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ORIGINAL RESEARCH

Parenthood and Job Quality: Is There a Motherhood Penalty in the UK?

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Abstract
Current research recognises the role of parenthood in contributing to gender inequalities at work. Meanwhile, there is a growing interest in job quality. We contribute to both these debates by analysing differences in job quality by gender and parenthood status, using data from a nationally representative UK household survey. We develop a 12-indicator, multi-dimensional measure of job quality and use this to analyse the combination and distribution of job quality attributes by gender and parenthood status. Our analysis shows that women and mothers are under-represented in high quality jobs and over-represented in poor quality jobs. While some mothers sacrifice career prospects for flexibility, motherhood is not always associated with more flexibility, and job quality disadvantages are multi-faceted. Working part time is a strong driver of job quality differences, suggesting that reduced hours after motherhood impacts on job quality in addition to worsening women's pay. Job quality gaps are larger for mothers of school-aged children, pointing to the additional constraints of managing work and childcare around the school day.

Keywords Job quality · Motherhood penalty · Gender · Part time work

1 Introduction

The transition to parenthood has become a key focus within research on workplace gender inequality. In the UK, becoming a mother typically leads to women earning less and working fewer hours (Andrew et al., 2021). This 'motherhood penalty' (Budig & England, 2001) is a major contributor to the gender pay gap and offsets the impact of large

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educational gains made by women in the past 25 years (Andrew et al., 2021). However, we know relatively little about whether parenthood is associated with changes in job quality. Post-pandemic, as employees re-evaluate the role of work in their lives and employers struggle with recruitment, job quality has never been more relevant. This relevance is sharpened by evidence that poor quality jobs are as harmful for wellbeing as unemployment (Chandola & Zhang, 2018) and that high quality jobs are associated with increased productivity and lower absenteeism (Preenen et al., 2017).

In this paper, we extend previous work in three ways. First, building on Holman (2013) and Eurofound (2017), we construct a multi-dimensional measure of job quality. Our approach makes an important contribution, since previous analyses (e.g. Leschke & Watt, 2014) rely on aggregating job quality dimensions, which can obscure how indicators combine. Second, we focus on both gender and parenthood as potential drivers of differences in job quality. Previous research on job quality and parenthood has focused on mothers (Piasna & Plagnol, 2018). Including fathers in the analysis helps to isolate which differences are driven by gender and which by parenthood. Third, we explore whether differences in working hours, job sector or occupation account for observed differences, thereby linking our analysis with the larger literatures on part time work and occupational segregation.

The paper is structured as follows. Section 2 details the background literature on job quality, gender and parenthood, and presents our multidimensional approach. Section 3 describes our methodology. Section 4 presents the results of our latent class analysis, before presenting differences by gender and parenthood status and assessing the role of part time work, job sector and occupation. We conclude with a discussion and implications.

2 Background

2.1 What is Job Quality?

Job quality is 'the set of work features that foster the well-being of the worker' (Green, 2006: 9). Whilst pay may be a key marker of a 'good' job, other aspects of work—high demands, low control, limited voice or job insecurity—also impact employee well-being. Indeed, research suggests that poor quality jobs, such as those characterised by high demands and low control, are as damaging as unemployment (Chandola & Zhang, 2018) and can even affect children's development by shaping parenting practices (Perry-Jenkins, 2022). This makes inequalities in job quality an important area of study.

2.2 Gender, Parenthood and Job Quality

Existing knowledge on gender, parenthood and job quality is drawn from a broader literature on women's workplace disadvantage, and emerging studies on motherhood and job quality. The former suggests that women have fewer promotion opportunities and less autonomy (Leschke & Watt, 2014; Mühlau, 2011), higher work intensity (Gorman & Kmec, 2007; Lindley, 2016; although cf. Leschke & Watt, 2014), and less schedule control and informal flexibility (Wheatley, 2017). On the other hand, studies also suggest that women have better working time quality (Leschke & Watt, 2014; Mühlau, 2011) and are less likely to work in unsafe jobs (Mühlau, 2011).

Studies showing that women have lower job quality do not link this explicitly to motherhood, despite evidence that the transition to parenthood is a critical point for the emergence of gendered inequalities at work. The 'motherhood penalty' has primarily been analysed in terms of wages (Budig & England, 2001; Budig & Hodges, 2010; Harkness, 2016), or reduced working hours and labour force participation (e.g. Costa Dias et al., 2018; Harkness et al., 2019). Even less is known about the impact of parenthood on fathers' job quality, with research focusing primarily on a (disputed) fatherhood wage premium (e.g. Mari, 2019). Yet, evidence indicates that men adjust their working hours in response to parenthood (Hoherz & Bryan, 2020) and a growing trend for involved fatherhood, combined with few workplace policy changes to accommodate this, makes it likely that fathers experience job quality impacts (Dermott, 2008).

While the majority of studies on gender and job quality neglect parenthood, there are some exceptions. Laurijssen and Glorieux (2013) find that Flemish mothers work in jobs with lower autonomy and mental effort, compared to non-mothers. Piasna and Plagnol (2018) report that mothers with young children have better job security and working-time quality than either non-mothers or mothers with older children. Felfe (2012) finds that German women who remain with the same employer reduce working hours, but experience no other job quality changes, while those who change employers see a decrease in night work and stress levels and a small increase in schedule flexibility. Bünning and Pollmann-Schult (2016) find that in countries with low provision of formal childcare, mothers are more likely than non-mothers to work nights, and that fathers are more likely than non-fathers to work weekends, but that this relationship is reversed in countries where formal childcare is more accessible.

These studies indicate a link between parenthood and job quality for women, with job quality improving in some domains and worsening in others. However, it is difficult to establish an overarching narrative because most studies focus on a single dimension of job quality, measured either with one indicator or by combining multiple indicators into a unidimensional scale, and largely do not tackle changes in job quality for fathers. This conceals the complex compromises and negotiations made within working lives in the transition to parenthood.

Existing theoretical perspectives on parenthood and job quality imply divergent predictions. Supply-side theories focus on preferences for specific job amenities, and a willingness to trade off other aspects of job quality (Rosen, 1986). According to the theory of compensating differentials, if women, or more specifically mothers, value certain job amenities (notably flexibility), then they would be willing to sacrifice promotion prospects or security to access them. This implies that women, especially mothers, have higher job quality in areas like flexibility, but lower in aspects like prospects and pay.

Others have challenged the idea that women's lower pay and prospects are 'compensated' by higher job quality in other areas, pointing towards cultural and structural barriers and women's lower social status (e.g. England, 1992; England et al., 1994). Women and mothers are instead forced to work in certain sectors and to take up certain working patterns. Moreover, work undertaken by women has less cultural and societal value, and women have less power to change their working conditions. These factors mean that women's jobs are likely to be under-valued and peripheral, with lower job quality across the board, including pay and promotion prospects, but also flexibility (Grimshaw et al., 2017) and other job amenities (Hodges, 2020). From this perspective, one would expect that women, and particularly mothers, have worse job quality in almost all domains.

2.3 Potential Mechanisms: Working Hours, Job Sector and Occupation

We investigate some of the likely structural drivers of gender and parental differences in job quality: reduced working hours and the concentration of female employment into particular sectors and occupations. Many women switch to part time hours after the birth of their first child, a rare transition for men (Costa Dias et al., 2018; Harkness, 2016). Part time jobs are often lower quality, offering reduced opportunities for wage progression (Costa Dias et al., 2018) and are more likely to combine multiple poor quality characteristics (Warren & Lyonette, 2018; Williams et al., 2020). There is less evidence on the impact of parenthood on men's working hours, although recent longitudinal evidence from the UK suggests a small increase (Hoherz & Bryan, 2020).

