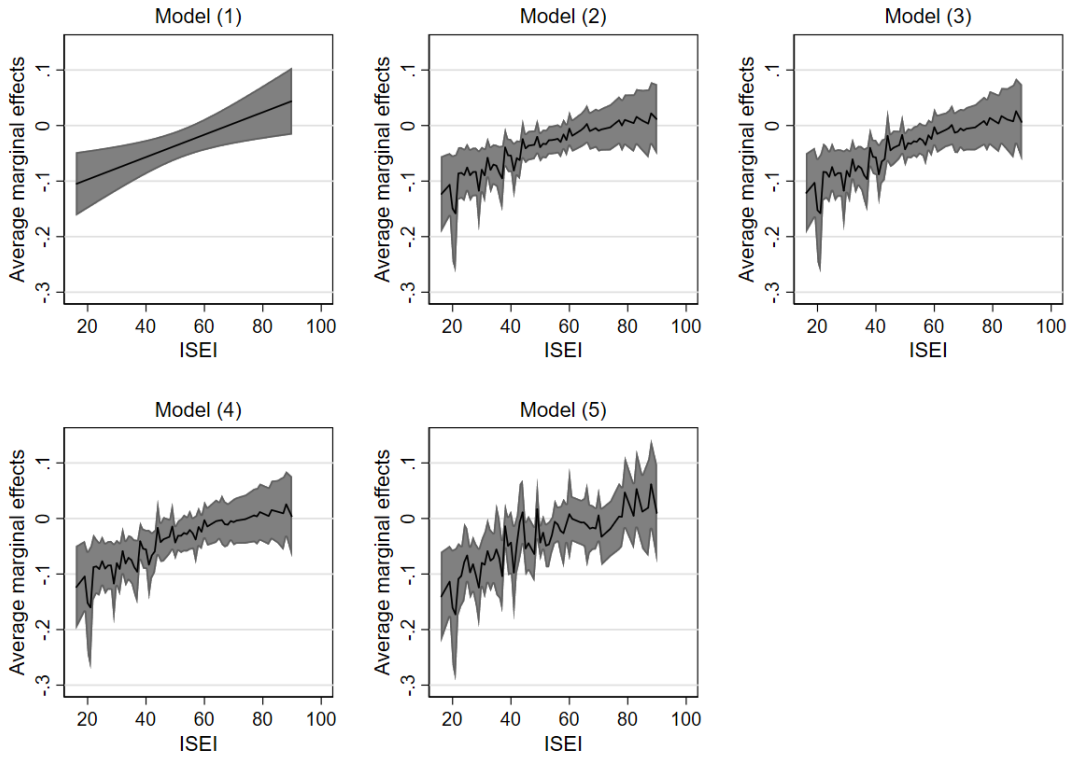
Source: SOEP v34, LFS, SES 2014, Dengler et al. 2014; 1995-2017; Author's calculations

Adding the indicator for structural market power resources to the model, however, renders the found heterogeneity insignificant, as can be seen in the second column of table 25. However, the coefficient of the interaction term of the occupational unemployment rate with part-time employment is not quite significant, only hinting at increasing wage penalties with an increasing unemployment rate. Nonetheless, hypothesis M-2.1b is confirmed: differences in the wage penalty of part-time employment across the vertical labour market segmentation are at least partly due to differences in the structural market power resources. Panel 2 in figure 9 reveals that there is still some heterogeneity remaining across ISEI, which however no longer results in a significant linear estimator.

Adding the indicators for associational and institutional power resources does not change the interaction between part-time employment and ISEI. The interaction effects of the sectoral union density or the collective agreement coverage are also not significant. While for women, union presence and collective agreements make a difference for the part-time wage differential, they do not for men. This may be a further indication that male part-timers are rather concentrated in a marginal labour force predominantly found in sectors with fewer or weaker organised labour institutions. Or it may simply be the result of too few male part-time observations. Nonetheless, hypotheses M-2.2b and M-2.3b are rejected.

Lastly, adding the non-routine tasks proportions as indicators for the control potential of the job also does not change the found heterogeneity. Hypothesis M-3.1b is thus rejected as well. Panel 5 in figure 9 shows that all part-time wage differentials from the ISEI value 35 upwards (roughly, skilled workers) are now insignificant. For the lowest labour market segments, I still find wage penalties of up to 16 percent for unskilled assistant workers.

Figure 9: Average marginal effects of part-time employment on gross hourly wages across ISEI (Men)



Note: Fixed effects models w/ cluster-robust standard errors; Controls as in table 25; Incrementally added contextual factors: occupational unemployment rate (2), sectoral union density (3), sectoral collective agreement coverage (4), non-routine task proportions (5); Grey area displays 95% confidence intervals

Source: SOEP v34, LFS, SES 2014, Dengler et al. 2014; 1995-2017; Author's calculations

5.9 Intermediate summary IV

Summarising the findings of this section, I find a significant wage premium for part-time employment for women, while male part-timers exhibit a significant wage penalty. Estimating asymmetric effects shows that this may be due to the fact that the female wage premium is based on changes from full-time to part-time employment, while the male wage penalty is based on changes from part-time to full-time employment. For both women and men, however, these wage differentials are found to be significantly heterogeneous across vertical labour market positions, indicated by ISEI. The lowest labour market positions exhibit the highest part-time wage penalties, which decrease with higher positions, first turning insignificant and then becoming wage premiums for the highest labour market positions. For men, however, the large wage penalties in the lower labour market segments predominate, while the premiums in higher positions are not significant. For women, the picture changes as the large wage premiums in higher positions predominate and the smaller penalties are only concentrated in the very lowest positions. The heterogeneity of the part-time wage penalties for men can be partly explained by the lack of structural market power resources, i.e. higher occupational unemployment rates. However, large and significant wage penalties for lower labour market segments still persist even when controlling for all resources and the task composition of the job. The heterogeneity of the female part-time wage penalties is rather explained by higher occupational proportions of analytical and interactive non-routine tasks, indicating a large transformation and screening problem for the employers.

The gender differences in the results may be explained by differences in the dominant function of part-time employment for women and men. Women may use part-time predominantly voluntarily – given the constraints by the gendered division of work – to shift their labour to family demands. For female employees in high labour market positions with a relatively large transformation problem and pronounced production power, employers may be more interested in keeping the employees, as the costs associated with finding new employees would be too high. Therefore, women in higher

labour market segments have a good bargaining position when changing from full-time to part-time employment and even secure gross hourly wage gains, possibly to partly compensate for the loss of the monthly income. Conversely, male part-timers may be restricted to part-time employment involuntarily by the need of the employer for an internal flexibility buffer in a marginal labour force, resulting in wage penalties in comparison to the more integrated permanent core workers. This seems to be especially true for unskilled assistant workers, who can be easily replaced in the context of high occupational unemployment rates. For them, changing from a part-time to a full-time position may mean rising from a marginal to a core position and therefore a considerable wage gain.

The material precarity risks of part-time employment are thus concentrated at lower labour market positions, especially for unskilled male employees in the context of high occupational unemployment rates. Female part-time employees in lower labour market positions are, however, also affected by wage penalties, especially when the sectoral union density and the collective agreement coverage is low.

Table 26: Summary of the hypotheses and results for the material precarity risks of part-time employment

Part-time Employment			
Hypotheses			**Results**
Part-time employment increases the material precarity risks *(M-1b)*			Not confirmed for women – rather decreases the precarity risks; Confirmed for men
Vertical labour market position	Higher positions less affected *(M-2b)*		Confirmed for both women and men
	Higher positions more affected *(M-3b)*		Not confirmed for either women or men
Market power / Personnel adjustment problem	decreases *(M-2.1b)*	Heterogeneity across labour market positions	Not confirmed for women; Confirmed for men
Associational power	decreases *(M-2.2b)*		Not confirmed for either women or men
Institutional power	decreases *(M-2.3b)*		Not confirmed for either women or men
Transformation problem	decreases *(M-3.1b)*		Confirmed for women; Not confirmed for men
Log gross hourly wages			

Source: Author's table

5.10 The inequality effects of non-standard employment

The previous sections were dedicated to an analysis of the contextual factors of the individual subjective and material precarity risks of non-standard work. With regard to temporary employment, the analyses confirm significant wage penalties for women and men. With regard to part-time employment, only men suffer a wage penalty, while women even gain a wage premium, at least those in higher labour market positions. Likewise, I find a considerable heterogeneity of the non-standard work differentials across the vertical labour market segmentation. Turning now from the individual to the distributional level, the question remains as to how the rise in non-standard work in recent decades has contributed to the rise in wage inequality (see section 3.7).

In order to answer this question, I first revise the analytical strategy and the research hypotheses guiding the analyses. After that, wage density estimates are presented, as unconditional quantile regressions rely on these estimates. Next, the main results of unconditional quantile regressions, separately for each time point, and simple decompositions of quantile differences are summarised in order to facilitate the understanding and interpretation of the final decomposition analyses. Finally, the results of the decomposed unconditional quantile regressions of the inter-quantile ratios are presented in order to evaluate the contribution of non-standard employment to the rise in wage inequality.

Technically speaking, I endeavour to statistically explain the changes in three measures of wage inequality: the ratio of the 50^{th} to the 15^{th} quantile of the marginal wage distribution serves as an indicator for inequality among the relatively low earning half of the sample. It basically reveals how many times greater the wage of the highest earner of the lowest earning 50 percent is than the wage of the highest earner of the lowest earning 15 percent of the sample. The ratio of the 85^{th} to the 50^{th} quantile of the marginal wage distribution does the same for the relatively high earning half of the sample. It shows how many times greater the wage of the highest earner of the lowest earning 85 percent is than the wage of the highest earner of the lowest earning 50

percent. Lastly, the ratio of the 85th to the 15th quantile indicates the overall wage inequality using the same logic. These three indicators are measured once for a pooled sample covering the years 1995 and 1996 and once for a pooled sample covering the years 2010 and 2011. They are then regressed on the indicators of non-standard work, temporary and part-time employment, and a series of control variables using unconditional quantile models as in equation (24). The difference between the same indicators of the two resulting regressions is then decomposed, once using a standard Oaxaca Blinder decomposition as in equation (29b) and once using a reweighted decomposition as in equation (32) (see section 4.6 for more details). The resulting coefficients of non-standard work then allow one to assess their compositional and structural contribution to the change in each inequality indicator.

As explained in section 3.7, I expect that the quantitative increase in temporary and part-time employment contributed significantly to the increase in wage inequality, both in the bottom half of the wage distribution (hypotheses I-2.1a and I-2.1b) and thereby the overall wage distribution (hypotheses I-1.1a and I-1.1b). In addition, I expect that temporary and part-time employment contributed less to the increase in wage inequality in the upper half of the wage distribution (hypotheses I-3.1a and I-3.1b). These considerations with regard to the compositional effects are relatively straightforward, as I could confirm the wage penalties for non-standard work except for female part-timers and because these employment forms did indeed increase in the given period (see figure 1 or table 5). It remains to be seen whether the contribution is in fact substantial and significant and whether it is in fact concentrated in the bottom half of the wage distribution.

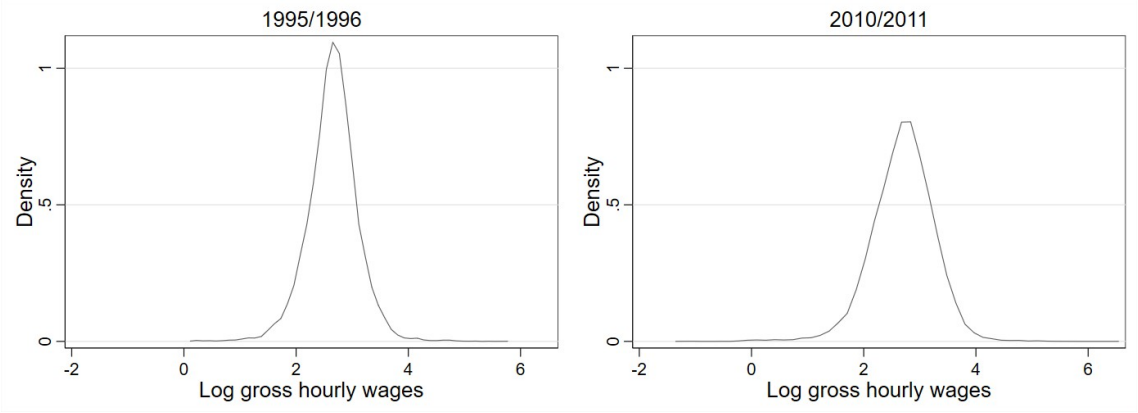
Elaborating hypotheses on the structural effects of non-standard work is less clear. Depending on whether a further polarisation or an equalisation between standard and non-standard work has taken place, contributions in both directions are conceivable. On the one hand, the labour market reforms between 1995 and 2010 aimed at facilitating marginal employment relationships (see section 2.1), which suggests a further polarisation raising the wage penalties associated with temporary and part-time

employment. On the other hand, the ongoing efforts towards a de-stigmatisation of part-time employment and a possible normalisation of temporary work may have caused wage penalties for these employment forms to fall. Nonetheless, I rather assume a further polarisation between permanent and temporary employment as well as full-time and part-time employment, as the labour market reforms of 1995 and 2004 changed the structural conditions of non-standard work. Therefore, I expect that increasing wage penalties of temporary and part-time employment contributed significantly to the increase in wage inequality in the bottom half of the wage distribution and in the overall distribution (hypotheses I-2.2a, I-2.2b and I-1.2a, I-1.2b). Likewise, I expect that they contributed less to the wage inequality in the top half of the wage distribution (hypotheses I-3.2a and I-3.2b).

The sample of analysis consists of 5,861 individuals in 1995 and/or 1996 and 14,173 individuals in 2010 and/or 2011. In total, the analyses are based on 31,840 person-year observations for both time points.

The estimation of unconditional quantile regressions is based on transforming the dependent variable – in this case the natural logarithm of the gross hourly wages – into values of the recentred influence function (RIF) of the quantile of interest – in this case the inter-quantile ratios. In order to calculate the RIF values, however, one has to estimate the density of the dependent variable (see section 4.5). A Gaussian kernel and the optimal bandwidth estimation of Silverman (1986) is used to estimate the unconditional quantile regressions and their decomposition, which is the default of the oaxaca_rif command (Rios-Avila 2019). Figure 10 displays the kernel density estimates used for the analyses for each time point. The density of the log gross hourly wages is estimated smoothly without any spikes which could bias the RIF estimations at these points.

Figure 10: Estimated densities of the logarithmic wage distribution



Note: Gaussian kernel; Bandwidths: 0.0534 (1995/1996), 0.0617 (2010/2011), Silverman optimisation; 10,007 (left panel) and 21,833 (right panel) person-year observations

Source: SOEP v34; Author's calculations

However, especially changing the bandwidth may change the density estimation and therefore the results. I thus re-estimate the density of the log gross hourly wages with the optimal bandwidths of Scott (1992) and Härdle (1991) and again all three bandwidth choices with an Epanechnikov kernel (see figures A3 and A4 in the Appendix). However, the shape of the respective density functions for the log gross hourly wages does not change for any combination. I therefore conclude that the results of the analyses below are robust with respect to the choice of the density estimation.

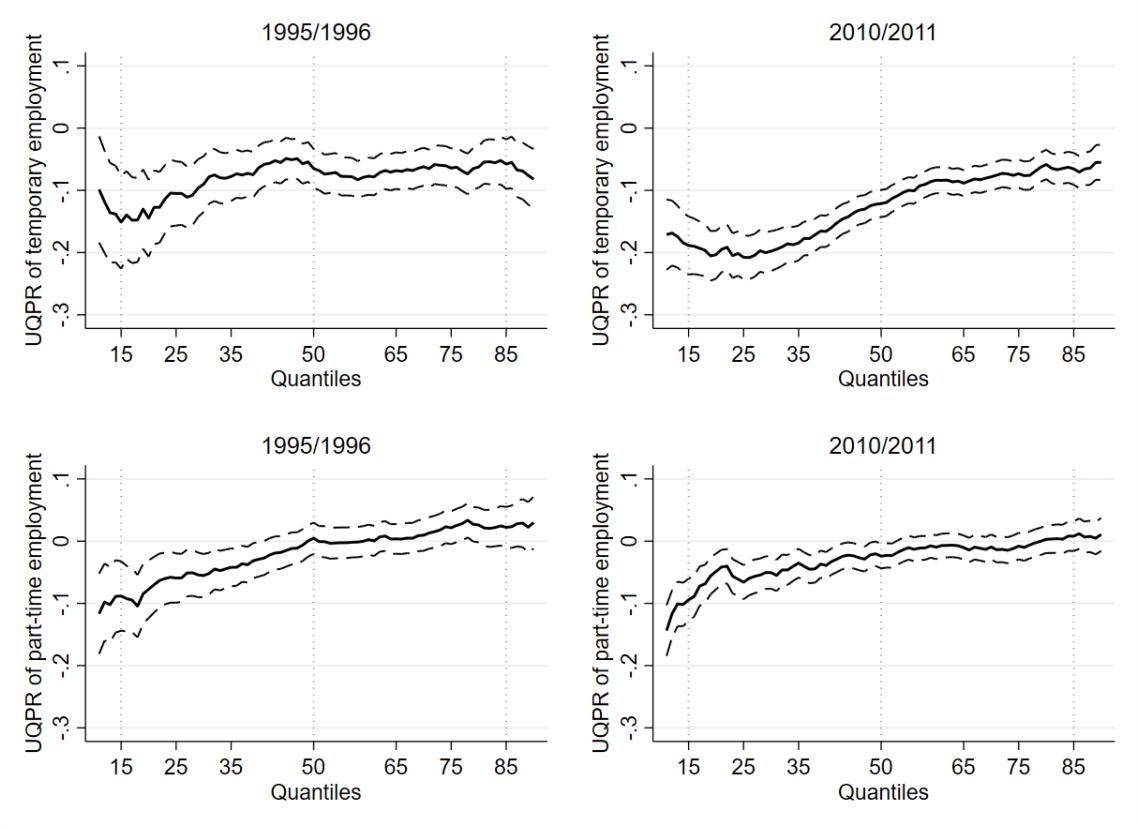
Before presenting the results of the decomposed unconditional quantile regressions using the RIFs of the inter-quantile ratios, it is helpful to first consider the basis of these analyses. Therefore, figure 11 displays the unconditional quantile partial effects (UQPE, see sections 4.2 and 4.5) of temporary and part-time employment on the quantiles of the log gross hourly wage distribution once for 1995/1996 and once for 2010/2011. I have chosen to cut the observed range under the 10th and above the 90th quantile, as the necessarily small number of observations at either side of the quantile cut-off in the margins of the distribution may bias the effect coefficients. Roughly, the effects shall be interpreted here as indicators for the relative change in the quantile value for an increasing proportion of temporary or part-time employment. While the thick line

represents the UQPE, the dashed lines depict the upper and lower borders of the 95 percent confidence intervals.

As can be seen in the first panel of figure 11, in 1995/1996 temporary employment significantly reduces the values of all quantiles between the 10th and the 90th quantile. The greatest effects are found between the 10th and the 30th quantile, especially between the 15th and the 20th quantile. For lower and higher quantiles, the effects become smaller and remain stable over the 30th quantile. Thus, a counterfactual increase in temporary employment would reduce everyone's wages, but particularly those of the low earners around the 18th quantile. Temporary employment thus seems to contribute to the wage inequality in the bottom half of the wage distribution in 1995/1996. The same pattern is reproduced in 2010/2011, but is much more pronounced (see panel 2, figure 11). Here, the largest negative effects on the quantile values are estimated around the 25th quantile. Under the 20th and above the 30th quantile the effects decrease linearly. While the effect on the 15th quantile is estimated to be around 17 percentage points, the effect on the 50th quantile is around eleven and the effect on the 85th quantile around seven percentage points. In 2010/2011 temporary employment seems to contribute to wage inequality in both the bottom and top half of the wage distribution.

Turning to part-time employment in the 3rd and the 4th panel of figure 11 reveals very similar effect structures of both time points. While in 1995/1996 part-time employment is estimated to progressively decrease the wages of those below the 40th quantile, the same is true in 2010/2011 below the 50th quantile. Above those thresholds, no significant effects of part-time employment on the quantile values are estimated. Hence, in both cases, part-time employment seems to increase the inequality in the bottom half of the wage distribution, while not affecting the inequality in the top half.

Figure 11: Unconditional quantile partial effects of non-standard work between the 10th and the 90th quantile of the log gross hourly wage distribution



Note: Unconditional quantile models w/ robust standard errors; Controls: Marginal employment, age, age squared, residence in East Germany, gender, education in years, full-time equivalent labour market experience, tenure, company size, occupational unemployment rate, sectoral union density, sectoral collective agreement coverage, analytical, interactive and manual non-routine task proportions; Dashed lines represent the margins of the 95% confidence intervals; 10,007 (left panels) and 21,833 (right panels) person-year observations

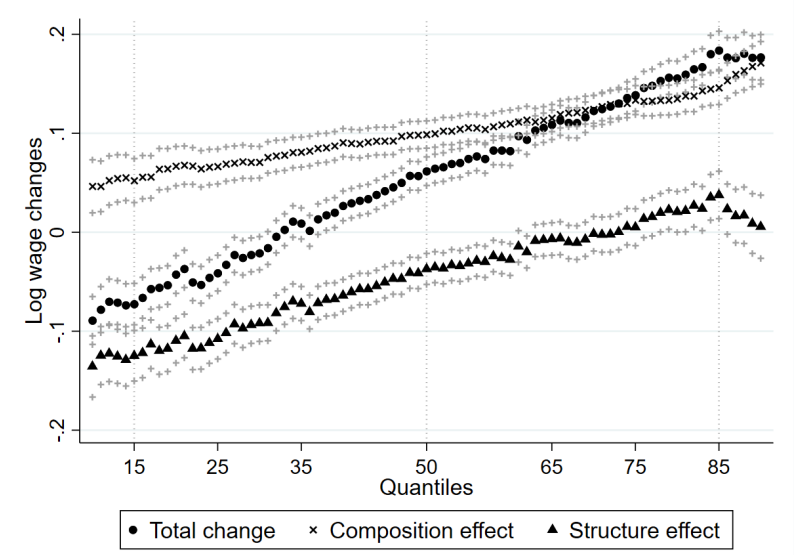
Source: SOEP v34, LFS, SES 2014, Dengler et al. 2014; Author's calculations

These standard unconditional quantile regressions rely on constructing counterfactual wage distributions at one time point and do not account for the actual wage increase of recent decades. Moreover, they do not differentiate between compositional and structural effects. In order to trace the contribution of non-standard work to the rising wage inequality, I therefore decompose the differences between the quantile values of 1995/1996 and 2010/2011 into compositional and structural effects of non-standard work.

Figure 12 displays the total difference of each quantile between the two time points and its decomposition into an aggregate compositional and an aggregate structural change. As shown by the dotted line, the quantile values decreased the most for the lowest quantiles by up to ten percent for the 5th to the 6th quantile. The differences then become linearly smaller with higher quantiles reaching zero roughly at the 35th quantile and reaching the highest value gains of up to 17 percent at the 85th quantile. While the lowest earning 35 percent of the sample suffered wage losses over the time period from 1995 to 2011, the highest earning 65 percent were able to realise wage gains. However, the greatest wage gains were realised by the highest earning and the greatest wage losses were suffered by the lowest earning employees, resulting in increasing wage inequality.

These total differences are the sum of the aggregate composition effects and wage structure effects. As shown by figure 12, the changing composition of the sample raised the wages for almost everyone, except for those at the very lowest quantiles and the most for those at the highest quantiles. The changing wage returns to the employees' characteristics explain the wage losses of the lower third and decrease the wage gains roughly up to the 60th quantile. Above that, they are mostly insignificant.

Figure 12: Decompositions of the total log wage change between 1995/1996 and 2010/2011 into aggregate composition and structure effects for every quantile between the 10th and the 90th quantile of the log gross hourly wage distribution



Note: Decomposed unconditional quantile (RIF) models w/ cluster-robust standard errors; Controls: Marginal employment, age, age squared, residence in East Germany, gender, education in years, full-time equivalent labour market experience, tenure, company size, occupational unemployment rate, sectoral union density, sectoral collective agreement coverage, analytical, interactive and manual non-routine task proportions; Grey plus symbols represent the margins of the 95% confidence intervals; 31,840 person-year observations

Source: SOEP v34, LFS, SES 2014, Dengler et al. 2014; Author's calculations

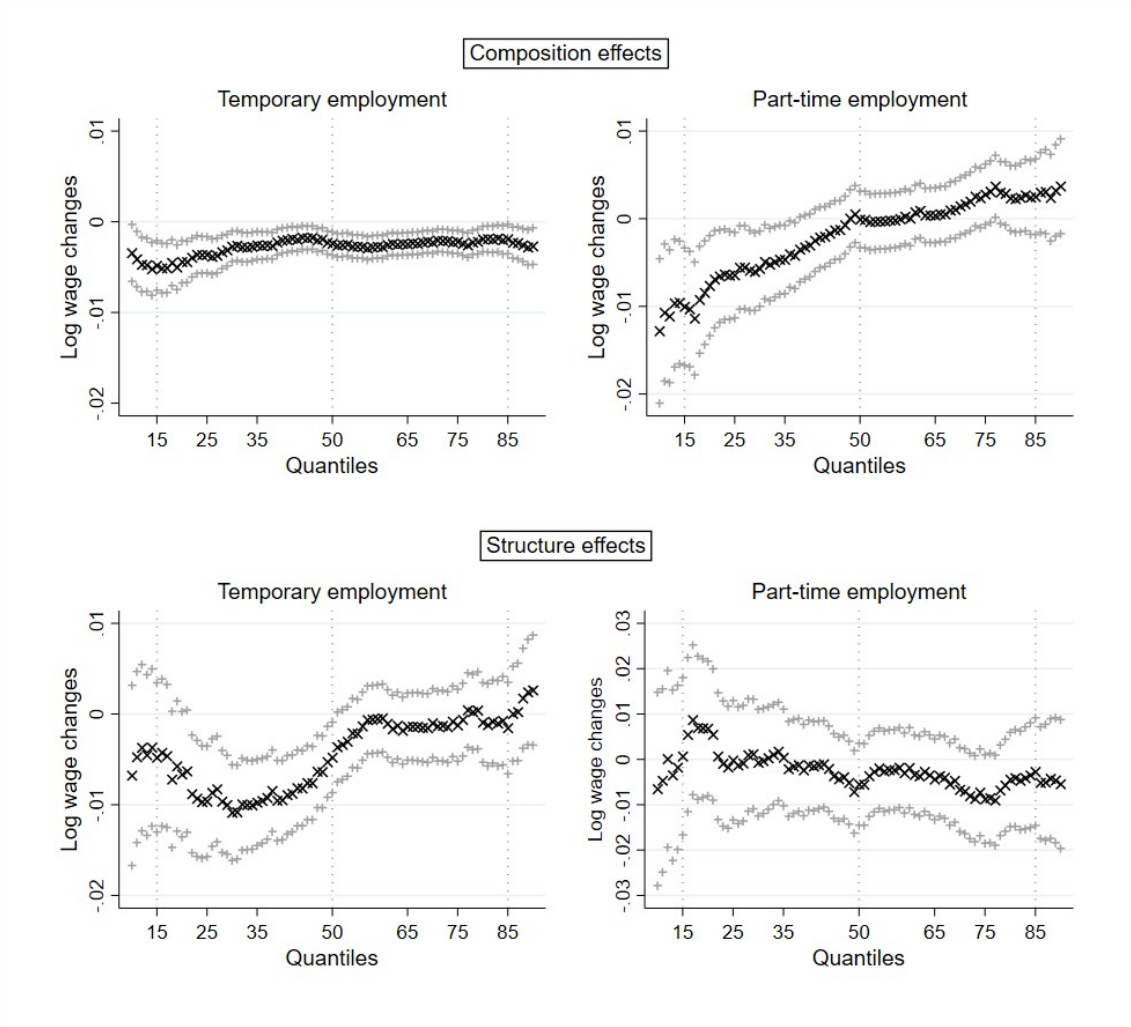
Figure 13 displays the contributions of temporary and part-time employment to the aggregate composition and wage structure effects. Firstly looking at the compositional effects in the first two panels of figure 13, it shows that the quantitative rise in temporary employment contributed mostly to the decreasing values of the 15th to the 20th quantile, by around 0.5 percent. It also depressed the quantile values above the 20th quantile, but less so. The steeper rise in part-time employment had a relatively greater impact, pushing the lowest quantile values down by more than two percent. This negative compositional effect decreases steeply with higher quantile values and reaches zero around the median without becoming significantly positive at any point. While the aggregate compositional effect rather increased nearly all quantile values, non-standard

employment worked against this and contributed significantly to the relatively smaller or even insignificant wage gains of the lowest quantiles.

Conversely, looking at the structural effects in the third and fourth panel in figure 13, part-time employment did not contribute to the change in the wage structure, with the effect being insignificant across all quantiles. The part-time wage differentials in 2010/2011 were apparently not so different from those in 1995/1996. The figure for temporary employment only reveals significant negative contributions roughly between the 20th and the 50th quantile. Apparently, the wage penalties of temporary employment increased for the employees in this area of the wage distribution, while the penalties for all others remained rather constant between 1995/1996 and 2010/2011.

While these results provide initial evidence for my hypotheses, they do not provide a statistical test for the contribution of non-standard work to the rising wage inequality. Therefore, in the analyses below inter-quantile ratios are used instead of quantiles for transforming the wages into RIF values. While all the above changes should be well reflected by the inter-quantile ratios of the 15th, the 50th and the 85th quantile, the last one – the changed wage structure of temporary employment – may remain unnoticed by the analyses below as none of the three quantiles is affected by it.

Figure 13: Decompositions of the total log wage change between 1995/1996 and 2010/2011 into composition and structure effects of non-standard work for every quantile between the 10th and the 90th quantile of the log gross hourly wage distribution



Note: Decomposed unconditional quantile (RIF) models w/ cluster-robust standard errors; Controls: Marginal employment, age, age squared, residence in East Germany, gender, education in years, full-time equivalent labour market experience, tenure, company size, occupational unemployment rate, sectoral union density, sectoral collective agreement coverage, analytical, interactive and manual non-routine task proportions; Grey plus symbols represent the margins of the 95% confidence intervals; 31,840 person-year observations

Source: SOEP v34, LFS, SES 2014, Dengler et al. 2014; Author's calculations

Table 27 finally displays the decomposition results of standard Oaxaca Blinder decompositions of the wage RIFs of the 15th, the 50th and the 85th quantiles, as well as of the inter-quantile ratios of the 50th to the 15th, the 85th to the 50th and the 85th to the 15th

quantile. The aggregate changes of the quantiles and the inter-quantile ratios all correspond to previous findings and theoretical expectations. As shown above by figure 12, all quantile values changed significantly from 1995 to 2011. The 15th quantile of the wage distribution decreased by seven percent, while the 50th quantile increased by six percent and the 85th quantile even by 20 percent. As column 4 reveals, the rise in the difference between the 50th and the 15th quantile proves substantial and highly significant. In 2010/2011, the difference is seven percent greater than in 1995/1996. Although slightly smaller, the rise in the difference between the 85th and the 50th quantile is also highly significant: it increased by four percent. The largest increase is estimated for the overall wage inequality: the difference between the 85th and the 15th quantile rose by 14 percent.

