PARENTAL LEAVE POLICIES: ECONOMETRIC ANALYSIS REPORT

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June 2023

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1. Introduction

There has been a steady increase in the number of countries providing government funded parental leave over the last 50 years. By 2013, all OECD countries, except for the USA, had state-funded programmes that generally offered high earnings replacement and employment protection to mothers who were working prior to giving birth. A more recent trend has been the significant increase in the duration of parental leave, with many countries extending the length of time that mothers can be on paid leave after childbirth.

The main premise for paid parental leave is the important social and economic goals that are addressed by state parental leave programmes. These goals include: (i) enhancing child development (through greater parental time investment); (ii) promoting gender equality (through higher maternal employment); (iii) facilitating family and career compatibility (through encouraging fertility); and (iv) the protection and advancement of mothers' labour market outcomes (through retention of human capital, higher wages, and career continuity).

However, despite these social and economic arguments in favour of paid parental leave, the empirical evidence on the impact of parental leave schemes is mixed, and many key questions remain unanswered. Central to the policy debate on parental leave provision is the impact of paid leave on labour market outcomes; most especially, the impact of parental leave entitlement on mothers' labour supply. Theoretically, job protected leave can increase the time that mothers spend at home with their infants, while increasing the likelihood that they will return to the pre-birth employer. So, paid leave can encourage mothers to return to the workforce instead of permanently quitting in order to care for their child, as well as encourage mothers to return to their full-time pre-birth job instead of switching to part-time employment.

However, paid parental leave policies are not without controversy, and evidence from a range of high- and low-income countries demonstrates that parental leave expansions may have little effect on parental earnings and participation in the labour market; they may exacerbate gender inequality in care-giving; they may have negative redistribution properties through larger transfers to families with higher earnings, thus benefiting the highly educated and middle-class; and they may negatively affect female employment and

wages. Thus, despite the increasing prevalence of parental leave policies, the available research does not conclusively indicate how these policies have influenced the leave-taking of parents, or whether they have been successful in achieving the social and economic goals that motivate them.

1.1 Policy context and relevance

The context for this research is the Department for the Economy's vision for the Northern Irish economy, as set out in its '10X Economy' Economic Vision, which provides guiding principles on how to make the Northern Irish economy more innovative, inclusive, and sustainable by 2030. This research specifically speaks into the need to make the NI economy more inclusive and sustainable by focusing on the key issue of female labour market participation. Northern Ireland faces challenging levels of labour market inactivity, and women comprise the majority of those in NI who are economically inactive: in 2019, 58.2% of those inactive were women, with 'home/family' reasons accounting for 34.7% of this inactivity by women (NISRA Topic Paper). In addition, female employment levels and employment growth in NI lag behind overall UK levels. If parental leave policies are an effective policy tool in promoting greater female labour market participation, then the possible economic benefits for the Northern Irish economy include: (i) increased female labour market participation (since reduced female labour market participation constitutes foregone GDP growth); (ii) enabling women to return to work sooner, thus reducing the negative impact of childbearing on women's careers; (iii) reducing the burden of childcare on women; and therefore (iii) promoting greater within-family gender equality in labour market attachment. All these perceived benefits align with the 10X Economy Vision for inclusive and sustainable growth.

This project speaks into the gap in current knowledge regarding the impact of parental leave in the UK. Specifically, it will assess the relationship between parental leave and key demographic characteristics and labour market outcomes. The aim of this report is to investigate the following:

1. What personal and labour market characteristics influence leave-taking?
2. What personal and labour market characteristics influence the length of leave?
3. What influences mothers' employment status after leave?

4. How has parental leave impacted on earnings as a key labour market outcome?

These questions will be addressed through the use of appropriate regression analysis techniques using the UK household longitudinal survey, Understanding Society.

2. Data

The data used for the econometric analysis is from 'Understanding Society', which is the UK Household Longitudinal Study (UKHLS)[1] that builds on the British Household Panel Survey (BHPS). The UKHLS is a longitudinal study of approximately 40,000 households in the United Kingdom (England, Scotland, Wales, and Northern Ireland), with former participants of the British Household Panel Survey (BHPS) as part of Understanding Society from Wave 2. Data is available for 12 waves, from 2009 to 2021, with each wave consisting of a 24-monthly sample with participants interviewed face-to-face at regular 1-year intervals. The main benefit of the UKHLS is that it provides detailed information about individuals' socio-demographic and personal characteristics, educational achievement, employment status, household structure, other objective and subjective measures about health and satisfaction with life, and questions regarding beliefs and values. The UKHLS study asks questions about maternity and paternity leave periods, but not specifically on shared parental leave as implemented by the 2015 SPL policy. From Wave 13 of UKHLS (available from November 2023) more comprehensive parental leave, including information on shared parental leave, will be included.

This study uses 10 consecutive waves of the UKHLS, covering more than a decade (2010 to 2021), to explore the main factors influencing leave-taking behaviour in the UK, and the impact that leave has on wages (as a key labour market outcome).

