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Motherhood in academia: A novel dataset of UK academic women with an application to maternity leave uptake

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Abstract

Motherhood is widely believed to be an important factor slowing down the career progression of women. We present a novel database that combines an original survey of women and mothers working in the UK Higher Education sector with data on the occupational maternity benefits offered by academic employers. This allows users to track, at the individual level, child-bearing experiences and employment histories simultaneously. We describe several aspects of mothers' experiences in academia and how those evolve over the years. We also conduct an empirical analysis of the determinants of maternity leave uptake, showing that women's employment status and family arrangements significantly impact the types of maternity leave – paid or unpaid – taken.

KEYWORDS
academia, maternity leave, motherhood, UK, women

1 | INTRODUCTION

Mothers often face disadvantages in the workplace. Women tend to select into lesser-paid career paths in expectation of becoming mothers (Kleven et al., 2019), mothers frequently interrupt their careers due to childbearing responsibilities (Adda et al., 2017) and, even when successfully returning to their place of employment, often end up

working shorter hours, due to the lack of family-friendly policies (Williams & Cooper, 2004). Identifying the factors that reduce mothers' opportunities in the labour market is critical to designing appropriate policy interventions. To make progress on this issue, we study the UK Higher Education sector, leveraging a novel survey answered by over 9000 women in the profession, with questions tailored to measure their career paths, family life, childbearing experiences, job satisfaction, and perceived support from employers.

Why higher education? Several aspects guide our attention to this sector. One is substantive. Academia represents an important 'litmus test': it is characterized by high levels of human capital, flexible working conditions – even compared to other highly-skilled sectors – and the career paths of academics can be typically measured straightforwardly. Documenting disparities between mothers and women without children in academia would, therefore, provide a lower bound of how far we are from a truly fair labour market.

Indeed, several studies have already explored the experience of academic women and mothers, and a few themes have emerged from the literature: *Who decides to have children?* Joecks et al. (2014) argue that only the most productive female scholars do; Li and Shen (2022) and Kemkes-Grottenthaler (2003) highlight the importance of job security for childbearing decisions. *What is the cost of having children?* Lutter and Schröder (2020) and Morgan et al. (2021) document that women suffer a larger productivity drop than men following childbirth. *What is the role played by the workplace culture?* Ahmad (2017) and Baker (2010a) find that gendered expectations and practices hinder women's ambitions, productivity, and retention. *Do family arrangements affect women's careers?* Baker (2010b) and Mason and Goulden (2002) document that a traditional, gendered separation of roles, where women bear most childrearing and housework responsibilities, is prevalent even when both parents are in demanding careers.

While all these studies contribute to our knowledge of women's academic experiences, they often explore one question at a time.[1] Instead, we asked around 115 detailed questions to capture comprehensive information on women's educational, occupational, and personal histories. We also asked mothers – half of our sample – information on each childbirth experience. Our survey combines standard questions, which permit comparison with existing works, and novel items, which allow users to investigate different puzzles. For example, we can learn for each child about mothers' maternity leave uptake, the activities performed while on leave (research, supervision, etc.), their partner's employment and education at the time, the childcare arrangements utilized, and the perceived supportiveness of their line manager.

There is a second advantage of focusing on academia. Scholars can virtually reach the universe of women working in this sector using publicly available institutional email addresses. This is what we did in the UK, emailing more than 59,000 female academics (manually identified based on their name) and gathering a sample of 9666 female respondents across eight disciplines (respondents who answered 90% of the sample and self-identified as women). In contrast, previous findings often rest on a small sample of respondents and a restricted number of disciplines (if not just one), reducing their external validity. As a result, our study innovates thanks to its breadth, coverage, and geographic focus, as the UK academic sector has received less attention in the literature.

There is a third reason to study academia, especially UK academia. The Statutory Maternity Pay provided by the government offers little compensation after the first 6 weeks of leave. As a result, many universities grant additional maternity benefits (Occupational Maternity Pay), which vary across institutions and over time. We filed Freedom of Information requests to collect and then code 679 policy documents on current and past occupational maternity packages in UK institutions, from 1970 to 2020. Merging this information with our survey, we can provide a detailed and encompassing overview of the occupational benefits available to each mother at the time of each childbirth and merge it with self-reported information on leave uptake. This can be useful for researchers interested in studying how changes to benefits in Higher Education Institutions (HEIs) affect their main employees, academic staff.

A few descriptive patterns emerge from our survey. In line with previous findings, women tend to first obtain secure positions before becoming mothers. This could be due to the cost of having children. Indeed, mothers in academia bear comparable costs to those employed in other sectors: seven in 10 rely on (paid) nurseries and nannies in the first 2 years after childbirth, therefore experiencing a negative income shock. Another reason may be an

imbalance in childrearing duties in the household. Despite evidence of assortative matching, with a striking 40% of partners working in higher education and only 9% not holding a college degree (or above), most mothers still identify as the primary caretaker of their child.

Our data also allows us to track changes over time. We document a less gendered division of labour within households in recent decades. We also uncover a significant change in norms in the academic environment: mothers having their first child in recent years report more support from their Head of Department (hereafter, *HoD*), and a greater involvement in research in the months following childbirth, compared to earlier decades.

In the final section, we provide an example of how our survey, combined with information on occupational leave generosity, can be leveraged to study more substantive questions. While much attention has been devoted to the *impact* of longer leaves on the health and economic outcomes of mothers and children, we focus here on factors affecting the *duration* of such leave in the first place. This question has arguably been less studied, possibly under the assumption that individuals take full advantage of the benefits they are entitled to. Yet, using administrative data from UK academia, Clifton-Sprigg et al. (2023) show this is not necessarily the case: maternity leave uptake very much depends on the types of packages offered to mothers by their institution.