Both compositional and coefficient structure effects contributed to the rise in wage inequality in the bottom half, the top half and the total distribution. However, the structural effects have a much greater proportion in the difference between 69 and 76 percent. The dominance of the aggregate coefficient structure effect in the rise in wage inequality is also found when using a reweighting strategy (table 28) or when using the sample for 1995/1996 as the reference group (table A15 in the Appendix). By contrast, the size, direction and significance of the total compositional effect varies considerably across the specifications.

The second panel of table 27 displays the compositional effects of the individual covariates. Confirming panel 1 of figure 13, the quantitative rise in temporary employment contributed significantly to decreasing wages across the whole wage distribution. The largest contribution is measured at the 15th quantile. As in figure 13, the rise in temporary employment decreased its value by 0.5 percent. Correctly interpreted according to the logic of the constructed counterfactual distribution, this means that if the number of temporary employees in 1995/1996 had been as high as in 2010/2011, the value of the 15th quantile would have been 0.5 percent smaller. While this seems to be a very small effect, it accounts for seven percent of the total difference at the 15th quantile. This effect is cut in half at the 50th quantile, decreasing its value by

merely 0.2 percent. At the 85th quantile, the effect is even slightly smaller, but is still significant.

Most importantly, the difference in the effects between the quantiles is significant: column 4 of table 27 shows a significant contribution of temporary employment to the rise in wage inequality in the bottom half of the wage distribution. The rise in temporary employment between 1995 and 2011 is estimated to have increased the 50/15 quantile ratio by 0.15 percent, which is two percent of the total difference between the two time points. Using the reweighting strategy to construct the counterfactual, as proposed by Fortin et al. (2018), instead produces a larger contribution of 0.3 percent, making up four percent of the total difference (table 28). The effect of temporary employment is, however, not quite significant in this specification with a t-value of 1.9. Considering that the effect is very close to significance and even larger, I take the findings of both analyses as evidence confirming hypothesis I-2.1a that the rise in temporary employment contributed significantly to the rising wage inequality in the bottom half of the wage distribution, but only to a small extent. As suggested by panel 1 of figure 13 and the effects at the quantiles in table 27, I do not find any significant or substantial contribution of temporary employment to the rising wage inequality in the top half of the wage distribution. Hypothesis I-3.1a is thus also confirmed. Lastly, the results suggest a significant compositional contribution of temporary employment to the rise in the overall wage inequality of 0.2 percent, explaining two percent of the total difference of the 85/15 quantile ratio between 1995 and 2011. While this is also a small contribution, hypothesis I-1.1a is confirmed. This is supported by the reweighted model (see panel 3 of table 28).

Looking at the effects of part-time employment in panel 2 of table 27, the same contribution structure is revealed. As suggested by panel 2 of figure 13, the increase in part-time employment between 1995 and 2011 significantly decreased the 15th quantile by one percent, while not changing either the 50th or the 85th quantile. Likewise, it contributed significantly to the rising inequality in the bottom half of the wage distribution: The increase in part-time employment raised the 50/15 quantile ratio by 0.5

percent between 1995 and 2011, thereby explaining eight percent of the total rise in inequality in the bottom half of the wage distribution. Hypothesis I-2.1b is thus confirmed. As expected from the previous evidence, I find no significant compositional effect of part-time employment on the 85/50 quantile ratio. Hypothesis I-3.1b is thus also confirmed. Lastly, I do find a significant compositional effect of part-time employment on the overall wage inequality. The increase in part-time employment enlarged the difference between the 85th and the 15th quantile by 0.7 percent, accounting for nearly six percent of the overall rise in wage inequality. Hypothesis I-1.1b is thus also confirmed. These results are supported by the reweighted models as displayed in table 28.

Marginal employment also exhibits the same compositional effect structure as temporary and part-time employment, but with greater effects. It is estimated to have significantly enlarged the 50/15 quantile ratio by one percent, the 85/50 quantile ratio by 0.3 percent and the 85/15 quantile ratio by 1.7 percent. Taking the compositional effects of these three forms of non-standard work – temporary, part-time and marginal employment – together explains 27 percent of the rise in inequality in the bottom half of the wage distribution and 20 percent of the overall wage inequality. These numbers should be interpreted with caution, as unobserved heterogeneity may bias the proportions. Nonetheless, they are a serious hint at the importance of compositional differences in (non-)standard work for wage inequality, especially in the bottom half of the wage distribution.

While the changing composition of the labour force in terms of (non-)standard work contributed significantly to the rise in wage inequality, this is not the case for the wage differentials of non-standard work. None of the estimated wage structure effects of temporary or part-time employment on wage inequality are significant, nor are those of marginal employment. Only when using the reweighting strategy to construct the counterfactual distribution does the wage structure effect of part-time employment increase the inequality in the top half of the wage distribution. I therefore reject hypotheses I-1.2a, I-2.2a, I-3.2a as well as hypotheses I-1.2b, I-2.2b, I-3.2b. Apparently,

the wage penalties of temporary and part-time employment did not change substantially between 1995 and 2011. Neither a further polarisation nor a normalisation of these employment forms seems to have taken place to a substantial extent. Considering panel 1 of figure 13, it may simply be that changing penalties of temporary employment contributed significantly to the rising wage inequality in the lower middle part of the wage distribution.

Besides the main effects that are of interest here, some control variables also have a substantial effect on the inequality. While the increasing average age of the labour force enlarges the wage inequality in the top half of the distribution by pulling down the median, changing wage effects of age have a much stronger positive effect on the inequality in the bottom half of the distribution by pulling down the 15^{th} quantile. This may be a hint at both a growing number of older employees with middle to low wages and greater wage penalties for young employees.

The shrinking proportion of those working in the territory of the former East Germany seems to have worked against the rising inequality in all parts of the wage distribution by reducing the relative number of those working for the relatively lower wages of the region, especially in the bottom part of the distribution. The ongoing equalisation of the wage levels between West and East Germany contributed to higher wages across the whole distribution, thereby having no effect on wage inequality.

The rising proportion of women in the labour force depressed wages across the whole distribution, but the most at the 85^{th} quantile. Accordingly, the wage inequality in the top half of the distribution is reduced significantly. In addition, I find that a changing gender wage gap raises the wages under the 15^{th} quantile, thereby reducing the bottom half wage inequality. Contrary to the other findings, however, this latter finding is not supported by the estimation with reweighted distributions (see table A16 in the Appendix for the detailed estimates).

The increasing education level of the labour force is estimated to contribute significantly to a rising wage inequality in the top half of the distribution by raising the

higher wages much more than middle and lower wages. Interestingly, however, I do not find any significant effect on wage inequality of changing wage returns to education. While I do find that the highest wages benefited the most from it, the differences between the quantiles are apparently not large enough.

The compositional differences in the labour market experience are found to decrease the wage inequality in the top half of the distribution, which is, however, not supported by the reweighted estimates. Changing wage returns to tenure have increased the wages below the median, thereby reducing the wage inequality in the top half of the wage distribution. The compositional and structural effects of company size differ considerably between the standard and the reweighted decomposition, which is why I refrain from taking them into consideration here.

The shrinking unemployment rate worked significantly against the rising wage inequality both at the bottom and the top of the wage distribution. In addition, a changing wage effect of the occupational unemployment rate is estimated to decrease the wage inequality, which is, however, not confirmed by the reweighted estimates.

The sectoral union density is estimated to have no significant effect. This may, however, be due to the insufficient data, which only allows an estimation of the effects of union density differences between sectors, while disregarding the declining union density within sectors (see sections 4.1).

Nonetheless, the sectoral collective agreement coverage does have an effect, although it only includes changes between sectors. Surprisingly, its compositional change between sectors worked slightly against the rising wage inequality. Apparently, it is predominantly the declining coverages within sectors that may drive the wage inequality and not changes in the composition of the economic sectors. The significant negative wage structure effect of the collective agreement coverage on the top half of the wage distribution is not confirmed by the reweighted decomposition.

The compositional and structural effects of the non-routine task proportions lastly all differ between the standard and the reweighted decomposition method and may be biased by their collinearity, which is why I do not interpret them.

Table 27: Decompositions of log gross hourly wage changes between 1995/1996 and 2010/2011 for selected quantiles and inter-quantile ratios (not reweighted)

	15th quantile	50th quantile	85th quantile	50/15 quantile ratio	85/50 quantile ratio	85/15 quantile ratio
OVERALL						
2010/2011	2.1735*** (283.72)	2.7245*** (680.96)	3.2351*** (429.59)	1.2535*** (301.67)	1.1874*** (419.44)	1.4884*** (256.53)
1995/1996	2.2461*** (219.23)	2.6629*** (469.06)	3.0514*** (369.75)	1.1855*** (249.81)	1.1459*** (404.30)	1.3585*** (209.57)
Total difference	-0.0726*** (-5.92)	0.0617*** (9.19)	0.1837*** (17.37)	0.0680*** (11.22)	0.0415*** (10.75)	0.1299*** (15.83)
Aggregate composition effect	0.0522*** (4.49)	0.0987*** (13.99)	0.1461*** (14.10)	0.0160*** (2.81)	0.0129*** (3.06)	0.0337*** (4.30)
Aggregate structure effect	-0.1248*** (-9.23)	-0.0371*** (-4.46)	0.0377*** (2.58)	0.0519*** (7.02)	0.0286*** (4.59)	0.0962*** (8.87)
DETAILED COMPOSITION EFFECTS						
Temporary employment	-0.0048*** (-3.34)	-0.0024*** (-3.64)	-0.0019** (-2.31)	0.0015** (2.11)	0.0003 (0.95)	0.0021** (2.30)
Part-time employment	-0.0100*** (-2.95)	-0.0001 (-0.05)	0.0025 (1.17)	0.0053*** (2.92)	0.0010 (1.04)	0.0072*** (3.08)
Marginal employment	-0.0257*** (-8.12)	-0.0046*** (-4.54)	0.0029* (1.89)	0.0116*** (7.58)	0.0031*** (6.86)	0.0169*** (8.80)
Age *(centred)*	0.0915*** (3.81)	0.1467*** (10.69)	0.0692*** (3.92)	0.0164 (1.29)	-0.0367*** (-4.89)	-0.0246 (-1.47)
Age squared	-0.1084*** (-4.97)	-0.1526*** (-11.15)	-0.0548*** (-3.25)	-0.0101 (-0.89)	0.0446*** (6.11)	0.0413*** (2.71)
Region of residence *(reference: West Germany)*	0.0241*** (7.41)	0.0191*** (7.45)	0.0147*** (7.07)	-0.0043*** (-4.57)	-0.0026*** (-5.00)	-0.0081*** (-5.97)
Gender *(reference: men)*	-0.0076*** (-4.76)	-0.0090*** (-7.30)	-0.0133*** (-7.01)	0.0000 (0.06)	-0.0012** (-2.20)	-0.0014 (-1.39)
Education in years *(centred)*	0.0199*** (4.31)	0.0333*** (11.50)	0.0654*** (10.82)	0.0042* (1.75)	0.0104*** (4.54)	0.0172*** (4.49)
Full-time equivalent experience *(centred)*	0.0088*** (3.39)	0.0084*** (4.74)	0.0014 (0.94)	-0.0009 (-0.79)	-0.0031*** (-3.96)	-0.0047*** (-2.87)

	15th quantile	50th quantile	85th quantile	50/15 quantile ratio	85/50 quantile ratio	85/15 quantile ratio
Tenure *(centred)*	0.0033**	0.0057***	0.0064***	0.0008	-0.0000	0.0009
	(2.41)	(5.15)	(4.17)	(1.06)	(-0.06)	(0.82)
Company size *(normalised)*						
Less than 20 employees	-0.0021*	-0.0010*	-0.0005*	0.0006	0.0002	0.0010
	(-1.69)	(-1.77)	(-1.68)	(1.59)	(1.63)	(1.64)
20-199 employees	0.0001	-0.0004	-0.0004	-0.0002	0.0000	-0.0002
	(0.32)	(-1.41)	(-1.35)	(-1.19)	(0.50)	(-1.05)
200-1999 employees	-0.0022***	-0.0010***	0.0002	0.0007***	0.0005***	0.0015***
	(-3.08)	(-2.95)	(0.82)	(2.71)	(2.73)	(3.00)
2000 or more employees	-0.0000	-0.0000	-0.0000	0.0000	0.0000	0.0000
	(-0.01)	(-0.01)	(-0.01)	(0.01)	(0.00)	(0.00)
Occupational unemployment rate	0.0699***	0.0498***	0.0123*	-0.0150***	-0.0167***	-0.0370***
	(6.63)	(8.52)	(1.92)	(-2.64)	(-5.20)	(-5.13)
Sectoral union density	-0.0015	0.0003	-0.0011	0.0009	-0.0006	0.0004
	(-1.30)	(0.56)	(-1.31)	(1.55)	(-1.52)	(0.50)
Sectoral collective agreement coverage	0.0043***	0.0012**	-0.0017**	-0.0017***	-0.0012***	-0.0034***
	(3.61)	(2.49)	(-2.49)	(-3.32)	(-3.10)	(-3.65)
Analytical non-routine task proportion	-0.0034	0.0131***	0.0590***	0.0076***	0.0167***	0.0285***
	(-0.67)	(4.32)	(9.97)	(2.80)	(7.10)	(6.91)
Interactive non-routine task proportion	-0.0142***	-0.0126***	-0.0098***	0.0020	0.0017	0.0042*
	(-4.09)	(-6.50)	(-3.54)	(1.09)	(1.47)	(1.76)
Manual non-routine task proportion	0.0103***	0.0047***	-0.0043***	-0.0034***	-0.0036***	-0.0082***
	(4.35)	(3.63)	(-2.65)	(-2.77)	(-4.70)	(-4.94)
DETAILED STRUCTURE EFFECTS						
Temporary employment	-0.0048	-0.0048**	-0.0015	0.0010	0.0016	0.0035
	(-1.12)	(-2.39)	(-0.60)	(0.45)	(1.52)	(1.19)
Part-time employment	0.0007	-0.0055	-0.0027	-0.0019	0.0013	0.0001
	(0.08)	(-1.19)	(-0.46)	(-0.39)	(0.52)	(0.01)
Marginal employment	0.0009	0.0014	0.0006	0.0018	-0.0004	0.0027
	(0.19)	(0.80)	(0.22)	(0.69)	(-0.54)	(0.88)
Age *(centred)*	-0.0619**	-0.0126	0.0194	0.0312**	0.0144*	0.0566***
	(-2.28)	(-0.87)	(0.99)	(2.04)	(1.73)	(2.81)
Age squared	-0.5274***	-0.0516	0.1788	0.2950***	0.1014*	0.4942***
	(-2.78)	(-0.49)	(1.23)	(2.75)	(1.66)	(3.48)
Region of residence *(reference: West Germany)*	0.0244***	0.0281***	0.0236***	0.0022	-0.0022	0.0013
	(3.42)	(7.64)	(5.77)	(0.50)	(-1.05)	(0.26)
Gender *(reference: men)*	0.0322***	-0.0048	-0.0208*	-0.0193***	-0.0039	-0.0284***
	(2.75)	(-0.63)	(-1.75)	(-2.80)	(-0.76)	(-3.07)

	15th quantile	50th quantile	85th quantile	50/15 quantile ratio	85/50 quantile ratio	85/15 quantile ratio
Education in years *(centred)*	0.0157***	0.0208***	0.0263***	0.0003	-0.0001	0.0009
	(3.83)	(7.45)	(5.10)	(0.14)	(-0.07)	(0.25)
Full-time equivalent experience *(centred)*	0.0006	-0.0001	0.0003	-0.0004	0.0001	-0.0004
	(1.02)	(-0.31)	(0.87)	(-1.17)	(0.86)	(-0.93)
Tenure *(centred)*	0.0090***	0.0095***	-0.0011	-0.0009	-0.0047***	-0.0069***
	(4.35)	(6.88)	(-0.57)	(-0.77)	(-5.43)	(-4.16)
Company size *(normalised)*						
Less than 20 employees	0.0125**	-0.0109***	-0.0102***	-0.0106***	0.0013	-0.0099***
	(2.34)	(-3.98)	(-3.32)	(-3.52)	(0.95)	(-2.64)
20-199 employees	-0.0048	-0.0034	-0.0071*	0.0010	-0.0009	-0.0002
	(-0.99)	(-1.16)	(-1.78)	(0.35)	(-0.52)	(-0.06)
200-1999 employees	-0.0057*	0.0066***	0.0008	0.0055***	-0.0026*	0.0025
	(-1.78)	(2.96)	(0.25)	(2.85)	(-1.84)	(0.95)
2000 or more employees	-0.0028	0.0066**	0.0152***	0.0041**	0.0023	0.0077**
	(-0.77)	(2.57)	(3.53)	(2.01)	(1.26)	(2.46)
Occupational unemployment rate	0.0226***	0.0105***	-0.0060**	-0.0090***	-0.0070***	-0.0199***
	(4.66)	(3.96)	(-2.08)	(-3.24)	(-4.89)	(-5.87)
Sectoral union density	-0.0318	0.0195	0.0063	0.0259*	-0.0064	0.0228
	(-1.26)	(1.31)	(0.30)	(1.87)	(-0.73)	(1.22)
Sectoral collective agreement coverage	-0.0071	0.0227	-0.1055***	0.0068	-0.0485***	-0.0593**
	(-0.23)	(1.12)	(-3.42)	(0.37)	(-3.70)	(-2.39)
Analytical non-routine task proportion	0.0005	0.0033**	-0.0067***	0.0013	-0.0041***	-0.0031*
	(0.24)	(2.34)	(-2.81)	(1.12)	(-4.01)	(-1.77)
Interactive non-routine task proportion	0.0005	-0.0003	0.0016**	-0.0004	0.0007**	0.0005
	(0.66)	(-0.63)	(2.12)	(-0.79)	(2.44)	(0.89)
Manual non-routine task proportion	0.0003	0.0008	0.0019**	0.0000	0.0004	0.0003
	(0.21)	(1.03)	(2.02)	(0.03)	(0.81)	(0.29)
Constant	0.4016*	-0.0730	-0.0754	-0.2818**	-0.0142	-0.3685**
	(1.81)	(-0.59)	(-0.44)	(-2.26)	(-0.20)	(-2.23)
Observations (n)	31,840	31,840	31,840	31,840	31,840	31,840

Note: Decomposed unconditional quantile (RIF) models w/ bootstrapped standard errors (1000 repetitions)

Source: SOEP v34, LFS, SES 2014, Dengler et al. 2014; Author's calculations

Re-estimating the decomposition analyses with reweighted distributions, as proposed by Fortin et al. (2018), in order to account for non-linearity in the construction of the counterfactual distribution or in the RIF regressions, results in very similar effects

concerning the main variables of interest – temporary and part-time employment (see table 28). However, some substantial differences are found concerning the control variables as described in the paragraphs above (see table A16 in the Appendix). When estimating the decomposition with reweighted distributions, the composition and the structure part of the total difference in the statistic of interest can be further separated into a pure composition effect and a specification error, as well as a pure structure effect and a reweighting error. These error terms allow one to assess the validity of the linearity assumptions and the quality of the reweighting procedure. As I find no significant reweighting error for any quantile range, I conclude that the reweighting process is adequate. However, I do find significant specification errors for the models of the 85/50 and the 85/15 quantile ranges. The aggregate pure composition effect deviates significantly from the difference between the 1995/1996 sample and the counterfactual distribution combining the composition of the 2010/2011 sample with the wage structure of the 1995/1996 sample. As Fortin et al. (2018) explain, that hints at a departure from the linearity assumption either in the RIF regressions or in the construction of the counterfactual distribution. The error is relatively large compared to the total difference in both instances, suggesting that the results may be biased by the violation of the linearity assumption.

Table 28: Decompositions of log gross hourly wage changes between 1995/1996 and 2010/2011 for selected inter-quantile ratios (reweighted)

	50/15 quantile ratio		85/50 quantile ratio		85/15 quantile ratio	
OVERALL						
2010/2011	1.2535***		1.1874***		1.4884***	
	(301.67)		(419.44)		(256.53)	
Counterfactual	1.2095***		1.1330***		1.3704***	
	(88.00)		(107.50)		(74.53)	
1995/1996	1.1855***		1.1459***		1.3585***	
	(249.81)		(404.30)		(209.57)	
Total difference	0.0680***		0.0415***		0.1299***	
	(11.22)		(10.75)		(15.83)	
AGGREGATE DECOMPOSITION						
	Composition	Structure	Composition	Structure	Composition	Structure
Aggregate effects	0.0240*	0.0440***	-0.0129	0.0544***	0.0119	0.1180***
	(1.75)	(3.05)	(-1.27)	(5.02)	(0.66)	(6.22)
Pure aggregate effects	0.0364***	0.0594***	0.0087	0.0474***	0.0520***	0.1270***
	(3.35)	(3.73)	(1.64)	(3.53)	(3.24)	(5.59)
Specification error	-0.0124		-0.0216***		-0.0401**	
	(-0.79)		(-2.65)		(-2.11)	
Reweighting error		-0.0154		0.0070		-0.0090
		(-1.40)		(0.84)		(-0.71)
DETAILED DECOMPOSITION						
	Composition	Structure	Composition	Structure	Composition	Structure
Temporary employment	0.0029*	0.0051	0.0006	0.0018	0.0041**	0.0083
	(1.90)	(1.11)	(0.92)	(0.78)	(2.06)	(1.56)
Part-time employment	0.0080***	-0.0045	0.0015	0.0120**	0.0110***	0.0102
	(2.70)	(-0.48)	(1.03)	(2.08)	(2.83)	(0.89)
Marginal employment	0.0226***	-0.0007	0.0060**	-0.0012	0.0330***	-0.0010
	(2.64)	(-0.09)	(2.51)	(-0.64)	(2.66)	(-0.12)
Constant		-0.7258***		-0.0027		-0.8490***
		(-3.17)		(-0.02)		(-2.96)
Observations (n)	31,840		31,840		31,840	

Note: Decomposed unconditional quantile (RIF) models w/ bootstrapped standard errors (1000 repetitions); Reweighted estimation of the counterfactual distribution following Firpo et al. (2018); Controls: age, age squared, residence in East Germany, gender, education in years, full-time equivalent labour market experience, tenure, company size, occupational unemployment rate, sectoral union density, sectoral collective agreement coverage, analytical, interactive and manual non-routine task proportions

Source: SOEP v34, LFS, SES 2014, Dengler et al. 2014; Author's calculations

As the results of a decomposition analysis are sensitive to the base group choice which serves as a reference for the counterfactual distribution, I re-estimate the non-reweighted model once with the base group being 1995/1996 instead of 2010/2011. The results displayed in table A15 in the Appendix confirm the previous results and their interpretation. The signs of the coefficients are reversed as the base group changes, but all the above reported significant effects of non-standard work on the quantiles and the inter-quantile ratios are also significant. They are even greater in magnitude and even the compositional effects of both temporary and part-time employment on the top half wage inequality are significant, while still being considerably smaller than the compositional effects on the bottom half and the total wage inequality. In addition, in this specification, as in the reweighted model, part-time employment even has a significant structural effect on the top half wage inequality, suggesting that a further polarisation between part-time and full-time employment has taken place at least in the upper part of the wage distribution. Most importantly, however, the previous results are not sensitive to the base group choice, which is additional evidence for the confirmed hypotheses regarding the compositional effects. Moreover, the now significant structural effect of part-time employment suggests that further research could be worthwhile into the change in the wage penalties of non-standard employment over time and its effect on wage inequality.

Finally, re-estimating the models separately for women and men reveals some further insights. As can be seen in table 29, the effects of the rise in temporary employment are solely due to male temporary workers, while the effects of the rise in part-time employment can be traced back exclusively to female part-time workers. This is true with regard to both the significance and the magnitude of the effects and is confirmed by models with reweighted distributions (see tables A17 and A18 in the Appendix). Apparently, male temporary workers are more often found in the lowest earning labour market segments, which means that an increase in them depresses the wages particularly below the 15th quantile of the wage distribution. Female temporary workers, on the contrary, are seemingly more evenly distributed across the wage distribution, resulting

in relatively similar effects on the different quantiles. Hypotheses I-1.1a, I-2.1a and I-3.1a are thus only true for men. The opposite is true for part-time employment. The rise in part-time employment was steeper for women than for men (figure 1 or table 5), resulting in substantial and significant compositional effects of part-time employment on the female wage distribution, while the rise in male part-time employment was not sufficient to contribute substantially to the rise in wage inequality. Hypotheses I-1.1b, I-2.1b and I-3.1b are thus only true for women. The effects of marginal employment found above are confirmed for both women and men, but the effect is much stronger for women.

Table 29: Decompositions of log gross hourly wage changes between 1995/1996 and 2010/2011 for selected inter-quantile ratios separately for women and men (not reweighted)

	Women			Men		
	50/15 quantile ratio	85/50 quantile ratio	85/15 quantile ratio	50/15 quantile ratio	85/50 quantile ratio	85/15 quantile ratio
OVERALL						
2010/2011	1.2624*** (208.43)	1.1792*** (307.10)	1.4886*** (176.10)	1.2328*** (274.28)	1.1714*** (351.00)	1.4441*** (226.76)
1995/1996	1.2029*** (161.49)	1.1420*** (250.35)	1.3737*** (134.37)	1.1659*** (243.91)	1.1391*** (268.18)	1.3281*** (181.82)
Total difference	0.0595*** (6.18)	0.0371*** (6.34)	0.1148*** (8.77)	0.0670*** (10.23)	0.0322*** (6.06)	0.1160*** (12.34)
Aggregate composition effect	0.0150 (1.61)	0.0139** (2.15)	0.0339*** (2.65)	0.0041 (0.60)	0.0151*** (2.74)	0.0223** (2.41)
Aggregate structure effect	0.0445*** (3.37)	0.0232*** (2.67)	0.0810*** (4.47)	0.0629*** (7.35)	0.0171** (2.20)	0.0937*** (7.53)
DETAILED COMPOSITION EFFECT						
Temporary employment	0.0000 (0.00)	0.0000 (0.05)	0.0000 (0.02)	0.0015** (2.20)	0.0002 (0.73)	0.0020** (2.40)
Part-time employment	0.0062** (2.32)	0.0054*** (3.25)	0.0135*** (3.65)	0.0004 (0.31)	0.0000 (0.02)	0.0005 (0.27)
Marginal employment	0.0157*** (4.99)	0.0066*** (7.13)	0.0258*** (6.52)	0.0018** (2.38)	0.0007** (2.15)	0.0029*** (2.87)
DETAILED STRUCTURE EFFECT						
Temporary employment	-0.0010 (-0.25)	0.0040** (2.24)	0.0040 (0.82)	0.0042 (1.61)	0.0008 (0.68)	0.0061* (1.94)
Part-time employment	-0.0005 (-0.05)	-0.0107* (-1.81)	-0.0125 (-0.94)	0.0031 (1.43)	0.0006 (0.48)	0.0044 (1.55)
Marginal employment	-0.0005 (-0.10)	-0.0030* (-1.91)	-0.0027 (-0.41)	0.0015 (1.42)	-0.0006 (-1.35)	0.0013 (0.98)
Constant	-0.3135 (-1.59)	-0.0976 (-0.89)	-0.4935** (-1.97)	-0.5709*** (-3.83)	-0.0144 (-0.16)	-0.7078*** (-3.72)
Observations (n)	15,009	15,009	15,009	16,831	16,831	16,831

Note: Decomposed unconditional quantile (RIF) models w/ bootstrapped standard errors (1000 repetitions); Controls: age, age squared, residence in East Germany, education in years, full-time equivalent labour market experience, tenure, company size, occupational unemployment rate, sectoral union density, sectoral collective agreement coverage, analytical, interactive and manual non-routine task proportions

Source: SOEP v34, LFS, SES 2014, Dengler et al. 2014; Author's calculations

5.11 Intermediate summary V

Summarising, I find that all three forms of non-standard work – temporary, part-time and marginal employment – contributed substantially and significantly to the rising wage inequality between 1995 and 2011. As they are all more prevalent in low earning labour market segments, their quantitative rise particularly depressed the wages of those below the 15th quantile, resulting in a significant rise in wage inequality particularly in the bottom half of the wage distribution. As gender separated models show, however, the effects of temporary employment are solely due to male temporary workers, while the effects of part-time employment are only found for female part-time workers. Hypotheses I-1.1a, I-2.1a and I-3.1a are thus confirmed for men, but not for women, while hypotheses I-1.1b, I-2.1b and I-3.1b are only confirmed for women, but nor for men. In the estimated models, the overall compositional contribution of non-standard work amounts to 27 percent of the rise in the bottom half wage inequality – indicated by the 50/15 quantile rage – and 20 percent to the overall wage inequality – indicated by the 85/15 quantile range. While these proportions may be overestimated due to unobserved heterogeneity, they are – together with the significant covariate effects – a strong indication of the considerable relevance of non-standard employment relationships for the rising wage inequality between 1995 and 2011.

Table 30: Summary of the hypotheses and results for the wage inequality effects on non-standard work

Temporary employment			
Hypotheses			**Results**
Composition	increased *(I-1.1a)*	**Overall wage inequality**	Confirmed for men
Structure	increased *(I-1.2a)*		Not confirmed
Composition	increased *(I-2.1a)*	**Bottom half wage inequality**	Confirmed for men
Structure	increased *(I-2.2a)*		Not confirmed
Composition	increased less *(I-3.1a)*	**Top half wage inequality**	Confirmed for men
Structure	increased less *(I-3.2a)*		Not confirmed
Part-time employment			
Hypotheses			**Results**
Composition	increased *(I-1.1b)*	**Overall wage inequality**	Confirmed for women
Structure	increased *(I-1.2b)*		Not confirmed
Composition	increased *(I-2.1b)*	**Bottom half wage inequality**	Confirmed for women
Structure	increased *(I-2.2b)*		Not confirmed
Composition	increased less *(I-3.1b)*	**Top half wage inequality**	Confirmed for women
Structure	increased less *(I-3.2b)*		Not confirmed

Source: Author's table

6 Conclusions

This study is dedicated to the question of for whom non-standard work bears precarity risks. In the following conclusion, I will first revise the political and scientific background before providing a summary of the theoretical considerations and a very brief description of the data and the methods used. Secondly, I will summarise the key findings in order to thirdly discuss their implications for the state of the art and the theory. Finally, I will discuss the limitations and remaining open questions in order to provide possible links for further research.

The study is based on a rich body of research in sociology, economics and to some extent psychology concerning non-standard work and precarity which has evolved in the last three decades in Germany and other Western countries. In Germany, the initial period was characterised by a focus on macroeconomic outcomes of the labour market reforms of the 1980s, such as unemployment, which gained a new prevalence after the Hartz reforms in 2004. The underlying public discourse for this research is the question of whether non-standard work can reduce unemployment by making the labour market more flexible, i.e. adaptable to the increasingly volatile needs of the employers, and by serving as a bridge to standard employment.

