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**Maternity leave take-up in UK academia.
Why are they hurrying back?**

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Maternity leave take-up in UK academia. Why are they hurrying back?

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April 13, 2023

Abstract

In this paper we explore the effects of terms of maternity leave policy on the duration of leave taken by mothers, focusing on the higher education sector in the United Kingdom, where there is a wide variation in financial coverage of the packages offered by employers. We use unique newly collected individual level data for over 13,000 academic and professional services staff at Higher Education Institutions (HEI) in the UK and add to it data on university characteristics from the Higher Education Statistics Agency and area-level characteristics from the Office for National Statistics. Using an instrumental variable approach, we find that on average academics take 2 additional weeks of leave for every additional week of full pay provided within the maternity leave package, when professional services staff take 2.7 additional weeks. Academics respond positively to the financial terms of the policy in departments with a lower proportion of teaching-only contracts, higher proportion of female employees and in institutions with above median generosity of the maternity leave package. These results may suggest the culture, research and teaching environment within departments may affect decisions of academics differently than of professional service staff.

Keywords: gender, maternity leave, academia, instrumental variable

JEL classification: J13, J16,

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1 Introduction

Family leave policies have increased in generosity over the years as they aim to simultaneously encourage higher female labour participation, gender equality and child development. For instance, an average duration of maternity leave in OECD countries increased from 14 weeks in 1980 to 53 in 2018 (Olivetti and Petrongolo, 2017).¹ Research suggests that leave expansions lead to more leave being taken up, especially by women (Dahl et al., 2016; Lalive et al., 2014; Han et al., 2009; Rossin-Slater et al., 2011). But what happens when protected leave is not accompanied by equally generous financial coverage? And does the employees' response depend on the nature of their job?

In this paper we explore the effect of the financial conditions of maternity leave – the main policy aimed to support new mothers in the labour market – on the length of leave taken. We focus on the higher education sector in the United Kingdom, where there is significant variation between employers in the generosity of the parental leave packages offered to staff. We use novel individual level data on maternity leave uptake among academic and professional staff in UK universities, complemented by other data sources, to firstly ask how different types of employees respond to the maternity leave packages that vary in financial terms. We then explore mechanisms which may explain the choices made, as stylized facts show that academic staff take significantly shorter leaves relative to professional staff, but also relative to the national average. We answer these questions empirically using OLS and IV regression techniques.

We focus on the higher education industry for several reasons. Firstly, because of the importance of achieving gender equity in this sector from a social benefit perspective. While it is prevalent in almost all economic sectors, the gender gap is particularly pronounced in the higher education sector (and high skilled jobs in general), and within this sector, in sciences and in senior positions (Ginther and Kahn, 2004; Ward, 2001).² Data for the UK show that while women constitute 54%

¹There is vast literature investigating causal effects of parental leave policies on an array of outcomes, including labour market outcomes of women, fertility, maternal and child health, later-life outcomes of children, etc. (See Olivetti and Petrongolo (2017); Canaan et al. (2022) for a review). Leave in general is seen as beneficial to maternal and child's health, as well as mother's labour market outcomes. However, longer leaves have little effect on mother's labour market outcomes, and in some cases can be detrimental.

²There appears to be significant variation between disciplines: relative to academics in other disciplines, women in economics are less likely to get tenure and take longer to achieve it; a significant portion of the gender promotion gap remains unexplained by observable characteristics, such as gender differences in productivity and the effect of children on promotion

of academic and professional staff working in UK higher education, men make up the majority of professors (75% male), senior managers (69% male) and heads of institutions (76% male) (The Economist, 2018). Women receive also on average lower salaries, are less likely to be promoted (Shepherd, 2017) and face more difficulties in the publication process (Sarsons, 2017). Additionally, Troeger et al. (2020b) find that, in the UK context, female academics who have children are also affected by the motherhood penalty, which has no effect on their wages but slows down the career progression.

Secondly, this particular setting characterised by high degree of regulation (and thus comparability across institutions) and a large variation in the employer-specific policies, and the fact that there are numerous and stable actors that we can observe over time, is very well suited for the attempt of causal identification of the role financial conditions play in maternity leave take up.

The maternity leave policies available to academics, especially early career women, could prove essential in narrowing the gender gap and reducing the motherhood penalty. This could be particularly relevant in the UK setting, where providing Occupational Maternity Pay over and above the statutory pay could offer employers additional leverage in addressing the gender disparities affecting their staff. Epifanio and Troeger (2020) examine both theoretically and empirically how UK universities decide about the generosity of their occupational maternity pay packages. They find that more research intense universities with a higher previous share of female professors provide more generous maternity pay, whereas universities' income does not seem to be relevant. In related work, Troeger et al. (2020b) investigate how the generosity of the maternity leave packages mitigate the documented motherhood penalty. They find that more generous maternity provisions are associated with higher salary, potentially because generosity reduces the crowding out of research activity.

Bawden (2014) reports that academics at the top 10 UK institutions take significantly shorter leaves than females in other careers.³ The reasons behind the poor uptake of leave among UK-based academics are unexplored. Firstly, there could be a financial reason: the maternity leave packages aren't sufficiently generous to permit female academics to take long leaves without potentially large financial losses. Secondly, there may be non-financial reasons drawing females back to work early,

³In 2013 the average length of maternity leave at the University of Cambridge was 187 days and at the University of St Andrews 138 days. For comparison, according to the UK Department of Work and Pensions, the average duration of the maternity leaves taken by mothers was 38 weeks and 5 days in 2010-2017.

which are specific to academics, such as needing to stay up to date in a fast-paced research environment, the general culture of being always available and working flexible but long hours, competition in an often male-dominated environment, or institutionalised norms about an “appropriate” duration of leave. For these reasons, it is not obvious that female academics would respond to more generous maternity leave package in the same way as professional staff would, which is in fact one of the findings of our study.

In this article we make use of a unique UK context in which all employers offer qualifying women Statutory Maternity Pay (SMP)⁴ and, in addition to that, typically add Occupational Maternity Pay (OMP). However, provision of OMP is entirely up to the employer and varies substantially across the higher education sector. Some universities offer zero weeks of full salary replacement, whilst several employers provide 26 weeks of full pay (Epifanio and Troeger, 2018).

