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Work, motherhood and women's affective well-being

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Abstract

This paper analyzes how motherhood and labor market status interact in their relationship to women's affective well-being using Day Reconstruction Method data from the United Kingdom Time Use Survey 2014–2015. The dataset contains information on how much time respondents spent on their various daily activities as well as how much they enjoyed each episode. This information is aggregated into a measure of an individual's affective well-being on a given day by calculating the mean of the reported enjoyments weighted by the duration of the respective episode. Results indicate a positive and significant correlation between motherhood and affective well-being. However, this relationship decreases in magnitude and even becomes insignificant in some specifications when controlling for labor market status. This could indicate that an increase in the likelihood of being in a labor market status associated with higher affective well-being mediates the positive relationship between motherhood and affective well-being. Women working part-time, self-employed women, homemakers and women on maternity leave are shown to have higher affective well-being than full-time employees. Furthermore, the time spent on and enjoyment experienced in employment related activities appears to be a key driver of many results in this study. Contrasting results in specifications using a measure of life satisfaction highlight the importance of considering affective as well as cognitive well-being.

Keywords Affective well-being · Labor market status · Motherhood · Family economics · Day reconstruction method

JEL classification codes D13 · I30 · J22

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1 Introduction

Considering the burden imposed by demographic ageing, increasing labor supply has become a key policy goal for many developed countries (European Commission, 2010). Given the traditionally lower participation rates among women, encouraging female labor force participation while maintaining or increasing fertility is central to achieving these objectives. However, besides significant increases in female labor supply in the last century, women still supply fewer hours on average than men. Furthermore, they are often the ones reducing working hours or leaving the labor market, at least temporarily, to care for children (Angrist & Evans, 1998; Bloom et al., 2009). In couple households, women also tend to do most of the household work, irrespective of how much they contribute to household income (Bittman et al., 2003). For this and other reasons, the impact of increases in female labor supply on women's quality of life is not clear. On the one hand, employment has many benefits, including an improvement in the families' financial situation and female empowerment (Darity & Goldsmith, 1996; Lundberg & Pollak, 1996). On the other hand, women, particularly those with children, could experience a reduction in subjective well-being due to the stresses of having to reconcile (full-time) employment with family responsibilities (Williams et al., 1991; Guendouzi, 2006). In this case, policies designed to increase female labor market participation would have a hidden cost in addition to or instead of the aforementioned potential benefits.

In the economic literature, the determinants of subjective well-being are usually studied using data based on life satisfaction questions in large-scale household surveys. Responding to these questions requires a cognitive process, such as constructing a relevant reference point and comparing the own situation to it. Thus, these questions provide a (global) measure of the *cognitive* component of subjective well-being (Diener et al., 1985). The life satisfaction literature has largely come to the consensus that unemployment is detrimental to *cognitive well-being*, particularly for men (Winkelmann & Winkelmann, 1998; Haller & Hadler, 2006; Kassenboehmer & Haisken-DeNew, 2009; Knabe & Rätzler, 2011; Baetschmann et al., 2015). While it has been suggested that women are affected less by unemployment (Gerlach & Stephan, 1996; Clark et al., 2008a; Van der Meer, 2014), not all findings point in this direction (Kassenboehmer & Haisken-DeNew, 2009). Furthermore, the evidence on a variety of other labor market statuses, such as homemaking and part-time employment, is mixed (Stutzer & Frey, 2006; Haller & Hadler, 2006; Clark et al., 2008a; Booth & van Ours, 2008/2009; Treas et al., 2011; Berger, 2013; Álvarez & Miles-Touya, 2016; Hamplová, 2019). Similarly, there is no consensus on the relationship between parenthood and subjective well-being (Stanca, 2012; Umberson et al., 2013; Nelson et al., 2013; Myrskylä & Margolis, 2014; Nelson et al., 2014; Baetschmann et al., 2016; Negraia & Augustine, 2020).

In addition, when considering measures of the *affective* component of subjective well-being, i.e., measures based on emotions experienced throughout the day, results may differ substantially (Kahneman et al., 2004a, b; Luhmann et al., 2012). For example, Knabe et al. (2010) show that unemployment is not associated with a reduction in *affective well-being* because working is typically among the lowest ranked activities in terms of emotional experience (see also Kahneman et al., 2004a; Bryson & MacKerron, 2016). The frequently diverging results warrant a further

investigation into how motherhood and labor market status relate to women's subjective well-being. This is particularly true for the affective component, where previous evidence in the economic literature is scarce in general. Furthermore, since fertility and labor market outcomes are correlated, there is a potential for these two aspects to interact in interesting ways in their relationship to affective well-being.

The data necessary to analyze affective well-being can be collected using various methods, including questions aimed at affective well-being in large-scale household surveys. However, other approaches, such as the Day Reconstruction Method (DRM) used in this study, provide a more detailed and immediate reading of affective well-being throughout the day. In the DRM, respondents complete a diary in which they record all activities they have been engaged in and the emotions experienced during these activities (Kahneman et al., 2004a). Even though the data is not necessarily recorded in the moment the emotions are experienced in, as Experience Sampling Method (ESM)¹ studies aim to do, it is collected shortly after, e.g., at the end of the day, to minimize recall bias. Furthermore, unlike ESM, the DRM can provide a full reconstruction of the entire day. Kahneman et al. (2004a) discuss the reliability of DRM data and provide a comparison to ESM and other measures of well-being.

This study investigates how motherhood and labor market status relate to women's affective well-being using data from the United Kingdom Time Use Survey 2014–15 (UKTUS), which includes DRM diaries. Affective well-being throughout the day is approximated by constructing the duration weighted mean enjoyment based on the enjoyment reported in each activity. The main contribution of the paper is to allow for both motherhood and labor market status to influence affective well-being jointly and to explicitly investigate how these two important aspects of individuals' lives interact in their relationship with affective well-being. Results suggest that mothers' affective well-being is higher compared to women without children. However, this positive relationship is reduced and even becomes statistically insignificant in some cases after controlling for the labor market status. This could indicate that the positive relationship between motherhood and affective well-being is (at least partially) mediated by mothers changing their employment pattern towards labor market statuses that are more conducive to affective well-being. This is perhaps the most interesting finding to emerge from the analysis and much of the discussion is written through the lens of this outcome, though the direct relationship between labor market status and affective well-being is also outlined. Contrary to most studies based on life satisfaction data, the present results suggest that unemployed women are just as happy as those working full-time, confirming previous results based on DRM data by Knabe et al. (2010). Women working part-time, self-employed women, homemakers and those on maternity leave have higher affective well-being than women working full-time, particularly when considering weekdays only. Furthermore, the time spent on and enjoyment experienced during working time seem to drive most of the results in this study, rather than episodes outside of market work. Finally, even though the point estimates are quite large, the coefficients on the interaction terms between the motherhood dummy and the labor market status dummies are never statistically significant.

To the best of the author's knowledge, this study is the first to consider the association between a summary measure of women's affective well-being using DRM data and

¹ For a discussion of the ESM see Larson and Csikszentmihalyi (2014).

motherhood as well as a variety of labor market statuses, explicitly addressing their interrelationship. The few studies approaching similar topics using DRM data focus on only one of these aspects². In addition, they apply different methodologies, ignore relevant labor market statuses and/or use different data sets, such as the American Time Use Survey (ATUS). In a recent study using the ATUS, Negraia and Augustine (2020) consider the affective well-being of parents compared to non-parents, finding both an increase in positive and negative affect. While they did control for labor market status, they did not analyze the interaction between parenthood and labor market status. Furthermore, previous affective well-being based studies considering the influence of labor market status have focused on unemployment (Knabe et al., 2010; Krueger & Mueller, 2012; Knabe et al., 2016). This is perhaps unsurprising given the high political and social relevance of unemployment. However, other labor market statuses, such as part-time employment and homemaking, which are particularly relevant for women (and especially mothers) should not be ignored. The study contributes to the happiness literature in two ways. Firstly, it provides new affective well-being based evidence whereas most previous studies use cognitive well-being. As subjective well-being is multifaceted and results can differ depending on the measure used, it is necessary to consider various measures in the literature to avoid precipitate conclusions. In this context it should, however, also be noted that the measure used is primarily aimed at positive affect and that results for negative affect, which is not available in the UKTUS, would likely differ, as has already been shown by Negraia and Augustine (2020). Secondly, by focusing specifically on the well-being of women and its relationship to motherhood and a variety of labor market statuses it considers an area of research where even cognitive well-being based evidence is comparatively scarce and conflicting. Considering the increasing movement towards using subjective well-being data to inform policy (see, e.g., Diener & Seligman, 2004), gaining new insights is important in both regards. In this context, it should also be noted that an individual's (affective) well-being is not only of interest because it is relevant for that person's quality of life, but also for the quality of life of others. For example, it has been shown that children of mothers who have an affective illness face worse outcomes later in life (see Beardslee et al., 1998, for a review).