In the UK, the 'one-and-a-half-earner' model—in which women's, but not men's, working time is impacted by parenthood—is deeply entrenched and reflects gendered norms about parenting (Phillips et al., 2018). Statutory paternity leave is just two weeks, in contrast to 52 weeks' maternity leave, and paternity pay is among the lowest in Europe (Koslowski et al., 2021). Since 2015 couples have been able to transfer some leave from the mother to the father, but uptake has been low due to a lack of affordability, strict eligibility rules, and the complexity of the system (Norman & Fagan, 2017). Relative to other countries, childcare costs in the UK are very high (OECD, 2022) which, combined with withdrawal of government subsidies as earnings increase, further limits incentives for women to return to full time work.

Although we might expect women to have worse job quality due to their over-representation among part time workers, the fact that more women than men work in the public sector could serve as a protective factor. Women make up the majority of public sector employees (Office for National Statistics, 2015) and previous research suggests that public sector jobs are superior in terms of multi-dimensional job quality (Eurofound, 2012; Williams et al., 2020) and on individual dimensions such as job security, work intensity and autonomy (Leschke & Watt, 2014).

A third mechanism that might explain gender or parenthood differences in job quality is occupation. The transition to parenthood has been linked to mothers' occupational downgrading (Dex et al., 2008) or stalled occupational upgrading (Harkness et al., 2019). Earlier studies suggested that the transition to part time work, particularly when accompanied by changing employer, was linked to moving into a lower status occupation (Connolly & Gregory, 2008; Dex & Bukodi, 2012). More recent research finds less upward occupational mobility for mothers in both full and part time employment, relative to fathers (Harkness et al., 2019). There is a strong link between occupation and job quality—job quality is highest among managers and professionals and lowest in lower status occupations (Williams et al., 2020).

To investigate differences in multidimensional job quality by gender and parenthood, and to examine some possible drivers of any differences found, our study is guided by the following research questions:

i. What are the associations between multi-dimensional job quality and (a) parenthood (b) gender?
ii. To what extent can working hours, sector and occupation explain any observed associations between gender, parenthood and multi-dimensional job quality?

3 Data and Methods

3.1 Data

The study data are drawn from the UK Household Longitudinal survey (UKHLS), a nationally representative longitudinal survey of British households (University of Essex, 2019). Questions on job quality are available in waves 2, 4, 6, 8 and 10. We used data from wave 8 (2016–18) to avoid capturing any job quality changes related to Covid-19. This paper is among the first to explore the relationships between gender, parenthood and job quality, therefore a cross-sectional approach is appropriate since it can inform assumptions about job quality in the intervening years in later longitudinal analysis. We limited the analysis to employee respondents aged 20–65 and deleted proxy interviews.[1] Missing data on job quality variables is dealt with via full information maximum likelihood (FIML). The final six class model and models predicting latent class membership were run on a sample (n = 15,877) with listwise deletion of respondents with missing data on the regression variables (n = 779, 5%). Sensitivity analyses comparing the latent class solution produced via listwise deletion to those where missing data was imputed using FIML produced very similar results. All analyses use weights provided by UKHLS to account for complex survey design, differential non-response, and unequal selection probabilities.

3.2 Measuring Job Quality

Our conceptualisation and measurement of job quality is guided by three broad principles (Felstead et al., 2019). First, measures of job quality should include only work features that have the potential to impact workers' wellbeing. Second, measures should focus on the objective attributes of the job (excluding, for example, job satisfaction, which is influenced by a worker's personal circumstances). Finally, measures of job quality should acknowledge its multi-dimensionality. That is, there are a range of job attributes (good and bad) which can affect wellbeing, and it is the interaction of these elements that matters. This approach is supported by well-researched and evidenced theories such as demand-control theory (Karasek, 1979) which argue that jobs combining high demands with low discretion or control are worst for worker wellbeing.

While there is consensus in the literature that job quality is a multi-dimensional concept, there is less agreement over exactly which dimensions and sub-dimensions should be included, or the combination of indicators within these dimensions (Warhurst et al., 2017). A variety of frameworks have been proposed and these have evolved over time (see Table 1). Part of the variation in these frameworks is due to the complexity of the proposed dimensions and the approach taken to the aggregation of sub-domains measuring different aspects of job quality. One method is to construct a composite index providing a single measure summarising job quality across all domains. The European Trade Union Institute's (ETUI) Job Quality Index (JQI), for example, provides a single overall measure of job quality by standardising and averaging scores across six dimensions (see column 2, Table 1). This approach is problematic for those interested in studying job quality through

[1] Sometimes when a person cannot participate in the interview, someone else in the household (generally their spouse or partner or adult children) answers questions on their behalf, that is, by proxy. This questionnaire is much shorter, asking basic factual information only.

Table 1 Dimensions of Job Quality in Selected Previous Frameworks

Eurofound (2017)	European Trade Union Institute's Job Quality Index (Leschke & Watt, 2008)	Warhust et al. (2017)	Felstead et al. (2019)	Domain	Question	Scale
Earnings	Wages	*Pay and other rewards*. Objective: Wage level, type of payment (e.g. fixed salary, performance pay), non-wage fringe benefits (employer-provided pension). Subjective: Satisfaction with pay.	Pay	Payment type	(a) Salaried or paid by the hour (b) Pay includes bonus or profit shares c) Pay includes annual increment	Salaried = 1; Non-salaried = 0 Yes = 1; No = 0
				Non-wage fringe benefits	Employer runs a pension scheme	Yes = 1; No = 0

Table 1 (continued)

Eurofound (2017)	European Trade Union Institute's Job Quality Index (Leschke & Watt, 2008)	Warhust et al. (2017)	Felstead et al. (2019)	Domain	Question	Scale
Prospects Employment status, career prospects, job security, downsizing	*Skills and career development* Participation in training, prospects for advancement	*Terms of employment* Objective: Contractual stability, opportunities for training, development and progression. Subjective: Perceptions of job security	Promotion Prospects	Promotion prospects	Likelihood of getting a better job with the same employer in the next 12 months	Yes = 1; No = 0
Skills and Discretion Cognitive dimension, decision latitude, organisational participation, training		*Intrinsic Characteristics of Work* Objective: Skills, autonomy, control, variety, work effort). Subjective: Meaningfulness, fulfilment, social support, powerfulness	Required Learning	Skills	Do you think you will undertake job-related training in coming 12 months?	Yes = 1; No = 0
	Working conditions and job security Work intensity, work autonomy, physical work factors, likelihood of job loss		Task Discretion	Task discretion	(a) Autonomy over job tasks (b) Autonomy over work pace (c) Autonomy over work manner (d) Autonomy over task order	Original scale for each question: None, a little, some, a lot (alpha = .86) Each question recoded to 0 (none/a little) or 1 (some/a lot) and then added to produce a final task discretion score: high = 4; medium = 3; low = 0–2

Table 1 (continued)

Eurofound (2017)	European Trade Union Institute's Job Quality Index (Leschke & Watt, 2008)	Warhust et al. (2017)	Felstead et al. (2019)	Domain	Question	Scale
Working Time Quality Duration, atypical working hours, working time arrangements, flexibility	*Working time and work-life balance* Long hours, shift work, voluntary part time work, working time family fit	*Work-life balance* Working time arrangements (duration, scheduling and flexibility of work), work intensity	Working time autonomy (ability to decide start and finish times of work)	Working time autonomy	Autonomy over the time you start and finish your working day	0 = none; 1 = a little/ some /a lot
				Overtime hours	(a) Number of overtime hours in a normal week b) Weekly contractual hours	Overtime hours as a percentage of contractual hours No overtime = 2; 1–15% = 1; 15% + = 0
				Whether works weekends	No = 1; Some/most/ every weekend = 0	Non-standard working time
				Whether works shifts	-	-
			Work-life balance: Ability to take an hour or two off during work hours for personal matters	Able to informally vary work hours	Are you able to vary your working hours on an informal basis?	Yes/Sometimes = 1; No = 0
				Access to location and schedule flexibility	Availability of flexible working arrangements *Schedule Flexibility* flexi-time compressed week annualised hours *Location Flexibility* regular home working	Access to either schedule or location flexibility = 1; Access to neither = 0