With the emerging discourse on an increasing labour market precarity in Western Europe, the main interest turned to the question of to what extent non-standard employment is precarious. At the same time, scholars started to research empirically the claim of a universal precarisation. It is only in recent years that the heterogeneity of the individual consequences of non-standard employment relationships and of the precarisation process came to be the explicit focus of research. This is where my research interest lies.

In the analyses above, I explicitly enquire about the contextual factors which determine to what extent non-standard employment relationships are a subjective and a material precarity risk for employees. By focusing on gender and vertical labour market

segmentation, I systematically relate the flexibilisation of the labour market with questions of inequality between groups of employees. In the final section, I raise this question to the macroeconomic level again by explicitly analysing the effects of non-standard work on wage inequality.

By systematically analysing the precarity risks of non-standard work across relevant contextual factors, this study is the first to look at the heterogeneity of both material and subjective precarity risks at the same time and across a series of theoretically based contextual factors. Moreover, it is the first to explicitly study the impact non-standard work has had on the rise in wage inequality in recent decades. It therefore provides a unique insight into the relationship between non-standard work and existing inequalities in the labour market.

As most prevalent instances of non-standard work, temporary and part-time employment relationships are the starting point for the analyses. While temporary employment enables a certain degree of external-numerical flexibility on the part of the employer by circumventing dismissal protections, part-time employment potentially enables both more extended adjustment possibilities between the labour and the non-labour sphere for the employee and a more flexible placement of hours worked for the employer, which is termed internal-temporal flexibility.

An employment relationship is defined as the special relationship between the seller and the buyer of labour power in capitalism, which is special in the sense that human labour represents an imperfect or “fictitious” commodity (Polanyi 1978), as it is inextricably physically linked to the seller who, moreover, is existentially dependent on the wage. The empirical manifestation of an employment relationship is therefore always the result of a demanding and conflictive bargaining process, which historically resulted in a specific set of labour market institutions regulating the degree of the commodification of human labour. In this sense, wage labour is by itself a precarious condition, as wage labourers have no means with which to survive other than selling their own labour power.

The struggle over the degree of the commodification of labour thus always entails the struggle over the precarity risks employees have to face, or expressed differently, the degree to which they are protected from these risks. The extended legal range and the rising proportion of non-standard employment are thus part of a re-commodification process and thereby alter the conditions for employment relationship bargaining on the individual and the collective level of trade unions and employers' associations.

The basic assumption here is that these altered conditions, however, do not impact all employees equally. Rather, established lines of inequality influence, i.e. moderate, how employees are affected by temporary and part-time employment. Here, I want to focus on two common and recognised dimensions of inequality: firstly, to be identified as a woman or a man still heavily structures the distribution of social roles, chances, work and recognition in Germany. Therefore, the influence of gender on the precarity risks of non-standard work is the first focus of the analyses. Secondly, the labour market is highly segmented into different occupations and employment systems. In their segmentation heuristic, Krause and Köhler (2008) identify a vertical segmentation of the labour market determined by the wage level and the employment stability. Hence, the influence of the vertical labour market position – indicated by the International Socio-Economic Index of Occupational Status (ISEI) – on the precarity risks of non-standard work is the second focus of the analyses.

These two dimensions of inequality correlate, however, with further contextual factors in the labour market, which potentially determine the bargaining positions of the employees and thus the individual precarity risks of non-standard work. In that sense, they may explain the influence of gender and the vertical labour market position on the precarity risks of non-standard work. In order to systematise these contextual factors, I turn to two theories that cover both sides of the underlying social conflict: the power resources theory as refined by Schmalz and Dörre (2014) focuses on the power resources of the *employees*. The neo-institutional labour economics approach of Krause and Köhler (2012) explains the structure of the labour market endogenously with the interests of the *employers*.

Schmalz and Dörre (2014) define four dimensions of power resources that workers can rely on in individual and collective bargaining processes: firstly, the structural production power is based on the economic relevance of the employees in the production process. Secondly, the structural market power derives from a dense labour supply raising the dependence of employers on their employees. Thirdly, the associational power stems from the capacity of trade unions to bargain collectively. Fourthly, the institutional power is the historically established frame of legal regulations and collective agreements structuring the bargaining process. From the perspective of the employers, these dimensions of workers' power resources are transformed into difficulties.

In their neo-institutional labour economics approach, Krause and Köhler (2012) postulate two basic problems that employers face in the labour market: the personnel adjustment problem describes the need of the employers to be able to hire and discard personnel according to their needs. It implies that the larger the labour surplus employers can draw from, the better their bargaining position and the worse the bargaining position of the employees. This matches the structural market power of the employees. The transformation problem poses the question of how employers can secure the transformation of the labour power of the employees into the product even when the production process or the product cannot be entirely controlled. This implies that the bargaining position of the employers becomes worse – while the bargaining position of the employees becomes better – the more difficult it is to control the job tasks.

From these theoretical propositions, I derive five indicators of the relevant contextual factors shaping the bargaining conditions of non-standard employees: the International Socio-Economic Index of Occupational Status (ISEI), the occupational unemployment rate, the sectoral union density, the sectoral collective agreement coverage and finally the occupational proportion of non-routine tasks. Due to the lack of appropriate panel data, the last three indicators are included as time-constant variables and are derived from the years 2013 to 2015.

In the analyses, I endeavour to explain the heterogeneity of the precarity risks of non-standard employment across gender and vertical labour market positions with these contextual factors in two steps. In accordance with the precarity definition of Brinkmann et al. (2006), I first focus on the subjective precarity risks indicated by affective job insecurity in the case of temporary employment and cognitive labour market insecurity in the case of part-time employment. In order to theorise the subjective transformation of a contractual condition into an affective or cognitive response, I make use of the transactional theory of stress and coping (Lazarus/Folkman 1984). Basically, this asserts that a stressor – such as a temporary contract – leads to a stress response – such as affective job insecurity – by means of two appraisals: in the first appraisal, the individual assesses to what extent the temporary contract is a threat to her needs, values or goals. In the second appraisal, she assesses to what extent she has the resources to cope with that threat in a problem-oriented manner. Power resources and neo-institutional labour economics theory then serve as the basis for hypothesising the heterogeneity in these appraisals.

In the second step, I analyse the heterogeneity of the material precarity risks indicated by log gross hourly wage differentials. Here, power resources and neo-institutional labour economics theory provide the basis for hypothesising the differentials and their heterogeneity as a result of heterogeneous bargaining conditions.

Finally, I raise the analyses to the macro level and focus on the heterogeneity of the wage effects of non-standard employment on the distributional level. Therefore, I test whether temporary and part-time employment contributed to the rise in inequality in the bottom half of the wage distribution – indicated by the 50/15 quantile ratio – the top half of the wage distribution – indicated by the 85/50 quantile ratio – and the whole distribution – indicated by the 85/15 quantile ratio between 1995 and 2011.

I mainly use SOEP data from 1995 to 2017 for the analyses, restricting the sample to employed individuals aged between 17 and 65. The occupational unemployment rate is taken from the LFS (European Commission 1998), the collective agreement coverage

from the SES (European Commission 2014; Statistisches Bundesamt 2016) and the occupational non-routine task proportions from Dengler et al. (2014). For the analyses of the precarity risks, I use fixed effects regressions with interactions between the indicators of non-standard work and the indicators of the inequality dimensions and the contextual factors. As the subjective precarity risks are indicated by dummies, I assume a linear probability relation, which I check with conditional logit models. In order to estimate the influence of non-standard work on wage inequality, I decompose the differences between the quantile ratios of 1995/1996 and 2010/2011 into aggregate and covariate compositional and structural effects using unconditional quantile regressions and Oaxaca Blinder decompositions, as well as reweighted decompositions.

6.1 Key findings

Overall, I find a considerable heterogeneity of the precarity risks of non-standard work between women and men, as well as across vertical labour market positions. While women are significantly more at risk than men of subjective precarity as a result of temporary employment, they are significantly less at risk of material precarity as a result of temporary and part-time employment. These gender differences prevail when considering differences in the power resources and the occupational control potential. The subjective precarity risks of temporary and part-time employment increase with higher vertical labour market positions, except for male temporary workers. The material precarity risks of temporary employment also increase with higher vertical labour market positions, while the material precarity risks of part-time employment decrease. These heterogeneities can only partly be explained by the occupational transformation problem, indicated by the non-routine task proportions, and the structural market power or the personnel adjustment problem, indicated by the occupational unemployment rate. Finally, the rise in non-standard work contributed significantly to rising wage inequality in recent decades, especially in the bottom half of the distribution. Looking at the results more closely, the following findings are the most interesting:

Firstly, *I find that temporary employment significantly and substantially increases the subjective precarity risks of both women and men, while part-time employment only slightly increases the subjective precarity risks of men*. While the subjective precarity risk of temporary employment is not a surprising finding, this study provides an initial evaluation of its extent, which is substantial: working under a temporary contract compared to a permanent one raises the probability of affective job insecurity on average by nearly 29 percent from 49 to 63 percent. Moreover, the results show that part-time employment surprisingly only poses a subjective risk to men, but it is a rather small one. Working part-time compared to full-time raises the probability of cognitive labour market insecurity for men by only 2.5 percent from 78 to 80 percent, while it does not affect the mean subjective insecurity for women.

Secondly, *in the case of temporary employment the risk is considerably higher for women than for men*. Women's probability of affective job insecurity is raised by 16 percentage points when temporarily employed, compared to ten percentage points for men. This significant gender gap in the subjective precarity risk cannot be explained by differences in the vertical labour market position – indicated by ISEI –, the structural market power – indicated by the occupational unemployment rate – or associational power resources – indicated by the sectoral union density. Controlling for differences in household resources only slightly raises the gender gap, resulting in a seven percentage points difference. As further robustness checks reveal, this gender difference is not due to differences in personality traits. A robustness check with different age samples suggests that the higher subjective precarity risk for female temporary workers may be due to disadvantages of nascent mothers or to a real or anticipated discrimination against potential mothers: temporary employment poses a greater risk to employment when coinciding with pregnancy and parental leave. And employers may discriminate against young women in temporary employment with regard to their chances of further (permanent) employment because they expect them to become mothers. Or, at least, women may expect this discrimination. This a new and interesting finding which adds

to the existing literature on motherhood discrimination and gender inequalities in the labour market and provides a promising starting point for future research.

Thirdly, *the subjective precarity risks of temporary employment are particularly large for women in high labour market positions, while those of part-time employment are particularly large for men in high labour market positions*. Contrary to my theoretical reasoning, the effect of temporary employment on the probability of affective job insecurity is eleven percentage points higher for those women in the highest positions than for those in the lowest positions, reaching more than 20 percentage points for academic professionals, physicians, scientists and legal professions among others. This heterogeneity can be explained by the occupational non-routine task proportions indicating the transformation problem of the occupation and the occupational unemployment rate indicating the employees' structural market power resources or the employers' personnel adjustment problem.

Apparently, the increasing subjective precarity risks of temporary employment with higher ISEI values have their source, firstly, in the larger proportions of non-routine tasks in higher labour market positions. While the absolute insecurity level decreases with greater proportions of non-routine tasks, the effect of temporary employment on insecurity increases with greater proportions of analytical and manual non-routine tasks. Assuming that greater proportions of non-routine tasks require more extensive screening, this finding suggests that temporary employment may be particularly concerning when it is used as an extended probationary period for screening purposes.

This is further elucidated, secondly, by the effects of the occupational unemployment rate. While a higher unemployment rate increases the absolute level of affective insecurity, it decreases the subjective precarity risk of temporary employment. This latter counterintuitive result may be explained by peer-comparisons in the first appraisal. In the context of high unemployment rates, temporary employment may be more prevalent and also permanent employment may be more unstable. Therefore, temporary and unstable employment may be more part of the norm in these

occupational fields, and being in temporary employment may thus be assessed less as a threat in comparison to permanent employment. By contrast, in the high performance employment systems of the higher labour market positions with low unemployment rates, temporary employment may either be a stronger deviation from the norm or part of a screening process in which employees are tested, resulting in a harsher assessment of the contract as a threat. The greater resources of those in higher positions, on the contrary, do not seem to support the second appraisal, which fails to compensate for the relatively harsh first appraisal. These results add an interesting aspect to the precarisation research, as they contradict the common notion that those with the weakest labour market positions suffer the highest precarity risks. At least for subjective job insecurity, this is not the case, as non-standard workers seem to evaluate their job insecurity in comparison to peer groups rather than in comparison to a societal norm.

In line with my theoretical reasoning, the subjective precarity risks of part-time employment also increase significantly with higher labour market positions. However, this pattern is much more pronounced for men. While for men the vertical labour market positions differ in total by nearly 15 percentage points, attaining a subjective precarity risk of ten percentage points for part-timers in the highest positions, for women they differ by only five percentage points, attaining merely a subjective precarity risk of three percentage points in the highest positions. For men, the effect of part-time employment on cognitive labour market insecurity becomes significant from ISEI value 48 upwards, while for women it only becomes significant from ISEI value 77 upwards. None of the power contextual factors can explain the heterogeneity, which stays robust over all model specifications. Hence, part-time employment seems to be a particular concern for men in higher labour market positions, where it deviates more strongly from the norm of high performance male full-time work. Here again, the primary appraisal dominates, while the resources in the second appraisal do not seem to play a significant role.

Fourthly, *I find significant material precarity risks of temporary employment for both women and men and of part-time employment for men, while women's gross hourly*

wages actually gain from part-time employment. Temporary employment reduces the gross hourly wages on average by six percent, resulting in a one euro difference between temporary and permanent workers at the mean, controlling for time-constant heterogeneity and job characteristics. The women's wage gap is slightly smaller with four percent, while the men's wage gap is slightly larger with eight percent, resulting in a significant gender gap to the detriment of men in the wage effect of temporary employment. These results are in line with previous research on the wage gap of temporary employment. The magnitudes of the wage gaps found are roughly located in the lower middle of the previously found wage gaps between two and 22 percent.

Part-time employment does not show any significant wage penalty in a pooled model. However, this hides a significant wage penalty for male part-timers of 4.5 percent and a significant wage premium for female part-timers of two percent. Interestingly, this gender difference matches a pronounced asymmetry of the effects. While the male wage penalty can exclusively be traced back to changes out of part-time, the female wage premium is solely driven by changes into part-time. This may suggest that women are receive more support than men when fulfilling their socially expected role of caring outside the labour sphere and reducing their working time. The wage premium may then be an incentive to stay in work. For men, in turn, part-time employment runs counter to their socially expected role of career-oriented earners, which is why on average they receive a wage penalty while working part-time, which vanishes when they change to a full-time position. In addition, women may work part-time more often out of choice – within the restrictions of the gendered division of work – whereas men may work part-time rather because of the employer's preference for maintaining an internally flexible labour force. These results provide a promising explanation for the very heterogeneous results of previous research on the part-time wage penalty by taking into account the asymmetry of the effects and gender differences. Future research should elaborate on that and test the robustness of these findings.

Fifthly, *I find a pronounced heterogeneity of the material precarity risks of non-standard work across vertical labour market positions. Interestingly, while those in the*

highest and the lowest labour market positions suffer the highest wage penalties from temporary employment, those in lower labour market positions suffer the highest wage penalties from part-time employment. Overall, unskilled workers are particularly affected by wage penalties from both temporary and part-time employment. In the basic model, the wage penalty of temporary employment for women increases from zero at the lowest ISEI value to twelve percent at the highest ISEI value. None of the contextual factors explains this heterogeneity. On the contrary, controlling for differences in the occupational unemployment rate enlarges the heterogeneity, as lower unemployment rates reduce the wage penalty. The full model reveals linearly increasing wage penalties across vertical labour market positions, with the exception however of unskilled workers who reach the same penalty size as those with ISEI values around 60 of nearly ten percent.

For men also, I find an increasing wage penalty of temporary employment across vertical labour market positions, ranging from six percent in the lowest positions to twelve percent in the highest positions in the basic model. This heterogeneity becomes insignificant when controlling for differences in the collective agreement coverage and the non-routine task proportions by turning the linear relation into an inverted U shaped function. Contrary to the theoretical reasoning, a higher sectoral collective agreement coverage entails greater wage penalties for male temporary employees, presumably by raising the wages of the permanent core workers and disregarding the temporary marginal workers. Therefore, the collective agreement coverage suppresses the wage penalties of those with lower coverages in the highest and lowest labour market segments. Controlling for it leads to higher wage penalties in the extremes of the vertical labour market segmentation. The greater proportion of non-routine tasks in the higher positions in turn partly explains the large wage penalties in this segment. This suggests that the efficiency wages of permanent employees in jobs which are difficult to control do indeed drive the wage difference from temporary employees, whose efficiency can be assured by the threat of dismissal. As a result, in the last model I find the greatest wage penalties of temporary employment in both the lowest and the highest

labour market segments, while the middle segment exhibits the lowest penalties. As for women, unskilled workers suffer particularly large penalties compared to other employees in the lower labour market segment of up to 16 percent, nearly reaching those of the highest labour market positions. These results stand in contrast to previous research, which finds the highest wage penalties for those with the lowest wages and the smallest or no wage penalties for those with the highest wages. As detailed in the next section, methodological problems of previous studies or the combined effects of educational and wage levels may be the reason for this difference.

The wage penalties of part-time employment decrease with higher labour market positions. For women, wage premiums even predominate: while those in the lowest labour market position suffer from wage penalties of up to three percent, the penalties turn into premiums around the ISEI value 40 and increase to ten percent for the highest positions. Apparently, women in higher labour market positions in particular can achieve a wage premium when changing to part-time employment. This suggests that these wage premiums may represent the employers' efforts to keep these women in higher positions in work, as the costs of finding a new employee are relatively high.

For men as well, the wage penalties decrease over the vertical labour market segmentation. For them, however, the penalties clearly predominate, reflecting the mean gender difference in the part-time wage differential. Those in the lowest labour market positions, such as cleaners or unskilled workers, suffer significant part-time penalties of up to ten percent, which turn zero around the ISEI value 56 and increase to insignificant wage premiums of up to four percent for those in the highest labour market positions. As the results show, the male part-time wage penalty is predominantly found in the lowest labour market positions, further strengthening the consideration that it derives from part-timers being used as part of a marginal labour force. The occupational unemployment rate as an indicator of structural market power resources explains part of this heterogeneity, as it tends to be higher in lower labour market segments and to increase the wage penalty of part-time employees. In line with previous research,

especially the precarisation literature, these results confirm that part-time employment is a particular material precarity risk for those already in the weakest positions.

Sixthly, *I find that the increase in non-standard work significantly and substantially contributed to the rising wage inequality of recent decades, particularly in the bottom half of the wage distribution, by depressing the wages at the 15th quantile. Changing wage differentials of non-standard work did not have any effect on wage inequality.* The rise in temporary employment – i.e. the compositional effect – depressed the wages around the 15th quantile by 0.5 percent, representing seven percent of the total change at the quantile. It did so by only 0.2 percent at the 50th and the 85th quantile, resulting in a significant contribution to the rising difference between the 50th and the 15th quantile. The change in the proportion of temporary employment accounts for two percent of the total change in the 50/15 quantile ratio as well as the total change in the 85/15 quantile ratio. By depressing low wages in particular, temporary employment contributed considerably to the rising wage inequality, especially in the bottom half of the wage distribution.

The same pattern is found for part-time employment, which depressed the wages around the 15th quantile by around one percent, representing 14 percent of the total change at that quantile. As a result, the rise in part-time employment raised the difference between the 50th and the 15th quantile by 0.5 percent, which is eight percent of the total change in the 50/15 quantile ratio. It also raised the difference between the 85th and the 15th quantile by 0.7 percent, amounting to six percent of the total change in the 85/15 quantile ratio. Together, temporary and part-time employment explain ten percent of the change in the bottom half wage inequality and seven percent in the change in overall wage inequality.

Interestingly, gender-separated models show that the influence of temporary employment on the wage distribution is driven solely by male temporary employees, while the influence of part-time employment is driven solely by female part-time employees. In the case of part-time employment, this is intuitive, as the vast majority of

part-timers are female. In the case of temporary employment, this may be due to the higher wage penalties for male temporary employees, which are estimated to be double those of female temporary employees.

Lastly, the influence of marginal employment on the wage distribution shows the same pattern as the influences of temporary and part-time employment, but is even considerably larger in magnitude. All three together explain 27 percent of the rise in the bottom half wage inequality and 20 percent of the rise in overall wage inequality in the estimated models. While this may be overestimated due to unobserved heterogeneity, it still represents a strong hint that non-standard work played a considerable role in the rising wage inequality of recent decades.

This study is thus the first to provide an inferential evaluation of the contribution of non-standard work to the rising wage inequality in Germany. It shows that non-standard work had a significant and substantial impact on wage inequality in recent decades, suggesting that this may be one explanation for the rising heterogeneity between companies even within sectors which has been identified by previous studies (see section 2.5). Future research should aim to test the robustness of these initial findings and clarify the pronounced gender differences which structure the results.

Seventhly, *I do not find any significant influence of changing wage differentials of non-standard work on wage inequality*. Apparently, there has been neither a clear polarisation between standard and non-standard work in terms of wages in recent decades nor a clear normalisation. It may, however, be the case that the two processes overlapped or occurred consecutively and therefore compensated for each other. This is not accounted for in the models and is a possible subject for future research. All in all, the results of the distributional effects of non-standard work suggest that a further increase in non-standard work will most likely aggravate the existing wage inequality.

6.2 Implications for the theory and the state of the art

Some pivotal implications of the empirical findings for the theories used and for the current state of the art in sociology deserve an explicit elaboration: firstly, the found heterogeneity of the precarity risks of non-standard employment across gender and the vertical labour market positions as primary contextual factors could only very rarely be explained by differences in power resources or employers' problems as secondary contextual factors. Thus, the inequalities in the (re)-allocation of labour and gratifications associated with gender and the vertical labour market positions measured by ISEI cannot simply be explained by them structuring the allocation of resources. Or expressed differently, the heterogeneity of the precarity risks of non-standard employment across gender and vertical labour market positions seems to be indeed due to gender and the labour market positions independent of differences in resources.

Hence, segmentation perspectives are strengthened by this finding, which state that the labour market is segmented into hierarchical subfields. From this perspective, the heterogeneity of the precarity risks cannot be explained by a common threat of non-standard employment which is dealt with differently according to the resources at hand. Apparently, non-standard employment relationships themselves exhibit already heterogeneous threats due to differences in their socio-economic functions, which are structured by the labour market segmentation at least across gender and vertical occupational positions. It may well be that the relevant question is whether temporary employment serves as a marginal labour force, an extended probationary period or as maternity cover, among other things, and that these different functions are relatively independent of power resources or the degrees of the employers' problems, but are structured by a vertical and gendered labour market segmentation. Likewise, part-time employment may be an employee-driven form in order to reconcile labour and non-labour demands or a form of employer-driven underemployment and an internal flexibility buffer, again relatively independent of the secondary contextual factors, but structured by gender and labour market positions.

Therefore, power resources theory does not seem to be an appropriate approach for explaining differences in the subjective precarity risks of non-standard work, at least when measured as relative deviations from the group means of standard employees. Moreover, the measures of the power resources may have been insufficient, as they were not all available as panel data, only considering variation between sectors and occupations. However, power resources theory may still be suitable for explaining precarity measured as a given deviation from a defined societal norm instead of as precarity risks.

Of all the secondary contextual factors, only the occupational unemployment rate and the occupational non-routine task proportions were in some instances relevant for the heterogeneity of the precarity risks across gender and vertical labour market positions. While the occupational unemployment rate served as an indicator for the structural market power resources of the employees and the employers' personnel adjustment problem, the task composition served as an indicator for the employers' transformation problem. Thus, the neo-institutional labour economics approach fared better in revealing factors of the labour market segmentation by defining these two problems of employers as pivotal for the structure of the labour market.

Secondly, analogous to the considerations above, the primary appraisal of the threat of non-standard employment dominates the subjective precarity risks, while the second appraisal of the resources for coping with the threat is not as relevant. The emphasis of the transactional theory of stress and coping on the second appraisal is thus put into question by the empirical findings.

This may be explained by the consideration that the subjective precarity risks associated with non-standard work in this study are relative deviations from a standard defined by employees with similar characteristics but with a standard contract. As the results suggest, the subjective precarity risks of non-standard employees are primarily determined by the comparison with these co-workers and not necessarily by the actual degree of precarity associated with their own employment condition. Likewise, this may

be the reason for the fact that higher trade union densities and collective agreement coverages, as well as higher labour market positions, are related to higher subjective precarity risks for non-standard workers. In these contexts, the comparison groups benefit from relatively stable jobs and deviating from this high standard results in even higher subjective precarity risks.

Thus, it is this peer group comparison which seems to drive the subjective precarity risks in the primary appraisal, while both the assessment of the objective situation of the non-standard employment and the second appraisal of the resources at hand seem to play only a minor role.

In addition to these theoretical implications, there are two empirical findings which I want to emphasise, as they are new to or in conflict with the state of the art. Firstly, I find a substantial gender gap in the subjective precarity risk of temporary employment which cannot be explained in this study. Women are subjectively affected by temporary employment significantly more than men, even when controlling for differences in household resources, power resources, job tasks and personality traits. As a first tentative analysis of different age samples shows, this may be due to disadvantages of nascent mothers or a statistical discrimination against younger women as potential mothers in the assignment of contract extensions or permanent positions. This adds an interesting new aspect to the rich body of research on the role of motherhood in the labour market, as it suggests that even potential motherhood entails certain risks in the labour market.

Secondly, the results of the heterogeneity of the material precarity risks across vertical labour market positions and of the inequality effects of non-standard employment show that research employing unconditional quantile regressions in order to estimate heterogeneous wage penalties may be mistaken in the conclusions drawn from their results.

As argued in section 4.5, unconditional quantile regressions do not estimate group wage differentials at given quantiles of an unconditional wage distribution, but rather estimate

the influence of a marginal change in a group on any given quantile value of the unconditional wage distribution, which is called the unconditional quantile partial effect. Therefore, the very method itself does not allow one to draw conclusions regarding group wage differentials across the unconditional wage distribution.

Nonetheless, the decreasing wage penalties of temporary employment across the wage distribution found for instance by Laß and Wooden (2019) and Regoli et al. (2019) are still a very comprehensible result. Despite the methodological shortcomings, it may still be the case that the lowest earning employees have the greatest financial disadvantages as a result of temporary employment.

In this study, however, I rather find curvilinearly heterogeneous wage penalties of temporary employment across ISEI, which ranks occupations according to their wage and their education level. According to these results, those in the highest and the lowest labour market positions – especially unskilled workers – suffer the largest penalties, while those in the middle exhibit the smallest penalties. Hence, it seems that the studies using unconditional quantile regressions to estimate heterogeneous wage differentials miss an important part of the story, because the unequal distribution of temporary employment across the wage distribution suppresses the unconditional quantile partial effects at the top of the wage distribution where temporary employment is relatively rare and leverages the effects at the bottom of the wage distribution where temporary employment is relatively common.

Another explanation may be that the curvilinear pattern of the wage penalties across ISEI found here results from contrary effects of education and wage level. Previous research suggests that the wage penalties of temporary employment increase with educational levels (Groß 2000; Giesecke/Groß 2007). Assuming that the wage penalties simultaneously decrease with higher wage levels, this could also result in the curvilinear relation of the temporary employment wage penalty across ISEI, with both the highest and the lowest labour market positions suffering the highest wage penalties. Future research could therefore make use of new methods to estimate unconditional quantile

treatment effects (Powell forthcoming) in order to analyse the heterogeneity of the wage penalties across the wage distribution.

This influence of the density of temporary employment on the unconditional quantile partial effect can, however, be put to use when analysing the distributional effects of non-standard employment on different quantiles of the unconditional wage distribution, i.e. the effect of non-standard employment on wage inequality. As I show in section 5.10, the results of Laß and Wooden (2019) and Regoli et al. (2019) point towards the contribution of the rise in temporary employment to the rise in wage inequality, especially in the bottom half of the wage distribution, rather than towards heterogeneous wage differentials.

6.3 Limitations and open questions

Of course, this study has certain limitations and leaves some questions open. Here, I will discuss the most pertinent of them in order to facilitate the link for further research.

To begin with, I focused on a relative measurement of precarity *risks* of non-standard employment as deviations from standard employment. This has the advantage of not relying on a predefined norm – as a relative measurement of precarity would do – and to facilitate the analysis of their heterogeneity across multiple factors. However, this focus on precarity risks also entails certain limitations, which I want to mention here.

Looking at precarity risks only allows conclusions about differences in the risks of employment characteristics causing precarity and not about differences in precarity of individuals. Hence, while insights are gained about specific mechanisms relating non-standard employment to precarity, the analyses lack any claim on the actual social situation of non-standard workers, which is the complex outcome of many more social mechanisms. This is most obvious in the case of the large wage penalties of temporary employment found for workers in high occupational positions. Most probably, these do not translate into actual precarity of the workers, as they are presumably compensated for by high overall wage levels or high probabilities of becoming permanent, associated

with relatively steep wage growth. On the contrary, the large wage penalties of temporary employment for unskilled workers and of part-time employment for men in lower labour market positions translate much more probably into actual precarity, as they add to low overall wage levels and other disadvantages.

Furthermore, other dimensions or indicators of precarity risks are conceivable and would be an interesting supplement to the analyses of the more standard indicators. For instance, income variability is likely to hinder the ability to conduct long-term planning and may entail serious economic hardships. This has rarely been researched hitherto, presumably also due to the difficulty of finding appropriate data and indicators. Likewise, the long-term consequences of non-standard employment are particularly interesting in the case of the numerous female part-timers who may be supported by their partners now, but who may fall into poverty after separation or divorce or when retiring.

Secondly, as discussed in the previous section, the heterogeneity of the precarity risks across gender and vertical labour market positions remains unexplained to a large extent in this study. Therefore, it may be promising to raise the question of whether the gender gap in the subjective precarity risks of temporary employment is due to disadvantages of or discrimination against potential mothers or to other factors. In addition, further research may benefit from a focus on the different socio-economic functions of non-standard employment, how they can be measured, how they are distributed and what are their consequences.

Thirdly, due to data restrictions, the indicators of associational and institutional power resources – the sectoral union density and the sectoral collective agreement coverage – only cover the variation between sectors, while disregarding changes within sectors over time. As data on union densities or memberships as well as collective agreement coverages at the sectoral level are difficult to compile on a yearly basis, in this study they are time-constant measures with the reference years being 2015 and 2014. The same is true for the indicators of the transformation problem – the occupational non-

routine task proportions – which are only available for 2013. For all three indicators, only variation between the sectors and occupations could influence the subjective precarity risks of non-standard employment. Hence, the limited explanation power of these contextual factors may also stem from their lack of within variation, which could be an interesting focus of further research.

Fourthly, the results of the wage inequality effects of non-standard work show that changes in the wage penalties of temporary, part-time and marginal employment did not affect the wage inequality. Apparently, neither a normalisation nor a polarisation has taken place in the relation of non-standard to standard work. However, this may conceal conflicting dynamics or consecutively occurring opposing trends between 1995 and 2011, as I only look at these two time points. It therefore may be interesting to analyse the wage penalties of non-standard work over time in order to trace possible dynamics of polarisation or normalisation and further understand the impact of non-standard employment on wage inequality.