The remainder of the paper is structured as follows. Section 2 provides some theoretic background and reviews the existing literature on the influence of parenthood and labor market status on well-being. The data set and methodology are outlined in Section 3, which also provides some descriptive statistics. The baseline estimation results are presented in Section 4. Section 5 covers extensions and robustness checks. Section 6 concludes.

2 Background and literature review

There are some excellent previous theoretical analyses on the decision-making within families, especially regarding labor supply and home production (Becker, 1991; Browning et al., 2014; Grossbard, 2014). These generally highlight the trade-offs

² Of course, the potential for interrelationships are not completely ignored, as the respective other aspects is often controlled for in the analysis. However, neither mediation nor moderation analysis is conducted and the respective other aspect is typically not discussed beyond a brief note.

faced by households and frequently lead to testable prediction, for example, regarding the influence of wage rates and non-labor income. Since labor market status is endogenous in these models, the relationship between labor market status and utility is ultimately driven by the exogenous circumstances, which lead the individual/family to make the labor market decision in the first place. A similar point could also be made about motherhood, at least since the advent of reliable birth control. Various changes in exogenous variables could have the same influence on labor supply but opposing consequences for utility. For example, both a reduction in a woman's wage rate in the labor market and an increase in non-labor income could reduce a woman's labor supply. However, the former change likely decrease utility while the latter increases it. Thus, the direction of the relationship between labor market status and well-being is, a priori, not clear. In addition, many unobservable variables, like the availability/quality of a support network, will also influence decisions and utility outcomes. Finally, well-being measures, especially those aimed at affective well-being, likely deviate to a certain degree from the concept of 'utility' and individuals may not make decisions to maximize the respective measure (Dolan et al., 2008; Dolan & Kahneman, 2008). Thus, analyzing the relationship between labor market status/ motherhood and well-being is, at least partially, an empirical issue. Nonetheless, it is interesting to think about some of the channels through which labor market status and motherhood could affect subjective well-being.

On the one hand, employment increases household income, which should increase subjective well-being by allowing for an increase in consumption as well as a buffering of adverse conditions (Cummins, 2000). In addition, a higher personal income could strengthen the woman's bargaining position within the household (Lundberg & Pollak, 1996; Bittman et al., 2003; Browning et al., 2014). On the other hand, standard labor economics assumes a disutility of labor³ resulting in a leisure-consumption trade-off. It would be plausible that this disutility of labor impacts affective well-being more than cognitive measures, whereas some of the living standard afforded by labor income primarily increases cognitive well-being, such as via comparison income effects, which have been documented by Ferrer-i-Carbonell (2005). Employment could also have positive intangible effects related to norm fulfillment, self-esteem, social contacts and/or being engaged in meaningful activities (Jahoda, 1981; Darity & Goldsmith, 1996), which may impact cognitive and affective well-being differently. Similarly, the influence of motherhood on well-being is, a priori, ambiguous. While parents might enjoy spending time with their children (Musick et al., 2016), the household's financial needs and the chores to be done increase. Despite changing gender norms, household duties fall disproportionately into the hands of women or are seized by them voluntarily, particularly when considering childcare (Lachance-Grzela & Bouchard, 2010; Craig & Mullan, 2011). Thus, working women and particularly working mothers have to fulfill several roles. According to the 'role stress hypothesis', this may become overwhelming and induce negative emotions such stress or guilt if each role cannot be given adequate attention

³ This 'disutility' is often only found in the forgone utility of leisure (Cahuc & Zylberberg, 2014), though some models also include the time spent on work outside and inside the home explicitly in the utility function (Grossbard, 2014). This also opens up the possibility that working has a positive marginal utility over a certain range, which would be in line with the intangible benefits of employment discussed below.

(Williams et al., 1991; Kinnunen & Mauno, 1998). Given norms prescribing intensive childcare, mothers could be affected particularly strongly by these feelings (Guendouzi, 2006). At the same time, working women/mothers could also derive happiness from their various roles, which could outweigh any adverse effects, as suggested by the 'role expansion hypothesis' (Nordenmark, 2002/2004). As noted above, cognitive and affective well-being measures are likely affected differently by these channels (Knabe et al., 2016). For example, a working mother might be very satisfied with her life when thinking about how she contributes to household income, stands her ground at work and simultaneously manages to take care of her family even though she may experience episodes of stress, exhaustion and unhappiness during the day. In this scenario, being a working mother would be associated with comparatively high cognitive well-being but low affective well-being, but the converse case could also be argued easily.

The empirical evidence on the relationship between motherhood/parenthood and well-being is rather mixed with some finding a positive (e.g. Kohler et al., 2005; Cetre et al., 2016; Baetschmann et al., 2016), negative (e.g. Stanca, 2012; also see the review by Umberson et al., 2013) or no (Clark et al., 2008a) relationship, which may also depend on how long ago the birth of the child occurred (Myrskylä & Margolis, 2014). This is likely due to parenthood influencing subjective well-being both positively and negatively, with the relative strength depending on circumstances (Nelson et al., 2014). Nomaguchi and Milkie (2003) further highlight that there are both costs and benefits associated with parenthood, which also vary by gender and marital status. Using the World Values Survey and data from ESM and DRM surveys, Nelson et al. (2013) find that parents' cognitive evaluations of their life are more positive than non-parents' and that parents experience higher affective well-being day-to-day. However, the difference in well-being is more pronounced in the case of fathers and insignificant for some measures when considering only women. They also find that caring for children is associated with more positive emotions than being engaged in other activities parents performed throughout the day. However, Bhargava et al. (2014) note that parents' higher well-being can be explained fully by omitted factors such as marital status, age and income. Furthermore, in Kahneman et al.'s (2004a) study taking care of own children is ranked lower than many other activities in terms of positive affect and displays the second highest negative affect score (after working). On the other hand, Musick et al. (2016) find in the ATUS that parents generally experience higher subjective well-being in activities with children. Using the same dataset, Negraia and Augustine (2020) show that parents/mothers experience both more positive (more happiness and meaning, less sadness) and more negative emotions (more stress and fatigue), with increases in positive emotions primarily observable when children were co-present. Since they control for labor market status, their estimates exclude any indirect influence parenthood could have on affective well-being via changes in the labor market status. They also control for the duration of the episode, which likely filters out some of the consequences of changes in time-composition.

As noted in the introduction, the influence of labor market status has been extensively analyzed in the life satisfaction literature. However, research considering the issue in the context of motherhood is comparatively scarce. Treas et al. (2011) provide cross-sectional evidence based on data from the International Social Survey

Program indicating that homemaking (and, depending on the specification, part-time working) wives are happier than full-time employees. However, the negative influence of full-time work is reduced by childcare availability and norms favoring working women. Similarly, Hamplová (2019) finds, using a subsample of mothers with children under three in the European Social Survey (ESS), that homemakers have higher subjective well-being than full-time workers. However, there is no significant difference in subjective well-being between homemakers and part-time employees. In contrast, focusing specifically on mothers Berger's (2013) fixed effects analysis using SOEP data shows that those in family-related non-participation and part-time employment are less satisfied than full-time employees. Similarly, Booth and van Ours (2008) find, using British Household Panel Survey (BHPS) data, that while life satisfaction is unaffected by the labor market status in childless couples, both men and women are generally more satisfied when working if they have children, though employed mothers are only more satisfied if their job involves working 40 h or less. However, in the companion study using the Household, Income and Labour Dynamics in Australia Survey (HILDA), Booth and van Ours (2009) find that women are more satisfied in non-employment than working between 35 and 50 h, while the opposite is true for men. Those working fewer hours are just as satisfied as those without employment. Furthermore, for women the birth of a child increases life satisfaction, hours satisfaction and job satisfaction.