Table 1 (continued)

Eurofound (2017)	European Trade Union Institute's Job Quality Index (Leschke & Watt, 2008)	Warhust et al. (2017)	Felstead et al. (2019)	Domain	Question	Scale
Work Intensity Quantitative demands, pace determinants and interdependency, emotional demands			Work Intensity Working at high speed or to tight deadlines	See overtime hours		
	Non-standard forms of employment Temporary employment, involuntary part time employment		Job security	Job security	Contract type: permanent or temporary contract	-
See Prospects	See Working conditions and job security	See Terms of employment			How likely is it you will lose your job in the next 12 months?	-
Social Environment Adverse social behaviour, social support, management quality	See Working conditions and job security	*Health and safety* Physical and psycho-social risks	Managerial Support	–	–	–
Physical Environment Posture-related, ambient, biological and chemical		See also intrinsic characteristics of work	–	–	–	–

Table 1 (continued)

Eurofound (2017)	European Trade Union Institute's Job Quality Index (Leschke & Watt, 2008)	Warhust et al. (2017)	Felstead et al. (2019)	Domain	Question	Scale
	Collective representation Collective bargaining, trade union density, worker consultation	*Representation and voice* Employee consultation, trade union representation, involvement in decision making	Worker Voice	–	–	–

a gender (or parental) lens since, as the authors themselves note, a lack of gender difference in the overall job quality scores obscures substantial gender differences in the sub-dimensions (Leschke & Watt, 2014).

In a second approach, a series of sub-indices are constructed measuring job quality across sub-domains, although these sub-domains themselves might be complex, and made up of lower-order domains measuring separate job quality features. For example, while indicators measuring opportunities for skill development are combined with those measuring career advancement in a single dimension by the ETUI, in the Eurofound framework skills are considered alongside measures of task discretion[2] (control over the order, speed and method of completing tasks) and organisational participation in a single 'skills and discretion' dimension (Table 1, column 1). However, similar scores on sub-indices can arise from very different patterns of scores on component parts. For example, Eurofound (2012) report that equal scores on their prospects index for men and women arise from greater scores for men in terms of career progression being compensated for by worse scores in terms of job security and contract quality.

Surveying the job quality literature to date, Warhurst et al. (2017) identify a considerable degree of overlap in terms of the key aspects of job quality. These can be found in column 3 of Table 1 and broadly reflect those employed in other frameworks. Taking these as our starting point we develop measures of job quality informed by the emerging literature on gender, parenthood and job quality (GIWL et al., 2021) which argues that a more nuanced approach to concepts such working hours, work flexibility and work-life balance is required if we are to capture the elements of job quality of importance for working parents. The final dimensions and their associated question and scale can be found in columns 4–6 of Table 1 and are described in detail below. Rather than aggregating measures into complex sub-dimensions, we follow Felstead et al (2019), whose 10 dimensions of job quality measure a single job quality attribute with either one or two indicators. We build on recent studies that employ latent class analysis to identify sub-groups with qualitatively different job quality profiles (Eurofound, 2017; Holman, 2013) by grouping individuals with similar response patterns across the range of job quality indicators. As this technique allows the various attributes of job quality to vary independently, we remain agnostic about how the different elements might combine.

Overtime hours Firstly, unlike some previous measures (e.g. Eurofound, 2012) we do not include a measure of weekly working hours. Parenthood-related changes in working hours for mothers, but not fathers, are well established (Costa Dias et al., 2018) and from a gender perspective it is problematic to link shorter working hours with improved job quality. Historically, part time jobs have been accorded a low status, concentrated in 'peripheral' lower status labour markets (Atkinson, 1987; Doeringer & Piore, 1971), and qualitatively different from full time jobs in terms of their poorer job quality (Warren & Lyonette, 2018). Rather than using a simple measure of working hours we measure overtime work hours since these hours have the potential to create spillover from work to family life (Lott, 2018). Although overtime hours are primarily seen as a problem for full time workers, research also suggests that a transition to part time work is not always accompanied by a corresponding reduction in workload, resulting in unpaid overtime and an expectation that part timers are available on non-working days (e.g. Lyonette, 2015). In recognition of this, we construct a variable that measures overtime hours as a percentage of contractual

[2] Termed 'decision latitude'.

hours (three categories—no overtime, overtime of 1–15% of regular hours, overtime of 15% + regular hours). *Non-standard working time* is captured by a variable measuring whether or not the respondent works weekends (two categories—never versus sometimes/often).

Flexible working arrangements We distinguish between three types of flexible working arrangements (FWA) and allow them to vary independently. The first variable, 'access to flexitime or location flexibility', measures access to (primarily formal) FWA which allow workers to vary the timing or location of their work. UK legislation in 2014 extended the right to request flexible working to all workers, and this captures access to most of the arrangements specified in the legislation. We code this as 1 if respondents have access to either (a) flexitime—(flexi-time,[3] working a compressed week and annualised hours) or (b) location flexibility (working from home on a regular basis). We distinguish between these arrangements and a further variable, 'able to informally vary work hours', which asks whether, 'aside from any formal arrangements' previously listed, respondents can vary their hours on an informal basis. Previous research finds that working parents place different value on formal and informal arrangements with some welcoming the stability of the former, while others valuing nimbleness of the latter (GIWL et al., 2021).[4] As detailed in Supplementary Appendix Table S1 this distinction is important; over half of those who reported having *no access to flexi-time* were able to *informally* vary their hours. Our final variable 'control over start and finish times' captures a stronger degree of autonomy over the timing of work. This distinction is based on evidence that the different types of FWA have different relationships to work-to-home spillover (Lott, 2018) and unpaid overtime hours (Chung & van der Horst, 2018a).

We capture *skills* related job quality through the likelihood of undertaking work-related training in the next year. *Promotion prospects* are captured by a question on the likelihood of getting a better job in the same company within the next year.

Four variables are available that correspond to the 'pay and other rewards' dimension outlined by Warhurst et al. (2017). Three capture *type of payment*—whether salaried or paid by hour, receipt of an annual incremental pay rise, and whether pay includes an annual bonus or profit shares. *Non-wage fringe benefits* are captured via a variable asking respondents whether their employer runs a pension scheme.[5]

To measure *task discretion,* we combine the degree of autonomy the respondent has over (a) job tasks (b) work pace (c) work manner and (d) task order (None, a little, some, a lot) (alpha = 0.86). Each is coded 0 (none/a little) or 1 (some/a lot) and then aggregated to produce a final task discretion score which we categorise into 0/2 (low task discretion), 3 (medium task discretion) and 4 (high task discretion).

Initial latent class models included job security—whether the respondent had a permanent or temporary contract, perceived chances of losing their job in the next 12 months, and a further working time quality variable (working shifts). However, regardless of the

[3] Defined by UKLHS as 'a system where employees work a particular number of hours each week or month but can choose, within certain set limits, when to start and finish work each day'.

[4] While the wording of the UKLHS questionnaire explicitly refers to the latter arrangements as informal (and in doing so refers back to the former arrangements as 'formal') the question of whether the first variable captures specifically formal arrangements is less clear. Some, such as compressed hours, are unlikely to available on an informal basis and the arrangements listed mirror those included in the right to request flexible working legislation further suggesting they might be interpreted in that way.

[5] Most employees are automatically enrolled into a workplace pension scheme (https://www.gov.uk/workplace-pensions/joining-a-workplace-pension).

model solution, these variables remained statistically independent of the latent classes—a respondent's predicted latent class membership was uninformative about that respondent's level of job security/contract status/shift work etc.