[1] Institute for Social and Economic Research. (2022). Understanding Society: Waves 1-12, 2009-2021 and Harmonised BHPS: Waves 1-18, 1991-2009, User Guide, 14 November 2022, Colchester: University of Essex.

3. Methodology

The first research task is to model the likelihood that a parent takes parental leave. The aim is to identify which personal and labour market characteristics are most associated with parental leave-taking. For this, we adopt a probit model specification that estimates the association between these variables and the probability of taking leave. We further run separate probit models for mothers and fathers since their expected employment and leave-taking behaviours are likely to differ dramatically:

$$Prob(\text{leave}) = F(\beta_0 age_i + \beta_1 gender + \beta_2 education + \beta_3 marital\ status + \beta_4 sector + \beta_5 area + \beta_6 pay + \beta_7 managerial\ duties)$$

where the dependent variable 'leave-taking' is defined as a binary dummy variable that takes the value of 1 if the individual took parental leave, and 0 if the individual did not take leave. Age is measured in years; and gender is defined as a binary dummy variable with a value of 1 for male and a value of 0 for female. Education is classified into five groups (higher education; diploma or equivalent; A level or equivalent; GCSE or equivalent; none of the above); area denotes whether the individual lives in a rural or urban environment; sector represents the sector of employment (public sector; central/local government/armed forces; health institution/NHS; charity/other; or private sector). The gross pay variable is also categorised into seven income groups (of £500 increments); and the managerial duties variable is included as an indicator or proxy for labour market seniority or occupational status (manager; foreman/supervisor; not manager or supervisor).

The second research objective is to model the factors that influence the duration of leave-taking. To examine the determinants of leave length, we estimate two specifications. First, we run an OLS model where the dependent variable is the number of weeks that an individual took leave, and we regress this on a range of personal and labour market characteristics (alternating between pay, managerial duties and sector):

$$Length\ of\ leave = F(\beta_0 age_i + \beta_1 gender + \beta_2 education + \beta_3 marital\ status + \beta_4 area + \beta_5 pay\ \ or\ sector\ or\ managerial\ duties)$$

Second, we specify a probit model where the dependent variable is a binary dummy variable that takes the value of 1 if the mother took leave of 39 weeks or more and a value of 0 if the leave was less than 39 weeks in length. This specification is to identify those mothers who are more likely to take unpaid maternity leave after the period of paid maternity leave has ended. In Northern Ireland, statutory maternity leave is paid for a maximum period of 39 weeks. This probit model will therefore seek to identify those mothers who are more likely to extend maternity leave past the point of receiving maternity pay:

$$Prob\ (unpaid\ leave) = F(\beta_0 age_i + \beta_1 education + \beta_2 marital\ status + \beta_3 sector + \beta_4 area + \beta_5 pay\ or\ sector\ or\ managerial\ duties)$$

The third research objective is to investigate the factors that affect the decision to switch from full-time employment pre-birth to part-time employment post-leave. In the UK, one very common strategy to combine work with childcare responsibilities is through part-time employment. To explore this, we estimate the probability that an individual will transition from full-time employment to part-time employment after leave:

$$Prob\ (FT\ to\ PT) = F(\beta_0 age_i + \beta_1 gender + \beta_2 education + \beta_3 marital\ status + \beta_4 sector + \beta_5 area + \beta_6 pay)$$

The fourth research question is to investigate whether parental leave has any effect on parent's pay. This is a key labour market outcome, and there is no consensus in the theoretical and empirical literatures on how parental leave affects the wages of those who take leave. To explore whether parental leave has any effect on parent's pay, we estimate a wage equation that relates an individual's pay to a range of personal and labour market characteristics:

$$Gross\ Pay = F(\beta_0 age_i + \beta_1 gender + \beta_2 education + \beta_3 marital\ status + \beta_4 sector + \beta_5 area + \beta_6 leave)$$

The wage equation is further estimated for men and women separately, as we might expect parental leave to affect mothers and fathers differently (given the differences in the length of parental leave entitlements). We also investigate whether longer leave periods are detrimental to mothers' pay. One of the few areas in the literature where consensus exists is the common finding that longer leave periods are associated with substantial wage reductions for women.

4. Results

4.1 The determinants of leave-taking

Table 1 shows the results for the probit model to investigate the determinants of parental leave-taking. The first specification (in column 1) focuses on personal and human capital characteristics. As expected, women are more likely to take parental leave compared to men, and those who are married have higher probabilities of taking parental leave compared to those who are single. The probability of taking leave increases with education level, so that those who have higher levels of education are more likely to take parental leave.

The second model specification (in column 2) includes the sector of employment to investigate whether this key employment characteristic influences the probability of taking parental leave. The results point to higher leave-taking probabilities amongst parents who are employed in government (whether central or local) and in health institutions/NHS. In contrast, being employed in a national or public company or in a higher educational institution does not influence leave-taking behaviour compared to being employed in the private sector.