The few previous studies studying the relationship between labor market status and affective well-being primarily focus on the (full-time) employment/unemployment dichotomy. Using DRM data, Knabe et al. (2010) find no significant difference in affective well-being between employed and unemployed individuals, even though within the same sample there is a negative relationship between unemployment and life satisfaction. In a related study, Knabe et al. (2016) consider gender differences and confirm that the affective well-being of unemployed women is not significantly different from employed women. In the UKTUS, Hoang and Knabe (2020) even find the average enjoyment of the unemployed to be higher than that of the employed. Furthermore, Wolf et al. (2019) show that the employed report fewer pleasurable minutes in their day due to the presence of working episodes. Using smartphone-based ESM data, Bryson and MacKerron (2016) also find that working is the second lowest ranked activity (only being sick in bed is worse), confirming similar results by Kahneman et al. (2004a). Contrary to these results, Krueger and Mueller (2012) find in their DRM study of initially unemployed workers in New Jersey that reemployment is associated with a decrease in sadness and stress as well as an increase in happiness, once fixed effects are controlled for. In their replication study, Hoang and Knabe (2021) show that results are sensitive to the definition of unemployment and measure of affective well-being used. While the unemployed are confirmed to be sadder than the employed, there is no significant difference in aggregate measures of affective well-being. Interestingly, Negraia and Augustine's (2020) analysis, which focuses on the influence of parenthood, does include controls for part-time employment, unemployment, and non-participation (default full-time employment). In a pooled sample of men and women, their estimates indicate that non-participation is associated with a reduction in happiness and meaning as well as an increase in sadness and stress. Nonetheless, considering the previous literature jointly, the positive aspects of working in regards to subjective well-being seem to be more

visible in the cognitive component, while the negative aspects relate more strongly to the affective component.

The present study is unique in utilizing DRM data to construct a measure of average enjoyment throughout the day to carefully analyze how women's affective well-being relates to motherhood and a variety of labor market statuses as well as how these two factors interact. Previous studies looking at parenthood did not analyze how changes in labor market status could be a channel through which being a mother could impact affective well-being and studies considering the influence of the labor market status did not include some statuses particularly relevant to mothers.

3 Data and methodology

3.1 Data, sample restrictions and key explanatory variables

To investigate the affective well-being of women, this study considers data from the United Kingdom Time Use Survey 2014–15 (Gershuny & Sullivan, 2017), which focusses on how individuals in the United Kingdom spend their time. The data was collected between April 2014 and October 2015. The UKTUS involves a household and an individual interview, which provide demographic and socioeconomic information, as well as time use diaries, in which each household member (aged 8 and above) records their activities. Two types of time use diaries were handed out, only one of which asked respondents about their enjoyment in each episode. Only individuals who received these DRM diaries are included in the analysis. The diaries cover one entire day (24 h starting at 4am) in 10-minute intervals. For each 10-minute period respondents are requested to record their primary activity and the enjoyment they felt during the episode on a scale from 1 “didn't enjoy the period at all” to 7 “enjoyed it very much”. In addition, they were asked about secondary activities, ICT device use (smartphone, tablet or computer), where they were and whether other people were present. Respondents were asked to complete two diaries, one on a weekday and one on a weekend. The dates were randomly allocated.

Several sample restrictions are applied to facilitate the analysis. The study only considers women aged between (and including) 18 and 55 living in single or couple households with or without children. Thus, men and individuals living in multi-generational households, apartment-sharing communities, institutional homes and any other type of household besides the aforementioned types are dropped from the sample. Since only women that could be working and could have a child living with them are of interest, the sample includes only individuals that are employed (full-time or part-time), unemployed, self-employed, looking after the home/family or on maternity leave. If the labor market status is unknown or the individual is retired, in full-time education, long-term disabled/sick or not working for other reasons, the observation is excluded from the sample. Those still living with their parents are also dropped. After applying these sample restrictions, the sample consists of 2365 person-day observations, for which diary data including enjoyment levels are available.

Variables identifying the presence of children are derived directly from information given in the household questionnaire. The ‘mother’ dummy indicates whether

the respondent is the mother/guardian, step-mother or foster mother of any other household member⁴. Women who do not meet this criterion are referred to as 'childless' throughout the study, even though they could have an (adult) child living outside the household, which cannot be identified in the data. Grandmothers are not picked up by this variable, as multigenerational households are excluded from the sample. The dummy variables capturing the presence of children in a certain age group, which are used in the robustness analyses, only consider the age of the youngest child and are, thus, coded to be mutually exclusive, i.e. a family with one child aged 2 and another aged 10 would only be picked up by the 'Kids 1–3' dummy variable, but not by 'Kids 4–15' variable.

The labor market status dummies are largely based on the derived economic activity variable provided in the UKTUS. In this variable, an individual is defined as working if they did "any paid work in the previous 7 days ending last Sunday" or if they reported having a job they were away from. The distinction between full-time employees, part-time employees and self-employed individuals is based on unguided self-reports. Unemployment is defined according to the ILO definition. If an individual is in neither of these categories and states that they consider themselves as mainly doing domestic work (housekeeping, taking care of children, etc.) they are considered a homemaker. However, due to the focus of this investigation, a separate maternity leave category is introduced and all women reporting being on maternity leave are assigned to this group instead of any other category they may fall into according to the above definition. The set of labor market statuses is mutually exclusive and exhaustive within the sample.

3.2 Methodology

Based on ideas put forward in Kahneman et al. (2004b) and Knabe et al. (2010) the measure of affective well-being used in this study is a summary measure given by the duration-weighted mean of self-reported enjoyment (dwh_i) given by

$$dwh_i = \sum_{e=1}^{E_i} f_{ei} H_{ei} \quad (1)$$

where i denotes the diary (i.e., a person-day observation), $e \in \{1, \dots, E_i\}$ denotes the episode, f_{ei} the fraction of the reported time spent in episode e in diary i and H_{ei} the reported enjoyment level in episode e in diary i . Since some people spend substantial amounts of time on only a few activities whereas others switch activity frequently and because some episodes have no associated enjoyment level, the total number of episodes E_i varies across person-day observations. Lastly, $f_{ei} = d_{ei} / \sum_{e=1}^{E_i} d_{ei}$ where d_{ei} is the duration of episode e in diary i . To avoid lengthy descriptions, the variable dwh_i will be referred to as *mean enjoyment* or *enjoyment score* throughout the remainder of the study. The variable is interpreted as a

⁴ The mother dummy is constructed without considering the age of the child, i.e. adult children still living with their mother are included. Analyses considering the age of the youngest child were conducted as part of the robustness checks.

summary measure of positive affect throughout the day⁵ and depends on both enjoyment within each activity as well as time allocation.

Even though the dataset is technically a panel dataset covering one weekday and one weekend day for each respondent, it is treated as a cross-sectional dataset because all variables of interest, except the type of day, are constant across the two observation days. Thus, the enjoyment score variable is regressed on the respective set of explanatory variables, most importantly the variables capturing motherhood and the labor market status, using OLS. This results in the following general estimating equation:

$$dwh_i = \alpha + \beta'x_i + \delta'z_i + \varepsilon_i \quad (2)$$

where dwh_i is the enjoyment score as defined above. x_i denotes the set of key explanatory variables, which is varied in order to address the research question. Initially either a motherhood dummy *or* a full set of labor market status dummies are included to establish their respective baseline relationship with affective well-being. Then both (sets of) dummies are included jointly to investigate the possibility of one relationship mediating the other. Finally, some specifications also include a full set of dummy interactions between the motherhood dummy and the labor market status dummies. This allows for the influence of being a mother in the respective labor to differ from the sum of the two individual contributions. z_i denotes the set of control variables, which always contains a control for age and age squared to account for a u-shaped relationship between age and happiness (Blanchflower & Oswald, 2008; Knabe et al., 2010). In some specifications, additional control variables are added to investigate whether their inclusion changes the relationship between the key explanatory variables and affective well-being. These control variables consist of full sets of dummy variables capturing the marital status, day of the week, region of residence, education level and migration background. It should also be noted that z_i does not include a measure of (equivalent household) income. Thus, coefficient estimates on key explanatory variables include any potential income based channel.⁶ Lastly, ε_i denotes a random error term. Since postcode sectors are the primary sampling unit of the study, standard errors are clustered at the postcode sector level, which also accounts for clustering at the individual level, as the individual level is nested within the postcode sector level.⁷ However, before discussing any results it must be noted that there is some potential for endogeneity, implying that even the regression results should not be interpreted as indicating a causal relationship. Even though some specifications include controls to explicitly model certain characteristics, which

⁵ Unfortunately, as noted in the introduction a measure of negative affect is not available in the UKTUS

⁶ As a tentative investigation into income mediating some of the estimated relationships, the log of equivalent household income (using the square root scale) was included in unreported regressions. In regressions including all key explanatory variables and the additional control variables, the coefficient on the income variable is close to zero and insignificant, suggesting that there is no substantial income based channel. However, without additional controls, the coefficient on the income variable is negative and significant (similar results are found by Hoang & Knabe, 2020) and its inclusion reduced the magnitude of key coefficients somewhat. Nonetheless, key conclusions of this study are not changed by the inclusion of this variable. More research would be required to fully address the role of income in the determination of affective well-being.

⁷ There are around 480 clusters, with small changes depending on the specification.

