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DISCUSSION PAPER SERIES

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ABSTRACT

Fathers Taking Leave: Evaluating the Impact of Shared Parental Leave in the UK*

We study the effect of the introduction in 2015 of UK Shared Parental Leave policy on the up-take and the length of leave taken by fathers. Using the UK Household Longitudinal Study and Regression Discontinuity in Time, we show that the reform has not affected uptake or length of parental leave reinforcing questions as to its effectiveness.

JEL Classification: D13, J08, J13, J18

Keywords: parental leave reform, Regression Discontinuity in Time, UK Household Longitudinal Study

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1 Introduction

Family-friendly policies can be important for addressing gender inequalities in the labour market but their design is crucial to success.[1] The UK ranks among the lowest across the OECD and EU countries in terms of the financial attractiveness of its family-friendly policies (Chzhen et al., 2019). Shared Parental Leave (SPL), introduced in the UK in April 2015, was designed to enable parents to share statutory paid leave, previously principally allocated to the mother (DBIS, 2013). Under this policy, eligible working parents could flexibly share 50 out of 52 weeks of leave between them in the first year after the child is born if the mother chooses to end her maternity leave early. Qualitative research points towards low take-up of this policy due to poor financial coverage and complicated regulations (Birkett and Forbes, 2019). However, no causal analysis of its effects has been undertaken. This paper fills this evidence gap. Focusing on take-up and the length of leave taken by fathers, we apply Regression Discontinuity in Time (RDiT) to UK Household Longitudinal Study (UKHLS) (ISER, 2023) data to consider the effect among those eligible as well as groups who might be expected to benefit disproportionately. We find no significant impact on leave take-up or length by fathers, overall and by most subgroups. This finding is robust to a range of sensitivity analyses and confirmed by analogous analyses conducted for mothers.

2 Background

Before 5th April 2015, working parents were entitled to 52 weeks of Statutory Maternity Leave (SML) and 2 weeks of Statutory Paternity Leave. In addition, fathers could request up to 26 weeks of Additional Paternity Leave (APL), once their child turned 20 weeks old and the mother returned to work. These entitlements came with Statutory Leave Pay of 90% of average weekly earnings in the first six weeks for mothers and then at £139.58 a week or 90% of average weekly earnings, whichever was lower.[2] The take-up of APL was low with under 1% of eligible fathers taking it in 2011/2012 (TUC, 2013).

SPL replaced APL and was seen as an improvement due to its flexible design. Up to 50 weeks of SPL are available to eligible couples in addition to Paternity Leave and at the expense of Maternity Leave. To be eligible for both leave and pay, parents must be continuously employed with the same employer for 41 weeks before the due date and each earn on average at least £123 a week in the 8-week qualifying period. SPL statutory payments mirrored those previously offered for APL. However, eligibility requirements have become tighter. Previously fathers had to be employed for the same length of time as in case of SPL but mothers simply needed to qualify at least for (less strict) statutory maternity allowance and have returned to work. Other features of the leave system

[1] See Olivetti and Petrongolo (2017) and Rossin-Slater (2018) for reviews of recent literature.

[2] The flat rate was equivalent of 52% of weekly earnings at national minimum wage.

remained unchanged.

The relatively low, flat-rate payments offered after the first 6 weeks of leave generated a system in which many employers offer enhanced policies, often topping up the payments to 100% in the first few weeks and then reducing them over time. No rigorous data on terms of these policies is collected but a survey by CIPD (2022) indicates that in 2016 only 49% of employers offered statutory payments and 24% provided 1 or 2 weeks of enhanced payments for paternity leave. In line with this 2018/2019 Management and Wellbeing Survey results show that 17% of surveyed companies offered maternity and paternity pay above the statutory minimum, and only 10% offered additional paternity leave, beyond statutory minimum. A higher percentage of large employers (with over 250 employees) offered longer and more generous leave (DBT, 2023a). It is implied that employers often do not match the enhanced pay for SPL with that for Maternity Leave.