We use institution-level and individual-level data for over 13,000 female staff at 66 HEIs in the UK on the maternity leave uptake, their personal characteristics, characteristics of their employers originating from various sources, covering the period 2011-2016. First, we estimate the impact of the generosity of the maternity leave package (measured as the equivalent fully paid weeks) on the weeks of maternity leave taken by academic and professional staff separately, in OLS regressions, controlling for individual, university and Nomenclature of Territorial Units for Statistics (NUTS3) area characteristics, and including department and year fixed effects and a London fixed effect. We find no significant effect of the leave policy on the duration of leave taken, for either academics or professional staff. However, there is a concern that the least squares estimation suffers from omitted variable bias, selection of females into employment at universities based on their preference for maternity leave or responsiveness of the institutions to their existing gender and age structure among staff. Therefore, we instrument the generosity of the university’s own maternity leave package with the average maternity leave policy of neighbouring universities. Specifically, we construct an average policy of other universities located in the same NUTS3 area as the given institution.

The instrumental variable approach indicates that staff take on average more leave as the generosity of the package increases. However, academics take almost a week less relative to professional

⁴If an employee qualifies for it, SMP covers 90% of the average weekly earnings before tax for the first 6 weeks of leave, £145.18 or 90% of the average weekly earnings (whichever is lower) for the following 33 weeks and nothing for the last 13 weeks of maternity leave entitlement.

services staff per every additional week of full maternity pay. We then explore potential mechanisms behind these differences. We find that academics respond more to the financial terms of the policy 1) in departments with a lower proportion of teaching-only contracts and do not respond to enhanced packages when working in more teaching oriented departments, 2) in departments with a higher proportion of female employees relative to departments to lower share of female employees, and 3) in institutions with above median generosity of the maternity leave package relative to less generous institutions.

With this paper, we contribute to the literature on the determinants of take up of maternity leave. We show that individuals in the same workplace, benefiting from the same policies and structure of incentives, can have diverging behaviours depending on the nature of their jobs. This indicates that the financial incentives may not be the only factor at play. We conduct the analysis in the UK HEI setting and, to the best of our knowledge, this is the first study to use administrative individual level data on maternity leave uptake by all types of university employees.

This paper is structured as follows. Section 2 provides context for maternity leave policies in the UK and specifically in academia, and introduces the data. Empirical approach is discussed in Section 3, results presented in Section 4. Finally Section 6 concludes.

2 Background and data

2.1 Parental leave policies in the UK and the case of academia

The UK is one of the least generous European countries in terms of provision of paid maternity leave, despite improvements in recent years (O'Brien et al., 2017; Griffiths, 2018; van Belle, 2016). Most recent reforms included changes to Statutory Maternity and Paternity Leave provisions in 2006⁵ and 2010, and introduction of Shared Parental Leave entitlement in 2015.

A pregnant employee is by law entitled to a total of 52 weeks of statutory maternity leave - 26 weeks of ordinary leave and 26 weeks of additional leave. A woman must take 2 weeks after the child is born and can take up to 50 further weeks. Qualifying employees⁶ can receive up to 39 weeks

⁵Work and Families Act 2006

⁶To qualify, the expectant mother must be an employee, provide the employer with the correct notice and proof

of Statutory Maternity Pay: the first 6 weeks at 90% of the average weekly earnings (before tax); the following 33 weeks at £156.66⁷ or 90% of the average weekly earnings, whichever is lower. The remaining 13 weeks, until the total of 52, of statutory maternity leave are unpaid. Over the period 2010-2017, the average duration of the maternity leaves taken by mothers was 38 weeks and 5 days (Department for Work and Pensions, 2017), so mothers tend to take up the period covered by the Statutory Maternity Pay, and do not, on average, use any unpaid leave.⁸

In addition to the Statutory Maternity and Paternity Pay, employers may offer enhanced pay packages (Occupational Maternity/Paternity Pay) in which case the employee receives a higher payment, but cannot offer less than the statutory amounts. These enhanced pay packages differ significantly between sectors, but may also vary considerably between employers within the same sector. Typically, employers offer through OMP several weeks at full replacement rate and several weeks at 50% replacement rate; lower replacement rates are also possible, although they are less common in practice.

In the UK HEIs, which is the focus of this paper, all but a few employers offer enhanced pay packages. Universities are in fact among the most generous organisations in the UK: Maternity Leave and Pay XpertHR Survey 2017 found that roughly one third of organisations offer full pay for typically 16 weeks before reverting to the standard rate of the SMP; around 22% of organisations offer enhanced pay (full pay and half pay) for a total of approximately 26 weeks; and 18.2% of organisations offer full pay for 6 weeks then offer enhanced pay at half rate for a further 12 or 20 weeks.⁹ Despite their relative generosity, there is a rather poor uptake of these benefits by the employees of these HEIs, and especially by female academics (Bawden, 2014; The Economist, 2018). Troeger et al. (2020a) have conducted a large survey of women in British universities and have found that contract status at childbirth and the partner's participation in parenting had significant effects

of pregnancy, earn on average at least £116 a week and have worked for the employer continuously for at least 26 weeks continuing into the 'qualifying week' - the 15th week before the expected week of childbirth.

⁷Note that this is the replacement rate in 2023. In 2011 the value stood at £124.88 and in 2016 at £139.58.

⁸Prospective fathers are entitled to up to 2 weeks of paternity leave following the birth of the child. An employee is entitled to Paternity Leave when his partner is having a baby, he is adopting a child or having a baby through a surrogacy arrangement. Qualifying fathers also receive the statutory Paternity Pay of £156.66 or 90% of the average weekly earnings, whichever is lower, during paternity leave. The qualifying conditions require the father to be employed by his employer up to the date of birth, earn at least £116 a week (before tax), give the correct notice and have been continuously employed by your employer for at least 26 weeks up to any day in the 'qualifying week'.

⁹<https://www.xperthr.co.uk/survey-analysis/maternity-and-paternity-leave-and-pay-survey-2017/162374/>

on the types of maternity leave taken, and their duration.