Table 1 Estimated mean affective well-being and difference in means tests

	(1) Childless	(2) Mother	(3) All	(4) Diff. (Mother)	(5) Diff. (Lab. Sta.)
Full-time	5.499 (0.050) <i>N</i> = 594	5.636 (0.054) <i>N</i> = 431	5.553 (0.036) <i>N</i> = 1025	0.137* (0.075)	Reference group
Part-time	5.732 (0.082) <i>N</i> = 165	5.747 (0.055) <i>N</i> = 457	5.743 (0.045) <i>N</i> = 622	0.015 (0.099)	0.189*** (0.058)
Self-employed	5.829 (0.127) <i>N</i> = 78	5.701 (0.079) <i>N</i> = 115	5.757 (0.073) <i>N</i> = 193	-0.128 (0.148)	0.203*** (0.078)
Unemployed	5.658 (0.184) <i>N</i> = 40	5.738 (0.207) <i>N</i> = 56	5.704 (0.144) <i>N</i> = 96	0.079 (0.275)	0.151 (0.144)
Homemaker	6.023 (0.160) <i>N</i> = 24	5.824 (0.065) <i>N</i> = 328	5.838 (0.061) <i>N</i> = 352	-0.200 (0.178)	0.285*** (0.072)
Maternity leave	-	5.858 (0.098) <i>N</i> = 77	5.858 (0.098) <i>N</i> = 77	-	0.304*** (0.103)
All	5.590 (0.041) <i>N</i> = 901	5.733 (0.030) <i>N</i> = 1464	5.675 (0.025) <i>N</i> = 2365	0.143*** (0.050)	-

Standard errors in parentheses (clustered at postcode sector level), *N* refers to the sample size the estimate was based on

For difference in means test: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

Source: UKTUS 14/15, own calculations, sampling weights were applied

might be correlated with both motherhood/employment status and affective well-being, there is no way of ensuring that the estimated conditional correlations are not driven by unobserved heterogeneity. Particularly selection of happier individuals into certain labor market statuses or parenthood is concerning (Stutzer & Frey, 2006; Cetre et al., 2016).

3.3 Descriptive statistics

Estimated means of the enjoyment score variable for various sub-groups applying the diary weights included in the UKTUS are reported in Table 1. Pooling all observations, the estimated enjoyment score is 5.68 on a scale between 1 and 7. Column (4) reports the difference in means between mothers and childless women. Overall, mothers have a 0.14 points higher enjoyment score than childless women. The difference is statistically significant at the 1% level. However, when distinguishing by labor market status, there is no significant relationship between motherhood and affective well-being in any group except for the full-time employees. Considering the relationship between enjoyment and labor market status without distinguishing by the presence of (potentially adult) children, those employed full-time have the lowest estimated mean enjoyment score. Furthermore, when conducting pairwise tests for equality of means between full-time employees and individuals in other employment statuses in column (5), the difference in means is statistically significant at the 5% level in all cases except for unemployment where the p-value is equal to roughly 0.3. Even though homemakers and those on maternity leave have the highest enjoyment

Table 2 Mean time spent on and enjoyment experienced in various activity types

	Time use (in Minutes)				Mean enjoyment			
	Mother	Childless	Diff.	P-value	Mother	Childless	Diff.	P-value
Sleep	416.68	431.33	-14.65	0.19	6.38	6.23	0.15	0.01
Work rel.	144.74	260.78	-116.04	0.00	4.72	4.58	0.14	0.18
Housekeep	169.18	122.84	46.34	0.00	4.88	5.02	-0.14	0.05
Leisure	180.04	215.60	-35.57	0.00	6.07	5.96	0.11	0.04
Childcare	75.65	1.73	73.92	0.00	5.46	5.78	-0.32	0.25
Play child	27.34	0.30	27.04	0.00	6.23	6.58	-0.35	0.05
Other comm.	222.57	246.13	-23.56	0.01	5.55	5.45	0.10	0.09

	Time use (in Minutes)				Mean enjoyment			
	Full-time	Homemaker	Diff.	P-value	Full-time	Homemaker	Diff.	P-value
Sleep	430.15	392.79	37.36	0.03	6.26	6.39	-0.14	0.08
Work rel.	292.97	3.50	289.47	0.00	4.53	5.15	-0.62	0.38
Housekeep	118.70	227.20	-108.50	0.00	4.94	5.00	-0.07	0.48
Leisure	185.36	215.56	-30.19	0.01	6.00	6.06	-0.07	0.42
Childcare	20.81	99.19	-78.38	0.00	5.51	5.49	0.03	0.83
Play child	6.30	32.36	-26.06	0.00	6.41	6.17	0.24	0.05
Other comm.	218.35	238.17	-19.82	0.07	5.43	5.66	-0.23	0.00

Source: UKTUS 14/15, own calculations, sampling weights were applied, within each person-day observation the mean enjoyment within each activity category was also duration weighted

scores, the difference to part-time employment, self-employment and unemployment is not statistically significant. There is also a clear correlation between motherhood and labor market status. Only roughly 29% of mothers in the sample are full-time employed compared to 66% of childless women. Instead, mothers are more likely to be part-time employed (31%) or homemakers (22%) than women without children (18% part-time and 3% homemakers). These labor market statuses are also associated with higher affective well-being. In combination with motherhood only being associated with higher affective well-being in the group of full-time employees when separating the sample by labor market status, this could be a first indication that the positive relationship between motherhood and affective well-being is, at least partially, mediated by changes in labor market status. For reference, the unweighted sample means and standard deviations of the enjoyment scores as well as the sample size for each of these sub-groups are reported in Appendix 1.

Table 2 documents significant differences in the time spent on and mean enjoyment experienced in various activity types by different groups. For example, mothers spend less time on work related activities and leisure but more on housekeeping and childcare. They also tend to enjoy leisure more and housekeeping less than childless women.

There are a few “childless” (according to the definition above) women, who report spending time on childcare of and playing with own children. Some of these instances are explained by a minor child the respondent is still in contact with living outside of the household. Motherhood is defined as described above because this study is mainly

concerned with the influence of living with children in the household and fulfilling the role of a mother (irrespective of whether the person is the biological mother). However, key results were confirmed using an alternative definition of motherhood, which included all women reporting an episode of childcare of own child, an episode of playing with their own child or having a minor child living outside the household they are still in contact with. Regression results can be seen in Table A.2 in Appendix 2.

Similarly, a small number of homemakers reported episodes of work related activities. This could be a timing issue, as the information on the labor market status was collected shortly before the diary was filled in or it could be a small temporary job, which does not constitute a fundamental shift in labor market status. The latter explanation appears more likely as no breaks at work and only four incidences of working more than one hour were recorded in this group. Furthermore, only one of these cases worked more than four hours. As a robustness check, the key analysis was run again after excluding these homemakers from the analysis, with virtually unchanged results (Table A.3 and A.4 in Appendix 3). Tables including a more detailed list of individual activities, rather than the broad groups presented in Table 2, can be found in Appendix 4.

3.4 Decomposition

Any changes in the duration weighted mean enjoyment arise via two distinct underlying changes directly related to how the measure was constructed. As noted by Knabe et al. (2010), who studied the influence of unemployment on affective well-being, either the enjoyment associated with each activity changes (“saddening/cheering effect”) or how much time an individual spends in enjoyable/unenjoyable activities changes (“time-composition effect”), or both. However, when the data is disaggregated to look at individual time uses, particularly when considering the more extensive Tables in Appendix 4, it is difficult to identify overall trends. This issue is combatted by the decomposition suggested by Knabe et al. (2010), which is applied to the difference in enjoyment scores between mothers and women without children as an example below. However, before outlining the decomposition further, it must be noted that, besides the terms “cheering/saddening effect” and “time-composition effect”, no causal relationship between motherhood and affective well-being will be established. The focus rests exclusively on how the underlying changes in reported enjoyment in given activities and changes in time use affect the overall measure. Furthermore, while reading the remainder of the paper it should be kept in mind that all presented changes in overall affective well-being could, in principle, also be decomposed into a “cheering/saddening effect” and “time-composition effect” in an analogous way.

The first step to conduct the decomposition is to calculate the mean enjoyment experienced in each activity for the two sub-groups, in this case mothers and childless women, using diary and duration weights⁸. For each childless woman, a hypothetical enjoyment score is then calculated using her actual time use but the

⁸ Duration weights are applied in two situations in the analysis. Following the remainder of the study, they are applied when calculating the enjoyment score over a day. In addition, they are applied when calculating the mean enjoyment in any given activity over various individuals. The latter weighting is necessary for internal consistency, since the mean enjoyment score within a group should be identical when calculated as a mean over the individual enjoyment scores as well as when using the mean time-use in combination with the mean enjoyment within each activity in that group.