Fifthly, only looking at temporary and regular part-time employment covers the vast majority of non-standard employment relationships, but leaves out interesting other forms. While temporarily employed agency workers are considered as temporary employees, agency workers are yet another form of non-standard employment whose precarity risks would be interesting to research as much as marginal employees. The difficulty is that both are relatively small groups of employees, which makes fine-grained analyses of heterogeneous effects difficult. In addition, the precarity risks of solo self-employed are also an interesting research subject, which is not included in this study. In this case, the difficulty also resides in the measurement of their income in addition to their relatively small number.

Lastly, even employment relationships that are considered standard in terms of their contract type and working time undergo a considerable change as flexibility measures are also implemented in internal employment systems. Efficiency control through market-related criteria, various flexible working time arrangements and performance-

related wages are instances of a de-standardisation or even re-commodification of standard employment relationships, which potentially entail ambivalent consequences for the employees. Researching those could counter the dual perspective of non-standard and standard employment relationships and provide a more comprehensive picture of the ongoing labour market changes.

Bibliography

Abraham, Martin/Hinz, Thomas (eds.) (2018): Arbeitsmarktsoziologie. Probleme, Theorien, empirische Befunde. Wiesbaden: VS Verlag.

Adamy, Wilhelm (1988): Deregulierung des Arbeitsmarktes. Zwischenbilanz des Beschäftigungsförderungsgesetzes. WSI-Mitteilungen 41(8), 475–482.

Aisenbrey, Silke/Brückner, Hannah (2008): Occupational aspirations and the gender gap in wages. European Sociological Review 24(5), 633–649.

Alberti, Gabriella/Bessa, Ioulia/Hardy, Kate/Trappmann, Vera/Umney, Charles (2018): In, against and beyond precarity: Work in insecure times. Work, Employment and Society 32(3), 447–457.

Albrecht, Ernst (1983): Unser wirtschaftliches und gesellschaftliches System ist verkrustet. In: Handelsblatt (27 August 1983).

Allmendinger, Jutta/Eichhorst, Werner/Walwei, Ulrich (eds.) (2005): IAB-Handbuch Arbeitsmarkt. Analysen, Daten, Fakten. Frankfurt a. M.: Campus.

Alternate Routes (eds). (2016): Precarious work and the struggle for living wages. Alternate Routes: A Journal of Critical Social Research 27.

Anger, Silke (2005): Working time as an investment? The effects of unpaid overtime on wages, promotions and layoffs. SFB 649 discussion paper 32.

Antonczyk, Dirk/Fitzenberger, Bernd/Sommerfeld, Katrin (2010): Rising wage inequality, the decline of collective bargaining, and the gender wage gap. Labour Economics 17, 835–847.

Arminger, Gerhard/Clogg, Clifford C./Sobel, Michael E. (eds.) (1995): Handbook of statistical modeling for the social and behavioral sciences. New York: Plenum.

Atkinson, Jon (1984): Flexibility, Uncertainty and Manpower Management. In: The Institute for Employment Studies, Report 89.

Aulenbacher, Brigitte (2009): Die soziale Frage neu gestellt – Gesellschaftsanalysen der Prekarisierungs- und Geschlechterforschung. In: Castel, Robert/Dörre, Klaus (eds.): Prekarität, Abstieg, Ausgrenzung. Die soziale Frage am Beginn des 21. Jahrhunderts. Frankfurt am Main: Campus, 65–77.

BA (Bundesagentur für Arbeit) (2011): Klassifikation der Berufe 2010 – Band 1: Systematischer und alphabetischer Teil mit Erläuterungen. Nürnberg.

BA (Bundesagentur für Arbeit) (2019): Die Arbeitsmarktsituation von Frauen und Männern 2018. Bericht: Blickpunkt Arbeit. Nürnberg.

Balz, Anne (2017): Cross-national variations in the security gap: Perceived job insecurity among temporary and permanent employees and employment protection legislation. European Sociological Review 33(5), 675–692.

Bechmann, Sebastian/Dahms, Vera/Tschersich, Nikolai/Frei, Marek/Leber, Ute/Schwengler, Barbara (2013): Beschäftigungsmuster von Frauen und Männern. Auswertungen des IAB Betriebspanels 2012. IAB-Forschungsbericht 14/2013.

BeschFG (1985): Beschäftigungsförderungsgesetz 1985. Bundesgesetzblatt (BGB) 1, 21 (30.04.1985).

BeschFG (1990): Gesetz zur Verlängerung beschäftigungsfördernder Vorschriften. Bundesgesetzblatt (BGB) 1, 61 (29.12.1989).

BeschFG (1996): Arbeitsrechtliches Gesetz zur Förderung von Wachstum und Beschäftigung. Bundesgesetzblatt (BGB) 1, 48 (27.09.1996).

Bielenski, H. 1998: Enttäuschte Hoffnungen, enttäuschte Befürchtungen. Praktische Erfahrungen mit der Deregulierung des Rechts befristeter Arbeitsverträge. In: Keller, Berndt/Seifert, Hartmut (eds.): Deregulierung am Arbeitsmarkt. Eine empirische Zwischenbilanz. Hamburg: VSA-Verlag, 56–70.

Bielenski, Harald/Kohler, Bärbel/Schreiber-Kittl, Maria (1994): Befristete Beschäftigung und Arbeitsmarkt. Empirische Untersuchung über befristete Arbeitsverträge nach dem Beschäftigungsförderungsgesetz (BeschFG 1985/1990). Bonn: Bundesministerium für Arbeit und Sozialordnung.

Bihler, Wolf/Zimmermann, Daniel (2016): Die neue Mikrozensus-Stichprobe ab 2016. Statistisches Bundesamt: WISTA 6, 20–29.

Blau, Francine D./Ferber, Marianne A./Winkler, Anne E. (2014): The Economics of Women, Men, and Work. Boston: Pearson.

Blinder, Alan S. (1973): Wage discrimination: Reduced form and structural estimates. The Journal of Human Resources 8(4), 436–55.

BMAS (Bundesministerium für Arbeit und Soziales) (2016): Solo-Selbständige in Deutschland – Strukturen und Erwerbsverläufe. Forschungsbericht 456.

Boll, Christina (2016): Die Arbeitsteilung im Paar – Theorien, Wirkungszusammenhänge, Einflussfaktoren und exemplarische empirische Evidenz. Expertise für den Zweiten Gleichstellungsbericht der Bundesregierung. Hamburgisches Weltwirtschaftsinstitut (HWWI).

Borgen, Nicolai T. (2016): “Fixed effects in unconditional quantile regression”. The Stata Journal 16(2), 403–415.

Bosch, Gerhard/Kalina, Thorsten (2007): Niedriglohnbeschäftigung in Deutschland – Zahlen, Fakten, Ursachen. In: Bosch, Gerhard/Weinkopf, Claudia (eds.): Arbeiten für wenig Geld: Niedriglohnbeschäftigung in Deutschland. Frankfurt a. M.: Campus 20–105.

Bosch, Gerhard/Weinkopf, Claudia (eds.) (2007): Arbeiten für wenig Geld: Niedriglohnbeschäftigung in Deutschland. Frankfurt a. M.: Campus.

Bossler, Mario (2015): The efficiency wage effect of employer provided occupational pensions. IZA Journal of European Labor Studies 4(8).

Bourdieu, Pierre (1999): Acts of resistance. Against the new myths of our time. Cambridge: Polity Press.

Brehmer, Wolfram/Seifert, Hartmut (2008): Sind atypische Beschäftigungsverhältnisse prekär? Eine empirische Analyse sozialer Risiken. Zeitschrift für Arbeitsmarktforschung 41(4), 501–532.

Brenke, Karl (2006): Wachsender Niedriglohnsektor in Deutschland – sind Mindestlöhne sinnvoll? DIW Wochenbericht 73(15/16), 197–205.

Brinkmann, Ulrich/Dörre, Klaus/Röbenack, Silke/Kraemer, Klaus/Speidel, Frederic (2006): Prekäre Arbeit. Ursachen, Ausmaß, soziale Folgen und subjektive Verarbeitungsformen unsicherer Beschäftigungsverhältnisse. Bonn: Friedrich-Ebert-Stiftung.

Büchtemann, Christoph F. (1989): More jobs through less employment protection? Evidence for West Germany. Paper prepared for the meeting of the European Association of Labour Economists (EALE) in Turin, Italy.

Büchtemann, Christoph F./Quack, Sigrid (1989): "Bridges" or "traps"? Non-standard forms of employment in the federal republic of Germany. The case of part-time and temporary work. Berlin: Wissenschaftszentrum Berlin für Sozialforschung.

Büchtemann, Christoph F./Quack, Sigrid (1990): How precarious is ‘non-standard’ employment? Evidence for West Germany. Cambridge Journal of Economics 14, 315–329.

Burgoon, Brian/Dekker, Fabian (2010): Flexible employment, economic insecurity and social policy preferences in Europe. Journal of European Social Policy 20(2), 126–141.

Busch, Anne (2013). Die berufliche Geschlechtersegregation in Deutschland. Ursachen, Reproduktion, Folgen. Wiesbaden: Springer VS.

Card, David/Heining, Jörg/Kline, Patrick (2012): Workplace heterogeneity and the rise of West Germany wage inequality. IAB-Discussion Paper 26/2012.

Carr, Ewan/Chung Heejung (2014): Employment insecurity and life satisfaction: The moderating influence of labour market policies across Europe. Journal of European Social Policy 24(4), 383–399.

Castel, Robert (2002): From manual workers to wage laborers: transformation of the social question. London: Taylor & Francis.

Castel, Robert (2009): Die Wiederkehr der sozialen Unsicherheit. In: Castel, Robert/Dörre, Klaus (eds.): Prekarität, Abstieg, Ausgrenzung. Die soziale Frage am Beginn des 21. Jahrhunderts. Frankfurt am Main: Campus, 21–34.

Castel, Robert/Dörre, Klaus (eds.) (2009): Prekarität, Abstieg, Ausgrenzung. Die soziale Frage am Beginn des 21. Jahrhunderts. Frankfurt am Main: Campus.

Chamberlain, Gary (1980): Analysis of covariance with qualitative data. Review of Economic Studies 47, 225–238.

Cheng, Grand H.-L./Chan, Darius K.-S. (2008): Who suffers more from job insecurity? A meta-analytical review. Applied Psychology: An International Review 57(2), 272–303.

Chernozhukov, Victor/Fernandez-Val, Ivan/Melly, Blaise (2013): Inference on counterfactual distributions. Econometrica 81, 2205–2268.

Chung, Heejung/Van Oorschot, Wim (2011): Institutions versus market forces: Explaining the employment insecurity of European individuals during (the beginning of) the financial crisis. Journal of European Social Policy 21(4), 287–301.

Comi, Simona/Grasseni, Mara (2012): Are temporary workers discriminated against? Evidence from Europe. The Manchester School 80(1), 28–50.

Connelly, Roxanne/Gayle, Vernon/Lambert, Paul S. (2016): A review of occupation-based social classifications for social survey research. Methodological Innovations 9, 1–14.

Da Silva, António Dias/Turrini, Alessandro (2015): Precarious and less well-paid? Wage differences between permanent and fixed-term contracts across the EU countries. European Commission: Economic Papers.

Dämmrich, Johanna and Blossfeld, Hans-Peter (2017): Women's disadvantage in holding supervisory positions. Variations among European countries and the role of horizontal gender segregation, Acta Sociologica 60, 262–282.

De Cuyper, Nele/De Jong, Jan/De Witte, Hans/Isaksson, Kirsten/Rigotti, Thomas/Schalk, René (2008): Literature review of theory and research on the psychological impact of temporary employment: Towards a conceptual model. International Journal of Management Reviews 10(1), 25–51.

De Cuyper, Nele/De Witte, Hans (2007): Job insecurity in temporary versus permanent workers: Associations with attitudes, well-being, and behaviour. Work and stress 2007 21(1), 65–84.

De Witte, Hans and Näswall, Katharina (2003): 'Objective' vs. 'subjective' job insecurity: Consequences of temporary work for job satisfaction and organizational commitment in four European countries. Economic and Industrial Democracy **24,** 149–188.

Dengler, Katharina/Matthes, Britta/Paulus, Wiebke (2014): Berufliche Tasks auf dem deutschen Arbeitsmarkt. Eine alternative Messung auf Basis einer Expertendatenbank. IAB: FDZ-Methodenreport 12/2014.

Dichmann, Werner/Hickel, Rudolf (1989): Zur Deregulierung des Arbeitsmarkts – Pro und Contra. Institut der deutschen Wirtschaft: Beiträge zur Gesellschafts- und Bildungspolitik 148(7).

Dieckhoff, Martina/Gash, Vanessa/Mertens, Antje/Gordo, Laura R. (2020): Partnered women's contribution to household labor income: Persistent inequalities among couples and their determinants. Social Science Research 85.

Dieke, Saskia/Lesch, Hagen (2017): Gewerkschaftliche Mitgliederstrukturen im europäischen Vergleich. Ergebnisse des European Social Survey. IW-Trends 44(3), 25–41.

Dixon, Jeffrey C./Fullerton, Andrew S./Robertson, Dwanna L. (2013): Cross-national differences in workers' perceived job, labour market, and employment insecurity in Europe: Empirical tests and theoretical extensions. European Sociological Review 29(5), 1053–1067.

Dörre, Klaus (2005): Prekarisierung contra Flexicurity. Unsichere Beschäftigungsverhältnisse als arbeitspolitische Herausforderung. In: Kronauer, Martin/Linne, Gudrun (eds.): Flexicurity. Die Suche nach Sicherheit in der Flexibilität. Berlin: edition sigma, 53–72.

Dörre, Klaus (2012): Landnahme, das Wachstumsdilemma und die „Achsen der Ungleichheit". In: Berliner Journal für Soziologie 22, 101–128.

Dustmann, Christian/Ludsteck, Johannes/Schönberg, Uta (2009): Revisiting the German wage structure. In: The Quarterly Journal of Economics 124(2), 843–881.

Edlund, Jonas and Öun, Ida (2016): Who should work and who should care? Attitudes towards the desirable division of labour between mothers and fathers in five European countries, Acta Sociologica 59, 151–169.

Efron, Bradley (1982): The jackknife, the bootstrap and other resampling plans, Vol. 38. Philadelphia: Society for Industrial and Applied Mathematics.

Ehlert, Martin (2016): The impact of losing your job. Unemployment and influences from market, family, and state on economic well-being in the US and Germany. Amsterdam: Amsterdam University Press.

Eichhorst, Werner/Gartner, Hermann/Krug, Gerhard/Rhein, Thomas/Wiedemann, Eberhard (2005): Niedriglohnbeschäftigung in Deutschland und im internationalen Vergleich. In: Allmendinger, Jutta/Eichhorst, Werner/Walwei, Ulrich (eds.): IAB-Handbuch Arbeitsmarkt. Analysen, Daten, Fakten. Frankfurt a. M.: Campus, 107–142.

Eichhorst, Werner/Marx, Paul (2011): Reforming German labour market institutions. A dual path to flexibility. Journal of European Social Policy 21(1), 73–87.

Eichhorst, Werner/Tobsch, Verena (2015): Not so standard anymore? Employment duality in Germany. Journal for Labour Market Research 48, 81–95.

Erikson, Robert/Golthorpe, John H./Portocarero, Lucienne (1979): Intergenerational class mobility in three Western European societies: England, France and Sweden. The British Journal of Sociology 30, 415–441.

Erlinghagen, Marcel (2008): Self-perceived job insecurity and social context: A multi-level analysis of 17 European Countries. European Sociological Review 24, 183–197.

Erlinghagen, Marcel (2010): Zunehmende Angst vor Jobverlust trotz gleichbleibender Beschäftigungsstabilität. Informationsdienst Soziale Indikatoren 44, 1–4.

European Commission (1998): The European Union Labour Force Survey. Methods and definitions. Luxembourg.

European Commission (2004): Employment in Europe 2004. Luxembourg.

European Commission (2014): Structure of Earnings Survey 2014. Eurostat's arrangements for implementing the Council Regulation 530/1999, the Commission Regulations 1916/2000 and 1738/2005. Luxembourg.

Eurostat (2002): NACE Rev. 1.1 Statistical classification of economic activities in the European Community. Luxembourg.

Eurostat (2008): NACE Rev. 2 Statistical classification of economic activities in the European Community. Luxembourg.

Firpo, Sergio P./Fortin, Nicole M./Lemieux, Thomas (2007): Unconditional quantile regressions. NBER Technical Working Paper Series 339.

Firpo, Sergio P./Fortin, Nicole M./Lemieux, Thomas (2009): Unconditional quantile regressions. Econometrica 77(3), 953–73.

Firpo, Sergio P./Fortin, Nicole M./Lemieux, Thomas (2018): Decomposing wage distributions using recentred influence function regressions. Econometrics 28(6).

Fitzenberger, Bernd (1999): Wages and employment across skill groups. An analysis for West Germany. Heidelberg: Physica.

Fitzenberger, Bernd (2012): Expertise zur Entwicklung der Lohnungleichheit in Deutschland. Arbeitspapier des Sachverständigenrat 4/2012.

Folkman, Susan/Lazarus, Richard S./Dunkel-Schetter, Christine/DeLongis, Anita/Gruen, Rand J. (1986): Dynamics of a stressful encounter: cognitive appraisal, coping, and encounter outcomes, *Journal of Personality and Social Psychology* 50, 992–1003.

Fouarge, Didier/Muffels, Ruud (2009): Working part-time in the British, German and Dutch labour market: Scarring for the wage career? Schmollers Jahrbuch 129(2), 217–26.

Gallie, Duncan/Felstead, Alan/Green, Francis/Inanc, Hande (2017): The hidden face of job insecurity. Work, Employment and Society 31, 36–53.

Ganzeboom, Harry B.G./De Graaf, Paul M./Treiman, Donald J. (1992): A standard international socio-economic index of occupational status. Social Science Research 21(1), 1–56.

Ganzeboom, Harry B.G./Treiman, Donald J. (1996): Internationally comparable measures of occupational status for the 1988 International Standard Classification of Occupations. Social Science Research 25, 201–239.

Gariety, Bonnie S./Shaffer, Sherrill (2001): Wage differentials associated with flextime. Monthly Labor Review 3, 68–75.

Garz, Marcel (2013): Labour market segmentation: Standard and non-standard employment in Germany. German Economic Review 14(3), 349–71.

Gash, Vanessa (2008): Bridge or trap? Temporary workers' transitions to unemployment and to the standard employment contract. European Sociological Review 24, 651–668.

Gebel, Michael (2010): Early career consequences of temporary employment in Germany and the UK. Work, Employment and Society 24(4), 641–660.

Gebel, Michael/Giesecke, Johannes (2011): Labor market flexibility and inequality: The changing skill-biased temporary employment and unemployment risks in Europe. Social Forces 90(1), 17–40.

Gensicke, Miriam/Herzog-Stein, Alexander/Seifert, Hartmut/Tschersich, Nikolai (2010): Einmal atypisch, immer atypisch Beschäftigt? Mobilitätsprozesse atypischer und normaler Arbeitsverhältnisse im Vergleich. WSI Mitteilungen 4,179–87.

Giesecke, Johannes (2006): Arbeitsmarktflexibilisierung und soziale Ungleichheit: Sozio-Ökonomische Konsequenzen befristeter Beschäftigungsverhältnisse in Deutschland und Großbritannien. Wiesbaden: VS Verlag für Sozialwissenschaften.

Giesecke, Johannes (2009): Socio-economic risks of atypical employment relationships. European Sociological Review 25(6), 629–46.

Giesecke, Johannes/Groß, Martin (2007): Flexibilisierung durch Befristung. In: Keller, Berndt/Seifert, Hartmut (eds.): Atypische Beschäftigung. Flexibilisierung und soziale Risiken. Berlin: edition sigma: 83–105.

Giesecke, Johannes/Verwiebe, Roland (2008): Die Zunahme der Lohnungleichheit in der Bundesrepublik. Aktuelle Befunde für den Zeitraum von 1998 bis 2005. Zeitschrift für Soziologie 37(5), 403–422.

Giesselmann, Marco/Schmidt-Catran, Alexander W. (2020): Interactions in fixed-effects regression models. Sociological Methods & Research.

Goebel, Jan/Grabka, Markus M./Schröder, Carsten (2015): Einkommensungleichheit in Deutschland bleibt weiterhin hoch – junge Alleinlebende und Berufseinsteiger sind zunehmend von Armut bedroht. DIW Wochenbericht 82(25), 571–586.

Goebel, Jan/Grabka, Markus, M./Liebig, Stefan/Kroh, Martin/Richter, David/Schröder, Carsten/Schupp, Jürgens (2019). The German Socio-Economic Panel (SOEP), Jahrbücher für Nationalökonomie und Statistik 239, 345–360.

Goebel, Jan/Krause, Peter/Schupp, Jürgen (2005): Mehr Armut durch steigende Arbeitslosigkeit: Niedriglöhne überwiegend als Zusatzeinkommen im Haushalt. DIW Wochenbericht 72(10), 175–184.

Graf Lambsdorff, Otto (1982): Konzept für eine Politik zur Überwindung der Wachstumsschwäche und zur Bekämpfung der Arbeitslosigkeit. In: Handelsblatt (14 September 1982).

Grätz, Michael (2019): When less conditioning provides better estimates: Overcontrol and collider bias in research on intergenerational mobility. SOFI Working Paper 2/2019. Stockholm University.

Green, Francis (2009): Subjective employment insecurity around the world. Cambridge Journal of Regions, Economy and Society 2(3), 343–363.

Greene, William H. (2012): Econometric Analysis. 7th Edition. London: Pearson.

Greenhalgh, Leonard/Rosenblatt, Zehava (1984): Job insecurity: Toward conceptual clarity. The Academy of Management Review 9(3), 438–448.

Groß, Martin (2000): Flexible Beschäftigungsverhältnisse und Einkommensungleichheit. Vortrag auf der 2. Nutzerkonferenz "Forschung mit dem Mikrozensus: Analysen zur Sozialstruktur und zum Arbeitsmarkt", Octobre 2000, Mannheim.

Gundert, Stefanie/Hohendanner, Christian (2014): Do fixed-term and temporary agency workers feel socially excluded? Labour market integration and social well-being in Germany. Acta Sociologica, 57(2), 135–152.

Gundert, Stefanie/Mayer, Karl U. (2012): Gender segregation in training and social mobility of women in West Germany. European Sociological Review 28(1), 59–81.

Hagen, Tobias (2002): Do temporary workers receive risk-premiums? Review of Labour Economics and Industrial Relations 16(4), 667–707.

Haipeter, Thomas (2017): Lohnfindung und Lohnungleichheit in Deutschland. IAQ-Report 1/2017.

Hamerle, Alfred/Ronning, Gerd (1995): Panel analysis for qualitative variables. In: Arminger, Gerhard/Clogg, Clifford C./Sobel, Michael E. (eds.): Handbook of statistical modeling for the social and behavioral Sciences. New York: Plenum, 401–451.

Hank, Karsten and Erlinghagen, Marcel (2011): Perceptions of job security in Europe's ageing workforce. Social Indicators Research 103, 427–442.

Härdle, Wolfgang (1991): Smoothing techniques. With implementation in S. New York: Springer.

Haupt, Andreas/Borgen, Nicolai/Wiborg, Øyvind (forthcoming): No title. Unpublished manuscript.

Haupt, Andreas/Nollman, Gerd (2014): Warum werden immer mehr Haushalte von Armut gefährdet? Zur Erklärung erhöhter Armutsrisikoquoten mit unbedingten Quantilsregressionen. Kölner Zeitschrift für Soziologie und Sozialpsychologie, 66, 603–627.

Hausmann, Ann-Christin/Kleinert, Corinna (2014): Berufliche Segregation auf dem Arbeitsmarkt. Männer- und Frauendomänen kaum verändert. IAB-Kurzbericht 09/2014.

Helbling, Laura/Kanji, Shireen (2018): Job insecurity: differential effects of subjective and objective measures on life satisfaction trajectories of workers aged 27–30 in Germany. Social Indicators Research 137, 1145–1162.

Hellevik, Ottar (2007): Linear versus logistic regression when the dependent variable is a dichotomy. Quality & Quantity 43(1), 59–74.

Hipp, Lena (2016): Insecure times? Workers' perceived job and labor market security in 23 OECD countries. Social Science Research, 60, 1–14.

Hipp, Lena (2020). Do hiring practices penalize women and benefit men for having children? Experimental Evidence from Germany. European Sociological Review 36(2), 250–264.

Hipp, Lena/Stuth, Stefan (2013): Management und Teilzeit? − Eine empirische Analyse zur Verbreitung von Teilzeitarbeit unter Managerinnen und Managern in Europa. Kölner Zeitschrift für Soziologie und Sozialpsychologie 65(1), 101–128.

Hoffmann, Eivind/Scott, Mirjana (1993): The revised International Standard Classification of Occupations (ISCO-88). A short presentation. Geneva: ILO Bureau of Statistics.

Hohendanner, Christian (2019): Befristete Beschäftigung 2018. Aktuelle Daten und Indikatoren. Nürnberg: Institute for Employment Research (IAB).

Hohendanner, Christian/Gerner, Hans-Dieter (2010): Die Übernahme befristet Beschäftigter im Kontext betrieblicher Personalpolitik. Soziale Welt 61(1), 27–50.

Höhne, Jutta/Linden, Benedikt/Seils, Eric/Wiebel, Anne (2014): Die Gastarbeiter. Geschichte und aktuelle soziale Lage. WSI-Report 16/2014.

Hosmer, David W./Lemeshow, Stanley A./Sturdivant, Rodney X. (2013): Applied logistic regression. New Jersey: Wiley.

IAB (Institute for Employment Research) (1989): Beschäftigungsförderungsgesetz 1985 – 1995. Chronik der Arbeitsmarktpolitik. Nürnberg.

ILO (International Labour Office) (2012): International Standard Classification of Occupations. ISCO-08. Volume 1: Structure, group definitions and correspondence tables. Geneva: ILO.

Jahn, Elke (2008): Reassessing the wage penalty for temps in Germany. IZA Discussion Papers 3663.

Jahn, Elke (2015): Don’t worry, be flexible? – Job satisfaction among flexible workers. Australian Journal of Labour Economics 18(2), 147–168.

Jann, Ben (2019): ISCOGEN: Stata module to translate ISCO codes. Boston College Department of Economics: Statistical Software Components S458665.

Jonna, Jamil R./Foster, John B. (2016): Marx’s theory of working-class precariousness – and its relevance today. In: Alternate Routes (eds.): Precarious work and the struggle for living wages. Alternate Routes: A Journal of Critical Social Research 27.

Kahn, Lawrence M. (2015): The structure of the permanent job wage premium: Evidence from Europe. Industrial Relations. A Journal of Economy and Society 55(1), 149–178.

Kalina, Thorsten/Weinkopf, Claudia (2008): Konzentriert sich die steigende Niedriglohnbeschäftigung in Deutschland auf atypisch Beschäftigte? Zeitschrift für Arbeitsmarktforschung 41(4), 447–69.

Kalina, Thorsten/Weinkopf, Claudia (2018): Niedriglohnbeschäftigung 2016 – beachtliche Lohnzuwächse im unteren Lohnsegment, aber weiterhin hoher Anteil von Beschäftigten mit Niedriglöhnen. IAQ Report 6/2018.

Kalleberg, Arne L. (2018): Precarious lives. Job insecurity and well-being in rich democracies. Cambridge: Polity Press.

Karl Marx – Friedrich Engels – Werke (MEW) 23. Berlin: Dietz Verlag.

Keim, Alaina C./Landis, Ronald S./Pierce, Charles A./Earnest, David R. (2014): Why do employees worry about their jobs? A meta-analytic review of predictors of job insecurity, Journal of Occupational Health Psychology 19(3), 269–290.

Keller, Berndt/Seifert, Hartmut (eds.) (1998): Deregulierung am Arbeitsmarkt. Eine empirische Zwischenbilanz. Hamburg: VSA-Verlag.

Keller, Berndt/Seifert, Hartmut (eds.) (2007): Atypische Beschäftigung. Flexibilisierung und soziale Risiken. Berlin: edition sigma.

Kiersztyn, Anna (2017): Non-standard employment and subjective insecurity: How can we capture job precarity using survey data? Research in the Sociology of Work 31, 91–122.

Killewald, Alexandra/Bearak, Jonathan (2014): Is the motherhood penalty larger for low-wage women? A comment on quantile regression. American Sociological Review 79(2), 350–357.

Kinnunen, Ulla/Nätti, Jouko (1994): Job insecurity in Finland: Antecedents and consequences. European Work and Organizational Psychologist 4(3), 297–321.

Kirves, Kaisa/De Cuyper, Nele/Kinnunen, Ulla/Nätti, Jouko (2011): Perceived job insecurity and perceived employability in relation to temporary and permanent workers' psychological symptoms: a two samples study. International Archives of Occupational and Environmental Health 84, 899–909.

Klandermans, Bert/Klein Hesselink, John/van Vuuren, Tinka (2010): Employment status and job insecurity: On the subjective appraisal of an objective status. Economic and Industrial Democracy 31(4), 1–21.

Knabe, Andreas/Schöb, Ronnie/Weimann, Joachim (2016): Partnership, gender roles, and the well-being cost of unemployment. Social Indicators Research 129, 1255–1275.

Koenker, Roger (2005): Quantile Regression. New York: Cambridge University Press.

Koenker, Roger/Bassett, Gilbert Jr. (1978): Regression Quantiles. Econometrica 46(1), 33–50.

Köhler, Christoph/Struck, Olaf/Grotheer, Michael/Krause, Alexandra/Krause, Ina/Schröder, Tim (2008): Offene und geschlossene Beschäftigungssysteme. Determinanten, Risiken und Nebenwirkungen. Wiesbaden: VS Verlag.

Kohn, Karsten (2006): Rising wage dispersion, after all! The German wage structure at the turn of the century. IZA Discussion Paper 2098.

Kraemer, Klaus (2008): Prekarität – was ist das? Arbeit 17(2), 77–90.

Krause, Alexandra/Köhler, Christoph (2011): Von der Vorherrschaft interner Märkte zur dynamischen Koexistenz von Arbeitsmarktsegmenten. WSI-Mitteilungen 11, 588–596.

Krause, Alexandra/Köhler, Christoph (2012): Was sind flexible Arbeitsmärkte und wie kann man sie erklären? In: Krause, Alexandra/Köhler, Christoph (eds.) (2012): Arbeit als Ware. Bielefeld: transcript, 9–43.

Krause, Alexandra/Köhler, Christoph (eds.) (2012): Arbeit als Ware. Bielefeld: transcript.

Kronauer, Martin/Linne, Gudrun (eds.) (2005): Flexicurity. Die Suche nach Sicherheit in der Flexibilität. Berlin: edition sigma.

Kuha, Johni/Mills, Colin (2020): On group comparisons with logistic regression models. Sociological Methods & Research 49(2), 498–525.

Kühhirt, Michael (2012): Childbirth and the long-term division of labour within couples: How do substitution, bargaining power, and norms affect parents' time allocation in West Germany? European Sociological Review 28(5), 565–582.