3 Data

The UKHLS contains rich information on household structure, demographics and labour market situation of respondents and permits linkage of respondents, spouses and their children. We focus on the years 2010-2019 as 2010 is the first year of data for which leave details are available and to avoid confounding effects of COVID-19. We choose households with married or cohabiting, working parents (when the child was born and a year before) to approximate the policy eligibility. To preserve sample size, we consider all parents and control for the birth order of the child, recognising the potentially different effect for families with older children.[3]

Our variables of interest are 1) (self-reported) leave uptake by new fathers following the birth of a child and 2) the number of (calendar) days of leave taken, based on the start and end date of leave provided by respondents, conditional on having taken leave.[4]

Given that leave decisions are made at household level, our focus is on fathers.[5] Specifically, if the reform encouraged fathers who otherwise did not take leave to now share, we expect to see a change in take-up. If it encouraged those who would have already taken paternity leave to complement it with SPL, we will see a change in the leave length, conditional on uptake. Since SPL requires a trade-off with maternity leave, we would expect to see an analogous change in the length of leave taken by mothers and also in the respective shares of leave by each parent. We can

[3]The analysis repeated on a sub-sample of first-time parents leads to similar results but at an expense of sample size. The results are available upon request.

[4]Similarly to Gonzalez and Zoabi (2021), we do not observe the leave type (i.e., maternity, paternity or shared) so the length of leave taken may be a combination of entitlements.

[5]One of the reasons for focusing on fathers instead of mothers is the high number of missing dates for mothers' return from leave, which prevents us from determining the precise leave length. Specifically, many mothers were still on leave when being interviewed and hence provided a start date of leave but not an end date. This question was not repeated in the subsequent year. Because periods of fathers' leave are shorter, the proportion of missing values was much lower. The findings are, however, robust to using an imputed data for mothers (see Section 5).

only consider these using an imputed sample and therefore see them as complementary to the main results (see Section 5).

In Online Appendix Table A1 we present select demographic characteristics of parents with children born pre- and post-SPL roll-out captured a year before the child's birth. They are comparable on all dimensions, including the leave take-up. The differences in the leave length are not statistically significant. The distribution of outcome variables over time (Figure 1) shows some variation in the uptake and length of leave by fathers. There is no visible change in level or slope around the time of policy implementation.

4 RDiT design

Similar to Canaan (2022) who studies the effect of leave expansion in France on parents' labour market outcomes and Gonzalez and Zoabi (2021) who explore the heterogeneous effects of Spanish paternity leave reform, we apply RDiT around policy implementation and estimate the following equation:

$$Y_{it} = \alpha + \beta postSPL_t + \gamma R + \delta I[postSPL = 1] \times R + \lambda X_{it} + \epsilon_{it} \quad (1)$$

where Y_{it} is either a dummy variable equal to 1 if father *i* took leave or a number of calendar days of leave taken by father *i* in year *t*, $postSPL_t$ is a dummy variable equal to 1 if the child was born to eligible parents on or after the policy roll-out. R is the running variable (month of birth of the child normalised to 0 in April 2015).[6] The interaction term between R and $postSPL_t$ allows for trends in month-year of birth to be different. The vector X_{it} varies across specifications, but in the most comprehensive model, it includes characteristics that are likely determinants of fathers' leave, such as ethnicity, whether the respondent is UK-born, age, education and child's birth order.[7] β is the coefficient of interest and it captures the intent-to-treat (ITT) effects of leave eligibility. The key identifying assumption is that working (non-single) parents with children born before and after the cutoff should be otherwise comparable and other indicators are not affected by this reform.[8] In our baseline estimates, we use a donut approach around April and the local polynomial and triangular kernel, which assigns greater weights to the observations closer to the cutoff (Cattaneo et al., 2019).[9,10] We apply individual cross-sectional weights provided in UKHLS.

We undertake a power prediction exercise to gauge the sample size required to identify the policy effects, if any. We take the conservative approach and assume that 80% predictive power and

[6] The distribution of the running variable can be found in Online Appendix Figure A1.

[7] We estimate models with controls to ensure comparability of the control and treatment group, particularly given the wide bandwidth we apply. Analysis without covariates produces similar results and can be made available on request.

[8] We demonstrate continuity of the control variables at threshold in Online Appendix Table A2.

[9] The policy came into force on 5th April and we do not observe day of birth.

[10] We explore the sensitivity of our results to the methodological choices in Section 5.