Our analysis supports the idea that mothers' choices respond to the generosity of the occupational benefits offered by their HEI, which impacts the financial sacrifice women face after giving birth. Mothers benefiting from more generous maternity provisions, that is, a higher number of weeks with no associated salary drop, report taking shorter (longer) partial-salary (full-salary) leaves. Yet, mothers' incentives to use maternity benefits do not solely depend on their generosity. Women in secure positions are more likely to take longer leaves, and the division of labour within the household, that is, partners' perceived support, has repercussions on women resorting to partially-paid and unpaid leave, with the financial and career costs these types of leave entail. Taken together, our findings show how personal, institutional, and organizational factors interact in preventing mothers from taking full advantage of the occupational packages offered to them.

2 | WOMEN IN THE WORKING AND FAMILY ENVIRONMENTS: A SHORT REVIEW OF THE LITERATURE

Our survey instrument aims to improve our understanding of the challenges women, in general, and mothers, in particular, face in their professional and personal lives. As such, our work touches upon a host of empirical contributions on women in the working and family environment, which we describe briefly in this section.

One of the key findings in the literature on women in the workplace is the existence of both a 'gender' and a 'family' gap. While earning differences between men and women declined over the last decades in most professions (e.g., Erosa et al., 2016), women are still disadvantaged. The so-called motherhood penalty reinforces gender disparities (Kleven et al., 2019): following childbirth, many women do not return to work (about one in two in Germany, according to Ejrnæs & Kunze, 2013), reduce their working hours (Lundberg & Rose, 2000), or switch to lesser-paid jobs permitting a better work-life balance (Bertrand et al., 2010). The motherhood penalty appears to vary by educational level, with graduates being more affected due to the higher opportunity cost of career breaks (England et al., 2016) and the requirement to work flexibly to move up the ladder (Bütikofer et al., 2018). As for academia specifically, a recent paper by Morgan et al. (2021) documents a gendered effect of parenthood on publication outcomes in the U.S. and Canada, with mothers suffering a higher drop in productivity than fathers.

Maternity benefits are seen as one of the most effective policies to mitigate the motherhood penalty (inter alia, Paterson et al., 2019). Being entitled to longer and more generous leaves reduces mothers' dropout rates following childbirth (Guertzgen & Hank, 2018; Keck & Saraceno, 2013), hence improving their career perspectives (Lalive & Zweimüller, 2009; Zveglich & van der Meulen Rodgers, 2003) and well-being (Glass et al., 2016). Yet, evidence of the long-run impact of leave generosity on mothers' careers remains mixed. Encouraging a longer absence from the

workplace, more generous leave might cause the depreciation of firm-specific human capital (Low & Sánchez-Marcos, 2015) and a reduction in working hours (Dechter, 2014).[2]

Nevertheless, the availability of maternity benefits is not enough: a family-friendly work culture is necessary for women to feel entitled to make use of them (Durnová & Hejzlarová, 2018). This can be the case even in academia. Academic women receive lower salaries (Ward, 2001), experience lower promotion rates (Ginther & Kahn, 2004), and are less likely to work in research-intensive institutions (Renzulli et al., 2013). Female academics also face a motherhood penalty in the form of shorter working hours (Abele & Spurk, 2011) and reduced opportunities for collaboration (Long, 1990). Indeed, academics interviewed by Mason et al. (2013) expressed their fear that using family-friendly policies might be perceived negatively, and that discussing family plans with a potential employer would harm their career perspectives. Female academics often are unaware of the full extent of family-friendly policies offered by their institution (Gunn et al., 2014), and show concerns around the male-dominated workplace culture (Howe-Walsh & Turnbull, 2016). These are all important issues, as a favourable workplace culture can help women thrive in the labour market (Joecks, 2021).

Our work complements these important contributions in two main ways. We cover a representative sample of female academics from the universe of disciplines and of UK HEIs. We pose a broad range of questions that enable us to link topics typically studied in isolation. Our survey, we believe, can help scholars better understand how high-skilled women adapt to their work environment and react to motherhood.

3 | THE SURVEY

In late 2016 and early 2017, we sent our questionnaire to 59,161 email addresses of female academics collected from institutional websites.[3] Between 16 January and 12 September 2017, approximately 16.3% of those contacted ($N = 9666$) completed more than 90% of the questionnaire (we also removed from the sample the few respondents who did not identify as women). While this response rate might appear low, our survey is not administered to a predefined, random sample drawn from an underlying population but to the universe of female academics across all UK HEIs. The survey data (as well as all replication materials) are available on the Harvard Dataverse.[4]

The survey questionnaire, reproduced in full in Online Appendix D, contains 115 questions, although the actual number varies depending on the respondent's characteristics.[5] We ask detailed questions about the respondent's *three* most recent childbirths (if any), which include: the partner's employment status at the time, the childcare arrangements, and maternity benefits available/utilized. We ask our respondents about their current rank and salary, and about their evaluation of their working conditions, both at the time of the survey and at each childbirth: this includes the supportiveness of their line manager and how fairly women felt they were treated compared to men.

Some of the questions we ask are found in previous works. For example, Morgan et al. (2021), a paper that closely speaks to ours, survey academics in U.S. and Canadian universities about leave availability, subjective experiences after becoming a parent, and so forth, (we offer a full comparison of the two surveys in Appendix C). As such, scholars can use this set of questions to compare the experience of academic women across different national contexts. Other survey items, such as activities performed while on leave, partners' occupation, are entirely unique to our study. We also ask our respondents about their experience following their three most recent childbirths. As such, scholars can use these questions specific to our survey to answer new puzzles, such as the evolution of mothers' experiences over time.