Table 3 Decomposition

	Any day		Weekday		Weekend	
Enjoyment childless women	5.590 (0.040)		5.508 (0.044)		5.796 (0.039)	
	(a)	(b)	(a)	(b)	(a)	(b)
“Cheering effect”	0.109	0.077	0.131	0.099	0.056	0.032
“Time-composition effect”	0.034	0.066	0.046	0.077	0.003	0.027
Enjoyment mothers	5.733 (0.029)		5.684 (0.031)		5.855 (0.031)	
Difference	0.143		0.176		0.059	
P-value ^a	0.004		0.001		0.239	

Robust standard errors in parentheses (clustered at postcode sector level)

Source: UKTUS 14/15, own calculations, sampling weights were applied

^aP value for the null-hypothesis of no difference in means

mean enjoyment within each activity of mothers. Following this, the mean of the hypothetical enjoyment scores is calculated using diary weights. The difference between this hypothetical mean affective well-being and the actual affective well-being of childless women is the “saddening/cheering effect”, as in the hypothetical case only the enjoyment experienced in each activity is changed to that of mothers while the time use remains that of childless women. The remaining difference in mean affective well-being between mothers and childless women is the ‘time-composition effect’. This decomposition is denoted with (a) in Table 3. Conversely, the decomposition could also be conducted by taking the time use of mothers and combining it with the mean enjoyment of childless women in each activity to calculate the hypothetical enjoyment score. This decomposition is reported in Table 3 in all columns denoted with (b).⁹

On average mothers experience higher affective well-being within given activities (though their affective well-being in some activities could be lower) and they also spend more time in more enjoyable activities. The “cheering effect” appears somewhat larger than the “time composition effect”, though the relative size changes substantially depending on which decomposition is applied.¹⁰ Table 3 also reports the results separately for weekdays (Monday to Friday) and weekends (Saturday and Sunday). The difference in affective well-being between mothers and childless individuals is larger during the week and actually no longer statistically significantly different from zero on the weekend.

⁹ Since childless women should not report any childcare of and playing with own children the relevant hypothetical enjoyment of childless women in childcare cannot be calculated. Thus, in decomposition (b) mothers were assigned the “hypothetical” enjoyment of a mother for these specific activities. As noted there are a number of individuals who report childcare of/ playing with own children besides not being a “mother”, as previously defined. However, since calculations based on these would not be representative of either group, these were not used in the analysis.

¹⁰ In this context, it should also be noted that the time composition of the day can also influence the enjoyment experienced within a given activity. For example, there could be spillover effects or a diminishing marginal utility of being engaged in any given activity. These would be included in the “cheering effect” besides being ultimately caused by changes in time-composition.

4 Regression results

4.1 Baseline estimation

Table 4 reports regression results using the various sets of explanatory variables on the full sample. When controlling only for age in column (1), motherhood is associated with higher affective well-being, mirroring results from Table 1. However, after controlling for labor market status, the respective coefficient roughly halves in magnitude and becomes statistically insignificant, which could indicate that the positive relationship between motherhood and affective well-being is mediated by changes in labor market status. As noted before, there is a clear correlation between motherhood and labor market status, with mothers tending to be in labor market statuses, which are associated with higher affective well-being. Compared to full-time employment, which always serves as the default group, all other included employment statuses, with the exception of unemployment, are associated with higher affective well-being¹¹ in column (2), which only controls for age and age squared.

As a counterpart to the aforementioned mediation, one could argue that certain labor market statuses like homemaking could simply capture the joys of being a mother. However, this is unlikely to be the main driver of the results, as the respective coefficients remain significant in column (3) which includes the motherhood dummy as well as column (4) which includes additional control variable. Instead results in columns (3) and (4) point towards a direct positive relationship between being in these labor market statuses (compared to full-time employment) and affective well-being. With the evidence presented so far it would still be possible for some labor market statuses, such as maternity leave and homemaking, to capture having young children in the household rather than teenagers. However, this also does not appear to be the case as will be shown in Section 5. Considering this as well as previous evidence by Gibb et al. (2014) and Cools et al. (2017), it is plausible that motherhood indeed causes changes in labor market status more than the reverse.¹² However, it is likely that, for example, the availability and quality of part-time employment, childcare accessibility as well as the ease of re-entry into the labor market influence fertility decisions.¹³

If one is interested in the direct relationship between motherhood and affective well-being, which is probably relevant to individuals deciding on whether to have children or not, any change brought about via changes in labor market status needs to be filtered out. In this case, the results indicate that this relationship is much

¹¹ These results confirm the previous finding by Knabe et al. (2010) that unemployment is not associated with a significant change in affective well-being compared to full-time employment. However, they contrast with the coefficients estimated by Negraia and Augustine (2020), which indicate that non-participation is associated with a reduction in happiness compared to the default category of full-time employment and no difference in happiness between part-time and full-time employees.

¹² Kravdal (2002) only finds small effects of women's unemployment experience on fertility in Norway (positive for first births and negative for higher order births).

¹³ Del Boca (2002) shows a positive impact of the accessibility of part-time employment and childcare on women's employment and fertility. In contrast, perceived economic uncertainty appears to reduce fertility, though primarily for higher order births (Hofmann & Hohmeyer, 2013).

Table 4 OLS regression results

	Dependent variable: duration weighted mean enjoyment				
	(1)	(2)	(3)	(4)	(5)
Mother	0.160*** (0.048)				
Part-time		0.194*** (0.051)	0.080 (0.052)	0.060 (0.052)	0.089 (0.065)
Self-employed		0.161** (0.076)	0.170*** (0.054)	0.146*** (0.053)	0.178* (0.094)
Unemployed		0.136 (0.134)	0.148* (0.077)	0.156* (0.081)	0.238* (0.125)
Homemaker		0.249*** (0.067)	0.122 (0.134)	0.078 (0.139)	0.006 (0.227)
Maternity leave		0.240** (0.104)	0.211*** (0.071)	0.171** (0.075)	0.292 (0.204)
Mother*part-time			0.198* (0.109)	0.200* (0.120)	0.181 (0.124)
Mother*self-employed					-0.056 (0.116)
Mother*unemployed					-0.146 (0.156)
Mother*homemaker					0.112 (0.275)
Constant	6.534*** (0.364)	6.148*** (0.353)	6.329*** (0.368)	6.284*** (0.403)	-0.145 (0.218)
Age and age squared	yes	yes	yes	yes	yes
Additional controls	no	no	no	yes	yes
Observations	2365	2365	2365	2347	2347
R-squared	0.010	0.018	0.020	0.090	0.091

Standard errors in parentheses (clustered at postcode sector level), *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

Additional controls (full sets of dummy variables): day of the week, region, marital status, education level, migration background

Source: UKTUS 14/15, own calculations

lower than suggested by a simple correlation and in some cases to the extent that a significant positive relationship can no longer be established. In contrast, if one is interested in the total influence of motherhood on the average woman in society, all channels must be allowed to be included in the estimate. If motherhood indeed causes changes in labor market status¹⁴, this includes any influence on affective well-being via these changes. However, even in this latter case, it is important to understand the channels contributing to this outcome. Similarly, keeping the potential for an indirect relationship in mind is also relevant in the former case, if the family is indeed considering a change in labor market status following the birth of a child.

It is conceivable that the influence of being a mother *and* in a specific labor market status on affective well-being differs from the sum of the two individual influence. This can be accounted for by including interaction terms between the motherhood dummy and the labor market status dummies. For example, even if motherhood and homemaking both increase affective well-being, a stay-at-home mother may be able to benefit from both positive influences to the full degree. This could be the case because her day is filled with more chores than that of a childless homemaker, she may be unhappy with only having the role of a primary caregiver or there could be a diminishing marginal utility of affective well-being improving life circumstances. In this case (assuming there are no other undue influences on the coefficient estimates), the coefficient on the respective interaction term would be negative. Column (5) reports results including interaction terms between motherhood and all labor market statuses, with the exception of maternity leave, which always coincides with motherhood. None of the interactions are significant. However, the point estimates themselves are comparatively large and some coefficients of interest change quite substantially compared to column (4). The labor market status coefficients now capture differences in enjoyment scores between childless women in the respective status and childless full-time employees and remain positive and significant only for part-time and self-employment¹⁵. To investigate whether this is also the case for mothers, post-estimation testing is required. The null hypothesis $\beta_{lms} + \beta_{lms*mother} = 0$, where *lms* refers to the respective labor market status, can be rejected at the 10% level for part-time employment and homemaking, implying that mothers in these labor market statuses have significantly higher enjoyment scores than mothers who work full-time. Similarly, it can be tested whether mothers in a specific labor market status have higher affective well-being than their childless peers ($H_0: \beta_{mother} + \beta_{lms*mother} = 0$). The null hypothesis cannot be rejected for any of the included labor market statuses. Detailed results of all post-estimation tests are available in Table A.8 in Appendix 5.