As of April 2015, parents can jointly take Shared Parental Leave (SPL), which allows them to share up to 50 weeks of leave during the first 52 weeks of their child’s life.¹⁰ In 2018, only 2% of eligible couples took SPL (BBC, 2018); more than five years later, the take-up continued to remain exceptionally low, with government estimates of between 2% and 8%. The average duration of maternity leave spells, as recorded in the Maternity Allowance quarterly statistics, has not changed after the introduction of SPL, remaining surprisingly stable at 38 weeks and 5 days.¹¹

2.2 Data

Freedom of Information data

We have used Freedom of Information requests¹² to collect individual level data regarding uptake of maternity leave and some personal characteristics of employees of HEIs in the UK. Specifically, in August 2018 we contacted 162 HEIs registered with the Higher Education Statistics Agency (HESA)¹³ with an identical request to provide us with annual individual level information regarding weeks of maternity leave taken by an employee, their age, paygrade, department or cost centre of employment, whether they have taken shared parental leave and whether they are academic or professional services staff for the period between 2010 and 2017. We also requested the details of family-related policies in place at the organisations, including their financial conditions. Clifton-Sprigg et al. (2020) analyse the responses of HEIs to this request. They show that 78% of the institutions acknowledged the receipt of the request and 91% of those responding provided some data¹⁴ – either as requested or averages (due to concerns about breach of data protection). They

¹⁰Parents can take leave together or at different times and are allowed to split it into separate blocks of at least one week. To make use of SPL, the mother has to officially cease her maternity leave and the family switches to SPL with no option of reverting afterwards. SPL is also accompanied by Statutory Shared Leave Pay with similar eligibility criteria as the Statutory Maternity & Paternity Pay schemes and the same financial conditions as the Statutory Maternity Pay.

¹¹Birkett and Forbes (2019) identify poor policy communication at an organisational level, perceived policy complexity and societal expectations around maternal identities as the main barriers to sharing leave between parents. Above statutory pay provision for SPL is possible, as in the case of maternity/paternity pay, but it is still relatively uncommon, which possibly contributes to the very low take-up of this policy.

¹²Clifton-Sprigg et al. (2020) discuss the conditions for making a FOI request in the UK and the potential limitations of the method.

¹³<https://www.hesa.ac.uk/support/providers>; we have excluded those institutions which operate under an umbrella of another institution, e.g. medical schools, as the main institution would have provided us with the relevant data.

¹⁴About 2/3 of compliers provided all requested data and 1/3 supplied partial information.

also find no statistically significant relationship between provision of data and various characteristics of the institutions, which suggests that the responses were not selective. As a result of this data collection process, we have individual-level data for the maternity leaves of academics and professional staff employed by 82 institutions, with full data (as used in regressions) from 66 institutions.

Other data

We also link the following characteristics of HEIs (at university level) from the HESA data base - the proportion of staff by gender, full time or part time, contract type (teaching, research, or teaching & research) and permanent or fixed term contract. Lastly, we use Gross Disposable Household Income statistics from NOMIS¹⁵ at the NUTS3 level to capture location-specific labour market circumstances surrounding the HEIs for years 2010-2017. This information is merged with data provided by the university by postcode. We also attach to each HEI the competitors located within the same NUTS3 code by geocoding the distance between each pair of HEIs.

Summary Statistics

The descriptive statistics of the data set can be found in Table 1 for the characteristics of the HEIs in our sample and in Table 2 for the individual level characteristics.

On average, a HEI in the sample offers Occupational Maternity Leave pay at a rate equivalent to 15.47 weeks of full pay coverage¹⁶ across the available 52 weeks of maternity leave, comparable to the average full pay equivalent benefits offered by the other HEIs in the same NUTS3 geographical area. The HEIs in our sample offer on average almost 11 weeks with at least 90% replacement of the salary (compared to the 6 weeks at 90% pay guaranteed through the Statutory Maternity Pay provisions), an additional 9 weeks with a replacement rate between 50 and 90% and 19 weeks with below 50% salary replacement rate. Figure 1 provides a graphical representation of the occupational maternity policies that the universities in our sample offer, as well as the average duration of leave taken by the employees of those universities, by type of employees (academic staff or professional

¹⁵<https://www.nomisweb.co.uk/>

¹⁶This is calculated as the total number of weeks for which the salary is replaced, weighed by the replacement rate of the salary. It estimates the full monetary value of the paid maternity benefits. For example, if an employer offers 8 weeks at full pay, followed by 16 weeks at 50% wages, followed by the remainder at either Statutory Replacement rate or no pay, this will be equivalent to $8 * 1 + 16 * 0.5 = 16$ weeks of full pay coverage.

services staff). The first observation is that the majority of universities offer 6 weeks at at least 90% replacement rate followed by (typically) 12 weeks at half-pay. The next most common policy is to offer at least 16 weeks (but typically 18) weeks at a replacement rate of at least 90%, with no weeks at half pay. The middle-generosity universities tend to offer 8 weeks at nearly full pay and 16-18 weeks at half-pay.

The employees in our sample of HEIs take on average 36 weeks of maternity leave (See Table 2). There is, however, a significant difference in uptake between academics and professional services staff with the former taking on average 32 weeks and the latter 38.5 weeks of leave, which coincides with the end of Statutory Maternity Leave pay after the period of 39 weeks, and is equal to the national average of maternity leave over the period. Academic employees thus take leaves that are considerably shorter than the national average, by over 6 weeks. The upper part of Figure 1 shows the average duration of leave of academics and professional staff in each of the universities in our sample. An interesting observation is that while there is rather little variation in the average uptake of professional staff, there seems to be more variation for academics, but there does not appear to be an obvious positive relationship to the generosity of the maternity leave policy in place. The average age of the women in our sample is almost 35 at the time of leave. In terms of paygrade, most academics are on grade 6 (postdoctoral fellow or research fellow), 7 (lecturer) or 8 (senior lecturer), whereas professional staff are in grades 4 to 8.

In Figure 2a we present average leave lengths, separately for academics and professional staff, by seniority (pay grade) and by university characteristics. We find that there is relatively little variation in the length of leave taken by both groups; they take comparable lengths of leave irrespective of the paygrade they are in or characteristics of the employer, such as the share of females or teaching only staff. As expected, we do find that staff in less generous institutions take shorter leave than in more generous institutions. The differences we see in the overall sample when comparing academic and professional services staff hold throughout.