5% statistical significance would be needed.[11] To choose hypothetical effect sizes to be obtained, we use scenarios considered by DBIS (2013) in pre-policy impact assessment. A sample of around 1,900 fathers would be needed to detect an 8% increase in uptake, and even larger one for smaller effects. We cannot reach that with the sample at hand, and hence our analysis is underpowered. However, a sample of about 700 would be sufficient to identify a 3 day increase in length of leave and a sample of around 200 would be enough for an effect of a week (See Online Appendix Figure A1). Given these considerations in our baseline we choose a bandwidth of 48-months, largest possible that does not overlap with roll-out of APL reform but also explore the sensitivity of our analysis to this choice. This guarantees sufficiently large sample sizes even when we focus on subgroups of parents.

5 Results

We present results of this analysis in Table 1, focusing on uptake of leave in Panel A and leave length (conditional on uptake) in Panel B. We find no significant effect on leave uptake or leave length for the sample as a whole (column (1)). This result is robust to changes in bandwidth, in kernels and placebo tests (see Online Appendix Tables A3 and A4).[12] Specifications where leave length beyond 10 or 14 calendar days or share of leave taken are used as dependent variables produce comparable results.[13] In Online Appendix Table B3 we show that focusing on mothers' outcomes or the length of leave taken by mothers as a proportion of the total leave taken by both parents does not change our conclusions.[14]

Gonzalez and Zoabi (2021) propose (and demonstrate for the case of Spanish paternity leave) that zero aggregate effects may hide significant impacts on marginal groups of couples. We consider this possibility for UK SPL. It was anticipated in the pre-policy assessment that fathers whose partner earns the same or more may be more likely to respond to the new rights (DBIS, 2013). In addition, responses to the 2019 Parental Rights Survey suggest that those taking SPL were often highly qualified and working in professional occupations. They also had better financial situation (DBT, 2023b). At the same time, a survey of employers (DBT, 2023a) revealed that larger employers had greater awareness of the policy and were more likely to offer enhanced pay packages for SPL, in line with the Maternity Leave, which would lessen the financial burden on new parents.

To explore whether there has been an effect for those more likely to benefit, we repeat the anal-

[11] We use *rdsampsi* Stata command.

[12] We explore the following falsification tests. First, we look at the effect of the APL policy roll-out in April 2011 (using the sample up until April 2015) as an alternative reform which may affect behaviour. Second, in a typical placebo type setting we simply move the policy cutoffs to years when no reforms took place (2016 onwards) to ensure we do not find an effect in non-event years.

[13] Available upon request.

[14] Missingness in the mothers' leave length information and the applied imputation methods are discussed in Online Appendix B.

ysis on sub-samples where the respondent graduated from university, both parents are university graduates, father is in a managerial or professional occupation, household's income is above the mean, and within-couple difference in labour income is below the mean. We also look at fathers working for employers with more than 200 or more than 500 employees. These results are in columns (2)-(9) of Table 1 and they indicate no effect on take-up for any of the subgroups considered (Panel A). There is no significant effect on fathers' leave uptake either, except for couples where both parents are university graduates, where there is weak evidence (significant at 10% level only) of a positive effect (Panel B).

6 Conclusion

Applying a RDiT to data from the UKHLS we find no evidence that the introduction of SPL in 2015 increased the take-up or length of leave among fathers. In this respect our evidence reinforces questions as to the effectiveness of SPL in the UK and suggests reform is required if it is to meet its aim of encouraging fathers to play a greater caring role in their child's first year.