Before discussing the representativeness of our sample, we outline a few limitations of our survey instrument and their implications for researchers wishing to work with it. First, given that the survey only covers academic women, it is not well suited to address questions about the 'gender gap'. It can only provide a partial, gendered picture of parenthood in academia. Second, we only interviewed women still in academia as of 2017, a sample that may differ from the initial pool of women, who had originally entered academia on observable and unobservable characteristics. In other words, our sample suffers from survival bias. The consequences of such bias vary depending on the

research question scholars are interested in we provide an illustration when we turn to the determinants of maternity uptake below. Third, our survey asks retrospective questions. As such, the recollection of events or perceptions experienced further away from the interview date may be noisier, and indeed the number of missing observations increases going back in time. Fourth, our survey took place in 2017, before the COVID-19 pandemic. As a result, our data cannot inform researchers about their experiences during the pandemic.

3.1 | Representativeness of the survey sample

The sample we employ for our analyses consists of 7323 academics, almost equally split between respondents with and without children.[6] Most (71%) are UK citizens, with approximately 75% of respondents having obtained a PhD after the 1990s, and in the country. More than 8 in 10 identify themselves as white and heterosexual (this information is removed from the data to ensure confidentiality).

We compare our sample on a few relevant characteristics with the population of UK female academics using administrative information from the UK Higher Education Statistics Agency, hereafter, *HESA* (see Appendix A.1 for a full analysis).[7] The modal respondent in our sample is between 31 and 40 years old as in the HESA dataset. However, our sample slightly over-represents women aged 31–50 and under-represents women under 31. This age imbalance comes with two advantages: first, it increases the amount of information in our (retrospective) survey; second, it raises the number of women in their fertile years during the most recent wave of reforms of maternity provisions. Consistently, our survey is skewed in favour of academics with permanent positions (80%), compared to the HESA population (71%). This comes along an over-representation of professors (16% in the survey, 4% in the HESA population) and high earners, with 15% of our respondents reporting a yearly gross salary of above £59,400, compared to 10% in the HESA population. Again, this ensures an adequate sample size for longer-term analyses on the career impact of motherhood. In terms of disciplines, our sample under-represents women in Clinical Sciences (21% against 30%) and over-represents women in Social Sciences (9% compared to 6%). Yet, our sample broadly reflects the overall cross-discipline distribution of the UK female academic population.[8]

4 | MOTHERS IN UK ACADEMIA: SELECTED DESCRIPTIVE STATISTICS

In our sample, 3719 respondents are mothers or mothers-to-be.[9] Among mothers, small families are the norm: 38% have one child, 49% have two, and the rest have three or more. Our data permits users to trace a profile of the family situation of academic mothers, both at the time of the survey and at the time of their three most recent pregnancies. While more detailed comparisons between mothers and non-mothers are presented in Appendix A.2, we focus here on mothers' characteristics at the time of their first childbirth.

4.1 | Contract at first childbirth

Slightly less than half (49.60%) of the interviewed women with children waited to be in a permanent contract before becoming mothers (Table A.8). Figure 1 shows substantial stability in the evolution of mothers' contractual status at childbirth, over the last four decades.[10]

4.2 | Partners' characteristics

Our data reveals a significant degree of assortative matching in UK academia: almost 40% of respondents' partners are employed in Higher Education at first childbirth, and non-academic ones tend to be employed in middle-level

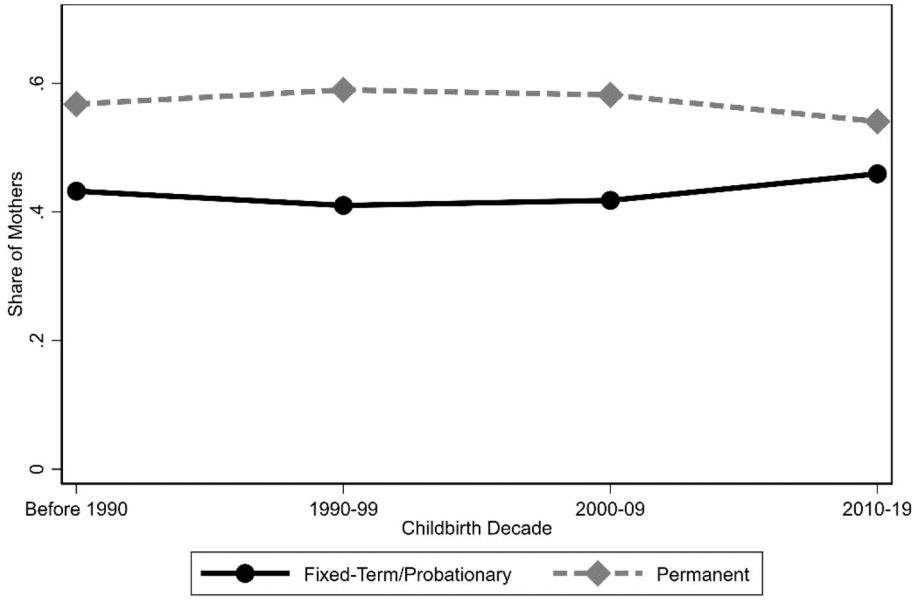

FIGURE 1 Mother's contract at first childbirth (percentage over valid answers).