3 Empirical Strategy

3.1 OLS models

To assess the impact of the maternity leave package generosity on the weeks of maternity leave taken by academic and professional staff, we estimate the following linear regression:

$$WeeksLeave_{it}^s = \alpha_s + \beta_1 WeeksPaid_{u(i)} + \delta_1 X_{it} + \delta_2 W_{ut} + \delta_3 Z_{a(u),t} + \gamma_t + \gamma_d + \epsilon_{it} \quad (1)$$

where $WeeksLeave$ is the number of weeks of maternity leave an employee i of type s (i.e. either academic or professional staff), takes in the financial year t . $WeeksPaid$ is a measure of generosity of the maternity leave package offered by university u where employee i works, measured as the number of weeks equivalent to full pay weeks during maternity leave.¹⁷ With X we control for age and age squared, and in an accompanying specification we also include paygrade dummies. W is a vector of university u level characteristics some of which vary every financial year t such as total number of academic staff, proportion of research only staff, proportion of teaching & research staff, proportion of females and female academics, proportion of females working part time, and a time invariant London dummy. We include year dummies (γ_t) to capture seasonality in the number of weeks of maternity leave an employee takes. We also control for differences in maternity leave uptake between different types of departments (e.g. Business schools, STEMs, Humanities & Social Sciences and Health Sciences & Medicine) by including dummies for each (γ_d). Finally, we also include the gross disposable household income (GDHI) growth rate for year t in the NUTS3 a area where HEI u is located (Z). ϵ_{it} is a bootstrapped standard error clustered by university u . We estimate models for the sample as a whole and then for academics (s =academic staff) and professionals (s =professional staff), separately.

We are interested in β_1 , measuring the relation between generosity of the maternity leave package offered by university u and the weeks of maternity leave taken by employee i . However, there are at least two reasons why estimates of β_1 might be biased. First, employee i 's response to the university

¹⁷For example, if the Occupational Maternity Leave package offers 8 weeks of pay at full pay, further 16 weeks at 50% pay and then defaults to the Statutory Maternity Leave pay for the remaining 15 weeks, this is equivalent to $8 + 16*0.5 = 16$ weeks of full pay equivalence.

u 's policy is driven by the university's anticipation of employee i behaviour. In other words, some institutions might have more generous policies because of the type of employees they have hired. A second issue is that there may be selection of employees based on unobservable preferences over the generosity of the university's maternity leave package. Although we control for institution-, department type- and employee- level characteristics to mitigate these issues, they likely remain unresolved.

3.2 Instrumental Variable models

The issues of reverse causality and selection into the institution motivate our instrumental variable approach. We are trying to separate the impact of maternity leave policies on employee behaviour from all other determinants of the policy adoption itself. To do so, we instrument the generosity of the university's own maternity leave package with the average maternity leave policy of universities in the local market, defined by the NUTS3 geographical area. We rely on the two sample 2sls regression (Inoue and Solon, 2010; Angrist and Krueger, 1992). Specifically, in the first stage we use a sample of all universities in the data set and their characteristics as captured by HESA data, weighted by the number of employees.¹⁸ We model the maternity leave policy by university u as a function of institution characteristics that were described for equation (1) and the average number of weeks equivalent to full pay weeks of the other (neighbour) universities (n) in their geographical proximity (NUTS3 area). Thus we estimate:

$$WeeksPaid_u = \alpha_u + \beta_1 AvWeeksPaid_{n-u} + \delta_1 W_u + \epsilon_u \quad (2)$$

The predicted value of full-pay weeks equivalent is then used in the second stage regressions, which are ran on the sample of individuals, using data collected through our FOI requests. The second stage is the same as equation 1 but including predicted *WeeksPaid* from stage one:

$$WeeksLeave_{it}^s = \alpha_s + \beta_1 \hat{WeeksPaid}_{u(i)} + \delta_1 X_{it} + \delta_2 W_{ut} + \delta_3 Z_{a(u),t} + \gamma_t + \gamma_d + \epsilon_{it} \quad (3)$$

¹⁸The rationale for this step is that larger universities may be more influential in setting the market standard for maternity leave policy than smaller institutions.

Identification

In order for the β coefficients in equation (3) to measure the Local Average Treatment Effect (LATE) of the impact of the maternity leave package generosity on uptake of leave, the instrument needs to be internally valid. This is untestable, but we make the following arguments to support the validity argument. First, we assume that generosity of the maternity leave package is as good as randomly assigned, *conditional* on the set of university characteristics.

Second, we assume that the exclusion restriction holds, that is, the only channel through which the average maternity leave policy of the universities in the relevant market affects its uptake by employees is via the university u 's own maternity leave policy. This also can hold conditional on employee and university characteristics. Only given the first stage regression, the conditional independence assumption, and the exclusion restriction can the β coefficients in equation (3) be interpreted as the plausibly exogenous effect of the generosity of the package on female employees' uptake of leave.

4 Results

The baseline OLS results can be found in columns (1), (3) and (5) of Table 3, in Panel A when we do not control for individual paygrade and in Panel B when we include dummies for individual paygrade. Although statistically insignificant, we find a small but positive relationship between the total generosity of the package and the length of maternity leave taken by all staff and by professional services staff. A negative coefficient is found in regressions on subsample of academics. However, these effects may be biased and reflect selection into universities based on the preference for leave, where individuals with a preference for longer leave self select into more generous universities, hence leading to a downwards bias in the OLS estimates.

Therefore, we move to the instrumental variable regression results in columns (2), (4) and (6) of Table 3. The first stage regression conditional correlation between policy offered and that of competitors within NUTS3 area is negative and statistically significant. The IV results paint a very different picture to OLS. In panel A, when we do not control for individual paygrade, we find that for every additional week of full pay equivalence offered within the maternity leave package, an

employee takes on average 2.7 more weeks of leave. The effects is lower for academics, who take on average 2 extra weeks for each extra week of full pay equivalent, than it is for professional services staff, who take on average 2.8 extra weeks when offered an additional week at full pay equivalent. The coefficient magnitudes may seem surprising but they reflect the fact that the main explanatory variable is measured in weeks of full pay equivalence whereas the dependent variable is measured in calendar weeks; if women take maternity weeks beyond those offered at full pay, then taking up one extra week at full pay equivalent entails taking two or more calendar weeks at lower than full replacement rates. Expressing the effects in standard deviations, our findings indicate that a 1 standard deviation increase in policy generosity (defined as weeks of full pay equivalence) triggers a corresponding increase in the leave length of 0.9 st.dev. for the sample as a whole, 0.65 st.dev. for academics and 1.01 st.dev. for professional services staff. The results in Panel B, when we control for individual paygrade, are very similar -although there is a concern of reverse causality and omitted variable bias in the inclusion of paygrade; the weeks of maternity leave taken may affect one's paygrade and selection into paygrade may determine the decision of how many weeks of leave should be taken.