Due to data availability, our measurement of job quality is not exhaustive—we are not able to include measures of work intensity, levels of managerial support or issues surrounding health and safety. Nor do we include pay as our focus here is on non-pecuniary job quality—it is well established that motherhood is linked to reduced pay and our aim here is to move beyond this.

3.3 Explanatory Variables

To investigate the relationship between job quality and parenthood we create a multi-category parenthood status variable reflecting the fact that parents with children of varying ages are likely to face different employment-related constraints, and that the relationship between motherhood and job quality is influenced by the youngest child's age (Piasna & Plagnol, 2018).

1. No children
2. Youngest child preschool age (0–4)
3. Youngest child primary school age (5–10)
4. Youngest children secondary school age (11–15)
5. Youngest child 16 + or non-resident

Unlike previous studies (e.g. Piasna & Plagnol, 2018), which measure parenthood by the presence of children in the household, we are able to use detailed fertility histories available in the UKHLS for biological children to distinguish between those who never had children and parents whose children are not currently living with them.

In all models we control for age (and age-squared) and highest educational qualification (three categories—degree level or higher, A-levels or equivalent, GCSEs or less).

We construct variables to explore the role that compositional factors play in explaining associations between gender, parenthood and job quality. Working hours are captured via a variable that measures part time work (1 if respondent works less than 30 hours a week). Job sector is captured via a dummy variable (1 if respondent works in the private sector) and occupation via a variable measuring five class NS-SEC.[6]

3.4 Analysis Methods

We use Latent Class Analysis (LCA) to extract unobserved, qualitatively different subgroupings of job quality from our dataset using the set of observed job quality variables (Collins & Lanza, 2013). A latent class model has two key sets of parameters. The gamma parameters describe the size of the latent classes, while the rho parameters (or item-response probabilities) describe the relationship between the latent class variable and its

[6] The National Statistics Socio-economic Classification (NS-SEC) has been constructed to measure the employment relations and conditions of occupations, for more information see: https://www.ons.gov.uk/methodology/classificationsandstandards/standardoccupationalclassificationsoc/soc2020/soc2020volume3thenationalstatisticssocioeconomicclassificationnssecrebasedonthesoc2020

constituent indicator variables. We began by selecting the appropriate number of latent classes using fit statistics and comparing the meaningfulness and distinctiveness of the extracted classes. The rho parameters were then used to label the classes.

3.4.1 Modelling Strategy

We ran a multinomial logistic regression model predicting class membership for each individual in our dataset using the manual ML 3 step method in Mplus, the preferred method for estimating LCA with covariates (Nylund-Gibson et al., 2019).

We fit four model specifications. For full details, please see Supplementary Appendix S1. First, we fit a base model in which class membership is predicted by gender, parenthood status, age, age squared and education. As we expect the relationship between parenthood and latent class membership to differ by gender, as well as the relationship between gender and class membership to vary according to parenthood status, we interact our multicategory parenthood status variable with gender and include this in the models. Predicted probabilities of belonging to each latent class are calculated. Our use of interaction terms allows us to understand both gender and parenthood-based differences in job quality from the same model by calculating the average marginal effects of (a) gender and (b) parenthood status on predicted class membership (Williams, 2012). In Sect. 4.3 we explore the association between parenthood and job quality within gender—i.e. compare mothers and non-mothers, or fathers and non-fathers—while in Sect. 4.4 we look at both the association of gender with class membership within parenthood status groups—which allows us to compare mothers and fathers with similarly-aged children (as well as non-mothers to non-fathers).

To understand to what extent our explanatory variables account for any observed difference by gender or parental status we sequentially add them to the base model, examining changes in the AMEs of gender and parenthood, before fitting a final model with all predictors. Throughout the results section, we focus on AMEs, as these are more intuitive and parsimonious in the context of interactions.

4 Results

4.1 Latent Class Analysis

We estimated models with 1–8 latent classes with 300 random starts and compared fit indices (Table 2), where lower values of the Akaike information criterion (AIC), Bayesian information criterion (BIC) and sample adjusted BIC (ABIC) indicated better relative model fit. Significant values for the Lo-Mendell-Rubin (LMR) or Vuong-Lo-Mendell-Rubin (VLMR) adjusted likelihood ratio tests ($p > 0.005$) indicate that the model with n-1 classes fits the data better than the current model.

As the AIC, BIC and ABIC did not reach a global minimum, we plotted the fit statistics (Supplementary Appendix Figure S1) and identified an elbow of diminishing returns (Nylund-Gibson & Choi, 2018). The plot showed an elbow at 5 and 7 classes while the LMR and VLMR favoured a 7-class solution. Although it is common that fit statistics do not reach a global minimum it can sometimes indicate a violation of the conditional

Table 2 Fit statistics for LCA models of Job Quality with 1–8 Latent Classes, with and without the Conditional Independence Assumption Relaxed

Class	LL	AIC	BIC	aBIC	Entropy	LMR	VLMR	Model
1	– 131,028	262,084	262,192	262,147	NA	NA	NA	Normal
2	– 125,658	251,374	251,598	251,506	0.70	0	0	Normal
3	– 124,559	249,206	249,546	249,406	0.68	0	0	Normal
4	– 123,880	247,879	248,334	248,147	0.66	0	0	Normal
5	– 123,302	246,753	247,324	247,089	0.65	0	0	Normal
5	– 123,157	246,464	247,043	246,805	0.65	0	0	C.I. assumption relaxed
6	– 123,033	246,244	246,931	246,648	0.64	0.006	0.006	Normal
6	– 122,890	245,961	246,656	246,370	0.66	0.037	0.037	C.I. assumption relaxed
7	– 122,786	245,780	246,583	246,252	0.66	0.009	0.008	Normal
7	– 122,723	245,657	246,467	246,134	0.66	**0.097**	**0.094**	C.I. assumption relaxed
8	**– 122,642**	**245,522**	**246,441**	**246,062**	0.62	0.56	0.558	Normal

Source UKHLS Wave 8, 2016–18. Bold values indicate the best fit for each statistic. LL = log-likelihood; AIC = Akaike Information Criterion; BIC = Bayesian Information Criterion; aBIC = adjusted BIC; LMR = Lo-Mendell-Rubin adjusted likelihood ratio tests; VLMR—= Vuong-Lo-Mendell-Rubin adjusted likelihood ratio tests

independence assumption.[7] To check this, we examined the bivariate standardised residual z-scores in excess of ± 3.84 (Vermunt & Magidson, 2005). Models 5–7 were run again with the conditional independence assumption relaxed by adding the residual covariances with the largest standardised residuals to the analysis model. The fit statistics from these models are labelled 'C.I. assumption relaxed' in Table 2. With this assumption relaxed the LMR and VLMR favoured a 6-class solution. We closely inspected the class solution for the 5, 6 and 7 class models and selected the 6-class model as it offered the best separation and interpretability of the latent classes—that is each of the classes could be clearly distinguished from each other and meaningfully interpreted. Comparing the 6-class model with and without the conditional independence assumption relaxed, we found that the gamma and rho estimates were almost identical and so we proceeded with the normal model. Average posterior probabilities of correct classification for each class were above or very close to 0.7 (Supplementary Appendix Table S2), indicating adequate classification precision for each class (Nagin, 2005). We ran our selected model with 1000 random starts to confirm that the best log likelihood was retained.

A summary of the parameter estimates for each of the six classes are presented in Table 3 with each estimate labelled as high, medium or low. Because a high score does not always correspond to better job quality (as in the case of working overtime) we add colour coding for ease of interpretation. Full estimates can be found in Supplementary Appendix Table S3. The classes were interpreted and labelled by examining the patterns of probability of having each of the given job quality attributes conditional on class membership.[8]

[7] This states that class membership explains all the shared variance among the indicators used to generate the latent classes (Nylund-Gibson and Choi, 2018).