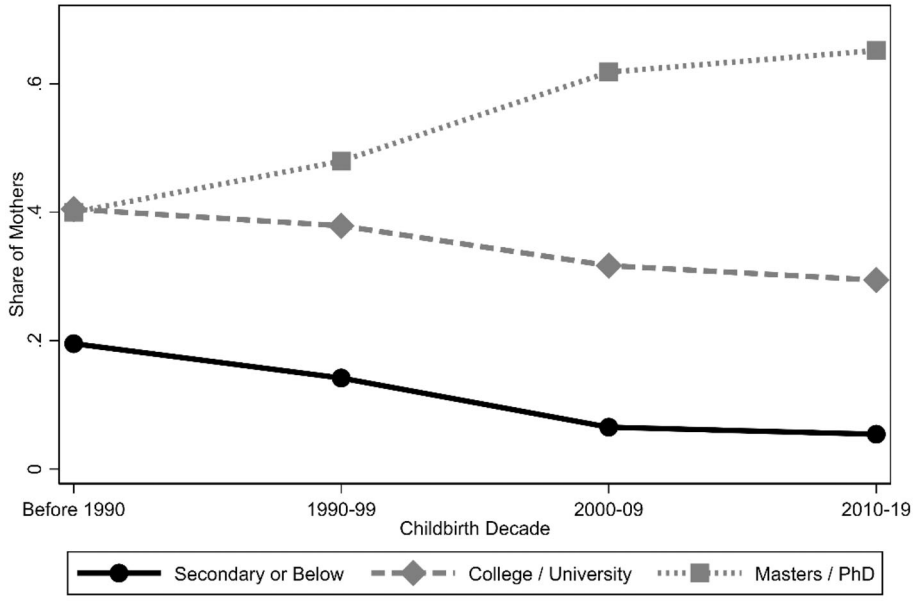

FIGURE 2 Partner's highest attained education at first childbirth (percentage over valid answers).

and senior-executive roles, hence earning relatively high salaries. Among mothers who gave birth for the first time in the last decade, less than 6% have a partner who did not complete college (Table A.9). While Figure 2 shows how partners became significantly more 'educated' over time, this pattern reflects the societal increase in educational attainments, as we observe no parallel increase in partners' occupational ranks (Table A.9).

4.3 | Support at home and at the workplace

When it comes to mothers' experiences, about a quarter declared that they shared childcare duties equally with their partners. Yet, when asked to estimate the childcare provided by the partner on a 0 to 100-point scale, almost 7 out of 10 indicated a number below 50, with a striking 33% of partners faring below 25 (Table A.10). This pattern does not vary when we focus on mothers at different stages of their careers (Table A.11). This finding is in line with the literature. Lundberg and Rose (2000) document a shift towards a more gendered division of labour within the household following childbirth, possibly driven by a combination of gender attitudes and family pressures (Nicoletti et al., 2018). Our survey reveals that such reversion to traditional gender roles can occur even in academia, possibly challenging the narrative that education mitigates the gendered division of tasks within the household.

We notice, however, how upbringing tasks have become more balanced in recent years (Figure 3): a change that is mostly driven by a more even allocation of duties (+7.9%) within the couple (Table A.10). This finding is in line with recent societal changes in parenting norms, with the diffusion of 'intensive parenting' (Nomaguchi & Milkie, 2020), and an increased expectation that fathers should be involved in nurturing and parenting tasks (Preisner et al., 2020).

Moving away from home and into the workplace, Table 1 reports mothers' assessment of the support their Head of Department (HoD) provided at first childbirth. The number of respondents stating that their manager was 'very supportive' increased significantly over the years (from 20% in the 1990s to 36.5% in the 2010s). However, this result may reflect the substantial increase in response rates.[11] Once more, reported support from line managers varies very little with mothers' career advancement at childbirth (Table A.12).

Motivated by evidence from the literature on child development (inter alia, Hansen & Hawkes, 2009), we also display in Table 2 respondents' childcare options in the 2 years following their return from leave. Six in 10 mothers exclusively used a combination of (paid) nurseries and childminders, while only 10% could rely on their families.

4.4 | Academic activities during maternity leave

To understand whether motherhood impacts work patterns in the short term, we asked respondents with children about their academic activities while on maternity leave (Table 3). A significant share of mothers remained active in

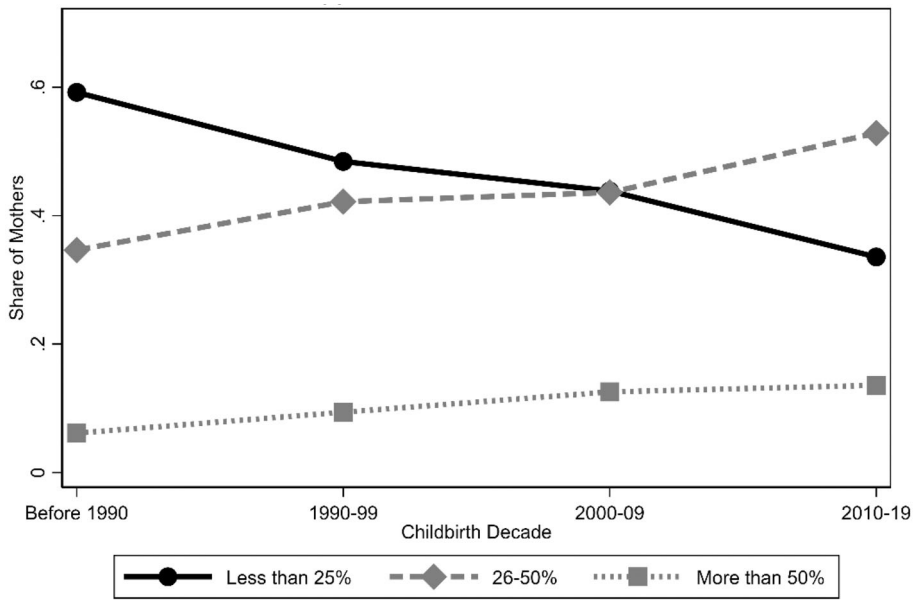

FIGURE 3 Partner's support in the 2 years after the first childbirth (percentage over valid answers).