Next, we analyse various heterogeneities within the subsample of academics only to explore the rationale for their lower response to increases in policy generosity relative to professional staff. We consider heterogeneity by: a) type of department: STEM and non-STEM (incl. Arts, Humanities, Social Sciences and Business Schools); b) share of female academics in department: academics in departments with above median vs below median share of female staff; c) share of staff on teaching contracts: academics in departments with a proportion of staff in teaching only contracts that is higher (lower) than the median; d) university's OMP generosity: academics in universities that offer a maternity leave package more generous than the median vs less generous than the median OMP and e) paygrade: academics on paygrade 7 and below and academics on grade 8 and above.¹⁹ The results are presented graphically in Figure 3. We find that academics in departments with a share of female employees above the median take significantly longer leave when more leave is offered than do academics in more male dominated departments: this suggests that there could be peer effects or that more female dominated departments foster a more accepting culture for longer leaves. We

¹⁹We choose paygrade 8 as a benchmark because this is the first academic grade which comes with contract stability.

also find that females in departments with below median share of staff on teaching contracts, so more research oriented departments, are more responsive to leave policies than are academic staff in more teaching oriented departments. Similarly, academics in institutions with above median generosity of the package offered are more responsive to more generous packages, suggesting that universities offering more generous packages may indeed have a different culture towards maternity leave, supporting staff to take more leave. We find that there are not significantly different effects by type of department or by the paygrade that the employee is on, which is a proxy for seniority/tenure.

5 Robustness checks and alternative specifications

As the first robustness check we verify whether our results are affected by the introduction of Shared Parental Leave in 2015. Therefore, we rerun the analysis excluding years 2015 and 2016. The results can be found in Table 4 and are broadly in line with our baseline estimates.

We then conduct a falsification test in which we randomly allocate the existing maternity leave policies among all universities and reestimate our models, repeating this procedure 100 times. Figure 4 plots the densities of the obtained estimates for the main effects, for the OLS and IV estimation in the models where we use weeks equivalent to full pay. In all cases, we observe that the estimated effects in the simulations are centered around 0, which suggests that the significant effects we detected in the main estimations are not likely to have been obtained by chance but do represent the (causal) effects of the actual maternity leave policies of the universities.

Next, we consider alternative ways of framing the question. Firstly, we redefine the dependent variable from “weeks of leave taken” to “weeks taken at full pay equivalence”. This means that we recalculate the actual leave uptake into a number of weeks this would correspond to at full pay, given the employer’s policy. For instance, given a policy of 8 weeks at full pay, followed by 16 weeks at half pay and then statutory pay entitlement, for an individual who took 16 actual weeks of leave this translates into 12 weeks at full pay. And for an individual who took 24 weeks of leave, this corresponds to 16 weeks at full pay. This way we are compressing the heterogeneity of leave uptake beyond the attractive financial coverage & focusing only on the most attractive period. We estimate Equation 3 with this new dependent variable. Results are presented in Table 5. The

OLS results produce negative and statistically insignificant coefficients. The IV regression results indicate clearly no strong effect on the sample as a whole or for professional services staff. A positive and statistically significant coefficient is found for academics. To be precise, it indicates that for every additional week equivalent of full pay that an employer offers, an academic member of staff takes just under 4 days additional leave at full pay equivalence. The statistical insignificance for the sample as a whole and for professional services staff, in our view, is due to the fact that these groups typically take more leave than the number of weeks recalculated at full pay. Hence this constraint is not binding for them. This is not the case for academics.

As a final exploration of the different policy response between academic and professional staff, we investigate whether these two categories of employees have different probabilities of not taking up available benefits. One extreme scenario may be that staff take less leave than even the weeks the employer offers at full pay. As this is not incentive compatible with the financial reason, such a behaviour may signal that other factors than financial considerations affect leave decision making in this case. We define a “takeless” variable which equals to 1 if a staff member does not fully utilise the 100% paid element of the policy offered by the employer. We then check whether academics are more or less likely than professional staff to behave this way by running an OLS regression of this dummy on an indicator variable for being an academic member of staff and institutional dummies, to absorb any time-invariant differences due to employer characteristics. The results can be found in Table 6. It is clear that on average academic members of staff are 3.5 p.p. more likely, relative to professional staff, to take less leave than it is offered to them at 100% replacement rate within the given institution (column (1) of Table 6). This effect is driven by employees in institutions which offer more than the median number of weeks at 100% pay. Coupled with the results in the heterogeneity analysis where we found that academics in the more generous universities are more responsive to more generous leave provisions than the academics in less generous institutions, it would suggest that academics in these more generous institutions have a much higher variation in leave taking behaviour. Some take longer leave than the average for academics and some are not even exhausting the weeks reimbursed at 100%. This clearly indicates that there are non-financial motivations behind the choice of leave length.

6 Conclusion

In this paper we have explored the effects of generosity of maternity leave packages on the length of leave taken by mothers, and we have focused on the higher education sector in the United Kingdom, where there is a wide variation between packages offered.

We have used newly collected data on over 13,000 academic and professional services staff from 66 out of the 162 UK Higher Education Institutions between 2010 and 2017. To this data we have added information on university characteristics from the Higher Education Statistics Agency and area-level information from the Office for National Statistics using the postcodes of universities.

We have used an instrumental variable strategy for the generosity of the university's own maternity leave package: the average maternity leave policy of universities in the relevant geographical market, within NUTS3. We have found that on average academics take 2 additional weeks of leave for every additional week of full pay provided within the maternity leave package, when professional staff services take 2.7 additional weeks. This difference in response is also sizeable when measured in standard deviations, with 1 standard deviation increase in policy generosity triggering a 1 st.dev. increase for professional services staff and 0.6 st.dev. response for academics. These results are robust to a battery of robustness checks where we have controlled for richer characteristics such as paygrade, we have examined full pay weeks and excluded 2015-16 when share leave was introduced.

We have investigated the potential drivers of these results by examining several heterogeneities. We have found that for every additional week of full pay equivalence offered within the maternity leave package, on average academics in departments where the share of staff on teaching-only contracts is lower take on average 1.5 extra weeks of leave per each week of policy. This may either be because of the lower pressure of being back into the classroom. We also find different behaviour in departments with higher proportion of female academics, where perhaps taking longer leave is perceived as more of a norm. Lastly we observe higher responsiveness to the policy in the more generous universities, which highlights the fact that good financial terms of leave also play an important role in take up.