Kvasnicka, Michael/Werwatz, Axel (2002): Lohneffekte der Zeitarbeit. DIW Wochenbericht 49(2), 847–854.

Laß, Inga/Wooden, Mark (2019): The structure of the wage gap for temporary workers: Evidence from Australian panel data. British Journal of Industrial Relations 57(3), 453–478.

László, Krisztina D./Pikhart, Hynek/Kopp, Mária S./Bobak, Martin/Pajak, Andrzej/Malyutina, Sofia/Salavecz, Gyöngyvér/Marmot, Michael (2010): Job insecurity and health: A study of 16 European Countries. Social Science and Medicine 70(6–3), 867–874.

Lazarus, Richard S. (1966): Psychological stress and the coping process. New York: McGraw-Hill.

Lazarus, Richard S./Folkman, Susan (1984): Stress, appraisal and coping. New York: Springer.

Lee, Cynthia/Huang, Guo-Hua/Ashford, Susan J. (2018): Job insecurity and the changing workplace: Recent developments and the future trends in job insecurity research. Annual Review of Organizational Psychology and Organizational Behavior 5, 9.1–9.25.

Lengfeld, Holger/Hirschle, Jochen (2009): Die Angst der Mittelschicht vor dem sozialen Abstieg. Eine Längsschnittanalyse 1984–2007. Zeitschrift für Soziologie, 38(5), 379–398.

Lott, Yvonne (2014): Working time autonomy and time adequacy: What if performance is all that counts? WSI Working Paper 188.

Lübke, Christiane/Erlinghagen, Marcel (2014): Self-perceived job insecurity across Europe over time: Does changing context matter? Journal of European Social Policy 24(4), 319–336.

Machado, José A. F./Mata, José (2005): Counterfactual decomposition of changes in wage distributions using quantile regression. Journal of Applied Econometrics 20(4), 445–465.

Manzoni, Anna/Härkönen, Juho/Mayer, Karl U. (2014): Moving on? A growth-curve analysis of occupational attainment and career progression patterns in West Germany. Social Forces 92(4), 1285–1312.

Marx, Karl (1968) [1867]: Das Kapital. Band 1. Kritik der politischen Ökonomie. In: Karl Marx – Friedrich Engels – Werke (MEW) 23. Berlin: Dietz Verlag 11–802.

Mau, Steffen/Mewes, Jan/Schöneck, Nadine M. (2012): What determines subjective socio-economic insecurity? Context and class in comparative perspective. Socio-Economic Review 10(4), 655–682.

McGinnity, Frances/Mertens, Antje (2002): Fixed-term contracts in East and West Germany: Low wages, poor prospects? SFB 373 Discussion Papers 72.

Mertens, Antje/Gash, Vanessa/McGinnity, Frances (2005): The cost of flexibility at the margin. Comparing the wage penalty for fixed-term contracts in Germany and Spain using quantile regression. Working Paper 4, Project Employment Relationships at Risk.

Mertens, Antje/McGinnity, Frances (2005): Einkommensverluste durch Befristete Beschäftigung? Ein Überblick über den Stand der Debatte in Deutschland. In: Kronauer, Martin/Linne, Gudrun (eds.): Flexicurity. Die Suche nach Sicherheit in der Flexibilität, Berlin: edition sigma, 169–82.

Möller, Joachim (2016): Lohnungleichheit – gibt es eine Trendwende? IAB-Discussion Paper 9/2016.

Mood, Carina (2010): Logistic regression: Why we cannot do what we think we can do, and what we can do about it. European sociological review 26(1), 67–82.

Motakef, Mona (2015): Prekarisierung. Bielefeld: transcript Verlag.

Muñoz de Bustillo, Rafael/de Pedraza, Pablo (2010): Determinants of job insecurity in five European countries. European Journal of Industrial Relations 16(1): 5-20.

O'Connor, Julia S./Olsen, Gregg M. (eds.) (1998): Power resource theory and the welfare state. University of Toronto Press.

Oaxaca, Ronald. 1973. Male-female wage differentials in urban labor markets. International Economic Review 14(3), 693–709.

Ochsenfeld, Fabian (2014): Why do women's fields of study pay less? A test of devaluation, human capital, and gender role theory. European Sociological Review 30(4), 536–548.

OECD (1996): Employment Outlook 1996 – Countering the risks of labour market exclusion. Paris: OECD Publishing.

OECD (2015). In it together. Why less inequality benefits all. Paris: OECD Publishing.

Origo, Federica/Pagani, Laura (2009): Flexicurity and job satisfaction in Europe. The importance of perceived and actual job stability for well-being at work. Labour Economics 16(5), 547–555.

Paulsen, Michael B. (ed.) (2015): Higher Education: Handbook of Theory and Research 30.

Pfeifer, Christian (2012): Fixed-term contracts and wages revisited using linked employer-employee data. Journal for Labour Market Research 45(2), 171–83.

Piore, Michael J./Doeringer, Peter (1971): Internal labor markets and manpower adjustment. New York: D.C. Heath and Company.

Polanyi, Karl (1978): The Great Transformation. Politische und ökonomische Ursprünge von Gesellschaften und Wirtschaftssystemen. Frankfurt a. M.: Suhrkamp.

Porter, Stephen R. (2015): Quantile regression: Analyzing changes in distributions instead of means. In: Paulsen, Michael B. (ed.): Higher Education: Handbook of Theory and Research 30, 335–381.

Powell, David (forthcoming): Quantile treatment effects in the presence of covariates. Review of Economics and Statistics.

Prasad, Eswar S. (2004): The unbearable stability of the German wage structure. Evidence and interpretation. IMF Staff Papers 51(2), 354–385.

Regoli, Andrea/D'Agostino, Antonella/Grandner, Thomas/Gstach, Dieter (2019): Accounting for the permanent vs. temporay wage gaps among young adults: Three European countries in perspective. International Labour Review 158(2), 337–364.

Reichelt, Malte (2015): Career progression from temporary employment: How bridge and trap functions differ by task complexity. European Sociological Review 31(5), 558–572.

Rhein, Thomas/Stamm, Melanie (2006): Niedriglohnbeschäftigung in Deutschland – deskriptive Befunde zur Entwicklung seit 1980 und Verteilung auf Berufe und Wirtschaftszweige. IAB-Forschungsbericht 12/2006.

Rios-Avila, Fernando (2019): Recentred influence functions in Stata: Methods for analyzing the determinants of poverty and inequality. Levy Economics Institute Working Paper No. 927.

Rosenblatt, Zehava/Talmud, Ilan/Ruvio, Ayalla (1999): A gender-based framework of the experience of job insecurity and its effects on work attitudes of Israeli schoolteachers. The European Journal of Work and Organizational Psychology 8(2), 197–217.

Schäfer, Claus (2003): Effektiv gezahlte Niedriglöhne in Deutschland. WSI-Mitteilungen 7, 420–428.

Schmalz, Stefan/Dörre, Klaus (2014): Der Machtressourcenansatz: Ein Instrument zur Analyse gewerkschaftlichen Handlungsvermögens. Industrielle Beziehungen 21(3), 217–237.

Schmidt, Jörg (2019): Bereinigter Verdienstunterschied in Deutschland leicht rückläufig. Institut der deutschen Wirtschaft: IW-Kurzbericht 15/2019.

Scott, David W. (1992): Multivariate Density Estimation. New York: John Wiley & Sons.

Sengenberger, Werner (1987): Struktur und Funktionsweise von Arbeitsmärkten: die Dundesrepublik Deutschland im internationalen Vergleich. Frankfurt a. M.: Campus.

Sesselmeier, Werner/Funk, Lother/Waas, Bernd (2010): Arbeitsmarkttheorien. Eine ökonomisch-juristische Einführung. Heidelberg: Physica.

Shapiro, Carl/Stiglitz, Joseph E. (1984): Equilibrium unemployment as a worker discipline device. The American Economic Review 74(3), 433–44.

Silver, Beverly J. (2005): Forces of labor: Arbeiterbewegungen und Globalisierung seit 1870. Berlin: Assoziation A.

Silverman, Bernard W. (1986): Density estimates for statistics and data analysis. London: Chapman & Hall.

Spence, Michael (1973): Job market signaling. The Quarterly Journal of Economics 87(3), 355–374.

Spitz-Oener, Alexandra (2006): Technical change, job tasks, and rising educational demands: Looking outside the wage structure. Journal of Labor Economics 24(2), 235–270.

Stancanelli, Elena G. F (2002): Do temporary jobs pay? Wages and career perspectives of temporary workers. Paris: OECD and Tilburg University.

Statistisches Bundesamt (2016): Verdienststrukturerhebung. Erhebung der Struktur der Arbeitsverdienste nach §4 Verdienststatistikgesetz. Wiesbaden.

Steiner, Viktor/Wagner, Kersten (1998): Has earnings inequality in Germany changed in the 1980's? Zeitschrift für Wirtschafts- und Sozialwissenschaften 118, 29–59.

Stier, Haya/Yaish, Meir (2014): Occupational segregation and gender inequality in job quality: a multi-level approach. Work, Employment and Society, 28(2), 225–246.

Stuth, Stefan/Schels, Brigitte/Promberger, Markus/Jahn, Kerstin/Allmendinger, Jutta (2018): Prekarität in Deutschland?! WZB Discussion Paper P 2018-004.

Sverke, Magnus/Hellgren, Johnny/Näswall, Katharina (2002): No security: A meta-analysis and review of job-insecurity and its consequences. Journal of Occupational Health Psychology 7(3), 242–264.

Tangian, Andranik S. (2007): Is flexible work precarious? A study based on the 4th European Survey of Working Conditions 2005. WSI Working Paper 153.

Thompson, Edward P. (1963): The making of the English working class. London: Victor Gollancz.

Tõnurist, Piret/Pavlopoulos, Dimitris (2013): Part-time wage-gap in Germany: Evidence across the wage distribution. Journal of Income Distribution 22(2), 124–47.

Trappe, Heike/Pollmann-Schult, Mathias/Schmitt, Christian (2015): The rise and decline of the male breadwinner model: Institutional underpinnings and future expectations. *European Sociological Review*, 31(2), 230–242.

TzBfG (2000): Gesetz über Teilzeit und befristete Arbeitsverträge und zur Änderung und Aufhebung arbeitsrechtlicher Bestimmungen (Teilzeit- und Befristungsgesetz). Bundesgesetzblatt (BGB) 1, 59 (21 December 2000).

TzBfG (2017): Gesetz über Teilzeitarbeit und befristete Arbeitsverträge (Teilzeit- und Befristungsgesetz). Bundesgesetzblatt (BGB) 1 (22 November 2019).

van der Meer, Peter H. (2014). Gender, unemployment and subjective well-being: Why being unemployed is worse for men than for women. Social Indicators Research 115, 23–44.

Voßemer, Jonas/Gebel, Michael/Täht, Kadri/Unt, Marge/Högberg, Björn/Strandh, Mattias (2017): The effects of unemployment and insecure jobs on well-being and health: The moderating role labor market policies. Social Indicators Research 138, 1229–1257.

Walinga, Jennifer (2008): Change readiness: The roles of appraisal, focus, and perceived control. Journal of Applied Behavioral Science 44(3), 315–347.

Weber, Max (1980): Wirtschaft und Gesellschaft. Tübingen: Mohr.

Weeden, Kim A. (2005): Is there a flexiglass ceiling? Flexible work arrangements and wages in the United States. Social Science Research 34(2), 454–482.

WissZeitVG (2007): Gesetz über befristete Arbeitsverträge in der Wissenschaft (Wissenschaftszeitvertragsgesetz). Bundesgesetzblatt (BGB) 1, (23 May 2017).

WissZeitVG (2007): Gesetz zur Änderung arbeitsrechtlicher Vorschriften in der Wissenschaft (Wissenschaftszeitvertragsgesetz). Bundesgesetzblatt (BGB) 1, 13 (17 April 2007).

Wolf, Elke (2010): Lohndifferenziale zwischen Vollzeit- und Teilzeitbeschäftigten in Ost- und Westdeutschland. WSI-Diskussionspapier 174.

Wooldridge, Jeffrey M. (2010): Econometric analysis of cross section and panel data. Cambridge/Massachusetts: MIT Press.

Wright, Erik O. (2000): Working-class power, capitalist-class interests and class compromise. The American Journal of Sociology 105(4), 957–1002.

Yergin, Daniel/Stanislaw, Joseph (1999): Staat oder Markt. Die Schlüsselfrage unseres Jahrhunderts. Frankfurt a. M.: Campus.

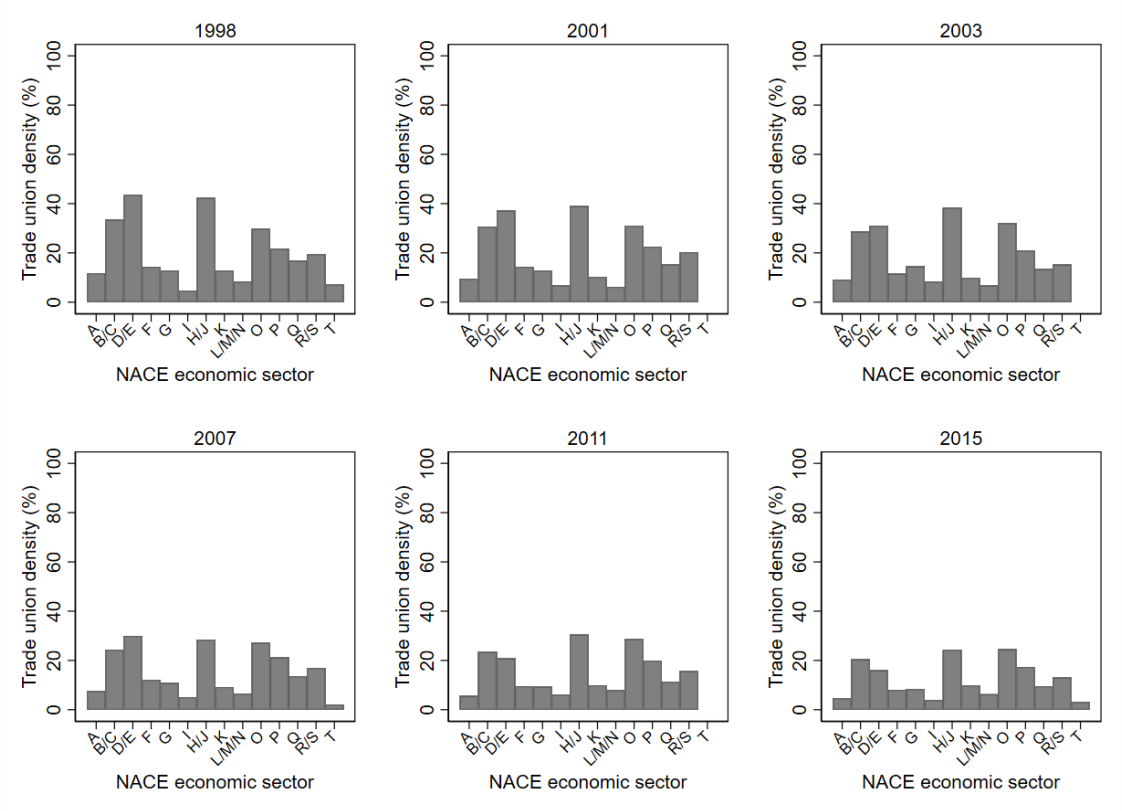
Zapf, Ines/Weber, Enzo (2017): The role of employer, job and employee characteristics for flexible working time. An empirical analysis of overtime work and flexible working hours' arrangements. IAB-Discussion paper 4/2017.

Zucco, Aline (2019): Occupational characteristics and the gender pay gap. DIW Berlin: Discussion Papers 1794.

Appendix I

The Stata do-files used for the analyses are available upon request.

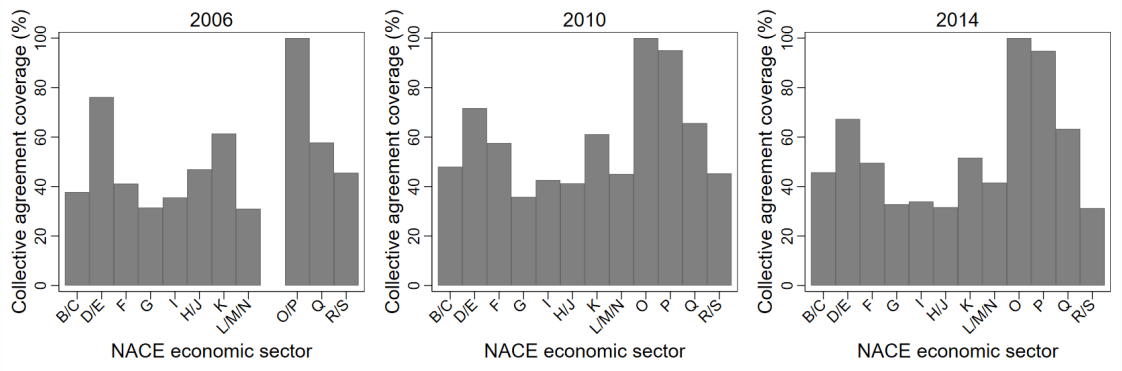
Figure A1: Trade union density over NACE sectors for selected years



Note: Weighted results; A: Agriculture, forestry and fishery, B/C: Manufacturing, mining and quarrying, D/E: Electricity, gas and water supply, F: Construction, G: Trade and reparation, I: Hotels and restaurants, H/J: Transport, storage and communication, K: Financial intermediation, L/M/N: Real estate, renting and business services, O: Public administration, defence and social security, P: Education, Q: Health and social work, R/S: Other community, social and personal services, T: Activities of households

Source: SOEP v34; 1998-2015; Author's calculations

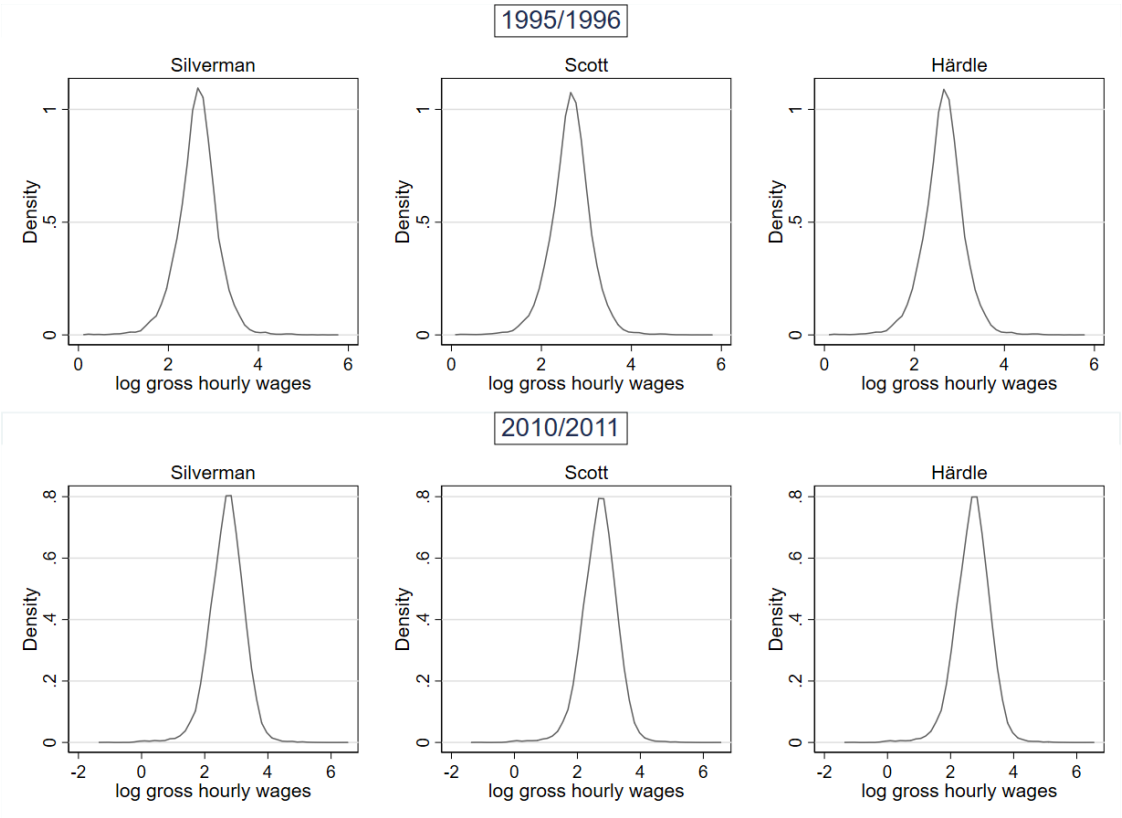
Figure A2: Collective agreement coverage over NACE sectors for selected years



Note: Weighted results; B/C: Manufacturing, mining and quarrying, D/E: Electricity, gas and water supply, F: Construction, G: Trade and reparation, I: Hotels and restaurants, H/J: Transport, storage and communication, K: Financial intermediation, L/M/N: Real estate, renting and business services, O: Public administration, defence and social security, P: Education, Q: Health and social work, R/S: Other community, social and personal services

Source: SES 2006, 2010, 2014; Author's calculations

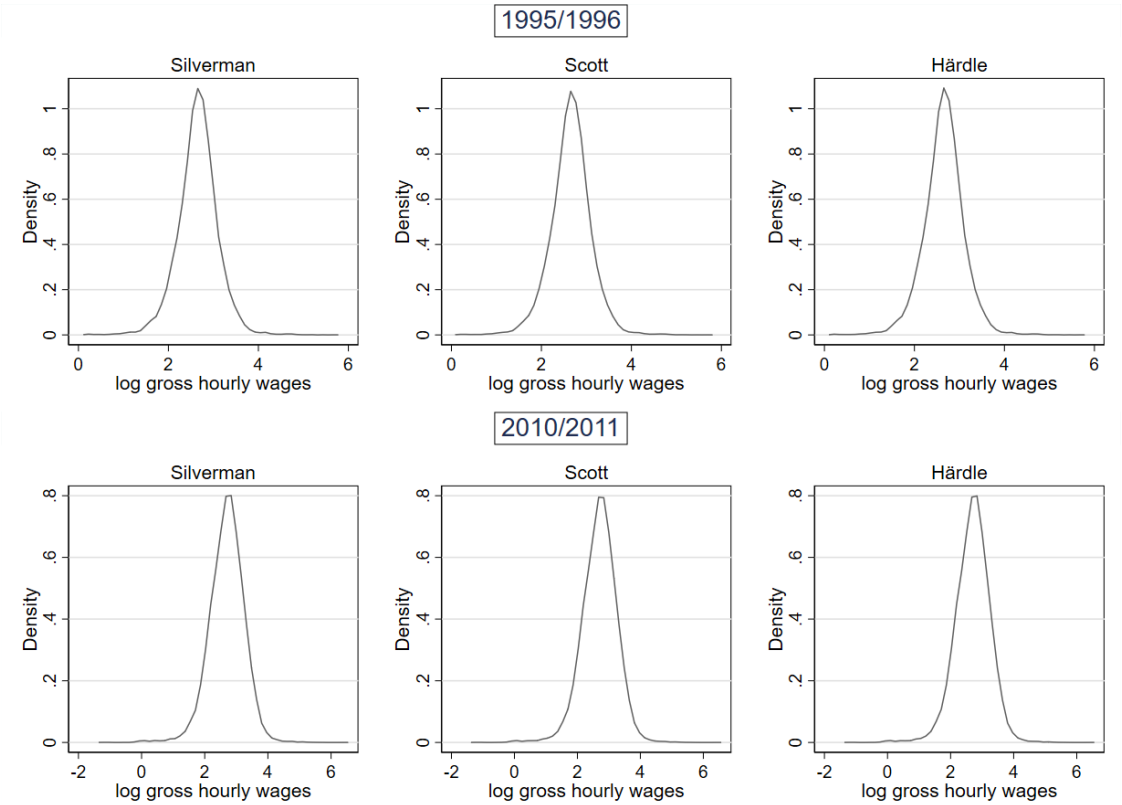
Figure A3: Comparison of density estimations of the logarithmic wage distribution with different bandwidth optimization methods (Gaussian kernel)



Note: Gaussian kernel; 10,007 (1995/1996) and 21,833 (2010/2011) person-year observations; Silverman (1986); Scott (1992); Härdle (1991)

Source: SOEP v34; Author's calculations

Figure A4: Comparison of density estimations of the logarithmic wage distribution with different bandwidth optimization methods (Epanechnikov kernel)



Note: Gaussian kernel; 10,007 (1995/1996) and 21,833 (2010/2011) person-year observations; Silverman (1986); Scott (1992); Härdle (1991)

Source: SOEP v34; Author's calculations

Table A1: Comparison of manually asymmetric double demeaned interactions with factor variable interactions for the heterogeneous effects of temporary employment on affective job insecurity across gender

	Factor variable interactions		Asymmetric double demeaned interactions	
	(1)	(6)	(1)	(6)
Regional unemployment rate *(centred)*	0.0095***	0.0094***	0.0095***	0.0094***
	(7.53)	(7.46)	(7.53)	(7.46)
Temporary employment (TE)	0.1040***	0.1019***	0.1040***	0.1019***
	(13.40)	(4.77)	(13.40)	(4.77)
Company size *(reference: less than 20 employees)*				
20-199 employees	0.0036	0.0042	0.0036	0.0042
	(0.70)	(0.81)	(0.70)	(0.81)
200-1999 employees	0.0029	0.0038	0.0029	0.0038
	(0.47)	(0.62)	(0.47)	(0.62)
2000 or more employees	-0.0095	-0.0087	-0.0095	-0.0087
	(-1.46)	(-1.34)	(-1.46)	(-1.34)
Actual weekly working hours *(centred)*	0.0001	0.0002	0.0001	0.0002
	(0.36)	(0.92)	(0.36)	(0.92)
Weekly overtime hours *(centred)*	-0.0019***	-0.0020***	-0.0019***	-0.0020***
	(-4.77)	(-4.86)	(-4.77)	(-4.86)
Tenure *(centred)*	0.0029***	0.0030***	0.0029***	0.0030***
	(6.38)	(6.48)	(6.38)	(6.48)
Interaction of TE and gender *(reference: men)*	0.0607***	0.0668***	0.0607***	0.0668***
	(5.65)	(5.64)	(5.65)	(5.64)
Household type *(reference: single)*				
w/ partner		-0.0064		-0.0063
		(-0.69)		(-0.69)
w/ partner and children		0.0082		0.0073
		(0.87)		(0.80)
w/ children		0.0182*		0.0174*
		(1.87)		(1.84)
Interaction of TE and household type				
TE – w/ partner		0.0019		0.0019
		(0.10)		(0.10)
TE – w/ partner and children		-0.0100		-0.0100
		(-0.55)		(-0.55)
TE – w/ children		-0.0100		-0.0100
		(-0.52)		(-0.52)
Relative income position in household *(centred)*		-0.0017		-0.0013
		(-1.55)		(-1.24)

	Factor variable interactions		Asymmetric double demeaned interactions	
	(1)	(6)	(1)	(6)
Interaction of TE and relative income position		0.0046*		0.0046*
		(1.89)		(1.89)
ISEI *(centred)*		0.0002		0.0002
		(0.91)		(1.00)
Interaction of TE and ISEI		0.0002		0.0002
		(0.45)		(0.45)
Occupational unemployment rate		0.0027***		0.0022***
		(3.28)		(2.75)
Interaction of TE and unemployment rate		-0.0059***		-0.0059***
		(-3.69)		(-3.69)
Sectoral union density		-0.0005		-0.0002
		(-1.21)		(-0.61)
Interaction of TE and union density		0.0028***		0.0028***
		(3.61)		(3.61)
Constant	0.4897***	0.4720***	0.4897***	0.4720***
	(53.82)	(34.96)	(53.82)	(34.96)
Observations (n)	189,153	189,153	189,153	189,153

Note: t statistics in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$; Fixed effects models w/ cluster-robust standard errors; Controls: year dummies

Source: SOEP v34, LFS, 1995-2017; Author's calculations

Table A2: Heterogeneous effects of temporary employment on affective job insecurity across gender with additional controls of gender specific personality traits (FULL TABLE)

	(6)	+ Big Five	+ Risk aversion
Regional unemployment rate *(centred)*	0.0099***	0.0100***	0.0100***
	(5.62)	(5.67)	(5.68)
Temporary employment (TE)	0.1016***	0.1025***	0.0805**
	(3.53)	(3.52)	(2.43)
Interaction of TE and gender *(reference: men)*	0.0676***	0.0695***	0.0727***
	(4.26)	(4.19)	(4.36)

	(6)	+ Big Five	+ Risk aversion
Company size *(reference: less than 20 employees)*			
20-199 employees	-0.0061 (-0.83)	-0.0058 (-0.80)	-0.0059 (-0.81)
200-1999 employees	-0.0059 (-0.69)	-0.0056 (-0.66)	-0.0058 (-0.68)
2000 or more employees	-0.0202** (-2.30)	-0.0199** (-2.26)	-0.0199** (-2.26)
Actual weekly working hours *(centred)*	-0.0003 (-0.85)	-0.0002 (-0.76)	-0.0002 (-0.74)
Weekly overtime hours *(centred)*	-0.0017*** (-2.95)	-0.0017*** (-2.93)	-0.0017*** (-2.91)
Tenure *(centred)*	0.0044*** (6.65)	0.0044*** (6.66)	0.0044*** (6.63)
Household type *(reference: single)*			
w/ partner	-0.0063 (-0.50)	-0.0067 (-0.53)	-0.0072 (-0.57)
w/ partner and children	-0.0024 (-0.19)	-0.0033 (-0.26)	-0.0040 (-0.32)
w/ children	0.0201 (1.51)	0.0196 (1.48)	0.0194 (1.46)
Interaction of TE and household type			
TE – w/ partner	-0.0058 (-0.22)	-0.0063 (-0.24)	-0.0057 (-0.22)
TE – w/ partner and children	-0.0037 (-0.15)	-0.0044 (-0.17)	-0.0042 (-0.16)
TE – w/ children	-0.0022 (-0.08)	0.0004 (0.01)	-0.0001 (-0.01)
Relative income position in household *(centred)*	-0.0016 (-1.06)	-0.0016 (-1.09)	-0.0016 (-1.09)
Interaction of TE and relative income position	0.0049 (1.42)	0.0048 (1.37)	0.0047 (1.35)
ISEI *(centred)*	-0.0001 (-0.42)	-0.0001 (-0.48)	-0.0001 (-0.45)
Interaction of TE and ISEI	0.0001 (0.13)	0.0001 (0.21)	0.0001 (0.24)
Occupational unemployment rate	0.0013 (1.09)	0.0013 (1.07)	0.0013 (1.05)
Interaction of TE and unemployment rate	-0.0078*** (-3.10)	-0.0081*** (-3.20)	-0.0081*** (-3.18)