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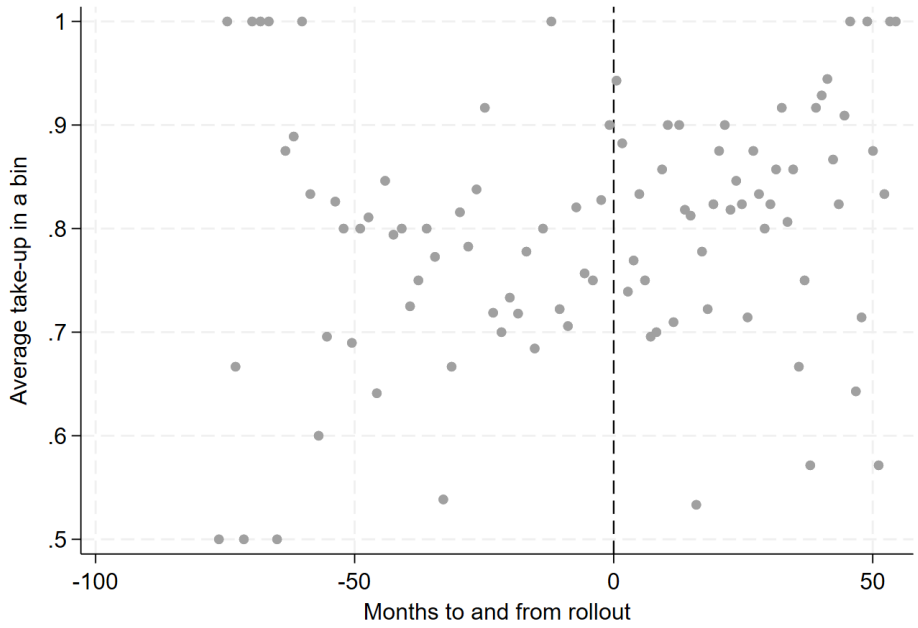
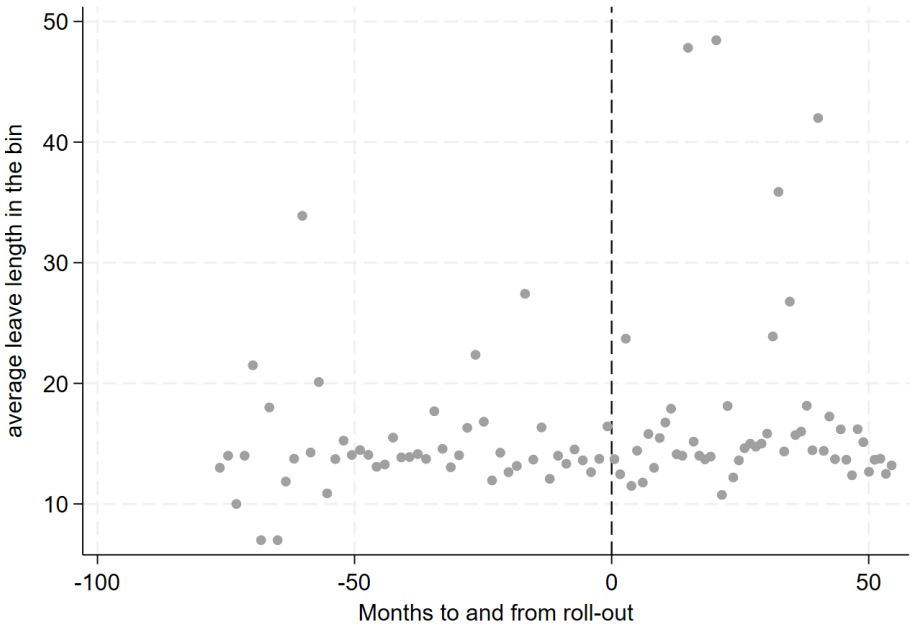
Table 1: The effect of SPL roll-out on uptake and leave length

	All fathers	Subsamples							
		Father university graduate	Both parents university graduate	Father managerial occupation	Father professional occupation	Household income above mean	Couple labour income difference below mean	Father's employer > 200 employees	Father's employer > 500 employees
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel A: Uptake									
RDiT Estimate	0.004	0.033	0.051	-0.120	0.138	0.012	0.027	-0.006	-0.065
	(0.059)	(0.082)	(0.099)	(0.126)	(0.087)	(0.060)	(0.107)	(0.058)	(0.097)
N	1367	727	489	317	595	1098	286	1535	350
Panel B: Leave length									
RDiT Estimate	-0.788	2.073	4.640*	2.649	2.060	0.371	-2.599	-0.898	-1.416
	(1.597)	(2.204)	(2.358)	(2.120)	(1.891)	(1.569)	(4.075)	(1.559)	(2.515)
N	1002	537	376	221	468	820	220	1103	280

Notes: 1 month donut, 48 month bandwidth, local polynomial approach with triangular kernel, specification includes controls. Column (1) presents estimates for all fathers included in the sample (baseline). Columns (2)-(9) present estimates for the sub-samples indicated by the respective column titles. Standard errors in parentheses. *** 1%, ** 5% , * 10% significance level.



(a) Uptake by fathers



(b) Leave length by fathers

Figure 1: Leave uptake and length around the 2015 reform.

Notes: Dots represent averages in a given bin. The dashed vertical line marks the cut-off on April 2015.