¹⁴ Even though it is possible that, for example, women with conservative values are both more likely to have children and be homemakers, it does appear reasonable to suggest that a significant amount of the difference in labor supply between mothers and childless women is actually driven by the increased childcare demands and the desire to spend more time with children.

¹⁵ Since the point estimates are not generally reduced, the drop in significance level is likely due to smaller cell size.

4.2 Differentiating by weekdays and weekend

For employed/self-employed individuals the daily structure heavily depends on whether it is a working day. Thus, the enjoyment score and how it relates to the employment status (and, by extension, motherhood) likely varies by the type of day. For employed individuals working days are easily identified. However, for those without a job, it is impossible to separate diaries into counterfactual “working days” and “non-working days”. Instead, the sample is separated into weekday and weekend observations as a proxy. When comparing the two samples a statistically significant (at the 1% level) difference in mean enjoyment between weekdays (5.601) and weekends (5.835) emerges. Estimation results after separating the sample into weekday and weekend observations are presented in Table 5.

The difference in coefficient estimates between weekdays and weekends is also substantial. On weekends, all key coefficients are smaller in magnitude than in Table 4 and many are insignificant. Consequently, the estimates for weekdays become larger, including the one on the mother dummy, which now remains significant even after controlling for employment status. The positive and significant coefficient on the mother dummy in column (7), which includes interaction terms, also implies that (at least on weekdays) mothers working full-time are happier than childless full-time employees. Since the interaction terms are negative for all included labor market statuses except unemployment, the positive relationship between motherhood and the enjoyment score is reduced and even becomes negative for individuals in these labor market statuses. However, the null hypothesis $H_0 : \beta_{mother} + \beta_{lms*mother} = 0$ cannot be rejected in any of the cases. These negative point estimates also raise the question whether the estimated positive relationship between these labor market statuses (compared to full-time employment) remains significant for mothers ($H_0 : \beta_{lms} + \beta_{lms*mother} = 0$). The null hypothesis can only be rejected in the case of homemaking (5%-level), suggesting that stay-at-home mothers have higher affective well-being than mothers working full-time. The same is true for maternity leave, however here the coefficient can be interpreted directly. More details can be found in Appendix 5.

Results from Table 2 and 3 are also re-estimated using the sampling weights provided by the UKTUS in Appendix 6. Key insights, such as the inclusion of labor market status controls reducing the coefficient in the motherhood dummy, are unchanged by the application of sampling weights, though the motherhood dummy now remains significant in some cases, where it was not previously.

4.3 Interim summary and further discussion

Collectively, these results indicate that women either benefit or are at least not worse off, in terms of affective well-being, if they are not working full-time, and that motherhood has a positive association with affective well-being at least partially due to mothers’ increased likelihood of not working full-time. However, even though homemakers generally have higher affective well-being, mothers working full-time do not appear to be affected negatively by having to balance a career and childcare, as their affective well-being tends to be higher than that of childless full-time employees.

Table 5 OLS-regression results differentiated by the kind of day

		Dependent variable: duration weighted mean enjoyment									
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
		Weekday	Weekend	Weekday	Weekend	Weekday	Weekend	Weekday	Weekend	Weekday	Weekend
Mother		0.233*** (0.054)	0.087* (0.050)								
Part-time		0.242*** (0.059)	0.146*** (0.055)	0.118** (0.058)	0.042 (0.056)	0.102* (0.059)	0.019 (0.057)	0.182** (0.074)	0.019 (0.057)	0.182** (0.074)	-0.005 (0.070)
Self-employed		0.223** (0.092)	0.098 (0.083)	0.206*** (0.061)	0.133** (0.060)	0.180*** (0.061)	0.111* (0.058)	0.297*** (0.104)	0.111* (0.058)	0.297*** (0.104)	0.061 (0.110)
Unemployed		0.237 (0.147)	0.036 (0.142)	0.204** (0.093)	0.091 (0.084)	0.213** (0.098)	0.099 (0.087)	0.392*** (0.141)	0.099 (0.087)	0.392*** (0.141)	0.085 (0.137)
Homemaker		0.381*** (0.072)	0.118* (0.070)	0.216 (0.147)	0.028 (0.143)	0.161 (0.152)	-0.006 (0.149)	0.076 (0.258)	-0.006 (0.149)	0.076 (0.258)	-0.066 (0.239)
Maternity leave		0.370*** (0.111)	0.112 (0.117)	0.324*** (0.076)	0.097 (0.076)	0.276*** (0.083)	0.066 (0.079)	0.409* (0.216)	0.066 (0.079)	0.409* (0.216)	0.172 (0.223)
Mother*part-time				0.308*** (0.115)	0.090 (0.122)	0.323** (0.130)	0.077 (0.131)	0.270** (0.135)	0.077 (0.131)	0.270** (0.135)	0.090 (0.134)
Mother*self-employed								-0.190 (0.128)		-0.190 (0.128)	0.079 (0.131)
Mother*unemployed								-0.321* (0.192)		-0.321* (0.192)	0.030 (0.170)
Mother*homemaker								0.118 (0.308)		0.118 (0.308)	0.108 (0.291)
Constant		6.670*** (0.433)	6.383*** (0.372)	6.098*** (0.419)	6.186*** (0.386)	6.366*** (0.364)	6.281*** (0.386)	6.277*** (0.471)	6.036*** (0.426)	6.217*** (0.476)	6.062*** (0.437)
Age and age squared	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Additional controls	no	no	no	no	no	no	no	yes	yes	yes	yes
Observations		1184	1181	1184	1181	1184	1181	1175	1172	1175	1172
R-squared		0.018	0.005	0.034	0.009	0.037	0.009	0.095	0.057	0.099	0.057

Standard errors in parentheses (clustered at postcode sector level), *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

Additional controls (full sets of dummy variables): day of the week, region, marital status, education level, migration background

Source: UKTUS 14/15, own calculations

Since employed individuals spend a significant amount of waking time on employment related activities, these episodes likely have a large influence on the enjoyment score. Thus, the time spent at work is considered in more detail. Within the group of full-time employees, mothers experience significantly higher enjoyment while working¹⁶, but also spend significantly fewer minutes on an average weekday on this still comparatively low enjoyment activity (see Table A.7a in Appendix 4). In addition to the insignificant coefficients on weekends, this is another indication that the time spent at work and the associated enjoyment level drive many results presented so far. To investigate this further, some regressions (available in Appendix 7) were re-estimated after dropping all time spent on employment, breaks at work and commuting from the analysis. This results in the mother dummy and labor market status dummies becoming insignificant in all cases (except part-time employment on weekends, if there are no socioeconomic controls), corroborating the hypothesis that time spent on and enjoyment experienced in employment related activities is a key determinant of overall affective well-being and drives most results in this study. In an alternative approach, a dummy variable indicating whether the person was working on a specific day, the number of reported working hours on that day and the square of working hours were included as additional explanatory variables. This also resulted in a reduction in the estimated coefficients, rendering many but not all coefficients insignificant. Differences compared to the previous approach emerge because now changes in the enjoyment experienced during working time are only controlled for insofar as they are related to the duration of work and because a functional form for the relationship between affective well-being and working hours is enforced. However, using control variables instead of simply dropping the episodes from the analysis also implies that some spillover effects on other episodes could be controlled for. These results are also available in Appendix 7.

Three points should be considered when interpreting the previous results. Firstly, as noted in Section 3, changes in the enjoyment score can result from changes in the enjoyment experienced in any given activity but also changes in the time-composition. Secondly, as also mentioned in Section 3, the analysis cannot establish a causal relationship, due to the potential for endogeneity for example via selection of happier individuals into specific groups such as motherhood. Thirdly, there could be substantial differences in results depending on the specific well-being measure used. Negraia and Augustine (2020) already showed that parenting is associated with both more positive and more negative emotions. The enjoyment measure used in this study primarily captures the former. Similarly, affective and cognitive well-being could be affected differently. Some tasks, such as working, might score low in terms of enjoyment but might have a positive impact on life satisfaction, an overall feeling of worthwhileness and other emotions.

¹⁶ Negraia and Augustine (2020) also found mothers to be happier during market work than childless women in the ATUS. In addition, Meier et al. (2016) also found no change in happiness and even a decrease in sadness in time with children if mothers are employed, which further corroborates the evidence against the “role stress” hypothesis. However, employed mothers were more fatigued in time with children.