	(6)	+ Big Five	+ Risk aversion
Sectoral union density	-0.0002 (-0.40)	-0.0002 (-0.41)	-0.0002 (-0.43)
Interaction of TE and union density	0.0029*** (2.74)	0.0028*** (2.66)	0.0028*** (2.68)
Extraversion		-0.0031 (-0.62)	-0.0027 (-0.54)
Interaction of TE and extraversion		-0.0132 (-1.23)	-0.0143 (-1.33)
Openness		-0.0099** (-2.13)	-0.0100** (-2.15)
Interaction of TE and openness		0.0169 (1.54)	0.0169 (1.54)
Conscientiousness		-0.0117** (-2.37)	-0.0111** (-2.26)
Interaction of TE and conscientiousness		0.0028 (0.25)	0.0010 (0.09)
Agreeableness		0.0097** (2.14)	0.0094** (2.07)
Interaction of TE and agreeableness		-0.0166 (-1.49)	-0.0154 (-1.38)
Neuroticism		0.0227*** (5.38)	0.0225*** (5.32)
Interaction of TE and neuroticism		0.0031 (0.34)	0.0042 (0.46)
Risk aversion			-0.0033*** (-3.50)
Interaction of TE and risk aversion			0.0040 (1.39)
Constant	0.6216*** (35.87)	0.6241*** (36.03)	0.6407*** (35.75)
Observations (n)	103,372	103,372	103,372

Note: t statistics in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$; Fixed effects models w/ cluster-robust standard errors; Controls: year dummies

Source: SOEP v34, LFS, 2004-2017; Author's calculations

Table A3: Heterogeneous effects of temporary employment on affective job insecurity across gender with incrementally added contextual factors (CONDITIONAL LOGIT MODELS)

	(1)	(2)	(3)	(4)	(5)	(6)
Regional unemployment rate *(centred)*	0.0841*** (8.75)	0.0842*** (8.76)	0.0841*** (8.75)	0.0840*** (8.74)	0.0838*** (8.72)	0.0839*** (8.74)
Temporary employment (TE)	0.9431*** (24.19)	0.7394*** (12.97)	0.7944*** (7.03)	0.7940*** (7.07)	0.8833*** (6.73)	0.6125*** (3.99)
Company size *(reference: less than 20 employees)*						
20-199 employees	0.0542 (1.53)	0.0535 (1.50)	0.0562 (1.58)	0.0568 (1.60)	0.0569 (1.60)	0.0581 (1.63)
200-1999 employees	0.0340 (0.81)	0.0339 (0.80)	0.0380 (0.90)	0.0393 (0.93)	0.0394 (0.93)	0.0413 (0.97)
2000 or more employees	-0.0703 (-1.56)	-0.0692 (-1.53)	-0.0664 (-1.47)	-0.0645 (-1.43)	-0.0642 (-1.42)	-0.0629 (-1.38)
Actual weekly working hours *(centred)*	0.0008 (0.55)	0.0007 (0.44)	0.0017 (1.12)	0.0017 (1.13)	0.0017 (1.14)	0.0017 (1.12)
Weekly overtime hours *(centred)*	-0.0138*** (-4.80)	-0.0138*** (-4.80)	-0.0141*** (-4.91)	-0.0142*** (-4.93)	-0.0142*** (-4.93)	-0.0141*** (-4.91)
Tenure *(centred)*	0.0169*** (5.26)	0.0170*** (5.31)	0.0173*** (5.39)	0.0171*** (5.33)	0.0171*** (5.35)	0.0171*** (5.35)
Interaction of TE and gender *(reference: men)*		0.3506*** (4.57)	0.4147*** (4.95)	0.4074*** (4.87)	0.3938*** (4.66)	0.4343*** (5.10)
Household type *(reference: single)*						
w/ partner			-0.0730 (-1.10)	-0.0714 (-1.07)	-0.0708 (-1.06)	-0.0695 (-1.04)
w/ partner and children			0.0314 (0.47)	0.0334 (0.50)	0.0340 (0.51)	0.0352 (0.52)
w/ children			0.1326** (1.97)	0.1317* (1.96)	0.1324** (1.97)	0.1310* (1.95)
Interaction of TE and household type						
TE – w/ partner			-0.0157 (-0.11)	-0.0084 (-0.06)	-0.0057 (-0.04)	-0.0110 (-0.08)
TE – w/ partner and children			-0.1169 (-0.88)	-0.0945 (-0.71)	-0.0973 (-0.74)	-0.1043 (-0.79)
TE – w/ children			-0.1850 (-1.39)	-0.1567 (-1.18)	-0.1601 (-1.21)	-0.1547 (-1.17)
Relative income position in household *(centred)*			-0.0177** (-2.21)	-0.0175** (-2.18)	-0.0174** (-2.17)	-0.0173** (-2.15)
Interaction of TE and relative income position			0.0325* (1.81)	0.0343* (1.92)	0.0342* (1.92)	0.0329* (1.85)

	(1)	(2)	(3)	(4)	(5)	(6)
ISEI *(centred)*				-0.0010	0.0009	0.0010
				(-0.77)	(0.63)	(0.67)
Interaction of TE and ISEI				0.0078***	0.0060**	0.0056**
				(3.34)	(2.14)	(2.02)
Occupational unemployment rate					0.0172***	0.0172***
					(2.81)	(2.81)
Interaction of TE and unemployment rate					-0.0161	-0.0159
					(-1.28)	(-1.26)
Sectoral union density						-0.0032
						(-1.26)
Interaction of TE and union density						0.0180***
						(3.33)
Observations (n)	116,840	116,840	116,840	116,840	116,840	116,840

Note: t statistics in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$; Conditional logit models w/ cluster-robust standard errors; Controls: year dummies

Source: SOEP v34, LFS, 1995-2017; Author's calculations

Table A4: Heterogeneous effects of temporary employment on affective job insecurity across ISEI with incrementally added contextual factors (Women) (FULL TABLE)

	(1)	(2)	(3)	(4)	(5)
Regional unemployment rate *(centred)*	0.0127***	0.0128***	0.0128***	0.0128***	0.0128***
	(6.90)	(6.91)	(6.90)	(6.95)	(6.94)
Temporary employment (TE)	0.1618***	0.2030***	0.1474***	0.0793***	-0.0246
	(21.21)	(13.93)	(7.34)	(2.94)	(-0.53)
ISEI *(centred)*	-0.0001	0.0002	0.0002	0.0002	0.0002
	(-0.35)	(0.56)	(0.68)	(0.52)	(0.45)
Interaction of TE and ISEI	0.0015***	0.0006	0.0003	0.0004	0.0002
	(3.43)	(1.13)	(0.64)	(0.76)	(0.19)
Company size *(reference: less than 20 employees)*					
20-199 employees	0.0093	0.0094	0.0098	0.0103	0.0105
	(1.30)	(1.31)	(1.36)	(1.43)	(1.46)
200-1999 employees	0.0063	0.0066	0.0073	0.0080	0.0083
	(0.75)	(0.78)	(0.86)	(0.95)	(0.98)
2000 or more employees	-0.0081	-0.0080	-0.0073	-0.0069	-0.0067
	(-0.91)	(-0.91)	(-0.83)	(-0.78)	(-0.75)
Actual weekly working hours *(centred)*	-0.0019***	-0.0019***	-0.0018***	-0.0018***	-0.0018***
	(-2.74)	(-2.74)	(-2.71)	(-2.72)	(-2.71)
Weekly overtime hours *(centred)*	0.0002	0.0002	0.0003	0.0003	0.0003
	(0.85)	(0.86)	(0.89)	(0.95)	(0.94)

	(1)	(2)	(3)	(4)	(5)
Tenure *(centred)*	0.0017**	0.0018***	0.0018***	0.0016**	0.0016**
	(2.48)	(2.58)	(2.62)	(2.36)	(2.30)
Occupational unemployment rate		0.0028*	0.0028**	0.0022	0.0018
		(1.94)	(2.00)	(1.57)	(1.25)
Interaction of TE and unemployment rate		-0.0084***	-0.0088***	-0.0061**	-0.0041
		(-3.30)	(-3.45)	(-2.29)	(-1.50)
Sectoral union density			-0.0008	0.0010	0.0007
			(-1.46)	(1.48)	(1.05)
Interaction of TE and union density			0.0045***	0.0019	0.0032**
			(3.97)	(1.47)	(2.34)
Sectoral collective agreement coverage				-0.0012***	-0.0011***
				(-4.56)	(-3.96)
Interaction of TE and collective agreement coverage				0.0015***	0.0009**
				(3.91)	(2.02)
Analytical non-routine task share					-0.0007
					(-1.19)
Interaction of TE and analytical task share					0.0020**
					(1.97)
Interactive non-routine task share					-0.0005
					(-1.39)
Interaction of TE and interactive task share					0.0012*
					(1.77)
Manual non-routine task share					-0.0007**
					(-2.08)
Interaction of TE and manual task share					0.0015**
					(2.23)
Constant	0.4435***	0.4279***	0.4379***	0.4837***	0.5234***
	(32.11)	(26.16)	(24.25)	(23.54)	(17.30)
Observations (n)	91,876	91,876	91,876	91,876	91,876

Note: t statistics in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$; Fixed effects models w/ cluster-robust standard errors; Controls: year dummies

Source: SOEP v34, LFS, SES 2014, Dengler et al. 2014; 1995-2017; Author's calculations

Table A5: Heterogeneous effects of temporary employment on affective job insecurity across ISEI with incrementally added contextual factors (Men) (FULL TABLE)

	(1)	(2)	(3)	(4)	(5)
Regional unemployment rate *(centred)*	0.0062***	0.0061***	0.0061***	0.0061***	0.0061***
	(3.62)	(3.53)	(3.54)	(3.55)	(3.55)
Temporary employment (TE)	0.1073***	0.1321***	0.1202***	0.0939***	0.0208
	(13.59)	(9.11)	(5.59)	(3.28)	(0.51)
ISEI *(centred)*	-0.0001	0.0002	0.0002	0.0002	0.0006*
	(-0.54)	(0.71)	(0.70)	(0.77)	(1.80)
Interaction of TE and ISEI	0.0002	-0.0003	-0.0003	-0.0005	-0.0018**
	(0.50)	(-0.63)	(-0.59)	(-0.88)	(-2.15)
Company size *(reference: less than 20 employees)*					
20-199 employees	-0.0024	-0.0021	-0.0021	-0.0020	-0.0021
	(-0.31)	(-0.28)	(-0.28)	(-0.27)	(-0.27)
200-1999 employees	-0.0010	-0.0008	-0.0008	-0.0003	-0.0004
	(-0.11)	(-0.09)	(-0.09)	(-0.04)	(-0.05)
2000 or more employees	-0.0113	-0.0112	-0.0112	-0.0110	-0.0110
	(-1.18)	(-1.17)	(-1.17)	(-1.15)	(-1.14)
Actual weekly working hours *(centred)*	-0.0019***	-0.0019***	-0.0019***	-0.0019***	-0.0019***
	(-3.71)	(-3.71)	(-3.70)	(-3.73)	(-3.73)
Weekly overtime hours *(centred)*	-0.0001	-0.0001	-0.0001	-0.0001	-0.0001
	(-0.20)	(-0.21)	(-0.22)	(-0.24)	(-0.16)
Tenure *(centred)*	0.0037***	0.0037***	0.0037***	0.0037***	0.0037***
	(6.27)	(6.27)	(6.27)	(6.22)	(6.15)
Occupational unemployment rate		0.0028***	0.0028***	0.0028***	0.0028***
		(2.71)	(2.70)	(2.74)	(2.67)
Interaction of TE and unemployment rate		-0.0042**	-0.0042**	-0.0042**	-0.0042**
		(-2.09)	(-2.06)	(-2.06)	(-2.01)
Sectoral union density			-0.0001	0.0004	0.0003
			(-0.22)	(0.79)	(0.55)
Interaction of TE and union density			0.0008	0.0003	0.0006
			(0.74)	(0.26)	(0.48)
Sectoral collective agreement coverage				-0.0006**	-0.0006**
				(-2.38)	(-2.16)
Interaction of TE and collective agreement coverage				0.0006	0.0004
				(1.39)	(0.75)
Analytical non-routine task share					-0.0011**
					(-2.45)
Interaction of TE and analytical task share					0.0030***
					(2.82)
Interactive non-routine task share					-0.0003
					(-0.72)

	(1)	(2)	(3)	(4)	(5)
Interaction of TE and interactive task share					-0.0008
					(-0.93)
Manual non-routine task share					-0.0006**
					(-2.39)
Interaction of TE and manual task share					0.0007
					(1.43)
Constant	0.5291***	0.5108***	0.5125***	0.5380***	0.5798***
	(42.68)	(36.15)	(32.22)	(27.98)	(23.95)
Observations (n)	97,277	97,277	97,277	97,277	97,277

Note: t statistics in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$; Fixed effects models w/ cluster-robust standard errors; Controls: year dummies

Source: SOEP v34, LFS, SES 2014, Dengler et al. 2014; 1995-2017; Author's calculations

Table A6: Heterogeneous effects of temporary employment on affective job insecurity across ISEI with incrementally added contextual factors (Women) (CONDITIONAL LOGIT MODELS)

	(1)	(2)	(3)	(4)	(5)
Regional unemployment rate *(centred)*	0.1110***	0.1111***	0.1113***	0.1119***	0.1122***
	(7.77)	(7.77)	(7.79)	(7.82)	(7.82)
Temporary employment (TE)	1.0701***	1.2166***	0.8283***	0.4359**	-0.4295
	(20.05)	(12.12)	(5.90)	(2.30)	(-1.30)
ISEI *(centred)*	-0.0008	0.0004	0.0007	0.0002	0.0001
	(-0.42)	(0.17)	(0.30)	(0.10)	(0.05)
Interaction of TE and ISEI	0.0115***	0.0081**	0.0061	0.0064	-0.0001
	(3.51)	(2.06)	(1.57)	(1.64)	(-0.02)
Company size *(reference: less than 20 employees)*					
20-199 employees	0.0907*	0.0911*	0.0940*	0.0967**	0.0978**
	(1.86)	(1.87)	(1.93)	(1.98)	(2.00)
200-1999 employees	0.0553	0.0564	0.0606	0.0665	0.0694
	(0.95)	(0.97)	(1.04)	(1.14)	(1.19)
2000 or more employees	-0.0438	-0.0428	-0.0370	-0.0341	-0.0325
	(-0.70)	(-0.69)	(-0.59)	(-0.55)	(-0.52)
Actual weekly working hours *(centred)*	-0.0141***	-0.0141***	-0.0141***	-0.0140***	-0.0140***
	(-2.90)	(-2.90)	(-2.90)	(-2.88)	(-2.88)
Weekly overtime hours *(centred)*	0.0013	0.0013	0.0014	0.0014	0.0015
	(0.67)	(0.67)	(0.69)	(0.72)	(0.74)
Tenure *(centred)*	0.0083*	0.0086*	0.0088*	0.0074	0.0071
	(1.65)	(1.71)	(1.74)	(1.48)	(1.42)

	(1)	(2)	(3)	(4)	(5)
Occupational unemployment rate		0.0118	0.0121	0.0080	0.0045
		(1.13)	(1.16)	(0.76)	(0.42)
Interaction of TE and unemployment rate		-0.0316*	-0.0337*	-0.0189	-0.0015
		(-1.65)	(-1.77)	(-0.94)	(-0.07)
Sectoral union density			-0.0059	0.0057	0.0039
			(-1.54)	(1.24)	(0.83)
Interaction of TE and union density			0.0310***	0.0160*	0.0258***
			(3.91)	(1.73)	(2.61)
Sectoral collective agreement coverage				-0.0080***	-0.0069***
				(-4.40)	(-3.79)
Interaction of TE and collective agreement coverage				0.0090***	0.0036
				(3.22)	(1.12)
Analytical non-routine task share					-0.0050
					(-1.22)
Interaction of TE and analytical task share					0.0204***
					(2.70)
Interactive non-routine task share					-0.0032
					(-1.29)
Interaction of TE and interactive task share					0.0093*
					(1.95)
Manual non-routine task share					-0.0052**
					(-2.18)
Interaction of TE and manual task share					0.0097**
					(2.01)
Observations (n)	56,126	56,126	56,126	56,126	56,126

Note: t statistics in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$; Conditional logit models w/ cluster-robust standard errors; Controls: year dummies

Source: SOEP v34, LFS, SES 2014, Dengler et al. 2014; 1995-2017; Author's calculations

Table A7: Heterogeneous effects of temporary employment on affective job insecurity across ISEI with incrementally added contextual factors (Men) (CONDITIONAL LOGIT MODELS)

	(1)	(2)	(3)	(4)	(5)
Regional unemployment rate *(centred)*	0.0576***	0.0568***	0.0569***	0.0571***	0.0573***
	(4.41)	(4.35)	(4.35)	(4.37)	(4.38)
Temporary employment (TE)	0.7841***	0.8521***	0.7357***	0.5096**	0.0722
	(13.35)	(7.94)	(4.60)	(2.39)	(0.24)
ISEI *(centred)*	-0.0013	0.0008	0.0008	0.0009	0.0039
	(-0.72)	(0.41)	(0.41)	(0.47)	(1.51)

	(1)	(2)	(3)	(4)	(5)
Interaction of TE and ISEI	0.0025 (0.76)	0.0012 (0.29)	0.0014 (0.35)	0.0001 (0.01)	-0.0076 (-1.23)
Company size *(reference: less than 20 employees)*					
20-199 employees	0.0062 (0.12)	0.0070 (0.13)	0.0071 (0.14)	0.0074 (0.14)	0.0068 (0.13)
200-1999 employees	0.0009 (0.01)	0.0016 (0.03)	0.0020 (0.03)	0.0057 (0.09)	0.0046 (0.07)
2000 or more employees	-0.0817 (-1.22)	-0.0809 (-1.21)	-0.0807 (-1.20)	-0.0786 (-1.17)	-0.0788 (-1.17)
Actual weekly working hours *(centred)*	-0.0131*** (-3.60)	-0.0131*** (-3.59)	-0.0130*** (-3.58)	-0.0131*** (-3.60)	-0.0131*** (-3.61)
Weekly overtime hours *(centred)*	-0.0004 (-0.17)	-0.0004 (-0.17)	-0.0004 (-0.19)	-0.0005 (-0.22)	-0.0003 (-0.15)
Tenure *(centred)*	0.0238*** (5.68)	0.0238*** (5.68)	0.0238*** (5.67)	0.0234*** (5.61)	0.0230*** (5.52)
Occupational unemployment rate		0.0176** (2.29)	0.0175** (2.28)	0.0178** (2.32)	0.0176** (2.25)
Interaction of TE and unemployment rate		-0.0123 (-0.73)	-0.0118 (-0.70)	-0.0114 (-0.68)	-0.0112 (-0.65)
Sectoral union density			-0.0014 (-0.40)	0.0023 (0.62)	0.0016 (0.41)
Interaction of TE and union density			0.0076 (0.98)	0.0035 (0.43)	0.0042 (0.48)
Sectoral collective agreement coverage				-0.0048** (-2.54)	-0.0044** (-2.36)
Interaction of TE and collective agreement coverage				0.0055 (1.62)	0.0042 (1.16)
Analytical non-routine task share					-0.0076** (-2.25)
Interaction of TE and analytical task share					0.0178** (2.23)
Interactive non-routine task share					-0.0024 (-0.85)
Interaction of TE and interactive task share					-0.0053 (-0.84)
Manual non-routine task share					-0.0040** (-2.32)
Interaction of TE and manual task share					0.0043 (1.13)

	(1)	(2)	(3)	(4)	(5)
Observations (n)	59,958	59,958	59,958	59,958	59,958

Note: t statistics in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$; Conditional logit models w/ cluster-robust standard errors; Controls: year dummies

Source: SOEP v34, LFS, SES 2014, Dengler et al. 2014; 1995-2017; Author's calculations

Table A8: Heterogeneous effects of part-time employment on affective job insecurity across gender with incrementally added contextual factors

	(1)	(2)	(3)	(4)	(5)	(6)
Regional unemployment rate *(centred)*	0.0101*** (9.62)	0.0101*** (9.60)	0.0101*** (9.55)	0.0100*** (9.54)	0.0100*** (9.53)	0.0100*** (9.55)
Part-time employment (PTE)	0.0018 (0.32)	0.0223* (1.84)	0.0092 (0.54)	0.0080 (0.48)	0.0069 (0.37)	-0.0033 (-0.16)
Marginal employment	-0.0505*** (-5.31)	-0.0523*** (-5.46)	-0.0549*** (-5.65)	-0.0592*** (-5.97)	-0.0593*** (-5.98)	-0.0591*** (-5.95)
Company size *(reference: less than 20 employees)*						
20-199 employees	0.0045 (0.89)	0.0045 (0.88)	0.0046 (0.89)	0.0044 (0.86)	0.0044 (0.87)	0.0035 (0.68)
200-1999 employees	0.0159*** (2.63)	0.0158*** (2.62)	0.0158*** (2.62)	0.0154** (2.55)	0.0154** (2.55)	0.0139** (2.31)
2000 or more employees	0.0208*** (3.30)	0.0208*** (3.30)	0.0208*** (3.31)	0.0201*** (3.20)	0.0200*** (3.19)	0.0183*** (2.92)
Weekly overtime hours *(centred)*	-0.0021*** (-5.70)	-0.0021*** (-5.68)	-0.0021*** (-5.68)	-0.0021*** (-5.81)	-0.0021*** (-5.81)	-0.0021*** (-5.80)
Tenure *(centred)*	0.0014*** (3.50)	0.0014*** (3.51)	0.0014*** (3.61)	0.0014*** (3.44)	0.0014*** (3.43)	0.0014*** (3.46)
Interaction of PTE and gender *(reference: men)*		-0.0241* (-1.82)	-0.0247* (-1.84)	-0.0238* (-1.79)	-0.0238* (-1.78)	-0.0229* (-1.71)
Household type *(reference: single)*						
w/ partner			0.0217** (2.55)	0.0215** (2.53)	0.0215** (2.53)	0.0215** (2.53)
w/ partner and children			0.0359*** (4.09)	0.0353*** (4.02)	0.0352*** (4.02)	0.0351*** (4.01)
w/ children			0.0173* (1.66)	0.0166 (1.59)	0.0166 (1.60)	0.0165 (1.59)

	(1)	(2)	(3)	(4)	(5)	(6)
Interaction of PTE and household type						
PTE – w/ partner			0.0113	0.0103	0.0105	0.0104
			(0.67)	(0.61)	(0.62)	(0.62)
PTE – w/ partner and children			0.0251	0.0236	0.0238	0.0237
			(1.45)	(1.37)	(1.38)	(1.38)
PTE – w/ children			0.0098	0.0098	0.0098	0.0100
			(0.57)	(0.57)	(0.58)	(0.58)
Relative income position in household *(centred)*			0.0022**	0.0022**	0.0022**	0.0022**
			(2.15)	(2.11)	(2.10)	(2.10)
Interaction of PTE and relative income position			0.0027	0.0028	0.0028	0.0028
			(1.49)	(1.49)	(1.50)	(1.51)
ISEI *(centred)*				0.0008***	0.0008***	0.0008***
				(4.39)	(4.30)	(4.32)
Interaction of PTE and ISEI				0.0010***	0.0011***	0.0010***
				(3.79)	(3.24)	(3.07)
Occupational unemployment rate					0.0007	0.0007
					(0.95)	(0.98)
Interaction of PTE and unemployment rate					0.0002	0.0002
					(0.14)	(0.16)
Sectoral union density						0.0009***
						(2.74)
Interaction of PTE and union density						0.0008
						(1.21)
Constant	0.6385***	0.6390***	0.6157***	0.6165***	0.6121***	0.5998***
	(76.23)	(76.23)	(58.91)	(58.99)	(53.29)	(48.53)
Observations (n)	158,492	158,492	158,492	158,492	158,492	158,492

Note: t statistics in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$; Fixed effects models w/ cluster-robust standard errors; Controls: year dummies

Source: SOEP v34, LFS, 2004-2017; Author's calculations

Table A9: Heterogeneous effects of part-time employment on affective job insecurity across gender with incrementally added contextual factors (CONDITIONAL LOGIT MODELS)

	(1)	(2)	(3)	(4)	(5)	(6)
Regional unemployment rate *(centred)*	0.1185***	0.1183***	0.1183***	0.1174***	0.1175***	0.1179***
	(9.06)	(9.03)	(9.04)	(8.98)	(8.98)	(9.00)
Part-time employment (PTE)	-0.0117	0.2300*	-0.0252	-0.0221	-0.0750	-0.2178
	(-0.21)	(1.75)	(-0.14)	(-0.12)	(-0.37)	(-1.00)

	(1)	(2)	(3)	(4)	(5)	(6)
Marginal employment	-0.4602***	-0.4808***	-0.4755***	-0.5084***	-0.5070***	-0.5040***
	(-5.82)	(-6.03)	(-5.72)	(-5.94)	(-5.91)	(-5.89)
Company size *(reference: less than 20 employees)*						
20-199 employees	0.0403	0.0390	0.0372	0.0347	0.0349	0.0234
	(0.84)	(0.82)	(0.78)	(0.73)	(0.73)	(0.49)
200-1999 employees	0.1370**	0.1355**	0.1301**	0.1250**	0.1255**	0.1096*
	(2.40)	(2.38)	(2.28)	(2.19)	(2.20)	(1.93)
2000 or more employees	0.1833***	0.1817***	0.1788***	0.1699***	0.1699***	0.1507**
	(3.12)	(3.10)	(3.05)	(2.90)	(2.89)	(2.56)
Weekly overtime hours *(centred)*	-0.0224***	-0.0224***	-0.0226***	-0.0232***	-0.0232***	-0.0232***
	(-6.02)	(-6.02)	(-6.08)	(-6.25)	(-6.24)	(-6.24)
Tenure *(centred)*	0.0289***	0.0289***	0.0292***	0.0285***	0.0284***	0.0286***
	(6.24)	(6.23)	(6.33)	(6.19)	(6.18)	(6.21)
Interaction of PTE and gender *(reference: men)*		-0.2811**	-0.2451*	-0.2298	-0.2277	-0.2137
		(-1.99)	(-1.69)	(-1.60)	(-1.58)	(-1.48)
Household type *(reference: single)*						
w/ partner			0.2384***	0.2353***	0.2349***	0.2349***
			(2.71)	(2.67)	(2.67)	(2.67)
w/ partner and children			0.2628***	0.2552***	0.2543***	0.2532***
			(2.90)	(2.81)	(2.81)	(2.79)
w/ children			0.1053	0.1009	0.1000	0.1000
			(1.05)	(1.00)	(1.00)	(1.00)
Interaction of PTE and household type						
PTE – w/ partner			0.2406	0.2275	0.2344	0.2390
			(1.24)	(1.17)	(1.20)	(1.23)
PTE – w/ partner and children			0.4634**	0.4435**	0.4482**	0.4515**
			(2.39)	(2.29)	(2.31)	(2.33)
PTE – w/ children			0.1195	0.1016	0.1003	0.1070
			(0.68)	(0.58)	(0.58)	(0.61)
Relative income position in household *(centred)*			0.0301***	0.0292***	0.0292***	0.0293***
			(2.70)	(2.63)	(2.62)	(2.64)
Interaction of PTE and relative income position			0.0468**	0.0470**	0.0480**	0.0484**
			(2.27)	(2.29)	(2.33)	(2.36)
ISEI *(centred)*				0.0077***	0.0081***	0.0082***
				(4.13)	(3.85)	(3.86)
Interaction of PTE and ISEI				0.0096***	0.0107***	0.0102***
				(3.63)	(3.34)	(3.16)
Occupational unemployment rate					0.0036	0.0038
					(0.41)	(0.43)

	(1)	(2)	(3)	(4)	(5)	(6)
Interaction of PTE and unemployment rate					0.0101 (0.65)	0.0111 (0.71)
Sectoral union density						0.0098*** (2.80)
Interaction of PTE and union density						0.0102 (1.57)
Observations (n)	66,038	66,038	66,038	66,038	66,038	66,038

Note: t statistics in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$; Conditional logit models w/ cluster-robust standard errors; Controls: year dummies

Source: SOEP v34, LFS, 2004-2017; Author's calculations

Table A10: Heterogeneous effects of part-time employment on affective job insecurity across ISEI with incrementally added contextual factors (Women) (CONDITIONAL LOGIT MODELS)

	(1)	(2)	(3)	(4)	(5)
Regional unemployment rate *(centred)*	0.1546*** (7.54)	0.1552*** (7.57)	0.1560*** (7.65)	0.1560*** (7.64)	0.1580*** (7.70)
Part-time employment (PTE)	-0.0397 (-0.65)	-0.1460 (-1.38)	-0.2347* (-1.68)	-0.0712 (-0.38)	-0.0128 (-0.04)
ISEI *(centred)*	0.0106*** (3.78)	0.0065** (2.01)	0.0064** (1.97)	0.0068** (2.09)	-0.0003 (-0.07)
Interaction of PTE and ISEI	0.0072** (2.42)	0.0097*** (2.72)	0.0093*** (2.59)	0.0090** (2.49)	0.0099* (1.78)
Marginal employment	-0.5081*** (-5.57)	-0.4965*** (-5.42)	-0.4876*** (-5.35)	-0.4758*** (-5.19)	-0.4556*** (-4.95)
Company size *(reference: less than 20 employees)*					
20-199 employees	0.0550 (0.83)	0.0544 (0.82)	0.0365 (0.56)	0.0365 (0.55)	0.0338 (0.51)
200-1999 employees	0.1856** (2.33)	0.1853** (2.33)	0.1593** (2.01)	0.1602** (2.02)	0.1610** (2.04)
2000 or more employees	0.2800*** (3.55)	0.2802*** (3.55)	0.2502*** (3.17)	0.2499*** (3.17)	0.2518*** (3.19)
Weekly overtime hours *(centred)*	-0.0218*** (-3.45)	-0.0218*** (-3.47)	-0.0215*** (-3.43)	-0.0214*** (-3.40)	-0.0205*** (-3.26)
Tenure *(centred)*	0.0288*** (4.09)	0.0295*** (4.19)	0.0292*** (4.16)	0.0297*** (4.22)	0.0293*** (4.16)
Occupational unemployment rate		-0.0374** (-2.50)	-0.0376** (-2.54)	-0.0335** (-2.24)	-0.0303* (-1.95)

	(1)	(2)	(3)	(4)	(5)
Interaction of PTE and unemployment rate		0.0222 (1.23)	0.0239 (1.33)	0.0175 (0.94)	0.0179 (0.93)
Sectoral union density			0.0198*** (3.40)	0.0143** (2.09)	0.0116* (1.65)
Interaction of PTE and union density			0.0070 (0.92)	0.0130 (1.42)	0.0125 (1.31)
Sectoral collective agreement coverage				0.0038 (1.46)	0.0039 (1.45)
Interaction of TE and collective agreement coverage				-0.0036 (-1.26)	-0.0029 (-0.93)
Analytical non-routine task share					0.0105* (1.77)
Interaction of TE and analytical task share					-0.0001 (-0.01)
Interactive non-routine task share					-0.0129*** (-3.21)
Interaction of TE and interactive task share					-0.0041 (-0.86)
Manual non-routine task share					-0.0077** (-2.18)
Interaction of TE and manual task share					0.0003 (0.07)
Observations (n)	32,681	32,681	32,681	32,681	32,681