Online Appendix

Appendix A. Additional Tables and Figures

Table A1: Characteristics of mothers and fathers, pre- and post-SPL policy roll-out

	Mothers				Fathers			
	pre-SPL		post-SPL		pre-SPL		post-SPL	
Variable	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Outcome variables								
took leave	0.984	0.124	0.958	0.201	0.761	0.426	0.781	0.414
leave length (calendar days)	249.833	86.075	250.863	87.706	15.734	20.988	16.858	24.562
Individual characteristics								
white	0.905	0.293	0.91	0.286	0.881	0.323	0.869	0.337
UK-born	0.869	0.337	0.849	0.357	0.838	0.368	0.852	0.355
age	32.005	4.882	32.796	4.497	34.065	5.579	34.952	5.683
university	0.629	0.483	0.677	0.468	0.453	0.497	0.566	0.496
high school	0.101	0.301	0.087	0.282	0.132	0.339	0.141	0.348
usual work hours	29.198	9.869	29.387	9.771	39.112	7.320	38.723	7.402
Occupation								
managerial	0.135	0.342	0.143	0.351	0.218	0.413	0.26	0.439
professional	0.230	0.421	0.210	0.408	0.176	0.381	0.198	0.399
associate professional	0.215	0.411	0.229	0.420	0.162	0.368	0.187	0.390
administrative	0.143	0.350	0.140	0.347	0.064	0.246	0.028	0.166
skilled trade	0.076	0.264	0.084	0.279	0.146	0.353	0.113	0.317
caring	0.056	0.229	0.068	0.251	0.015	0.124	0.008	0.091
sales	0.082	0.274	0.064	0.244	0.041	0.199	0.049	0.216
plants	0.014	0.119	0.009	0.096	0.096	0.295	0.090	0.287
elementary	0.048	0.214	0.051	0.220	0.078	0.268	0.065	0.246
Partner characteristics								
white	0.813	0.389	0.726	0.446	0.853	0.354	0.828	0.378
UK-born	0.874	0.333	0.736	0.446	0.741	0.441	0.810	0.398
age	34.304	5.679	35.220	5.552	31.512	4.884	32.771	4.376
university	0.418	0.493	0.446	0.497	0.547	0.497	0.618	0.486
high school	0.111	0.315	0.121	0.327	0.097	0.297	0.091	0.287
usual work hours	39.582	7.296	38.649	5.891	28.880	9.787	29.102	9.686

Data: UKHLS, waves 2-12. Notes: Parents are considered to be eligible for this policy if they have been continuously employed since the interview a year prior to child appearing in the data and they are a couple. Mothers and fathers are classified as having a child pre-SPL if the child was born before April 2015 and post-SPL if the child was born in or after April 2015. For education levels the reference category are those with below high school education.

Table A2: Continuity of control variables at roll-out

	Birth order	Respondent is white	Respondent is UK-born	Respondent's age	Respondent graduated uni	Respondent graduated high school
RDiT Estimate	-0.046	0.020	-0.063	0.331	0.034	-0.022
	(0.097)	(0.027)	(0.046)	(0.524)	(0.058)	(0.032)
N	1733	1724	1678	1733	1521	1521

Data: UKHLS, waves 2-12. Notes: 1 month donut, 48 month bandwidth, local polynomial approach with triangular kernel. Standard errors in parentheses. *** 1%, ** 5% , * 10% significance level.