TABLE 1 Head of Department's support before first childbirth (percentage over total answers).

	Full sample (Mothers)	Pre-1990	1990–99	2000–09	2010–17
Very / Slightly Unsupportive	10.85	6.92	12.15	12.74	9.77
Neither	18.36	14.06	19.49	20.81	17.02
Slightly / Very Supportive	52.49	28.13	39.97	53.90	68.41
Not Answered	18.30	50.89	28.39	12.56	4.80
Observations	3393	448	708	1091	1146

TABLE 2 Childcare option utilized in the 2 years after first mat. leave (percentage over total answers).

	Full sample (Mothers)	Pre-1990	1990–99	2000–09	2010–17
Nursery	48.13	17.63	37.43	53.53	61.52
Nanny / Au Pair / Childminder	13.73	22.54	17.94	14.67	6.81
Partner / Relative / Informal	10.64	11.61	9.89	11.27	10.12
A Combination of These	16.86	13.62	18.08	14.57	19.55
None / Myself / Informal	7.52	24.11	11.44	4.31	1.66
Not Answered	3.12	10.49	5.23	1.65	0.35
Observations	3393	448	708	1091	1146

TABLE 3 Activities performed while on first maternity leave (percentage over valid answers).

	Full sample (Mothers)	Pre-1990	1990–99	2000–09	2010–17
Research	38.82	14.89	29.01	42.07	48.52
Ad-Hoc Teaching	7.66	5.06	5.06	6.65	10.33
Administrative Tasks	10.13	2.81	7.39	9.52	14.38
Conferences	21.69	6.46	14.23	23.03	29.11
Mentoring	26.49	5.62	16.22	26.92	37.92
Journal	24.23	5.62	14.05	24.46	35.04
Observations	3001	356	555	977	1113

the first months of the baby's life: 39% kept conducting research, about 22% attended conferences, and slightly more than 24% were involved in journal editing and/or peer reviews. Almost one in four women kept mentoring their doctoral students, possibly due to the time flexibility of the task. Maternity leave also appears to effectively buy women time for their personal lives and, possibly, for their research agenda: very few respondents undertook any ad-hoc teaching (7%) or administrative tasks (11%) while on leave.

Interestingly, the share of women who remained active while on leave has increased over time. Compared to those who gave birth in the 1990s, mothers nowadays are twice more likely to devote time to research while on leave, and three times more likely to attend conferences, engage in professional activities, and continue mentoring their students. This could possibly be due to several facilitators of mothers' engagement with the academic world, from more generous maternity policies to the greater accessibility of academic resources while away from the office (e.g., paper repositories, specialist software available to academics while not physically 'on campus').

Table 4 displays the reported activities of mothers while on leave according to their contractual status at the time of childbirth. Two patterns are noteworthy. First, mothers on leave spend more time mentoring when they are in permanent positions. Second, they also devote more time to research than mothers on fixed-term or probationary

TABLE 4 Activities performed while on first maternity leave by contractual status (percentage over valid answers).

	Full sample (Mothers)	Fixed-term/ probation	Permanent
Research	43.14	38.85	46.65
Ad-Hoc Teaching	8.43	9.12	7.87
Administrative Tasks	11.47	8.19	14.15
Conferences	24.34	22.64	25.74
Mentoring	30.08	20.52	37.89
Journal	27.42	24.49	29.81
Observations	2633	1184	1449

contracts. Among possible explanations, this may be due to a form of selection whereby the most productive women obtain permanent contracts. This could also be the result of having access to more generous maternity benefits, or due to a greater confidence in taking full advantage of them. We return to this in the following section.

5 | MATERNITY LEAVE IN UK ACADEMIA

5.1 | Statutory and occupational maternity pay

In this section, we briefly describe the *status quo* of statutory maternity benefits in the UK, and of the occupational provisions offered by HEIs.

Since 2007, women in the UK qualify for Statutory Maternity Pay (hereafter, *SMP*) if they earn on average at least £120 a week and have continuously worked for the same employer for at least 26 weeks up to the fifteenth one before the Expected Week of Childbirth (EWC). At the time of writing, Statutory Maternity Pay in the UK is paid for up to 39 weeks: the first 6 weeks are paid at 90% of the average weekly pre-tax earnings, and the remaining 33 at 90% of the salary, or a flat rate of £172.48 (whichever is lower). The final 13 weeks of maternity leave are unpaid, making the overall length of the statutory period 52 weeks (i.e., 1 year).

Compared to many European countries, SMP in the UK is meagre.[12] As a result, many employers, including HEIs, offer Occupational Maternity Pay (hereafter, *OMP*). UK HEIs differ widely in OMP generosity – often due to strategic concerns (Epifanio & Troeger, 2019) – both in terms of pay rate and eligibility criteria. For example, in 2018, the University of Exeter offered all mothers – regardless of their length of service – full-salary leave for 26 weeks, SMP for 13 weeks and, finally, 13 unpaid weeks. In contrast, the London School of Economics and Political Science (LSE) granted full-salary replacement leave for the first 18 weeks and a statutory payment (at the lowest rate) for the remaining 21 weeks, only to academics employed at LSE for at least 26 continuous weeks before the 15th week before EWC.