Future research is needed to explain in more depth the potential reasons for which academics tend to come back earlier from leave. In this paper we infer these are a mixture of the culture

within departments as well as the pressure of the research environment.

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7 Tables

Table 1: Descriptive statistics - HEI level

	HEI working sample	
	mean	sd
Weeks maternity leave, full pay equiv	15.47	4.47
Avg Maternity leave weeks equiv of 10 geographically closest inst.	15.57	1.86
Weeks maternity leave, at at least 90% pay	10.92	5.48
Weeks maternity leave, at 50-90% pay	9.23	7.32
Weeks maternity leave, at below 50% pay	18.85	5.96
Based in London	0.19	0.39
Total academic staff at institution	1480.07	1090.93
Prop. on research contracts	0.15	0.15
Prop. on T&R	0.60	0.21
Prop. of female academics	0.54	0.04
Prop. of female academics part time	0.50	0.08
Prop. of academics full time	0.45	0.05
Average house price	329559.93	281983.12
Gross Disposable Household Income growth	4.11	2.53
Economic activity of 16-64 year olds	75.43	4.47
Unemployment rate among 16-64 year olds	7.39	2.88
Female unemployment rate among 16-64 year olds	6.96	2.91
Population size	489263.22	219020.18

Data: Own collection via FOIs and data from HESA and Nomisweb.

Table 2: Descriptive statistics - individual staff level

	(1)		(2)		(3)		(4)		(5)		(6)	
	Full sample mean	sd	Full sample mean	sd	Academic mean	sd	Academic mean	sd	Admin mean	sd	Admin mean	sd
Weeks maternity leave taken	36.01	13.36			32.01	13.73			38.57	12.47		
Age	34.72	4.14			35.56	3.90			34.17	4.19		
Grade 1			0.03	0.16			0.00	0.04			0.04	0.19
Grade 2			0.02	0.14			0.00	0.06			0.03	0.16
Grade 3			0.06	0.23			0.03	0.16			0.07	0.26
Grade 4			0.11	0.31			0.04	0.19			0.15	0.35
Grade 5			0.16	0.37			0.04	0.21			0.22	0.41
Grade 6			0.20	0.40			0.20	0.40			0.20	0.40
Grade 7			0.20	0.40			0.28	0.45			0.17	0.37
Grade 8			0.16	0.36			0.26	0.44			0.10	0.30
Grade 9			0.06	0.24			0.13	0.34			0.02	0.14
Grade 10			0.01	0.10			0.02	0.14			0.00	0.06
N	13636		9264		5337		3177		8299		6087	

Data: Own collection via FOIs and data from HESA

Table 3: Maternity leave uptake: OLS and IV

	All staff OLS (1)	All staff IV (2)	Academics OLS (3)	Academics IV (4)	Admin OLS (5)	Admin IV (6)
Panel A: not controlling for paygrade						
Mat weeks full pay equiv	0.055 (0.175)		-0.113 (0.154)		0.060 (0.171)	
Predicted Mat weeks full pay equiv		2.687*** (0.170)		2.011*** (0.280)		2.831*** (0.199)
No. of observations	13636	13588	5337	5320	8299	8268
Panel B: controlling for paygrade						
Mat weeks full pay equiv	0.069 (0.160)		-0.078 (0.146)		0.114 (0.167)	
Predicted Mat weeks full pay equiv		2.635*** (0.168)		2.092*** (0.286)		2.558*** (0.191)
No. of observations	13794	13588	5337	5320	8299	8268

Notes: The outcome variable is the number of weeks taken as maternity leave. Maternity leave full pay equivalence is instrumented using the average maternity leave policy of universities in the same NUTS3 area. Panel A: The regression controls include age, age squared, year dummies, department dummies, London dummy, university characteristics (size, proportion on teaching & research contracts, proportion female, proportion of female academics), and area characteristics. Panel B: The regression controls include age, age squared, year dummies, department dummies, London dummy, university characteristics (size, proportion on teaching & research contracts, proportion female, proportion of female academics), individual pay grades and area characteristics. Bootstrapped standard errors shown in parentheses * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 4: Maternity leave uptake, excluding years 2015-2016: OLS and IV

	All staff OLS	All staff IV	Academics OLS	Academics IV	Admin OLS	Admin IV
Mat weeks full pay equiv	0.052 (0.173)		-0.107 (0.144)		0.044 (0.174)	
Predicted Mat weeks full pay equiv		2.842*** (0.193)		2.145*** (0.409)		2.925*** (0.258)
No. of observations	8458	8429	3242	3234	5216	5195

Notes: The outcome variable is the number of weeks taken as maternity leave. Maternity leave full pay equivalence is instrumented using the average maternity leave policy of universities in the same NUTS3 area. All specifications include full set of control variables as specified in Equation 3. Bootstrapped standard errors shown in parentheses * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 5: Maternity leave uptake (at full pay equivalence)

	All staff OLS	Academics OLS	Admin OLS	All staff IV	Academic IV	Admin IV
Mat weeks full pay equiv	-0.251 (0.163)	-0.211 (0.148)	-0.265 (0.170)			
Predicted Mat weeks full pay equiv				0.122 (0.073)	0.747*** (0.115)	-0.127 (0.092)
No. of observations	13398	5235	8163	13350	5218	8132

Data: Own collection via FOIs and data from HESA and Nomisweb.

The outcome variable is not actual weeks of leave taken but an equivalent of weeks taken at full pay. For example, if 22 weeks were taken and of these the policy covers 8 weeks at full pay & 10 weeks at half pay, followed by statutory financial coverage, then 13 weeks at full pay equivalence were taken.

Maternity leave full pay equivalence is instrumented using the average maternity leave policy of universities in the same NUTS3 area. All specifications include full set of control variables as specified in Equation 3. Bootstrapped standard errors shown in parentheses * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 6: Taking less leave than offered at full pay

	All unis	Above 16 weeks	Below 16 weeks	Below 8 weeks
Academic member of staff	0.035*** (0.004)	0.039*** (0.005)	0.030*** (0.006)	0.023* (0.010)
No. of observations	13636	6930	6706	2282

Data: Own collection via FOIs.