Table A3: Sensitivity analysis: different kernels and bandwidths

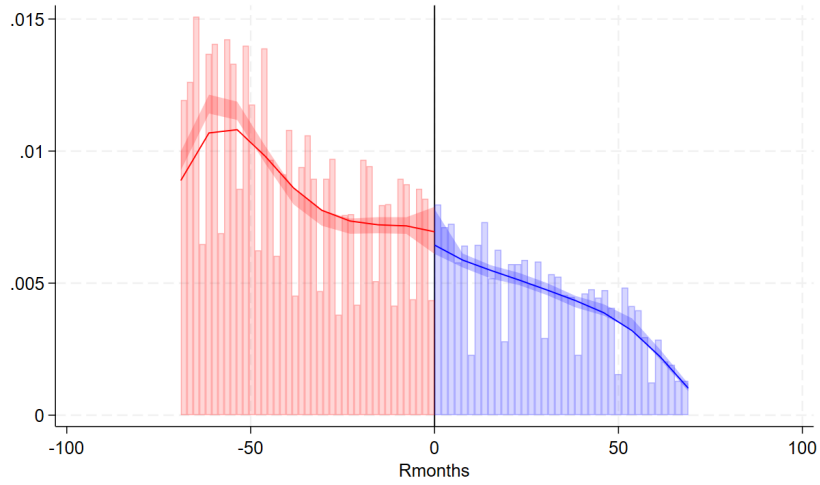
	Alternative kernels			Different bandwidths (months)						
	Uniform	EPA	Data-driven	36	30	25	20	15	12	9
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel A: Uptake										
RDiT Estimate	0.014	0.004	0.022	-0.002	-0.004	-0.008	0.011	0.022	0.041	0.072
	(0.055)	(0.058)	(0.098)	(0.067)	(0.073)	(0.079)	(0.086)	(0.097)	(0.105)	(0.113)
N	1412	1397	426	1070	889	731	592	426	345	258
Panel B: Leave length										
RDiT Estimate	-1.234	-0.922	-2.394	-0.177	-0.118	-0.626	-1.170	-2.274	-2.008	-1.990
	(2.198)	(1.899)	(1.662)	(1.141)	(1.112)	(1.536)	(1.923)	(1.641)	(1.683)	(2.005)
N	1011	1002	271	764	641	521	422	314	250	191

Notes: RDiT donut specification, regression with control variables. In col (1) uniform kernel and 48 month bandwidth is used. In col (2) Epanechnikov kernel and 48 month bandwidth is used. Triangular kernel and different bandwidths in col (3)-(10): (3) data-driven, (4) 36 months, (5) 30 months, (6) 25 months, (7) 20 months, (8) 15 months, (9) 12 months, (10) 9 months. Standard errors in parentheses. *** 1% , ** 5%, * 10% significance level.

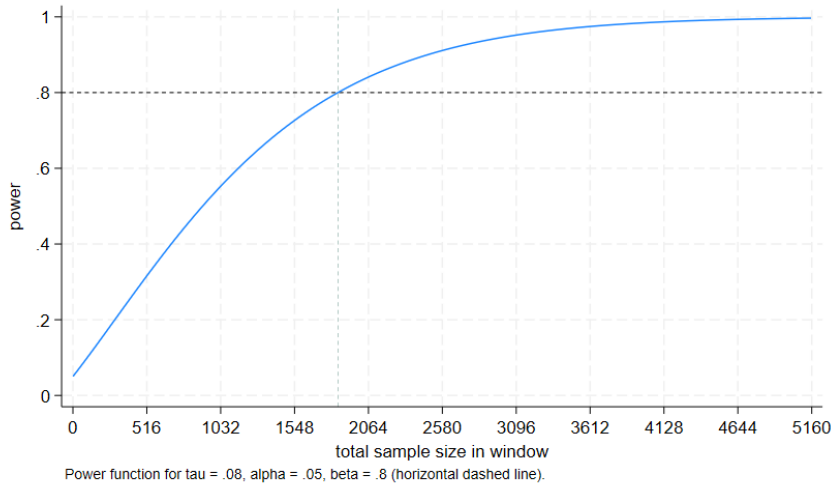
Table A4: Placebo exercise

	2015	2011	2016	2017	2018
	(1)	(2)	(3)	(4)	(5)
Panel A: Leave uptake					
RDiT Estimate	0.015	0.016	0.104	0.038	0.016
	(0.057)	(0.089)	(0.106)	(0.073)	(0.081)
N	1406	887	690	690	690
Panel B: Leave length					
RDiT Estimate	-0.814	1.887	3.175	-1.042	9.316
	(1.516)	(1.925)	(3.328)	(2.672)	(9.394)
N	1009	635	501	501	501