In December 2019, we filed a round of FOI requests to all UK HEIs. We collected 679 policy documents outlining the OMP benefits offered in UK Academia between 1970 and 2020, which we proceeded to code. To capture OMP generosity, we employ the widely used 'Full Weeks Equivalent' (hereafter, *FWE*) index, which looks at the full monetary value of the benefit (see Appendix B, for more information).[13] Merging this information with each childbirth date, we can learn about the generosity of the occupational benefits available to each academic mother in our sample.

Our data do not contain information regarding paternity leave, which was introduced in 2003, and Shared Parental Leave (SPL), which was launched in 2015. We do not expect this omission to bias our analysis in a significant way. The benefits associated with paternity leave are quite low, being paid for 2 weeks at the same flat rate of SMP, discouraging uptake. SPL also has a very low uptake (around 2%, as of 2018).[14]

5.2 | Maternity leave uptake

Our survey contains extensive questions asking mothers about the different types of leave – statutory, unpaid, partial-salary, full-salary – they took after giving birth. For each category, we ask whether the respondents took 'none,' 'some,' or 'all' of the available benefits. This approach reduces the precision of the analysis but also avoids relying on respondents' imprecise recalling of very specific information.[15] Table 5 provides a few descriptive statistics regarding leave uptake. Over 75% of mothers take full paid leave, whereas over 60% do not take unpaid leave (when counting only valid answers). We also observe an increase (decrease) in paid (unpaid) leave uptake over time.

In our regression analysis, we focus on three factors that may impact mothers' leave uptake. First, we look at mothers' contractual status at childbirth, as we expect that mothers in more stable positions face a lower opportunity cost of taking a long absence from work, regardless of the pay rate. Second, we include a variable measuring OMP generosity, affecting mothers' mix of unpaid, partially paid, and fully paid leave uptake. Third, we consider childcare arrangements at home: higher support from the partner may be associated with a shorter absence from the workplace, particularly with lower uptake of partially-paid and unpaid leaves, given the salary sacrifice they entail. We estimate the following OLS regression[16]:

$$Uptake_{ijdt} = \alpha + \beta X_{ijdt} + \delta_{ijd} + \gamma_d + \sigma_t + \epsilon_{ijdt} \quad (1)$$

Where $Uptake_{ijt}$ represents the amount of the three different forms of salary-replacement leave offered by occupational packages – fully-paid, partially-paid and unpaid – taken by respondent *i*, working in research area *d*, and employed by HEI *j* at the time of the first childbirth (*t*). Each outcome is coded as a rank: 'none offered or taken' (0), 'some taken' (1), and 'took the maximum offered' (2).

X_{ijdt} covers the set of individual-level explanatory factors just discussed. First, indicators for the mother's contractual status at childbirth: fixed-term, probationary, or no information available (permanent position is the

TABLE 5 Maternity leave uptake at first childbirth (percentage over total answers).

	Full sample (Mothers)	Pre-1990	1990–99	2000–09	2010–17
Full-Salary					
Not offered / Did Not Take Any	8.05	6.03	6.92	9.17	8.46
Took Some	6.75	4.24	7.06	8.07	6.28
Took Max, Offered	53.55	19.87	39.97	55.82	72.95
Not Answered	31.65	69.87	46.05	26.95	12.30
Partial-Salary					
Not offered / Did Not Take Any	18.86	5.58	14.69	18.97	26.53
Took Some	11.64	5.13	7.77	14.67	13.70
Took Max, Offered	26.50	7.37	16.53	27.22	39.44
Not Answered	43.00	81.92	61.02	39.14	20.33
Unpaid					
Not offered / Did Not Take Any	31.39	4.91	18.22	32.91	48.43
Took Some	9.17	4.46	7.06	8.34	13.09
Took Max, Offered	8.69	8.48	6.78	8.71	9.95
Not Answered	50.75	82.14	67.94	50.05	28.53
Observations	3393	448	708	1091	1146

reference category). Second, to measure OMP generosity, we employ the FWE index of the HEI employing respondent *i* at time *t*.[17] Third, for support at home, we recode the 'score' assigned to the partner's involvement in childbearing activities into three categories. We, therefore, include three indicators taking value one (else 0) if, respectively: the partner scored in the lowest quartile (less helpful than 26%), above the median (more than 50%), and no information is available (reference group: 26%–50%).

To enhance our estimation, we control for the mother's age at childbirth, and include a set of research area (γ_d) and childbirth year (σ_t) fixed effects. We also account for the partner's occupation at childbirth, via a variable that combines information from the question on his/her academic role (if in higher education at childbirth), with the one on his/her work responsibilities (if not in academia). We code the following set of indicators: (a) *high-rank academic* if professor, reader, principal teaching fellow or above (else 0); (b) *low-rank academic* if lecturer, research assistant, teaching fellow; (c) *high-rank non-academic* if top-executive, senior-executive or upper-middle rank; (d) *low-rank non-academic* if self-employed, freelance, office manager, supervisor or waged staff. As before, we include an extra category for missing responses.

At the university level (δ_{ijd}), to capture the research intensity of the mother's institution at childbirth, we include: (a) an indicator for whether the HEI belonged to the Russell Group; (b) the score (aggregated into six bands to prevent re-identification) the institution obtained in 2008's Research Assessment Exercise (RAE). We also control for the share of female academics over the total number of employees, employing data from HESA for the A. Y. 2015/16, and for the average salary earned by female employees (2012/13), again aggregated into six bands to avoid re-identification.

We employ heteroskedasticity-robust standard errors (ϵ_{ijt}). As the use of one type of leave will likely impact the uptake of the others, we run three Seemingly Unrelated Regressions (SURs), allowing for the error terms of each regression to be correlated with each other. While rendering estimations more efficient, this specification relies on the assumption – arguably safe in this setting – that error processes across the regressions behave similarly.