Column 3 controls for the impact of pay on parental leave-taking, but the results suggest that individual pay has a limited effect on the decision to take parental leave. It is only the highest earning parents (gross monthly pay above £4,000) who are more likely to take parental leave compared to lower earning individuals.

Lastly, column 4 includes an explanatory variable that captures whether a person's job entails managerial or supervisory responsibilities (as an indicator of occupational status). This variable is included to test whether parents with managerial level duties in their current job are less likely to take time out of the labour market through parental leave. The results suggest that having a job with managerial or supervisory responsibilities does not hinder parents from taking parental leave.

Table 1. The probability of taking maternity or paternity leave.

	Model (1)	Model (2)	Model (3)	Model (4)
Sex				
Women	0.978***	0.930***	1.101***	0.984***
	(0.066)	(0.067)	(0.081)	(0.066)
Age group				
25-29	0.010	0	-0.035	0
	(0.144)	(0.142)	(0.145)	(0.144)
30-34	0.125	0.098	0.045	0.115
	(0.139)	(0.138)	(0.142)	(0.14)
35-39	0.103	0.081	0.019	0.092
	(0.142)	(0.14)	(0.144)	(0.142)
40-44	0.042	0.006	-0.058	0.032
	(0.155)	(0.154)	(0.158)	(0.156)
45+	-0.344	-0.369**	-0.451**	-0.347
	(0.187)	(0.188)	(0.189)	(0.188)
Marital Status				
Married/equiv.	0.452**	0.446**	0.437**	0.440**
	(0.158)	(0.162)	(0.157)	(0.158)
Sep/Div./Wid.	-0.189	-0.253	-0.196	-0.193
	(0.300)	(0.312)	(0.303)	(0.302)
Education				
Diploma/equiv.	-0.152	-0.129	-0.106	-0.153
	(0.095)	(0.097)	(0.097)	(0.095)
A level/equiv.	-0.209**	-0.174	-0.153	-0.193**
	(0.089)	(0.09)	(0.091)	(0.09)
GCSE/equiv.	-0.148**	-0.087	-0.058	-0.137
	(0.07)	(0.072)	(0.075)	(0.072)
None of the above	-0.353***	-0.311***	-0.275**	-0.348***
	(0.085)	(0.086)	(0.087)	(0.086)
Area				
Rural area	0.106	0.086	0.079	0.103
	(0.069)	(0.069)	(0.069)	(0.069)
Sector				
Public/nat. company		0.260		
		(0.284)		
Central/local govt /armed forces		0.427***		
		(0.088)		

	Model (1)	Model (2)	Model (3)	Model (4)
University/other education		0.169 (0.204)		
Health inst. /NHS		0.269** (0.127)		
Charity/other		0.104 (0.135)		
Gross pay per month (£)				
501-1000			0.045 (0.129)	
1001-1500			0.033 (0.134)	
1501-2000			0.220 (0.141)	
2001-2500			0.240 (0.143)	
2501-3000			0.259 (0.151)	
3001-3500			0.231 (0.159)	
3501-4000			0.300 (0.174)	
4001+			0.531*** (0.162)	
Managerial duties				
Foreman/supervisor				0.118 (0.085)
Not Manager or supervisor				-0.046 (0.066)
Constant	0.361 (0.209)	0.297 (0.21)	0.173 (0.24)	0.382 (0.217)
Number of obs.	3,841	3,841	3,841	3,841

Table 2 reports the results for the probit models estimated for men and women separately. These gender-specific models allow us to explore whether the determinants of leave-taking differ across men and women.

For men, the key factors influencing parental leave-taking are marital status, sector of employment, and pay. Married men have higher probabilities of taking leave compared to single men; and, interestingly, the effect of marital status on taking leave is much larger for men than for women. Being a government employee increases the likelihood of a

father taking leave, as does being employed in a health institution/NHS (relative to private sector employees).

One very interesting finding is that pay matters for whether fathers take parental leave, with the probability of taking leave increasing with gross pay. Our analysis provides an opportunity to test an unresolved issue in the theoretical and empirical literatures. The effect of pay on fathers' leave-taking is ambiguous, given that it can be theorised to impact leave-taking either positively or negatively. One argument is that higher income represents a higher opportunity cost, so fathers with higher pay face higher opportunity costs of taking time out of work, thereby reducing the probability of taking parental leave. Alternatively, if increased work-related income is a result of job promotions to higher and more stable positions in the workplace, then fathers may be more likely to take parental leave once their careers have reached a relatively stable place, thereby having a positive effect on taking parental leave. The positive relationship between gross pay and leave-taking shown in Table 2 (Column 1) therefore supports the argument that men are more likely to take leave when they reach a point of career stability.

For women, only age and marital status are important in the probability of taking leave. Older women (those women aged over 45 years) are less likely to take leave, and we find the usual, expected result for married women having higher probabilities of taking maternity leave. The lack of significance for pay for women is interesting as it implies that higher pay (and greater career stability) is not an important determinant of taking leave for women, as it is for men.