Table 6 OLS results, combined life satisfaction

Dependent variable: life satisfaction					
	(1)	(2)	(3)	(4)	(5)
Mother	0.081 (0.118)		-0.056 (0.135)	-0.059 (0.135)	-0.024 (0.188)
Part-time		0.117 (0.127)	0.134 (0.140)	0.083 (0.145)	0.230 (0.228)
Self-employed		0.048 (0.215)	0.056 (0.218)	-0.046 (0.221)	-0.131 (0.389)
Unemployed		-1.285*** (0.387)	-1.276*** (0.389)	-1.227*** (0.371)	-1.041* (0.571)
Homemaker		0.213 (0.160)	0.240 (0.174)	0.152 (0.187)	-0.287 (0.547)
Maternity leave		1.023*** (0.204)	1.051*** (0.222)	0.854*** (0.215)	0.837*** (0.231)
Mother*part-time					-0.212 (0.298)
Mother*self-employed					0.130 (0.466)
Mother*unemployed					-0.325 (0.764)
Mother*homemaker					0.453 (0.585)
Constant	9.264*** (0.930)	9.268*** (0.880)	9.147*** (0.945)	8.882*** (1.025)	8.784*** (1.050)
Age and age squared	yes	yes	yes	yes	yes
Additional controls	no	no	no	yes	yes
Observations	1096	1096	1096	1089	1089
R-squared	0.011	0.043	0.043	0.094	0.095

Robust standard errors in parentheses (clustered at postcode sector level), *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

Additional controls (full sets of dummy variables): day of the week, region, marital status, education level, migration background

The life satisfaction variable is harmonized

Source: UKTUS 14/15, own calculations

4.4 Comparison to life satisfaction

The last point mentioned above is illustrated by the vastly different results in Table 6, which uses life satisfaction¹⁷ as the dependent variable instead of the enjoyment score. There is no significant relationship between motherhood and life satisfaction, even without labor market status controls. Furthermore, coefficients on labor market statuses positively related to affective well-being are not significant when using life satisfaction, with the exception of maternity leave. In addition, the well-known negative relationship between unemployment and life satisfaction emerges in all specifications. These life satisfaction results provide a point of comparison for the affective well-being results, which may also alleviate some concerns regarding the potential for biases due to the cross-sectional estimation method. Even if one is concerned about biases in the point estimates, considering the difference in estimates using various measures within the same sample should still provide some insight into overall trends, as it is plausible that these differences are affected less by any potential biases.

The differences in the estimates in Table 6 compared to previous tables highlight the importance of considering multiple aspects of subjective well-being or at least making a conscious decision about which measure is applicable in a given situation. For example, it seems reasonable to assume that measures of affective well-being based on DRM or ESM data are more likely to pick up what could be described as the “*disutility of working*” than other measures. Simultaneously, the material standard of living, particularly regarding status symbols, and norm fulfillment are likely to be significantly less relevant for emotional well-being for long stretches of time during the day, unless one is actively thinking about them (see also Kahneman & Thaler’s, 2006, discussion of “*experienced utility*” and “*decision utility*”). In contrast, cognitive measures of well-being, which have already been shown to be impacted by the income of the reference group, personal aspirations as well as social norms (Stutzer, 2004; Clark et al., 2008b; Goerke & Pannenberg, 2015; Hetschko et al., 2014; Knabe et al., 2016), may respond more to the material standard of living while the pain endured in achieving that standard of living is disregarded or even a source of a sense of achievement.

5 Extensions and robustness

This section covers three extensions, which consider the potential for heterogeneous results depending on the number of children, the age of the youngest child and the age of mother at last birth. In addition, it includes two robustness checks, which investigate the sensitivity of results to changes in the definition of part-time employment and the exclusion of episodes of sleep from the analysis. Regression results for all extensions and robustness checks are available in Appendix 8.

¹⁷ The measure of life satisfaction is harmonized because the satisfaction question was changed from a 7-point scale (April 2014 - September 2014) to an 11-point scale (October 2014 - October 2015) during the survey period.

5.1 Number of children

The previous analyses only considered whether a respondent is a mother as previously defined, but did not allow for heterogeneity in the relationship depending on the number of children. Using life satisfaction data and a twin-study design Kohler et al. (2005) found that for women only the first-born child was associated with an increase in happiness, while additional children actually reduced life satisfaction (compared to having only one child). To allow for this phenomenon, Table A.13 further differentiates by whether one or several children are present in the household. Without controlling for labor market status, all mothers have higher affective well-being than their childless peers on weekdays, but those with only one child display a higher level of affective well-being than those with more than one. After controlling for labor market status, the coefficient on the dummy indicating motherhood of two or more children is smaller than the coefficients on the simple motherhood dummy in Table 5 and insignificant in all cases. In contrast, in the single child case the coefficient estimate is larger and significant on weekdays in all specifications. Thus, when using a measure of affective well-being a similar pattern as observed by Kohler et al. (2005) emerges, at least on weekdays. Interestingly, the positive relationship between having only one child and affective well-being persists on weekdays even if all work related episode are excluded from the analysis, though the coefficient is smaller¹⁸.

5.2 Age of children

Table A.14 introduces a further differentiation by the age of the youngest child. Having only children aged 16 and above is not associated with an increase in affective well-being compared to not having any. Though there appears to be tendency for younger children to be associated with higher affective well-being when allowing for more age brackets for the youngest child below the age of 16, the differences are not statistically significant. After including labor market status controls, all coefficients on the interaction terms between motherhood and age group of youngest child decrease in magnitude and most become statistically insignificant corroborating previous results.¹⁹ Furthermore, the coefficients on the labor market status dummies are largely unaffected by the inclusion of these variables instead of the baseline motherhood dummy. This indicates that the enjoyment associated with having young children did not drive previous results on labor market status (Table A.14 column (7) and (8) compared to Table 5 column (7) and (8)). These findings contrast with the suggestion by Nelson et al. (2014) that parenting young children tends to be associated with lower subjective well-being. There are two explanations for these diverging results. Firstly, as noted before, only a measure of positive affect is considered here, which could mask some of the stresses associated with caring for a young child. Secondly, women tend to reduce their labor supply more the younger their children. When controls for the time spent on employment related activities are

¹⁸ Results available upon request.

¹⁹ Only the coefficient associated with having a youngest child between the ages of 4 to 15 is still significant and only on weekdays.

added, no significant relationship between being the mother of young children and affective well-being remains²⁰.

5.3 Age of mother at last birth

All regressions reported above already control for age (and age squared), however they did not allow for heterogeneous effects depending on the age of the mother at last birth. However, women at certain life stages could be, on average, better or worse equipped to deal with the demands of childcare or feel very differently about having children, which may impact affective well-being and its relationship to motherhood. To investigate this issue three new dummy variables are constructed based on the mother dummy and the age at last (observed) birth, which is approximated by:

$$\text{age at last birth} = \text{current age} - \text{age of youngest child}$$

A mother is defined as a “young mother”, if the age at last birth was strictly below 25 and as an “old mother” if the age at last birth was strictly above 35, otherwise the mother is defined as a “middle-aged mother”. Results reported in Table A.15 column (1) and (2) indicate a positive relationship between motherhood and affective well-being primarily for middle-aged mothers, as previously defined. Young mothers have higher affective well-being than their childless peers only on weekdays. In contrast, mothers whose last child was born later in life do not have higher affective well-being than childless women, which could potentially be explained via a correlation with higher order births. After controlling for labor market status in column (3) and (4) the coefficient on the “middle-aged mother” dummy remains positive and significant both on weekdays as well as on weekends, while the simple motherhood dummy is only significant on weekdays. Both Luhmann et al.’s (2012) meta-analysis and Nelson et al.’s (2014) literature review suggest that young mothers tend to benefit less than older mothers (see also Stanca, 2012; Myrskylä & Margolis, 2014; Baetschmann et al., 2016). However, it is difficult to compare results directly, as the various studies measure age differently (current age or age at first birth), use different measures of subjective well-being and/or define other age thresholds.

5.4 Defining part-time and full-time by number of hours

Using a distinction between part-time and full-time employment based exclusively on unguided self-reports might be unsatisfactory because the same job could be perceived differently by different individuals. Thus, an alternative part-time dummy variable is also constructed based on the response to the questions “How many hours per week do you usually work in your main/all other job(s)/business? Please exclude meal breaks.” Those usually working 30 or fewer hours in total are defined as working part-time. This results in a substantial change in who is defined as part-time employed. Of the 622 person-day observations, previously defined as part-time, 40 no longer fall into this category, while 104 newly join this group, resulting in a new total of 684 observations after accounting for new missing values. The coefficient

²⁰ Results available upon request.

estimates (available in Table A.15 columns (5) to (8)) on all included labor market status dummies are larger compared to the respective estimates in Table 5. Furthermore, the coefficient on the mother dummy reduces in size and is no longer significant on weekdays. Even though these changes are small in magnitude, they may provide another indication that the time actually spent at work is a driver of affective well-being.