A few remarks are in order, before presenting our findings in Table 6. Recall that our sample consists of women still in academia in 2017. As such, the analysis suffers from survival bias. This may bias our estimates downward if the women in our sample are more intrinsically motivated (inter alia) and less sensitive to changes in the benefits offered to them or the situation they face at home. In contrast, our empirical findings may be upwardly biased if women who left would have been less responsive to change in generosity due to the pressure they felt at work. Our results should, therefore, be interpreted with caution.

In line with our expectations, mothers on more precarious contracts are significantly less likely to take advantage of *any* type of leave, particularly a full-salary one. Besides signalling potential selection into the pool of eligible mothers, this finding suggests that mothers at an early career stage tend to return sooner to full-time work. Also, family arrangements matter. Mothers who do not receive much help from their partners end up taking a longer leave at the cost of a salary sacrifice, as signalled by the positive and significant effect of this indicator on partially-paid and unpaid leave uptake. More generous maternity benefits lead to a higher (lower) uptake of full-salary (partially-paid) leave.

Two more interesting patterns are worth noting. We observe that women giving birth in recent years (post-2000) are significantly less likely to take unpaid leave, maybe due to the availability of more childcare options (see Table 2). In Appendix B, we further show that our results are stronger when we focus on (first) childbirths occurring after or in 2010 (Table B.5), rather than before or in 2009 (Table B.4). This time variation may be due to a change in social norms (see Figure 3 and Table 1) and/or the increase in OMP generosity over time with mothers giving birth pre-2010 having low incentives to take full-paid leave only for a few weeks.

We also see significant differences in full-paid leave uptakes across disciplines. Women in IT and Mathematics are most likely to take advantage of generous maternity packages, whereas mothers working in engineering are the least likely to do so. This suggests that mothers' experiences vary even across STEM disciplines, a pattern worthy of further investigation.

TABLE 6 Determinants of maternity leave uptake at first childbirth: Estimation results.

	(1) Fully-paid	(2) Partially-paid	(3) Unpaid
Contract at Chilbirth (Ref: Permanent)			
Fixed-Term	−0.189***	−0.127**	−0.113**
	(0.043)	(0.062)	(0.054)
Probationary	−0.254***	−0.160*	−0.120*
	(0.068)	(0.091)	(0.071)
No Information	−0.461	−1.054***	−0.371*
	(0.412)	(0.128)	(0.223)
Partner Support (Ref: 25%–50%)			
Less Helpful than 25%	−0.029	0.145***	0.143***
	(0.036)	(0.054)	(0.053)
More Helpful than 50%	0.006	−0.180**	−0.091
	(0.048)	(0.087)	(0.072)
No Information	−0.086*	0.150**	0.202***
	(0.050)	(0.072)	(0.069)
Maternity Pay Generosity			
Full Weeks Equivalent (FWE)	0.036**	−0.116***	0.011
	(0.015)	(0.022)	(0.022)
Research Area (Ref: Engineer)			
Hard Sciences	0.172*	−0.128	−0.003
	(0.092)	(0.123)	(0.118)
IT and Mathematics	0.324***	−0.383**	−0.127
	(0.092)	(0.167)	(0.143)
Arts and Humanities	0.185**	−0.049	0.182
	(0.085)	(0.114)	(0.115)
Clinical Sciences	0.175**	0.065	0.119
	(0.089)	(0.116)	(0.115)
Business Studies, Economics and Law	0.219**	−0.069	0.017
	(0.087)	(0.124)	(0.122)
Social Sciences	0.165*	0.084	0.145
	(0.095)	(0.133)	(0.127)
Other	0.086	−0.021	0.031
	(0.093)	(0.119)	(0.118)
Birth Decade (Ref: pre-1990)			
1990–99	0.072	−0.695*	−0.569
	(0.190)	(0.355)	(0.410)
2000–09	0.078	−0.545	−0.811**
	(0.182)	(0.342)	(0.393)
2010–17	0.124	−0.489	−0.795**
	(0.183)	(0.342)	(0.392)

TABLE 6 (Continued)

	(1) Fully-paid	(2) Partially-paid	(3) Unpaid
Constant	0.411	1.487	−1.608
	(0.873)	(1.325)	(1.311)
Observations	1530	1530	1530
R-squared	0.060	0.123	0.076
Mother's Age at Childbirth	Yes	Yes	Yes
Partner Empl. at Childbirth	Yes	Yes	Yes
University Controls	Yes	Yes	Yes

Note: Heteroskedasticity-robust standard errors in parentheses. The outcome captures full/partial/unpaid leave uptake as a rank: 0 'none offered or taken'; 1 'some taken'; 2 'took the maximum offered'. Individual controls: partner's occupation at childbirth (high-rank academic; low-rank academic; high-rank non-academic; low-rank non-academic; NA); mother's age at childbirth. HEI Characteristics (2015/16): Russell Group affiliation, RAE score 2008; share of female academics over total employees, average female salary (2012/13).
$^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$.

6 | CONCLUDING REMARKS

In this paper, we introduced an original survey, which gives voice to women in UK academia. We document their difficulties in reconciling motherhood with working pressures in a profession characterized by high levels of human capital. Like in many sectors, academic women tend to postpone their decision to have children until achieving a more stable position. As in many households, child-rearing and -caring tasks are mainly borne by academic mothers, even if their partner has the same job. Combining our survey with precise information on the maternity provisions granted by UK HEIs over the years, we show how mothers' decision to use different forms of maternity leave depends on the generosity of the salary replacement and is significantly influenced by their contractual status at childbirth, by the supportiveness of their partners, and by the discipline they belong to.