[8] Item-response probabilities that are higher than the sample average (Supplementary Appendix Table S4) and/or .5 (.3) for two (three) class measures indicate that employees within that class have a relatively high probability of having the given job quality attribute.

The first class (26% of the sample), is distinguished by having medium or high scores on all job quality attributes. Employees in this category have average scores on promotion prospects and skills and score highly on variables relating to working-time quality (i.e. are unlikely to work regular overtime or at weekends) and score strongly on task discretion. They also score very highly in terms of access to all types of FWA. We label this class *high quality jobs*. A second class (16%), is labelled *poor quality jobs,* distinguished by low scores across almost all of the job quality dimensions except for those relating to working-time quality. Jobs in this category have very low skill and promotion prospects, task discretion or flexibility, but workers are unlikely to work overtime.

In between these two extremes are four additional classes which combine good and bad aspects of job quality. A third class (14%), looks similar to the general high-quality class as it combines high non-wage rewards, high task discretion, and good access to flexibility. However, this class has poor working-time quality—employees are likely to work weekends and work high overtime hours. Promotion prospects, skills and likelihood of receiving a bonus are highest in this group. We label this class *high prospect, high reward /poor working-time quality.*

A further class (17%), is distinguished by high scores on the variables related to task discretion, working-time quality, informal flexibility, and working time autonomy, but lower on those related to payment type and skills and promotion prospects. Because these jobs combine control over working tasks and working time, we label this category *high control/low rewards & prospects.*

A fifth class, (16%), is made up of almost the inverse job quality attributes. Employees in this category have high scores on variables relating to fringe-benefits and payment type (except for bonus) and medium on skills and promotion prospects, while scoring poorly on those related to all types of flexibility, and relatively poorly on those relating to task discretion. We label this class *low control/medium rewards and prospects.*

The final class, (10%), contains mixed job quality attributes. Employees in this category score average on promotion prospects variables, however they have poor working-time quality, relatively low task discretion and overall low access to work flexibility. While most of the rewards variables are high to average, they are very unlikely to be salaried. We label this category *inflexible odd hours with low discretion*.

While direct comparison of our taxonomy with previous latent class analyses of job quality is difficult due to our unique set of job quality indicators (dictated by our substantive interests and data constraints) we note similarities. Like Holman (2013) we find six classes of job quality, a similar number to the seven (Szekér et al., 2017) or five (Eurofound, 2017) found by other authors. Like previous authors we find a class that scores poorly on almost every dimension. Our high prospect, high reward/poor working-time quality resembles the 'high flying jobs' found by Eurofound, while the high-quality jobs are similar to their 'smooth running' class. Mapping occupation against our latent class classification (Supplementary Appendix Figure S2) confirms the disproportionate presence of managerial and professional occupations in the high job quality class and manual occupations in the low job quality class, providing some construct validity of the extracted classes.

There is a strong relationship between part time work and predicted class membership (Supplementary Appendix Figure S3). Part time workers are much less likely to be employed in high quality jobs (*high-quality* class, the *high prospect, high reward class with poor working-time quality)*; or in *low control/medium rewards and prospects* jobs. They are much more likely to be employed in *poor quality* or *high control/low rewards and prospects* jobs. Unlike working hours, job sector is not related to parenthood in our sample but

Table 3 Summary of the six latent classes of job quality

Variable	High quality jobs	High prospect, high reward / poor working-time quality	Low control / medium rewards and prospects	High control/ low rewards & prospects	Inflexible odd hours with low discretion	Poor quality jobs
Cluster Size	26.2%	14.4%	16.1%	17.5%	10.2%	15.6%
Skills	M	H	H	L	H	L
Promotion Prospects	M	H	M	L	M	L
Regular Overtime	L	H	M	L	H	L
Doesn't work weekends	H	L	H	M	L	M
Annual pay increments	H	M	H	L	M	L
Workplace pension	H	H	H	L	H	L
Salaried	H	H	H	L	L	L
Receives Bonus	M	H	L	M	M/H	L
Task Discretion	H	H	M/L	H	M/L	L
Control over start and finish times	H	H	L	H	L	L
Access to flexitime or location flexibility	H	H	L	L	L	L
Able to informally vary hours	H	H	L	H	M	L

Green is a signal of good quality and red is a signal of bad quality

is related to gender (see Supplementary Appendix Table S5). Women, with and without children, are much more likely to work in the public sector. Public sector jobs are much more likely to be in the *high quality* or the *low control/medium rewards prospects* classes (Supplementary Appendix Figure S4). Public sector jobs are much less likely to be

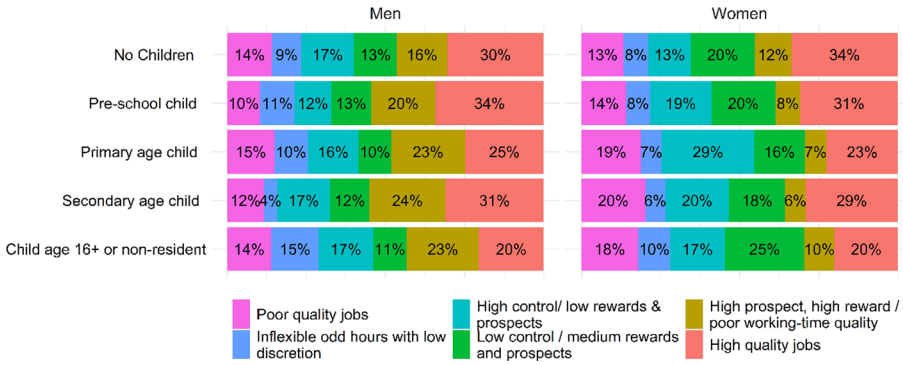

Fig. 1 Predicted Class Prevalences, by Gender and Parental Status. *Note:* Source UKHLS Wave 8, 2016–18. Base model controls for highest educational qualification, age and age-squared only

represented in the *poor quality*, *inflexible odd hours*, and the *high control/low rewards and prospects* classes.

4.2 Associations Between Job Quality and Parental Status, for Men and Women

Next, we examine the relationship between parental status and class membership. Here we present results from our base multinomial logistic regression model, focusing first on differences by parenthood.

Figure 1 presents the distribution of job quality among parents predicted from the base model, presented separately for men and women. The corresponding Average Marginal Effects of parenthood status for each gender are presented with 95% confidence intervals in Fig. 2a and b.[9]

When considering the AME of parental status the reference category are those of the same sex without children. For example, in Fig. 2a, for each job quality class (panel within the figure), the AME labelled 'primary aged child' shows the impact of being a woman with a primary school aged child on the likelihood of holding a job in that class, compared to a woman without children.

Figure 2a and b suggests that associations between parenthood and job quality are strongest in four classes of job—*high quality*, *poor quality*, *high control/low rewards and prospects* and *high prospect, high reward/poor working time quality*. Parents and non-parents were equally likely to be in the other classes. We focus on these four classes for the remainder of this section, returning to consider all six subsequently. The associations between parenthood and job quality are often in the opposite direction for men and women and are generally stronger for women. Broadly speaking, mothers with school-aged children are less likely than women without children to hold high quality jobs, while being more likely to hold poor quality jobs. Below, we comment on associations that are statistically significant at the <0.001 or <0.01 level.

High Quality Jobs Mothers of school-aged children are less likely than women without children to be employed in this class, although the strength of the association varies.

[9] Full AMEs can be found in Supplementary Appendix Table S6.