Note: t statistics in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$; Conditional logit models w/ cluster-robust standard errors; Controls: year dummies

Source: SOEP v34, LFS, SES 2014, Dengler et al. 2014; 1995-2017; Author's calculations

Table A11: Heterogeneous effects of part-time employment on affective job insecurity across ISEI with incrementally added contextual factors (Men) (CONDITIONAL LOGIT MODELS)

	(1)	(2)	(3)	(4)	(5)
Regional unemployment rate *(centred)*	0.0848*** (4.97)	0.0835*** (4.91)	0.0837*** (4.91)	0.0837*** (4.92)	0.0845*** (4.97)
Part-time employment (PTE)	0.2080 (1.56)	0.1160 (0.47)	0.3146 (0.87)	0.0363 (0.07)	0.2831 (0.41)
ISEI *(centred)*	0.0053** (2.09)	0.0080*** (2.83)	0.0080*** (2.82)	0.0080*** (2.83)	0.0064* (1.78)
Interaction of PTE and ISEI	0.0207*** (3.04)	0.0234*** (2.58)	0.0245*** (2.72)	0.0231** (2.54)	0.0438*** (3.03)

	(1)	(2)	(3)	(4)	(5)
Marginal employment	-0.4488**	-0.4557**	-0.4532**	-0.4536**	-0.4143**
	(-2.25)	(-2.28)	(-2.26)	(-2.26)	(-2.07)
Company size *(reference: less than 20 employees)*					
20-199 employees	0.0051	0.0085	0.0064	0.0047	0.0001
	(0.07)	(0.12)	(0.09)	(0.07)	(0.00)
200-1999 employees	0.0571	0.0618	0.0584	0.0550	0.0467
	(0.70)	(0.76)	(0.71)	(0.67)	(0.57)
2000 or more employees	0.0359	0.0398	0.0351	0.0320	0.0273
	(0.41)	(0.46)	(0.40)	(0.37)	(0.31)
Weekly overtime hours *(centred)*	-0.0227***	-0.0227***	-0.0227***	-0.0226***	-0.0224***
	(-4.91)	(-4.90)	(-4.90)	(-4.89)	(-4.84)
Tenure *(centred)*	0.0269***	0.0265***	0.0267***	0.0268***	0.0264***
	(4.44)	(4.37)	(4.39)	(4.42)	(4.37)
Occupational unemployment rate		0.0231**	0.0232**	0.0231**	0.0283**
		(1.99)	(2.00)	(1.98)	(2.32)
Interaction of PTE and unemployment rate		0.0183	0.0187	0.0272	0.0240
		(0.43)	(0.45)	(0.62)	(0.56)
Sectoral union density			0.0029	0.0011	0.0005
			(0.65)	(0.24)	(0.10)
Interaction of PTE and union density			-0.0152	-0.0225	-0.0232
			(-0.86)	(-1.20)	(-1.15)
Sectoral collective agreement coverage				0.0025	0.0024
				(0.95)	(0.90)
Interaction of TE and collective agreement coverage				0.0059	0.0086
				(0.85)	(1.04)
Analytical non-routine task share					-0.0013
					(-0.28)
Interaction of TE and analytical task share					-0.0232
					(-1.41)
Interactive non-routine task share					-0.0039
					(-0.99)
Interaction of TE and interactive task share					0.0096
					(0.74)
Manual non-routine task share					-0.0063**
					(-2.38)
Interaction of TE and manual task share					0.0067
					(0.71)

	(1)	(2)	(3)	(4)	(5)
Observations (n)	33,357	33,357	33,357	33,357	33,357

Note: t statistics in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$; Conditional logit models w/ cluster-robust standard errors; Controls: year dummies

Source: SOEP v34, LFS, SES 2014, Dengler et al. 2014; 1995-2017; Author's calculations

Table A12: Heterogeneous effects of temporary employment on gross hourly wages across gender with incrementally added contextual factors

	(1)	(2)	(3)	(4)	(5)	(6)
Temporary employment (TE)	-0.0596*** (-12.70)	-0.0842*** (-12.06)	-0.1337*** (-8.42)	-0.1330*** (-8.44)	-0.0767*** (-4.17)	-0.0810*** (-3.91)
Company size *(reference: less than 20 employees)*						
20-199 employees	0.0637*** (14.23)	0.0637*** (14.23)	0.0629*** (13.90)	0.0624*** (13.86)	0.0626*** (13.91)	0.0616*** (13.70)
200-1999 employees	0.0917*** (17.82)	0.0916*** (17.83)	0.0885*** (17.07)	0.0877*** (16.98)	0.0880*** (17.05)	0.0863*** (16.76)
2000 or more employees	0.1031*** (18.53)	0.1031*** (18.54)	0.1002*** (17.81)	0.0989*** (17.67)	0.0990*** (17.73)	0.0970*** (17.43)
Actual weekly working hours *(centred)*	0.0014*** (4.66)	0.0014*** (4.66)	0.0014*** (4.75)	0.0014*** (4.70)	0.0014*** (4.64)	0.0014*** (4.68)
Weekly overtime hours *(centred)*	-0.0132*** (-47.01)	-0.0132*** (-47.06)	-0.0137*** (-48.62)	-0.0138*** (-49.04)	-0.0138*** (-49.07)	-0.0138*** (-49.09)
Tenure *(centred)*	0.0049*** (11.69)	0.0048*** (11.70)	0.0048*** (11.43)	0.0048*** (11.47)	0.0049*** (11.69)	0.0049*** (11.74)
Interaction of TE and gender *(reference: men)*		0.0435*** (4.64)	0.0580*** (5.53)	0.0589*** (5.65)	0.0500*** (4.77)	0.0504*** (4.74)
Household type *(reference: single)*						
w/ partner			0.1529*** (20.69)	0.1521*** (20.62)	0.1521*** (20.63)	0.1520*** (20.63)
w/ partner and children			0.1560*** (21.32)	0.1545*** (21.18)	0.1546*** (21.20)	0.1545*** (21.19)
w/ children			-0.0129* (-1.77)	-0.0130* (-1.80)	-0.0124* (-1.72)	-0.0124* (-1.72)

	(1)	(2)	(3)	(4)	(5)	(6)
Interaction of TE and household type						
TE – w/ partner			0.0497***	0.0484***	0.0501***	0.0504***
			(2.66)	(2.60)	(2.70)	(2.71)
TE – w/ partner and children			0.0684***	0.0643***	0.0639***	0.0638***
			(3.92)	(3.70)	(3.69)	(3.68)
TE – w/ children			-0.0117	-0.0160	-0.0178	-0.0175
			(-0.62)	(-0.85)	(-0.94)	(-0.93)
Relative income position in household *(centred)*			0.0245***	0.0245***	0.0245***	0.0245***
			(23.44)	(23.43)	(23.46)	(23.48)
Interaction of TE and relative income position			0.0072***	0.0069***	0.0070***	0.0070***
			(2.86)	(2.75)	(2.80)	(2.79)
ISEI *(centred)*				0.0018***	0.0017***	0.0017***
				(12.07)	(10.41)	(10.39)
Interaction of TE and ISEI				-0.0013***	-0.0026***	-0.0026***
				(-4.43)	(-7.15)	(-7.15)
Occupational unemployment rate					-0.0006	-0.0006
					(-1.03)	(-0.99)
Interaction of TE and unemployment rate					-0.0097***	-0.0097***
					(-5.97)	(-5.97)
Sectoral union density						0.0012***
						(4.39)
Interaction of TE and union density						0.0003
						(0.41)
Constant	2.5621***	2.5620***	2.4689***	2.4706***	2.4754***	2.4586***
	(371.27)	(371.58)	(282.57)	(284.09)	(260.48)	(236.98)
Observations (n)	197,085	197,085	197,085	197,085	197,085	197,085

Note: t statistics in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$; Fixed effects models w/ cluster-robust standard errors; Controls: year dummies

Source: SOEP v34, LFS, 1995-2017; Author's calculations

Table A13: Heterogeneous effects of temporary employment on gross hourly wages across ISEI with non-routine task shares added individually (Men)

	w/ analytical task shares	w/ interactive task shares	w/ manual task shares	w/ all task shares
Temporary employment (TE)	0.0716**	0.0465	0.0189	0.0637*
	(2.08)	(1.55)	(0.65)	(1.67)
ISEI *(centred)*	0.0021***	0.0019***	0.0016***	0.0021***
	(8.70)	(9.24)	(8.00)	(8.80)
Interaction of TE and ISEI	-0.0004	-0.0013**	-0.0013**	-0.0004
	(-0.45)	(-2.29)	(-2.17)	(-0.45)
Company size *(reference: less than 20 employees)*				
20-199 employees	0.0587***	0.0585***	0.0580***	0.0582***
	(9.85)	(9.80)	(9.70)	(9.76)
200-1999 employees	0.0772***	0.0770***	0.0765***	0.0766***
	(10.83)	(10.79)	(10.69)	(10.73)
2000 or more employees	0.0955***	0.0955***	0.0948***	0.0949***
	(12.37)	(12.34)	(12.25)	(12.29)
Weekly overtime hours *(centred)*	0.0039***	0.0039***	0.0039***	0.0039***
	(10.58)	(10.57)	(10.54)	(10.58)
Actual weekly working hours *(centred)*	-0.0161***	-0.0161***	-0.0161***	-0.0161***
	(-38.81)	(-38.81)	(-38.70)	(-38.77)
Tenure *(centred)*	0.0049***	0.0049***	0.0049***	0.0048***
	(9.29)	(9.30)	(9.26)	(9.22)
Occupational unemployment rate	0.0012*	0.0012*	0.0017**	0.0015**
	(1.74)	(1.79)	(2.49)	(2.22)
Interaction of TE and unemployment rate	-0.0103***	-0.0105***	-0.0105***	-0.0107***
	(-4.56)	(-4.59)	(-4.59)	(-4.63)
Sectoral union density	0.0003	0.0003	0.0003	0.0002
	(0.74)	(0.76)	(0.68)	(0.51)
Interaction of TE and union density	0.0032***	0.0030***	0.0037***	0.0030***
	(3.18)	(2.89)	(3.69)	(2.87)
Sectoral collective agreement coverage	0.0002	0.0002	0.0002	0.0002
	(1.00)	(1.00)	(1.00)	(1.10)
Interaction of TE and collective agreement coverage	-0.0019***	-0.0020***	-0.0022***	-0.0018***
	(-4.14)	(-4.48)	(-4.89)	(-4.04)
Analytical non-routine task share	-0.0004			-0.0009***
	(-1.47)			(-2.75)
Interaction of TE and analytical task share	-0.0019**			-0.0014
	(-2.19)			(-1.49)
Interactive non-routine task share		-0.0004		-0.0004
		(-1.43)		(-1.47)

	w/ analytical task shares	w/ interactive task shares	w/ manual task shares	w/ all task shares
Interaction of TE and interactive task share		-0.0012		-0.0006
		(-1.54)		(-0.70)
Manual non-routine task share			-0.0004**	-0.0007***
			(-2.49)	(-3.58)
Interaction of TE and manual task share			0.0006	0.0002
			(1.28)	(0.45)
Constant	2.7344***	2.7280***	2.7312***	2.7626***
	(166.69)	(189.75)	(191.08)	(152.13)
Observations (n)	101,601	101,601	101,601	101,601

Note: t statistics in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$; Fixed effects models w/ cluster-robust standard errors; Controls: year dummies

Source: SOEP v34, LFS, SES 2014, Dengler et al. 2014; 1995-2017; Author's calculations

Table A14: Heterogeneous effects of part-time employment on gross hourly wages across ISEI with non-routine task shares added individually (Women)

	w/ analytical task shares	w/ interactive task shares	w/ manual task shares	w/ all task shares
Part-time employment (PTE)	-0.0734***	-0.0572***	-0.0244	-0.0664**
	(-3.57)	(-3.30)	(-1.40)	(-2.41)
ISEI *(centred)*	-0.0001	0.0002	0.0004	0.0002
	(-0.38)	(0.78)	(1.29)	(0.54)
Interaction of PTE and ISEI	0.0010**	0.0015***	0.0010**	0.0008
	(2.09)	(4.35)	(2.40)	(1.56)
Marginal employment	-0.1151***	-0.1139***	-0.1156***	-0.1149***
	(-8.33)	(-8.26)	(-8.38)	(-8.34)
Company size *(reference: less than 20 employees)*				
20-199 employees	0.0381***	0.0379***	0.0383***	0.0379***
	(6.08)	(6.06)	(6.12)	(6.07)
200-1999 employees	0.0679***	0.0675***	0.0679***	0.0677***
	(9.77)	(9.74)	(9.77)	(9.77)
2000 or more employees	0.0722***	0.0719***	0.0722***	0.0721***
	(9.65)	(9.64)	(9.65)	(9.66)
Weekly overtime hours *(centred)*	-0.0097***	-0.0097***	-0.0097***	-0.0097***
	(-18.12)	(-18.17)	(-18.16)	(-18.15)
Tenure *(centred)*	0.0038***	0.0038***	0.0038***	0.0038***
	(6.26)	(6.24)	(6.24)	(6.27)

	w/ analytical task shares	w/ interactive task shares	w/ manual task shares	w/ all task shares
Occupational unemployment rate	-0.0050***	-0.0054***	-0.0052***	-0.0049***
	(-3.95)	(-4.32)	(-4.14)	(-3.94)
Interaction of PTE and unemployment rate	0.0041***	0.0036**	0.0032**	0.0040***
	(2.67)	(2.33)	(2.10)	(2.59)
Sectoral union density	0.0006	0.0004	0.0007	0.0006
	(0.89)	(0.55)	(1.10)	(0.90)
Interaction of PTE and union density	0.0009	0.0011	0.0005	0.0009
	(1.07)	(1.30)	(0.62)	(1.11)
Sectoral collective agreement coverage	0.0003	0.0003	0.0002	0.0002
	(1.13)	(1.26)	(0.81)	(0.95)
Interaction of PTE and collective agreement coverage	0.0004	0.0004*	0.0006**	0.0004
	(1.37)	(1.71)	(2.43)	(1.35)
Analytical non-routine task share	0.0003			0.0009*
	(0.72)			(1.84)
Interaction of PTE and analytical task share	0.0013**			0.0008
	(2.41)			(1.36)
Interactive non-routine task share		-0.0010***		-0.0008**
		(-2.86)		(-2.20)
Interaction of PTE and interactive task share		0.0009**		0.0007*
		(2.35)		(1.73)
Manual non-routine task share			0.0006**	0.0007**
			(2.14)	(2.09)
Interaction of PTE and manual task share			-0.0009**	-0.0004
			(-2.54)	(-0.99)
Constant	2.4506***	2.4816***	2.4514***	2.4360***
	(109.82)	(130.97)	(134.41)	(90.95)
Observations (n)	95,484	95,484	95,484	95,484

Note: t statistics in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$; Fixed effects models w/ cluster-robust standard errors; Controls: year dummies

Source: SOEP v34, LFS, SES 2014, Dengler et al. 2014; 1995-2017; Author's calculations

Table A15: Decompositions of log gross hourly wage changes between 1995/1996 and 2010/2011 for selected quantiles and inter-quantile ratios (not reweighted) (ALTERNATIVE BASE GROUP: 1995/1996)

	15th quantile	50th quantile	85th quantile	50/15 quantile ratio	85/50 quantile ratio	85/15 quantile ratio
OVERALL						
1995/1996	2.2461*** (219.20)	2.6629*** (469.05)	3.0514*** (369.73)	1.1855*** (249.81)	1.1459*** (404.30)	1.3585*** (209.57)
2010/2011	2.1735*** (283.65)	2.7245*** (681.65)	3.2351*** (429.72)	1.2535*** (301.67)	1.1874*** (419.44)	1.4884*** (256.53)
Total difference	0.0726*** (5.92)	-0.0616*** (-9.19)	-0.1837*** (-17.37)	-0.0680*** (-11.22)	-0.0415*** (-10.75)	-0.1299*** (-15.83)
Aggregate composition effect	-0.1532*** (-13.13)	-0.1701*** (-19.84)	-0.1476*** (-16.34)	0.0093 (1.53)	0.0203*** (5.88)	0.0365*** (4.69)
Aggregate structure effect	0.2258*** (16.06)	0.1084*** (12.51)	-0.0361*** (-3.40)	-0.0773*** (-9.18)	-0.0618*** (-12.40)	-0.1664*** (-16.29)
DETAILED COMPOSITION EFFECTS						
Temporary employment	0.0066*** (6.38)	0.0042*** (7.19)	0.0025*** (4.18)	-0.0019*** (-3.60)	-0.0009*** (-3.77)	-0.0034*** (-4.77)
Part-time employment	0.0098*** (4.47)	0.0025** (1.97)	-0.0013 (-0.83)	-0.0044*** (-3.44)	-0.0016** (-2.26)	-0.0073*** (-4.39)
Marginal employment	0.0252*** (10.60)	0.0037*** (5.87)	-0.0032*** (-4.97)	-0.0127*** (-9.92)	-0.0028*** (-8.88)	-0.0187*** (-10.70)
Age *(centred)*	-0.1639*** (-7.84)	-0.1606*** (-12.44)	-0.0466*** (-3.23)	0.0198* (1.67)	0.0533*** (8.16)	0.0902*** (5.72)
Age squared	0.1870*** (9.67)	0.1596*** (12.97)	0.0284** (2.14)	-0.0335*** (-3.17)	-0.0596*** (-9.69)	-0.1144*** (-7.90)
Region of residence *(reference: West Germany)*	-0.0185*** (-7.23)	-0.0126*** (-7.34)	-0.0092*** (-6.99)	0.0048*** (5.62)	0.0021*** (5.35)	0.0084*** (6.46)
Gender *(reference: men)*	0.0034*** (3.40)	0.0095*** (7.36)	0.0160*** (7.46)	0.0025*** (3.91)	0.0017*** (3.58)	0.0050*** (5.25)
Education in years *(centred)*	-0.0413*** (-11.91)	-0.0614*** (-18.57)	-0.1011*** (-18.09)	-0.0047** (-2.28)	-0.0102*** (-5.78)	-0.0184*** (-5.92)
Full-time equivalent experience *(centred)*	-0.0126*** (-5.04)	-0.0079*** (-5.20)	-0.0033*** (-2.64)	0.0036*** (3.30)	0.0022*** (3.76)	0.0071*** (4.36)
Tenure *(centred)*	-0.0105*** (-6.43)	-0.0132*** (-7.51)	-0.0055*** (-4.83)	-0.0001 (-0.14)	0.0038*** (6.08)	0.0046*** (4.63)
Company size *(normalised)*						
Less than 20 employees	0.0015* (1.74)	0.0015* (1.76)	0.0010* (1.76)	-0.0002 (-1.20)	-0.0003* (-1.70)	-0.0006 (-1.64)

	15th quantile	50th quantile	85th quantile	50/15 quantile ratio	85/50 quantile ratio	85/15 quantile ratio
20-199 employees	0.0001	0.0005	0.0006	0.0002	-0.0000	0.0002
	(0.81)	(1.46)	(1.45)	(1.24)	(-0.06)	(1.20)
200-1999 employees	0.0017***	0.0017***	-0.0002	-0.0002	-0.0008***	-0.0012***
	(3.16)	(3.17)	(-0.70)	(-1.52)	(-3.04)	(-3.02)
2000 or more employees	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Occupational unemployment rate	-0.1400***	-0.0817***	0.0061	0.0426***	0.0381***	0.0982***
	(-13.59)	(-13.61)	(0.99)	(6.99)	(12.38)	(13.34)
Sectoral union density	-0.0002	0.0007	0.0015**	0.0004	0.0002	0.0008
	(-0.23)	(1.25)	(1.98)	(0.84)	(0.77)	(1.15)
Sectoral collective agreement coverage	-0.0042***	-0.0017***	0.0041***	0.0016***	0.0023***	0.0047***
	(-3.87)	(-3.36)	(3.69)	(3.44)	(3.87)	(3.96)
Analytical non-routine task share	0.0019	-0.0224***	-0.0398***	-0.0115***	-0.0048***	-0.0196***
	(0.56)	(-7.87)	(-9.87)	(-5.08)	(-2.99)	(-6.57)
Interactive non-routine task share	0.0116***	0.0139***	0.0022	-0.0002	-0.0053***	-0.0069***
	(5.00)	(9.14)	(1.14)	(-0.17)	(-5.96)	(-3.72)
Manual non-routine task share	-0.0109***	-0.0064***	0.0003	0.0033***	0.0029***	0.0076***
	(-4.99)	(-5.04)	(0.23)	(2.74)	(4.41)	(4.69)
DETAILED STRUCTURE EFFECTS						
Temporary employment	0.0030	0.0030**	0.0009	-0.0006	-0.0010	-0.0022
	(1.11)	(2.40)	(0.59)	(-0.45)	(-1.52)	(-1.19)
Part-time employment	-0.0004	0.0030	0.0015	0.0011	-0.0007	-0.0000
	(-0.08)	(1.18)	(0.46)	(0.39)	(-0.52)	(-0.01)
Marginal employment	-0.0003	-0.0005	-0.0002	-0.0006	0.0001	-0.0009
	(-0.20)	(-0.78)	(-0.21)	(-0.69)	(0.53)	(-0.88)
Age *(centred)*	0.1339**	0.0275	-0.0428	-0.0674**	-0.0311*	-0.1221***
	(2.26)	(0.88)	(-1.00)	(-2.03)	(-1.73)	(-2.81)
Age squared	0.4500***	0.0452	-0.1543	-0.2514***	-0.0864*	-0.4211***
	(2.76)	(0.50)	(-1.24)	(-2.75)	(-1.66)	(-3.48)
Region of residence *(reference: West Germany)*	-0.0303***	-0.0343***	-0.0296***	-0.0027	0.0027	-0.0016
	(-3.39)	(-7.37)	(-5.65)	(-0.50)	(1.05)	(-0.26)
Gender *(reference: men)*	-0.0282***	0.0043	0.0175*	0.0168***	0.0034	0.0247***
	(-2.74)	(0.64)	(1.67)	(2.80)	(0.76)	(3.08)
Education in years *(centred)*	0.0057***	0.0075***	0.0094***	0.0001	-0.0001	0.0003
	(3.48)	(5.59)	(4.19)	(0.14)	(-0.07)	(0.25)
Full-time equivalent experience *(centred)*	0.0032	-0.0004	0.0017	-0.0023*	0.0007	-0.0020
	(1.44)	(-0.35)	(1.07)	(-1.78)	(1.09)	(-1.26)
Tenure *(centred)*	-0.0019**	-0.0020**	0.0002	0.0002	0.0010**	0.0014**
	(-2.15)	(-2.27)	(0.56)	(0.70)	(2.26)	(2.16)

	15th quantile	50th quantile	85th quantile	50/15 quantile ratio	85/50 quantile ratio	85/15 quantile ratio
Company size *(normalised)*						
Less than 20 employees	-0.0121**	0.0104***	0.0096***	0.0101***	-0.0013	0.0095***
	(-2.34)	(3.98)	(3.28)	(3.54)	(-0.94)	(2.65)
20-199 employees	0.0047	0.0032	0.0067*	-0.0009	0.0009	0.0002
	(0.99)	(1.16)	(1.76)	(-0.35)	(0.52)	(0.06)
200-1999 employees	0.0063*	-0.0072***	-0.0009	-0.0060***	0.0029*	-0.0027
	(1.77)	(-2.96)	(-0.25)	(-2.83)	(1.83)	(-0.95)
2000 or more employees	0.0028	-0.0067***	-0.0151***	-0.0041**	-0.0023	-0.0077**
	(0.78)	(-2.58)	(-3.44)	(-2.00)	(-1.26)	(-2.46)
Occupational unemployment rate	0.0471***	0.0217***	-0.0125**	-0.0186***	-0.0145***	-0.0413***
	(4.65)	(3.95)	(-2.07)	(-3.26)	(-4.84)	(-5.89)
Sectoral union density	0.0337	-0.0204	-0.0064	-0.0273*	0.0067	-0.0240
	(1.26)	(-1.31)	(-0.29)	(-1.87)	(0.73)	(-1.22)
Sectoral collective agreement coverage	0.0073	-0.0222	0.1027***	-0.0066	0.0474***	0.0580**
	(0.24)	(-1.12)	(3.39)	(-0.37)	(3.70)	(2.39)
Analytical non-routine task share	0.0010	0.0061**	-0.0128***	0.0025	-0.0078***	-0.0058*
	(0.24)	(2.36)	(-2.97)	(1.11)	(-4.31)	(-1.83)
Interactive non-routine task share	0.0021	-0.0011	0.0061**	-0.0014	0.0029***	0.0021
	(0.67)	(-0.65)	(2.27)	(-0.79)	(2.61)	(0.91)
Manual non-routine task share	0.0003	0.0009	0.0022**	0.0000	0.0004	0.0003
	(0.20)	(0.99)	(1.99)	(0.03)	(0.80)	(0.29)
Constant	-0.4020*	0.0703	0.0799	0.2818**	0.0142	0.3685**
	(-1.81)	(0.57)	(0.46)	(2.26)	(0.20)	(2.23)
Observations (n)	31,840	31,840	31,840	31,840	31,840	31,840

Note: Decomposed unconditional quantile (RIF) models w/ bootstrapped standard errors (1000 repetitions)

Source: SOEP v34, LFS, SES 2014, Dengler et al. 2014; Author's calculations

Table A16: Decompositions of log gross hourly wage changes between 1995/1996 and 2010/2011 for selected quantiles and inter-quantile ratios (reweighted – FULL TABLE)

	15th quantile	50th quantile	85th quantile	50/15 quantile ratio	85/50 quantile ratio	85/15 quantile ratio
OVERALL						
2010/2011	2.1735***	2.7245***	3.2351***	1.2535***	1.1874***	1.4884***
	(283.72)	(680.96)	(429.59)	(301.67)	(419.44)	(256.53)
Counterfactual	2.2325***	2.7003***	3.0593***	1.2095***	1.1330***	1.3704***
	(81.18)	(111.70)	(136.36)	(88.00)	(107.50)	(74.53)
1995/1996	2.2461***	2.6629***	3.0514***	1.1855***	1.1459***	1.3585***
	(219.23)	(469.06)	(369.75)	(249.81)	(404.30)	(209.57)
Total difference	-0.0726***	0.0617***	0.1837***	0.0680***	0.0415***	0.1299***
	(-5.92)	(9.19)	(17.37)	(11.22)	(10.75)	(15.83)
COMPOSITION EFFECTS						
AGGREGATE DECOMPOSITION						
Aggregate effects	-0.0137	0.0374	0.0079	0.0240*	-0.0129	0.0119
	(-0.49)	(1.56)	(0.37)	(1.75)	(-1.27)	(0.66)
Pure aggregate effects	-0.0584**	0.0123	0.0369***	0.0364***	0.0087	0.0520***
	(-2.14)	(0.95)	(2.89)	(3.35)	(1.64)	(3.24)
Specification error	0.0447*	0.0251	-0.0290	-0.0124	-0.0216***	-0.0401**
	(1.65)	(1.38)	(-1.61)	(-0.79)	(-2.65)	(-2.11)
DETAILED DECOMPOSITION – PURE EFFECTS						
Temporary employment	-0.0094***	-0.0047***	-0.0037**	0.0029*	0.0006	0.0041**
	(-2.75)	(-2.94)	(-2.00)	(1.90)	(0.92)	(2.06)
Part-time employment	-0.0153***	-0.0001	0.0038	0.0080***	0.0015	0.0110***
	(-2.77)	(-0.05)	(1.13)	(2.70)	(1.03)	(2.83)
Marginal employment	-0.0502***	-0.0091**	0.0056	0.0226***	0.0060**	0.0330***
	(-2.63)	(-2.22)	(1.57)	(2.64)	(2.51)	(2.66)
Age *(centred)*	0.0789***	0.1265***	0.0596***	0.0142	-0.0316***	-0.0212
	(3.46)	(6.34)	(3.49)	(1.26)	(-4.12)	(-1.44)
Age squared	-0.0942***	-0.1326***	-0.0476***	-0.0087	0.0387***	0.0359**
	(-4.15)	(-5.99)	(-2.94)	(-0.86)	(4.61)	(2.55)
Region of residence *(reference: West Germany)*	0.0286***	0.0227***	0.0174***	-0.0051***	-0.0031***	-0.0096***
	(4.16)	(4.16)	(4.09)	(-3.39)	(-3.51)	(-3.84)
Gender *(reference: men)*	-0.0214***	-0.0254***	-0.0376***	0.0001	-0.0034**	-0.0038
	(-4.96)	(-7.52)	(-7.28)	(0.06)	(-2.22)	(-1.39)
Education in years *(centred)*	0.0145***	0.0244***	0.0478***	0.0031*	0.0076***	0.0126***
	(3.78)	(6.58)	(6.21)	(1.70)	(3.81)	(3.84)
Full-time equivalent experience *(centred)*	-0.0037	-0.0036	-0.0006	0.0004	0.0013	0.0020
	(-1.05)	(-1.04)	(-0.57)	(0.57)	(1.05)	(1.04)

	15th quantile	50th quantile	85th quantile	50/15 quantile ratio	85/50 quantile ratio	85/15 quantile ratio
Tenure *(centred)*	0.0002	0.0004	0.0005	0.0001	-0.0000	0.0001
	(0.21)	(0.23)	(0.23)	(0.17)	(-0.01)	(0.15)
Company size *(normalised)*						
Less than 20 employees	-0.0111**	-0.0056**	-0.0029**	0.0035**	0.0013**	0.0055**
	(-2.24)	(-2.28)	(-2.02)	(2.10)	(2.11)	(2.19)
20-199 employees	0.0000	-0.0002	-0.0002	-0.0001	0.0000	-0.0001
	(0.11)	(-0.29)	(-0.28)	(-0.27)	(0.16)	(-0.24)
200-1999 employees	0.0004	0.0002	-0.0000	-0.0001	-0.0001	-0.0003
	(0.22)	(0.21)	(-0.15)	(-0.21)	(-0.21)	(-0.22)
2000 or more employees	-0.0055***	-0.0058***	-0.0064***	0.0004	0.0000	0.0005
	(-4.19)	(-4.82)	(-4.13)	(0.77)	(0.12)	(0.66)
Occupational unemployment rate	0.0602***	0.0428***	0.0106*	-0.0129***	-0.0143***	-0.0318***
	(6.40)	(8.07)	(1.91)	(-2.63)	(-5.08)	(-5.01)
Sectoral union density	-0.0049	0.0011	-0.0038	0.0031	-0.0019	0.0013
	(-1.32)	(0.57)	(-1.31)	(1.59)	(-1.54)	(0.50)
Sectoral collective agreement coverage	0.0057***	0.0017**	-0.0023**	-0.0023***	-0.0016***	-0.0045***
	(3.14)	(2.32)	(-2.35)	(-2.94)	(-2.82)	(-3.19)
Analytical non-routine task share	0.0001	-0.0003	-0.0013	-0.0002	-0.0004	-0.0006
	(0.18)	(-0.30)	(-0.31)	(-0.29)	(-0.30)	(-0.30)
Interactive non-routine task share	-0.0138***	-0.0122***	-0.0095***	0.0019	0.0016	0.0041*
	(-3.99)	(-6.23)	(-3.47)	(1.08)	(1.46)	(1.75)
Manual non-routine task share	-0.0176***	-0.0080***	0.0074**	0.0058***	0.0063***	0.0140***
	(-4.00)	(-3.44)	(2.45)	(2.67)	(4.04)	(4.31)
DETAILED DECOMPOSITION – SPECIFICATION ERRORS						
Temporary employment	0.0076	-0.0034	-0.0042	-0.0055	-0.0002	-0.0065
	(0.71)	(-0.52)	(-0.85)	(-0.98)	(-0.06)	(-1.00)
Part-time employment	0.0079	0.0160	-0.0171	0.0032	-0.0132**	-0.0124
	(0.40)	(1.29)	(-1.26)	(0.30)	(-2.08)	(-0.98)
Marginal employment	-0.0087	-0.0030	0.0007	0.0039	0.0014	0.0060
	(-0.39)	(-0.37)	(0.07)	(0.28)	(0.45)	(0.41)
Age *(centred)*	0.1196**	0.0190	0.0512	-0.0561*	0.0103	-0.0500
	(2.04)	(0.47)	(1.28)	(-1.82)	(0.57)	(-1.45)
Age squared	0.8404**	0.1537	0.1837	-0.3837**	-0.0028	-0.4301**
	(2.56)	(0.72)	(0.84)	(-2.25)	(-0.03)	(-2.12)
Region of residence *(reference: West Germany)*	0.0084	0.0015	0.0017	-0.0033	-0.0005	-0.0043
	(0.44)	(0.20)	(0.18)	(-0.29)	(-0.11)	(-0.35)
Gender *(reference: men)*	0.0403	0.0006	0.0164	-0.0213	0.0055	-0.0177
	(1.44)	(0.03)	(0.68)	(-1.46)	(0.49)	(-0.92)