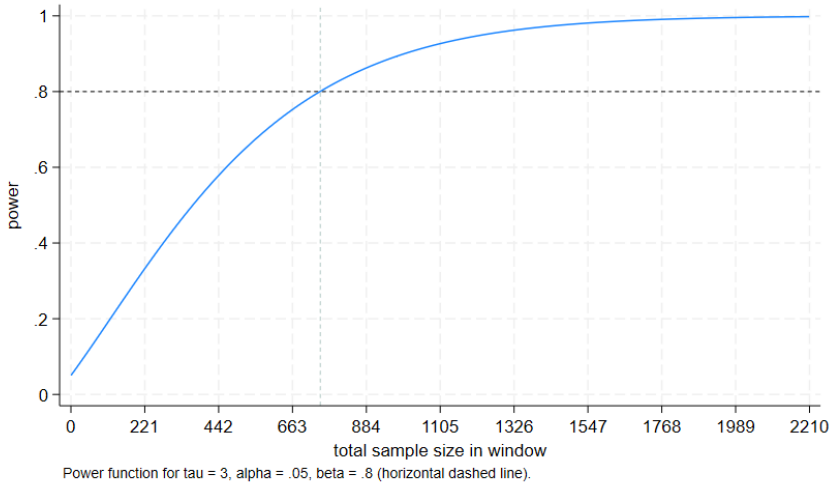
Notes: RDiT donut specification using triangular kernel, control variables and 48 month bandwidth. Baseline results are presented in column (1). In the remaining columns the reform date is now moved to April 2011, 2016, 2017 or 2018 (column (2), (3), (4) and (5), respectively). Standard errors in parentheses. *** 1% , ** 5%, * 10% significance level.



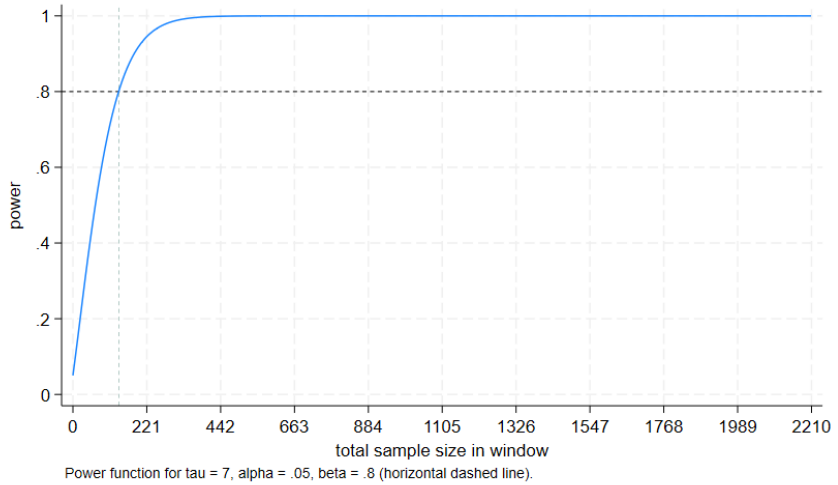
(a) Running variable



(b) Sample size needed: 8% increase in uptake by fathers



(c) Sample size needed: 3 day increase in fathers' leave length



(d) Sample size needed: 7 day increase in fathers' leave length

Figure A1: Distribution of the running variable and power prediction exercise (80% power and 5% statistical significance)

Appendix B. Uptake and length of leave by mothers

In this section we present complementary results for mothers, including uptake of leave, its length and number of days of leave taken as a fraction of the total number of days taken by both parents.

Although the uptake of leave and start date of leave information is available for all mothers, the end date of leave is missing for over 60% of mothers in the sample, which prevents us from determining the precise leave length. Although it is not possible to identify the exact reason for the absence of end date of leave information, it is most likely due to the fact that these mothers were still on leave at the point of interview and were not asked again about the details of their leave in the following wave of the survey.

To understand whether there is a non-random selection (on observable characteristics) of mothers with missing information, we compare the mothers for whom we have full details of leave and those with missing end date information on a number of personal characteristics (see Table B1) and do not find evidence of differences between these two groups.

Nonetheless, the resultant sample size limits the usability of the data. This limitation is one of the reasons why we focus on fathers in the main analysis. Nevertheless, to complement the results for fathers, we have imputed the length of leave information for mothers. For this purpose, we take two approaches to data imputation:

1. Unconditional mean imputation, by assigning the sample average to missing cases.

2. Multiple imputation with multivariate normal distribution (using Stata *MI* command). In multiple imputation the distribution of the observed data is used to estimate multiple values that reflect the uncertainty around the true value. These values are then used in the analysis of interest, such as in an Ordinary Least Squares model, and the results combined. We impute the length of leave by respondent and the length of leave by the spouse, using 5 iterations (i.e. 5 alternative data sets created and used in subsequent analysis). This approach relies on Markov Chain Monte Carlo procedures which assume that all the variables in the imputation model have a joint multivariate normal distribution. The data augmentation algorithm fills in missing data by drawing from a conditional distribution, in this case a multivariate normal, of the missing data given the observed data. We then construct the share of leave variable using the imputed length of leave variables.