Table 2. The probability of taking maternity or paternity leave by gender.

	Men (1)	**Women (2)**	**Men (3)**	**Women (4)**	**Men (5)**	**Women (6)**
Age group						
25-29	-0.098	0.074	0.082	0.023	0.029	0.017
	(0.211)	(0.216)	(0.207)	(0.214)	(0.206)	(0.215)
30-34	-0.042	0.247	0.159	0.185	0.131	0.176
	(0.207)	(0.211)	(0.202)	(0.205)	(0.202)	(0.207)
35-39	-0.043	0.214	0.143	0.148	0.110	0.118
	(0.208)	(0.22)	(0.203)	(0.216)	(0.203)	(0.216)

	Men (1)	Women (2)	Men (3)	Women (4)	Men (5)	Women (6)
40-44	-0.057	-0.169	0.147	-0.238	0.126	-0.256
	(0.218)	(0.252)	(0.212)	(0.245)	(0.213)	(0.249)
45+	-0.307	-1.375***	-0.074	-1.444***	-0.123	-1.400***
	(0.242)	(0.372)	(0.236)	(0.359)	(0.235)	(0.356)
Marital Status						
Married/equiv.	1.475**	0.405**	1.649**	0.412**	1.612**	0.378**
	(0.59)	(0.179)	(0.642)	(0.182)	(0.607)	(0.180)
Sep/Div./Wid.		-0.014		-0.041		-0.055
		(0.327)		(0.328)		(0.325)
Education						
Diploma/equiv.	-0.159	-0.068	-0.178	-0.069	-0.207	-0.066
	(0.118)	(0.171)	(0.118)	(0.168)	(0.115)	(0.167)
A level/equiv.	-0.185	-0.211	-0.201	-0.141	-0.231**	-0.132
	(0.107)	(0.186)	(0.105)	(0.182)	(0.104)	(0.181)
GCSE/equiv.	-0.126	0.072	-0.150	0.132	-0.240**	0.163
	(0.089)	(0.150)	(0.085)	(0.14)	(0.085)	(0.140)
None of the above	-0.324***	-0.079	-0.382***	-0.018	-0.442***	-0.025
	(0.101)	(0.196)	(0.099)	(0.193)	(0.099)	(0.197)
Area						
Rural area	0.077	0.03	0.104	0.015	0.135	0.012
	(0.082)	(0.130)	(0.081)	(0.131)	(0.080)	(0.133)
Sector						
Public/nat. company			0.193			
			(0.315)			
Central/local govt /armed forces			0.605***	0.150		
			(0.111)	(0.141)		
University/other education			0.297	-0.006		
			(0.268)	(0.297)		
Health inst. /NHS			0.574**	0.113		
			(0.203)	(0.166)		
Charity/other			0.152	-0.022		
			(0.165)	(0.222)		
Gross pay per month						
501-1000	0.170	0.003				
	(0.268)	(0.18)				
1001-1500	0.482	-0.163				
	(0.251)	(0.193)				
1501-2000	0.743**	-0.250				
	(0.248)	(0.211)				
2001-2500	0.681**	0.029				
	(0.249)	(0.255)				
2501-3000	0.741**	-0.160				
	(0.254)	(0.249)				
3001-3500	0.680**	-0.092				
	(0.259)	(0.312)				
3501-4000	0.672**					
	(0.27)					

	Men (1)	Women (2)	Men (3)	Women (4)	Men (5)	Women (6)
4001+	1.006*** (0.257)	-0.277 (0.321)				
Managerial duties						
Foreman/supervisor					0.169 (0.097)	-0.067 (0.193)
Not Manager or supervisor					0.034 (0.075)	-0.290 (0.156)
Constant	-1.211 (0.625)	1.356*** (0.29)	-0.985 (0.662)	1.258*** (0.261)	-0.830 (0.628)	1.540*** (0.290)
Number of obs.	1,979	1,814	1,979	1,846	1,979	1,861

4.2 The determinants of leave duration

Arguably, the main topic of debate around parental leave, in the literature and in policy making, is the length of parental leave. In particular, the empirical evidence from Europe has typically found that leave duration has a crucial influence on subsequent labour market outcomes. It is therefore important to try and understand what influences the length of leave that is taken by parents.

Table 3 shows the results of our regression models that explore the factors that affect leave duration. As expected due to statutory entitlements, women take longer leave than men. In addition, married parents take longer leave than single parents, and leave duration does not depend on education level. The length of parental leave does, however, vary with gross pay. As pay increases, the length of parental leave decreases. This can be explained by interpreting wages as the opportunity cost of taking time out of work to look after the child. Therefore, parents with higher pay will choose to take shorter leave periods.