	15th quantile	50th quantile	85th quantile	50/15 quantile ratio	85/50 quantile ratio	85/15 quantile ratio
Education in years *(centred)*	-0.0050	-0.0109	-0.0025	-0.0022	0.0037	0.0021
	(-0.72)	(-1.60)	(-0.37)	(-0.48)	(1.28)	(0.41)
Full-time equivalent experience *(centred)*	0.0042	0.0004	-0.0078	-0.0020	-0.0032	-0.0061
	(0.62)	(0.08)	(-1.25)	(-0.46)	(-1.29)	(-1.17)
Tenure *(centred)*	-0.0012	-0.0007	-0.0010	0.0004	-0.0001	0.0003
	(-0.58)	(-0.61)	(-0.84)	(0.38)	(-0.19)	(0.25)
Company size *(normalised)*						
Less than 20 employees	0.0037	-0.0153	0.0040	-0.0084	0.0077**	-0.0003
	(0.22)	(-1.63)	(0.44)	(-0.78)	(2.11)	(-0.02)
20-199 employees	0.0118	0.0059	0.0036	-0.0038	-0.0012	-0.0057
	(1.13)	(0.80)	(0.57)	(-0.73)	(-0.36)	(-0.87)
200-1999 employees	-0.0149	0.0079	-0.0064	0.0114**	-0.0057	0.0060
	(-1.36)	(1.08)	(-0.82)	(2.01)	(-1.57)	(0.80)
2000 or more employees	0.0014	0.0003	-0.0000	-0.0006	-0.0001	-0.0008
	(0.37)	(0.09)	(-0.00)	(-0.25)	(-0.02)	(-0.21)
Occupational unemployment rate	0.0207**	0.0102**	-0.0039	-0.0067	-0.0057**	-0.0145**
	(2.07)	(2.19)	(-0.67)	(-1.37)	(-2.38)	(-2.30)
Sectoral union density	0.0287	0.0057	0.0659**	-0.0132	0.0222*	0.0123
	(0.81)	(0.26)	(1.98)	(-0.73)	(1.93)	(0.50)
Sectoral collective agreement coverage	-0.0217	0.0564	-0.0192	0.0354	-0.0302	0.0033
	(-0.34)	(1.53)	(-0.29)	(1.05)	(-1.25)	(0.07)
Analytical non-routine task share	0.0008	-0.0045	-0.0136*	-0.0025	-0.0032	-0.0069
	(0.09)	(-0.87)	(-1.91)	(-0.51)	(-1.13)	(-1.09)
Interactive non-routine task share	-0.0023	-0.0006	0.0006	0.0010	0.0004	0.0017*
	(-1.48)	(-0.91)	(0.67)	(1.25)	(1.28)	(1.67)
Manual non-routine task share	0.0059	0.0017	0.0140**	-0.0023	0.0044	0.0029
	(0.67)	(0.35)	(2.11)	(-0.47)	(1.49)	(0.47)
Constant	-1.0029**	-0.2158	-0.2951	0.4440**	-0.0115	0.4805**
	(-2.56)	(-0.82)	(-1.06)	(2.21)	(-0.09)	(1.99)
STRUCTURE EFFECTS						
AGGREGATE DECOMPOSITION						
Aggregate effects	-0.0589**	0.0243	0.1758***	0.0440***	0.0544***	0.1180***
	(-2.08)	(0.99)	(7.49)	(3.05)	(5.02)	(6.22)
Reweighting error	0.1047***	0.0918***	0.1214***	-0.0154	0.0070	-0.0090
	(6.16)	(5.74)	(6.78)	(-1.40)	(0.84)	(-0.71)
Pure aggregate effects	-0.1636***	-0.0675***	0.0545	0.0594***	0.0474***	0.1270***
	(-5.41)	(-4.04)	(1.59)	(3.73)	(3.53)	(5.59)

	15th quantile	50th quantile	85th quantile	50/15 quantile ratio	85/50 quantile ratio	85/15 quantile ratio
DETAILED DECOMPOSITION – PURE EFFECTS						
Temporary employment	-0.0104 (-1.18)	-0.0022 (-0.43)	0.0015 (0.36)	0.0051 (1.11)	0.0018 (0.78)	0.0083 (1.56)
Part-time employment	-0.0057 (-0.33)	-0.0185* (-1.67)	0.0112 (0.90)	-0.0045 (-0.48)	0.0120** (2.08)	0.0102 (0.89)
Marginal employment	0.0063 (0.51)	0.0032 (0.65)	0.0001 (0.02)	-0.0007 (-0.09)	-0.0012 (-0.64)	-0.0010 (-0.12)
Age *(centred)*	-0.1651*** (-3.09)	-0.0289 (-0.76)	-0.0247 (-0.64)	0.0796*** (2.82)	0.0055 (0.32)	0.0997*** (2.98)
Age squared	-1.3844*** (-3.64)	-0.2083 (-0.85)	-0.0086 (-0.03)	0.6863*** (3.45)	0.1043 (0.84)	0.9328*** (3.81)
Region of residence *(reference: West Germany)*	0.0156 (0.71)	0.0265*** (2.98)	0.0218** (2.02)	0.0057 (0.44)	-0.0017 (-0.33)	0.0059 (0.41)
Gender *(reference: men)*	-0.0004 (-0.01)	-0.0053 (-0.29)	-0.0340 (-1.48)	-0.0021 (-0.16)	-0.0084 (-0.80)	-0.0141 (-0.80)
Education in years *(centred)*	0.0236** (2.00)	0.0380*** (4.11)	0.0302** (2.50)	0.0038 (0.53)	-0.0060 (-1.32)	-0.0024 (-0.28)
Full-time equivalent experience *(centred)*	0.0011 (0.95)	-0.0000 (-0.04)	-0.0006 (-0.73)	-0.0006 (-0.94)	-0.0002 (-0.72)	-0.0011 (-1.24)
Tenure *(centred)*	0.0138** (2.27)	0.0121*** (3.80)	0.0028 (0.97)	-0.0023 (-0.80)	-0.0044*** (-2.98)	-0.0081** (-2.14)
Company size *(normalised)*						
Less than 20 employees	0.0095 (0.65)	0.0018 (0.24)	-0.0135* (-1.65)	-0.0035 (-0.39)	-0.0051 (-1.62)	-0.0097 (-0.95)
20-199 employees	-0.0168 (-1.51)	-0.0094 (-1.18)	-0.0107 (-1.46)	0.0048 (0.84)	0.0003 (0.08)	0.0056 (0.77)
200-1999 employees	0.0076 (0.74)	-0.0005 (-0.08)	0.0066 (0.86)	-0.0048 (-0.90)	0.0024 (0.70)	-0.0029 (-0.41)
2000 or more employees	-0.0047 (-0.80)	0.0062 (1.11)	0.0152 (1.42)	0.0050 (1.29)	0.0024 (0.59)	0.0088 (1.50)
Occupational unemployment rate	-0.0137 (-0.84)	-0.0073 (-0.93)	0.0008 (0.08)	0.0028 (0.33)	0.0029 (0.75)	0.0055 (0.54)
Sectoral union density	-0.0645 (-1.36)	0.0130 (0.46)	-0.0688 (-1.52)	0.0410* (1.69)	-0.0317** (-2.00)	0.0087 (0.25)
Sectoral collective agreement coverage	0.0144 (0.21)	-0.0333 (-0.82)	-0.0865 (-1.16)	-0.0284 (-0.76)	-0.0185 (-0.67)	-0.0626 (-1.19)
Analytical non-routine task share	0.0009 (0.19)	0.0009 (0.32)	-0.0137*** (-3.06)	0.0000 (0.01)	-0.0058*** (-3.21)	-0.0066* (-1.78)

	15th quantile	50th quantile	85th quantile	50/15 quantile ratio	85/50 quantile ratio	85/15 quantile ratio
Interactive non-routine task share	0.0033*	0.0004	0.0009	-0.0016*	0.0002	-0.0015
	(1.83)	(0.51)	(0.73)	(-1.67)	(0.46)	(-1.30)
Manual non-routine task share	0.0015	0.0011	0.0048***	-0.0005	0.0013	0.0009
	(0.66)	(0.94)	(2.63)	(-0.36)	(1.61)	(0.54)
Constant	1.4045***	0.1428	0.2196	-0.7258***	-0.0027	-0.8490***
	(3.16)	(0.49)	(0.67)	(-3.17)	(-0.02)	(-2.96)
DETAILED DECOMPOSITION – REWEIGHTING ERRORS						
Temporary employment	0.0026	0.0032	0.0029	0.0000	-0.0003	-0.0003
	(0.78)	(1.42)	(1.44)	(0.01)	(-0.29)	(-0.14)
Part-time employment	0.0038	-0.0030	0.0019	-0.0034	0.0020	-0.0014
	(0.81)	(-1.09)	(0.67)	(-1.27)	(1.37)	(-0.50)
Marginal employment	0.0277**	0.0055	-0.0030	-0.0125**	-0.0035	-0.0183*
	(1.97)	(0.79)	(-0.58)	(-2.02)	(-0.99)	(-1.95)
Age *(centred)*	-0.0039	0.0176	0.0025	0.0100	-0.0065	0.0035
	(-0.35)	(1.13)	(0.32)	(1.06)	(-1.11)	(0.48)
Age squared	0.0024	-0.0170	-0.0036	-0.0089	0.0058	-0.0031
	(0.24)	(-1.05)	(-0.48)	(-1.02)	(0.99)	(-0.46)
Region of residence *(reference: West Germany)*	-0.0041	-0.0035	-0.0027	0.0007	0.0005	0.0013
	(-0.76)	(-0.76)	(-0.73)	(0.55)	(0.69)	(0.71)
Gender *(reference: men)*	0.0061	0.0163***	0.0212***	0.0040	0.0011	0.0059
	(1.04)	(3.32)	(3.54)	(1.32)	(0.47)	(1.47)
Education in years *(centred)*	0.0024	0.0027	0.0161**	-0.0001	0.0049**	0.0058
	(0.56)	(0.63)	(2.00)	(-0.05)	(2.43)	(1.40)
Full-time equivalent experience *(centred)*	0.0078	0.0115	0.0107	0.0010	-0.0008	0.0001
	(1.04)	(1.61)	(1.45)	(0.19)	(-0.31)	(0.01)
Tenure *(centred)*	-0.0004	0.0034	0.0030	0.0018	-0.0003	0.0017
	(-0.10)	(1.41)	(1.31)	(0.84)	(-0.26)	(0.59)
Company size *(normalised)*						
Less than 20 employees	0.0085**	0.0071	0.0017	-0.0014	-0.0023	-0.0044*
	(2.04)	(1.59)	(0.73)	(-0.80)	(-1.63)	(-1.95)
20-199 employees	0.0002	-0.0001	-0.0001	-0.0002	-0.0000	-0.0002
	(0.20)	(-0.16)	(-0.17)	(-0.23)	(-0.01)	(-0.21)
200-1999 employees	-0.0011	-0.0021	0.0010	-0.0003	0.0012	0.0011
	(-0.66)	(-1.18)	(0.77)	(-0.39)	(1.25)	(0.84)
2000 or more employees	0.0060***	0.0059***	0.0064**	-0.0006	-0.0001	-0.0008
	(3.63)	(3.12)	(2.18)	(-0.59)	(-0.07)	(-0.51)
Occupational unemployment rate	0.0253***	0.0146***	-0.0012	-0.0071*	-0.0066***	-0.0161***
	(2.93)	(3.00)	(-0.25)	(-1.86)	(-3.10)	(-3.10)

	15th quantile	50th quantile	85th quantile	50/15 quantile ratio	85/50 quantile ratio	85/15 quantile ratio
Sectoral union density	0.0075	-0.0000	0.0119**	-0.0040	0.0045**	0.0008
	(1.33)	(-0.00)	(2.21)	(-1.40)	(2.34)	(0.21)
Sectoral collective agreement coverage	-0.0013	-0.0008	0.0007	0.0003	0.0006	0.0011
	(-0.86)	(-0.96)	(0.77)	(0.61)	(1.01)	(0.93)
Analytical non-routine task share	-0.0046	0.0203**	0.0809***	0.0116	0.0218***	0.0396***
	(-0.34)	(2.43)	(6.50)	(1.45)	(4.80)	(3.71)
Interactive non-routine task share	-0.0009	-0.0005	-0.0002	0.0003	0.0001	0.0005
	(-0.66)	(-0.64)	(-0.48)	(0.61)	(0.59)	(0.65)
Manual non-routine task share	0.0207*	0.0107*	-0.0287***	-0.0064	-0.0152***	-0.0257***
	(1.69)	(1.65)	(-2.98)	(-0.96)	(-3.63)	(-2.97)
Observations (n)	31,840	31,840	31,840	31,840	31,840	31,840

Note: Decomposed unconditional quantile (RIF) models w/ bootstrapped standard errors (1000 repetitions); Reweighted estimation of the counterfactual distribution following Firpo et al. (2018)

Source: SOEP v34, LFS, SES 2014, Dengler et al. 2014; Author's calculations

Table A17: Decompositions of log gross hourly wage changes between 1995/1996 and 2010/2011 for selected inter-quantile ratios (REWEIGHTED) (WOMEN)

	50/15 quantile ratio		85/50 quantile ratio		85/15 quantile ratio	
OVERALL						
2010/2011	1.2624***		1.1792***		1.4886***	
	(208.43)		(307.10)		(176.10)	
Counterfactual	1.2002***		1.1349***		1.3620***	
	(58.50)		(85.22)		(63.67)	
1995/1996	1.2029***		1.1420***		1.3737***	
	(161.49)		(250.35)		(134.37)	
Total difference	0.0595***		0.0371***		0.1148***	
	(6.18)		(6.34)		(8.77)	
AGGREGATE DECOMPOSITION						
	Composition	Structure	Composition	Structure	Composition	Structure
Aggregate effects	-0.0027	0.0622***	-0.0072	0.0443***	-0.0117	0.1265***
	(-0.13)	(2.91)	(-0.53)	(3.22)	(-0.53)	(5.53)
Pure aggregate effects	0.0290**	0.0662***	0.0169*	0.0534***	0.0534**	0.1420***
	(2.00)	(3.27)	(1.94)	(4.50)	(2.48)	(6.31)
Specification error	-0.0317		-0.0241*		-0.0651**	
	(-1.16)		(-1.89)		(-2.18)	
Reweighting error		-0.0040		-0.0092		-0.0155
		(-0.30)		(-1.06)		(-0.95)
DETAILED DECOMPOSITION						
	Composition	Structure	Composition	Structure	Composition	Structure
Temporary employment	0.0000	-0.0079	0.0000	0.0047	0.0001	-0.0031
	(0.00)	(-1.00)	(0.04)	(1.19)	(0.02)	(-0.35)
Part-time employment	0.0068**	-0.0147	0.0059***	0.0019	0.0149***	-0.0133
	(2.06)	(-0.79)	(2.61)	(0.14)	(2.89)	(-0.61)
Marginal employment	0.0245**	0.0080	0.0103**	-0.0014	0.0403**	0.0090
	(2.28)	(0.46)	(2.30)	(-0.34)	(2.35)	(0.51)
Constant		-0.6982**		-0.1723		-1.0174**
		(-2.10)		(-0.68)		(-2.41)
Observations (n)	15,009		15,009		15,009	

Note: Decomposed unconditional quantile (RIF) models w/ bootstrapped standard errors (1000 repetitions); Reweighted estimation of the counterfactual distribution following Firpo et al. (2018); Controls: age, age squared, residence in East Germany, gender, education in years, full-time equivalent labour market experience, tenure, company size, occupational unemployment rate, sectoral union density, sectoral collective agreement coverage, analytical, interactive and manual non-routine task shares

Source: SOEP v34, LFS, SES 2014, Dengler et al. 2014; Author's calculations

Table A18: Decompositions of log gross hourly wage changes between 1995/1996 and 2010/2011 for selected inter-quantile ratios (REWEIGHTED) (MEN)

	50/15 quantile ratio		85/50 quantile ratio		85/15 quantile ratio	
OVERALL						
2010/2011	1.2328***		1.1714***		1.4441***	
	(274.28)		(351.00)		(226.76)	
Counterfactual	1.1702***		1.1531***		1.3493***	
	(66.21)		(143.78)		(58.04)	
1995/1996	1.1659***		1.1391***		1.3281***	
	(243.91)		(268.18)		(181.82)	
Total difference	0.0670***		0.0322***		0.1160***	
	(10.23)		(6.06)		(12.34)	
AGGREGATE DECOMPOSITION						
	Composition	Structure	Composition	Structure	Composition	Structure
Aggregate effects	0.0043	0.0626***	0.0140*	0.0183**	0.0212	0.0947***
	(0.25)	(3.46)	(1.83)	(2.12)	(0.94)	(3.99)
Pure aggregate effects	0.0160**	0.0863***	0.0108**	0.0087	0.0309**	0.1108***
	(1.97)	(4.10)	(2.03)	(0.74)	(2.56)	(4.79)
Specification error	-0.0117		0.0031		-0.0096	
	(-0.88)		(0.52)		(-0.58)	
Reweighting error		-0.0236		0.0095		-0.0161
		(-1.62)		(0.91)		(-0.83)
DETAILED DECOMPOSITION						
	Composition	Structure	Composition	Structure	Composition	Structure
Temporary employment	0.0036*	0.0020	0.0006	0.0016	0.0047**	0.0045
	(1.92)	(0.37)	(0.69)	(0.80)	(2.06)	(0.70)
Part-time employment	0.0011	0.0060*	0.0000	0.0029*	0.0014	0.0104**
	(0.30)	(1.70)	(0.02)	(1.75)	(0.27)	(2.23)
Marginal employment	0.0059	0.0007	0.0021	-0.0003	0.0091	0.0006
	(1.42)	(0.31)	(1.34)	(-0.74)	(1.56)	(0.23)
Constant		-0.7684**		-0.0196		-0.9401***
		(-2.57)		(-0.11)		(-2.77)
Observations (n)	16,831		16,831		16,831	

Note: Decomposed unconditional quantile (RIF) models w/ bootstrapped standard errors (1000 repetitions); Reweighted estimation of the counterfactual distribution following Firpo et al. (2018); Controls: age, age squared, residence in East Germany, gender, education in years, full-time equivalent labour market experience, tenure, company size, occupational unemployment rate, sectoral union density, sectoral collective agreement coverage, analytical, interactive and manual non-routine task shares

Source: SOEP v34, LFS, SES 2014, Dengler et al. 2014; Author's calculations

Appendix II – Abstracts and CV

English abstract

Non-standard work arrangements such as temporary and part-time employment are by now an integral part of the German labour market and subject to constant re-regulation. While the share of fixed-term contracts stagnates at around eleven percent, nearly half of all new work contracts are temporary (Hohendanner 2019) and nearly half of the female employees work part-time (BA 2019). At the same time, the low wage employment rate and the wage inequality stagnate at high levels (Kalina/Weinkopf 2018; Möller 2016). Stuth et al. (2018) find that 12 percent of the workers in their sample are in continuous precarious work.

While previous research underlines that non-standard work arrangements are not per se precarious and that they fulfil various functions both for employers and employees, it still finds substantial mean wage penalties and higher low wage risks. Also, temporary employment is by definition less protected against unemployment and part-time work is a strongly gendered work arrangement. Therefore, the question arises how exactly non-standard work arrangements interact with existing inequalities on the labour market such as gender, the labour market position and the workers' resources. In this dissertation, I consequently follow the questions: For whom are non-standard work arrangements a precarity risk and for whom not? How do they contribute to the rising wage inequality of the last decades?

The analyses are based on the precarisation debate (Brinkmann et al. 2006), power resources theory (Schmalz/Dörre 2014), neo-institutional labour economics (Krause/Köhler 2012) and transactional stress theory (Lazarus/Folkman 1984). The data stems mainly from the SOEP, using the waves from 1995 to 2017, while singular variables are drawn from the LFS, the SES and a task measurement of Dengler et al. (2014). Employing interacted fixed effects regressions, I firstly analyse the heterogeneous effects of temporary and part-time employment on subjective precarity risks, indicated by subjective job and labour market insecurity, across gender and

vertical labour market position. Secondly, I focus on the heterogeneous material precarity risks, indicated by wage differentials, of these employment arrangements again by gender and the vertical labour market position. Finally, I decompose unconditional quantile regressions at two time points in order to analyse the compositional and structural contributions of temporary and part-time employment to the rising wage inequality in the bottom half, the top half and the overall wage distribution between 1995 and 2011.

This dissertation adds to the literature by systematically analysing the heterogeneity of both the material and the subjective precarity risks of non-standard work. The main empirical results show that especially younger women in their child bearing age are subjectively affected by the insecurity of temporary employment, which cannot be explained by any other factors. Interestingly, this suggests that disadvantages or discrimination related to (a potential) motherhood may cause the gender gap. Also, the subjective precarity risks of both part-time and temporary employment are particularly high for those in higher labour market positions, suggesting that peer-group comparisons rather than objective conditions or comparisons to a societal norm drive these risks.

Regarding the material precarity risks of temporary employment, they are the largest for those in the highest labour market positions as well as for unskilled workers and, in the case of men, for those in the lowest labour market positions. This is a particularly interesting finding, as it stands in contrast to previous research who finds linearly decreasing wage penalties with higher wages. Either methodological problems of the previous studies or adverse moderating effects of wages and education may explain the divergence. By contrast, the material precarity risks of part-time employment are consistently the largest for those in the lowest labour market positions. Even wage premiums are found for women working part-time in middle and high labour market positions, while large penalties for those in low and middle labour market positions clearly dominate for male part-timers.

All in all, the indicators of the power resources explain very little of the found heterogeneity across gender and labour market positions. This may either point at the insufficiency of some indicators, which do not account for changes over time, or the relatively greater importance of the various functions non-standard work can have, independent of the workers' resources.

Lastly, the results show that the rise of both temporary and part-time employment between 1995 and 2011 significantly increased the wage inequality especially in the bottom half of the wage distribution, while there are no significant wage structure effects of temporary or part-time employment. This study is thus the first to provide inferential evidence for the relevance of non-standard work for wage inequality in Germany, suggesting that the increasing wage heterogeneity between firms may also stem from their usage of non-standard work.

Deutsche Zusammenfassung

Arbeitsformen abseits des Normalarbeitsverhältnis wie befristete und Teilzeitbeschäftigung sind mittlerweile integraler Bestandteil des deutschen Arbeitsmarktes und unterliegen einer ständigen Neuregulierung. Während der Anteil der befristeten Arbeitsverträge bei rund elf Prozent stagniert, sind fast die Hälfte aller neuen Arbeitsverträge befristet (Hohendanner 2019) und fast die Hälfte der weiblichen Arbeitnehmerinnen arbeitet Teilzeit (BA 2019). Gleichzeitig stagnieren die Niedriglohnquote und die Lohnungleichheit seit 2012 auf hohem Niveau (Kalina/Weinkopf 2018; Möller 2016). Stuth et al. (2018) stellen fest, dass 12 Prozent der Erwerbstätigen in ihrer Stichprobe kontinuierlich prekär beschäftigt sind.

Bisherige Studien heben hervor, dass atypische Arbeitsvereinbarungen nicht per se prekär sind und dass sie sowohl für Arbeitgeber*innen als auch für Arbeitnehmer*innen verschiedene Funktionen erfüllen. Dennoch finden sie nach wie vor erhebliche Lohnnachteile und höhere Niedriglohnrisiken. Zudem ist befristete Beschäftigung per Definition nicht gegen Arbeitslosigkeit geschützt, und Teilzeitarbeit eine stark geschlechtsspezifische Arbeitsform. Es stellt sich die Frage, wie genau diese

Arbeitsformen mit bestehenden Ungleichheiten auf dem Arbeitsmarkt bezogen auf Geschlecht, Arbeitsmarktposition und Ressourcen der Arbeitnehmer*innen zusammenwirken. In dieser Dissertation gehe ich daher den folgenden Forschungsfragen nach: Für wen sind Arbeitsformen abseits des Normalarbeitsverhältnis ein Prekaritätsrisiko und für wen nicht? Wie trugen sie zur steigenden Lohnungleichheit der letzten Jahrzehnte bei?

Theoretisch basieren die Analysen auf der Prekarisierungsthese (Brinkmann et al. 2006), der Machtressourcentheorie (Schmalz/Dörre 2014), der neo-institutionalistischen Personal- und Arbeitsökonomik (Krause/Köhler 2012) und dem transaktionalen Stressmodell (Lazarus/Folkman 1984). Die Daten stammen hauptsächlich aus dem SOEP, wobei die Wellen von 1995 bis 2017 verwendet werden, während einzelne Variablen aus der Europäischen Arbeitskräfteerhebung, der Verdienststrukturerhebung und einer Tasks Messung von Dengler et al. gezogen werden (2014). Mithilfe von Fixed Effects Regressionen und Interaktionseffekten analysiere ich zunächst die heterogenen Effekte von befristeter und Teilzeitbeschäftigung auf die subjektiven Prekaritätsrisiken für Frauen und Männer und unterschiedliche vertikale Arbeitsmarktpositionen. Zweitens konzentriere ich mich auf die heterogenen materiellen Prekaritätsrisiken, gemessen durch Lohnabschläge. Schließlich dekomponiere ich unbedingte Quantilsregressionen, um die Kompositions- und Struktureffekte von befristeter und Teilzeitbeschäftigung auf die steigende Lohnungleichheit zwischen 1995 und 2011 zu analysieren.

Die Dissertation ergänzt den Forschungsstand durch eine systematische Analyse der Heterogenität sowohl der materiellen als auch der subjektiven Prekaritätsrisiken von befristeter und Teilzeitbeschäftigung. Die wichtigsten empirischen Ergebnisse zeigen, dass vor allem jüngere Frauen im gebärfähigen Alter subjektiv von Unsicherheit durch befristete Beschäftigung betroffen sind, die nicht durch andere Faktoren erklärt werden kann. Die Ergebnisse deuten darauf hin, dass Benachteiligungen oder Diskriminierungen im Zusammenhang mit (potenzieller) Mutterschaft den Geschlechtsunterschied verursachen könnten. Zudem sind die subjektiven Prekaritätsrisiken von Teilzeit- und befristeter Beschäftigung für Personen in höheren

Arbeitsmarktpositionen besonders hoch. Das deutet darauf hin, dass eher Peer-Group Vergleiche die subjektive Unsicherheit antreiben als objektive Bedingungen oder Vergleiche mit einer gesellschaftlichen Norm.

Die materiellen Prekaritätsrisiken befristeter Beschäftigung sind am größten für Arbeitnehmer*innen in den höheren Arbeitsmarktpositionen sowie für ungelernte Arbeitskräfte und, im Falle der Männer, für diejenigen in den niedrigsten Arbeitsmarktpositionen. Im Gegensatz zu bisherigen Studien nehmen die Lohnabzüge mit höheren Arbeitsmarktpositionen nicht linear ab, sondern sind am größten für die unteren als auch die oberen Positionen. Der Unterschied könnte durch methodische Probleme der bisherigen Studien begründet sein. Oder entgegengesetzte Moderationseffekte von Löhnen und Bildung erklären den nicht-linearen Zusammenhang. Die materiellen Prekaritätsrisiken der Teilzeitbeschäftigten sind hingegen für Beschäftigte in den niedrigsten Arbeitsmarktpositionen durchweg am größten. Für Frauen, die in mittleren und hohen Arbeitsmarktpositionen teilzeitbeschäftigt sind, finden sich sogar Lohnzuschläge, während bei männlichen Teilzeitbeschäftigten hohe Abschläge für diejenigen in niedrigen und mittleren Arbeitsmarktpositionen deutlich dominieren.

Zusammengefasst erklären die Indikatoren der Machtressourcen nur einen marginalen Anteil der festgestellten Heterogenität zwischen den Geschlechtern und den Arbeitsmarktpositionen. Dies kann entweder auf die Unzulänglichkeit einiger Indikatoren hindeuten, die Veränderungen über Zeit nicht berücksichtigen. Oder die Heterogenität entsteht vornehmlich aus den verschiedenen Funktionen, die befristete und Teilzeitbeschäftigung unabhängig von den Ressourcen der Arbeitnehmer*innen haben können.

Schließlich zeigen die Ergebnisse, dass der Anstieg sowohl der befristeten als auch der Teilzeitbeschäftigung zwischen 1995 und 2011 die Lohnungleichheit vor allem in der unteren Hälfte der Lohnverteilung deutlich vergrößert hat, während es keine signifikanten Lohnstruktureffekte befristeter oder Teilzeitbeschäftigung gibt. Die

vorliegende Studie liefert damit erstmals inferenzstatistische Belege für die Relevanz von atypischen Arbeitsformen für die Lohnungleichheit in Deutschland. Die zunehmende Lohnheterogenität zwischen Unternehmen könnte also auch auf die unterschiedliche Nutzung von atypischer Arbeit zurückzuführen sein.

Curriculum Vitae

Mein Lebenslauf wird aus Gründen des Datenschutzes in der elektronischen Fassung meiner Arbeit nicht veröffentlicht.

Selbstständigkeitserklärung

Hiermit versichere ich, dass ich die vorliegende Dissertation selbstständig und nur unter Verwendung der angegebenen Literatur und Hilfsmittel angefertigt habe. Diese Dissertation wurde in gleicher oder ähnlicher Form noch in keinem früheren Promotionsverfahren eingereicht.

Nicolas Karl Morgenroth
Berlin, der 09.11.2020