Means of the imputed variables can be found in Table B2. Using the imputed data for mothers from these two approaches, we then mirror the analysis for fathers. The regression specification is as in Equation 1 with three different dependent variables: uptake of leave by mothers, leave length (conditional on uptake, imputed) and share of leave (i.e. the number of days the mother took as a fraction of the total days parents took, imputed). The RDiT results on the sample of mothers can be found in Table B3.

Table B1: Characteristics of leave-taking mothers, with varying degree of leave information

	full leave info		no end date		no start date or end date	
Variable	Mean	SD	Mean	SD	Mean	SD
Individual characteristics						
white	0.860	0.348	0.871	0.335	0.873	0.335
UK-born	0.860	0.347	0.854	0.354	0.870	0.338
age	32.459	4.859	32.403	4.729	30.814	5.666
university	0.643	0.480	0.656	0.475	0.505	0.503
high school	0.096	0.294	0.103	0.304	0.141	0.350
works part time	0.449	0.498	0.339	0.474	0.448	0.500
works full time	0.551	0.498	0.661	0.474	0.552	0.500
usual work hours	28.404	9.898	30.463	9.370	27.558	10.809
Occupation						
managerial	0.117	0.321	0.139	0.346	0.136	0.344
professional	0.276	0.447	0.215	0.411	0.110	0.314
associate professional	0.201	0.401	0.246	0.431	0.169	0.377
administrative	0.131	0.337	0.149	0.356	0.136	0.344
skilled trade	0.075	0.264	0.079	0.270	0.136	0.344
caring	0.058	0.233	0.060	0.238	0.093	0.292
sales	0.077	0.266	0.067	0.250	0.102	0.304
plants	0.015	0.123	0.007	0.083	0.017	0.130
elementary	0.051	0.219	0.037	0.189	0.102	0.304
Partner characteristics						
white	0.770	0.421	0.731	0.444	0.684	0.467
age	34.815	5.722	34.849	5.721	32.208	6.303
university	0.426	0.495	0.409	0.492	0.352	0.480
high school	0.086	0.281	0.114	0.319	0.093	0.291
usual work hours	38.845	7.522	39.359	6.557	38.981	6.519

Data: UKHLS, waves 2-12. Notes: We compare characteristics of three groups of *new mothers* who took leave: those for whom we observe start and end date of leave, those for whom we only observe the start date and those for whom we do not see start or end date (but who report having taken leave).

Table B2: Means of imputed variables

	Imputation 1	Imputation 2
Mother's leave length	251.288	250.829
	(49.384)	(3.615)
N	2414	2414
Mother's share of leave	0.937	0.997
	(0.071)	(0.167)
N	2414	2414

Data: UKHLS, waves 2-12. Notes: The length of leave taken by mothers & spouses was imputed in case of missings. Imputation 1 is based on assignment of group average. Imputation 2 is based on multiple imputation with multivariate normal distribution. Mother's share of leave is defined as the number of calendar days of leave taken by the mother as a fraction of the total number of calendar days of leave taken by both parents.

Table B3: The effect of SPL policy roll-out on mothers

	Uptake	Length Impute 1	Length Impute 2	Leave share Impute 1	Leave share Impute 2
	(1)	(2)	(3)	(4)	(5)
RDiT Estimate	-0.001	-2.892	1.375	-0.001	0.037
	(0.019)	(8.214)	(12.088)	(0.007)	(0.179)
N	1967	1967	1967	1967	1967

Notes: RDiT donut specification using triangular kernel and a bandwidth of 48 months. The dependent variable in col (1): whether respondent took leave, col (2)-(3) number of calendar days of leave taken, col (4)-(5) length of leave taken as a share of the overall leave taken by both parents. Data used in analysis in columns (2)-(5) imputed, following imputation methods 1 and 2, outlined in the text. Standard errors in parentheses. *** 1% , ** 5%, * 10% significance level.