Column 4 (of Table 3) shows the results for the probability of a mother taking leave past the 39 weeks leave that are paid. Married mothers are more likely to take unpaid work beyond the paid period compared to single mothers, perhaps reflecting the greater financial security in households with two parents. Mothers' pay is also important here, as higher earning mothers are less likely to take unpaid leave beyond the paid 39 weeks. This supports the argument in the literature that high-skilled wages are more likely to decrease

substantially due to the depreciation of human capital during parental leave, and therefore women with high-skilled, high-paid jobs are less likely to take longer leave periods. For these women, the opportunity cost of taking time out of work will also be higher, implying faster returns to work.

Table 3. Duration of maternity or paternity leave.

	(1)	(2)	(3)	(4)
Sex				
Women	32.34***	33.426***	33.446***	
	(0.586)	(0.538)	(0.526)	
Age group				
25-29	1.525	0.667	0.738	0.072
	(1.107)	(1.110)	(1.102)	(0.240)
30-34	2.162**	1.065	1.173	0.069
	(1.086)	(1.077)	(1.072)	(0.232)
35-39	1.193	0.080	0.175	0.061
	(1.091)	(1.091)	(1.087)	(0.242)
40-44	1.999	0.658	0.841	-0.246
	(1.096)	(1.093)	(1.089)	(0.304)
45+	2.234	1.062	1.078	0.752
	(1.172)	(1.153)	(1.148)	(0.904)
Marital Status				
Married/equiv.	5.422**	5.026**	5.161**	0.521**
	(2.159)	(2.170)	(2.136)	(0.257)
Sep/Div./Wid.	2.198	1.951	1.908	0.488
	(5.257)	(5.653)	(5.589)	(0.498)
Education				
Diploma/equiv.	0.002	0.454	0.544	-0.186
	(0.666)	(0.661)	(0.657)	(0.181)
A level/equiv.	-0.068	0.467	0.319	-0.065
	(0.478)	(0.462)	(0.461)	(0.205)
GCSE/equiv.	-0.614	0.256	0.124	-0.301
	(0.417)	(0.386)	(0.386)	(0.157)
None of the above	0.542	1.080	1.100	-0.069
	(0.571)	(0.568)	(0.573)	(0.205)
Area				
Rural area	-0.066	-0.249		0.064
	(0.378)	(0.380)		(0.137)
Sector				
Public/nat. company		1.934		
		(2.535)		
Central/local govt /armed forces		0.265		
		(0.434)		
University/other education		-2.139		
		(1.336)		

	(1)	(2)	(3)	(4)
Health inst. /NHS		1.060 (0.751)		
Charity/other		0.4040 (1.031)		
Gross pay per month				
501-1000	-3.496** (1.289)			-0.209 (0.191)
1001-1500	-4.056*** (1.174)			-0.302 (0.201)
1501-2000	-4.803*** (1.177)			-0.270 (0.228)
2001-2500	-5.022*** (1.173)			-0.549** (0.251)
2501-3000	-5.804*** (1.215)			-0.715** (0.27)
3001-3500	-5.821*** (1.21)			-0.846** (0.292)
3501-4000	-5.996*** (1.248)			-1.036** (0.393)
4001+	-5.882*** (1.169)			-0.802** (0.348)
Managerial duties				-0.492 (0.351)
Foreman/supervisor			-0.731 (0.480)	
Not Manager or supervisor			0.512 (0.375)	
Constant	0.229 (2.814)	-3.929 (2.501)	-4.164 (0.2494)	-0.492 (0.351)
Number of obs.	2051	2051	2051	592
R squared	0.82	0.81	0.81	

Notes: (1), (2), (3) Number of weeks of maternity/paternity leave taken (continuous variable); (4) Probit model with number of weeks below and above 39 weeks (women only);

4.3 The determinants of changes in employment status

One of the main arguments in support of parental leave programmes is that it promotes labour market attachment after childbirth, especially for mothers. In the UK, a common way for women to combine employment with childcare is through part-time employment. However, women who switch from full-time employment to part-time employment after having a child are more likely to experience diminished labour market outcomes in the form of occupational downgrading, lower occupation mobility in the future, lower future earnings and lower job security. Thus, women often face a penalty

for switching to part-time employment upon return to the labour market after having children.

Table 4 shows the results from the probit model that estimates the probability of a parent switching from full-time employment to part-time employment after leave. From Column 1, women are more likely to switch from full-time to part-time employment compared to men. This is not surprising given the UK is more typical of the male breadwinner model, where women still bear the majority of family caring responsibilities. For women, older mothers are less likely to switch to part-time employment on return to the workforce. One possible explanation of this finding is that older mothers may be more established in their careers prior to having a family, and therefore they are more likely to return to their pre-birth position in terms of occupational status and career stability.