The outcome variable is a dummy equal to 1 if an individual has taken less weeks of leave than the number of weeks at full pay offered by the employer. For example, the variable will be equal to 1 in case when 10 weeks of leave were taken and employer offers 11 weeks at full pay. In column (1) we present results for full sample, in column (2) for universities which offer above median number of weeks at full pay (i.e. ≥ 16), in column (3) for universities which offer below median number of weeks at full pay (i.e. < 16) and in column (4) the least generous universities in the sample, which offer less than 8 weeks at full pay. Standard errors shown in parentheses * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

8 Figures

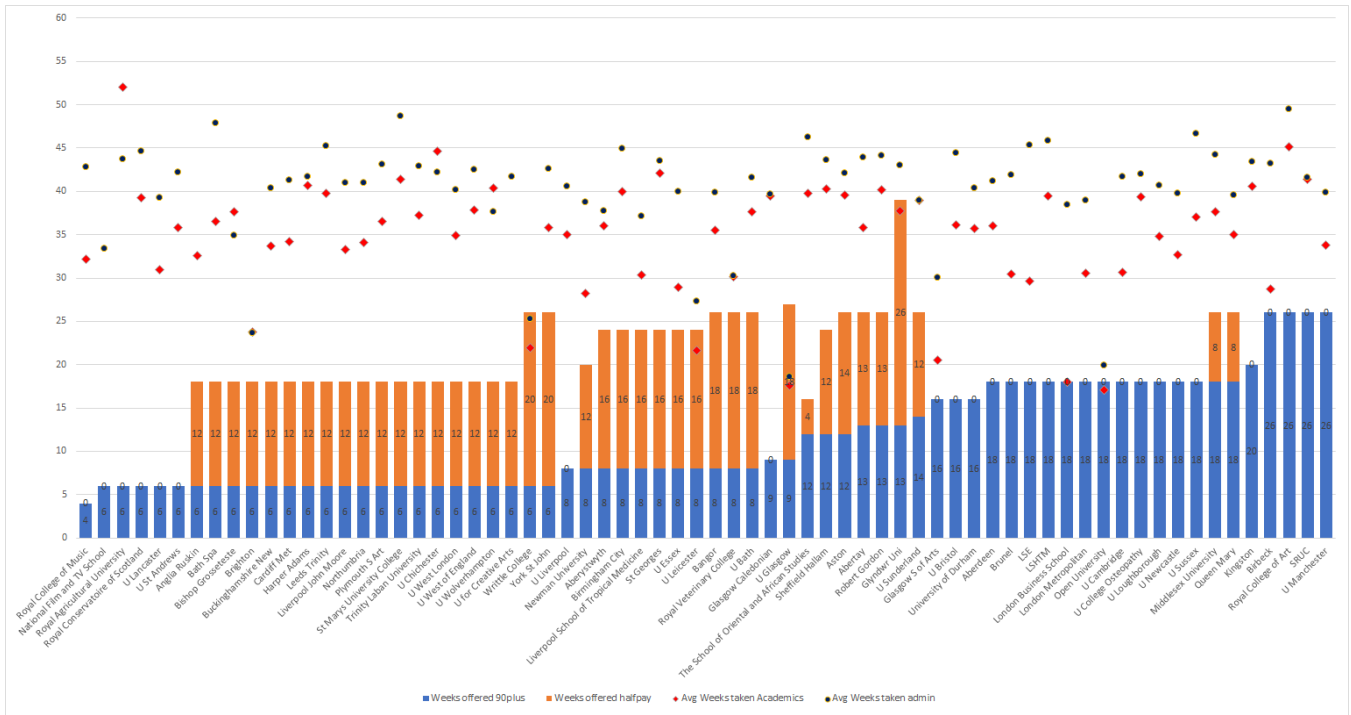
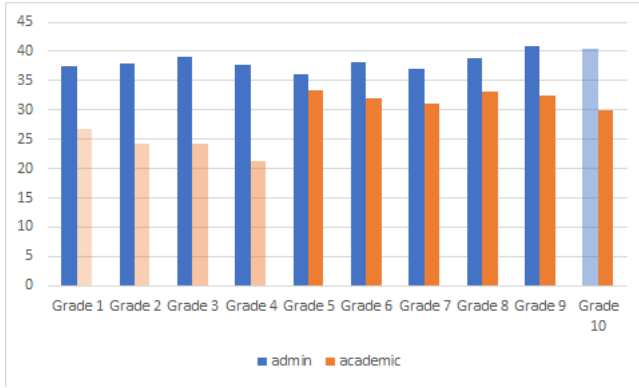
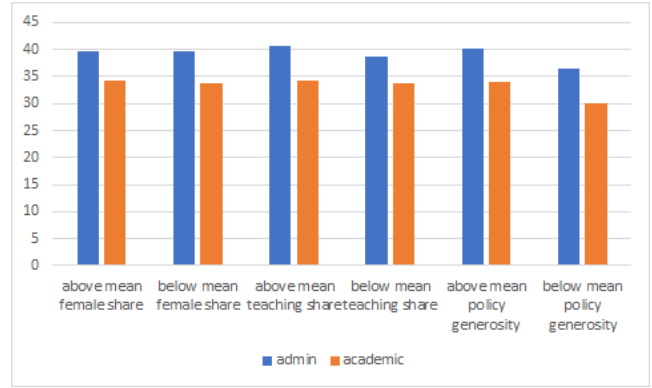


Figure 1: OPM policies in sample universities and average number of weeks taken within university