The analyses performed in this paper are just a few suggestive illustrations of how our database can be put to work. The breadth of our data can prove useful to researchers interested in understanding the trajectories of women across institutions and faculties. Given their anticipated, substantive implications for policymakers, we highlight a few questions we believe are worth exploring:

Do women in STEM disciplines bear a higher cost of having children? Researchers and policymakers interested in understanding the under-representation of women in scientific fields may exploit our data to study cross-discipline heterogeneities in childbirth experiences. Our results to date suggest that there may exist important variations in women's experience within a field often considered as homogenous like STEM.

How do women's (and mothers') perceptions of fairness in the workplace differ across disciplines and contractual status? Our survey includes a battery of questions capturing respondents' subjective feelings about their job at the time of the survey (satisfaction, perceived task, and salary fairness compared to male colleagues, commuting time). An analysis of such variables, especially from a cross-disciplinary perspective, would be of substantive interest.

How do childbirth experiences – and their career impact – differ from each other? Our dataset contains information on the three most recent childbirth experiences. This information allows to explore the differential impact of these events on leave uptake, activities performed while on leave, support received at home, and career outcomes, inter alia. Similarly, many of our respondents became mothers at very different points in time: a more complete analysis of normative changes in academia, complementing the snapshot provided in this paper, may be of particular interest.

Is there a motherhood penalty in UK academia? If so, on which dimensions? Our data not only permits to explore the existence of a penalty on 'standard' outcomes, like salaries and career progression, but also to measure other dimensions, such as reduced job satisfaction, through which the motherhood penalty can unfold.

CONFLICT OF INTEREST STATEMENT

The authors declare no conflicts of interest.

DATA AVAILABILITY STATEMENT

The data will made available on the Harvard repository upon acceptance for publication.

ETHICS STATEMENT

Approval was obtained from the Humanities & Social Sciences Research Ethics Sub-Committee, University of Warwick.

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ENDNOTES

[1] A notable exception is Morgan et al. (2021), surveying 3064 male and female tenure-track faculty across three disciplines and 450 departments in the U.S. and Canada. See below for further discussion.

[2] For a review, see: Rossin-Slater (2017).

[3] The pool of email addresses was constructed manually with the aim to contact every person: (a) identified as women, solely based on their name; (b) employed by a UK HEI, i.e., having an institutional email.

[4] The survey data and the replication material can be found at the following link: https://dataverse.harvard.edu/dataset.xhtml?persistentId=doi:10.7910/DVN/NPWRXL.

[5] Given the sensitivity of the information, some answers are either removed from the published dataset (e.g., ethnicity, institutions) or re-aggregated into broader categories (e.g., childbirth dates, research area) to protect the anonymity of the respondents.

[6] We exclude respondents who do not hold a PhD ($N = 1951$), are *emeriti* or research assistants ($N = 345$) – to maintain a more homogeneous sample –, and those who have adopted at least one child ($N = 47$), to prevent re-identification.

[7] In Appendix A.1 we also distinguish between universities affiliated, or not, to the research-intensive Russell Group.

[8] While our questionnaire allowed respondents to identify their research area from a list of 36 options, we employ these eight macro-categories to increase the confidentiality of the data. We homogenized HESA's categories accordingly (classifications available upon request).

[9] We define as "mothers" respondents who reported the birthdate of at least one child.

[10] In all figures, we show percentages over valid – rather than total – responses (i.e., we exclude non-answered responses). Figures with total responses are displayed in Appendix A.2.

[11] We performed a "missingness" analysis of the data to identify potential patterns in the information being omitted by the respondents about their first childbirth experience. Looking at all the potential combinations of missing and non-missing values across the 16 items studied in Figures 1–3 and Tables 1–5 reveals that there are 17% (12%) of cases in which all the variables are non-missing but for the partner's academic (non-academic) role. However, this is a by-product of the fact that we asked two mutually exclusive questions about this aspect (see Section 4.2). Each of the remaining combinations between missing and non-missing responses emerges with a probability lower or equal to 5%, confirming the absence of systematic patterns.

[12] See OECD Family Database. Last accessed: 12/02/2024.

[13] The index sums the number of weeks multiplied by the salary replacement rate (100%, 90%, 50%, etc.). For a package consisting of 6 weeks full paid, 9 at 90% of salary, 8 weeks at half pay, and 29 unpaid, the index equals $6 *1 + 9 *0.90 + 8 *0.50 + 29 *0 = 18.10$. We do not assign any weight to statutory flat payments. The correlation between this index and one that accounts for pay at a statutory flat rate is 0.92, leaving estimation results unchanged.

[14] See: "Fathers and the Workplace" (2018) and BBC (12/02/2018). Last accessed: 12/02/2024.

[15] Our survey did not ask specifically about "occupational" leave yet presented mothers with a "statutory" option, which should reduce the risk someone may have mis-interpreted full- or partial-salary leave as the income-proportional segment of SMP (the precise wording of the question is reported in Appendix D).

[16] In Appendix B.2, we show that our results are also virtually unchanged when we employ an ordered logit model (Table B.6).

[17] Whenever the childbirth date under scrutiny precedes the approval date of the oldest document in our possession for the relevant institution, we impute this policy as the one being into place at the time the child was born. Whenever HEIs offer more than one package to perspective mothers, for simplicity, we focus on the first item appearing in the document, as alternative packages are always equivalent in their FWE, and only vary in the combination of length and generosity. In the rare circumstances where more generous packages are offered to employees with a longer tenure, this implies we focus on the least restrictive one.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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