Table 4 also reveals that parents who earn between £500 – 2,000 per month are more likely to switch to part-time employment compared to those who earn less than £500 per month. In contrast, for higher earners (above £2,000 per month), pay does not appear to influence parents' employment status after childbirth. We might conjecture that this reflects a key issue for many parents around how to combine work and family with the financial resources that are available to them. Compared to the lowest earners, those with slightly higher earnings are financially more able to switch to part-time employment to enable one parent to care for the child. However, these parents may not have the financial resources to be able to afford childcare, which necessitates one parent (most likely the mother) switching from full-time to part-time employment. In contrast, parents with greater financial resources (higher pay) may have greater ability to pay for childcare to facilitate a return to full-time employment. So, this finding may be explained by the lack of affordable childcare that acts as a barrier for many lower earning parents returning to full-time employment after leave, a barrier that is not faced by more affluent households that are more able to facilitate work and family for both parents through utilising childcare provision.

Table 4. The probability of switching employment status.

	Men & women (1)	Women (2)
Sex		
Women	0.820***	
	(0.107)	
Age group		
25-29	-0.311	-0.411**
	(0.179)	(0.204)
30-34	-0.114	-0.315
	(0.171)	(0.197)
35-39	-0.170	-0.439**
	(0.178)	(0.210)
40-44	-0.548**	-0.787**
	(0.233)	(0.283)
45+	0.004	-0.284
	(0.32)	(0.620)
Marital Status		
Married/equiv.	-0.292	-0.323
	(0.195)	(0.201)
Sep/Div./Wid.	-0.782	-0.725
	(0.528)	(0.532)
Education		
Diploma/equiv.	-0.286**	-0.120
	(0.142)	(0.167)
A level/equiv.	-0.070	-0.070
	(0.134)	(0.174)
GCSE/equiv.	-0.265**	-0.286**
	(0.113)	(0.139)
None of the above	-0.258	-0.201
	(0.156)	(0.194)
Area		
Rural area	0.045	0.121
	(0.098)	(0.121)
Gross pay per month		
501-1000	0.475**	0.448**
	(0.177)	(0.182)
1001-1500	0.422**	0.469**
	(0.184)	(0.197)
1501-2000	0.288	0.567**
	(0.200)	(0.221)
2001-2500	-0.003	0.190
	(0.219)	(0.252)
2501-3000	-0.102	0.058
	(0.227)	(0.268)
3001-3500	-0.268	-0.011
	(0.258)	(0.304)
3501-4000	-0.089	0.303

	Men & women (1)	Women (2)
	(0.276)	(0.343)
4001+	-0.055	0.209
	(0.246)	(0.347)
Constant	-1.452***	-0.544
	(0.301)	(0.288)
Number of obs.	2364	924

4.4 The impact of parental leave on pay

Lastly, we explore whether parental leave affects the key labour market outcome of wages. While much of the literature on the impact of parental leave on labour market outcomes (such as employment, labour market participation, and career progression) is mixed, there is a greater consensus on the issue of how parental leave affects wages. Most studies find that child-related time out of the labour market is negatively associated with earnings. A negative relationship between parental leave and wages would therefore imply that the positive benefits of greater labour market attachment and female employment are outweighed by the negative effects of human capital depreciation which leads to lower productivity, lower wages and reduced career progression.

Table 5 displays the results of the wage equations, for men and women together (Columns 1 and 2), and for men and women separately (Columns 3 and 4). Interestingly, we find a positive association between taking leave and gross pay for men and women together and for men separately. However, for women, taking child-related leave does not impact upon their pay. We, therefore, find no evidence of a wage penalty from women taking leave. Perhaps this reflects the ability of the job protection aspect of maternity leave in the UK to allow women to return to their pre-birth position in the labour market, thus successfully protecting women from occupational downgrading and diminished labour market outcomes.

Table 5. The effect of parental leave on earnings.

	Men & women (1)	Men & women (2)	Men (3)	Women (4)
Leave taken	0.440***	0.437***	0.550***	-0.106
	(0.098)	(0.098)	(0.109)	(0.229)
Sex				
Women	-2.134***	-2.162***		
	(0.067)	(0.068)		
Age group				
25-29	0.561***	0.547***	0.729***	0.474***
	(0.11)	(0.109)	(0.229)	(0.117)
30-34	1.073***	1.061***	1.530***	0.730***
	(0.11)	(0.109)	(0.225)	(0.119)
35-39	1.362***	1.348***	1.602***	1.240***
	(0.119)	(0.119)	(0.23)	(0.144)
40-44	1.541***	1.515***	1.866***	1.222***
	(0.143)	(0.143)	(0.245)	(0.207)
45+	1.737***	1.708***	1.983***	1.468**
	(0.238)	(0.237)	(0.313)	(0.588)
Marital Status				
Married/equiv.	0.315***	0.284***	1.279	0.317**
	(0.143)	(0.142)	(0.702)	(0.133)
Sep/Div./Wid.	0.268	0.222	-1.647**	0.252
	(0.398)	(0.401)	(0.709)	(0.399)
Education				
Diploma/equiv.	-1.028***	-1.044***	-1.059***	-0.999***
	(0.1)	(0.101)	(0.158)	(0.129)
A level/equiv.	-1.114***	-1.100***	-1.108***	-1.066***
	(0.103)	(0.104)	(0.144)	(0.148)
GCSE/equiv.	-1.70***	-1.685***	-1.733***	-1.586***
	(0.077)	(0.081)	(0.115)	(0.110)
None of the above	-1.386***	-1.376***	-1.473***	-1.262***
	(0.108)	(0.109)	(0.147)	(0.157)
Area				
Rural area	0.303***	0.307***	0.572***	0.036
	(0.075)	(0.075)	(0.104)	(0.107)
Sector				
Public/nat. company		-0.185	-0.707	0.765
		(0.344)	(0.375)	(0.609)
Central/local govt/armed forces		-0.017	-0.357***	0.274**
		(0.081)	(0.107)	(0.120)
University/other education		0.287	-0.244	0.653**
		(0.203)	(0.321)	(0.267)
Health inst. /NHS		0.283**	0.433**	0.324**
		(0.111)	(0.203)	(0.134)
Charity/other		-0.333**	-0.413	-0.229
		(0.149)	(0.228)	(0.196)