(a) Average length of leave taken by pay grade



(b) Average length of leave taken by employer characteristics

Figure 2: Heterogeneity of leave decisions

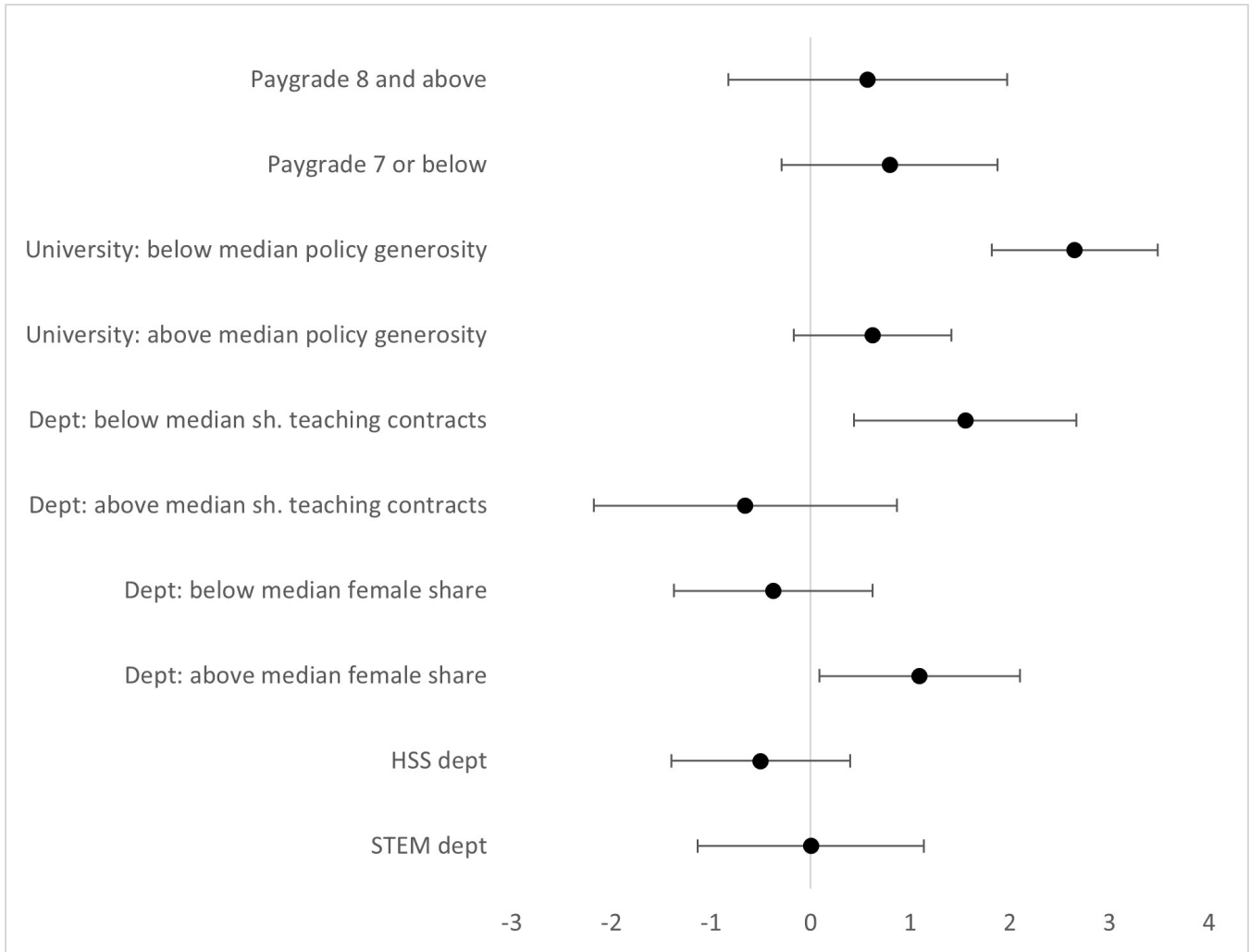


Figure 3: Heterogeneity results

Simulation results: Full pay equivalent

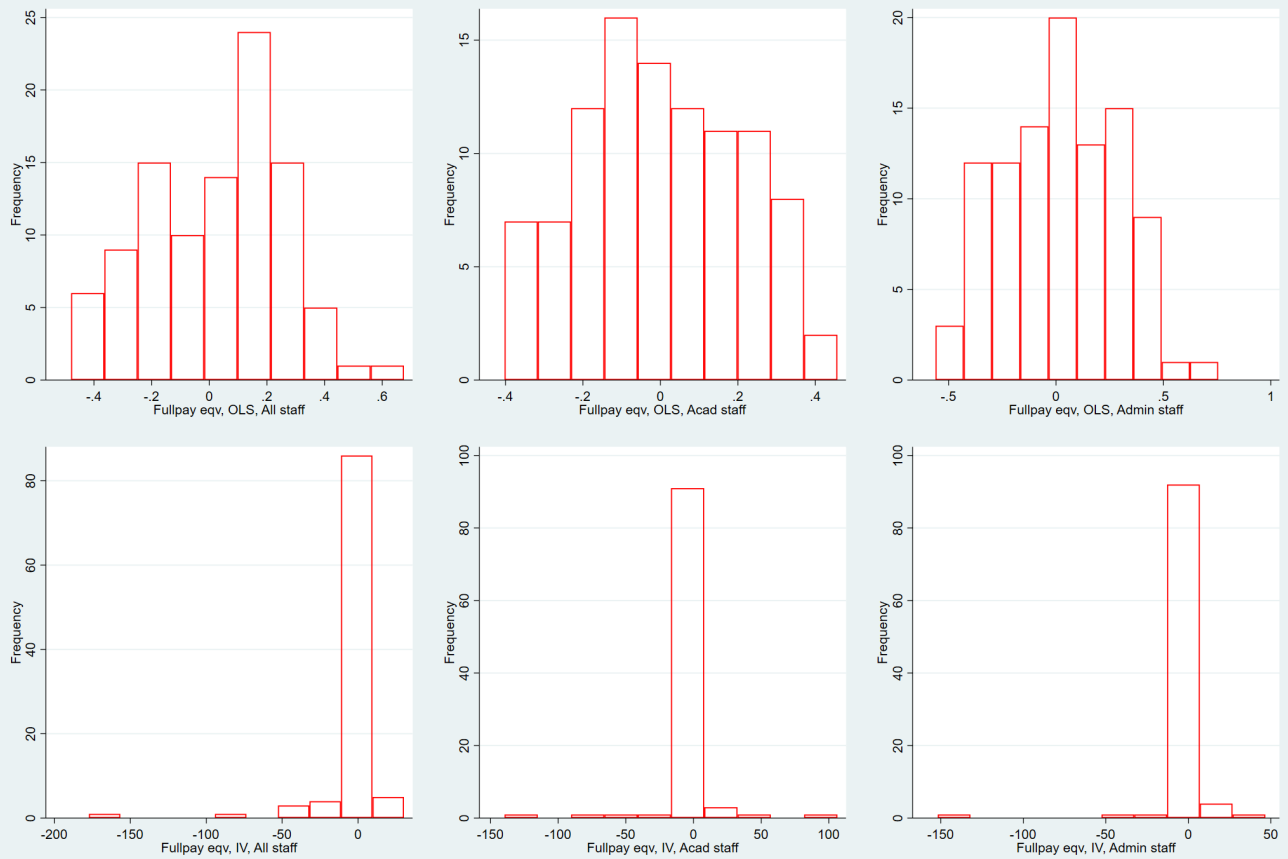


Figure 4: Simulation results: Full pay equivalent