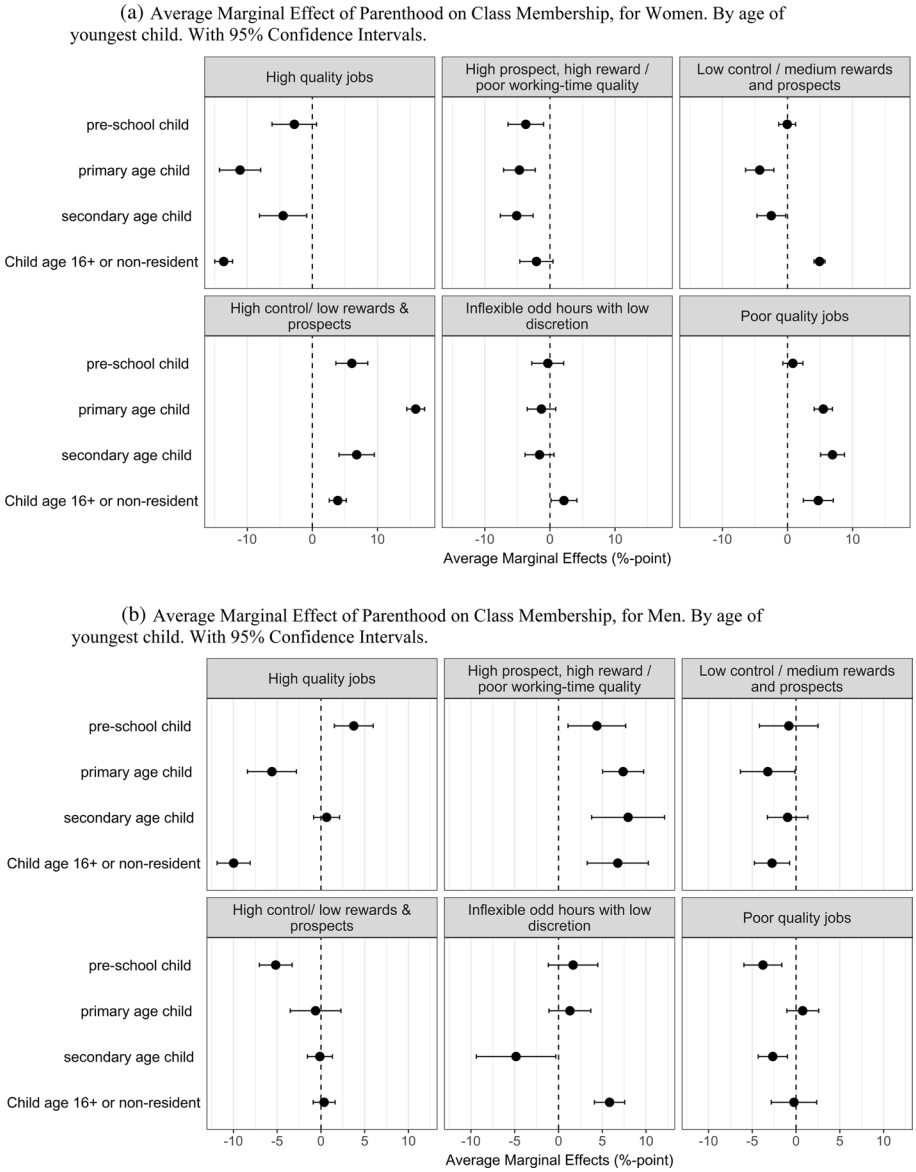

Fig. 2 **a** Average Marginal Effect of Parenthood on Class Membership, for Women. By age of youngest child. With 95% Confidence Intervals. Reference category: women without children. **b** Average Marginal Effect of Parenthood on Class Membership, for Men. By age of youngest child. With 95% Confidence Intervals. Reference category: men without children. *Note:* Source UKHLS Wave 8, 2016–18. Base model controls for highest educational qualification, age and age-squared only

Mothers of primary school aged children are 11.1 percentage points (pp) less likely than women without children to have jobs in this class. Fathers of pre-school aged children are slightly more likely (3.8 pp) than men without children to be employed in this class, while fathers of primary school aged children are slightly less likely (−5.6pp). For all

parents there is a strong negative association between being the parent of a child age 16 + or non-resident children and the high-quality class. This is counter to our expectations and could reflect the heterogenous nature of this group.

Poor Quality Jobs Mothers of school-age children are more likely than women without children to have jobs in this class, while for fathers there is either a statistically insignificant association, or a small negative association (fathers of pre-school children, − 3.8 pp). For women, having pre-school children is not associated with being in a poor quality job, but mothers of school age children are 5.5pp (primary age) and 6.9pp (secondary age) more likely to be in poor quality jobs than women without children.

High prospect high reward class with poor working time quality. Fathers with children of all ages are more likely than men without children to have jobs in this class, while the opposite is true for women. For fathers the association is smaller among those with pre-school age children (+ 4.4pp) than among among those with secondary age children (+ 8pp).

High control, low rewards and prospects Women with children of all ages are more likely than women without children to have jobs in this class, although the association is strongest among mothers of primary age children (+ 15.9pp). For fathers there is no relationship except among those with pre-school children who are 5.2pp less likely to be in this class.

4.3 Accounting for Differences in Job Quality by Parental Status

We sequentially add variables measuring part time status, sector, and occupation to the base model to understand how the observed associations between parental status and predicted job quality might be explained by working-time, sector, and occupation. Where some of the association is accounted for by the additional explanatory variable, we will observe reductions in the AME of parenthood (the difference in probability of class membership for parents of children in each age group compared to childless people of the same gender). Figure 3a and b show the AME of parenthood compared to those without children, by age of youngest child, for women (Fig. 3a) and men (Fig. 3b) in each model.

Part time working Fig. 3a reveals the substantial role of part time working in explaining associations between parenthood and job quality. Mothers are more likely than women without children to work in *poor quality jobs*. For mothers of children under 16 this difference is mostly accounted for by differences in working hours. Once we control for part time hours there is either no statistically significant relationship with parenthood or a negative association (pre-school children). Whilst mothers are less likely than women without children to work in *high quality jobs*, controlling for part time hours appears to account for much of this difference. We observe similar explanatory effects for part time hours for the associations between motherhood and being employed in *High prospect high reward class with poor quality working time* or *High control, low rewards and prospects.* In sum, part time working accounts for some, but not all, of the observed associations between motherhood and job quality, with a motherhood gap regarding *high-quality* and *high control, low rewards and prospects* jobs remaining for some groups even after working hours are taken into account. Figure 3b shows that adding part time work has minimal impact on the observed associations between fatherhood and job quality.