	Men & women (1)	Men & women (2)	Men (3)	Women (4)
Constant	4.548*** 0.197)	4.592*** (0.197)	3.226*** (0.721)	3.035*** (0.266)
Number of obs.	3841	3841	1980	1861

We explore one last aspect of the effect of parental leave on women's labour market outcomes. In European countries, parental leave entitlement is typically universal, long and paid, and therefore much of the debate in Europe centres on whether parental leave should be short or long. The effects of longer leave periods on labour market outcomes has mainly been investigated within the European context, and these studies commonly find that duration leave is a crucial factor in determining how leave influences subsequent labour market outcomes; in particular, longer leave reduces female labour market attachment and female wages. To investigate whether longer leave has a differential effect on women's wages after leave, we estimate the association between taking leave beyond paid maternity leave entitlement (39 weeks) and gross pay. Table 6 (Column 2) reveals that women who take longer leaves (measured as leave length beyond paid maternity leave) do suffer a negative effect on their pay. This supports the argument that the driving factor in how parental leave affects mothers' labour market outcomes is the length of the leave period taken. Our findings are in keeping with the argument that leaves of short or moderate length have no effect on female earnings, while lengthier leaves are associated with substantial wage reductions. The implication is that the penalties attached to human capital depreciation and lower productivity (through longer career interruptions) are greater than the positive benefits of job protection and continued labour market attachment when leave is long. It is also relevant to note here that longer periods of leave by mothers may be interpreted by employers as a signal of lower commitment by women to their careers, thereby resulting in reduced opportunities for training and human capital accumulation upon return to work, which will further contribute to lower career progression and wages for woman across their working lives.

Table 6. The effect of longer parental leave on earnings.

	Men & women (1)	Women (2)
Mat/ Paternity leave		
More than 39 weeks leave	-0.638*** (0.158)	-0.630*** (0.159)
Sex		
Women	-1.737*** (0.113)	
Age group		
25-29	0.738*** (0.179)	0.656** (0.222)
30-34	1.448*** (0.175)	1.125*** (0.217)
35-39	1.555*** (0.184)	1.331*** (0.266)
40-44	1.890*** (0.204)	1.559*** (0.343)
45+	2.078*** (0.317)	2.867*** (0.339)
Marital Status		
Married/equiv.	0.811** (0.257)	0.883*** (0.219)
Sep/Div./Wid.	1.128 (0.853)	1.198 (0.812)
Education		
Diploma/equiv.	-1.275*** (0.142)	-1.262*** (0.248)
A level/equiv.	-1.283*** (0.142)	-1.433*** (0.26)
GCSE/equiv.	-1.926*** (0.110)	-1.928*** (0.194)
None of the above	-1.295*** (0.150)	-1.388*** (0.284)
Area		
Rural area	0.284** (0.101)	0.022 (0.180)
Sector		
Public/nat. company	-0.178 (0.491)	2.113 (1.080)
Central/local govt/armed forces	-0.087 (0.104)	0.368 (0.212)
University/other education	-0.117 (0.261)	0.363 (0.429)
Health inst. /NHS	0.124 (0.161)	0.083 (0.261)
Charity/other	-0.385 (0.212)	-0.170 (0.314)
Constant	4.367***	2.699***

	Men & women (1)	Women (2)
	(0.326)	(0.344)
Number of obs.	2,030	592

5. Caveats

This project uses the UK Household Longitudinal Study (UKHLS), a UK-wide representative survey. While our results support previous findings in the literature, it is important to consider the following when interpreting the results. Across the 10 UKHLS waves that form the base of the econometric analysis, there is no measure of shared parental leave, which does not allow us to explore the effect of the 2015 Shared Parental Leave policy implementation. In several cases as mentioned above, the relatively small number of observations should be considered when interpreting the results. Although the UKHLS is a rich dataset, allowing research to inform policy, it does not allow household follow-up over time (waves). This aspect has limited the potential of answering several of the research questions set in the project proposal, namely "How parental leave has led to greater within-family gender equality in terms of labour market attachment?", and "How has parental leave impacted on flexible working hours?"