5.5 Excluding sleep

Since diaries cover 24 h, respondents generally report episodes of sleeping and most supply an associated enjoyment level (2298 of the 2365 person-day observations). In the preceding analysis, these episodes have been treated like any other recorded activity. However, due to the unconscious state, it is questionable whether enjoyment is actually experienced during these periods. Individuals might simply report how they believe they should feel or how well they slept. Furthermore, it is unclear whether the episode should be given the full duration weight. Therefore, all specifications underlying the results in Table 5 were re-estimated after excluding episodes of sleep. The key results regarding the labor market status are robust to this change, as the ranking is largely unaffected. If anything, on weekdays, the positive relationship between enjoyment score and not being full-time employed becomes larger in magnitude and even the positive association between unemployment and affective well-being becomes significant. There are also some small changes to the estimated coefficients on the motherhood dummy. Most notably, on weekdays, the previously positive and significant coefficient is reduced and becomes insignificant after controlling for labor market status (columns (5) and (7))²¹. In addition to differences in the enjoyment experienced during sleep across the groups, these changes could be explained by the now higher weight given to employment related activities, which make up a large fraction of waking time for those working full-time. The key conclusion, that the positive association between motherhood and affective well-being is mediated by changes in labor market status, is robust to excluding episodes of sleep. Estimation results are available in Table A.16.

6 Conclusion

Given the correlation between women's fertility and labor market outcomes, this study considered how these two important aspects of women's lives interact in their relationship to affective well-being. Even though mothers are shown to have higher affective well-being than childless women, this positive relationship appears to be (partially) explained by shifts in labor market status. In particular, mothers are more

²¹ On weekdays, the findings still document a significant positive association between motherhood and affective well-being without additional controls as well as when interaction terms are also added. However, on weekends, the motherhood dummy is no longer significant even without controls. Overall, the findings on a direct relationship between motherhood and affective well-being are not robust, as the respective coefficient tends to move around the significance threshold following changes in the specification. Thus, it is unclear whether the relationship between motherhood and affective well-being can be fully "explained away" by controlling for other variables or whether the relationship only becomes smaller in magnitude.

likely than childless women to be in labor market statuses, like family related non-participation and part-time employment, which are associated with higher affective well-being on weekdays. The results on homemaking also imply that, at least as long as non-employment is voluntary, affective well-being seems higher than in the case of full-time employment, which contrast with Winkelmann and Winkelmann's (1998) conclusion, based on life satisfaction data, that joblessness and not just unemployment is detrimental to subjective well-being. Furthermore, contrary to most life satisfaction based studies, but confirming previous results using affective well-being by Knabe et al. (2010), there is no significant association between unemployment (rather than full-time employment) and affective well-being. Some results differing from earlier findings using life satisfaction could be explained by gender differences in the response to certain labor market statuses and the already documented mixed results for labor market statuses going beyond the employment/unemployment dichotomy. (Stutzer & Frey, 2006; Haller & Hadler, 2006; Booth & van Ours, 2008/2009; Treas et al., 2011; Berger, 2013; Álvarez & Miles-Touya, 2016; Hamplová, 2019). However, the choice of subjective well-being measures, in this case the consideration of affective rather than cognitive well-being, is also relevant, as supported by results in Knabe et al. (2010) and the evidence presented in Table 6, which shows that results change substantially when life satisfaction is used instead of affective well-being. These results could indicate that while women's employment, particularly full-time employment, has several benefits, including alleviating the pressure on social security systems, reducing the risk of old age poverty and potentially increased life satisfaction, it may also have a cost in terms of affective well-being throughout the day. This should be considered when formulating policy objectives regarding women's labor supply. However, further investigations into the dynamic (affective and cognitive) well-being consequences of being in certain labor market statuses in various life stages are necessary. For example, even if homemaking is associated with a momentary increase in affective well-being while in this labor market status, it could lead to lower affective and cognitive well-being long-term, due to fewer career opportunities later in life, changes in the relationship to the partner and higher risk of old age poverty.

Furthermore, mothers do not appear to pay a price, in terms of affective well-being, for having a family and a career, as full-time working mothers actually have higher affective well-being than their childless peers. These mothers report higher enjoyment while working than childless women. However, they also spend significantly less time on this still comparatively low enjoyment activity, which may make the type of job they typically occupy not directly comparable. Increasing the available options for mothers by making workhours more flexible, promoting gender equality and enhancing childcare availability could potentially lead to even more welfare gains. However, considering that working is still among the lowest rated activities, while playing with own children is among the highest, it is questionable whether simply outsourcing childcare further to increase working hours is necessarily beneficial for working mothers. This is also reflected in mothers in other labor market statuses than full-time employment experiencing higher or equal affective well-being. However, more research, for example, on the relationship between the time spent on the various daily activities and the enjoyment experienced while engaged in specific activities, is needed before reaching a conclusion on this issue. Overall, the

results on a direct relationship between motherhood and affective well-being are less robust than the results on labor market status. Nonetheless, the negative relationship between parenthood and well-being suggested by some studies (see the review by Umberson et al., 2013) is not supported. However, it must again be acknowledged that the present study only considers a measure of positive affect, which might provide an incomplete picture considering Negraia and Augustine's (2020) results showing that parenthood is a "mixed bag".

Finally, the amount of time spent on and enjoyment experienced during episodes of employment and related activities appears to be a key driver of the results in this study, further highlighting the importance of this aspect for each individual's well-being and life in general. With more advanced evidence, we might be able to find ways to combine the positive aspects associated with having a job, such as social contacts, self-confidence, independence and engagement in meaningful activities, and minimize the negative aspects as much as possible, given the necessity to earn a living. For example, in some professions/positions it might be possible to eliminate wasteful working time, if employees only stay at work to satisfy the required weekly hours without actually engaging in productive tasks. This could also increase perceived meaningfulness of the job, thereby increasing affective well-being even more (Wolf et al., 2019). Furthermore, increasing subjective well-being may in turn lead to increases in productivity, resulting in a virtuous cycle (Oswald et al., 2015). Unfortunately, in their literature review De Menezes and Kelliher (2011) could not find a clear indication of flexible working arrangements increasing performance, thus, these cannot serve as a panacea. Nonetheless, of the mentioned studies only very few found a reduction in performance, which would imply that increasing the availability of flexible working arrangements is unlikely to impose high performance costs. However, before making any recommendations further research is needed, for example, because the results of the present study could change substantially following fundamental changes in the conditions in the labor market, the availability of high quality flexible childcare and/or social norms.

It must also be acknowledged that other potential driving factors such as unobserved heterogeneity cannot be addressed with the currently available DRM data. The results should, thus, be viewed as an initial tentative investigation rather than indicating a causal relationship. Self-selection, e.g., of happier individuals into parenthood or homemaking remains a major concern (Stutzer & Frey, 2006; Cetre et al., 2016). As more DRM data becomes available, it will become possible to address these issues in the same way the life satisfaction literature has already done, given the respective questions have been included in several large-scale household panel surveys for many years. Nonetheless, the current study provides additional evidence on how the choice of well-being measure can fundamentally alter the results. This is not necessarily surprising, since life satisfaction questions and DRM studies aim at different well-being concepts. In some regards, these might go hand in hand. For example, someone who is genuinely content with life may enjoy the same activities more or experience a blissful state of flow during work, which in turn contributes to life satisfaction. On the other hand, some stressful or painful activities, with low associated enjoyment, might induce a surge of satisfaction at the end of the day or whenever individuals think about their life as a whole. Similarly, some activities, which were highly enjoyable in the moment, might result in a drop in life satisfaction

in retrospect. Ultimately, it is a normative judgement whether more weight should be given to life satisfaction or to affective well-being. Depending on the research question, all or only some of the various measures available might be applicable. More research on measures going beyond life satisfaction will enrich our understanding of the determinants of well-being, thereby allowing policy to be aimed at specific issues more effectively.

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Compliance with ethical standards

Conflict of interest The author declares no competing interests.

Ethical approval This study uses data from the United Kingdom Time Use Survey, 2014–2015 which was collected by NatCen Social Research and accessed via the UK Data Service. Participation in the study was voluntary, which was also communicated clearly to potential participants. The information provided cannot be used to identify individuals. Participants were able to contact NatCen about any queries or complaints. Further information can be found in the official documentation, accessible via <https://beta.ukdataservice.ac.uk/datacatalogue/studies/study?id=8128>.

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