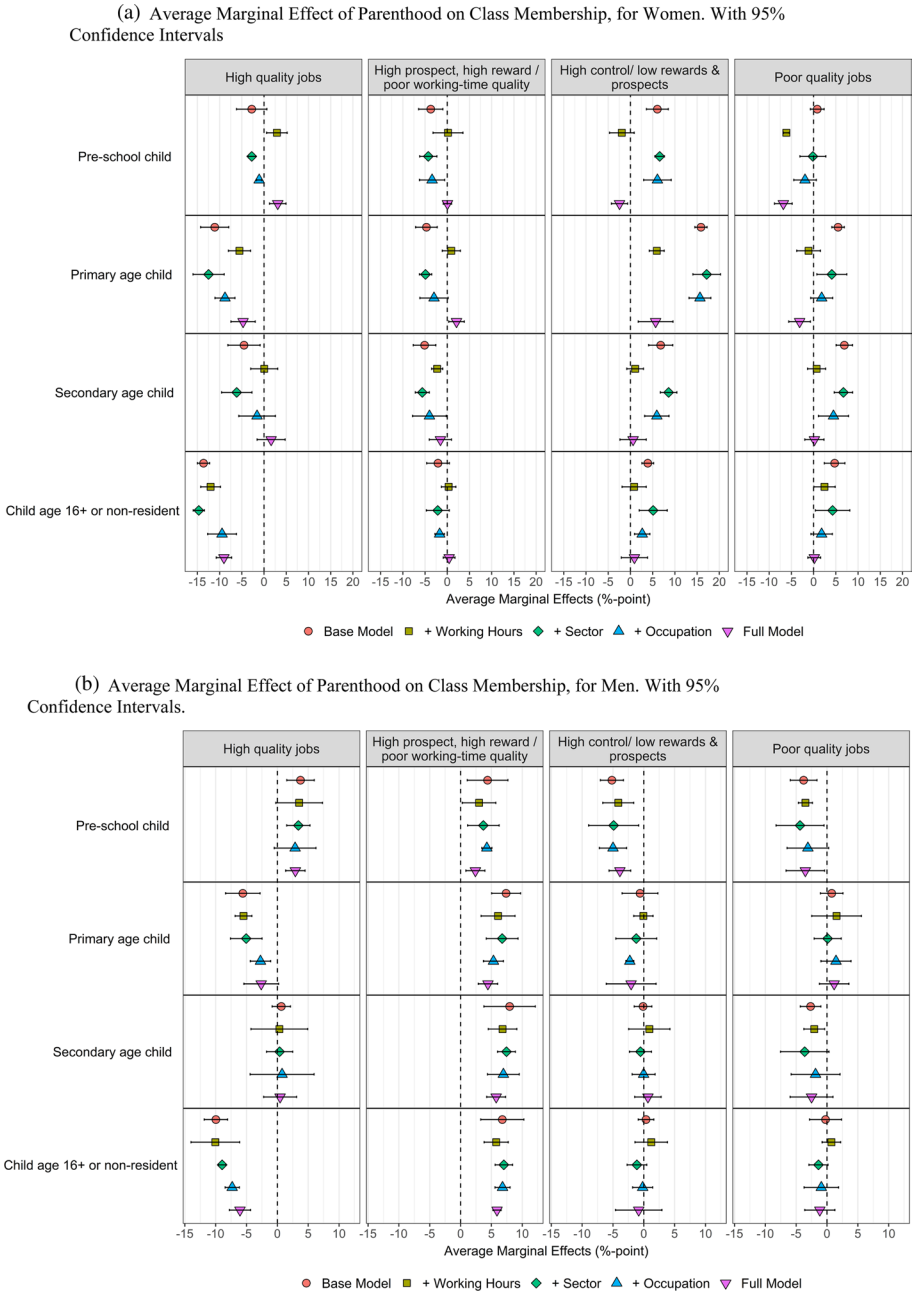

Fig. 3 **a** Average Marginal Effect of Parenthood on Class Membership, for Women. With 95% Confidence Intervals. Reference category: women without children. **b** Average Marginal Effect of Parenthood on Class Membership, for Men. With 95% Confidence Intervals. Reference category: men without children. *Note:* Source UKHLS Wave 8, 2016–18. Base model controls for highest educational qualification, age and age-squared only

Sector Controlling for sector has minimal impact on the observed associations between parenthood and job quality for either gender. As we explain below, sector plays a larger role in explaining gender differences in job quality.

Occupation Fig. 3a suggests that differences in occupation play a role in explaining associations between motherhood and job quality in the high- and low-quality classes. However, gaps of -8.8pp and + 4.5pp remain after controlling for occupation for mothers of primary age children in the *high-quality* jobs and mothers of secondary age children in the *poor quality* class. For all other classes any differences between parents and those without children are primarily within occupation.

The final model includes working hours, sector and occupation so that we are comparing parents to those without children working in similar hours, sector and occupations. These explanatory variables have individually and collectively explained very little of the associations between fatherhood and job quality. The associations between motherhood and job quality are (as expected) weaker in our final model, but some unexplained variance remains, particularly for mothers of primary age children who, all things being equal, are less likely to be employed in the *high quality* class and are more likely to be employed in the *high control/low reward and prospects* class.

4.4 Associations Between Job Quality and Gender

The previous section compared parents to those without children allowing us to explore the difference in job quality associated with parenthood amongst women or amongst men. In this section we focus on gender differences in job quality, estimating the likelihood of women holding jobs in each class compared to men with the same parental status.

Figure 4 shows the AME of being female in the base model (i.e. controlling for age, age-squared and education).[10] We plot both the AME for the overall sample (blue dot) and for each parental status group (red dots).

Focussing initially upon men and women who are not parents, we see that controlling for age and education, gender gaps in class membership are small. Women are more likely to be employed in jobs that are *High quality* (+3pp) or *Low Control/Medium rewards and prospects* (+6.8pp) and less likely to be employed in jobs that are *High prospect high reward with poor quality working time* (−4.3 pp) or *High control, low rewards and prospects* (−3.3 pp) and there is no gender gap in the likelihood of being employed in *poor quality* jobs. Gender differences emerge mainly among parents: mothers were less likely than fathers of children of the same age to be employed in *High quality* or *High prospect high reward class with poor quality working time* jobs. For instance, a mother of a primary age child is 16pp less likely than a father with a similar-aged child to be employed in the latter class of job. However, mothers were more likely than fathers of children of the same age to be employed in *High control, low rewards and prospects* and *Poor quality jobs.* For instance, a mother of a primary aged child is 12.9 pp more likely than a father with a similar-aged child to be employed in a job labelled *High control, low rewards and prospects.*

Again, we sequentially add variables measuring part time status, sector, and occupation to understand how the observed associations between gender and job quality might be explained by working-time, sector, and occupation, and show the resulting AMEs in Fig. 5. Working hours do not differ significantly for women and men without children, so controlling these does not help explain gender differences among this group. However, Fig. 5 shows that the gender gaps for those without children being employed in *High quality, Low*

[10] Full AMEs can be found in Supplementary Appendix Table S7a and S7b.

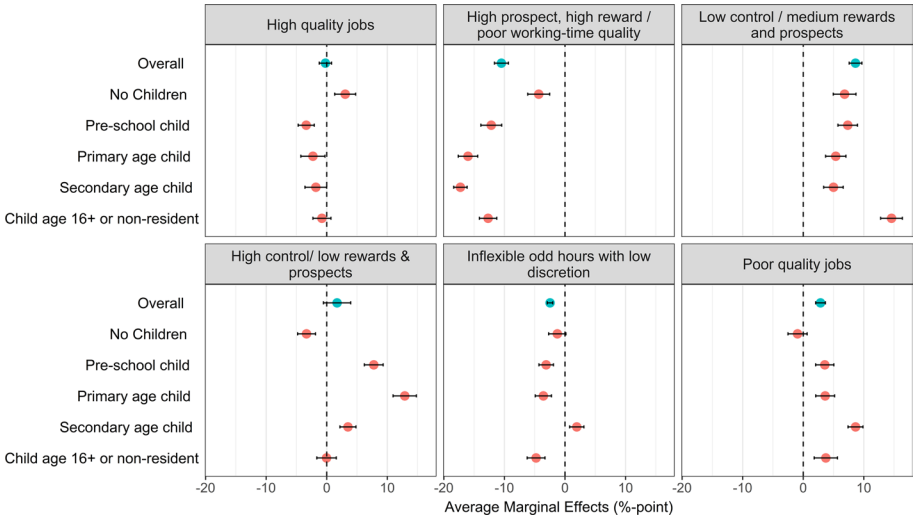

Fig. 4 Average Marginal Effect of being Female on Class Membership, by age of youngest child. With 95% Confidence Intervals. *Note*: Source UKHLS Wave 8, 2016–18. Base model controls for highest educational qualification, age and age-squared only. Reference category: men with the same parental status