6. Conclusion

This research project has sought to speak into the gap in current knowledge regarding the impact of parental leave in Northern Ireland, and more broadly the UK. The aim of this report has been to assess the relationship between parental leave and key demographic characteristics and labour market outcomes. To do this, we have investigated: (i) the main determinants of leave-taking and leave duration; (ii) what influences the decision to switch to part-time employment as a coping strategy to combine work and family responsibilities; and (iii) how taking parental leave impacts upon the key labour market outcome of wages.

In general, our findings support much of the existing empirical literature. One consistent result is that married parents are more likely to take parental leave than single parents. In addition, parents who work in a government job or the NHS have higher probabilities of

taking parental leave compared to those working in private sector companies. Interestingly, the effect of pay on taking leave is stronger for men than for women, and this perhaps suggests that men are more likely to take parental leave once they have achieved higher levels of pay and greater career stability, whereas this doesn't seem to be the case for women.

Individual pay is also an important factor in influencing the duration of leave. Higher levels of pay are associated with shorter leave periods. If we interpret pay as the opportunity cost of taking time out of work, then higher wages represent greater opportunity costs, and this creates the incentive to return to work sooner after childbirth. For women, higher pay also acts to reduce the likelihood that a mother will extend maternity leave beyond the paid period of 39 weeks.

Given that part-time employment is one of the most common strategies that mothers use to facilitate work with childcare, it is important to understand what influences this decision. As expected, it is women who are more likely to adopt this strategy compared to men, in keeping with the male breadwinner model that still prevails in the UK. It appears to be older mothers who are less likely to switch from full-time to part-time employment after leave, and also mothers with higher pay. These findings point to women with more career progression choosing to continue in full-time employment after leave, and women with greater financial resources being more able to pay for childcare to enable a return to full-time employment after childbirth. These are important findings, as they support the common narrative in the UK that the lack of affordable childcare continues to act as a barrier for lower-earning and younger mothers to return to full-time employment. Given that the strategy of moving to part-time employment is found to negatively impact or 'scar' women in terms of future career progression and labour market outcomes, this has implications for both the gender pay gap and also the pay gap between mothers who do return to work full-time and those who don't.

Lastly, our analysis speaks into one of the most important debates in the context of parental leave, which is how parental leave impacts upon wages and whether this is impacted by the duration of the leave. Most interestingly, for mothers, we find that the

wage penalty of taking parental leave is only evidenced for mothers who take longer leaves (more than 39 weeks). We therefore confirm previous studies which find that short or moderate leaves have no effect on female earnings, but lengthier leaves are associated with substantial wage reductions.

This research on parental leave sits within several important policy contexts. The first context is the Department for the Economy's '10X Economy' vision to promote innovation, inclusivity, and sustainability within the Northern Irish economy. As stated earlier, the Northern Irish economy faces persistently high levels of economic inactivity, and female employment is lower compared to the rest of the UK. If parental leave is one policy tool that can promote mothers to retain their labour market attachment, and if parental leave can be designed in such a way as to not detrimentally affect mothers' labour market outcomes after leave, then parental leave can be seen as an important policy solution to promote, and facilitate, female employment alongside childrearing. Future research to investigate the effect of shared parental leave should be conducted to add valuable insights into whether or not shared parental leave can successfully encourage more fathers to take parental leave, as a means to increase gender equality in childrearing responsibilities and improve mothers' labour market outcomes. This research should be possible once the shared parental leave data becomes available in the UKHLS dataset. So, the first policy context is the ability of parental leave to mitigate the pressures and barriers that confront parents in balancing work and home time in the months following the birth of a child. This work-family conflict has become more pressing as the labour market participation of women has increased sharply in recent decades.

The second, broader policy context where parental leave is vitally important is in relation to the demographic shifts that are taking place in many countries, and the resultant ageing population problems that have arisen. In the UK, the fertility rate is well below the replacement fertility level needed for the UK to 'naturally' replace its population. Fertility in the UK has dropped dramatically, with women having fewer children, and this has occurred alongside rising economic activity and employment rates for women. It is in this context of rising female employment and falling fertility rates that work-family policies

are increasingly relevant and high on the political agenda. As a work-family policy, parental leave is seen as one way to resolve the tension created between labour market participation and childbearing, especially for women.

Overall, there are strong arguments in favour of parental leave policies: proponents will argue that parental leave can promote healthier children, improve the position of women in the workplace, help households address the increasing conflict between work and family, and promote within-family gender equality in terms of labour market attachment. These social and economic benefits are behind the adoption of parental leave polices in many OECD countries. However, as discussed in this research project, of fundamental importance to the success of parental leave polices is their design. In particular, the key elements of a parental leave policy in terms of generosity and length will be crucial in determining how successful parental leave policies are in achieving their social and economic goals.