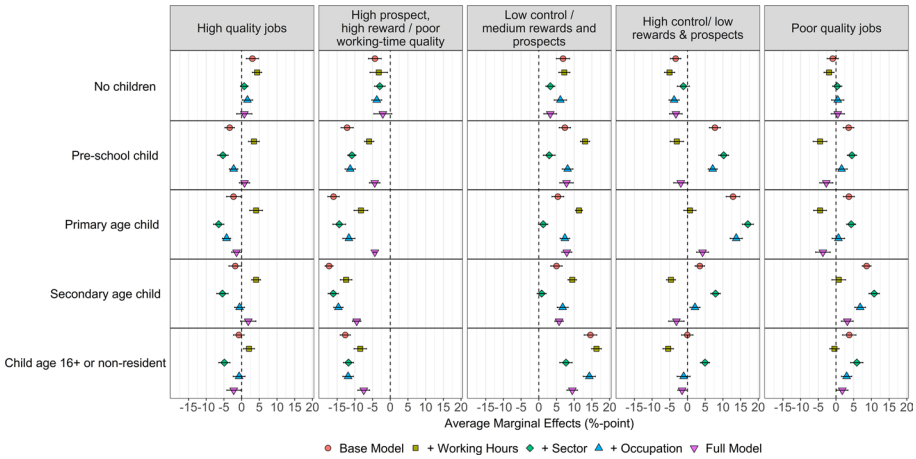

Fig. 5 Average Marginal Effect of being Female on Class Membership, by Parental Status. With 95% Confidence Intervals. *Note*: Source UKHLS Wave 8, 2016–18. Base model controls for highest educational qualification, age and age-squared only. Reference category: men with the same parental status

Control/Medium rewards and prospects or *High control, low rewards and prospects* are accounted for by sector—notably the concentration of women in the public sector.

As Fig. 5 shows, part time hours account for much of the gender gap among parents—where we find that controlling for hours either reduces or even reverses the gap. Interestingly, controlling for hours, mothers are even more likely than fathers of children of the same age to be employed in jobs that are *Low Control/Medium rewards and prospects*.

Once we have controlled for age, education, hours, sector and occupation, the gender gaps between parents are mostly closed, but mothers remain less likely than fathers of children of the same age to be employed in *High prospect high reward class with poor quality working time* jobs and more likely to be employed in jobs that are *Low Control/Medium rewards and prospects.*

5 Discussion

The transition to parenthood has become a central focus within research on gender inequality, yet little is known about both gender and parenthood-based differences in job quality. In this study, we explored whether there is a 'motherhood penalty' when it comes to job quality by comparing mothers, fathers, men, and women without children on multidimensional latent job quality classes, derived using 12 job quality indicators. We then investigated the role of working hours, occupation, and sector in explaining any gender and parenthood-related differences.

Six latent classes of job quality emerged, two of which combine either high or low scores on most job quality variables and can be labelled as high- or poor-quality jobs. For those without children gender differences in these groupings are small, but mothers are more likely than fathers or women without children to have *Poor quality* jobs, while the opposite is true for fathers. Parenthood is also an important differentiator for employment in *High quality* jobs. Mothers of school-aged children are less likely than women without children, or fathers, to be employed in these jobs. Focusing on gender alone would obscure these differences.

The other four job quality classes combine aspects of job quality in ways that appear to reflect trade-offs, combining both 'good' and 'bad' aspects in a similar way to previous studies (e.g. Eurofound, 2017). A *high prospect, high reward class with poor quality working time* combines excellent access to training and promotion prospects with a relatively high chance of working long overtime and weekends. Women are generally less likely to have jobs in this class than men, a difference which is exacerbated by parenthood and widens with the age of the youngest child. This gender gap for parents persists even when hours, sector and occupation are controlled for.

A different sort of trade-off is evident in the *high control class with low rewards and prospects*. Jobs in this category score poorly in terms of payment type, skills and promotion prospects and have low access to more formal types of FWA, yet workers have high levels of control over the nature and timing of their work and are unlikely to work overtime. We find that mothers are much more likely to be employed in this class than either fathers or women without children, an effect which peaks among mothers of primary-age children, almost a third of whom hold jobs in this class and are twice as likely to do so as fathers of primary age children and women without children.

The remaining two classes include jobs with *Low control, medium rewards and prospects* and *Inflexible odd hours with low discretion* which also combine both 'good' and 'bad' aspects, with women more likely to be employed in the former and men in the latter. Parenthood is not a differentiator amongst women or men in terms of likelihood of employment in these jobs. In the former class, gender differences are mostly driven by sector, and gaps remain even when our models include a full set of controls (age, education, hours, sector, occupation).

While further longitudinal evidence is needed, our findings are suggestive of a motherhood penalty in job quality. Mothers are less likely to work in high quality jobs than women

without children, while almost half of mothers with primary age children are predicted to have jobs in two classes with limited access to training, promotions, more formal types of FWA and low non-wage rewards, compared to a quarter of women without children and a third of fathers of primary age children.

We discover a nuanced relationship between flexibility, control and parenthood. Motherhood does not necessarily lead to more flexibility—mothers are less likely than women without children to hold jobs in the two classes with the best access to FWA (*High quality* and *High prospect*) and more likely to work in two classes with very little access to flexitime and location flexibility (*Poor quality* and *High control*). Consistent with the theory of compensating differentials, mothers working in the *High control* class are compensated with strong access to informal flexibility and control over job tasks and timing, while the increased likelihood of mothers working in the *Poor quality* class is more in line with labour market segmentation perspectives. What the two classes most associated with motherhood have in common are low levels of regular overtime and a high percentage of part time workers. Taken together these findings point to the limited potential for flexible working to reconcile work and family life in long-hours working environments.

Mothers' high likelihood of working part time is a strong driver of job quality differences. This suggests that part time working not only contributes to worsening women's pay (e.g. Costa Dias et al., 2018) but also their overall job quality. While many women feel positively about working part time, it is clear that the decision is made subject to multiple constraints (GIWL et al., 2021 and Murphy, 2022). One such constraint is the high cost of pre-school childcare in the UK (Andrew et al., 2021). Free childcare is only available for 38 weeks of the year and at less than full time hours for parents of three- and four-year-olds and disadvantaged two-year-olds, which negatively impacts mothers' ability to work full time (Brewer et al., 2022). Our findings that job quality gaps are larger for mothers of school-aged children point to the additional constraints of managing work and childcare around a school timetable, with 'wraparound care' both expensive and oversubscribed (Centre for Progressive Policy, 2021). A lack of access to FWA, particularly among lower paid workers, can mean that part time work is the only viable route to reconcile work and family (GIWL et al., 2021; Murphy, 2022), while access to FWA reduces the likelihood that mothers reduce their hours of work (Chung & van der Horst, 2018b). Recognising that it not always possible or desirable for mothers to increase their working hours, this research adds to the call to strengthen the quality of part time jobs.

Although in general fatherhood made less difference to men's job quality, fathers were more likely to combine high prospects and access to training with poor working time quality, consistent with other evidence that men's working time quality deteriorates when they have children (Eurofound, 2020) and that fathers have poor perceived access to FWAs (Cook et al., 2021). Our results support the contention that to create true gender equality in the workplace, including in job quality, the link between career 'success' and standard, or even long hours, working time must be severed. This way, mothers could gain equal access to important job quality attributes while fathers could contribute more to domestic unpaid work without sacrificing job quality.

Our study is subject to several limitations which might fruitfully be addressed by further research. Firstly, we have used cross-sectional data. Future longitudinal research will be able to better establish causality by examining the impact of *becoming a parent* on individuals' job quality, as well as examining what might lead to differences—like job changes or occupational downgrading. We were also limited by the job quality variables available within the UKHLS, which are not comprehensive.

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Declarations

Conflict of interest The authors declare no financial or non-financial interests that are directly or indirectly related to the work submitted for publication.

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